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Mental health and substance use risks and resiliencies in a U.S. sample of transgender and gender diverse adults

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Abstract

Purpose Victimization contributes to mental and behavioral health inequities among transgender and gender diverse (TGD) people, but few studies have simultaneously examined health-promoting resiliencies. We sought to identify classes of risk and resilience among TGD adults, assess characteristics associated with these classes, and examine their relationship with mental health and substance use outcomes.

Methods Cross-sectional data were from the 2015 US Transgender Survey, a non-probability study including 26,957 TGD adults. Using latent class analysis, we classified patterns of vulnerability and resilience based on risk (past-year denial of equal treatment, verbal harassment, physical attack, bathroom-related discrimination; lifetime sexual assault, intimate partner violence) and protective (activism; family, work, classmate support) factors. Regression models were fit to (1) determine the association between sociodemographic and gender affirmation characteristics and latent classes; (2) model associations between latent classes and mental health (current serious psychological distress, past-year and lifetime suicidal thoughts and attempts, and lifetime gender identity/transition-related counseling) and substance use (current binge alcohol use, smoking, illicit drug use; past-year drug/alcohol treatment) outcomes.

Results Three latent classes were identified: high risks, with activism involvement ("risk-activism," 35%); low risks, with not being out about one's TGD identity ("not-out," 25%); and low risks, with high family support ("family-support," 40%). Gender affirmation and sociodemographic characteristics, such as race/ethnicity and sexual orientation, were associated with latent classes. Risk-activism class membership was associated with higher odds of negative mental health and substance use outcomes, while the family-support class had lower odds of these outcomes.

Conclusions Interventions leveraging family support, and policy protections from discrimination and victimization, may promote TGD mental and behavioral health.

Keywords Transgender · Mental health · Substance use · Resilience · Resistance · Activism

Introduction

Transgender and gender diverse (TGD) people, individuals whose gender identity differs from their sex-assigned-at-birth, are disproportionately burdened by poor mental health and substance use outcomes [1–4]. Compared with cisgender (i.e., non-transgender) people, TGD individuals have heightened risk of psychological distress, depression, and suicidality [1–3]. Studies also demonstrate increased binge drinking and illicit drug use among TGD compared with cisgender populations [4]. Given these widespread disparities, efforts to address the mental and behavioral health needs of TGD people are necessary to promote health equity.

One integral component to improving mental health and wellbeing for TGD people is gender affirmation, the social

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process of receiving recognition and support in one's gender identity and expression [5, 6]. Gender affirmation involves social (e.g., name and pronoun), psychological (e.g., feeling validated in one's gender identity), medical (e.g., hormone therapy, surgery), and legal (e.g., legal name and gender marker change) processes [6]. Needs for gender affirmation vary across individuals [5]—for instance, not all TGD people desire medical gender affirmation, and those who do may desire different elements of it. Medical gender affirmation through hormone therapy, for those who seek it, is associated with improvements in quality of life and lowered depression and anxiety symptoms [7]. Gender-affirming surgeries have also been linked to positive psychological effects such as decreased suicidal ideation, and reductions in substance use behaviors like tobacco smoking [8]. Similarly, legal gender affirmation through changes to state identification documents (IDs) and passports is protective against depression, anxiety, and distress [9].

The minority stress model, originally applied to understand disparate mental health outcomes among sexual minorities, can also be applied to inequities in TGD health [10]. According to this model, chronic social stress from unique exposures resulting from occupying a marginalized social position, such as experiences of stigma and discrimination, leads to psychological distress and poorer mental health. It is well documented that TGD people experience widespread harassment, physical assault, sexual violence, and other forms of victimization [11]. TGD research has consistently linked stigma-related stress, from the individual to structural level, to negative mental health outcomes, such as depressive symptoms and suicidality [11, 12]. Minority stressors additionally contribute to increased substance use as a coping mechanism in TGD people [4, 13].

In the face of adverse experiences, though, development of resilience through within-group identity, social support, and positive coping processes may mitigate effects of minority stressors [11, 12, 14, 15]. For example, Puckett et al. identified four profiles of social support among transgender individuals based on levels of community connectedness and support from family and friends. The authors found that individuals belonging to the class with high community connectedness and support had lower levels of depression compared with those in other classes [16]. In addition, engaging in activism has been identified as an empowering component of resilience for many TGD people [17]. Though activism can serve as a means of community connectedness and support, as well as facilitate access to gender-affirming legal and healthcare resources [18], its role in relation to health promotion has rarely been studied [19, 20].

Moreover, while much mental health research has focused on risk, fewer studies have simultaneously examined the effects of both risk and protective factors on TGD health [19, 21–28]. Among these studies that included both risk

and protective factors, exposure to risk is generally measured through experiences of discrimination, though inclusion of other dimensions of victimization, such as intimate partner violence [22], may provide a more comprehensive assessment of risk. Furthermore, most of these studies have relied on small, community-based samples [29]. Even less research has investigated multiple forms of both risk and resilience in regards to substance use outcomes, with inconsistent findings across studies [26, 30, 31].

In addition, understanding sociodemographic correlates of risk and resilience can help inform development of targeted interventions. Characterizing the subgroups who are most and least likely to experience risk and resilience may provide information on the populations whom individual and interpersonal interventions should center to reduce the effects of stigma. Though results are mixed, prior research generally has identified racial minority status and lower education and income as correlates of discrimination within TGD populations [26, 32–35]. Meanwhile, limited research has studied sociodemographic factors related to resilience, with varying operationalizations of resilience across studies. The aforementioned study by Puckett et al. found no differences by gender identity, race/ethnicity, sexual orientation, education, or age between latent classes based on community connectedness and family and friend support [16]. Bariola et al. reported that higher income and more frequent contact with sexual/gender minority peers were associated with a greater Brief Resilience Scale score, while sexual minority status was generally associated with lower resilience; no significant associations were observed for gender identity, age, and education [36]. Lelutiu-Weinberger et al. examined resilience through a latent construct based on legal, medical, and familial gender affirmation [26]. Older TGD individuals and those with higher education were more likely to report affirmation, while sexual minority and Native American individuals were generally less likely to report affirmation relative to heterosexual and white participants, respectively. Differing findings on whether race/ethnicity, sexual orientation, age, and education are associated with resilience suggest more work is needed [16, 26, 36].

To address these gaps, we analyzed data from the largest national study to date examining the lives of TGD people across the United States (U.S.). We classified patterns of vulnerability and resilience, based on a range of risk (denial of equal treatment, verbal harassment, physical attack, bathroom-related discrimination, sexual assault, and intimate partner violence) and protective (activism and family, work, and classmate support) factors. We then described sociodemographic and gender affirmation characteristics (medical affirmation through hormone treatment and surgery, legal affirmation through name and gender listed on IDs) of these risk and resilience classes and tested their association with mental health and substance use outcomes.

Methods

Study design and population

The U.S. Transgender Survey (USTS) is a cross-sectional, non-probability study of TGD adults residing in the U.S. and U.S. territories and military bases [37]. Conducted online, the study included those ages ≥ 18 who identified as transgender, trans, genderqueer, nonbinary, or other identities on the transgender identity spectrum. Data collection occurred August 19–September 21, 2015. Upon removal of ineligible participants and duplicate, incomplete, or illogical responses [37], the final sample comprised 27,715 participants (71% of 38,916 initial respondents). The University of California—Los Angeles North General Institutional Review Board approved the study. Participants provided online consent.

Measures

Risk

Six binary risk indicators were operationalized. Participants reported whether they had been denied equal treatment, verbally harassed, and physically attacked due to their transgender status or gender identity in the past year. Participants were considered to have experienced any bathroom discrimination in the past year if they reported being asked if or told that they were using the wrong bathroom, stopped from entering the bathroom, or verbally harassed or physically attacked when accessing a bathroom. Participants were asked if they had ever experienced sexual assault and, separately, intimate partner violence (IPV).

Resilience

Six resilience indicators were categorized. Participants reported whether they participated in political activism with other TGD people. Participants also reported how supportive, on average, their immediate family whom they grew up with, current co-workers, and current classmates were of their transgender identity, with response options of very supportive, supportive, neither supportive nor unsupportive, unsupportive, and very unsupportive. Family, coworker, and classmate support was categorized as supportive (collapsing very supportive and supportive), neutral (neither supportive nor unsupportive), or unsupportive (collapsing unsupportive and very unsupportive) according to these responses; categorized as not-out if no one in that group knew the participant was transgender; or categorized as not applicable (NA) if no one in that group was in the participant's life. Participants

reported whether they had experienced any accepting behaviors from their spiritual/religious community over the past year. Participants additionally indicated whether they socialized with other TGD people (e.g., in person, online, or in support groups).

Sociodemographic and gender affirmation characteristics

Sociodemographic

Participants reported their sex-assigned-at-birth (female, male) and chose the term best describing their current gender identity: cross-dresser, woman, man, trans woman, trans man, or nonbinary/genderqueer. Responses to these questions were used to categorize participants into five gender categories of cross-dressers, trans women, trans men, genderqueer/nonbinary (assigned-female-at-birth, AFAB), and genderqueer/nonbinary (assigned-male-at-birth, AMAB). Race/ethnicity, age, sexual orientation, U.S. census region, citizenship status, education, employment, poverty level, and marital status were categorized as indicated in Table 1.

Gender affirmation

Participants were asked about their desires for and receipt of gender affirmation. For medical gender affirmation, participants marked whether they had ever wanted and ever had hormone treatment and puberty blocking hormones for their gender identity/transition. Participants also selected surgical procedures, from a list of various procedures by sex-assigned-at-birth, that they had ever had or wanted. Hormone treatment and surgical procedure were coded as yes, at least one treatment (indicating that medical gender affirmation was at least partially met, with at least one needed treatment obtained); no, never wanted any (indicating no need for medical gender affirmation); and no, but wanted one (indicating unmet need for medical gender affirmation). Regarding legal gender affirmation, participants answered whether all, some, or none of their IDs and records (e.g., birth certificate, drivers' license, passport) listed the name and gender they preferred, indicating fully met, inadequately met, and fully unmet need for legal gender affirmation, respectively.

Outcomes

Mental health outcomes

Nonspecific psychological distress was measured with the validated 6-item Kessler Psychological Distress Scale (K6) [38], a global measure of distress developed based on depressive and anxiety-related symptoms. The K6 assessed how often over the past 30 days respondents felt so sad that

Table 1 Descriptive characteristics of transgender and gender diverse adult participants in the observed and imputed sample, U.S. Transgender Survey

	Analytic group[a]	
	Observed (n = 26,957)[b]	Imputed (n = 26,957)[c]
Demographics		
Gender identity		
Transgender man	7950 (29.49)	7950 (29.49)
Transgender woman	9238 (34.27)	9238 (34.27)
Genderqueer/nonbinary (AFAB)	7844 (29.10)	7844 (29.10)
Genderqueer/nonbinary (AMAB)	1925 (7.14)	1925 (7.14)
Race/ethnicity		
White	21,980 (81.54)	21,980 (81.54)
Alaskan Native/American Indian	314 (1.16)	314 (1.16)
Asian/Native Hawaiian/Pacific Islander	767 (2.85)	767 (2.85)
Biracial/Multiracial/Not listed	1533 (5.69)	1533 (5.69)
Black	782 (2.90)	782 (2.90)
Latinx	1451 (5.38)	1451 (5.38)
Middle Eastern/North African	130 (0.48)	130 (0.48)
Age group in years		
18–24	11,781 (43.70)	11,781 (43.70)
25–44	10,791 (40.03)	10,791 (40.03)
45–64	3749 (13.91)	3749 (13.91)
≥ 65	636 (2.36)	636 (2.36)
Sexual orientation		
Heterosexual	3045 (11.30)	3045 (11.30)
Asexual	2952 (10.95)	2952 (10.95)
Bisexual	3897 (14.46)	3897 (14.46)
Gay/lesbian	4532 (16.81)	4532 (16.81)
Pansexual	5012 (18.59)	5012 (18.59)
Queer	5693 (21.12)	5693 (21.12)
Not listed	1826 (6.77)	1826 (6.77)
U.S. census region		
West	8374 (31.06)	8374 (31.06)
Northeast	5555 (20.61)	5555 (20.61)
Midwest	5571 (20.67)	5571 (20.67)
South	7397 (27.44)	7397 (27.44)
None	60 (0.22)	60 (0.22)
Citizenship status		
US citizen by birth	25,968 (96.33)	25,968 (96.33)
US citizen, naturalized	536 (1.99)	536 (1.99)
Documented resident	409 (1.52)	409 (1.52)
Undocumented resident	44 (0.16)	44 (0.16)
Education		
< High school	892 (3.31)	892 (3.31)
High school graduate	3384 (12.55)	3384 (12.55)
Some college	10,300 (38.21)	10,300 (38.21)
Associate's degree	2244 (8.32)	2244 (8.32)
Bachelor's degree	6724 (24.94)	6724 (24.94)
Graduate/professional degree	3413 (12.66)	3413 (12.66)
Employment status		
Employed	17,453 (65.07)	17,532 (65.04)
Unemployed	3560 (13.27)	3583 (13.29)
Out of labor force	5808 (21.65)	5842 (21.67)
Living in/near poverty	8563 (33.49)	9138 (33.90)
Marital status		
Married	4562 (16.96)	4574 (16.97)
Widowed/divorced/separated	3052 (11.35)	3060 (11.35)
Never married	19,279 (71.69)	19,323 (71.68)

Table 1 (continued)

	Analytic group[a]	
	Observed (*n*=26,957)[b]	Imputed (*n*=26,957)[c]
Gender affirmation		
Hormone treatment		
Yes, at least one treatment	13,067 (48.97)	13,177 (48.88)
No, never wanted any	5056 (18.95)	5132 (19.04)
No, but want one	8560 (32.08)	8647 (32.08)
Surgical procedures		
Yes, at least one procedure	8917 (33.74)	9046 (33.56)
No, never wanted any	3758 (14.22)	3826 (14.19)
No, but want one	13,757 (52.05)	14,085 (52.25)
Gender and name correct on IDs		
All	2765 (10.31)	2780 (10.31)
Some	5419 (20.20)	5434 (20.16)
None	18,645 (69.50)	18,743 (69.53)
Risk factors		
Verbal harassment	12,651 (47.10)	12,700 (47.11)
Bathroom-related discrimination	7069 (26.32)	7087 (26.29)
Sexual assault	12,577 (46.75)	12,601 (46.74)
Intimate partner violence		
Yes	9354 (35.12)	9473 (35.14)
NA	2879 (10.81)	2906 (10.78)
Resilience factors		
Activism	8615 (31.99)	8622 (31.98)
Family support		
Supportive	12,228 (45.46)	12,254 (45.46)
Neutral	4446 (16.53)	4457 (16.53)
Unsupportive	3742 (13.91)	3749 (13.91)
Not out	5482 (20.38)	5494 (20.38)
NA	998 (3.71)	1002 (3.72)
Work support		
Supportive	7460 (27.88)	7503 (27.83)
Neutral	3131 (11.70)	3150 (11.68)
Unsupportive	399 (1.49)	404 (1.50)
Not out	7879 (29.45)	7933 (29.43)
NA	7888 (29.48)	7968 (29.56)
Classmate support		
Supportive	4343 (16.31)	4387 (16.28)
Neutral	3001 (11.27)	3028 (11.23)
Unsupportive	366 (1.37)	373 (1.38)
Not out	6163 (23.15)	6221 (23.08)
NA	12,747 (47.89)	12,948 (48.03)

[a]Data are expressed as number (percentage) of participants

[b]Data are missing for 136 participants (0.50%) for employment status, 1391 (5.16%) for poverty status, 64 (0.24%) for marital status, 274 (1.02%) for hormone treatment, 525 (1.95%) for surgical procedures, 128 (0.47%) for correct gender and name on IDs and records, 97 (0.36%) for verbal harassment, 99 (0.37%) for bathroom discrimination, 57 (0.21%) for sexual assault, 322 (1.19%) for IPV, 61 (0.23%) for family support, 200 (0.74%) for work support, 337 (1.25%) for classmate support, and 23 (0.09%) for activism

[c]Means of frequencies and percentages are calculated for 20 imputations

nothing could cheer them up, nervous, restless or fidgety, hopeless, that everything was an effort, and worthless. Items were scored on a scale of 0–4, with a total score of ≥ 13 out of 24 indicating serious psychological distress [38].

Participants also reported past-year and lifetime suicide ideation and attempts. Participants indicated whether they had ever received healthcare services of counseling or therapy related to their gender identity/transition.

Substance use outcomes

Individuals engaging in binge drinking were defined as those who reported consuming ≥ 5 drinks on the same occasion within the past 30 days [39]. Participants who currently smoked were defined as those who had smoked a cigarette within the past 30 days. Illicit drug use included use of illegal drugs ("e.g. cocaine, crack, heroin, LSD, meth, inhalants like poppers or whippits") or misuse of prescription drugs in the past 30 days. Participants reported whether they had visited or used services of a drug or alcohol treatment program in the past year.

Statistical analysis

Analyses excluded participants identifying as cross-dressers ($n = 758$), as these individuals likely have fundamentally different experiences of risk and resilience compared with TGD participants ($n = 26,957$) [40]. Using SAS, version 9.4 (SAS Institute Inc), we conducted latent class analysis (LCA) to identify risk and resilience profiles. LCA is a statistical method that assesses a set of observed variables to classify mutually exclusive, unobserved subgroups of individuals, based on individuals' responses to these variables [41]. Participants with missing values for indicator variables ($< 1.5\%$) were included in these models, as LCA handles missing data through full-information maximum-likelihood estimation.

We specified a series of latent class models with one through six classes and 100 iterations performed for each model using randomly generated starting values. Variables with low item response probabilities < 0.50 across all classes were removed from models to improve parsimony. We selected the optimal model considering a combination of model identification, interpretability, and fit statistics (i.e., information criteria, entropy). The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) compare the fit of competing models while penalizing for the number of estimated parameters, with lower AIC and BIC values indicating better fit [41]. Entropy, a measure of classification error, was also used to assess model fit, with higher entropy values approaching 1 indicating clearer distinction between classes [42]. Using the optimal model, individuals were classified to the latent class for which they had the maximum posterior probability of membership.

Missing data on covariates and outcomes were then completed with multiple imputation by chained equations using the mice package in R, version 1.2.1335 (R Project for Statistical Computing), to create 20 imputed datasets with 5 iterations. All subsequent analyses were conducted in SAS using appropriate procedures to analyze multiply imputed data. We estimated the associations between latent classes and potential sociodemographic and gender affirmation characteristics with multinomial logistic regression. We used multivariable logistic regression, adjusted for all sociodemographic and gender affirmation characteristics listed previously, to determine whether latent classes were associated with mental health and substance use outcomes. Bonferroni correction was applied to the 95% confidence intervals (CIs) estimated in regression analyses to account for multiple testing [43] (i.e., 13 comparisons made in the multinomial regression and 10 comparisons across logistic regression models).

Results

Among the 26,957 respondents, 29% were transgender men, 34% transgender women, 29% genderqueer/nonbinary and AFAB, and 7% genderqueer/nonbinary and AMAB (Table 1). Most participants were non-Latinx white (82%) and between ages 18 and 45 years (84%). Almost 40% had completed some college. A third were living at or near poverty.

LCA model selection and membership

Twelve manifest variables of risk and resilience were initially included for LCA model selection, examining models with one-to-six classes. Physical attack and denial of equal treatment were removed from models due to low item response probabilities (< 0.05 across each class; analyses available upon request). Two variables of socialization with TGD people and accepting behaviors from spiritual/religious communities were also excluded, as initial analyses indicated high probabilities of socialization and of non-involvement in religious communities in each class, with little between-class variation.

Latent class models with one-to-six classes were refit among the eight remaining manifest variables and compared to select the optimal model (Online Resource 1). The four- and five-class solutions could not be sufficiently identified, with 40% and 30%, respectively, of the 100 sets of random starting values converging to the maximum-likelihood solution. Entropy, or classification certainty, was similar across two-, three-, and six-class models. The AIC and BIC suggested that the six-class model was superior. However, each class of the three-class model was more distinguishable from the others and could be more meaningfully labeled than that of the six-class model. We ultimately selected the three-class model because it had adequate information criteria, was well identified, and provided the most interpretable solution.

Table 2 shows class membership and item response probabilities. The classes were characterized by: (1) high risks, with activism involvement; (2) low risks, with high family support; and (3) low risks, with not being out about

one's TGD identity. The "high risks, activism involvement" class (35% of the sample), henceforth referred to as "risk-activism," included participants who were likely to have experienced verbal harassment (0.85), bathroom-related discrimination (0.53), sexual assault (0.71), and intimate partner violence (0.54). Participants had low probabilities for resilience indicators of family, work, and classmate support, but were likely to be involved in activism with other TGD people (0.51). Participants in the "low risks, high family support" class (40% of the sample), henceforth referred to as "family-support", had the lowest probabilities of risk indicators compared with the other classes, and the highest probability of reporting supportive families (0.59). The "low risks, not out" class (25% of the sample), henceforth referred to as "not-out," was also characterized by lower probabilities of the risk indicators compared with the risk-activism class. Considering the resilience indicators, the not-out class had moderate probability of not being out about one's TGD identity to family (0.50) and high probability of not being out at work (0.82) and in school (0.73).

Sociodemographic and gender affirmation correlates of latent classes

All sociodemographic and gender affirmation variables were associated with latent class membership in adjusted multinomial regression (Table 3). For example, compared with white respondents, biracial/multiracial/other race participants had greater odds of membership in the risk-activism class relative to the not-out class (aOR = 1.27; 95% CI = 1.03–1.57) and relative to the family-support class (aOR = 1.42; 95% CI = 1.18–1.70). Alaskan Native/American Indian individuals had over twice the odds of membership in the risk-activism class than the family-support class (aOR = 2.13; 95% CI = 1.44–3.15). In general, sexual minorities had greater odds of membership in the risk-activism class than the family-support class, relative

Table 2 Parameter estimates and standard errors (SE) of three latent classes of risks and resiliencies in transgender and gender diverse adults, U.S. Transgender Survey

	Latent classes		
	High risks, activism involvement	Low risks, high family support	Low risks, not-out
Class membership probabilities (SE)	0.35 (0.01)	0.40 (0.01)	0.25 (0.01)
Item–response probabilities[a] (SE)			
Risk			
Verbal harassment	**0.85** (0.01)	0.23 (0.01)	0.33 (0.01)
Bathroom-related discrimination	**0.53** (0.01)	0.11 (0.01)	0.14 (0.01)
Sexual assault	**0.71** (0.01)	0.30 (0.01)	0.40 (0.01)
Intimate partner violence			
Yes	**0.54** (0.01)	0.24 (0.01)	0.26 (0.01)
NA	0.03 (0.00)	0.12 (0.00)	0.19 (0.01)
Resilience			
Activism	**0.51** (0.01)	0.24 (0.01)	0.18 (0.01)
Family support			
Supportive	0.43 (0.01)	**0.59** (0.01)	0.27 (0.01)
Neutral	0.20 (0.00)	0.16 (0.00)	0.13 (0.00)
Not out	0.12 (0.00)	0.10 (0.00)	**0.50** (0.01)
NA	0.04 (0.00)	0.05 (0.00)	0.02 (0.00)
Work support			
Supportive	0.35 (0.01)	0.38 (0.01)	0.01 (0.00)
Neutral	0.19 (0.00)	0.11 (0.00)	0.02 (0.00)
Not out	0.13 (0.01)	0.11 (0.01)	**0.82** (0.01)
NA	0.29 (0.01)	0.39 (0.01)	0.14 (0.01)
Classmate support			
Supportive	0.20 (0.01)	0.19 (0.00)	0.06 (0.00)
Neutral	0.17 (0.00)	0.10 (0.00)	0.06 (0.00)
Not out	0.07 (0.00)	0.06 (0.00)	**0.73** (0.01)
NA	**0.52** (0.01)	**0.65** (0.01)	0.14 (0.01)

[a]Probability of endorsing each item, unless otherwise indicated. Item–response probabilities greater than 0.50 appear in bold to facilitate interpretation

Table 3 Sociodemographic and gender affirmation characteristics associated with latent class membership in transgender and gender diverse adults, U.S. Transgender Survey

	Latent Classes aOR (95% CI)[a]		
	"High risks, activism involvement" vs. "Low risks, not out"[b]	"Low risks, high family support" vs. "Low risks, not out"[b]	"High risks, activism involvement" vs. "Low risks, high family support"[b]
Demographics[c]			
Gender identity			
Transgender man	Reference	Reference	Reference
Transgender woman	**0.81 (0.70, 0.94)**	**0.81 (0.71, 0.93)**	1.00 (0.89, 1.12)
Genderqueer/nonbinary (AFAB)	0.96 (0.82, 1.12)	**0.59 (0.50, 0.69)**	**1.62 (1.41, 1.87)**
Genderqueer/nonbinary (AMAB)	**0.65 (0.52, 0.81)**	**0.63 (0.51, 0.77)**	1.03 (0.85, 1.26)
Race/ethnicity			
White	Reference	Reference	Reference
Alaskan Native/American Indian	1.40 (0.89, 2.21)	0.66 (0.40, 1.07)	**2.13 (1.44, 3.15)**
Asian/Native Hawaiian/Pacific Islander	0.90 (0.67, 1.21)	0.88 (0.65, 1.17)	1.02 (0.78, 1.34)
Biracial/multiracial/not listed	**1.27 (1.03, 1.57)**	0.89 (0.72, 1.11)	**1.42 (1.18, 1.70)**
Black	0.89 (0.66, 1.19)	0.79 (0.59, 1.05)	1.12 (0.87, 1.45)
Latinx	0.88 (0.71, 1.10)	0.82 (0.67, 1.02)	1.07 (0.88, 1.30)
Middle Eastern/North African	1.29 (0.64, 2.60)	0.88 (0.42, 1.82)	1.47 (0.80, 2.69)
Age group in years			
18–24	Reference	Reference	Reference
25–44	**1.50 (1.31, 1.72)**	**1.36 (1.19, 1.56)**	1.10 (0.98, 1.23)
45–64	1.08 (0.86, 1.36)	**1.39 (1.13, 1.72)**	**0.78 (0.65, 0.93)**
≥65	0.73 (0.45, 1.17)	**1.68 (1.14, 2.46)**	**0.43 (0.30, 0.63)**
Sexual orientation			
Heterosexual	Reference	Reference	Reference
Asexual	1.09 (0.87, 1.38)	1.13 (0.92, 1.39)	0.97 (0.79, 1.18)
Bisexual	1.20 (0.97, 1.49)	1.08 (0.89, 1.30)	1.12 (0.94, 1.33)
Gay/lesbian	**1.44 (1.16, 1.77)**	**1.21 (1.00, 1.46)**	**1.19 (1.00, 1.41)**
Pansexual	**2.16 (1.76, 2.66)**	**1.35 (1.12, 1.64)**	**1.60 (1.35, 1.89)**
Queer	**3.60 (2.91, 4.45)**	**1.58 (1.30, 1.93)**	**2.27 (1.92, 2.69)**
Not listed	**2.56 (1.98, 3.31)**	**1.51 (1.18, 1.93)**	**1.69 (1.37, 2.08)**
U.S. census region			
West	Reference	Reference	Reference
Northeast	0.96 (0.83, 1.11)	0.93 (0.81, 1.07)	1.03 (0.92, 1.16)
Midwest	0.90 (0.78, 1.03)	0.89 (0.78, 1.03)	1.00 (0.89, 1.13)
South	**0.83 (0.73, 0.95)**	0.90 (0.79, 1.02)	0.93 (0.83, 1.04)
None	0.59 (0.22, 1.54)	0.56 (0.22, 1.43)	1.05 (0.40, 2.75)
Citizenship status			
US citizen by birth	Reference	Reference	Reference
US citizen, naturalized	1.04 (0.72, 1.50)	0.98 (0.69, 1.40)	1.06 (0.77, 1.44)
Documented resident	1.20 (0.81, 1.77)	0.82 (0.55, 1.23)	**1.46 (1.03, 2.07)**
Undocumented resident	1.88 (0.48, 7.28)	1.56 (0.41, 5.87)	1.20 (0.44, 3.27)
Education			
<High school	**1.41 (1.01, 1.98)**	1.36 (0.98, 1.88)	1.04 (0.79, 1.36)
High school graduate	1.12 (0.88, 1.41)	1.22 (0.98, 1.52)	0.91 (0.76, 1.10)
Some college	0.89 (0.73, 1.08)	**0.82 (0.68, 0.98)**	1.09 (0.94, 1.27)
Associate's degree	0.84 (0.66, 1.06)	0.81 (0.65, 1.02)	1.03 (0.85, 1.24)
Bachelor's degree	0.97 (0.80, 1.18)	0.98 (0.82, 1.18)	0.99 (0.86, 1.15)
Graduate/professional degree	Reference	Reference	Reference

Table 3 (continued)

	Latent Classes aOR (95% CI)[a]		
	"High risks, activism involvement" vs. "Low risks, not out"[b]	"Low risks, high family support" vs. "Low risks, not out"[b]	"High risks, activism involvement" vs. "Low risks, high family support"[b]
Employment status			
Employed	Reference	Reference	Reference
Unemployed	**1.24 (1.06, 1.45)**	**1.57 (1.35, 1.83)**	**0.79 (0.70, 0.90)**
Out of labor force	1.07 (0.94, 1.22)	**1.52 (1.34, 1.72)**	**0.71 (0.63, 0.79)**
Living in/near poverty	**1.44 (1.29, 1.62)**	1.01 (0.90, 1.13)	**1.43 (1.29, 1.57)**
Marital status			
Married	Reference	Reference	Reference
Widowed/divorced/separated	**1.97 (1.57, 2.46)**	**1.47 (1.19, 1.81)**	**1.34 (1.13, 1.57)**
Never married	**1.22 (1.04, 1.43)**	1.16 (0.99, 1.35)	1.05 (0.93, 1.20)
Gender affirmation			
Hormone treatment			
Yes, at least one treatment	Reference	Reference	Reference
No, never wanted any	**0.24 (0.20, 0.29)**	**0.33 (0.27, 0.40)**	**0.73 (0.62, 0.87)**
No, but want one	**0.32 (0.27, 0.37)**	**0.34 (0.29, 0.39)**	0.95 (0.84, 1.07)
Surgical procedures			
Yes, at least one procedure	Reference	Reference	Reference
No, never wanted any	**0.72 (0.58, 0.88)**	**0.66 (0.53, 0.81)**	1.09 (0.91, 1.31)
No, but want one	0.96 (0.82, 1.12)	**0.74 (0.64, 0.86)**	**1.29 (1.15, 1.45)**
Gender and name correct on IDs			
All	Reference	Reference	Reference
Some	**2.00 (1.59, 2.51)**	**1.32 (1.08, 1.62)**	**1.51 (1.28, 1.80)**
None	**1.92 (1.57, 2.34)**	1.08 (0.91, 1.29)	**1.77 (1.50, 2.09)**

[a]Adjusted odds ratio = aOR. 95% confidence interval = 95% CI. Bold indicates statistical significance at the alpha 0.05-level

[b]Multinomial logistic regression was used to estimate the association between sociodemographic and gender affirmation characteristics and latent classes. Estimates are adjusted for all other variables in table

[c]In general, reference groups for sociodemographic and gender affirmation characteristics were chosen, such that a variable's referent category was hypothesized to be associated with the lowest odds of risk-activism membership compared with other variable categories

to heterosexuals. Living in or near poverty was also associated with higher odds of membership in the risk-activism class compared with the not-out class (aOR = 1.44; 95% CI = 1.29–1.62) and compared with the family-support class (aOR = 1.43; 95% CI = 1.29–1.57). Regarding gender affirmation, participants who had their correct gender and name on none versus all IDs had higher odds of being in the risk-activism class compared with the not-out class (aOR = 1.92; 95% CI = 1.57–2.34) and family-support class (aOR = 1.77; 95% CI = 1.50–2.09).

Mental health and substance use outcomes

Logistic regression was used to determine whether latent classes were associated with mental health and substance use outcomes, controlling for sociodemographic and gender affirmation characteristics (Table 4). Membership in the risk-activism class compared with the not-out class

was associated with higher odds of serious psychological distress (aOR = 1.34; 95% CI = 1.20–1.48), past-year (aOR = 1.52; 95% CI = 1.37–1.68) and lifetime (aOR = 1.94; 95% CI = 1.69–2.24) suicide ideation, past-year (aOR = 1.89; 95% CI = 1.58–2.27) and lifetime (aOR = 2.04; 95% CI = 1.84–2.25) suicide attempts, and counseling related to gender identity/transition (aOR = 1.73; 95% CI = 1.54–1.95). Compared with participants in the not-out class, those in the risk-activism class also had higher odds of binge alcohol use (aOR = 1.29; 95% CI = 1.15–1.45), current smoking (aOR = 1.81; 95% CI = 1.60–2.05), current illicit drug use (aOR = 1.59; 95% CI = 1.34–1.89), and past-year drug or alcohol treatment (aOR = 1.50; 95% CI = 1.02–2.20). Results comparing the risk-activism class with the family-support class were similar, though associations were generally stronger. Compared with the not-out class, the family-support class had lower odds of poor mental health outcomes

Table 4 Associations between latent class membership and mental health and substance use outcomes in transgender and gender diverse adults, U.S. Transgender Survey

	Latent Classes aOR (95% CI)[a]		
	"High risks, activism involvement" vs. "Low risks, not out"	"Low risks, high family support" vs. "Low risks, not out"	"High risks, activism involvement" vs. "Low risks, high family support"
Mental health outcomes			
Serious psychological distress, past 30 days	**1.34 (1.20, 1.48)**	**0.65 (0.59, 0.72)**	**2.06 (1.88, 2.25)**
Suicide ideation, past year	**1.52 (1.37, 1.68)**	**0.72 (0.66, 0.80)**	**2.09 (1.92, 2.28)**
Suicide ideation, lifetime	**1.94 (1.69, 2.24)**	**0.81 (0.72, 0.91)**	**2.41 (2.13, 2.72)**
Suicide attempts, past year	**1.89 (1.58, 2.27)**	**0.72 (0.59, 0.88)**	**2.62 (2.23, 3.08)**
Suicide attempts, lifetime	**2.04 (1.84, 2.25)**	**0.79 (0.71, 0.87)**	**2.59 (2.38, 2.83)**
Counseling related to gender identity/transition	**1.73 (1.54, 1.95)**	**1.59 (1.41, 1.78)**	1.09 (0.99, 1.21)
Substance use outcomes			
Binge alcohol use, past 30 days	**1.29 (1.15, 1.45)**	**0.85 (0.75, 0.95)**	**1.53 (1.39, 1.68)**
Current smoking	**1.81 (1.60, 2.05)**	1.00 (0.88, 1.14)	**1.80 (1.63, 1.99)**
Current illicit drug use	**1.59 (1.34, 1.89)**	0.86 (0.71, 1.03)	**1.86 (1.61, 2.14)**
Drug or alcohol treatment program, past year	**1.50 (1.02, 2.20)**	0.73 (0.48, 1.11)	**2.04 (1.48, 2.81)**

[a]Adjusted odds ratio = aOR. 95% confidence interval = 95% CI. Adjusted for gender, race/ethnicity, age, sexual orientation, U.S. census region, citizenship status, education, employment status, poverty status, marital status, hormone treatment, surgical procedures, and correct name and gender on IDs. Bold indicates statistical significance at the alpha 0.05-level

and binge alcohol use, and higher odds of gender identity-related counseling.

Discussion

In this large sample of U.S. TGD adults, we classified three distinct patterns of risk and resilience characterized by risk and activism, not being out about one's TGD identity, and family support. Consistent with the minority stress model [10, 44], sociodemographic factors, such as gender identity, race/ethnicity, poverty, and sexual orientation, as well as gender affirmation factors, were associated with membership in these classes. Belonging to varying stigmatized social groups conferred unique patterns of risk and resilience for TGD adults. Over one-third of adults were in the risk-activism class, highlighting engagement with activism in the face of adversity and victimization. However, risk-activism class membership was associated with higher odds of psychological distress, suicidality, gender identity-related counseling, current substance use, and treatment for substance use. Results highlight that resistance to oppression alongside high exposure to discrimination and violence may take a toll on the health of TGD people. Forty percent of individuals were in the family-support class, characterized by high probability of family support and low probabilities of victimization. Family-support class membership was also

associated with greater odds of counseling, but lower odds of poor mental health outcomes and binge drinking, suggesting a protective role of the combination of family support with fewer experiences of risk. Taken together, these findings underscore the important impacts of victimization, resistance to victimization, and family support on TGD mental health and substance use, suggesting potential avenues for intervention.

Other TGD studies examining sociodemographic characteristics generally report comparable results to those found here. Consistent with this study, racial minority identity, lower socioeconomic status, and hormone therapy were associated with higher exposure to discrimination in prior literature [23, 32–35]. Though we found that gay/lesbian, pansexual, queer, and unlisted sexual orientation identities were associated with risk-activism class membership, other research identified null [32] or protective associations [33] between sexual minority identity and discrimination in TGD populations. These conflicting findings likely reflect our inclusion of a broader range of risk factors, consideration of risk and resilience factors simultaneously using LCA methods, and differences in the geographic regions covered by these studies.

Our work supports decades of research linking discrimination and victimization to adverse mental health outcomes [11, 12]. We further build upon evidence that factors related to resilience can promote mental health, potentially

protecting against harmful effects of gender minority stressors [21, 22, 25, 28]. While we observed that belonging to the family-support class was largely protective against substance use, past research has indicated varying associations by the type of substance used and social support. One study found that greater general social support was positively associated with use of higher risk illicit substances, while parental support showed no association [30]. Another documented that social support from family was protective of non-medical prescription drug use, while social support from friends had no effect [31]. Though victimization is a well-identified risk factor for substance abuse [13, 45], it may be that peer support also increases substance use through socialization norms within TGD communities [46], operating via separate processes than family support. Regardless of these differential support processes, though, results indicate that families may play a vital role in promoting positive psychological and behavioral health.

While the largest proportion of the sample belonged to the family-support class, a quarter of participants were assigned to a class characterized by not being out to family, classmates, and co-workers. Previous research has differentiated between stigmatized identities that are concealable (e.g., TGD identity) versus visible (e.g., race/ethnicity), and considered how individuals with concealable stigmatized identities face regular decision-making on whether to disclose this information [47]. Though identity concealment can serve to protect individuals from harm, concealment may also have negative psychological implications. In the cognitive–affective–behavioral model, Pachankis proposes that situations marked by (1) high salience of stigma, (2) likely threat of potential discovery, and (3) costly implications of discovery, activate cognitive and affective consequences (e.g., preoccupation, vigilance, anxiety, depression, and shame) which can influence behaviors (e.g., social isolation) and self-evaluations (e.g., negative self-perception) [47]. TGD people often choose not to disclose their TGD identity to avoid threat of stigma and victimization [10, 48, 49]. In this sample, while the not-out class had the highest item response probabilities for TGD identity concealment with family, classmates, and co-workers, the probability of not being out to these groups of people still ranged from 6 to 13% across the risk-activism and family-support classes. Consistent with the cognitive–affective–behavioral model, the not-out class had higher odds of negative mental health outcomes and binge alcohol use compared with the family-support class. Yet, identity concealment for TGD people may operate differently than for other stigmatized identities. Qualitative work has indicated that concealment can also function as a health-promoting form of gender affirmation [49]. For example, TGD participants described concealment through changing their physical body (e.g., binding, hormones) and through not sharing their gender histories (e.g.,

birth names, old photos). Furthermore, concealment may intersect with the concept of passing/blending (i.e., not being perceived as TGD), which is linked to greater physical safety [49, 50]. Thus, while identity concealment was associated with worse mental and behavioral health compared with having family support, belonging to the not-out class may have conferred protection against these negative health outcomes when compared with experiencing high exposures to risk alongside lower support.

Of note, individuals in the latent class marked by high probability of risk were also more likely to endorse participating in activism with other TGD people. This grouping supports prior work characterizing activism as a response to oppression [51]—an act of resistance that is simultaneously empowering and stressful, and one inherent to survival [17, 52]. Qualitative research has identified connecting with an activist TGD community as a critical means of enhancing resilience after trauma [18]. Conversely, it may be that engaging in activism exposes individuals to heightened discrimination and victimization. Indeed, while TGD community connectedness has been linked to better mental health [16, 23], activism has been associated with higher psychological distress [19, 20], consistent with the results of this study. Additional research, particularly longitudinal data, is needed to explore the role of activism in the lives and health of TGD people, including strategies of resistance, empowerment processes, and biopsychosocial stress pathways.

Study findings should be considered with several limitations in mind. First, the cross-sectional design precludes us from determining temporality between variables; prospective designs will be needed to replicate findings and establish causality. Given the non-probability sample with a high proportion of white respondents, generalizability to the U.S. TGD population is also limited. Finally, due to model convergence limitations, we used the classify–analyze technique with a non-inclusive LCA, shown to produce greater bias than approaches which include covariates in the classification model [53]. However, the non-inclusive LCA is expected to bias results toward the null (i.e., resulting in underestimates).

These findings contribute to limited data about the simultaneous effects of risk and resilience on TGD health. Given differences in mental health and substance use outcomes between transfeminine, transmasculine, and nonbinary people [54, 55], future research should investigate potential effect modification by gender identity subgroups. This will be especially important considering identity concealment likely differs for nonbinary people, for whom low concealment has been linked to greater victimization, but passing/blending may result in increased distress through identity erasure [56]. Future work should also examine longitudinal trajectories of risk and resilience, as these experiences likely vary over time, and identity

concealment and gender affirmation are likewise dynamic, ongoing processes throughout the lifecourse [6]. Finally, the integration of a strength-based framework, in which salutogenic factors are incorporated into research, will be critical for successful public health efforts to enhance the wellbeing of TGD people [14].

Our results suggest that interventions leveraging family support may represent one such path to improve mental health among TGD communities. For example, family support groups and education programs may help to combat stigma and discrimination. Such interventions should highlight the need for gender-affirming home environments, providing parents with up-to-date evidence regarding the importance of family support on preventing substance use and promoting mental health. Considering that a substantial portion of TGD populations experiences rejection by their families of origin [11], many TGD people may not have the option of family support, despite availability of interventions. Instead, chosen families—or, families formed by choice, outside of biological ties and regardless of legal recognition—may provide TGD individuals with emotional care, mutual aid, and support in navigating medical systems [57]. Mental and behavioral healthcare providers should additionally recognize the significance of chosen family in TGD people's lives when discussing home care and support plans [57]. Other interventions to foster social support outside of families of origin could also include providing TGD individuals with opportunities to connect through peer-delivered support groups, shown by other research to buffer against harmful effects of stigma [11]. Intervention strategies that mitigate the cognitive–affective–behavioral consequences of stigma are warranted [11, 47, 58]. However, along with developing individual and interpersonal interventions to strengthen resilience, it is crucial to address structural factors maintaining transphobic stigma. In this study, only 30% of TGD adults had their correct gender and name on some or all identification documents, and over half of the sample reported unmet need for medical gender affirmation. Legal policies that support equitable access to gender-affirming care, streamline legal gender affirmation, protect against discrimination based on gender identity, and address socioeconomic vulnerabilities such as poverty, are necessary to promote the mental and behavioral health of TGD people.

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Declarations

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