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ORIGINAL PAPER

Social and Medical Gender Affirmation Experiences Are Inversely Associated with Mental Health Problems in a U.S. Non-Probability Sample of Transgender Adults

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Abstract

A dearth of research has explored concurrently the associations between multiple forms of gender affirmation (or transitioning) and the mental health of transgender adults. In 2015, 288 U.S. transgender adults completed a cross-sectional, online survey assessing demographics, gender affirmation experiences, and mental health. Adjusting for age and discrimination experiences, we used mixed-effect logistic regression analyses to examine changes in self-reported suicidal ideation, suicide attempts, and non-suicidal self-injury (NSSI) before and after initiating the gender affirmation process, and linear regression analyses to examine associations between gender affirmation experiences and self-reported depressive, anxiety, and stress symptoms. Overall, 81.3% of participants identified along the female-to-male, trans masculine gender spectrum (of which 20.9% identified as non-binary) and 18.8% identified along the male-to-female, trans feminine gender spectrum (of which 7.4% identified as non-binary). Nearly all participants (98.6%) reported disclosing their gender identity to family or a coworker; 67.4% endorsed recently using hormones, and 31.3% endorsed a gender-affirming medical procedure. In multivariable models, participants were at greater odds of NSSI, contemplating suicide, and attempting suicide before initiating the gender affirmation process compared to after. In additional models, gender identity disclosure and medical procedure engagement were inversely associated with depressive and anxiety symptoms, whereas gender identity disclosure, hormone use, and medical procedure engagement were inversely associated with stress symptoms. Finally, the number of gender affirmation experiences endorsed was inversely associated with depressive, anxiety, and stress symptoms. Findings support the possibility that social and medical gender affirmation experiences may be protective against mental health problems in transgender adults.

Keywords Transgender · Gender affirmation · Mental health · Suicide · Self-harm

Introduction

Transgender individuals have a gender identity or expression that differs from their assigned sex at birth. Published research documents widespread disparities in the frequency of depression, anxiety, suicidal ideation, and suicide attempts among U.S. transgender individuals relative to cisgender (i.e., non-transgender) individuals (Bockting, Miner, Romine, Hamilton, & Coleman, 2013; Clements-Nolle, Marx, & Katz, 2006; James et al., 2016; Reisner et al., 2016a; Reisner, White, Mayer, & Mimiaga, 2014). One non-probability study found a 35% lifetime frequency of having a major depression diagnosis among transgender women compared to 11% in the general population (Avenevoli, Swendsen, He, Burstein, & Merikangas, 2015; Reisner et al., 2016a). Further, a retrospective analysis of records from an adolescent community health center found that transgender patients were significantly more likely to have

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a depression diagnosis (51%), anxiety diagnosis (27%), and engaged in non-suicidal self-injury (NSSI; 17%), suicide ideation (31%), and attempted suicide (17%) relative to their cisgender counterparts (21% depression, 10% anxiety, 4% NSSI; 11% suicide ideation; 6% suicide attempt; Reisner et al., 2015a, b). Elevated levels of suicidality have also been documented at the national level, with 40% of participants in a non-probability study of more than 27,000 U.S. transgender adults having attempted suicide in their lifetime (James et al., 2016)—nearly 15 times the estimated prevalence of lifetime suicide attempts (2.7%) in the U.S. general population (Nock & Kessler, 2006).

One factor that likely contributes to the mental health and suicide risk disparities observed among transgender individuals (relative to cisgender individuals) is identity-based harassment, discrimination, violence, and other forms of stigma. Indeed, research indicates that transgender people experience high levels of stigma due to having a non-conforming gender identity or expression (White Hughto, Reisner, & Pachankis, 2015) with an estimated 63% of transgender people in a national, non-probability study reporting having experienced some form of discrimination in their lifetime (Grant et al., 2011). Transgender stigma can manifest in many forms, including discriminatory policies, employment discrimination, refusal of healthcare services, verbal harassment, physical assault, and intimate partner violence (Reisner et al., 2015a; Stotzer, 2009; White Hughto et al., 2018; White Hughto, Murchison, Clark, Pachankis, & Reisner, 2016; White Hughto, Rose, Pachankis, & Reisner, 2017b). According to the social-ecological model of transgender stigma (White Hughto et al., 2015) and gender minority stress pathways (Hendricks & Testa, 2012; Meyer, 2003), these various forms of stigma can interact to directly (e.g., via physical violence) and indirectly (e.g., the avoidance of needed care for fear of discrimination) affect the health of transgender individuals (Mizock & Mueser, 2014; Reisner et al., 2015a, 2016b; Rood, Puckett, Pantalone, & Bradford, 2015; White Hughto et al., 2015, 2016; White Hughto, Pachankis, Willie, & Reisner, 2017a).

Despite an extensive body of research examining stigma as a risk factor for the elevated frequency of mental health problems observed among transgender populations, far less research has explored factors that may protect against adverse mental health in the population—although burgeoning research suggests that gender affirmation may be one such factor (Glynn et al., 2016; Sevelius, 2013; White Hughto & Reisner, 2016). Gender affirmation, also referred to as gender transitioning, is a dynamic process whereby an individual affirms their gender through social (e.g., name, pronoun, and gender expression changes, gender identity disclosure) and medical (e.g., hormones, surgery) processes (Scheim & Bauer, 2015). The elements, duration, and timing of specific gender affirmation experiences vary widely, with transgender individuals choosing to engage in some forms of gender affirmation but not others (Scheim & Bauer, 2015). Notably, in the present study, the terms "social" and "medical" gender affirmation experiences pertain to the categories of actions that an individual can take to affirm their identified gender. However, an individual's gender identity can also be affirmed through interactions with others, such that their gender is validated by being addressed and treated in ways that are consistent with their gender identity (Sevelius, 2013).

Social gender affirmation can include living full time or part-time in one's identified gender, changing one's name or pronoun, dressing in ways that align with one's gender identity, and disclosing one's gender/transgender experience to others. Social forms of gender affirmation are often the first and sometimes the only forms of gender affirmation engaged in by transgender individuals (Coleman et al., 2012), and several studies have linked social gender affirmation experiences to positive mental health in diverse transgender populations. In fact, one non-probability study of 573 transgender women from California demonstrated that greater social gender affirmation in the form of familial support was associated with lower levels of depression and greater self-esteem (Glynn et al., 2016). Similarly, another non-probability study of 452 transgender adults from Massachusetts found that social gender affirmation (i.e., living "full time" in one's identified gender) was associated with reduced odds of NSSI and depressive distress (Katz-Wise, Reisner, White Hughto, & Budge, 2017b). Further, in another non-probability study of 105 transgender women recruited from a national conference, investigators found that disclosure of one's transgender identity was associated with psychological well-being (Strain & Shuff, 2010). Taken together, this set of findings may reflect, at least in part, the notion that being seen as one's authentic self (i.e., identified gender) is cathartic, and the resulting visibility allows for the possibility of support, acceptance, or validation from others (Erich, Tittsworth, Dykes, & Cabuses, 2008). However, research has also found that social gender affirmation in the form of gender identity disclosure can be met with discrimination, violence, and other forms of transgender stigma, and these stigmatizing experiences are associated with poor mental health (Levitt & Ippolito, 2014; White Hughto et al., 2015). Thus, additional research is warranted that explores the relations between gender identity disclosure and mental health, accounting for the potential impact of discrimination (e.g., Rood et al., 2017).

Medical gender affirmation includes the use of hormones, surgery, or other procedures (e.g., silicone injections, laser hair removal) to masculinize or feminize the body (Coleman et al., 2012). For some transgender people, some or all of these steps are a vital part of their gender affirmation process, and accessing these therapies may help to reduce gender dysphoria—the distress associated with the pervasive sense of incongruence between one's gender identity and physical

appearance (American Psychiatric Association, 2013; Coleman et al., 2012). There is mounting evidence that medical gender affirmation is associated with indicators of positive mental health. To that end, one systematic review of 28 observational studies largely conducted in Europe examined the psychological benefit of hormone therapy and gender-affirming surgeries. Pooling across studies, the review found that, although some individuals did not see improvements in psychological functioning post-surgery, the majority of transgender individuals (80%) reported significant improvement in gender dysphoria; 78% reported significant improvement in psychological symptoms; and 80% reported significant improvement in quality of life (Murad et al., 2010). A more recent systematic review of studies with more rigorous research designs found that, across prospective cohort studies, the initiation of hormones was associated with significant reductions in depressive and anxiety symptoms in transgender people (White Hughto & Reisner, 2016). Notably, the studies available for review in Murad et al. (2010) and White Hughto and Reisner (2016) were non-randomized and uncontrolled, due in part to the ethical limitations of withholding needed hormones and surgery from transgender people. Nonetheless, published systematic reviews and meta-analyses have concluded that medical gender affirmation likely improves psychological symptoms and quality of life in transgender patients.

Although a few empirical studies have concurrently linked social and medical gender affirmation to improvements in mental health (e.g., Murad et al., 2010; White Hughto & Reisner, 2016), and transgender care guidelines recommend gender affirmation as a treatment for gender dysphoria in transgender adults (American Psychiatric Association, 2016; Coleman et al., 2012), there has been a lack of research in the U.S. directly examining depression, anxiety, stress, and suicidality as a function of social and medical affirmation. Moreover, none of the published reports we could identify statistically controlled for discrimination, which could confound the relations between gender affirmation and mental health. These gaps in research, therefore, support the need for further research on the relations between gender affirmation and the mental health of transgender individuals. Using a non-probability sample of U.S. transgender adults, we aimed to: (1) characterize the frequency of social and medical gender affirmation, and mental health indicators; (2) examine whether gender affirmation is associated with a reduced frequency of non-suicidal self-injury and suicidal thoughts and behaviors over time; (3) identify which gender affirmation experiences are associated with mental health indicators; and (4) evaluate whether the number of gender affirmation experiences is associated with mental health indicators.

Method

Participants and Procedure

We drew data from the Transgender Stress and Health Study, an online survey of U.S. transgender adults, conducted in 2014–2015. After receiving Institutional Review Board approval, we distributed electronic flyers via public and (with permission) private online message boards, listservs, and social networking sites with transgender audiences. Recruitment materials contained basic information about the study and investigators (i.e., that our team was conducting the study from an affirmative and non-pathologizing perspective), and the web link to participate. To minimize ascertainment bias, recruitment materials did not contain information pertaining directly to the study aims (i.e., "Do you identify as transgender, gender nonconforming, and/or some other non-cisgender gender identity and want to share your story with a trans-ally?"). Participants were recruited from all regions of the U.S.

Interested individuals were directed to a secure area of an online data collection platform to complete the eligibility screener. In addition to asking participants to indicate whether they identified as "transgender or non-cisgender," we further established their transgender identity through a standard two-step process: Respondents first indicated their sex assigned at birth, followed by their gender identity. Eligible participants were individuals who: (1) resided in the U.S., (2) identified as "transgender" or "non-cisgender," (3) were age 18 or older, and (4) had begun their gender affirmation/transition process by dressing much or most of the time as their affirmed gender the past 6 months or longer.

Eligible individuals who provided informed consent were asked to complete an online survey, which took approximately 15 min to complete. Upon completion of the survey, all participants were provided with a list of U.S.-based mental health and social service resources (e.g., TGNC-affirming websites focused on health and safety, national suicide hotline numbers, national TGNC organizations) and could submit their e-mail address to enter themselves in a raffle for four $25 Amazon.com gift cards. In total, 331 participants attempted the survey. Of those, 31 participants were excluded from the present analysis due to omitting responses to key measures used in analyses, and an additional 12 were removed due to duplicate responses, resulting in a final analytic sample of 288 participants.

Measures

Demographics

Age in years was assessed continuously. Gender was assessed by asking: (1) assigned sex at birth (female, male) and (2) current gender identity (man, woman, transgender man/

female-to-male [FTM], transgender woman/male-to-female [MTF], genderqueer, non-binary, gender non-conforming, agender, another non-binary gender). We coded participants as being on the FTM trans masculine spectrum, which was inclusive of binary (e.g., man, trans man) and non-binary identities (e.g., gender non-conforming, gender variant), or being on the MTF trans feminine gender spectrum, which was inclusive of binary (e.g., woman, trans woman) and non-binary identities (e.g., gender non-conforming, gender variant). Participant race/ethnicity was coded as White versus a person of color (i.e., Black/African American; Asian/Asian American; Latinx/Hispanic; Native American/American Indian; Biracial/multiracial). Geographical region included Northeast, South, Midwest, and West. Educational attainment was coded as high school graduate/equivalent or less versus some college or more.

Participants were also asked to indicate the earliest age (in years) at which they first affirmed their gender (e.g., dressing as one's identified gender, disclosing gender identity to friends/family/others, receiving hormone therapy, or surgery). To account for the number of years since first affirming one's gender, we created a continuous variable by subtracting current age from the age at which participants first affirmed their gender.

Transgender-Related Discrimination

We assessed discrimination via an adapted measure that was previously developed for and utilized in research with transgender samples (Rood et al., 2015, 2016). Participants were first provided with the following definition of discrimination: "Discrimination is an event or process in which someone treats you differently—usually more negatively—because of the group, class, or category in which you belong." Participants were then asked to indicate (yes/no) whether they had experienced transgender-related discrimination in seven different contexts: at school or work; at a health office or during a health provider visit; from one's biological family; from friends or acquaintances; from romantic or sexual partners; from lesbian, gay, bisexual (LGB) people; and from transgender people. Responses for each item were summed and ranged from 0 (no reported discrimination) to 7 (reported discrimination in all contexts). Prior studies with transgender samples have shown a positive association between one or two forms of discrimination and suicidal ideation and substance abuse (Keuroghlian, Reisner, White, & Weiss, 2015; Rood et al., 2015).

Gender Affirmation

Social gender affirmation was assessed by asking participants whether they had disclosed their gender identity to one or more family members or coworkers. We operationalized medical gender affirmation via two variables. One item assessed whether participants participated in hormone therapy in the past 6 months or longer (yes/no). The other assessed for engagement in gender-affirming medical procedures; these could include lifetime gender-affirming surgeries (e.g., breast or chest surgery, vaginoplasty, phalloplasty) or other medical procedures, such as silicone injections to affirm one's gender (yes/no). We created a sum variable to account for the total number of gender affirmation experiences, which ranged from 0 (no reported experiences) to 3 (reported gender identity disclosure, hormone use, and other medical procedures).

Non-suicidal Self-injury and Suicidality

In these investigator-created questions, participants were asked to report on non-suicidal self-injury (NSSI), and suicidal thoughts and behaviors both before and after first initiating the gender affirmation process. First, participants were asked about NSSI, suicidal thoughts, and suicidal behaviors prior to first initiating the gender affirmation process. Participants were asked, in three separate questions, "Before you started the gender affirmation/transition process, did you ever (1) purposefully engage in NSSI behaviors; (2) seriously consider killing yourself (suicidal thoughts); and/or (3) attempt to kill yourself (suicidal behavior)?" Response options were "yes" or "no" for each of the three questions. Subsequently, participants were asked the same three questions with a different root: "Since you started your gender affirmation/transition process…"

Mental Health Symptoms

We measured depressive, anxiety, and stress symptoms using the Depression, Anxiety, and Stress Scale (DASS-21) (Lovibond & Lovibond, 1995), a well-validated measure consisting of three subscales with seven questions each, designed to measure the emotional states of depression, anxiety, and stress in the past 7 days. Items were assessed on a 4-point scale from 0 ("Did not apply to me at all") to 3 ("Applied to me very much, or most of the time"). Sample items include: "I found it difficult to relax," "I felt down-hearted and blue," and "I felt I was close to panic." The scores on each of the three subscales were summed and doubled to create three continuous total scores for depressive, anxiety, and stress symptoms. In prior research with transgender samples, the measure and subscales have shown good reliability (Dickey, Reisner, & Juntunen, 2015). In the current study, each subscale also demonstrated good reliability (α: .92 for depressive symptoms; .84 for anxiety symptoms; .86 for stress symptoms).

Data Analysis

We assessed distributions of individual items, including missingness, in SPSS 24. No participants had missing data for the gender affirmation variables or the control variables (i.e., age, discrimination). Missing values for the individual items comprising the DASS-21 ranged from 0.3 to 1.0%, and were imputed using single imputation (i.e., missing values were replaced with the variable mean score).

We conducted all remaining analyses in SAS 9.4. To determine whether the frequency of self-reported NSSI and suicidality was significantly different before and after engagement in gender affirmation processes, we used bivariate and multivariable mixed-effect logistic regression analyses to examine the associations between time and NSSI (Model 1); suicide contemplation (Model 2); and suicide attempts (Model 3). The mixed-effects models were calculated using PROC GLIMMIX with a logit link function for each of the binary dependent variables (odds ratios reported) and subject = ID to account for the dependency of the data. A compound symmetry covariance matrix was used for each model, which was selected based on model fit (i.e., lowest Akaike information criterion). Additionally, we tested whether demographic variables hypothesized to be associated with the dependent variables (i.e., birth sex, gender, race, geographical region, years since first affirming one's gender, education, and transgender-related discrimination) were in fact statistically related in bivariate analyses. In the multivariable mixed-effect models, we then controlled for the demographic variables found to be significantly associated with the dependent variables in preliminary bivariate analyses (i.e., years since first affirming one's gender, education, and transgender-related discrimination).

For the depressive, anxiety, and stress dependent variables, we used bivariate and multivariable linear regression analyses to examine associations between gender affirmation (each of the three forms as well as the sum variable) and each of the three mental health symptom variables. We also tested the bivariate association between key demographic variables hypothesized to be associated with the dependent variables (i.e., age, birth sex, gender, race, and transgender-related discrimination). Next, we fit three separate models regressing depressive (Model 4a), anxiety (Model 5a), and stress (Model 6a) symptoms on: gender identity disclosure, hormone use, and medical gender affirmation procedures. We included all forms of gender affirmation in the multivariable models, regardless of bivariate significance. Finally, we used a multivariable linear regression model to examine whether the number of gender affirmation experiences was associated with depressive (Model 4b), anxiety (Model 5b), and stress (Model 6b) symptoms. To isolate the independent associations between gender affirmation and depressive, anxiety, and stress symptoms, in all multivariable models, we controlled for the demographic variables found to be significantly associated with the dependent variables in preliminary bivariate analyses (i.e., age, education, and transgender-related discrimination). For all models, we determined significance at $p < .05$.

Results

Sample Characteristics

Table 1 shows the sample characteristics. Participants had a mean age of 33 years (SD = 13.0, the majority identified along the trans masculine gender spectrum (81.3%), were White (75.3%), and had completed some college or more (89.6%). The largest proportion of participants lived in the West (31.3%), followed by the South (26.7%), Northeast (26.0%), and Midwest (15.6%). The mean age at which participants first affirmed their gender was 15.4 years (SD = 10.7), and the mean number of years since participants first affirmed their gender was 17.4 years (SD = 14.7).

The majority of the sample (92.7%) reported experiencing one or more form of transgender-related discrimination ($M = 3.3$; SD = 2.0). The most commonly reported forms of transgender-related discrimination experienced by participants were discrimination by their biological family (62.2%), at work or school (58.0%), by their friends or acquaintances (55.6%), and by cisgender LGB individuals (55.6%).

All participants had accessed one or more form of social or medical gender affirmation, and all, but one participant had accessed hormones or surgery. Most participants (98.6%) had disclosed their gender identity to a family member or coworker, 67.4% had used hormones in the past 6 months, and 31.3% had a gender-affirming medical procedure. The majority of participants (69.4%) reported two or more gender affirmation experiences ($M = 2.0$; SD = 0.8; range 0–3).

The majority of the sample (83.3%) had engaged in NSSI, suicide contemplation, or attempted suicide in their lifetime. More than half the sample (66.0%) reported engaging in NSSI before they began the gender affirmation process, whereas less than a third (29.0%) reported engaging in NSSI after beginning the gender affirmation process. Nearly three-quarters of the sample (73.3%) reported contemplating suicide prior to beginning the gender affirmation process, and 43.4% reported contemplating suicide post-gender affirmation process initiation. Finally, 35.8% of the sample reported having attempted suicide prior to beginning the gender affirmation process, and 9.4% reported having attempted suicide post-gender affirmation process initiation. All individuals who had attempted suicide endorsed having contemplated suicide.

With regard to mental health symptoms, on average, participants had mild (stress symptoms: $M = 17.1$, SD = 9.4) to moderate mean scores (depressive symptoms: $M = 14.3$,

Table 1 Characteristics of a U.S. sample of transgender adults ($N = 288$)

	M	SD
Demographics		
Age: range (18–75)	32.8	13.0
Age when first affirmed gender: range (2–70)	15.4	10.7
Years since first affirmed gender: range (1–69)	17.4	14.7
Gender identity	*N*	%
Trans masculine gender spectrum	234	81.3
Non-binary	49	20.9
Trans male/man	110	47.0
Male/man	75	32.1
Trans feminine gender spectrum	54	18.8
Non-binary	4	7.4
Trans female/woman	29	53.7
Female/woman	21	38.9
Race/ethnicity		
White	217	75.3
Person of color	65	22.6
Race/ethnicity not listed	6	2.1
Geographical region		
Northeast	75	26.0
Midwest	45	15.6
South	77	26.7
West	90	31.3
Unknown	1	0.3
Educational attainment		
High school graduate or equivalent or less	30	10.4
Some college or more	258	89.6
Discrimination		
Transgender-related discrimination		
From your biological family	179	62.2
At school or work	167	58.0
From friends or acquaintances	160	55.6
From lesbian, gay, bisexual individuals (cisgender)	160	55.6
At a health office or during a healthcare visit	138	47.9
From romantic or sexual partners	97	33.7
From transgender individuals	71	24.7
Transgender-related discrimination experiences (sum)		
Mean (SD): range (0–7)	3.3	2.0
0	21	7.3
1	31	10.8
2	51	17.7
3	64	22.2
4	36	12.5
5	32	11.1
6	28	9.7
7	25	8.7
Gender affirmation		
Social: disclosure of gender identity		
No	4	1.4
Yes	284	98.6
Family only	46	16.0
Coworkers only	1	0.3
Both family and coworkers	237	82.3
Medical: hormone use—past 6 months		
No	94	32.6
Yes	194	67.4
Medical: gender affirmation procedures		
No	198	68.8
Yes	90	31.3
Silicone injections only	1	0.3
Surgery only	89	30.9
Both silicone and surgery	0	0.0
Number of gender affirmation experiences (sum)		
M (SD): range (0–3)	2.0	0.8
0	1	0.3
1	87	30.2
2	119	41.3
3	81	28.1
Self-harm		
Non-suicidal self-injury (NNSI)		
Before affirming one's gender	190	66.0
After affirming one's gender	85	29.5
Contemplated suicide		
Before affirming one's gender	211	73.3
After affirming one's gender	125	43.4
Attempted suicide		
Before affirming one's gender	103	35.8
After affirming one's gender	27	9.4
Mental health		
Depressive symptoms—past 7 days		
M (SD): range (0–42)	14.3	10.7
Anxiety symptoms—past 7 days		
M (SD): range (0–42)	10.0	8.8
Stress symptoms—past 7 days		
M (SD): range (0–42)	17.1	9.4

Mental health symptoms assessed via the Depression, Anxiety, and Stress Survey (DASS)

SD = 10.7; anxiety symptoms: $M = 10.0$, SD = 8.8) according to clinical ranges (Lovibond & Lovibond, 1995).

Main Outcomes

Table 2 shows mixed-effects models demonstrating within-person differences in self-reports of NSSI and suicidality from before and after the start of the gender affirmation process. In separate adjusted multivariable models, participants were at significantly greater odds of reporting NSSI (Model 1: adjusted odds ratio [aOR] = 5.50; 95% CI = 3.78–8.01;

$p < .001$); contemplating suicide (Model 2: aOR = 3.86; 95% CI = 2.67–5.57; $p < .001$); and attempting suicide (Model 3: aOR = 5.52; 95% CI = 3.45–8.84; $p < .001$) pre-gender affirmation, compared to post-gender affirmation.

Table 3 shows the association between gender affirmation and mental health symptoms. In multivariable Model 4A, gender identity disclosure (aBeta = − 15.31; standard error [SE] = 5.14; $p = .003$) and gender-affirming medical procedures (aBeta = − 3.85; SE = 1.40; $p = .01$) were each inversely associated with depressive symptoms. The number of gender-affirming medical procedures was also inversely associated with depressive symptoms in Model 4B (aBeta = − 3.48; SE = 0.79; $p < .001$). In multivariable Model 5A, gender identity disclosure (aBeta = − 8.49; SE = 4.18; $p = .04$) and gender-affirming medical procedures (aBeta = − 3.03; SE = 1.14; $p = .01$) were each inversely associated with anxiety symptoms. The number of gender-affirming medical procedures was also inversely associated with anxiety symptoms in Model 5B (aBeta = − 1.82; SE = 0.64; $p = .01$). In the final multivariable models, gender identity disclosure (aBeta = − 9.63; SE = 4.72; $p = .03$), recent hormone use (aBeta = − 2.67; SE = 1.19; $p = .02$), and gender-affirming medical procedures (aBeta = − 3.07; SE = 1.22; $p = .01$) were each inversely associated with stress symptoms in Model 6A. Lastly, the number of gender-affirming medical procedures was inversely associated with stress symptoms in Model 6B (aBeta = − 3.04; SE = 0.69; $p < .001$).

Discussion

Prior studies have demonstrated a positive association between social and medical gender affirmation and optimal mental health in transgender populations (Glynn et al., 2016; Strain & Shuff, 2010; White Hughto & Reisner, 2016; Wilson, Chen, Arayasirikul, Wenzel, & Raymond, 2015). However, several studies only examined one form of gender affirmation (e.g., medical) or limited their examination to a specific segment of the transgender population (e.g., transgender women, single geographic region). The present study is, to the best of our knowledge, the first to document an inverse association between multiple forms of gender affirmation and mental health indicators in a sample of transgender adults from all U.S. regions. Our within-subject comparisons found that participants reported a significantly lower frequency of NSSI and suicidal thoughts and behaviors after initiating the gender affirmation process as compared to before. Findings highlight the importance of further exploring the potential health benefit of multiple forms of gender affirmation on the mental health of transgender adults.

Consistent with prior U.S.-based studies, participants reported elevated levels of lifetime NSSI, suicide contemplation, and suicide attempts (James et al., 2016; Reisner et al.,

Table 2 Mixed-effect models examining changes in self-harm over time in a U.S. sample of transgender adults ($N = 288$)

	Model 1: Non-suicidal self-injury						Model 2: Contemplated suicide						Model 3: Attempted suicide					
	Bivariate			Multivariable			Bivariate			Multivariable			Bivariate			Multivariable		
	OR	95% CI	*p* value	aOR	95% CI	*p* value	OR	95% CI	*p* value	aOR	95% CI	*p* value	OR	95% CI	*p* value	aOR	95% CI	*P* value
Time																		
Before affirming one's gender	4.72	3.32–6.72	**< .001**	5.50	3.78–8.01	**< .001**	3.54	2.49–5.03	**< .001**	3.86	2.67–5.57	**< .001**	5.30	3.35–8.38	**< .001**	5.52	3.45–8.84	**< .001**
After affirming one's gender	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–

Bivariate and multivariable analyses used PROC GLIMMIX with a binary distribution and logit link function. Multivariable models adjusted for education, years since first affirming one's gender and transgender-related discrimination experiences. Bolded *p*-values = significant at $p < .05$

OR odds ratio; *CI* confidence interval; *aOR* adjusted odds ratio

Table 3 Bivariate and multivariable linear regression analyses examining the association between gender affirmation and mental health symptoms in a U.S. sample of transgender adults ($N = 288$)

	Depressive symptoms						Anxiety symptoms						Stress symptoms					
	Model 4A						Model 5A						Model 6A					
	Bivariate			Multivariable			Bivariate			Multivariable			Bivariate			Multivariable		
	Beta	SE	*p* Value	aBeta	SE	*p* Value	Beta	SE	*p* Value	aBeta	SE	*p* Value	Beta	SE	*p* Value	aBeta	SE	*p* Value
Social: disclosure of gender identity																		
No	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–
Yes	−13.40	5.31	**.01**	−15.31	5.14	**.003**	−5.54	4.44	0.21	−8.49	4.18	**.04**	−7.52	4.72	.11	−9.63	4.49	**.03**
Medical: hormone use																		
No	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–
Yes	−4.21	1.32	**.002**	−2.54	1.36	*.06*	−1.69	1.11	0.13	−0.34	1.10	.76	−4.05	1.16	**<.001**	−2.67	1.19	**.02**
Medical: gender affirmation procedures																		
No	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–
Yes	−5.02	1.32	**<.001**	−3.85	1.40	**.01**	−3.67	1.10	**0.001**	−3.03	1.14	**.01**	−4.45	1.17	**<.001**	−3.07	1.22	**.01**
	Model 4B						Model 5B						Model 6B					
	Multivariable			Multivariable			Multivariable			Multivariable			Multivariable			Multivariable		
	Beta	SE	*p* Value	aBeta	SE	*p* Value	Beta	SE	*p* Value	aBeta	SE	*p* Value	Beta	SE	*p* Value	aBeta	SE	*p* Value
Number of gender affirmation experiences	−3.67	0.78	**<.001**	−3.48	0.79	**<.001**	−2.07	0.66	**.002**	−1.82	0.64	**.01**	−3.27	0.69	**<.001**	−3.04	0.69	**<.001**

SE standard error; *aBeta* adjusted beta. Multivariable models adjusted for age, education, and transgender-related discrimination experiences. Bolded *p*-values = significant at $p < 0.05$; italicized *p*-values = approaching significance ($p = 0.05$)

2015b). Additionally, participants in the present study reported a significantly lower frequency of NSSI and suicidal thoughts and behaviors after initiating the gender affirmation process, as compared to before beginning the gender affirmation process—a finding that aligns with prior research conducted in the U.S. (Rood et al., 2015) and Europe (De Cuypere et al., 2006; Kröhn, Bertermann, Wand, & Wille, 1981; Yuksel, Yucel, & Tukel, 1991). Although our design did not allow us to assess participants' gender affirmation and NSSI experiences prospectively, the retrospective approach to analyzing cross-sectional, self-reported data used here allowed for the temporal ordering of variables, and lends support to the potentially protective nature of gender affirmation on reducing NSSI and suicidality. Future research using traditional prospective cohort designs is needed to more rigorously examine the potential benefit of gender affirmation on reductions in NSSI and suicidal thoughts and behaviors among transgender individuals in the U.S.

Notably, although there was a lower frequency of NSSI, suicidal thoughts, and suicide ideation after initially affirming one's gender identity, the relative frequency of NSSI (43.4%) and suicide contemplation (29.5%) remained high after initiating the gender affirmation process—a finding that is consistent with those of several European studies (De Cuypere et al., 2006; Dhejne et al., 2011; Simonsen, Giraldi, Kristensen, & Hald, 2016a). It is important to note, however, that gender affirmation is a process rather than a singular event. Thus, although NSSI and suicidal ideation may cease or be reduced following the initiation of the gender affirmation process for some transgender people, for those who continue to seek additional forms of gender affirmation (such as hormones or surgery), gender dysphoria may persist—along with NSSI and suicidality. Further, for many transgender people, the act of affirming one's gender, for example, by living full time or part-time as one's identified gender, may be cathartic and initially alleviate suicidal thoughts and self-harm behaviors (Erich et al., 2008). However, if this change is met with rejection by others (Rodriguez & Kelly, 2006; Rood et al., 2017), it is possible that NSSI and suicidal ideation could persist at high levels.

Notably, although reviews based on 31 studies found an overall positive association between medical gender affirmation and mental health (Murad et al., 2010; White Hughto & Reisner, 2016), two non-randomized European studies documented psychiatric morbidity among a subset of transgender individuals following gender confirmation surgery. Using data from 104 transgender individuals drawn from the Danish Psychiatric Central Research Register (a national registry of psychiatric hospital admissions), Simonsen, Giraldi, Kristensen, and Hald (2016a) found no significant differences in the prevalence of psychiatric (i.e., depression, anxiety, anxiety, substance abuse, personality disorder, neurotica personalis, and psychosis) disorders among Danish transgender adults before and after undergoing gender confirmation surgery. Further, while 23% of patients no longer had a psychiatric condition following surgery and 7% had a psychiatric condition at both time-points, 16% received a diagnosis at a psychiatric hospital in the years following surgery. Additionally, between 1970 and 2014, two of the 104 participants died by suicide following gender affirmation surgery (Simonsen et al., 2016a; Simonsen, Hald, Kristensen, & Giraldi, 2016b). Relatedly, in a study conducted in Sweden during a period of less social acceptance of transgenderism (1973–2003), Dhejne et al. (2011) found higher rates of death by suicide and psychiatric hospital admissions among individuals who had received gender confirmation surgery compared to population-matched controls.

Despite the methodological limitations of the studies conducted by Simonsen et al. (2016a, b) (e.g., small sample, data drawn from psychiatric hospital admissions, no control group) and Dhejne et al. (2011) (e.g., data drawn from psychiatric hospital admissions, non-randomized, non-transgender/population-level control group), these studies suggest that psychological morbidity may be present for some transgender individuals in the years following gender confirmation surgery. It is possible that some transgender individuals in the Swedish and Danish studies may have experienced persistent discrimination, resulting in ongoing gender dysphoria and limiting the potential benefits of gender-affirming medical procedures for some individuals. With regard to the present study, although we controlled for discrimination, the discrimination measure only assessed dichotomous experiences of lifetime discrimination across seven contexts (e.g., family, school, work), rather than the intensity or frequency of discrimination experiences, or discrimination at various points of the gender affirmation process. Participants in our sample who experienced severe or frequent forms of discrimination after first affirming their gender may have continued to experience distress and engaged in NSSI and suicide ideation to cope. Future mixed-methods research is needed to examine how the gender affirmation process shapes self-harm and suicide-related symptoms for transgender people over time while simultaneously considering the impact of the frequency and severity of discrimination on these conditions.

In addition to demonstrating an association between gender affirmation and NSSI and suicidal thoughts and behaviors, we found that social gender affirmation (in the form of gender identity disclosure) and medical gender affirmation (in the form of surgery or silicone injections) were each inversely associated with depressive, anxiety, and stress symptoms. In considering how gender identity disclosure may serve a protective function against multiple forms of adverse mental health indicators, published research suggests that concealing one's minority identity can lead to poor mental health (Fredriksen-Goldsen et al., 2014; Pachankis, 2007), whereas disclosing one's minority identity, particularly in safe and supportive environments, can lead to improvements in mental health (Erich et al., 2008)—findings that are consistent with

the current study. For transgender individuals, disclosing one's transgender identity or history to others may represent an early form of self-actualization and identity development and, thus, has strong implications for mental health (Katz-Wise et al., 2017a; Rood et al., 2017). Similarly, medical gender affirmation procedures are often accessed later in one's gender affirmation process and, thus, may represent an additional experience of self-actualization and identity development (Bockting & Coleman, 2007; Coleman et al., 2012). Moreover, medical gender affirmation procedures such as surgery often result in more permanent and transformative physical changes that may be associated with greater gender conformity in transgender individuals who have a binary identity (e.g., man, woman) (Coleman et al., 2012). These changes could, in turn, precipitate greater social recognition as one's identified gender, fewer experiences of discrimination due to having a visually gender non-conforming expression, and, ultimately, improved mental health (Reisner et al., 2016b). Future research examining the mechanisms linking social and medical gender affirmation procedures to improvements in mental health in transgender adults is warranted.

Unlike gender identity disclosure and medical gender affirmation procedures (e.g., surgical procedures), recent hormone use was significantly and inversely associated with stress symptoms, but not depressive or anxiety symptoms. Although these associations were in the anticipated direction, and the relations between depression and hormone use approached significance ($p < .06$), these findings do not fully converge with those from a recent systematic review showing that hormone therapy use is associated with significant reductions in depressive and anxiety symptoms for transgender people over time (White Hughto & Reisner, 2016). These equivocal findings may be due, in part, to differences in methods, as our U.S.-based study used a cross-sectional design and collected data online and the studies evaluated in the review used a prospective design with patients recruited from gender identity clinics in Europe. Although our study attempted to establish the temporality between the gender affirmation variables and the mental health variables, our cross-sectional methods precluded the examination of the associations between hormone therapy and depressive, anxiety and stress symptoms over time.

For many, but not all transgender individuals, hormone therapy may represent an intermediary step in one's gender affirmation process (Coleman et al., 2012). Thus, although hormone use has been shown to be associated with better mental health in the 6–12 months following initiation (White Hughto & Reisner, 2016), it is possible that these benefits, especially in relation to depression and anxiety symptoms, are not sustained for all transgender people who access them. Time-limited gains in improved mental health post-hormone initiation could be explained by new challenges faced by transgender individuals who desire to further affirm their gender through additional medical procedures like surgery, but who are unable to access such procedures due to various barriers (e.g., financial, geographic, family). Ultimately, longitudinal research is needed to measure the desire for and barriers to accessing multiple forms of gender affirmation over longer periods of time (i.e., > 12 months) in order to fully characterize the relations between gender affirmation and the mental health of transgender samples. Such data could be extremely helpful in informing future iterations of transgender clinical care guidelines.

In addition to exploring the relations between specific gender affirmation experiences and mental health, we discovered a dose–response association between number of gender affirmation experiences and mental health. Specifically, as the number of reported gender affirmation experiences increased, the severity of depressive, anxiety, and stress symptoms decreased. Although not every person wishes to affirm their gender through various social and medical experiences (Coleman et al., 2012), findings from the present study suggest that, overall, the more sources of gender affirmation that transgender people are able to access, the better their mental health. Based on the findings of this study and prior systematic reviews on the effects of medical gender affirmation procedures (Murad et al., 2010; White Hughto & Reisner, 2016), mental health and other healthcare providers involved in the care of transgender individuals should be sure to evaluate each patients' personal gender affirmation goals, and provide education about the potential mental health risks and benefits of various sources of gender affirmation to aid in clinical decision making and facilitate the health and well-being of transgender patients.

Potential methodologic limitations of this study warrant consideration. Given our study's cross-sectional design, it is not possible to make causal inferences. Given that our measures were self-reported, it is possible that biases in recollection or reporting influenced the results. We specifically asked about NSSI and suicidal thoughts and behaviors pre- and post-gender affirmation using different questions, in order to provide a crude metric of temporality; however, given the cross-sectional design, these data must still be interpreted cautiously. Presenting the questions in this format may have increased the risk of ascertainment bias. That is, it is possible that transgender participants may have been motivated to report favorable gender affirmation outcomes (i.e., less NSSI and suicidality) post-gender affirmation since self-harm and suicidality were directly assessed in relation to gender affirmation initiation. However, given the still-elevated levels of NSSI and suicide ideation reported following the initiation of the gender affirmation process, it appears unlikely that such a bias skewed the results drastically.

Additionally, although we measured multiple gender affirmation experiences, we did not capture all possible forms of gender affirmation (e.g., name change, specific forms of

surgery) and the limited sample size precluded the examination of which combination of gender affirmation experiences was associated with more optimal mental health. Further, each measure of gender affirmation was assessed dichotomously (yes/no); thus, it is likely that a proportion of those who did not experience a specific form of gender affirmation may not have desired it. Prior research has found that individuals who have not had a specific gender affirmation procedure, but want it, have worse mental health (i.e., history of suicide attempts) than those who have not had a specific gender affirmation experience and do not want it (Haas, Rodgers, & Herman, 2014). Thus, by including both groups in the no category, we likely biased our findings toward the null hypothesis. Future research should attempt to replicate our findings and determine whether findings vary according to both participants' gender affirmation experiences and goals.

Notably, we conducted this study exclusively online. One major benefit of online data collection methods is that we were able to recruit participants from across the U.S. and, especially, reach participants who may not have otherwise been comfortable or available to complete an in-person survey. One major drawback to online recruitment, however, is that only transgender individuals with Internet access had the opportunity to participate. Online-recruited samples tend to be biased toward those who identify as White or have a higher socioeconomic status, relative to in-person samples (Kraut et al., 2004). To that end, although the sample was diverse in many respects, most participants identified as White, were on the masculine gender spectrum, and had completed some college education or more. Although we did not observe differences in the frequency of mental health symptoms according to gender identity or race in preliminary analyses (see data analysis methods), and we controlled for educational attainment in all analyses, it is possible that our findings may be less generalizable to samples primarily comprising trans feminine individuals, people of color, and those with lower educational attainment. Future studies should utilize purposive sampling techniques in order to replicate our findings in more diverse populations of transgender adults.

Conclusions

Overall, in the present study, we provide evidence in support of the significant association between social and medical gender affirmation experiences and the mental health of U.S. transgender adults. Given the high frequency of attempted suicide among transgender individuals, and documented disparities in other mental health concerns among transgender (vs. cisgender) communities, our findings add to the collective body of evidence suggesting that multiple sources of gender affirmation may help to curb self-harm and poor mental health symptoms in transgender people. Future research should use prospective, longitudinal designs and objective measures of mental health in a more diverse sample of transgender individuals, as well as measure and model the impact of potential mediating factors such as gender-based discrimination and barriers to gender affirmation. This work is critical to better understand the role of gender affirmation experiences and the mental health of U.S. transgender adults.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the Suffolk University Institutional Review Board, and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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