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**Psychological Processes Underlying the Impact of Gender-Related Discrimination on  
Psychological Distress in Transgender and Gender Nonconforming People**

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### Abstract

In this study we combined understanding from the Gender Minority Stress and Resilience (GMSR) model (Testa, Habarth, Peta, Balsam, & Bockting, 2015) and Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999, 2012) to test a theoretically integrated and expansive account of the development of psychological distress in transgender and gender nonconforming (TGNC) people. Specifically, we constructed a parallel multiple mediation model in which we examined the role of psychological processes deriving from the GMSR model (i.e., internalized transphobia and identity nondisclosure) and ACT (i.e., psychological inflexibility) in the relationship between gender-related discrimination and psychological distress (i.e., depression, anxiety and stress). We based this model upon data from a two-wave longitudinal panel design in which 358 TGNC people living in England responded to a battery of measures on two occasions, 12 months apart (herein, Time 1 and Time 2). Initial tests of model fit and temporal invariance indicated that our proposed measurement model offered an excellent fit to the data and demonstrated equivalence of measurement across the two study timepoints. Autoregressive cross-lagged manifest path analysis indicated that while our hypothesized full structural model offered an excellent fit to the data, psychological inflexibility alone mediated the relationships between gender-related discrimination and depression, anxiety and stress. Model comparison analysis confirmed the redundancy of internalized transphobia and identity nondisclosure as mediators and ruled out alternative patterns of causality. We discuss theoretical, empirical and practical implications for the field of TGNC mental health.

**Key words:** Transgender and gender nonconforming people; psychological distress; gender minority stressors; psychological inflexibility; longitudinal panel design.

### **Public Significance Statement**

This study advanced understanding of how experiences of gender-related discrimination may lead to symptoms of psychological distress in transgender and gender nonconforming (TGNC) people. It also responded to recent calls for more methodologically sophisticated research into the needs and experiences of this underserved population.

### **Introduction**

Transgender and gender nonconforming (TGNC) people are individuals whose gender identity does not fully align with the sex they were assigned at birth (American Psychological Association, 2015). TGNC people may identify as the opposite gender or experience a gender identity that sits outside of the mutually exclusive categories of female or male (Harrison, Grant, & Herman, 2012). Research has suggested that TGNC people experience disproportionately high levels of psychological distress relative to the general population. For example, McNeil, Bailey, Ellis, Morton, and Regan (2012) found prevalence rates of depression and anxiety in transgender people in the UK (55% and 38% currently/previously diagnosed with depression and anxiety respectively) that far surpassed estimations in the general UK population (18.3% showing some evidence for depression and/or anxiety in 2012/13; Office for National Statistics, 2015). Such statistics signal an urgent need to better understand the development of psychological distress in TGNC people.

Numerous studies have shown that TGNC people are subject to frequent and intense gender-related discrimination, stigma, rejection and violence and that these prejudice events relate to psychological distress (e.g., Bockting, Miner, Swinburne Romine, Hamilton, & Coleman, 2013; Breslow et al., 2015; Nemoto, Bödeker, & Iwamoto, 2011; Nuttbrock et al., 2014; Reisner et al., 2016; Tebbe & Moradi, 2016; Testa, Habarth, Peta, Balsam, & Bockting, 2015; Testa et al., 2017; Timmins, Rimes, & Rahman, 2017; Velez, Breslow, Brewster, Cox, & Foster, 2016; White Hughto, Pachankis, Willie, & Reisner, 2017). However, there has been

less research on *how* these relationships occur. Discussions in the gender and sexual minority field have highlighted the potential role of psychological processes. For example, Meyer (2003, 2015) suggested that objective minority stressors create mindsets in the stigmatized; that, through cognitive appraisal, external conditions and structures gain psychological significance. To investigate this, we examined multiple psychological processes underlying the impact of prejudice events on psychological distress in TGNC people. While prejudice events take many forms, we assessed gender-related discrimination. This construct involves institutional practices (e.g., around housing, employment etc.) that restrict opportunities and disadvantage TGNC people. Since this can occur “even in the absence of individual prejudice” (Link & Phelan, 2001, p. 372), we believed it would be the most pervasive form of discrimination within our population. Consistent with the tripartite model (Clark & Watson, 1991; Mineka, Watson, & Clark, 1998) and supporting research (e.g., Clark, Steer, & Beck, 1994), we operationalized psychological distress as a multidimensional construct involving the specific emotional states of depression, anxiety and stress.

To guide our examination of psychological processes, we drew on Hatzenbuehler’s (2009) integrative mediation framework which posited the importance of both group-specific and general psychological processes in the minority discrimination—distress relationship. While originally developed to understand the experiences of sexual minority individuals, researchers have also applied the framework to transgender populations (e.g., Testa et al., 2017; Timmins et al., 2017). Group-specific processes are unique to minority individuals and occur as a result of being a member of a stigmatized group (Hatzenbuehler, 2009). We focused on two such processes highlighted by the Gender Minority Stress and Resilience (GMSR) model (Testa et al., 2015), namely internalized transphobia and identity nondisclosure. General psychological processes are “established cognitive, affective, and social determinants of mental health outcomes” that operate for all individuals

(Hatzenbuehler, 2009, p. 708). We focused on the general process of psychological inflexibility deriving from a contemporary cognitive behavioral therapy (CBT) theory called Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999, 2012). We tested the explanatory power of these processes in the context of a parallel multiple mediation model. In doing so, we analyzed an integrated and expansive account of the pathways of effect from gender-related discrimination to depression, anxiety and stress. We also tested our proposed model longitudinally, while controlling for potentially confounding exogenous variables and investigated alternative models of causality. Such a rigorous analysis of a theoretically integrated model offered an exceptionally precise and comprehensive test of the processes underpinning the development of psychological distress in TGNC people.

### **Explanatory Processes: Gender Minority Stressors**

In their GMSR model, Testa et al. (2015) presented a TGNC-specific explanation of the psychological processes underlying the impact of prejudice events on psychological distress. This built on Meyer's (1995, 2003) minority stress model, originally developed to understand the unique stressors experienced by lesbian, gay and bisexual (LGB) people. Testa et al. (2015) described two major types of TGNC stressor: distal and proximal. Distal stressors are external prejudice events involving direct experiences of gender-related discrimination, rejection and victimization, and non-affirmation of gender identity. Proximal stressors are internal psychological processes including internalized transphobia, stress related to identity nondisclosure and negative expectations for future events. Testa et al. (2015) suggested that distal stressors lead directly to experiences of psychological distress, but also to proximal stressors. Proximal stressors, in turn, mediate the relationships between distal stressors and experiences of psychological distress. Finally, Testa et al. (2015) described two resilience factors—community connectedness and identity pride—that buffer

the direct and indirect (via proximal stressors) relationships between the distal stressors and experiences of psychological distress.

Recent research on TGNC minority stress experiences has found effects consistent with the GMSR model (e.g., Breslow et al., 2015; Testa et al., 2017; Timmins et al., 2017); however, to our knowledge, all studies to date have used cross-sectional research designs. Although such designs may uncover connections between variables, they cannot establish the temporal directions of these connections. Dickey, Hendricks, and Bockting (2016) noted the general lack of longitudinal TGNC research and the limitations this imposes on examinations of causality. Thus, to build upon extant research, we examined relationships consistent with the GMSR model using a longitudinal panel design. More specifically, we examined internalized transphobia and identity nondisclosure as potential mediators of the impact of gender-related discrimination on depression, anxiety and stress. While there is a dearth of research on all three proximal stressors (Hendricks & Testa, 2012), we examined the two that appeared to warrant the most immediate attention. Internalized transphobia is potentially the most damaging of the three stressors as it is the most subjective (i.e., closest to the self) and therefore the most likely impact an individual's ability to cope (Hendricks & Testa, 2012). Identity nondisclosure is the stressor considered to show the most distinctive manifestation in gender, relative to sexual, minority individuals (Testa et al., 2015).

Beyond testing the temporal sequence specified by the GMSR model, we examined alternative models of causality. Breslow et al. (2015) suggested that while researchers should use longitudinal studies to test the directional assumptions underpinning the minority stress field, they should also explore competing models. For instance, it is possible that proximal stressors may promote TGNC people's reports of objective discrimination, because of individuals coming to view environments as hostile over time (Breslow et al., 2015). It is also possible that psychological distress may promote TGNC people's reports of objective

discrimination since psychiatric morbidity can disrupt social functioning such that more negative interactions transpire (Mays & Cochran, 2001). Accordingly, we tested two alternative models in which we placed proximal stressors, and psychological distress, respectively, at the start of the temporal sequence. For the most effective comparison, we retained all study variables (i.e., constructed nested models) and simply reordered the original sequence. In the first alternative model, we tested whether internalized transphobia, identity nondisclosure and psychological inflexibility would impact depression, anxiety and stress via gender-related discrimination. In the second alternative model, we tested whether depression, anxiety and stress would impact gender-related discrimination via internalized transphobia, identity nondisclosure and psychological inflexibility.

### **Explanatory Processes: Maladaptive Emotional Management**

Other explanations of the psychological processes underlying the impact of prejudice events on psychological distress in TGNC people derive from studies of general maladaptive emotional management processes in this population. For example, White Hughto et al. (2017) found that avoidant coping mediated the relationship between victimization and depression in transgender people. Avoidant coping involves people not dealing directly with a stressor (White Hughto et al., 2017) through cognitive responses such as minimizing and suppressing and behavioral responses such as drinking and substance abuse (Budge, Adelson, & Howard, 2013). As another example, Timmins et al. (2017) found that depressive rumination mediated the relationship between prejudice events and psychological distress in transgender people. Depressive rumination occurs when people repetitively focus on their symptoms of distress and the events surrounding these (Nolen-Hoeksema, 1991). We extended this line of research by examining a process known as psychological inflexibility. Psychological inflexibility is the core process of change within ACT (Hayes et al., 1999, 2012). It is defined as “the rigid dominance of psychological reactions over chosen values and contingencies in guiding

action” (Bond et al., 2011, p. 678) and occurs when people’s behavior is excessively controlled by their internal experiences (e.g., thoughts, feelings, physiological sensations), rather than by what would be most effective or meaningful for them in that moment (Hayes et al., 1999, 2012). For example, an individual in a new social situation could become so focused on feelings of worry and apprehension about how they are being perceived that they are unable to connect with others in a way that is deeply desired. In this case, the individual’s actions are being guided more by their difficult and challenging internal experiences and less by what the environment has afforded them in relation to their desired qualities of living (i.e., an opportunity to develop new friendships).

According to ACT theory, psychological inflexibility stems from the way in which language and cognition interact with our life circumstances (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). It arises when we employ our normal and natural language processes on occasions when they are not helpful or in ways that are ineffective (Luoma, Hayes, & Walser, 2007). For instance, take the psychopathological process of experiential avoidance, which describes people’s attempts to avoid, suppress, or otherwise control internal experiences, even when such attempts may cause behavioral harm (Hayes et al., 1996). From an ACT perspective, experiential avoidance derives from our abilities to evaluate, predict and avoid events (Luoma et al., 2007). Such abilities are useful when applied to aspects of the external world (e.g., avoiding a dangerous situation), but their overextension to the internal psychological world can have harmful consequences. Specifically, avoidance of aversive internal experiences often has the unfortunate “ironic effect” of enhancing psychological distress (Bond et al., 2011, p 678). ACT theorists have discussed several other psychopathological processes arising from entanglement with language and cognition, including cognitive fusion (i.e., the dominance of evaluative and self-descriptive thoughts in guiding action) and lack of values clarity and contact (i.e., the absence or weakness of chosen

life directions) (Hayes et al., 1996; Luoma et al., 2007). Importantly, while these processes stem directly from our verbal abilities, our social/verbal community works to foster and sustain them (Hayes et al., 1996). For example, a culture preoccupied with “feeling good” and avoiding pain, which focusses on the manipulation of emotional states as an indicator of successful living, may amplify experiential avoidance (Hayes et al., 1996).

While research has shown psychological inflexibility to correlate with and predict psychological, behavioral and attitudinal outcomes across a range of clinical, community and occupational samples (Bond et al., 2011; Bond, Lloyd, & Guenole, 2013; Hayes, Luoma, Bond, Masuda, & Lillis, 2006), there appears to have been no research on TGNC people. However, an account of how this psychological process may unfold and confer risk for distress in the context of TGNC discrimination readily arises from ACT theory. Specifically, negative psychological experiences (e.g., critical thoughts about one’s identity, feelings of anxiety about personal safety etc.) may, understandably, arise from encounters in which a person’s identity is devalued. As people attempt to regulate their internal environment, they may begin to interact unhelpfully with these experiences [e.g., attempt to control, alter or suppress (i.e., experientially avoid) them or become excessively entangled or caught up (i.e., cognitively fused) with them], initiating a kind of internal struggle or battle. This internal struggle or battle may lead to additional worry and upset and to people becoming distracted from, or finding they have less energy for, taking actions that are personally meaningful (e.g., finding supportive relationships and nourishing environments). Eventually, the continued dominance of psychological experiences, over and above deeply held values (i.e., psychological inflexibility), may lead to psychological distress. In line with this, research has suggested that psychological inflexibility may develop under difficult life conditions, and this, in turn, may lead to experiences of psychological distress (e.g., Kurz, Bethay, & Ladner-Graham, 2014; Williams, Ciarrochi, & Heaven, 2012).

**The Present Study: A Theoretically Integrated and Expansive Model**

In sum, there is a clear need for longitudinal research investigating *how* prejudice events relate to psychological distress in TGNC people. Through a consideration of both group-specific and general psychological processes, researchers may examine more comprehensive explanations for this relationship. Thus, using understanding from the GMSR model and ACT theory, we specified an integrated and expansive parallel multiple mediation model (see Figure 1 for conceptual diagram) in which we expected: gender-related discrimination to predict higher levels of internalized transphobia, identity nondisclosure and psychological inflexibility (Hypothesis 1); internalized transphobia, identity nondisclosure and psychological inflexibility to predict more depression, anxiety and stress (Hypothesis 2); and internalized transphobia, identity nondisclosure and psychological inflexibility to mediate the impact of gender-related discrimination on depression, anxiety and stress (Hypothesis 3).

[Insert figure 1 about here]

**Method****Design and Procedure**

We used a two-wave longitudinal panel design that involved identical data from a sample of TGNC people living in England ( $N = 358$ ) on two occasions, 12 months apart (i.e., Time 1 and Time 2). We drew these data from the ‘Quality of Life in TGNC People in England’ study, an ongoing longitudinal cohort study investigating TGNC people’s health and happiness. In this study, we recruit new cohorts of participants every year (between August and September, starting in 2016) to respond to our online survey and simultaneously invite previous years’ cohorts to respond again. We access new participants via adverts on TGNC social media platforms and through contact with TGNC organizations and community groups. Participation is voluntary, anonymous and confidential and we offer no remuneration. We inform participants of the benefits and risks of taking part. Eligibility requirements

include that participants: (a) are over 18 years in age; (b) live in England; and (c) identify as TGNC. Consistent with step one of the “two-step” method (Conron, Scout, & Austin, 2008; Reisner et al., 2015), we consider the latter criterion met if participants report that they do not identify as the gender they were assigned at birth. We received ethical approval for this study from the IMS ethics committee.

At Time 1 (i.e., in 2016), a total of 1336 participants began the survey. Of these, we excluded 346 as they had 100% missing data (i.e., they immediately discontinued the survey); 49 as they failed to respond to one whole scale; 39 as they did not meet the identity criterion; and 18 as they did not meet the age criterion. This resulted in a final Time 1 sample of 884. Within this, 731 participants (83%) indicated their willingness to complete the survey again the following year. At Time 2 (i.e., in 2017), a total of 400 returning individuals began the survey. Of these, we excluded 33 because they had 100% missing data; and 8 because they had failed to respond to one whole scale. We excluded one further individual during the data screening phase. This resulted in a final Time 2 sample of 358, which represented 49% of the Time 1 participants that had declared their willingness to complete the survey again. This return rate is similar to other year-long two-wave panel studies (e.g., Bond & Bunce, 2003). There were no significant differences on the Time 1 study variables between participants who took part in the second survey, and those who did not.

The incidence of missing data across the study variables was low for the remaining participants (0.3% on two variables at Time 1 and between 0.3% and 1.1% across five variables at Time 2). Little’s test indicated that data were missing completely at random (MCAR). Rather than delete these cases, we used data estimation methods in Mplus version 8.2, the package used for all data analysis (Muthén & Muthén, 1998-2017).

## **Participants**



partnership and 0.3% ( $n = 1$ ) as widowed. Finally, in terms of income, 41.3% ( $n = 148$ ) of the participants stated their annual income as below £10,000 per year, 20.7% ( $n = 74$ ) as between £10,000 and £20,000 per year, 13.7% ( $n = 49$ ) as between £20,000 and £30,000 per year, 9.8% ( $n = 35$ ) as between £30,000 and £40,000 per year, 3.9% ( $n = 14$ ) as between £40,000 and £50,000 per year, 3.1% ( $n = 11$ ) as between £50,000 and £60,000 per year, 0.8% ( $n = 3$ ) as between £60,000 and £70,000 per year and 2.5% ( $n = 9$ ) as above £70,000 per year.

## Measures

**Gender minority stressors.** We used three scales from the Gender Minority Stress and Resilience (GMSR) measure (Testa et al., 2015).

**Gender-related discrimination.** This five-item scale assessed TGNC people's experiences of difficulty in accessing certain resources (e.g., medical care, legal documents etc.) because of their gender identity or expression. Items included "I have experienced difficulty getting identity documents that match my gender identity." Respondents selected all responses that applied to them from *Never*, *Yes, before age 18*, *Yes, after age 18*, and *Yes, in the past year*. A score of 0 denoted a never response, while a score of 1 denoted all other responses. Higher scores indicated higher levels of gender-related discrimination. This scale has shown preliminary evidence of strong factor loadings, and criterion, convergent and discriminant validity in a sample of 844 TGNC people (Testa et al., 2015). However, this initial validation indicated that the scale's internal consistency was only adequate (i.e., Cronbach alpha .61), a finding that we replicated in the present study (Cronbach alphas: .60 at Time 1, .61 at Time 2). This lower internal consistency could have attenuated the variable's relationship with others in the model. Unfortunately, efforts to address this through elimination of weaker items did not result in an improvement and therefore we proceeded with the planned analyses while applying caution to the interpretation of results.

***Internalized transphobia.*** This eight-item scale assessed TGNC people's internalization of negative societal views about their gender identity or expression, and the transgender community. Items included "I resent my gender identity or expression." Respondents indicated their level of agreement on a five-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated higher levels of internalized transphobia. This scale has shown preliminary evidence of strong factor loadings, internal consistency and criterion, convergent and discriminant validity in a sample of 844 TGNC people (Testa et al., 2015). In the present study, internal consistency for the scale at the two timepoints was excellent (Cronbach alphas: .91 at Time 1, .92 at Time 2).

***Identity nondisclosure.*** This five-item scale assessed TGNC people's efforts to conceal their gender identity/history through modifying aspects of their appearance and/or behavior (e.g., style of dress, movement and gesture etc.). Items included "Because I don't want others to know my gender identity/history, I modify my way of speaking." Respondents indicated their level of agreement on a five-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated higher levels of identity nondisclosure. This scale has shown preliminary evidence of strong factor loadings, internal consistency and criterion, convergent and discriminant validity in a sample of 844 TGNC people (Testa et al., 2015). In the present study, internal consistency for the scale at the two timepoints was good (Cronbach alphas: .81 at Time 1, .80 at Time 2).

***Psychological inflexibility.*** We used the seven-item Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) to assess psychological inflexibility. This is the rigid dominance of internal psychological experiences (e.g., thoughts, feelings, memories) over chosen values and contingencies in guiding people's actions. Items included "My painful memories prevent me from having a fulfilling life." Respondents indicated their level of agreement on a seven-point Likert-type scale ranging from 1 (*never true*) to 7 (*always*



.88 and .89 for depression, anxiety and stress scales) in a sample of 161 TGNC people (Ho & Mussap, 2017). In the present study, internal consistency for the three scales at the two timepoints ranged from good to excellent (depression: .93 at Time 1, .94 at Time 2; anxiety: .87 at Time 1, .87 at Time 2; and stress: .87 at Time 1, .86 at Time 2).

### **Control Variables**

Research has indicated that demographic characteristics may influence both mental health outcomes and experiences of minority stressors in TGNC people, with particularly strong evidence for the impact of age, ethnicity, education, income/socioeconomic status (SES) and relationship status (e.g., Bockting et al., 2013; Breslow et al., 2015; Budge et al., 2013; Haas, Rodgers, & Herman, 2014; Nemoto et al., 2011; Nuttbrock et al., 2014; Reisner et al., 2015; Reisner et al., 2016; Testa et al., 2017; Velez et al., 2016). To control for the influence of these potential confounds, we estimated our structural models and path coefficients while controlling for those that showed significant associations with our study variables. As indicated in Table 1, there were a series of non-trivial correlations (see Table 1 notes for coding of demographics).

[Insert table 1 about here]

### **Data Screening**

We screened our data to ensure its appropriateness for analysis. We found one case that contained both univariate and multivariate outliers. After attempts to reduce the influence of the univariate outlier (through score transformation and alteration) had no impact on the multivariate outlier, this case was eventually deleted (Tabachnick & Fidell, 2001). Skewness and kurtosis were within acceptable ranges (i.e., skewness < 2; kurtosis < 7; Curran, West, & Finch, 1996). Histograms, normal probability plots and detrended normal probability plots confirmed that data were reasonably normally distributed. Bivariate scatterplots confirmed linearity and homoscedasticity as they had a roughly oval-shaped distribution. A simple a-

priori sample size calculator for structural equation modelling (SEM) confirmed the minimum necessary sample size of  $N = 274$  (Soper, 2019).

### Data Analysis

**First phase of analysis.** To test whether our variables are good measures of the underlying constructs, we fit a seven-factor measurement model. We allowed the items for the seven scales to load onto their respective constructs at Time 1 and Time 2, resulting in 14 factors in total (seven at each time point) and allowed all factors to correlate. We examined the fit of this model in comparison to two alternative models. While research has largely supported the hypothesized three-factor structure of the DASS-21 (e.g., Antony et al., 1998; Clara et al., 2001), a few studies have found that a one-factor structure offered superior fit (e.g., Tran, Tran, & Fisher, 2013). Therefore, we also tested the fit of a five-factor model in which we allowed depression, anxiety and stress items to load onto a single 'psychological distress' factor. Also, while preliminary research has supported the distinctiveness of the three GMSR scales (e.g., Testa et al., 2015), validation of this measure is in its infancy and it is plausible that TGNC people may not always distinguish between different prejudicial experiences. Therefore, we also tested the fit of a five-factor model in which we allowed gender-related discrimination, internalized transphobia and identity nondisclosure items to load onto a single 'TGNC minority stress' factor.

Demonstrating temporal invariance (i.e., the equivalence of measurement of constructs across timepoints) is a key underpinning assumption of longitudinal panel studies (Selig & Little, 2012). We followed the procedures recommended by Liu et al. (2017) for research involving ordered-categorical indicators. Specifically, once we established the fit of the baseline measurement model (i.e., general pattern of factor loadings held constant over time), we compared this to three alternative models with increasing degrees of invariance: the loading invariance (item-factor loadings also held constant), the threshold invariance

(threshold of going from one response category to the next also held constant) and the unique factor invariance (unique factor variances also held constant) models. The highest degree of invariance suggests that observed changes reflect “true” changes in the constructs of interest, rather than changes in what is being measured over time.

We fitted the measurement models using weighted least squares with mean and variance adjustment (WLSMV) estimation to allow for the ordinal (i.e. Likert-type) nature of the scales. We dealt with missing data using the WLSMV default pairwise present method (Asparouhov & Muthén, 2010). We evaluated the goodness of fit using a combination of absolute and incremental fit indices recommended by Hu and Bentler (1998): the root mean square error of approximation (RMSEA), the comparative fit index (CFI) and the Tucker-Lewis Index (TLI). Goodness of fit is indicated when  $RMSEA \leq .06$ ,  $CFI \geq .95$  and  $TLI \geq .90$  (Hu & Bentler, 1998). We compared our competing models using an alternative chi-squared difference test (DIFFTEST) appropriate for WLSMV estimation. We used the 95% confidence level (i.e.,  $p < 0.05$ ) with two-tailed test for all model comparisons.

**Second phase of analysis.** To estimate our full structural model and test our hypotheses, we used autoregressive cross-lagged manifest path analysis. We had attempted to extend our initial measurement model to a full structural equation model, but persistent convergence problems suggested that the addition of the demographics and mediated pathways had increased the number of parameters beyond what the sample could support. For this reason, we computed mean scale scores for the study variables and used these observed values in place of latent factors. Accordingly, we fitted these models and estimated missing data using full information maximum likelihood (FIML) estimation and compared competing models using the standard chi-squared difference test. Once again, we assessed goodness of fit using the indices and cut-off criteria suggested by Hu and Bentler (1998).



transphobia, identity nondisclosure and psychological inflexibility (i.e., outcomes first; Model 6). Once again, we followed Cole and Maxwell's (2003) approach in the specification of our mediated models and assessed goodness of fit using the indices and cut-off criteria suggested by Hu and Bentler (1998).

## **Results**

As indicated in Table 1, correlations between the study variables were broadly consistent with the theories, research and hypotheses noted above.

### **First Phase of Analysis**

As indicated in Table 2, our seven-factor baseline measurement model offered an excellent fit to the data and outperformed the alternative five-factor combined psychological distress and five-factor combined TGNC minority stress models.

[Insert table 2 about here]

As further indicated in Table 2, our seven-factor baseline measurement model showed good evidence of temporal invariance, with model fit not being significantly reduced by us holding item-factor loadings or thresholds constant. While also holding unique factor variances constant did significantly reduce the model fit, practical fit indices did not change. Thus, we are confident that we achieved the highest level of measurement invariance.

### **Second Phase of Analysis**

As indicated in Table 3, our full structural model offered an excellent fit to the data. It also explained a large proportion of variance in both mediating (45%, 56% and 63% in identity nondisclosure, internalized transphobia and psychological inflexibility respectively) and outcome (49%, 55% and 47% in stress, anxiety and depression respectively) variables.

[Insert table 3 about here]

Table 4 and Figure 2 display the unstandardized path coefficients for the full structural model. Inconsistent with Hypothesis 1, Time 1 gender-related discrimination did



0.013/0.072). Due to the non-significance of two of the three specific mediated effects, a formal comparison was not carried out.

As further indicated in Table 3, the sequence of restricted alternative nested models suggested that modelling mediated effects only (Model 2), and mediation via psychological inflexibility only (Model 4), did not result in significantly worse fitting models. However, modelling mediation via internalized transphobia and identity nondisclosure only (Model 3) resulted in a significantly worse fitting model. This confirms findings from our full path model that direct effects of gender-related discrimination on depression, anxiety and stress, and mediational pathways involving internalized transphobia and identity nondisclosure, are not essential to attaining the best fitting model. Thus, Model 4 would appear to be the most parsimonious.

### **Third Phase of Analysis**

As further indicated in Table 3, both the mediators first (Model 5) and outcomes first (Model 6) alternative models of causality offered poor overall fit to the data and were significantly worse fitting than our original full path model. Thus, there was no evidence that either proximal stressors or psychological distress should initiate the temporal sequence.

### **Discussion**

In this study we examined an integrated and expansive multiple mediation model informed by understanding from the GMSR model and ACT theory. Inconsistent with Hypotheses 1, 2 and 3, we found no evidence that gender-related discrimination predicted internalized transphobia and identity nondisclosure, that internalized transphobia and identity nondisclosure predicted depression, anxiety and stress, or for mediation effects involving these relationships. These findings are inconsistent with the GMSR model and related research. Since we were able to rule out alternative patterns of causality between variables, we consider other explanations for these findings. One possible explanation is that cross-

sectional relationships within the GMSR model do not have longitudinal counterparts. To our knowledge, all prior studies showing findings consistent with the model have made use of cross-sectional data. However, Cole and Maxwell (2003) stated that while cross-sectional mediation studies are often used to justify progression to longitudinal designs, such studies can only provide an accurate test of mediational pathways under very restrictive conditions. It is possible to find relationships observed cross-sectionally to be in direct contrast to relationships observed across time (Ployhart & Vandenberg, 2010). Future researchers may wish to further investigate whether the relationships specified in the GMSR model are replicable when tested longitudinally.

Another possible explanation is that the relationships specified within the GMSR model do not exist over a 12-month interval. Wang et al. (2017) noted that when time intervals in longitudinal studies are too long or too short, this can obscure the true patterns of change, or lead to the emergence of false patterns. Importantly, the GMSR model does not specify the length of time over which its relationships occur. Therefore, future researchers planning longitudinal studies should consider the following actions. First, they should attempt to explicate the nature of the substantive constructs of interest, their underlying change processes and the context for change (Wang et al., 2017). This will serve as an effective guide for decision-making about length of time intervals and number of observation points (Wang et al., 2017). Second, if they determine that relationships are likely to manifest on different schedules, they should consider the use of variable-lag designs over the fixed-lag methods typical of most longitudinal studies (Selig & Little, 2012). This will reduce the likelihood that “true effects” are inadvertently masked. Finally, as an alternative option to variable-lag designs, researchers could consider employing multi-wave longitudinal designs in which they take measurements at several timepoints and assess the strength of the relationships across numerous intervals (Taris & Kompier, 2014).

It is also possible that confounding exogenous variables have more of an influence on minority stress experiences than we have previously been able to ascertain. Because of our longitudinal design, we were able to control for Time 1 outcome and mediator variables, as well as for key demographics. All Time 2 mediator and outcome variables were significantly and strongly positively predicted by each of their respective Time 1 counterparts (as well as, in some cases, by demographic characteristics). Indeed, one of the most important features of longitudinal research designs is that they provide researchers with an opportunity to control for the influence of prior levels of the dependent variable; one of the most important ‘third variable’ confounds (Gollob & Reichardt, 1991). This is important because when estimating an outcome at Time 2, from a predictor at Time 1, we cannot infer causation if uncontrolled variables correlate with the predictor and cause the outcome; this may spuriously inflate our estimates of the causal paths (Cole & Maxwell, 2003). As a matter of course, future researchers carrying out longitudinal investigations of the GMSR model should apply the above statistical controls in their studies.

A final possible explanation is that we failed to account for the conditions under which longitudinal relationships within the GMSR model exist. Varied findings across studies can indicate the presence of unexamined moderators. Moderators specify ‘when’ and ‘for whom’ a predictor is more strongly related to an outcome and are therefore useful for illuminating wider contexts of effect (Frazier, Tix, & Barron, 2004). The GMSR model specifies two resilience factors that may moderate (i.e., buffer) the relationships between gender minority stressors and psychological distress, namely community connectedness and identity pride (Testa et al., 2015). While it would have been informative to examine these variables, the constraints of our sample size alongside the high computational demands of our multiple mediator analysis made this statistically problematic. Future researchers may wish to test all relationships (i.e., mediation and moderation) within the GMSR model if this does not

overburden their models through the inclusion of too many parameters. They may also wish to test moderators not specified by the GMSR model; but, they should use well-defined theory as a guide to their choice of variables (Frazier et al., 2004).

Consistent with Hypotheses 1, 2 and 3, we found that gender-related discrimination predicted psychological inflexibility, psychological inflexibility predicted depression, anxiety and stress, and psychological inflexibility mediated the relationships between gender-related discrimination and depression, anxiety and stress. Thus, psychological inflexibility may be a key process underlying the long-term development of psychological distress in TGNC people experiencing discrimination. These findings are consistent with ACT theory and with research indicating that psychological inflexibility mediates the relationship between negative life events and psychological distress (e.g., Kurz et al., 2014). These findings also dovetail with TGNC research demonstrating that emotional management strategies emphasizing suppression, avoidance, excessive focus etc. (i.e., avoidant coping and rumination) mediate relations between prejudice events and psychological distress (Timmins et al., 2017; White Hughto et al., 2017).

### **Theoretical, Empirical and Practical Implications**

Our findings have several theoretical implications. First, our findings highlight the GMSR model's silence on temporality. While this is a common issue within theories of change phenomenon (Wang et al., 2017), static conceptualizations of constructs and processes may hamper model development. Future researchers may wish to systematically review the literature on the GMSR model constructs and consider issues relevant to examining them in more dynamic ways. This may include their fundamental nature (e.g., stable vs. changeable), form of change (e.g., linear vs. nonlinear), change period (e.g., weeks vs. months) and the variables and contexts (i.e., the wider systems) that may influence them or that they may influence. Second, our findings highlight the dearth of discussion of wider

life contexts in the GMSR model. As noted, we found that Time 1 variables (and some demographics) had more of an influence on mediators and outcomes than variables hypothesized within the GMSR model. Thus, future researchers may wish to consider the influence of prior experiences, pre-existing mental health and other factors when specifying their models. Indeed, Meyer, in his 2003 update of his sexual minority stress model, depicted distal and proximal minority stressors as overlapping and interdependent experiences, deriving from a complex interplay of general environmental (e.g., SES), minority status (i.e., sexual orientation) and minority identity (i.e., being gay, lesbian) factors. Finally, our findings fail to confirm the predictive validity of Hatzenbuehler's (2009) integrative mediation framework. Future researchers may wish to further test the utility of this paradigm in TGNC populations using different samples, time intervals and research designs.

Our findings also have implications for extant research. As noted, Dickey et al. (2016) stated that the lack of longitudinal TGNC research poses limitations on examinations of causality. Responding to this, we examined our proposed model longitudinally, while also applying stringent statistical controls and testing alternative models of causality. Thus, our study may offer one of the most methodologically sophisticated investigations of TGNC minority stress experiences to date. Future researchers may wish to explore the utility of other kinds of longitudinal designs for capturing TGNC minority stress experiences. However, considering our failure to find significant effects over 12 months, they may wish to explore more condensed measurement schedules using research designs such as quantitative diary methods. Furthermore, to our knowledge, this study was the first to investigate psychological inflexibility in TGNC people. Thus, this study has been successful in extending the application of this construct to a previously untested population. Future researchers may wish to examine whether psychological inflexibility mediates the impact of gender-related

discrimination on other life outcomes (e.g., life satisfaction, self-esteem etc.) and whether it is relevant to other key TGNC issues (e.g., community involvement, belongingness etc.)

Regarding practical implications, our findings support a growing evidence base indicating that issues outside of those related to TGNC identity (e.g., transition status, gender dysphoria), and particularly those related to emotional management, are especially important to TGNC people's mental health. Thus, alongside medically focused technologies such as hormone therapy and gender affirmation surgery, it may be useful to offer psychological skills training to TGNC people. Since psychological inflexibility accounted for the development of depression, anxiety and stress, interventions which target this process would be particularly beneficial. Fortunately, psychological inflexibility is a manipulable process at the heart of the ACT intervention model, and research using randomized controlled trials has shown that enhancements of this process mediate improvements in psychological, behavioral and attitudinal outcomes (e.g., Lloyd, Bond, & Flaxman, 2013). There are also established ACT protocols for working with gender and sexual minorities (e.g., Skinta & Curtin, 2016). However, a focus on coping skills alone is inadequate in the context of systematic and pervasive discrimination against TGNC people. Thus, individual-focused training should always be supplementary to interventions designed to reduce prejudice at the institutional, community and societal levels. Such initiatives include psychoeducation, community advocacy and policy efforts (Tebbe & Moradi, 2016).

### **Limitations**

We must consider our findings in the context of several study limitations. First, our online convenience sample may not be representative of the wider TGNC population. Our strategy may have biased the sample towards those who have internet access and who typically engage with TGNC-related social media. The sample was also predominantly White, and relatively young and highly educated. Second, due to the combination of our

sample size and computationally demanding multiple mediation analysis, we used observed/manifest variables in place of latent variables within our structural model. This is suboptimal because latent variables account and correct for measurement error and thus provide a greater level of accuracy in model estimations. Third, mediation analysis in two-wave designs assumes stationarity which implies that “the degree to which one set of variables produces change in another set remains the same over time” (Cole & Maxwell, 2003, p. 560). However, the stationarity assumption may not always hold, which would render the product of the path coefficients (i.e., the mediated effect) biased. Unfortunately, without at least three waves of data we cannot test the stationarity assumption. Fourth, the study was somewhat limited in scope as we only examined one type of prejudice event/distal stressor, namely gender-related discrimination.

The most significant limitation of the present study is that the gender-related discrimination scale achieved only adequate internal consistency, which may have attenuated the variable's relationship with other variables in the model. This issue could relate to the fact that the scale has only five items. Research has indicated that Cronbach alpha estimates increase as scale length increases (Voss, Stem, & Fotopoulos, 2000), with the negative effect of low item numbers especially salient below seven (Swales & McIntyre-Bhatty, 2002). It could also relate to the binary nature of scale's response options which means that it is narrow (i.e., a width of two points) and has no central point. Research has indicated that Cronbach alpha estimations increase as the width of response options increase (particularly above 4-points), and that they tend to be higher in scales with a central point (e.g., 7-points) as opposed to those with no central point (e.g., 6-points) (Voss et al., 2000). While this poor internal consistency makes the continued use of the gender-related discrimination scale a risk, future researchers should consider this limitation alongside the current lack of appropriate measures available for use within TGNC populations. That is, much research to date has

adapted LGB-specific scales for use in TGNC samples. We do not consider this to be an ideal way of assessing TGNC people's experiences since sexual minority issues do not always map onto gender minority issues. However, Testa et al. (2015) developed the GMSR measure with TGNC people, ensuring its relevance to their unique experiences. Therefore, until there is a wider array of TGNC-specific tools available, it is difficult to definitively recommend against the use of the gender-related discrimination scale.

### **Conclusion**

Despite these limitations, the findings of the present study make an important contribution to the field of TGNC mental health. They expand our understanding of how gender-related discrimination relates to psychological distress by illuminating a general psychological process which accounts for this relationship. They also demonstrate this effect within a longitudinal, statistically well-controlled study, and rule out the possibility of alternative models of causality. While we failed to find support for the GMSR model, as discussed in detail above, the findings highlight several important methodological and conceptual issues that future researchers can address. The methodological issues include: (1) the longitudinal replication of cross-sectional relationships; (2) the optimal length of time intervals to demonstrate longitudinal relationships; (3) the potential impact of confounding variables; (4) the limitations imposed by sample size/number of parameters when testing complex models; and (5) the psychometric properties of existing TGNC-specific measures. The conceptual issues include: (1) understanding of the temporal dimension/dynamic processes at work; and (2) consideration of the wider contexts of effect. In sum, our findings represent an important step forward in moving towards a more precise and comprehensive understanding of the development of psychological distress in TGNC people.

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