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### Title

The Gender Minority Stress and Resilience Measure: Psychometric Validity for Use in Spanish

### Permalink

<https://escholarship.org/uc/item/70k8n1qn>

### Journal

Transgender Health, 9(1)

### ISSN

2688-4887

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### Publication Date

2024-02-01

### DOI

10.1089/trgh.2021.0190

Peer reviewed



## ORIGINAL ARTICLE

# The Gender Minority Stress and Resilience Measure: Psychometric Validity for Use in Spanish

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### Abstract

**Purpose:** Stigma is a fundamental driver of HIV disparities among transgender women (TW). The gender minority stress and resilience (GMSR) measure has not been validated in Spanish-speaking, resource-limited settings. We examined the psychometric properties of a translated and abbreviated GMSR among TW in Tijuana, Mexico.

**Methods:** From 2020 to 2021, 152 participants were recruited through social media and venue-based sampling. We collected information on the abbreviated GMSR, psychosocial factors (e.g., depressive symptoms), and socio-demographics. The abbreviated GMSR assessed 7 factors (Discrimination, Rejection, Internalized Transphobia, Negative Expectations, Nondisclosure, Pride, and Community Connectedness). Confirmatory factor analysis, Cronbach's alphas, and McDonald's omegas assessed structural validity. Pearson's partial correlations assessed criterion, convergent, and discriminant validities.

**Results:** The 7-factor structure solution had acceptable fit (root mean square error of approximation [95% confidence interval]=0.05 [0.05–0.06]; comparative fit index/Tucker–Lewis index=0.92/0.91); and internal reliability ( $\alpha=0.62$ –0.89;  $\omega=0.62$ –0.89). Depressive ( $r=0.22$ –0.43;  $p<0.001$ –0.007), post-traumatic stress disorder (PTSD;  $r=0.20$ –0.34;  $p<0.001$ –0.017) symptoms, and perceived stress ( $r=0.19$ –0.41;  $p\leq 0.001$ –0.030) were all positively associated with all stress factors (e.g., Discrimination, Rejection, Internalized Transphobia, Negative Expectations, and Nondisclosure). The resilience factor Pride was associated with fewer PTSD symptoms ( $r=-0.18$ ;  $p=0.027$ ), lower perceived life stress ( $r=-0.21$ ;  $p=0.012$ ), and greater general resilience ( $r=0.26$ ;  $p=0.002$ ). The Community Connectedness resilience factor was associated with fewer depressive symptoms ( $r=-0.22$ ;  $p=0.007$ ). Constructs were conceptually distinct with factor correlations below 0.60.

**Conclusion:** Findings suggest that the Spanish-translated, abbreviated GMSR is a reliable and valid measure. These data expand the usability of the GMSR to TW in a Latin American, Spanish-speaking context.

**Keywords:** Latin America; Mexico; psychometrics; resilience; stress; transgender women

### Introduction

Globally, transgender women (TW) continue to be disproportionately affected by HIV and other sexually transmitted infections (STIs),<sup>1–3</sup> as well as factors that amplify HIV/STI vulnerability, including poor mental health, substance use, and violence.<sup>4,5</sup> Gender-

related stress factors are a fundamental driver of these health outcomes and vulnerabilities, where transgender people continue to describe stigma and discrimination as stressors and primary barriers to accessing health services.<sup>6,7</sup> Despite gender-related stress factors, gender-related resilience factors such as pride and

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community connectedness may buffer the effects of gender-related stress on health outcomes and vulnerabilities experienced by TW. There is a need for validated, theory-based measurements to assess experiences of and resilience against gender-related stress factors to better understand their impact across multiple health disparities.

The minority stress theory by Meyer outlines distal and proximal stress and resilience factors that work concurrently to affect mental health outcomes among sexual minorities.<sup>8</sup> Distal stress factors include constructs such as discrimination, victimization, rejection, and nonaffirmation that occur externally and are upheld by societal and cultural norms. Proximal stress factors reflect the internal manifestation of distal stress factors, such as internalized stigma, negative future expectations, and nonidentity disclosure. The minority stress theory was later adapted by Hendricks and Testa for use in transgender and gender nonconforming populations.<sup>9</sup>

To address the lack of reliable and valid minority stress and resilience measures for these populations, Testa et al. developed the 9-factor gender minority stress and resilience (GMSR) scale.<sup>10</sup> Despite the successful validation of the GMSR among transgender and gender nonconforming adults in the United States<sup>10</sup> and Italy,<sup>11</sup> and adolescents in the United States,<sup>12</sup> there are gaps in knowledge regarding how the instrument performs Latin American contexts.

Before the landmark Mexican field study by Robles et al. supporting the removal of transgender identity as a mental disorder from the International Classification of Diseases-11,<sup>13</sup> and later approval by the World Health Organization in 2018, being transgender was considered a mental illness in Mexico. Now, there are current policies that allow individuals to initiate administrative processes to gain legal gender recognition.

While federal rulings in Mexico mandate gender equality, state and local entities are not required to enforce the policy changes, creating a situation where governmental protections of transgender rights vary geographically.<sup>14</sup> Moreover, as reported by the Transgender Murder Monitoring project, Mexico was second only to Brazil in the number of homicides against TW worldwide in 2019.<sup>15</sup> A recent public opinion report of transgender rights in Mexico found that men, older age, and less formal education were less accepting of transgender persons, while those who knew someone who is transgender were more accepting of transgender people and political issues.<sup>14</sup>

Our study fills current gaps in the literature by testing the psychometrics of an abbreviated version of the GMSR among a sample of TW in Tijuana, Mexico. We aimed to test six hypotheses related to structural, criterion, convergent, and divergent validity of the scale using similar approaches applied by Testa et al.<sup>10</sup> (e.g., using the 10-item Centre for Epidemiological Studies Depression Scale [CESD-10]<sup>16,17</sup> to examine criterion validity and operationalize depression).<sup>10</sup>

Structural Validity: (1) the psychometric integrity of the abbreviated 7-factor GMSR would maintain adequate internal reliability and model integrity. Criterion Validity: (2) proximal and distal stress factors will be positively correlated with depression and post-traumatic stress disorder (PTSD), (3) resilience factors will be negatively correlated with depression and PTSD. Convergent Validity: (4) proximal and distal stress factors will be positively correlated with perceived life stress, (5) resilience factors will be positively correlated with general resilience, and Divergent Validity: (6) correlations between the GMSR subscales will be below 0.60 to demonstrate conceptual distinction between constructs following previous research.<sup>18</sup>

## Materials and Methods

### Study design, recruitment, and sample

This study is a secondary analysis of quantitative baseline data collected by the *Salud Trans* study, an academic-community partnership between the study investigators and a community-based organization in Tijuana, Centro de Servicios SER (aka Centro SER), between 2020 and 2021. The *Salud Trans* study was a multimethod prospective study, including both quantitative and qualitative data, focused on examining syndemics and social networks of TW in Tijuana.

Data collection for *Salud Trans* began in March 2020 using venue-based sampling to recruit participants. Study staff compiled a list of places where TW in Tijuana work (e.g., *maquiladoras* or factories), socialize (e.g., bars and clubs), congregate, or access social services (e.g., community-based organizations providing services to the local Lesbian, Gay, Bisexual, Transgender, Queer [LGBTQ+] community). Recruitment was also targeted specifically toward TW living with HIV, and therefore other venues included hospitals and HIV care and service providers. Staff visited these places at random times to approach and screen participants on site. In April 2020, internet sites were added as additional recruitment “venues” due to lockdown restrictions and challenges posed by the COVID-19 pandemic.

Specifically, study advertisements were posted on a Facebook page that was created for the study, on pages of LGBTQ+ service and care providers, and on pages catering to TW engaged in sex work (e.g., *Mileroticos*, *Locanto*, *Grinder*, *Tinder*).

Individuals were eligible if they (1) were  $\geq 18$  years old, (2) were identified as a TW, (3) lived in Tijuana with no plans to leave in the next 6 months, and (4) were willing to be tested for HIV. At baseline, following informed consent, participants completed an interviewer-administered survey on a study tablet. Interviewers were local Spanish-speaking members of or had experience working with TW in Tijuana. The survey consisted of items that assessed demographic, behavioral, mental, and social network factors. Surveys took  $\sim 1$ – $1.5$  h to complete. After completion, participants received \$25 U.S. dollars as compensation for their time. The Institutional Review Boards at the University of California, San Diego, and Xochicalco University Tijuana reviewed and approved the protocol of this study.

### Measures

**Demographics.** Demographic items included age (years), education level (less than high school degree/high school degree or greater), income ( $\leq$  \$4,000 Mexican Pesos [MXN]/ $>$  \$4,000 MXN), employment (unemployed/employed part time/employed full time), and current use of gender-affirming hormone therapy (yes/no). Income was made binary based on the urban poverty line provided by National Council for the Evaluation of Social Development Policy.<sup>19</sup>

**Gender minority stress and resilience.** We used an abbreviated version of the Hidalgo et al. GMSR scale,<sup>12</sup> initially developed by Testa et al.<sup>10</sup> (Supplementary Appendix SA1). Grounded in Meyer's minority stress model,<sup>8</sup> later applied to transgender and gender-nonconforming U.S. populations,<sup>9</sup> the unabbreviated GMSR is composed of nine subscales reflecting experiences of gender-related stress (Discrimination, Rejection, Victimization, nonaffirmation of gender identity [Nonaffirmation], Internalized Transphobia, and negative future expectations [Negative Expectations], and Nondisclosure) and resilience (Pride and Community Connectedness). As previously applied,<sup>10,12</sup> among the seven stress subscales, Discrimination, Rejection, Victimization, and Nonaffirmation were considered distal stress factors and Internalized Transphobia, Negative Expectations, and Nondisclosure were considered proximal stress factors.

Our abbreviated version of the GMSR retained seven subscales. Victimization and Nonaffirmation subscales were not assessed to manage participant burden of the overall study and because experiences of violence were measured with different items to assess both gender minority-related and nonrelated victimization experiences.

The GMSR scale was first forward translated by a bilingual native of Tijuana, Mexico. This translation was then back translated by another individual who is also a bilingual native of Mexico. The study principal investigator (PI) compared the back translation to the original items to ensure that the translation met the original intent of the items. Then, the PI sent the translated items to study personnel at the community organization of recruitment to ensure cultural/linguistic appropriateness of the items. All suggested changes were discussed and any disagreement was resolved through discussion between the PI and the study personnel, resulting in the final Spanish version of the 7-factor GMSR scale tested as part of this study.

Discrimination and Rejection subscales were measured using the following response options: *Never/Yes, before age 18/Yes, after age 18/Yes*, and *in the past year*. Never was scored as zero and any other response was scored as one, similar to previous validations of the GMSR scale.<sup>10–12</sup> Sum scores were calculated for each subscale. The remaining five subscales were measured using a 5-point Likert scale ranging from strongly disagree (0) to strongly agree (4). Appropriate items were reverse coded before calculating the sum scores for each subscale. Higher scores reflect greater stress for stress factors and greater resilience for resilience factors.

**Depression.** Symptoms of depression were assessed using the CESD-10.<sup>16,17</sup> The CESD comprised 10 items that assess symptoms of depression in the past week on an ordinal scale ranging from "Rarely or none of the time (less than one day) (0)" to "Most or all the time (3)." Sample items included, "I was bothered by things that don't usually bother me," "I had trouble keeping my mind on what I was doing," and so on. Positively worded items were reverse coded before calculating a sum score with a total possible range from 0 to 30. Internal reliability ( $\alpha = 0.86$  and  $\omega = 0.87$ ).

**Post-traumatic stress disorder.** Symptoms of PTSD were assessed using the primary care post-traumatic stress disorder (PC-PTSD) screen.<sup>20</sup> The PC-PTSD includes four binary (Yes/No) items. Sample items include, "In your life, have you ever had any experience

that was so frightening, horrible, or upsetting that in the past month, you ...1) had a nightmare about it or thought about it when you did not want to? 2) tried hard not to think about it or went out of your way to avoid situations that reminded you of it?, etc.” Sum scores were calculated with a total possible range from 0 to 4. Internal reliability ( $\alpha=0.81$  and  $\omega=0.82$ ).

**Perceived life stress.** Perceived life stress was measured using the perceived stress scale (PSS).<sup>21</sup> The PSS includes 10 items on an ordinal scale from “Never (0)” to “Very Often (4).” Sample items included, “In the last month, how often have you ...1) been upset because of something that happened unexpectedly, 2) felt nervous and ‘stressed’, etc.” Positively worded items were reverse coded before calculating a sum score with a total possible range from 0 to 40. Internal reliability ( $\alpha=0.78$  and  $\omega=0.78$ ).

**General resilience.** General resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC).<sup>22</sup> The CD-RISC includes 10 items on an ordinal scale from “Not true at all (0)” to “True nearly all the time (4).” Sample items included, “I am not easily discouraged by failure,” “Having to cope with stress makes me strong,” etc. Sum scores were calculated with a total possible range from 0 to 40. Internal reliability ( $\alpha=0.84$  and  $\omega=0.83$ ).

#### Statistical analysis

We employed two statistical approaches to evaluate the psychometrics of the abbreviated 7-factor GMSR. First, we conducted a confirmatory factor analysis (CFA) using robust weighted least square estimators in MPlus 8 due to the ordinal nature of the items. We hypothesized a 7-factor solution based on factor loadings of GMSR items observed in prior work.<sup>10,12</sup> Model fit was evaluated using comparative fit index (CFI), the Tucker–Lewis index (TLI), and the root mean square error of approximation (RMSEA). CFI and TLI  $>0.90$  indicate adequate fit ( $>0.95$  indicates good fit). An RMSEA  $<0.08$  indicates adequate fit ( $<0.06$  indicates good fit), with values approaching zero indicating better fit.

After determining model fit, we computed Cronbach’s alphas and McDonald’s omegas using the developed SAS macros by Hayes and Coutt to determine internal reliability for each of the scales.<sup>23</sup> We include Cronbach’s alpha to allow for comparison of our results to other studies, given its widespread use throughout the literature. However, use of Cronbach’s alpha to assess reliability has some limitations outlined in previ-

ous literature (alpha relies on assumptions that are rarely met, violations of assumptions can cause attenuation to internal consistency estimates, and so on.), leading us to also include the preferred reliability measure of McDonald’s omega.<sup>23–25</sup> If an item was deleterious to the internal reliability of the subscale in which it was included, the item was deleted. *Post hoc* qualitative assessments were used to explore participants’ understanding of poorly functioning items.

Second, we used SAS (v9.4) software, (SAS Institute Inc., Cary, NC) to assess criterion validity by examining correlations between GMSR and PTSD and depression. We assessed convergent validity by examining correlations between GMSR stress subscales and perceived life stress, and between GMSR resilience subscales and general resilience. We assessed divergent validity by examining correlations between all GMSR subscales.

#### Results

The study enrolled 152 participants, with 151 participants retained in the analytic sample after removing a participant with missing data on all GMSR subscales. The majority of participants were less than 40 years of age (79.6%), had less than a high school education (57.2%), made \$4,000 or more MXN monthly (64.5%), were unemployed (50.0%), and were receiving hormone injection therapy (55.2%; Table 1).

#### Structural validity

Preliminary analyses indicated that one item (*I’m not like other people who share my gender identity*) was deleterious to the internal reliability of the subscale, and was thus dropped in subsequent analyses, improving the subscale’s internal reliability from  $\omega=0.61$  to  $\omega=0.72$ . In *post hoc* analysis, the field interviewer indicated that participants were interpreting this item in different ways, where some were happy to have some uniqueness and others did not want to associate themselves with the transgender community.

Using the remaining 45 items from the abbreviated GMSR, the CFA supported the 7-factor model identified in hypothesis 1 (CFI/TLI=0.92/0.91; RMSEA=0.05 [90% confidence interval=0.05–0.06]). Cronbach’s alphas and McDonald’s omegas for the seven subscales ranged from 0.62–0.89 to 0.64–0.89, respectively (Fig. 1; Table 2).

#### Criterion validity

Consistent with hypothesis 2, criterion scores for distal and proximal gender minority stress factors correlated

**Table 1. Sample Demographics Among Transgender Women in Tijuana, Mexico (n=151)**

Variable	n (%)
Age group (years)	
18–29	65 (42.8)
30–39	56 (36.8)
40–49	22 (14.5)
≥50	9 (5.9)
Education level	
Less than high school degree	87 (57.2)
High school degree or greater	65 (39.7)
Income <sup>a</sup>	
\$4,000 MXN or less	54 (35.5)
>\$4,000 MXN	98 (64.5)
Employment	
Unemployed	76 (50.0)
Employed part time	19 (12.5)
Employed full time	57 (37.5)
Currently on hormone replacement therapy	
Yes	84 (55.2)
No	68 (44.7)

n = 1 participant was removed from analyses due to missingness of all GMSR scale responses.

<sup>a</sup>\$4,000 MXN = ~\$200 United States Dollars.

GMSR, gender minority stress and resilience; MXN, Mexican Pesos.

positively with depression and PTSD scores (Table 3). Correlation coefficients of distal stress factors on depression (Discrimination  $r=0.31$  [ $p<0.01$ ] and Rejection  $r=0.43$  [ $p<0.01$ ]) and on PTSD (Discrimination  $r=0.26$  [ $p<0.01$ ] and Rejection  $r=0.34$  [ $p<0.01$ ]) were significant. Correlation coefficients of proximal stress factors on depression (Internalized Transphobia  $r=0.36$  [ $p<0.01$ ], Negative Expectations  $r=0.39$  [ $p<0.01$ ], and Nondisclosure  $r=0.22$  [ $p<0.01$ ]) and on PTSD (Internalized Transphobia  $r=0.31$  [ $p<0.01$ ], Negative Expectations  $r=0.21$  [ $p<0.01$ ], and Nondisclosure  $r=0.20$  [ $p=0.02$ ]) were significant.

Partially consistent with hypothesis 3, the pride resilience subscale correlated negatively with PTSD ( $r=-0.18$  [ $p=0.03$ ]) and community connectedness correlated negatively with depression ( $r=-0.22$  [ $p<0.01$ ]). However, the pride resilience subscale was not statistically correlated with depression ( $r=-0.13$  [ $p=0.13$ ]), and the community connectedness subscale was not statistically correlated with PTSD ( $r=-0.08$  [ $p=0.36$ ]).

#### Convergent validity

Consistent with hypothesis 4, perceived life stress was positively correlated with both distal (Discrimination  $r=0.19$  [ $p=0.03$ ] and Rejection  $r=0.41$  [ $p<0.01$ ]) and proximal (Internalized Transphobia  $r=0.40$  [ $p<0.01$ ], Negative Expectations  $r=0.41$  [ $p<0.01$ ], and Nondisclosure  $r=0.28$  [ $p<0.01$ ]) stress factors (Table 3).

Partially consistent with hypothesis 5, general resilience was positively correlated with the pride resilience factor  $r=0.26$  ( $p<0.01$ ), but not statistically correlated with the community connectedness factor  $r=0.07$  ( $p=0.37$ ).

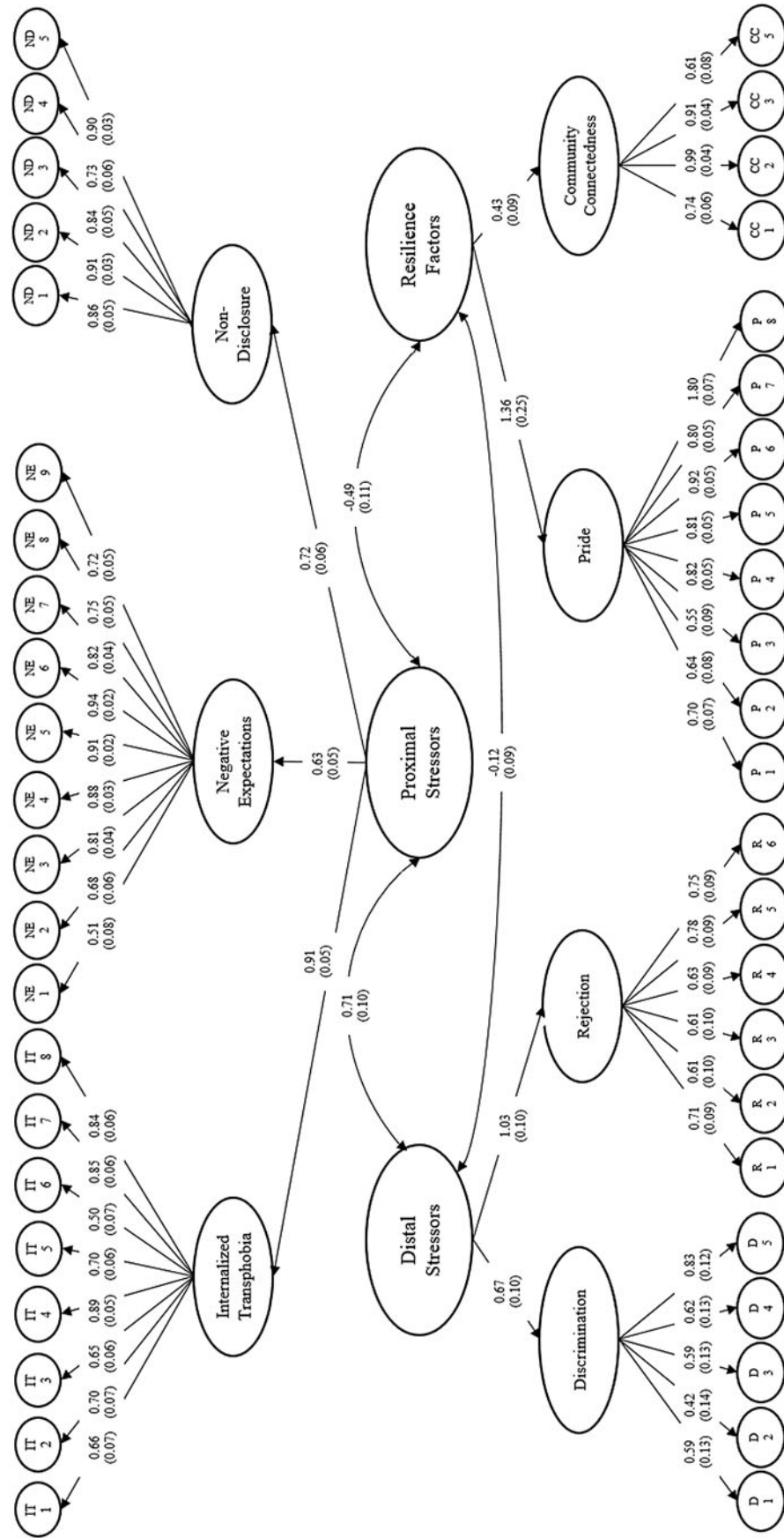
#### Divergent validity

Hypothesis 6 suggesting discriminant validity of factors with correlation coefficients below 0.60 was supported, signifying that the subscales comprising the GMSR are measuring distinct dimensions of gender-related stress and resilience.

#### Discussion

We conducted a psychometric evaluation of an abbreviated version the Spanish-translated GMSR among TW in Tijuana, Mexico. Consistent with hypotheses, the abbreviated GMSR maintained acceptable model integrity, confirming the 7 distinct subscale solution. In addition, analyses demonstrated that the 7-subscale GMSR in Spanish has good criterion, convergent, and divergent validity in the sample, suggesting it is a reasonable tool to assess GMSR among Spanish-speaking populations. These findings are an important advancement, particularly in Mexico where the homicide rate against transgender individuals is high and governmental protections of transgender rights vary geographically.<sup>14</sup> This study provides a psychometric evaluation of the GMSR in a Spanish-speaking context, providing Spanish-speaking researchers and clinicians a psychometrically acceptable tool to assess gender minority stigma and resilience factors.

Consistent with previous studies,<sup>10–12</sup> we found significant correlations between distal and proximal stress factors and poor mental health outcomes (e.g., symptoms of depression and PTSD). These findings continue to bolster evidence supporting the Minority Stress Theory,<sup>8</sup> particularly as it applies to individuals who identify as transgender.<sup>9</sup> Moreover, the GMSR pride subscale was negatively associated with PTSD symptoms and the GMSR community connectedness subscale was negatively associated with depression, consistent with theory that suggests gender minority protective factors (e.g., pride, community connectedness) may buffer negative impacts of gender minority stress factors.<sup>8,26</sup> Future research should continue to examine the potential buffering or moderating effect of other resilience factors (e.g., trait-level resilience, resistance, coping) on the relationship between gender-related stress factors and mental health outcomes.



**FIG. 1.** Structural validity: 7-factor latent variable model with standardized factor loadings. CC, Community Connectedness; D, Discrimination; IT, Internalized Transphobia; ND, Nondisclosure; NE, Negative Future Expectations; P, Pride; R, Rejection.

**Table 2. Gender Minority Stress and Resilience Scale Confirmatory Factor Model (Standard Errors in Parentheses)**

Scale, number of items, and coding	$\alpha$	$\omega$	Range	Mean (SD)
Gender-related Discrimination (5) 0=No, 1=Yes	0.62	0.62	0–5	2.42 (1.55)
Item number and abbreviation				Factor loading (SE)
D1 Difficulty getting medical or mental health treatment				1.00
D2 Difficulty finding a public bathroom				0.72 (0.30)
D3 Difficulty getting identity documents				1.00 (0.31)
D4 Difficulty finding/staying in housing				1.05 (0.31)
D5 Difficulty with employment				1.42 (0.38)
Gender-related Rejection (6) 0=No, 1=Yes	0.70	0.71	0–6	2.65 (1.87)
Item number and abbreviation				Factor loading (SE)
R1 Difficulty finding someone to date/relationship ended				1.00
R2 Rejected/felt unwelcome by religious community				0.86 (0.18)
R3 Rejected/felt unwelcome in ethnic/racial community				0.86 (0.19)
R4 Rejected/distanced from friends				0.90 (0.14)
R5 Rejected at school/work				1.10 (0.19)
R6 Rejected/distanced from family				1.07 (0.19)
Internalized Transphobia (8) 0–4 ordinal scale (0=strongly disagree; 4=strongly agree)	0.80	0.77	0–32	6.14 (6.21)
Item number and abbreviation				Factor loading (SE)
IT1 Resent gender identity/expression				1.00
IT2 Feel like a freak				1.07 (0.12)
IT3 Gender identity/expression makes me depressed				0.98 (0.12)
IT4 Gender identity/expression makes me unhappy				1.35 (0.18)
IT5 I feel like an outcast				1.06 (0.13)
IT6 Feel gender identity/expression is not “normal”				0.75 (0.13)
IT7 Embarrassed by gender identity/expression				1.29 (0.17)
IT8 Envy others without my gender identity/expression				1.28 (0.15)
Negative Future Expectations (9) 0–4 ordinal scale (0=strongly disagree; 4=strongly agree)	0.89	0.89	0–36	17.45 (10.67)
Item number and abbreviation				Factor loading (SE)
NFE1 Others would not accept me				1.00
NFE2 Employers would not hire me				1.34 (0.24)
NFE3 People would think I am “crazy”				1.60 (0.27)
NFE4 People would think I am disgusting/sinful				1.73 (0.29)
NFE5 Most people would think less of me				1.80 (0.30)
NFE6 Most people would look down on me				1.86 (0.31)
NFE7 I could be a victim of crime/violence				1.61 (0.28)
NFE8 I could be arrested or harassed by police				1.47 (0.26)
NFE9 I could be denied good medical care				1.42 (0.25)
Nondisclosure (5) 0–4 ordinal scale (0=strongly disagree; 4=strongly agree)	0.86	0.86	0–20	7.66 (6.74)
Item number and abbreviation				Factor loading (SE)
ND1 I don’t talk about past experiences/change details				1.00
ND2 I modify my way of speaking				1.07 (0.07)
ND3 I pay special attention to personal dress/grooming				0.98 (0.08)
ND4 I avoid exposing my body				0.85 (0.08)
ND5 I change the way I walk/gesture/sit/stand				1.05 (0.06)
Community Connectedness (5) 0–4 ordinal scale (0=strongly disagree; 4=strongly agree)	0.78	0.72	0–20	12.78 (3.72)
Item number and abbreviation				Factor loading (SE)
C1 Feel part of a community that shares my gender				1.00
C2 Feel connected to others who share my gender				1.33 (0.12)
C3 Feel like I belong				1.23 (0.11)
C4 Not like others who share my gender <sup>a</sup>				—
C5 Feel isolated/separate from others who share my gender				0.82 (0.12)
Pride (8) 0–4 ordinal scale (0=strongly disagree; 4=strongly agree)	0.81	0.80	0–32	26.90 (5.93)
Item number and abbreviation				Factor loading (SE)
P1 Feel special and unique				1.00
P2 Okay people know that my gender and sex are different				0.93 (0.16)
P3 No problem talking about gender identity/history				0.79 (0.17)
P4 It’s a gift that my gender identity and sex are different				1.18 (0.14)
P5 Like others, but different because of my gender				1.17 (0.15)
P6 Proud that my gender identity and sex are different				1.32 (0.16)
P7 Comfortable revealing gender identity and sex to others				1.15 (0.15)
P8 Rather people know everything and accept me				1.15 (0.17)

<sup>a</sup>Removed due to poor performance.

CC, Community Connectedness; D, Discrimination; IT, Internalized Transphobia; ND, Nondisclosure; NFE, Negative Future Expectations; P, Pride; R, Rejection; SD, standard deviation; SE, standard error.



**Table 3. Correlations Among Gender Minority Stress and Resilience Scale Factors, Depression, Post-Traumatic Stress Disorder, Perceived Life Stress, and Resilience**

Subscale/measure	1	2	3	4	5	6	7	8	9	10	11
1. GMSR-Discrimination	—										
2. GMSR-Rejection	0.43**	—									
3. GMSR-Internalized Transphobia	0.23**	0.42**	—								
4. GMSR-Negative Future Expectations	0.35**	0.48**	0.42**	—							
5. GMSR-Nondisclosure	0.22**	0.33**	0.41**	0.56**	—						
6. GMSR-Pride	-0.00	-0.13	-0.49**	-0.13	-0.27**	—					
7. GMSR-Community Connection	0.13	-0.03	-0.23**	-0.06	-0.01	0.32**	—				
8. CESD	0.31**	0.43**	0.36**	0.39**	0.22**	-0.13	-0.22**	—			
9. PC-PTSD	0.26**	0.34**	0.31**	0.21*	0.20*	-0.18*	-0.08	0.54**	—		
10. PSS	0.19*	0.41**	0.40**	0.41**	0.28**	-0.21*	-0.16	0.65**	0.46**	—	
11. CD-RISC	0.06	-0.11	-0.35**	-0.28**	-0.14	0.26**	0.07	-0.35**	-0.25**	-0.44**	—

\* $p < 0.05$ ; \*\* $p < 0.01$ .

CD-RISC, Connor-Davidson Resilience Scale; CESD, Centre for Epidemiological Studies Depression Scale; PC-PTSD, primary care post-traumatic stress disorder; PSS, perceived stress scale.

We also found that the distal and proximal stress factors (e.g., Discrimination, Rejection, Internalized Transphobia, Negative Future Expectations, and Nondisclosure) of the abbreviated GMSR demonstrated good convergent validity with the perceived life stress scale. Moreover, the resilience factors of the abbreviated GMSR showed good convergent validity with the CD-RISC, supporting the notion that the GMSR subscales of Pride and Community Connectedness capture more general resilience. However, consistent with previous psychometric findings outside of Latin America,<sup>10,11</sup> the GMSR Discrimination subscale continues to show poor to questionable internal reliability, suggesting that Spanish-speaking researchers should also use this subscale in its current state with caution. Future qualitative research should be conducted to better understand why the Discrimination subscale questions are not functioning optimally and how they could be altered to more accurately represent gender-related discrimination.

We found in our item-level analysis that the item, "I'm not like other people who share my gender identity," was deleterious to the internal reliability of the community connectedness subscale. Factor loading of this item on the community connectedness subscale has varied from study to study.<sup>10-12</sup> Upon further investigation of this item in our study, the field interviewer indicated that participants were interpreting this item in different ways, where some were happy to have some uniqueness and others did not want to associate themselves with the transgender community.

### Implications

The validation of the Spanish-translated, abbreviated GMSR allows for its use within clinic practice, public

health, and psychosocial research in Spanish-speaking settings. Using the GMSR in clinical practice may offer health care providers a preliminary tool to assess gender-related stressors and resilience factors among transgender patients, allowing for a better understanding of how these factors may be playing into the health of their patients and resources they may choose to recommend (e.g., local LGBTQ+ Centers) to improve community connection and pride.

In a public health context, the GMSR offers a tool to quickly assess risk and resilience factors among a population-based sample of TW, which can help inform policies and interventions to improve both community acceptance of TW and resilience of TW against distal and internal gender-related stressors. For use in psychosocial research, the GMSR provides a validated tool to further test mechanisms that may buffer or exacerbate the effect of gender-related stress on the health outcomes of TW.

### Limitations

Our study has several limitations. First, this study only utilized baseline data limiting our ability to infer causation. Future studies should longitudinally measure and examine the GMSR model with mental health outcomes. Second, as the goal of the parent study was to understand TW along the U.S.-Mexico border and specifically in Tijuana, the sample may not be representative of TW in Mexico. Future research should continue to examine the psychometric properties of the GMSR in different areas of Mexico and other Spanish-speaking contexts.

Third, it is possible that the scores of the GMSR stress factors may be lower and resilience factors may

be higher among our sample compared to other transgender communities as the participants were recruited by a local transgender community clinic and were willing to participate in a study specifically for TW. Finally, our study only captured constructs of resilience as a protective factor against gender-related stress. Future research should examine other complimentary constructs such as resistance and coping on mental health among TW.

### Conclusion

Despite the limitations, the study demonstrated that the Spanish-translated abbreviated 7-factor GMSR is a psychometrically sound tool that can be used by researchers and clinicians alike for measuring gender-related stress and resilience in a Spanish-speaking context.

### Authors' Contributions

A.B.A.: conceptualization, formal analysis, writing—original draft, writing—review and editing, and funding acquisition. L.R.S. and H.A.P.: writing—review and editing and supervision. M.F.Z.-V. and R.P.-G.: investigation and writing—review and editing. S.N.-A. and E.V.P.: writing—review and editing, supervision, and funding acquisition.

### Author Disclosure Statement

No competing financial interests exist.

### Funding Information

This research was funded, in part, by a NIDA T32 post-doctoral fellowship (T32DA023356; PI: Strathdee) and an Office of AIDS Research, Sexual and Gender Minority Research Office, and Fogarty International Center funded UC GloCal Health Fellowship (D43TW009343; PI: Cohen and Strathdee) to A.B.A., a NIDA Mentored Career Development Award to E.V.P. (K01042666; PI: Pitpitan), an NIMH R01 award to L.R.S. (R01MH123282; PI: Smith), the California HIV/AIDS Research Program (H21PC3601; Smith), as well as a 2020 International Core Pilot Grant Award to Drs. Navarro and Pitpitan (Co-PIs) from the San Diego Center for AIDS Research (SD CFAR), an NIH-funded program (P30 AI036214).

### Disclaimer

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

### Supplementary Material

Supplementary Appendix SA1

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**Cite this article as:** Algarin AB, Smith LR, Pines HA, Zapien-Vasquez MF, Padilla-Garcia R, Navarro-Alvarez S, Pitpitan EV (2024) The gender minority stress and resilience measure: psychometric validity for use in Spanish, *Transgender Health* 9:1, 24–33, DOI: 10.1089/trgh.2021.0190.

### Abbreviations Used

CC = Community Connectedness  
 CD-RISC = Connor-Davidson Resilience Scale  
 CESD-10 = 10-item Centre for Epidemiological Studies Depression Scale  
 CFA = confirmatory factor analysis  
 CFI = comparative fit index  
 D = Discrimination  
 GMSR = gender minority stress and resilience  
 IT = Internalized Transphobia  
 LGBTQ+ = lesbian, gay, bisexual, transgender, queer  
 MXN = Mexican Pesos  
 ND = Nondisclosure  
 NFE = Negative Future Expectations  
 P = Pride  
 PC-PTSD = primary care post-traumatic stress disorder  
 PI = principal investigator  
 PSS = perceived stress scale  
 PTSD = post-traumatic stress disorder  
 R = Rejection  
 RMSEA = root mean square error of approximation  
 SD = standard deviation  
 SE = standard error  
 STIs = sexually transmitted infections  
 TLI = Tucker–Lewis index  
 TW = transgender women