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Abstract

One key aspect of evidence-based psychological services is monitoring progress to inform treatment decision making, often using a brief self-report measure. However, no such measure exists to support measurement based care given the distinct needs of transgender and gender

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diverse people (TGD), a group facing large documented health disparities and marginalization in healthcare. The purpose of the present study was to develop and provide initial psychometric validation of a short, behavioral health progress monitoring self-report measure, the Trans Collaborations Clinical Check-in (TC^3). TGD communities, providers identified as TGD-affirmative, and relevant academic experts contributed to item and scale development. The final 18 item version was administered to 215 TGD adults (75 transfeminine, 76 transmasculine, 46 nonbinary, 18 unknown; mean age of 30 with a range of 19 to 73), who were recruited for an online study, with other questionnaires assessing negative affect, well-being, gender dysphoria, gender minority stressors, and resilience. Higher scores on the TC^3 (indicating better adjustment and comfort with gender) were generally associated with lower depression, anxiety, minority stress, and gender dysphoria and greater life satisfaction, body congruence, and positive aspects of being TGD such as pride in identity and community belongingness. These results support the validity of the TC^3 as a brief measure to be used as a clinical tool for TGD people receiving mental health services. Additional research is needed on the reliability and validity of the TC^3 across multiple time points to determine utility as a progress monitoring measure. The TC3 should also be further validated with more culturally diverse samples.

Keywords

In both society and the scientific community, there is increasing recognition that a stable binary gender identity that is assigned at birth is a poor fit for some individuals. Although terminology differs across time and settings, a broad umbrella term often used to identify those with a gender different than their gender assigned at birth is *transgender and gender diverse* (TGD). TGD communities often face marginalization, both at a structural level with discriminatory laws and policies (Hughto, Reisner, & Pachankis, 2015) and at a personal level with elevated risk for violence and stigmatization (e.g., James et al., 2016), compared to cisgender (individuals whose gender identity matches their sex assigned at birth) communities. This marginalization is compounded for TGD people of color (James et al., 2016). Not surprisingly, these experiences can lead to well-documented mental health disparities (Bockting, Miner, Swinburne-Romine, Hamilton, & Coleman, 2013; Haas et al., 2010) including anxiety, depression, post-traumatic stress disorder, substance abuse, and suicidality.

In addition to seeking psychological services to help cope with marginalization and for the mental health concerns noted above, individuals who identify as TGD may also seek services as part of the process to affirm their gender identity. Psychological services may be primarily for support through transition-related life changes, but often access to certain medical approaches to gender affirmation (e.g., hormone therapy or surgeries) requires a mental health evaluation (Coleman et al., 2012). Thus members of TGD communities may find themselves seeing a mental health provider for a variety of reasons, leading to high mental health service usage in TGD communities (James et al., 2016).

Unfortunately, the marginalization associated with being TGD may extend into mental health settings and services as well. Beyond the historical use of diagnostic categories to stigmatize TGD identities (Singh, 2016), TGD people routinely report being marginalized when receiving behavioral health care, reducing engagement in care and likely leading to poor outcomes (Mizock & Lundquist, 2016; Shipherd, Green, & Abramovitz, 2010). Various professional organizations serving mental health professionals have published guidelines for cultural competence with TGD clients (e.g., American Psychological Association, 2015; American Counseling Association, 2010). Others have noted the need for culturally responsive care that is also evidence-based (Hope, Mocarski, Bautista, & Holt, 2016; Austin & Craig, 2015). Although there is evidence that culturally adapted approaches improve outcomes in other minority groups (Griner & Smith, 2006), there is little information about the efficacy of psychosocial interventions, culturally adapted or not, for TGD clients. Other than interventions focused on HIV risk (e.g., Deutsch et al., 2015), there are no known published clinical trials of a psychosocial intervention specifically focused on mental health with participants who identify as TGD. This lack of evidence means that progress monitoring, always an important feature of evidence-based care, is especially important with TGD clients to provide data to guide treatment decisions and yield the best possible outcomes.

Progress monitoring, also known as measurement based care (Scott & Lewis, 2015), involves collecting idiographic or standardized data on symptoms, functioning, or therapeutic processes at frequent intervals to guide treatment (Persons, Koerner, Eidelman, Thomas, & Liu, 2016). For example, the Beck Depression Inventory-II (Beck, Steer, & Brown, 1996) is commonly used in cognitive therapy for depression (Beck, 2011) to track session-by-session change. Providers who utilize progress monitoring have clients with better outcomes and may prevent dropout by catching deterioration (Persons & Hong, 2015; Ionita & Fitzpatrick, 2014). Progress monitoring may also engage clients, create a collaborative working relationship by reviewing results together and setting individualized goals (Carlier et al., 2012).

Despite the benefits of progress monitoring, clinicians have described barriers including concerns about the time and effort, receiving negative feedback from colleagues and clients, or feeling anxious and lacking expertise about progress monitoring measures (Ionita, Fitzpatrick, Tomaro, Chen, & Overington, 2016). Additionally, an important barrier to progress monitoring is the need for valid culturally sensitive measures. In some cases, minor changes to established measures, such as adding gender-neutral language (Weiss, Hope, & Cappozoli, 2013), may help providers overcome this barrier (Ionita et al., 2016). However, progress monitoring measures that have been developed with and/or validated on the client population with which they are being used are ideal as measures can have different psychometric properties with different groups (Freese, Ott, Rood, Reisner, & Pantalone, 2018).

Assessment with TGD populations

Assessment with TGD clients has traditionally focused on diagnosing gender-related disorders, such as Gender Identity Disorder or Gender Dysphoria, the current Diagnostic and

Statistical of Mental Disorders (DSM-5) diagnosis (American Psychiatric Association, 2013; Beek, Cohen-Kettenis, & Kreukels, 2016). However, as emphasis shifts from pathologizing gender identities to understanding the distress and resilience of TGD people, gender diagnostic tools have become less central. Furthermore, TGD individuals seek therapy for general mental health reasons, such as anxiety, depression, and substance abuse, and transition-focused care reflects only a portion of services that mental healthcare providers conduct (Holt, Hope, Mocarski, Meyer, King, & Woodruff, 2019). Established self-report measures for anxiety, depression, and other common clinical concerns have not been validated with TGD samples. However, many of these measures appear to function well in TGD-related research, offering indirect evidence of their validity with this population. For example, in a recent study on suicide, Tebbe and Moradi (2016) utilized standard measures of depression and suicidality without any adaptations with good results. On the other hand, traditional standardized tests that utilize gendered norms based on cisgender respondents should be used with caution, if at all, with TGD individuals (Keo-Meier & Fitzgerald, 2017; Moe, Finnerty, Sparkman, & Yates, 2015). Moe and colleagues (2015) suggest providers practice with a critical lens by recognizing psychology's historical oppression of TGD people and taking steps to not enact further stigma. For example, having a collaborative and open discussion about the use of assessment tools can reduce the potential for stigmatizing experiences and help ascertain which measures are most appropriate for TGD clients (Prince & Potoczniak, 2012). Nevertheless, comprehensive contemporary assessment with TGD individuals requires assessment of how minority stress and gender-related issues contribute to TGD clients' mental health and well-being, regardless of their presenting problem, and differentiation between gender dysphoria and other mental health symptoms (Boroughs, Bedoya, O'Cleirigh, & Safren, 2015; Keo-Meier & Fitzgerald, 2017). Measures originally developed with cisgender populations will not address the unique concerns of gender minorities.

Shulman and colleagues (2017) conducted a review of non-diagnostic self-report measures that capture different psychological domains associated with identifying as TGD. These measures extend beyond transition care to capture the diverse experiences of TGD individuals and their journeys. Shulman et al. found eight contemporary measures that assessed domains such as identity reflection and rumination (Bauerband & Galupo, 2014), minority stress and resiliency (Testa, Habarth, Peta, Balsam, & Bockting, 2015), community belongingness (Barr, Budge, & Adelson, 2016), strength of identity and importance of transition (Barr et al., 2016), positive identity (Riggle & Mohr, 2015), identity congruence (Kozee, Tylka, & Bauerband, 2012), and comfort with voice (Dacakis, Davies, Oates, Douglas, & Johnston, 2013). The measures ranged in number of items from 9 to 58 and touched on a variety of stressors, positive aspects of being TGD, and psychosocial components of medically affirming one's gender. Many measures incorporated feedback from TGD individuals to ensure the items were culturally-sensitive at the time of development and most were free of stigmatizing language. However, Shulman and colleagues (2017) noted that several of the measures had not been used extensively and were not tested in clinical applications. Despite the high potential utility of the reviewed measures in clinical and research settings, their content and/or length make them inappropriate for progress monitoring in mental health treatment. Shulman et al. (2017) identified a need for a

brief, but comprehensive, measure specifically developed with TGD individuals to be used in clinical settings.

The purpose of the current study was to develop and validate a progress monitoring measure for TGD clients, the Trans Collaborations Clinical Check-In (TC³), that meets the need identified in the Shulman et al. review (2017). Specifically, we sought to develop an assessment tool that reflects several domains important to TGD experiences and common priorities in therapy (e.g., social support, body dysphoria, comfort with expression, and coping with stigma and discrimination) (Holt et al., 2019; Singh & dickey, 2017) and is brief enough to be utilized in clinical settings for frequent progress monitoring. The TC³ also needed to be culturally-responsive and thus we incorporated feedback from TGD individuals and mental health care providers who work with TGD clients on the utility and language of the measure. Exploratory factor analysis was used to understand how items relate to one another and explore possible subscales. We expected that higher scores on the TC³ (better adjustment and comfort with affirming one's gender) would be associated with less depression, anxiety, minority stress, and gender dysphoria and associated with more life satisfaction, body congruence, and positive aspects of being TGD such as pride in identity and community belongingness.

Method

Early Development and Qualitative Feedback

The first version of the TC³ was developed by the third author in collaboration with a TGD client at a university training clinic to meet the clinical need of an appropriate progress monitoring scale for that client. Three clinicians who work with TGD clients participated in unstructured interviews about what topics should be covered in a progress monitoring measure for TGD. Based on these interviews, 16 items were created to assess distress about common areas addressed in therapy or that would be important to monitor, such as dealing with discrimination, comfort with sexual characteristics and voice, and social support. The TGD client (a White transgender woman in her mid-30s), who was receiving therapy for gender-related concerns and social anxiety disorder, agreed to give feedback on the measure and the first version of the TC³ was implemented as a progress monitoring measure with the client. Some items were stable while others varied as expected given the life experiences she reported occurring between sessions, demonstrating clinical utility.

After utilizing the first version of the TC³ with several TGD clients in a university training clinic for purely clinical purposes, we sought feedback on the utility, necessity, language, and content of the TC³ as part of a larger study of health care services for gender minorities (Holt et al., 2019; Meyer et al., 2019). Twenty-seven TGD adults living in the Central Great Plains and 10 mental health clinicians identified by TGD community members as providing affirmative services provided feedback on the TC³ in qualitative interviews. The TGD adults were recruited largely through our Local Community Board and included 10 (25.9%) transmasculine individuals, 14 (48%) transfeminine, and 3 (11.1%) nonbinary individuals whose mean age was 36 years (range of 22 to 64). The sample was 81% White and 48% rural. The 10 clinicians included 9 Master's level clinicians and 1 doctoral level provider.

Seven clinicians identified as women, including one transgender woman, and 3 providers identified as men. All providers identified as White.

The TGD participants and providers were given a copy of the original TC[3] and asked to identify "what's right, what's wrong, and what's missing" from the measure. Providers were also asked how they may use the TC[3] in their current practice. Their responses were analyzed using an inductive analytic approach consistent with grounded theory (Weiss, 1994). Feedback was coded as positive, neutral, negative, and suggestions for improvement. The feedback from community members and providers were integrated with comments from the Trans Collaborations Nebraska Local Community Board, a group of local TGD individuals, and National Advisory Board, a panel of experts in TGD health, which collaborate and oversee Trans Collaborations' research efforts. Changes included more gender affirming language, better addressing the needs of nonbinary individuals, such as ensuring the items do not emphasize a dominant narrative focused on medical transition, and expanding the assessment of social support. The edited version of the TC[3] was presented to members of the Local Community Board for further approval as part of our community based participatory model of research (Minkler & Wallerstein, 2008). The final version of the TC[3] has 18 items.

Online Validation Study

Participants.—Two hundred and fifteen TGD individuals completed an online survey that included the TC[3] and other measures and demographics described below. Participants were given space to describe their gender identity and then asked to select a forced option category that best describes their gender identity. Seventy-five participants (34.9%) identified as a transwoman/trans woman/MTF (male-to-female)/woman, 76 participants (35.3%) selected transman/trans man/FTM (female-to-male)/man, and 46 participants (21.4%) identified as non-binary/gender nonconforming/genderqueer/agender/bigender/ another gender minority in the forced choice but included a much broader array of identities in the free response space. These identities were too numerous to use in statistical analyses. Eighteen participants (8.4%) did not select a forced option. The average participant age was 30 and ranged from 19 to 73. Sixty-four participants (29.7%) did not report their age, but confirmed to be over the age of 19 (age of majority in Nebraska). A wide range of sexual orientations were represented in the sample: 96 participants (44.7%) identified as straight, 32 participants (14.9%) as gay, 21 participants (9.8%) as bisexual, 16 participants (7.4%) as lesbian, 15 participants (7.0%) as queer, 6 participants (2.8%) as pansexual, and 4 participants (1.9%) as asexual. Six participants (2.8%) offered their own description of their sexual orientation. Nineteen participants (8.8%) did not report their sexual orientation.

Most participants (149; 69.3%) identified as European American/Caucasian/White. Eleven participants (5.1%) identified as African American/Black, 7 participants (3.3%) as Native American/American Indian/Alaskan Native, 6 participants (2.8%) as Asian American including Pacific Islander, 7 participants (3.3%) as Latino/a/x, and 3 participants (1.4%) as Hispanic. Eleven participants (5.1%) selected at least two racial/ethnic identity categories suggesting a biracial or multiracial identity and 2 participants (<1.0%) wrote in their racial/ ethnic identity. Nineteen participants (8.8%) did not report their racial/ethnic identity.

Forty percent of the sample reported they live in an urban area, characterized as population over 50,000, 33.5% as living in an urban cluster area with a population of 5,000 to 50,000, and 11.6% in a rural area with under 5,000 people. 14.8% did not report their urban/rural status

Procedure.—Data collection was completed in October and November 2017. Recruitment emails were sent to LGBT organizations across the United States and posted to LGBT list-serves and social media that included an anonymous link to the survey, hosted on Qualtrics. The recruitment notice called for TGD-identified participants over the age of 19 to participate in a study that paid participants $10. Individuals who accessed the link confirmed they identified as TGD or another gender minority and were over the age of 19. Those who consented proceeded to the survey. Participants completed general mental health measures as well as measures specific to gender-related constructs, and the 18-item TC[3] followed by a question measuring comfort completing the TC3 in therapy. The individual measures were presented to each participant in a random order to reduce order effects. Participants then completed demographics and two measures on gender embodiment and naming, unrelated to the current study. Participants who opted to provide an email address were sent a $10 online gift card within 24 hours. After payment, participants' email addresses were deleted from the data set. All procedures were approved by the University of Nebraska Institutional Review Board.

Two-hundred and ninety-seven people opened the survey, 270 people consented to participate, and 215 participants answered the complete TC[3] and provided data analyzed in this study. Examination of Qualtrics metadata and reported demographics indicated the 215 included no duplicate responses. Median completion time for the 215 participants was 23.58 minutes. An examination of the 55 people who were not included suggested they failed to complete a sufficient number of items on key measures, including the TC[3] and demographic variables. One hundred and ninety-nine people opted to provide an email address for payment purposes.

Measures.

TC[3].: Participants completed the adapted version of the TC[3], which has 18 items scored on a Likert-scale of 1 to 5 for a possible range of scores from 18 to 90. Higher scores on the TC[3] suggest better adjustment and comfort with one's gender. TC[3] items are detailed in Table 2.

Depressive symptoms.: The Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used to assess level of depressive symptoms. This measure has 9 items and higher scores indicate more depressive symptoms. The PHQ-9 has previously been used with TGD samples (e.g. Tucker et al., 2018). Internal consistency for the current sample was good as Cronbach's alpha was .81.

Anxiety symptoms.: Anxiety symptoms were measured with the Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006). The GAD-7 was designed to be a brief measure (7 items) of generalized anxiety, but also shows good sensitivity and

specificity for other anxiety and related disorders (Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007). Higher scores on the GAD-7 indicate higher levels of anxiety. The GAD-7 previously has been used with TGD individuals (Pflum, Testa, Balsam, Goldblum, & Bongar, 2015). In the current sample, internal consistency was acceptable (α = .79).

Positive and Negative Affect.: Positive and negative affect was assessed using the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS has two subscales to measure positive and negative affect. Higher scores on both subscales indicate greater positive or negative affect. The negative affect subscale has previously been used with a TGD sample (McLemore, 2015). Internal consistency was acceptable for positive affect (α = .77) and good for the negative affect (α = .83).

Life satisfaction.: As the name suggests, the Satisfaction with Life Scale was used to assess life satisfaction (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). This measure includes 5 items that capture global judgments of life satisfaction. Higher scores suggest greater life satisfaction. The SWLS has been used with TGD samples in previous studies (Kozee et al., 2012; Barr et al., 2016). The SWLS had acceptable internal consistency in the current sample (α = .72).

Body congruence.: Participants' body congruence was measured with the Transgender Congruence Scale (TCS; Kozee et al., 2012), a 12-item measure which includes subscales for appearance congruence and gender identity acceptance. The TCS was subtly adapted with original first author's approval by changing each item to past tense, as the instructions specify "indicate the response that best describes your experience over the past two weeks." Higher scores on the TCS indicate greater congruence and acceptance. The TCS showed acceptable internal consistency (α = .70).

Gender-related reflection and rumination.: The Gender Identity Reflection and Rumination Scale (GIRRS; Bauerband & Galupo, 2014) was used to capture how often participants think about their gender identity and as a marker of gender-related emotion regulation. The GIRRS includes 15 items that span three subscales: reflection about gender identity, rumination about gender identity, and preoccupation with other's thinking. Higher scores suggest greater thinking, either positively or negatively, about one's gender identity. Internal consistency for the three subscales were lower than expected, ranging from .55 (Preoccupation with Other's Thinking) to .68 (Rumination), compared to the .88 to .91 range in the original validation study.

Gender-related minority stress and resiliency.: The Gender Minority Stress and Resilience Scale (GMSR; Testa et al., 2015) was used to assess several minority stress domains and positive aspects of gender minority identities. The GMSR has 58 items that contribute to 9 subscales. The nine subscales are gender-related discrimination, gender-related rejection, gender-related victimization,[1] nonaffirmation of gender identity,

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[1]The response options for the discrimination, rejection, and victimization subscales were slightly modified to first inquire if participants had experienced the event or situation. Then, if the participant answered "yes," they were asked if the event occurred in the previous year. These subscales were scored based on participants' responses to the first binary question.

internalized transphobia, negative expectations for the future, nondisclosure, pride, and community connectedness. The subscales are scored independently and higher scores on each subscale indicate more experiences or alignment with the target domain. Internal consistency was acceptable or good for most of the subscales (α = .73 to .83). Internal consistency was lower than expected for nondisclosure (α =.60) and community connectedness (α =.48) subscales so these two subscales were not included in the analyses.

Gender dysphoria.: The Gender Preoccupation and Stability Questionnaire (GPSQ; Hakeem, rn ec, Asghari-Fard, Harte, & Eapen, 2016) was selected to measure gender dysphoria. It was developed to not adhere to binary notions of gender and be appropriate for all gender diverse people. This 14-item measure includes questions about comfort with gender, stability of identity, desire for body alteration, and thinking about gender. The GPSQ has shown good convergent validity with another measure of gender dysphoria (Hakeem et al., 2016), the Gender Identity/Gender Dysphoria Questionnaire for Adolescents and Adults (Deogracias et al., 2007). Higher scores on the GPSQ indicate greater gender dysphoria. Internal consistency on the GPSQ in the current sample was acceptable at .75.

Analytic Approach

Examination of the TC^3.—Examinations of the interrelationships between TC^3 total and factor scores with measures of general functioning (i.e. depression and anxiety, positive/negative affect, and life satisfaction) as well as gender identity-related measures (i.e. body congruence, gender-related reflection and rumination, gender-related minority stress and resiliency, and gender dysphoria), inter-item correlations on the TC^3 and Cronbach's alpha were conducted. Additionally, using SPSS, Version 24, ANOVAs and Pearson's correlations were used to explore relationships between TC^3 total scores with demographic variables.

Exploratory Factor Analyses.—Factor analysis was used to describe the variability among the TC^3 questions in order to identify the underlying structure of the factors of the TC^3. Factor analyses were conducted using SAS/STAT software for Windows version 9.4 (SAS Institute, Cary, NC, USA). A polychoric correlation covariance matrix with a varimax rotation was used for the factor analysis; a technique that allows PROC FACTOR in SAS to perform factor analysis on binary and ordinal data (Andrich, 1988; Bartholomew, 1987; van Rijckevorsal & de Leeuw, 1988). The number of factors in the model was determined based on the scree test plot, which plots the factors on the x-axis versus the corresponding eigenvalues on the y-axis (Colgan, 1981). Additionally, at least two variables must have loading scores .50; factors must have an eigenvalue > 1.0; and each factor must account for at least 1% of the total variance. A factor loading score was calculated for each variable. The factor loading scores represent the correlations between each of the variables included in each factor. Generally, a factor loading score .30 is considered meaningful. For this analysis, a factor loading score .50 was used to identify the most highly correlated variables in each factor.

Results

TC³ Scores and Demographic Variables

The means and standard deviations of the TC³ total by demographic group are available in supplemental material. Age and scores on the TC³ total ($r = .42$, $p < .001$) were positively correlated. This suggests older participants had higher TC³ total scores. Total scores on the TC3 did not vary by the three gender categories (transmasculine, transfemining, and non-binary) or medical transition status. Race/ethnicity was coded into a binary variable, White (n = 149) and non-White (n = 47), due to small sample sizes in some racial and ethnic categories. There was no significant mean difference on the TC³ total score between White and non-White participants.

Results of Correlational Analyses with TC³ Total Scores

Correlational results between TC³ and measures of general functioning and gender-identity domains are summarized in Table 1. Higher total scores on the TC³ were significantly related to lower ratings of depression (PHQ-9), anxiety (GAD-7), negative affect (PANAS), gender identity rumination (GIRRS), preoccupation with other's thinking (GIRRS), gender dysphoria (GPSQ), as well as lower ratings of non-affirmation of gender identity, internalized transphobia, and negative expectations for the future (GMSR). This is consistent with the hypothesis that better adjustment and comfort with gender would be associated with lower ratings of negative symptoms and experiences for TGD individuals.

Inversely, higher TC³ total scores are related to higher ratings of positive affect (PANAS), satisfaction with life (SWLS), body congruence (total score, appearance, and identity acceptance on the TCS), and gender minority pride (GMSR). This is consistent with the hypothesis that better adjustment and comfort with gender would be associated with more life satisfaction, body congruence, and positive aspects of being TGD.

However, there were no significant relationships between TC³ total scores and gender identity reflection (GIRRS), as well as no relationship with gender minority discrimination, rejection, and victimization (GMSR), which is contrary to the hypothesized relationships between the TC³ and related measures.

TC³ Inter-item Correlations

Correlations between TC³ items are available in supplemental materials. Correlations ranged from unrelated to modest and significant correlations were generally in the expected direction. The Cronbach's alpha for the TC³ was acceptable ($\alpha = .74$).

Comfort Completing the TC³

To address acceptability of the TC³ as a progress monitoring measure, participants rated their comfort completing the measure in a therapeutic setting.[2] Of the 215 participants, 49.30% reported feeling completely or mostly comfortable answering the TC3 in a mental

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[2]Fifteen participants indicated they had never received counseling or psychotherapy. Results of data analyses were similar whether these 15 are included or excluded so results reported here are based on the full sample.

health setting. 30.70% reported they would feel somewhat comfortable and 20.00% reported feeling a little comfortable or not at all comfortable.

Results of Exploratory Factor Analyses

The first four factors have eigenvalues > 1.0, while the fifth and sixth factors have eigenvalues < 1.0 (see table in supplemental materials). The first factor explains 24.72% of the variation in the data; the second factor explains 13.20% of the variation; the third factor explains 7.54% of the variation; the fourth factor explains 5.93% of the variation; the fifth factor explains 5.38% of the variation; and the sixth factor explains 5.23% of the variation in the data. In total, the cumulative proportion of variation that is explained by a four-factor model is 51.39%, a five-factor model is 56.77%, and a six-factor model is 62.01%. The scree plot indicated that the break of inflection was between four to six factors.

Models with four to six factors were examined based on scree plots, eigenvalues, and proportion of variance explained by each factor. The four-factor model was chosen for the current analysis as it meets the criteria that at least two variables have loading scores   0.5; each factor has an eigenvalue > 1.0; and each factor accounts for at least 1% of the total variance. Examination of individual item factor loadings in the four-factor model also revealed item structures that formed more coherent conceptual groupings in terms of content and theme than that of the five and six factor models. Therefore, subsequent analyses focused on the four-factor model. Table 2 illustrates individual TC^3 questions that load highly on each of the factors. Each of the factors were labeled to highlight the groupings of individual items. Factor 1 was labeled as *Acceptance/Confidence*; Factor 2 as *Comfort with Public Perception;* Factor 3 as *Social Support/Voice*; and Factor 4 as *Body Comfort*. While exploratory analyses revealed stable factor structures, the item groupings did not all form face-valid subscales (e.g., Factor 3 covered both social support and comfort with one's voice) for the TC^3.

Results of Correlations with TC^3 Factor Scores

Results of correlational analyses with exploratory factor structures also revealed significant interrelationships between factor scores and related measures.

Factor 1: Acceptance/Confidence.—Higher scores on the first factor, indicating more acceptance in society and confidence in presentation and expression, were associated with higher ratings of positive affect, satisfaction with life, transgender congruence (total score, appearance, and identity acceptance), gender identity reflection, and gender minority pride. Additionally, higher *Factor 1* scores were associated with less gender identity rumination, gender minority nonaffirmation, and internalized transphobia.

Factor 2: Comfort with Public Perception.—Higher scores on the second factor, meaning greater comfort with other individuals' perceptions, were related to higher ratings of transgender comfort (total score, appearance, and identity acceptance). Additionally, higher *Factor 2* ratings were associated with lower depression, anxiety, negative affect, gender identity rumination, preoccupation with other's thinking, and body dysphoria, as well

as lower gender minority discrimination, rejection, victimization, nonaffirmation of identity, internalized transphobia, and negative expectations for the future.

Factor 3: Social Support/Voice.—Higher scores on the third factor were related to higher positive affect, satisfaction with life, transgender comfort (total score and appearance subscale), gender identity reflection, and gender minority pride. Additionally, higher *Factor 3* ratings were associated with lower non-affirmation of identity. An unexpected finding was that higher scores on the third factor were related to higher gender minority discrimination, rejection, and victimization, as well as greater gender dysphoria.

Factor 4: Body Comfort.—Higher scores on the fourth factor were related to higher positive affect, satisfaction with life, transgender comfort (total score and appearance), and gender minority pride. Additionally, higher *Factor 4* ratings were associated with lower gender identity rumination, as well as lower gender minority non-affirmation of identity, and internalized transphobia. Another unexpected finding was that higher scores on the fourth factor were also related to higher ratings of gender minority rejection and victimization.

The results of these exploratory analyses mostly align with the hypothesis that better adjustment, coping, and comfort reported on the TC^3 would be related to fewer negative and more positive aspects of being TGD.

Discussion

The Shulman and colleagues (2017) review identified a critical need for a brief, clinically relevant measure that covered key topics for clients receiving psychological services who identified as TGD. The results of this study supported the TC^3 as a culturally-responsive measure to meet this identified need. The involvement of community and academic expertise in item development guided the choice of domains covered and ensured a culturally appropriate measure. The survey study provided initial support for the consumer acceptability and internal and construct validity of the TC^3, setting up the next step of a longitudinal study to assess the sensitivity of the TC3 to clinical changes over time.

The TC^3 showed good construct validity with established measures that tap several domains. TC^3 scores correlated in the expected direction with measures of depression, anxiety, positive and negative affect, gender-related rumination, preoccupation with other's thinking, gender dysphoria, satisfaction with life, body congruence, internalized stigma, negative expectations for the future, non-affirmation of gender identity, and gender minority pride. Surprisingly, the TC^3 total score did not correlate with measures of gender minority discrimination, victimization, and rejection. This may be due to the differing timeframes across measures as these GMSR subscales inquire about lifetime experiences of marginalization while the TC^3 reflects individuals' functioning in the previous two weeks. Overall the results of this study are promising as the TC^3, with only 18 questions, relates to several measures of mental health, well-being, and gender minority specific topics. Given this pattern of correlations, we hypothesize that the changes in TC^3 would correspond with good clinical outcomes including reduced negative affect, greater comfort with gender expression, good social support, and coping with stigma.

The inter-item correlations largely support our attempt to create a brief clinical tool that taps multiple distinct domains. There were modest significant relationships among some items, but, as expected, the individual items appear to tap separate constructs. We envision that clinicians may find the TC³ useful as a conversation starter and to note session-to-session changes on particular items. Tracking the total scale score is likely to provide a global assessment of well-being and stress in domains unique to TGD clients.

Given the brevity of the TC³, we did not include sufficient items to create stable subscales but used the factor analyses to better understand what the TC³ is measuring. Surprisingly, two of the four subscales have high face validity and, overall, the pattern of correlations between the factor scores and other measures were interpretable. For example, Acceptance/ Confidence scores correlated with body congruence on the TCS and Comfort with Public Perception relates to GRRS subscales Preoccupation with Other's Thinking and Gender Identity Rumination. However, Factor 3, Social Support/Voice, was a combination of social support questions and a question about voice making it difficult to interpret. While this factor related to several positive outcomes, the unique clustering of these items should be explored in future research. The attempt to measure comfort with one's body with two items on the TC³ appears to have been largely successful. These items formed their own factor and correlated in the expected direction with the total and appearance scores on the TCS which measure congruence with one's physical appearance. Body Comfort was generally associated with overall well-being on other measures as well, but surprisingly, Body Comfort was not related to gender dysphoria. These two items about comfort with one's body are not meant to imply a need for a medical transition and were specifically worded to fit for individuals who may or may not wish to undergo medical transition. Given some limitations of face validity, particularly related to Factor 3, it is unclear whether the TC3 has valid subscales. Until further research is available, such as additional factor analyses with larger samples, researchers and clinicians should use the total score.

In an effort to create a TGD-specific scale, the intent was to measure more than just gender distress. This appears largely successful. The total score correlates modestly with the measures of negative affect – PHQ-9, GAD-7, and PANAS – negative subscale. The factor correlations indicate that those associations are driven by items on the second factor. Participants who were more concerned about how they were perceived by others tended to be more anxious and depressed and they also tended to ruminate more about their gender identity. It could be that worrying about what others think leads to more negative affect. This worry may be warranted, however, given low scores on the second factor were also associated with more experiences of bias including discrimination, rejection, victimization and non-affirmation of TGD identity.

Limitations

The results of the study should be considered in light of the study's limitations. First, the sample was primarily White and most participants reported accessing some medical transition. The TC³ should be further validated with a large, diverse sample of TGD individuals to further understand the potential effects of race/ethnicity on TC³ scores, as comparisons between White and non-White participants is limiting given the heterogeneity

of the non-White sample. Similarly, we lack sufficient geographic data to explore the representation of participants across U.S. states. Our sample is somewhat older, more likely to identify as heterosexual, and has a somewhat greater representation of transmasculine participants than the US Transgender Survey (James et al., 2016). Additionally, the self-selection to participate in the online data collection creates some limitations including sample bias (Reisner et al., 2014). However, online methods such as this one also increase access to decentralized target populations, such as TGD individuals, and can increase privacy and anonymity for at-risk groups (Riggle, Rostosky, & Reedy, 2005). In the interest of balancing brevity and scope, the TC3 does not cover all possible topics of interest for TGD clients. However, the domains were guided by community and provider experts and were carefully designed to avoid imposing a dominant narrative of the trans experience. For example, items do not assess for "transition progress." Finally, this study was cross-sectional and the intended use as a progress monitoring measure requires repeated administration. Current research underway in our lab is examining the measure's sensitivity to change across time given the strong evidence of construct validity in this study. Additional research is needed to explore the TC^3's utility as an outcome measure in clinical interventions.

TC^3 in Clinical Settings

The TC^3 is a clinically relevant, brief assessment tool that can be used with TGD clients to monitor different domains. A longitudinal study is needed to validate the TC^3 as a measure of change over time. In the meantime, our clinical experience suggests the TC^3 should track therapeutically important changes. It was developed with input from TGD individuals and affirming mental healthcare providers to address barriers to progress monitoring. For example, the TC^3 inquires about clients' experiences in the previous two weeks, meaning it only needs to be administered every other session with traditional weekly clients, reducing a known barrier to progress monitoring (Ionita et al., 2016). Feedback from TGD community members during the qualitative interviews suggested the TC^3 is a good way to start conversations about potentially difficult conversations, such as comfort with genitals. Keeping in mind the lack of longitudinal data, providers can share the results of the TC^3 with their clients to help identify shared goals for therapy and mutually track progress, adjusting case conceptualizations and treatment plans if necessary. TC^3 results should always be considered within the personal and cultural context of the client, including potential structural barriers to desired social, legal, and medical transition steps.

The majority of participants (80.00%) reported feeling somewhat, mostly, or completely comfortable answering the TC^3 as part of mental health services. The source discomfort for the remaining 20.00% of participants is unknown but may be because the therapeutic approach of some providers is inconsistent with progress monitoring (Ionita et al., 2016). Participants who worked with these types of providers may have recognized that inconsistency. Nevertheless, providers who wish to use the TC^3 should be aware that it may not be acceptable to all clients. To adhere to best practices of affirming assessment with TGD clients (Prince & Potoczniak, 2012), providers should collaboratively explore concerns and decide whether the TC^3 is appropriate for each individual case. Clients seeking treatment for concerns unrelated to their gender identity may feel the therapist is overemphasizing their gender identity if the TC^3 is completed frequently. In such cases,

progress monitoring specific to the concerns for which they are seeking services would be more appropriate.

Conclusion—As demonstrated in the Shulman et al. review (2017), TGD specific measures are rapidly developing with a variety of tools to meet the needs of both researchers and clinicians. The TC^3 shows promise as a brief, clinical measure that is culturally-responsive for TGD clients. Ongoing measurement of progress and outcomes is a key aspect of evidence-based care and is especially important given the lack of research on the efficacy of mental health interventions with TGD adults. The need for more mental health providers to effectively serve TGD communities is well-documented. The TC^3 may be especially useful to providers with less experience with TGD clients as it can prompt conversations about TGD-specific topics that could otherwise be overlooked.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Highlights

- Study presents a behavioral health measure (TC^3) for use with transgender clients

- Substantial community and stakeholder input informed measure development

- TC^3 relates to important domains including depression, anxiety, and minority stress

Table 1

Means and Standard Deviations for Full Samples for Validation Measures and Correlations with TC^3 Total Score

	M(SD)	*N*	TC^3 **Total**
Negative Affect Measures			
PHQ-9 Depression	13.16 (5.67)	212	**−0.21**[**]
GAD-7	10.72 (4.62)	208	**−0.15**[*]
PANAS Negative	26.26 (7.34)	207	**−0.16**[*]
Positive Affect/Well-being			
PANAS Positive	28.68 (6.27)	205	**0.37**[**]
Satisfaction with Life	21.51 (5.88)	211	**0.45**[**]
Transgender Congruence Scale			
Total	38.60 (7.04)	205	**0.57**[**]
Appearance	28.69 (6.09)	205	**0.53**[**]
Identity Acceptance	9.90 (2.54)	207	**0.32**[**]
Gender Preoccupation & Stability	41.92 (8.05)	209	**−0.22**[**]
Gender Reflection and Rumination Scale			
Reflection	13.01 (2.82)	210	0.13
Rumination	12.34 (3.25)	210	**−0.32**[**]
Preoccupation with Other's			
……Thinking	12.91 (2.87)	210	**−0.17**[*]
Gender Minority Stress and			
Resiliency Scale			
Discrimination	3.62 (1.68)	207	−0.13
Rejection	4.15 (2.04)	203	−0.04
Victimization	4.00 (2.25)	201	−0.02
Nonaffirmation	14.22 (4.68)	202	**−0.36**[**]
Internalized Transphobia	16.82 (6.61)	203	**−0.37**[**]
Pride	18.58 (5.85)	203	**0.34**[**]
Negative Expectations/Future	20.52 (6.23)	202	**−0.17**[*]

Note: PHQ-9=Patient Health Questionnaire-9, GAD-7=Generalized Anxiety Disorder-7, PANAS=Positive and Negative Affect Schedule, TCS=Transgender Congruence Scale, GIRRS=Gender Identity Reflection and Rumination Scale, GMSR=Gender Minority Stress and Resilience. Community Connectedness and Nondisclosure (GMSR subscales) were excluded due to low internal consist ency.

[*] =$p<.05$,

[**] =$p<.01$

Table 2

Varimax Rotated Factor Patterns for TC^3 by Factor

Question	Factor 1: Acceptance/ Authenticity	Factor 2: Comfort With Public Perception	Factor 3: Social Support/ Voice	Factor 4: Body Dysphoria
In the past two weeks, how comfortable were you with presenting as your gender identity in public?[a]	**0.67**[*]	0.11	0.22	0.05
In the past two weeks, how concerned were you about what others thought of your gender presentation?[b]	−0.26	**0.79**[*]	0.14	0.08
In the past two weeks, how concerned were you about not being perceived as your gender identity in public (regardless of whether you desire to fit a particular social category)?[b]	0.06	**0.61**[*]	−0.20	0.23
How often did you avoid using gendered public restrooms?[c]	0.11	**0.62**[*]	−0.18	−0.15
How often did you feel you knew how to present as your gender identity?[c]	**0.61**[*]	−0.00	0.26	0.07
How concerned were you about meeting and gendered societal expectations?[b]	0.03	**0.68**[*]	−0.02	0.07
Regardless if you experienced stigma or discrimination due to your gender identity, how confident did you feel to handle it?[d]	**0.65**[*]	0.03	0.25	0.33
Thinking about your gender identity, how comfortable did you feel with your voice?[a]	0.16	−0.05	**0.62**[*]	0.26
In the past two weeks, how comfortable were you about your genitals?[a]	0.15	0.06	0.13	**0.73**[*]
In the past two weeks, how comfortable were you about your secondary sex characteristics (ex: facial hair, breasts)?[a]	0.26	0.01	0.30	**0.63**[*]
In the past two weeks, how often did you feel like you were accepted in society as a transgender or gender nonconforming person?[c]	**0.61**[*]	−0.02	0.26	0.11
How often did it feel like you were living two different lives?[c]	−0.14	**0.61**[*]	−0.09	0.45
How satisfied were you with the support you received for being transgender or gender nonconforming from your friends?[e]	**0.61**[*]	0.04	0.03	−0.02
How satisfied were you with the support you received for being transgender or gender nonconforming from your family?[e]	0.21	0.05	**0.64**[*]	0.22
How satisfied were you with the support you received for being transgender or gender nonconforming at work or school?[e]	0.21	−0.28	**0.64**[*]	−0.15
Currently, how many people that you care about know your gender identity?[f]	**0.72**[*]	−0.11	−0.07	−0.02
Currently, how close do you feel to your ideal self- expression?[g]	**0.57**[*]	0.02	0.23	0.14
Currently, how capable do you feel to handle any stressors that may arise due to your gender identity?[h]	**0.63**[*]	−0.07	0.09	−0.39

Note: All values that are bolded and have

[*] indicate factor loading scores > .50. Response options for items are identified by superscripts as follows:

[a] = "Not at all comfortable" to "Completely comfortable";

[b] = "Not at all concerned" to "Extremely concerned";

[c] = "Never" to "Always";

[d] = "Not at all confident" to "Extremely confident";

[e] = "Not at all satisfied" to "Completely satisfied";

[f] = "None" to "All";

[g] = "Not at all close" to "Extremely close";

[h] = "Not at all capable" to "Completely capable"