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Rural living environment predicts social anxiety in transgender and gender nonconforming individuals across Canada and the United States

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ABSTRACT

Transgender and gender nonconforming (TGNC) individuals frequently confront discrimination, rejection, and violence. Such experiences may put TGNC individuals at risk for minority stress and associated psychiatric symptoms. Protective factors like social support, pride in one's gender identity, or connectedness to similar others may make TGNC individuals less vulnerable to psychiatric symptoms, and the presence of risk and protective factors may vary depending on living environment. This study examined the relationship of living environment (urban vs. suburban vs. small-town/rural) to social anxiety (SA) in a sample of 902 TGNC individuals who participated in the Trans Health Survey. Analysis of variance revealed a significant difference in SA across living environments. Those living in small-town/rural environments reported significantly higher levels of SA compared to those living in urban environments. There was a trend-level difference in SA in suburban compared to urban environments. Linear regression analyses revealed that living environment significantly moderated the relationship between social support and SA. Higher social support was more protective against elevated SA in urban and suburban than in small-town/rural environments. This study is the first to demonstrate the experience of elevated SA among TGNC individuals living in rural environments. Implications and future directions for research are discussed.

1. Introduction

Research on transgender and gender nonconforming (TGNC) populations is in its early stages (e.g., Bariola et al., 2015). However, the extant literature indicates that TGNC persons are subject to minority stress, frequently facing targeted stigma in the form of discrimination, rejection, nonaffirmation of gender identity, and/or violence (Testa, Habarth, Peta, Balsam, & Bockting, 2015; Valentine & Shipherd, 2018). Although most research on transgender experiences is based on surveys utilizing non-random sampling techniques, rates of reported victimization and discrimination are concerning. In a survey of 402 transgender individuals, 59.5% of respondents reported experiencing violence or harassment in their lifetime, 14% experienced rape or attempted rape, 47% had been assaulted, and 37% reported economic discrimination (Lombardi, Wilchins, Priesing, & Malouf, 2002). In another survey of transgender individuals (Bradford, Reisner, Honnold, & Xavier, 2013; $N = 350$), 27% reported sexual abuse since age 13, and 38% reported physical abuse/assault since age 13. Additionally, 37% reported harassment or discrimination during high school, and 41% reported gender-related discrimination in health care, employment, and/or housing. In another study, transgender individuals were more likely than their non-transgender siblings to report experiencing any type of harassment or discrimination (Factor & Rothblum, 2008), providing further indication that these adverse experiences are related to gender minority status.

Minority stressors such as stigma and discrimination are consistently related to elevated psychological symptoms in TGNC adults, including depression, anxiety, and substance abuse (Valentine & Shipherd, 2018). Gender-related discrimination, rejection, nonaffirmation, and violence have also been associated with elevated social anxiety, depression, suicidal ideation, and general life distress (Testa et al., 2015; Testa et al., 2017). In a longitudinal study, gender-related abuse mediated the relationship between coming out as one's identified gender and depression and suicidality (Nuttbrock et al., 2010), suggesting a causal link between gender-related stressors and adverse mental health outcomes.

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1.1. Minority stress and social anxiety

Consistent findings demonstrate that, in the general population, victimization predicts elevated social anxiety (SA) (e.g., Ranta, Kaltiala-Heino, Fröjd, & Marttunen, 2012; Roth, Coles, & Heimberg, 2002). For instance, significantly more individuals with social anxiety disorder (SAD; 92%) than with obsessive-compulsive disorder (50%) or panic disorder (35%) reported a history of bullying or severe teasing (McCabe, Antony, Summerfeldt, Liss, & Swinson, 2003). Given the specific relationship between victimization and SAD, one might conjecture that TGNC individuals may be at risk for elevated SA. Moradi's (2013) model of minority stress posits that the experience of discrimination (e.g., heterosexism) leads minority individuals to become hypervigilant to potential threat and to engage in ongoing self-monitoring behaviors as a result. Meidlinger and Hope (2014) point out the similarities between this model and the cognitive-behavioral model of SA (e.g., Rapee & Heimberg, 1997): both models discuss one's assessment of social threat, through self-focused and other-focused attention, which results in self-monitoring, avoidance, and the perpetuation of anxiety symptoms. Thus, heightened anticipation of social threat, influenced by situational minority stressors (Moradi, 2013), could heighten SA among TGNC people.

Indeed, as noted above, Testa et al. (2015) found that discrimination, rejection, victimization, and nonaffirmation were associated with greater SA in TGNC individuals. This finding parallels research on gay men, which revealed a significant relationship between perceived discriminatory events and elevated SA (Burns, Kamen, Lehman, & Beach, 2010). Furthermore, research indicates that the prevalence of SAD may be higher in TGNC individuals than in the general population, in which the lifetime and 12-month prevalence rates of SAD have been reported to be 10.7% and 7.4%, respectively (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). In a cross-sectional study of trans individuals in Spain ages 14–59 ($N = 210$), 31.4% of participants currently met criteria for SAD. Participants were more likely to have a diagnosis of SAD if they reported a higher level of perceived violence in school during childhood and adolescence (Bergero-Miguel et al., 2016).

In sum, research suggests that TGNC individuals may be at heightened risk for elevated SA and that gender-related victimization is associated with elevated SA in this population. However, we found no research examining broader contextual factors associated with SA in TGNC persons. Living environment, such as urban or rural area, is one such contextual factor that can influence mental health (Jackson, 2003).

1.2. Minority stress and living environment

It is reasonable to think that living in a rural environment (versus an urban environment) could confer risk for SA in TGNC individuals due to exposure to more minority stressors or to less diversity of people, attitudes, or values (Swank, Frost, & Fahs, 2012). Additionally, more resources might be in place in urban compared to rural environments to support marginalized populations, including TGNC individuals. For instance, Horvath, Iantaffi, Swinburne-Romine, and Bockting (2014) found that social support and TGNC community connectedness were lower in TGNC individuals living in rural compared to urban areas. A systematic review of health and health care of rural sexual and gender minorities concluded that rural healthcare providers may have limited education in LGBT healthcare and demonstrate more negative LGBT bias than healthcare providers in urban communities (Rosenkrantz, Black, Abreu, Aleshire, & Fallin-Bennett, 2017). Conversely, however, the odds of experiencing transgender-related discrimination have been found to be higher in suburban compared to rural environments (Bradford et al., 2013). There is a need for research examining urban-rural disparities in minority stressors among TGNC persons. However, the literature suggests a possible elevation of minority stressors in rural areas, which might put TGNC persons at risk for elevated SA.

We found no studies to date examining the relationship between SA and living environment in TGNC persons. Furthermore, only a few studies have examined urban-rural mental health disparities in TGNC populations, and the results have been mixed. In one study, suburban/urban lesbian, gay, and transgender veterans reported greater positive affinity with the LGBT community and a greater sense of closeness than rural/small-town veterans. However, transgender veterans did not demonstrate differences in anxiety, depression, or "outness"/disclosure of one's gender identity in suburban/urban compared to small-town/rural areas (Kauth, Barrera, Denton, & Latini, 2017). Of note, the authors grouped urban and suburban areas together, potentially missing difference among more nuanced categories. In a study among TGNC men and women who participated in a national survey of LGBT Australians (Bariola et al., 2015), living environment was not significantly associated with psychological distress or resilience scores. However, 129 participants in this study were categorized as urban, whereas only 34 were categorized as rural, raising the possibility that the sample did not include a sufficient number of rural participants to find an effect. Contrary to these findings, a large US survey of TGNC adults found that rural trans men reported significantly higher Global Severity Index, somatization, and depression scores, and significantly lower self-esteem than non-rural trans men (Horvath, Iantaffi, Swinburne-Romine, & Bockting, 2013). There was also a nearly significant relationship between rural living environment and elevated anxiety in trans men.

More research is needed to clarify the relationship between living environment and psychological symptoms, and specifically SA, in TGNC individuals. Thus, in the current study we aimed to examine differences in SA across urban, suburban, and rural living environments.

1.3. Protective factors in TGNC persons

Despite the negative mental health outcomes that TGNC persons may face, research suggests that certain intrapersonal factors (such as pride) and interpersonal factors (such as social support and connectedness to a TGNC community) may protect against psychological symptoms in TGNC individuals. In a systematic review of mental health in TGNC persons, Valentine and Shipherd (2018) concluded that protective factors such as social support, TGNC community connectedness, and adaptive coping strategies may reduce psychological symptoms. With regard to TGNC-specific factors, TGNC community connectedness is a key protective factor, often comprising TGNC-specific support groups and social networks that serve to relieve minority stress (e.g., Frost & Meyer, 2012; Pflum, Testa, Balsam, Goldblum, & Bongar, 2015). In the Trans Health Survey (Testa et al., 2015; the same dataset we used in the present study), TGNC community connectedness was negatively correlated with depression and anxiety for trans female spectrum persons (Pflum et al., 2015). Similarly, TGNC Pride was negatively associated with psychological distress (Bockting et al., 2014).

Even more research points to social support as an important protective factor. The support of others may facilitate the use of adaptive coping mechanisms and mitigate psychological symptoms related to minority stress (Budge, Adelson, & Howard, 2013; Sánchez & Vilain, 2009). Gender-affirming social support in particular might allow TGNC persons to develop greater self-acceptance (Budge et al., 2013). Inverse relationships between social support and depression and anxiety have been found in multiple studies (e.g., Budge et al., 2013; Testa et al., 2015). Furthermore, in a systematic review, Rosenkrantz et al. (2017) concluded that low levels of social support and social engagement and isolation in rural communities were related to worse health outcomes for rural LGBT persons. Finally, Bariola et al. (2015) found that social support from family in particular protects against psychological distress in TGNC adults and that social support from LGBT peers is associated with resilience.

No studies to date have examined whether living environment changes the relationship between protective factors and SA in TGNC individuals. Thus, in the current study, we examined how the broader

contextual layer of living environment relates to the presence of SA in TGNC individuals, as well whether living environment moderates the relationship between intra- and interpersonal protective factors and SA in TGNC persons.

1.4. The present study

We utilized data from the Trans Health Survey (e.g., Testa et al., 2015) to examine the relationship between living environment (urban vs. suburban vs. small-town/rural) and SA in TGNC individuals. We also aimed to determine whether living environment moderates the relationship between protective factors (i.e., pride in one's TGNC identity [TGNC pride], social support, and connectedness with the TGNC community) and SA. We hypothesized that mean SA would be higher in TGNC individuals living in more rural environments. We hypothesized that there would be a stronger inverse relationships between protective factors and SA in more rural environments. In other words, we predicted that protective factors would have even greater benefits in rural compared to urban environments due to the importance of possessing these resiliency factors in a broader context that may be associated with worse mental health for this population.

2. Method

2.1. Procedure

All participants voluntarily completed the Trans Health Survey, an online anonymous survey consisting of 115 questions. Participants were residents of the U.S. or Canada and were recruited through online postings through social media, contact with leaders in the TGNC community, and local and national TGNC listservs. To increase ethnic diversity in the sample, targeted emails and postings were directed toward "Trans People of Color" through applicable websites and listservs. Participants were eligible if they indicated that they were at least 18-years-old and that their gender identity differed from their sex assigned at birth. Participation in the survey lasted approximately 40 min and was not compensated. The survey was approved by the Institutional Review Board of Palo Alto University where one of the authors (RJT) was on faculty at the time.

2.2. Participants

Participants were 902 individuals who filled out the Trans Health Survey (M_{age} = 32.47 years, SD = 13.15). Of the 1,414 respondents who began participating in the Trans Health Survey, 1,167 individuals had valid entries and completed the survey. In the present study, we included only individuals who completed all questions asking about living environment, social support, TGNC pride, and TGNC community connectedness. Thus, the final number included in analyses was 902 individuals. Participant demographic characteristics are presented in Table 1. All participants provided informed consent for the survey study.

Table 1
Demographic characteristics of study sample, differentiated by living environment (N = 902).

Demographic Characteristic	Urban (n = 443)		Suburban (n = 264)		Small town/Rural (n = 195)	
	Mean or n	*SD* or %	*Mean or n*	*SD* or %	*Mean or n*	*SD* or %
Age (M, SD)	32.3	12.6	32.2	13.4	33.2	14.0
Sex at birth (n, %)						
Male	134	30.2	113	42.8	65	33.3
Female	297	67	136	51.5	123	63.1
Intersex	4	0.9	3	1.1	1	0.5
No response	8	1.8	12	4.5	6	3.1
Gender (n, %)						
Male	81	18.3	34	12.9	33	16.9
Female	45	10.2	43	16.3	22	11.3
Trans Man/ Female to Male	137	30.9	67	25.4	58	29.7
Trans Woman/ Male to Female	68	15.3	58	22.0	42	21.5
Genderqueer	106	23.9	58	22.0	38	19.5
Other or No response	6	1.4	4	1.6	2	1.0
Race/ethnicity (n, %)						
White/Caucasian	386	87.1	234	88.6	176	90.3
African-American	12	2.7	7	2.7	1	0.5
American Indian/ Alaska native	2	0.5	3	1.1	5	2.6
Native Hawaiian/ Pacific Islander	2	0.5	2	0.8	2	1.0
Asian or Asian American	11	2.5	4	1.5	0	0.0
Multiracial	24	5.4	8	3.0	7	3.6
Other	4	0.9	4	1.5	3	1.5
No response	2	0.5	2	0.8	1	0.5
Hispanic (n, %)						
Yes	30	6.8	18	6.8	5	2.6

2.3. Measures

Demographic Questionnaire. Living environment was assessed in this survey using the Demographic Questionnaire, which also inquired about participants' sex assigned at birth, gender identity, age, race, ethnicity, level of education, and household income. The living environment item asked participants to select the term that best describes the area in which they currently lived. Response options were "urban area/city," "suburb, close to a city," "small town," and "rural area."

Mini-Social Phobia Inventory (Mini-SPIN; Connor, Kobak, Churchill, Katzelnick & Davidson, 2001). SA was assessed using the Mini-SPIN, a 3-item SA screening measure. Items assess fear and avoidance of being embarrassed or being the center of attention (e.g., "Fear of embarrassment causes me to avoid doing things or speaking to people"). Items are rated based on the past week on a 5-point Likert-type scale from 0 (*not at all*) to 4 (*extremely*). A cutoff score of 6 on the Mini-SPIN indicates a probable diagnosis of SAD (Seeley-Wait, Abbott, & Rapee, 2009; Weeks, Spokas, & Heimberg, 2007). The Mini-SPIN has displayed strong internal consistency and good convergent and discriminant validity in adult clinical samples (Seeley-Wait et al., 2009; Weeks et al., 2007). Internal consistency in this sample was good (Cronbach's α = .86).

Berlin Social Support Scale—Perceived Social Support Scale (BSSS; Schulz & Schwarzer, 2003). Perceived social support was assessed with the 8-item perceived social support scale of the BSSS. Items on this scale assess instrumental and emotional support and are rated on a 4-item Likert-type scale from 1 (*strongly disagree*) to 4 (*strongly agree*). Example items include "Whenever I am sad, there are people who cheer me up" and "There are people who offer me help when I need it." The BSSS has demonstrated good reliability and validity (Schulz & Schwarzer, 2003). Internal consistency in this sample was excellent for the perceived social support scale (α = .94).

Gender Minority Stress and Resilience Measure (GMSR; Testa et al., 2015). TGNC community connectedness was assessed using the 5-item community connectedness subscale of the GMSR, which asks about feelings of affiliation with and belongingness to the TGNC community. Items are rated on a 5-point Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items are "I feel part of a community of people who share my identity" and "I'm not like other people who share my gender identity" (reverse scored). This scale has demonstrated good convergent validity and reliability (Testa et al., 2015). Internal consistency in this sample was good (α = .85).

Pride in one's TGNC identity was also measured using the GMSR, using the 8-item pride subscale, which was adapted from the

Transgender Identity Scale (Bockting et al., 2014). Items are rated on a 5-point Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items are "I am proud to be a person whose gender identity is different from my sex assigned at birth" and "My gender identity or expression makes me feel special and unique." Good internal consistency has been demonstrated (Testa et al., 2015). Internal consistency was good in this sample (α = .90).

2.4. Data analyses

Differences in Mini-SPIN scores (SA) between individuals living in urban, suburban, and small town/rural environments were examined using analysis of variance (ANOVA). For the purposes of maximizing power, small-town and rural environments were combined into a single category. If a significant difference in SA between living environment was revealed, *post hoc* pairwise comparisons were conducted. Alpha levels for multiple comparisons were adjusted using Bonferroni correction. Multiple linear regression analyses were conducted to examine whether living environment moderated the relationship between protective factors and SA. Living environment was dummy coded with urban environment as the reference group. Social support, TGNC pride, and TGNC community connectedness scores were mean centered before running regression analyses.

3. Results

See Table 2 for descriptive statistics for all primary study variables, grouped by living environment.

3.1. Zero order correlations

The zero order correlations between SA, TGNC pride, social support, and TGNC community connectedness are presented in Table 3. All variables were significantly correlated in the expected directions. Descriptive statistics on measures of SA, TGNC pride, social support and TGNC community connectedness are also presented in Table 3. The mean Mini-SPIN score of the entire sample was 5.33 (*SD* = 3.69).

3.2. Social anxiety and living environment

ANOVA examined whether those living in urban, suburban, or small-town/rural environments reported significantly different levels of SA. There was an overall between-groups difference in SA, $F(2, 899) = 5.38$, $p < .01$. Pairwise comparisons revealed that those living in small-town/rural environments ($M = 5.85$; $SD = 3.62$) reported significantly higher SA compared to those living in urban environments ($M = 4.93$; $SD = 3.73$), $t(637) = 2.92$, $p = .01$. There was no significant difference in levels of SA between those living in suburban environments ($M = 5.61$; $SD = 3.60$) and those living in small-town/rural environments, $t(458) = 0.75$, $p = 1.00$. There was a trend-level difference in SA between respondents from suburban and urban environments, such that SA was higher in suburban compared to urban environments, $t(708) = 2.39$, $p = .051$.

Table 3
Bivariate correlations among primary study variables.

	Social Anxiety	Social Support	Pride	Trans Community Connectedness
Social Anxiety	1.00			
Social Support	−.29***	1.00		
Pride	−.22***	.25***	1.00	
Trans Community Connectedness	−.18***	.30***	.34***	1.00
M (*SD*)	5.33 (3.69)	25.95 (5.58)	16.49 (8.23)	11.72 (5.04)

*$p < .05$.
**$p < .01$.
***$p < .001$.

3.3. Social anxiety, living environment, and protective factors

Next, we conducted linear regression analyses to determine whether living environments (urban, suburban, and small-town/rural) moderated the relationships between social support, TGNC pride, and TGNC community connectedness and SA in TGNC individuals. Living environment was dummy coded with urban environment as the reference group. Social support, TGNC pride, and TGNC community connectedness scores were mean centered. The first multiple linear regression revealed that social support was associated with lower levels of SA ($\beta = -.35$, $t = -6.95$, $p < .001$). There was a significant interaction between living environment and social support ($\beta = .10$, $t = 2.24$, $p < .03$; See Fig. 1). However, the moderation effect was not in the expected direction. While we hypothesized that there would be a stronger inverse relationship between social support and SA in rural environments, we found the opposite; the protective effects of social support on SA scores were stronger in urban and suburban environments compared to small-town/rural environments. Full regression results are reported in Table 4.

A second multiple linear regression analysis showed that TGNC pride was associated with lower levels of SA ($\beta = -.18$, $t = -3.87$, $p < .001$). However, living environment did not significantly moderate the relationship between TGNC pride and SA. Full regression results are reported in Table 5.

The final multiple linear regression analysis revealed that TGNC community connectedness significantly predicted lower levels of SA ($\beta = -.18$, $t = -3.67$, $p < .001$). However, living environment did not significantly moderate the relationship between TGNC community connectedness and SA. Full regression results are reported in Table 6.

To facilitate interpretation of the moderation results, we conducted *post hoc* ANOVAs aimed at better understanding the relationships between protective factors and living environment. A *post hoc* ANOVA examining differences in mean social support across urban, suburban, and small-town/rural living environments did not reveal any significant differences in social support across the three environments, $F(2, 899) = 1.97$, $p = .14$. Similarly, *post hoc* ANOVAs revealed no significant differences in TGNC pride across the three environments [$F(2, 899) = 0.67$, $p = .51$] or TGNC community connectedness across the three environments [$F(2, 899) = 1.02$, $p = .36$].

Table 2
Descriptive statistics for primary study variables, grouped by living environment.

	Urban (n = 443)			Suburban (n = 264)			Small town/Rural (n = 195)		
	Mean	*SD*	Range	*Mean*	*SD*	Range	*Mean*	*SD*	Range
Social Anxiety	4.93	3.73	0–12	5.61	3.60	0–12	5.85	3.62	0–12
Social Support	26.33	5.11	8–32	25.55	6.06	8–32	25.66	5.91	8–32
Pride	16.67	8.09	0–32	16.00	8.30	0–32	16.77	8.50	0–32
Trans Community Connectedness	11.94	4.89	0–20	11.38	5.18	0–20	11.68	5.19	0–20

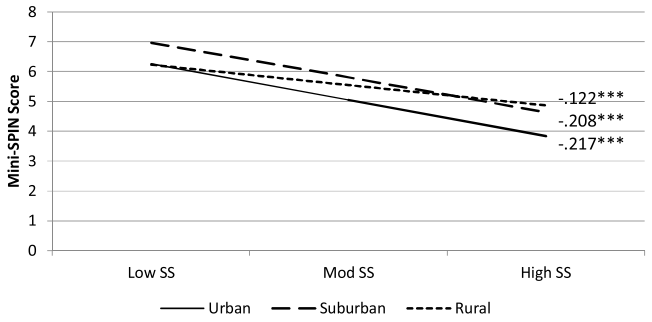

Fig. 1. Graph of the interaction between social support (SS) and living environment in the prediction of social anxiety as assessed by the Mini-SPIN. Social support is depicted one standard deviation above the mean (high SS), at the mean (moderate [mod] SS), and one standard deviation below the mean (low SS). The cut-off score on the Mini-SPIN for a probable diagnosis of SAD is 6 (Seeley-Wait et al., 2009; Weeks et al., 2007).

Table 4
Results of multiple linear regression model of social support predicting social anxiety, moderated by living environment.

	B	SE	*t*	*β*
Social Support	−.23	.03	−6.95	−.35***
Rural	.77	.30	2.56	.09*
Suburban	.55	.27	2.01	.07
Rural x Social Support	.02	.05	0.36	.02
Suburban x Social Support	.11	.05	2.24	.10*
Overall Model F (5, 897) = 18.98, p < .001				
R^2 = .10				

Note. *p < .05, **p < .01, ***p < .001. B = unstandardized coefficient; SE = standard error; β = standardized coefficient.

Table 5
Results of multiple linear regression model of TGNC pride predicting social anxiety, moderated by living environment.

	B	SE	*t*	β
Pride	−.08	.02	−3.87	−.18***
Rural	.95	.31	3.07	.11**
Suburban	.63	.28	2.26	.08*
Rural x Pride	−.06	.04	−1.72	−.07
Suburban x Pride	.001	.03	0.02	.001
Overall Model F (5, 897) = 11.69, p < .001				
R^2 = .06				

Note. *p < .05, **p < .01, ***p < .001. B = unstandardized coefficient; SE = standard error; β = standardized coefficient.

Table 6
Results of multiple linear regression model of living environment predicting social anxiety, moderated by TGNC community connectedness.

	B	SE	*t*	β
Community Connectedness	−.13	.04	−3.67	−.18***
Rural	.89	.31	2.85	.10**
Suburban	.62	.28	2.20	.08
Rural x Community Affiliation	−.02	.06	−0.27	−.01
Suburban x Community Connectedness	−.03	.06	0.45	.02
Overall Model F (5, 897) = 7.76, p < .001				
R^2 = .04				

Note. *p < .05, **p < .01, ***p < .001. B = unstandardized coefficient; SE = standard error; β = standardized coefficient.

4. Discussion

This is the first study to examine the relationship between living environment and SA in TGNC persons, and the results indicate an urban-rural discrepancy in SA among TGNC individuals. SA was higher for TGNC individuals in rural compared to urban environments, and respondents living in suburban areas reported higher SA than those living in urban areas at the trend level. SA did not differ significantly among TGNC individuals in small-town/rural compared to suburban environments. It is possible that the suburbs tend to be more conservative than urban areas and more similar in that way to rural environments (Williamson, 2008).

In contrast, there is no such urban-rural discrepancy within the general population. In a study examining the point prevalence of SAD and associated demographic variables in the Swedish general population, there were no differences in prevalence rates in urban versus rural regions, either when comparing densely populated Stockholm with less populated Gotland, or when comparing urban and rural areas within Gotland (Furmark et al., 1999). No urban-rural differences in SAD prevalence were found in the US (Magee, 1996) or in Canada (Romans, Cohen, & Forte, 2010). Finally, a meta-analysis of urban-rural differences in psychiatric disorders found that the pooled prevalence rate of anxiety disorders was actually higher in urban compared with rural environments (Peen, Schoevers, Beekman, & Dekker, 2010). Thus, it seems that rural environments are associated with SA among TGNC people in particular, rather than the population at large.

Furthermore, while a formal comparison of SA in our TGNC sample to SA in the cisgender or general population is beyond the scope of this study, our data suggest elevated SA levels in TGNC persons. The mean Mini-SPIN score of the entire sample in the present study was 5.3 ± 3.7. A clinical sample of individuals with SAD had a mean Mini-SPIN score of 8.8 ± 2.7, while those in a nonclinical group had a mean score of 1.8 ± 1.6 (Seeley-Wait et al., 2009). Thus, mean SA in the current TGNC sample is closer to that of the clinical sample than the nonclinical group. Furthermore, mean SA in small-town/rural and suburban areas (see Table 2) was only slightly under the clinical cutoff of 6 on the Mini-SPIN. In addition, the mean Mini-SPIN score was 4.5 in treatment-seeking individuals without SAD but meeting criteria for major depressive disorder, generalized anxiety disorder, and/or panic disorder (Fogliati et al., 2016). Thus, the mean SA score in the current TGNC sample was also higher than the mean SA score in a clinical, treatment-seeking sample. These comparisons provide further support for the possibility that TGNC individuals in general are at increased risk for elevated SA.

There are various explanations for why SA may be higher for TGNC individuals in more rural compared to urban environments. Meyer's (2003) minority stress model suggests that LGB individuals who engage in the LGB community are able to access protective factors, such as social support and connectedness to the LGB community more readily. This model likely extends to gender minorities, and it is possible that gender minorities in rural areas have less access to such protective factors. It is likely that urban environments provide more opportunities to engage in the TGNC community, which might help TGNC persons access protective resources and feel more accepted and less judged by others. Although there were no differences in social support, TGNC community connectedness, or TGNC pride across the three living environments in our sample, other research has found lower levels of social support and TGNC community connectedness in rural compared to urban TGNC persons (Horvath et al., 2013). Future research should continue to examine differences in mental health resources and protective factors across different living environments among TGNC persons.

Second, TGNC individuals living in rural environments may experience more minority stress, which could lead to increased fear of social threat, consequent self-monitoring, and the perpetuation of anxiety in the context of interacting with others (Meidlinger & Hope, 2014; Moradi, 2013). We found only one study examining urban-rural differences in minority stressors in TGNC persons, which found that the odds of experiencing gender-related discrimination were higher in suburban compared to rural areas (Bradford et al., 2013). Future

research should investigate whether there is a relationship between living environment and TGNC-specific minority stressors, such as discrimination, victimization, rejection, and nonaffirmation.

Social support, TGNC community connectedness, and TGNC pride were associated with lower SA in TGNC individuals. Living environment moderated the relationship between social support and SA, but not the other protective factors and SA. The specific moderating effect differed from what we predicted. We hypothesized that social support would be associated with greater reductions in SA in more rural environments, where there may be less access to other protective resources and social support may therefore be especially important; however, the relationship between social support and SA was stronger in urban and suburban environments than in rural areas. Although these findings suggest that social support is especially beneficial to TGNC individuals living in urban and suburban areas, they also suggest that social support does less to mitigate SA in rural areas. This interaction did not result from differences in social support levels across the three living environments, as no significant difference emerged between the groups. One explanation for this finding is that the nature of social support among the three environments differs, such that individuals in rural environments receive general social support from people close to them but do not feel supported in their affirmed gender. Bradford et al. (2013) found that many TGNC individuals lack support from family members regarding their gender expression/transgender identity. Further research examining the effects of TGNC-specific social support versus general social support is needed to confirm this speculation.

Living environment did not moderate the relationships between TGNC pride and TGNC community connectedness and SA, suggesting that living environment does not alter the protective effects of these TGNC-specific factors. There were no differences in TGNC pride or TGNC community connectedness across the different living environments. This finding diverges from extant research which found lower levels of TGNC community connectedness in rural compared to urban TGNC persons (Horvath et al., 2013). It is possible that the increasing popularity of Internet-based TGNC communities has mitigated geographic disparities in TGNC-specific protective factors (Pflum et al., 2015).

In interpreting the results of this study, we must consider its limitations. First, the data are cross-sectional, so causal relationships cannot be established. Thus, we cannot determine whether living in a rural environment leads to the development of higher SA, whether individuals with higher SA choose to live in more rural or small-town environments, or whether there is a third variable influencing both of these factors. Future research should investigate these variables longitudinally, examining, for instance, whether moving from a rural to an urban environment leads to reductions in SA and whether specific factors (e.g., easier access to TGNC-specific resources/a TGNC community) mediate these changes.

Whereas the measures of TGNC community connectedness and pride in one's TGNC identity were, of necessity, TGNC-specific, the measure of social support was a more general measure of instrumental and emotional support. It may be that a more TGNC-specific measure of social support might have yielded a different pattern of results. For instance, it is possible that one's family or community members may provide many important aspects of social support but at the same time differ quite dramatically in the support for one's TGNC-specific needs.

Additionally, this study utilized an online convenience sample. Such a sample may not be representative of all TGNC individuals, including persons with lower SES who may not have consistent access to the Internet. Although recruitment efforts geared toward ethnic minority individuals were employed, ethnic minorities were underrepresented in this sample, precluding analyses examining intersectional identities and differences in findings for people of different ethnic backgrounds. The intersection of TGNC identity and ethnicity/race, as well as other forms of minority stress, may impact outcomes and warrants further study. Future research should utilize in-person study recruitment and participation, which could serve to increase ethnic minority representation and decrease the amount of missing data for individuals who fill out the survey.

Finally, combining the small-town and rural living environment groups prevented more nuanced analyses of living environments. However, given the relatively small proportions of individuals who reported living in these environments, we chose to maximize power in order to detect differences between small-town/rural and suburban and urban groups. Small-town environments are arguably more similar to rural than to suburban environments, at least in regard to lower number of residents and the potential of reduced access to TGNC-specific resources. However, future research could benefit from targeted recruitment efforts in small-town and rural areas to maximize power and examine more nuanced differences between living environments.

Future research should continue to investigate factors associated with rural environments that may contribute to greater SA in TGNC individuals. It would be beneficial to collect data on factors that may be related to living environment, such as access to TGNC community or resource centers, number of local TGNC friends or acquaintances, social-political attitudes of residents of that area, access to TGNC-specific medical healthcare, access to TGNC-specific mental healthcare (e.g., therapists who specialize in working with individuals experiencing gender minority stress), population density, or anti-discrimination laws. Additionally, attitudes, values, and social resources across communities can be heterogeneous even within location type and should be considered in the context of community- and individual-based assessments and interventions. Once these factors are identified, efforts may be taken to reduce risks and protect against negative outcomes in persons who comprise an already vulnerable population.

5. Conclusions

This study provides preliminary evidence that living in more rural environments is associated with elevated social anxiety among TGNC individuals. Whereas social support, TGNC pride, and TGNC community connectedness were all negatively correlated with social anxiety in TGNC individuals, only the relationship between social support and social anxiety differed based on living environment. Social support appears to protect TGNC individuals against elevated SA more strongly in urban and suburban than small-town/rural environments. Future research should continue to examine urban-rural mental health disparities among TGNC individuals. More studies are necessary to identify factors that moderate or mediate the relationship between living environment and psychological symptoms in TGNC individuals.

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Declaration of Competing Interest

None.

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