



Published in final edited form as:

Eat Behav. 2020 April ; 37: 101381. doi:10.1016/j.eatbeh.2020.101381.

Community Norms for the Eating Disorder Examination Questionnaire (EDE-Q) among Transgender Men and Women

Jason M. Nagata, MD.¹, Stuart B. Murray, Ph.D.², Emilio J. Compte, Ph.D.^{3,4}, Erica H. Pak, B.A.², Rebecca Schauer, B.A.², Annesa Flentje, Ph.D.^{2,5,6}, Matthew R. Capriotti, Ph.D.^{7,5,8}, Micah E. Lubensky, Ph.D.^{5,6}, Mitchell R. Lunn, M.D., M.A.S.^{5,9}, Juno Obedin-Maliver, M.D., M.P.H., M.A.S.^{5,10}

¹Department of Pediatrics, University of California, San Francisco, San Francisco, CA

²Department of Psychiatry, University of California, San Francisco, San Francisco, CA

³School of Psychology, Adolfo Ibáñez University, Santiago Chile

⁴Research Department, Comenzar de Nuevo Treatment Center, Monterrey, México

⁵The PRIDE Study/PRIDENet, Stanford University School of Medicine, Stanford, CA

⁶Department of Community Health Systems, University of California, San Francisco, San Francisco, CA

⁷Department of Psychology, San José State University, San Jose, CA

⁸Department of Medicine, University of California, San Francisco, San Francisco, CA

⁹Division of Nephrology, Department of Medicine, Stanford University School of Medicine, Stanford, CA

¹⁰Department of Obstetrics and Gynecology, Stanford University School of Medicine, Stanford, CA

Abstract

Transgender men and women may be at risk for eating disorders, but prior community norms of the Eating Disorders Examination Questionnaire (EDE-Q) are based on presumed cisgender men and women and have not intentionally included transgender people. The objective of this study was to develop community norms for eating disorder attitudes and disordered eating behaviors in transgender men and women using the EDE-Q. Participants were 312 transgender men and 172 transgender women participants in The PRIDE Study, an existing cohort study of sexual and

Corresponding author and person to whom reprint requests should be addressed: Jason M. Nagata, M.D., M.Sc., 550 16th Street, 4th Floor, Box 0110, San Francisco, CA 94158, jasonmnagata@gmail.com, Phone: +1 (626) 551-1932.

Author Statement:

Jason M. Nagata: conceptualization, analysis, methodology, writing original draft, review, and editing. Stuart B. Murray: conceptualization, writing original draft, review, and editing. Emilio J. Compte: analysis, methodology, writing original draft, review, and editing. Erica H. Pak and Rebecca Schauer: writing original draft, review, and editing. Annesa Flentje, Matthew R. Capriotti, Micah E. Lubensky, Mitchell R. Lunn, Juno Obedin-Maliver: conceptualization, methodology, review, and editing.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

gender minority people. We present mean scores, standard deviations, and percentile ranks for the Global score and four subscale scores of the EDE-Q in transgender men and women. Transgender men and women reported any occurrence ($1/28$ days) of dietary restraint (25.5% and 27.9%), objective binge episodes (11.2% and 12.8%), excessive exercise (8.0% and 8.1%), self-induced vomiting (1.6% and 1.7%), and laxative misuse (.3% and .6%), respectively. Compared to a prior study of presumed cisgender men 18–26 years (Lavender *et al.*, 2010), our age-matched subsample of transgender men reported lower rates of objective binge episodes and excessive exercise. Compared to a prior study of presumed cisgender women 18–42 years (Mond *et al.*, 2006), we found that an age-matched sample of transgender women reported higher rates of dietary restraint but lower rates of excessive exercise. These norms should aid clinicians in applying and researchers in investigating and interpreting the EDE-Q scores of transgender men and women.

1. Introduction

Historically, transgender people have been underrepresented in clinical research. Transgender people have a gender identity or gender expression that differs from their sex assigned at birth, whereas cisgender people have a gender identity or gender expression that matches their sex assigned at birth (*i.e.*, a transgender man identifies and expresses his gender as a man, but was assigned female sex at birth; a transgender woman identifies and expresses her gender as a woman, but was assigned male sex at birth). Sexual orientation, a person's physical, romantic, or emotional attraction to other people, is separate from their gender identity. Transgender people may identify with any sexual orientation. In the context of eating disorders, challenges around illness recognition and treatment may be amplified due to the intricate overlap between gender identity and body image (Murray, 2017).

Body dissatisfaction plays a pivotal role in the development of disordered eating (Menzel *et al.*, 2010), and transgender people have higher levels of disordered eating behaviors compared to cisgender people (Jones, Haycraft, Murjan, & Arcelus, 2016). In addition to body dissatisfaction, other factors, such as social stigma and reduced social support, may exacerbate disordered eating behaviors for transgender people (Brewster, Velez, Breslow, & Geiger, 2019; Watson, Veale, & Saewyc, 2017). Some disordered eating behaviors may be implicated in pursuing body image ideals consistent with one's gender identity, such as dietary restriction leading to amenorrhea and loss of female sex characteristics in a gender-affirmed transgender man (Avila, Golden, & Aye, 2019; Testa, Rider, Haug, & Balsam, 2017). Parsing out disordered eating profiles from gender-oriented behaviors may be challenging (Gordon, Austin, Krieger, White Hughto, & Reisner, 2016; McClain & Peebles, 2016; Murray, 2017).

Transgender Men

Although literature on disordered eating in transgender men is sparse, research has shown that transgender men exhibit more disordered eating than cisgender men (Ålgars, Alanko, Santtila, & Sandnabba, 2012) and transgender women (Witcomb *et al.*, 2015). Furthermore, transmasculine individuals (those identifying among the masculine spectrum and assigned female sex at birth) demonstrated clinically significant eating pathology levels on the Eating Attitudes Test (EAT-26) (Testa *et al.*, 2017). The elevated rate of disordered eating behaviors

in transgender men and transmasculine individuals may be partially due to the desire to suppress menstruation and secondary female sex characteristics (Avila et al., 2019; Hepp & Milos, 2002). In accordance, significantly fewer eating disorders were observed in transmasculine individuals who had received chest surgery, gender-affirming hormone treatment, or hysterectomy (Testa et al., 2017).

Transgender Women

Sexual objectification and gender minority stress may contribute to disordered eating among transgender women (Brewster et al., 2019). Specific social standards, such as slimness, are correlated with the drive for weight loss in transgender women, which may also manifest in eating pathology (Diemer, Grant, Munn-Chernoff, Patterson, & Duncan, 2015). In parallel, transgender women may use weight loss to repress secondary male characteristics (Jones et al., 2016). Experiences of stigma may contribute to disordered eating behaviors among transgender women. Disordered eating behaviors can be further exacerbated by having reduced protective factors such as social support (Watson et al., 2017).

Aim of Current Study

Although the Eating Disorder Examination Questionnaire (EDE-Q) is widely used as a measure of eating disorder attitudes and disordered eating behaviors (Mond, Hay, Rodgers, & Owen, 2006), there is no research that examines EDE-Q norms among transgender men and women. Establishing community norms of self-reported eating disorder attitudes and disordered eating behavior measures in transgender populations is needed to address challenges and health disparities. This is especially salient given the overlap between eating and body image-related practices and the construction of gender (Nagata, Domingue et al., 2020). The aim of the present study was to aid in developing community norms for the EDE-Q, a standard for assessment of eating disorder attitudes and disordered eating behaviors, for the first time among transgender men and transgender women.

2. Methods

2.1. Study Design and Population

The PRIDE Study is a large-scale national longitudinal cohort study of sexual and gender minority (SGM) adults, which include, but are not limited to, people who identify as lesbian, gay, bisexual, transgender, and/or queer (LGBTQ) in the US. The PRIDE Study launched in 2017, and data were collected on a web-based platform accessible from any computer, tablet, or smartphone. Inclusion criteria included age ≥ 18 years, self-identification as a sexual and/or gender minority, living in the U.S. or its territories, and ability to read and respond to written questions in English. Further description of the cohort population, demographics, and the technology that support it have been previously described (Lunn, Lubensky et al., 2019; Lunn, Capriotti et al., 2019). PRIDEnet, a national network of organizations and individuals, was created to actively engage SGM communities in all stages of research for The PRIDE Study. Participants in The PRIDE Study were recruited through PRIDEnet constituents, digital communications (blog posts, newsletters), distribution of The PRIDE Study-branded promotional items, in-person outreach at conferences and events, social media advertising, and word-of-mouth. All participants in The PRIDE Study were

invited to participate in this cross-sectional self-reported online survey on eating behaviors and body image from April to August 2018.

We included transgender men and women in this analysis. Participants were asked about their gender identity (“What is your current gender identity?”) and sex (“What sex were you assigned at birth on your original birth certificate?”). Transgender men were defined as persons who responded “transgender man (female-to-male)” and/or “man” and/or “transmasculine” (write-in) for gender identity and “female” for birth-assigned sex. Transgender women were defined as persons who responded “transgender woman (female-to-male)” and/or “woman” and/or “transfeminine” (write-in) for gender identity and “male” for birth-assigned sex. Participants of all sexual orientations were included. 4,285 of 10,665 participants from The PRIDE Study completed the questionnaire (40.2% response rate). Of these, 352 identified as transgender men and 181 as transgender women. Participants who fully completed all of the EDE-Q questions (312 transgender men and 172 as transgender women) were included in the current study.

2.2. Measures

The EDE-Q is a self-report questionnaire that assesses eating disorder attitudes and disordered eating behaviors over the previous 28 days (Fairburn & Beglin, 2008). The measure provides four subscale scores: Restraint (5 items), Eating Concern (5 items), Shape Concern (8 items), and Weight Concern (5 items). The Global score is calculated as the average of the four subscales. Responses are on a 7-point ordered response; higher scores reflect greater eating-related concerns or behaviors. Frequencies of disordered eating behaviors (*e.g.*, binge eating, compensatory behaviors) are assessed. Cronbach’s alpha in this study for transgender men and women, respectively, were as follows: Global score (.94 and .94), Restraint (.78 and .80), Eating Concern (.84 and .77), Weight Concern (.86 and .86), and Shape Concern (.90 and .90).

In the EDE-Q, the frequency of binge eating and compensatory behaviors were assessed by the number of episodes occurring during the past 28 days in accordance with previous literature (Lavender, De Young, & Anderson, 2010; Nagata, Capriotti et al., 2020; Penelo, Villarroel, Portell, & Raich, 2012). Any occurrence was defined as 1 episode in the past 28 days (Lavender et al., 2010; Penelo et al., 2012). Regular occurrences of dietary restraint were defined as going for long periods of time (> 8 h) without eating anything to influence shape or weight for > 13 days over the past 28 days (Lavender et al., 2010; Penelo et al., 2012). Regular occurrences of excessive exercise were defined as exercising in a driven or compulsive way as a means of controlling weight, shape or amount of fat, or burning off calories for > 20 days over the past 28 days (Lavender et al., 2010; Penelo et al., 2012). For all other behaviors (objective binge episodes, self-induced vomiting, and laxative misuse), regular occurrence was defined as > 4 occurrences over the past 28 days (Lavender et al., 2010).

Demographic information (age, race, ethnicity, and education), weight, and height were self-reported. The standard formula weight (kilograms) divided by height (meters) squared was used to determine body mass index ($BMI = \text{weight}/\text{height}^2$). Participants were also asked: “Has a mental health professional or physician ever told you that you have an eating disorder

such as anorexia nervosa, bulimia nervosa, or binge eating disorder?” If affirmative, participants were asked to specify which type. Options included anorexia nervosa, bulimia nervosa, binge eating disorder, or other/not specified. Participants could select more than one diagnosis.

2.3. Data Analysis

SPSS 20.0 was used for all analyses. Associations between participants' BMI and EDE-Q subscales and Global scores were assessed using Pearson product-moment correlations coefficient. Lowess smoothing plots were created to demonstrate the relationship between age and EDE-Q Global Score, as well as BMI and EDE-Q Global score. Lowess plots use locally weighted smoothing on scatter plots to demonstrate a smooth line visualization of the relationship between a predictor and outcome. A series of item analyses were conducted to estimate the psychometric quality of each item in measuring the target construct by correlating each subscale with their correspondent items (Kyriazos & Stalikas, 2018), as well as the EDE-Q Global score with all 22 attitudinal items (Nunnally, 1978). No values $r < .20$ were expected. Norms in an age-matched subset ($n = 143$) of transgender men (ages 18–26 years) and in a subset ($n = 109$) of transgender women (ages 18–42) from The PRIDE Study were calculated in order to compare norms to those previously published in (presumed cisgender) men 18–26 years old (Lavender et al., 2010) and (presumed cisgender) women 18–42 years old (Mond et al., 2006). Given the broad age range of our sample (18–74 years), we selected an age-matched subset for comparison to the previously published norms. We chose Lavender et al. (2010) and Mond et al. (2006) as comparison groups because they represented the samples of men and women with published EDE-Q norms that most closely matched The PRIDE Study (*i.e.*, non-clinical, adult sample with adequate sample size for comparisons). However, neither Lavender et al. (2010) nor Mond et al. (2006) assessed gender comprehensively while also ascertaining sex assigned at birth; some transgender men and women may have been included. We are unaware of EDE-Q norms published in a community sample in which current gender identity and sex assigned at birth were assessed and only cisgender people were included. Z-tests or Fisher exact test were conducted comparing the proportions of individuals who reported each disordered eating behavior, and independent samples t-tests were used to compare the Global and subscale scores.

3. Results

3.1. Transgender Men

Among transgender men, the mean age was 30.5 years old ($SD = 9.7$) in a range of 18 to 67 years of age (Table 1). Mean BMI was 28.7 kg/m² ($SD = 7.5$) with values between 16.1 and 58.5. A total of 85.5% of the participants identified as White, 3.6% as Hispanic/Latino, 2.2% as Black, 0.3% as Asian or Pacific Islander, 0.3% as Native American, and 8.1% as other/Multiracial. In addition, 60.5% of participants had completed a college degree or higher. Overall, 10.6% of participants reported being told by a mental health provider or physician that they had an eating disorder, including anorexia nervosa (4.2%), bulimia nervosa (3.2%), binge eating disorder (1.6%), or other/not specified (5.1%).

Mean scores, standard deviations, and percentile ranks for the EDE-Q subscales and Global score are presented in Table 2. BMI showed a significant positive correlation with the Eating Concern ($r = .21, p < .001$), Weight Concern ($r = .34, p < .001$), and Shape Concern ($r = .25, p < .001$) subscales, and Global score ($r = .25, p < .001$). No significant correlation between BMI and the Restraint subscale was observed among transgender men ($r = .05, p = .397$). Lowess smoothing plots demonstrated that among transgender men, EDE-Q Global scores were generally stable across adult participants of all ages, with slightly higher scores among participants in their early 20s (Figure 1). EDE-Q Global score was generally higher among participants with a higher BMI until approximately 40 kg/m² (Figure 2). Item analyses revealed that all items showed positive significant correlation with their correspondent subscale score and with the Global score with values $r > .20$ in all cases (Restraint: $r = .58$ to $.87$, Eating Concern: $r = .61$ to $.85$, Weight Concern $r = .72$ to $.89$, Shape Concern: $r = .68$ to $.86$, and Global score: $r = .46$ to $.83$).

Any occurrence and regular (*i.e.*, two or more per week) occurrences of key disordered eating behaviors are presented in Table 3. At least one episode of dietary restraint during the previous 28 days was observed for more than one quarter of the participants. Approximately 10% of the participants endorsed one episode of objective binge eating and less than 10% reported excessive exercise over the past 28 days. Episodes of self-induced vomiting (1.6%) and laxative misuse (0.3%) in the last 28 days were rarely observed.

Comparison from an age-matched (18 to 26 years) subset of transgender men from the current study ($n = 143$) and presumed cisgender men from Lavender et al. (2010) are presented in Table 4. Transgender men showed higher values in EDE-Q Eating Concern, Weight Concern, Shape Concern, and Global scores compared to presumed cisgender men. However, among key disordered eating behaviors, the subset sample of transgender men did not report laxative misuse and showed lower proportions of objective binge eating episodes and excessive exercise than presumed cisgender men from Lavender et al. (2010); no differences were observed for dietary restraint and self-induced vomiting across groups. Norms of the EDE-Q attitudinal subscales and Global score for the age-matched sample of transgender men 18–26 years are presented in Appendix A.

3.2. Transgender Women

Among transgender women, the mean age was of 41.2 years old ($SD = 14.9$) in a range of 20 to 74 years of age (Table 1). Mean BMI was 28.1 kg/m² ($SD = 6.5$) with values between 17.3 and 55.5. A total of 88.4% of the participants identified as White, 2.9% as Hispanic/Latino, 0.6% as Asian or Pacific Islander, and 8.1% as other/Multiracial. In addition, 56.5% of participants had completed a college degree or higher. Overall, 8.1% of participants reported being told by a mental health provider or physician that they had an eating disorder, including anorexia nervosa (4.1%), bulimia nervosa (2.9%), binge eating disorder (1.7%), or other/not specified (1.8%).

Mean scores, standard deviations, and percentile ranks for the EDE-Q subscales and Global score are presented in Table 2. BMI showed a significant positive correlation with the Eating Concern ($r = .19, p = .014$), Weight Concern ($r = .39, p < .001$), and Shape Concern ($r = .26, p = .001$) subscales, and Global score ($r = .28, p < .001$). No significant correlation between

BMI and the Restraint subscale was observed among transgender women ($r = .13$, $p = .098$). Lowess smoothing plots demonstrated that among transgender women, EDE-Q Global scores were mostly stable around 2 across age groups (Figure 3). Participants with a higher BMI generally had higher EDE-Q scores (Figure 4). Item analyses showed positive significant correlations between subscales totals and their correspondent items, and between all 22 attitudinal items and the Global score with values $r > .20$ in all cases (Restraint: $r = .53$ to $.84$, Eating Concern: $r = .54$ to $.83$, Weight Concern $r = .71$ to $.89$, Shape Concern: $r = .63$ to $.86$, and Global score: $r = .40$ to $.82$).

Any occurrence and regular (*i.e.*, two or more per week) occurrences of key disordered eating behaviors are presented in Table 3. At least one episode of dietary restraint during the previous 28 days was observed for almost 30% of the participants. Close to 10% of the participants endorsed one episode of objective binge eating and excessive exercise over the past 28 days. Episodes of self-induced vomiting (1.7%) and laxative misuse (0.6%) in the last 28 days were rarely observed.

Comparison from an age-matched (18 to 42 years) subset of transgender women from the current study ($n = 109$) and presumed cisgender women from Mond et al. (2006) are presented in Table 4. Transgender women showed higher values of Weight Concern, Shape Concern, and for the EDE-Q Global score compared to age-matched presumed cisgender women. No significant differences were observed for the Restraint and Eating Concern subscales. Among key disordered eating behaviors features, no significant differences across groups were observed for objective binge episodes, self-induced vomiting, and laxative misuse. However, transgender women showed a higher proportion of dietary restraint, while presumed cisgender women presented a higher frequency of excessive exercise. Norms of the EDE-Q attitudinal subscales and Global score for the age-matched sample of transgender women 18–42 years are presented in Appendix A.

4. Discussion

We leveraged The PRIDE Study to assess and describe EDE-Q norms for the first time among transgender men and women. Similar to studies in presumed cisgender men and women (Lavender et al., 2010; Luce, Crowther, & Pole, 2008), Shape Concerns were the highest subscale in both transgender men and women. Compared to a prior study of presumed cisgender men 18–26 years (Lavender et al., 2010), we found that an age-matched sample of transgender men reported higher EDE-Q Eating Concern, Weight Concern, Shape Concern, and Global scores. Compared to a prior study of presumed cisgender women 18–42 years (Mond et al., 2006), we found that an age-matched sample of transgender women reported higher EDE-Q Global score and Weight and Shape Concerns subscale scores. Prior studies have found that transgender participants had higher levels of body dissatisfaction in comparison to cisgender populations (Ålgars et al., 2012; Cella, Iannaccone, & Cotrufo, 2013; Vocks, Stahn, Loenser, & Legenbauer, 2009). Lower gender congruence with one's external presentation and internal self has been shown to be related to lower levels of body satisfaction among transgender individuals (Kozee, Tylka, & Bauerband, 2012). Transgender individuals may also have body dissatisfaction with sex-specific body parts (Becker et al., 2016).

Body dissatisfaction may reflect contemporary gender norms around body image; in many Western cultures, the idealized feminine body ideal is thin whereas the idealized male body ideal is muscular (Murray et al., 2017). Transgender women have reported striving for thinness-oriented body ideals to appear more feminine (Ålgars et al., 2012; Jones et al., 2016). Because the thin ideal has been viewed as unattainable for many cisgender women (Fitzsimmons-Craft, 2011), this may have been perceived as even more unattainable for transgender women in which certain anatomical structures cannot be altered medically or surgically (such as broad shoulders) (Jones et al., 2016). Transgender men have reported dissatisfaction with several body features, including genitalia, body hair, body shape, facial features, and extremities (Becker et al., 2016). Transgender men may also desire a “masculine” build and thus engage in muscle-enhancing behaviors such as bodybuilding and fitness (Farber, 2017). Fitness activities at the gym for some transgender men may be oriented towards building a chest and reducing ‘feminine’ fat, especially at the hips (Farber, 2017).

We also reported disordered eating behaviors in transgender men and transgender women. Dietary restraint was the most common disordered eating behavior reported by transgender men (26%) and transgender women (28%), followed by binge eating (11% and 13%, respectively). Compared to a prior study of presumed cisgender men 18–26 years (Lavender et al., 2010), our age-matched subsample of transgender men reported lower rates of objective binge episodes and excessive exercise. Compared to a prior study of presumed cisgender women 18–42 years (Mond et al., 2006), we found that an age-matched sample of transgender women reported higher rates of dietary restraint but lower rates of excessive exercise. One prior Canadian study previously reported high rates of fasting (34% and 45%) and binge eating (35% and 30%) among young adult transgender men and transgender women, respectively (Watson et al., 2017). Our lower reported rates may be due to the older age of our sample, different countries, and differences in the measures (Watson et al., 2017 timeframe was past 12 months). Transgender persons may engage in disordered eating behaviors to accentuate features consistent with their gender identity and suppress secondary sex characteristics of their sex assigned at birth (Ålgars et al., 2012). For instance, transgender men may engage in muscle-enhancing behaviors but may also engage in dietary restriction to induce amenorrhea (Farber, 2017) whereas transgender women may engage in dietary restriction to attain the thin ideal (Gordon et al., 2016; McClain & Peebles, 2016; Murray, 2017). Transgender men and women experience high rates of mistreatment and violence in the US; 46% report verbal harassment and 9% report being physically attacked because of being transgender in the prior year (James et al., 2016). One study found that enacted stigma, such as high rates of harassment and discrimination, was linked to binge eating, fasting, and vomiting in transgender youth (Watson et al., 2017). Protective factors included family connectedness, school connectedness, caring friends, and social support (Watson et al., 2017). Future research could examine the EDE-Q in clinical settings to correlate EDE-Q scores to eating pathology among clinical samples of transgender people with and without diagnosed eating disorders.

Our sample had a wide age range spanning 18–74 years. The EDE-Q Global score remained relatively high among transgender participants of all ages. In contrast, EDE-Q Global score was lower among presumed cisgender men older than 65 years (Hilbert, de Zwaan, &

Braehler, 2012), among cisgender gay men older than 40 years (Nagata et al., 2020), and among presumed cisgender women older than 30 years (Mond et al., 2006) compared to younger participants in each respective study.

4.1. Limitations

There are several limitations to this study. ED assessment in a convenience sample recruited via a web-based platform may limit generalizability but may also enhance responsiveness to a query on a sensitive topic area. In order to analyze normative data for this target population, we focused on transgender men and women and excluded other less commonly discussed gender identities among gender minority people (gender nonbinary, nonconforming, others); however, this should be an area of future research. Our sample was highly educated and mostly White, and was not representative of all transgender men and women in the US. Additional research in this area that focuses specifically on engaging with transgender people from marginalized socioeconomic and ethnoracial backgrounds (Gordon et al., 2016) would be critical in addressing this particular limitation. Selection bias was possible as individuals with more health problems may be more likely to participate in health studies (Ullemer et al., 2015). Future research could identify optimal cut-off values for the EDE-Q in transgender men and women using gold standard clinical assessments.

5. Conclusion

In conclusion, we found high rates of eating disorder attitudes in both transgender men and women, particularly in the Shape Concern subscale. Clinicians should be aware that disordered eating behaviors may be present among transgender people and consider screening for these behaviors. The normative data for transgender men and transgender women presented here can enable clinicians and researchers to interpret the EDE-Q scores among these understudied populations.

Appendix

Appendix A.

Distribution of means, standard deviations, and percentile ranks for global Eating Disorder Examination Questionnaire (EDE-Q) Global and subscale scores among transgender men 18-26 years (N= 143) and transgender women 18-42 (N= 109) from The PRIDE Study.

	Transgender men 18-26 years (n = 143)					Transgender women 18-42 years (n = 109)				
	EDE-Q R	EDE-Q EC	EDE-Q WC	EDE-Q SC	EDE-Q Global	EDE-Q R	EDE-Q EC	EDE-Q WC	EDE-Q SC	EDE-Q Global
M (SD)	1.28 (1.41)	0.94 (1.28)	2.11 (1.71)	2.69 (1.67)	1.76 (1.36)	1.48 (1.51)	0.83 (1.08)	2.16 (1.61)	2.86 (1.67)	1.83 (1.28)
Range	0-5.60	0-5.80	0-6.00	0-6.00	0-5.65	0-5.60	0-4.80	0-5.80	0-6.00	0-5.40
Percentile rank										
5	0	0	0	0.3	0.1	0	0	0	0.2	0.2
10	0	0	0	0.6	0.3	0	0	0.2	0.7	0.4
15	0	0	0.2	0.9	0.4	0	0	0.4	1.0	0.5
20	0	0	0.4	1.1	0.5	0	0	0.6	1.3	0.6

	Transgender men 18-26 years (n = 143)					Transgender women 18-42 years (n = 109)				
	EDE-Q R	EDE-Q EC	EDE-Q WC	EDE-Q SC	EDE-Q Global	EDE-Q R	EDE-Q EC	EDE-Q WC	EDE-Q SC	EDE-Q Global
25	0	0	0.6	1.4	0.7	0	0	0.8	1.6	0.7
30	0	0	0.8	1.5	0.8	0.2	0	0.8	2.0	1.1
35	0.1	0.2	1.2	1.7	0.9	0.4	0.2	1.1	2.1	1.2
40	0.4	0.2	1.3	2.0	1.1	0.4	0.2	1.4	2.4	1.3
45	0.6	0.2	1.6	2.1	1.3	0.8	0.2	1.6	2.5	1.4
50	0.6	0.4	1.8	2.4	1.5	1.2	0.4	2.0	2.6	1.6
55	1.2	0.4	2.0	2.6	1.6	1.4	0.4	2.4	2.9	1.8
60	1.3	0.6	2.4	3.1	1.8	1.4	0.6	2.4	3.1	2.0
65	1.6	0.8	2.8	3.5	2.0	1.9	0.8	2.6	3.6	2.2
70	2.0	1.2	3.2	3.8	2.3	2.4	1.0	3.0	3.8	2.4
75	2.4	1.4	3.6	4.1	2.8	2.6	1.4	3.2	4.4	2.6
80	2.6	1.8	3.8	4.5	3.0	2.8	1.6	3.8	4.5	2.9
85	2.9	2.3	4.2	4.8	3.3	3.5	2.0	4.2	5.1	3.3
90	3.3	3.2	4.6	5.0	3.7	3.6	2.6	4.4	5.3	3.7
95	3.8	3.6	5.2	5.7	4.5	4.7	3.1	5.1	5.7	4.4
99	5.6	5.5	6.0	6.0	5.7	5.5	4.7	5.8	6.0	5.4

EDE-Q R, Restraint subscale; EDE-Q EC, Eating Concern subscale; EDE-Q WC, Weight Concern subscale; EDE-Q SC, Shape Concern subscale; EDE-Q Global, Global score; M, Mean; SD, standard deviation.

References

- Ålgars M, Alanko K, Santtila P, & Sandnabba NK (2012). Disordered eating and gender identity disorder: A qualitative study. *Eating Disorders*, 20(4), 300–311. doi:10.1080/10640266.2012.668482 [PubMed: 22703571]
- Avila JT, Golden NH, & Aye T (2019). Eating disorder screening in transgender youth. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 65(6), 815–817. doi:10.1016/j.jadohealth.2019.06.011 [PubMed: 31500946]
- Becker I, Nieder TO, Cerwenka S, Briken P, Kreukels BPC, Cohen-Kettenis PT, ... Richter-Appelt H (2016). Body image in young gender dysphoric adults: A european multi-center study. *Archives of Sexual Behavior*, 45(3), 559–574. doi:10.1007/s10508-015-0527-z [PubMed: 25836027]
- Brewster ME, Velez BL, Breslow AS, & Geiger EF (2019). Unpacking body image concerns and disordered eating for transgender women: The roles of sexual objectification and minority stress. *Journal of Counseling Psychology*, 66(2), 131–142. doi:10.1037/cou0000333 [PubMed: 30702325]
- Cella S, Iannaccone M, & Cotrufo P (2013). Influence of gender role orientation (masculinity versus femininity) on body satisfaction and eating attitudes in homosexuals, heterosexuals and transsexuals. *Eating and Weight Disorders: EWD*, 18(2), 115–124. doi:10.1007/s40519-013-0017-z [PubMed: 23760839]
- Diemer EW, Grant JD, Munn-Chernoff MA, Patterson DA, & Duncan AE (2015). Gender identity, sexual orientation, and eating-related pathology in a national sample of college students. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 57(2), 144–149. doi:10.1016/j.jadohealth.2015.03.003 [PubMed: 25937471]
- Fairburn CG, & Beglin S (2008). Eating disorder examination questionnaire In Fairburn CG (Ed.), *Cognitive behavior therapy and eating disorders* (pp. 309–313). New York: Guilford Press.
- Farber R (2017). ‘Transing’ fitness and remapping transgender male masculinity in online message boards. *Journal of Gender Studies*, 26(3), 254–268. doi:10.1080/09589236.2016.1250618

- Fitzsimmons-Craft EE (2011). Social psychological theories of disordered eating in college women: Review and integration. *Clinical Psychology Review*, 31(7), 1224–1237. doi:10.1016/j.cpr.2011.07.011 [PubMed: 21903047]
- Fredrickson BL, & Roberts T (1997). Objectification theory. *Psychology of Women Quarterly*, 21(2), 173–206. doi:10.1111/j.1471-6402.1997.tb00108.x
- Gordon AR, Austin SB, Krieger N, White Hughto JM, & Reisner SL (2016). “I have to constantly prove to myself, to people, that I fit the bill”: Perspectives on weight and shape control behaviors among low-income, ethnically diverse young transgender women. *Social Science & Medicine* (1982), 165, 141–149. doi:10.1016/j.socscimed.2016.07.038 [PubMed: 27518756]
- Hepp U, & Milos G (2002). Gender identity disorder and eating disorders. *The International Journal of Eating Disorders*, 32(4), 473–478. doi:10.1002/eat.10090 [PubMed: 12386912]
- Hilbert A, de Zwaan M, & Braehler E (2012). How frequent are eating disturbances in the population? norms of the eating disorder examination-questionnaire. *PLoS One*, 7(1), e29125. doi:10.1371/journal.pone.0029125 [PubMed: 22279527]
- James SE, Herman JL, Rankin S, Keisling M, Mottet L, & Anafi M (2016). The report of the 2015 U.S. transgender survey. (). Washington, D.C.: National Center for Transgender Equality Retrieved from <https://transequality.org/sites/default/files/docs/usts/USTS-Full-Report-Dec17.pdf>
- Jones BA, Haycraft E, Murjan S, & Arcelus J (2016). Body dissatisfaction and disordered eating in trans people: A systematic review of the literature. *International Review of Psychiatry (Abingdon, England)*, 28(1), 81–94. doi:10.3109/09540261.2015.1089217 [doi]
- Kozee HB, Tylka TL, & Bauerband LA (2012). Measuring transgender individuals' comfort with gender identity and appearance: Development and validation of the transgender congruence scale. *Psychology of Women Quarterly*, 36(2), 179–196. doi:10.1177/0361684312442161
- Kyriazos TA, & Stalikas A (2018). Applied psychometrics: The steps of scale development and standardization process. *Psychology*, 9(11), 720–726. doi:10.4236/psych.2018.911145
- Lavender JM, De Young KP, & Anderson DA (2010). Eating disorder examination questionnaire (EDE-Q): Norms for undergraduate men. *Eating Behaviors*, 11(2), 119–121. doi:10.1016/j.eatbeh.2009.09.005 [doi] [PubMed: 20188296]
- Luce KH, Crowther JH, & Pole M (2008). Eating disorder examination questionnaire (EDE-Q): Norms for undergraduate women. *The International Journal of Eating Disorders*, 41(3), 273–276. doi:10.1002/eat.20504 [doi] [PubMed: 18213686]
- Lunn MR, Capriotti MR, Flentje A, Bibbins-Domingo K, Pletcher MJ, Triano AJ, ... Obedin-Maliver J (2019). Using mobile technology to engage sexual and gender minorities in clinical research. *PLoS One*, 14(5), e0216282. doi:10.1371/journal.pone.0216282 [PubMed: 31048870]
- Lunn MR, Lubensky M, Hunt C, Flentje A, Capriotti MR, Sooksaman C, ... Obedin-Maliver J (2019). A digital health research platform for community engagement, recruitment, and retention of sexual and gender minority adults in a national longitudinal cohort study--the PRIDE study. *Journal of the American Medical Informatics Association: JAMIA*, doi:10.1093/jamia/ocz082
- McClain Z, & Peebles R (2016). Body image and eating disorders among lesbian, gay, bisexual, and transgender youth. *Pediatric Clinics of North America*, 63(6), 1079–1090. doi:S0031-3955(16)41060-6 [pii] [PubMed: 27865334]
- Menzel JE, Schaefer LM, Burke NL, Mayhew LL, Brannick MT, & Thompson JK (2010). Appearance-related teasing, body dissatisfaction, and disordered eating: A meta-analysis. *Body Image*, 7(4), 261–270. doi:10.1016/j.bodyim.2010.05.004 [PubMed: 20655287]
- Mond JM, Hay PJ, Rodgers B, & Owen C (2006). Eating disorder examination questionnaire (EDE-Q): Norms for young adult women. *Behaviour Research and Therapy*, 44(1), 53–62. doi:10.1016/j.brat.2004.12.003 [PubMed: 16301014]
- Murray SB (2017). Gender identity and eating disorders: The need to delineate novel pathways for eating disorder symptomatology. *The Journal of Adolescent Health : Official Publication of the Society for Adolescent Medicine*, 60(1), 1–2. doi:S1054-139X(16)30400-1 [pii] [PubMed: 27838236]
- Murray SB, Nagata JM, Griffiths S, Calzo JP, Brown TA, Mitchison D, ... Mond JM (2017). The enigma of male eating disorders: A critical review and synthesis. *Clinical Psychology Review*, 57, 1–11. doi:S0272-7358(17)30137-X [pii] [PubMed: 28800416]

- Nagata JM, Capriotti MR, Murray SB, Compte EJ, Griffiths S, Bibbins-Domingo K, ... Lunn MR (2020). Community norms for the eating disorder examination questionnaire among cisgender gay men. *European Eating Disorders Review: The Journal of the Eating Disorders Association*, 28(1), 92–101. doi:10.1002/erv.2708 [PubMed: 31793119]
- Nagata JM, Domingue BW, Darmstadt GL, Weber AM, Meausoone V, Cislighi B, & Shakya HB (2020). Gender norms and weight control behaviors in U.S. adolescents: A prospective cohort study (1994–2002). *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 66(1S), S34–S41. doi:10.1016/j.jadohealth.2019.08.020 [PubMed: 31866036]
- Nunnally J (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.
- Penelo E, Villarroel AM, Portell M, & Raich RM (2012). Eating disorder examination questionnaire (EDE-Q): An initial trial in spanish male undergraduates. *European Journal of Psychological Assessment*, 28(1), 76–83. doi:10.1027/1015-5759/a000093
- Testa RJ, Rider GN, Haug NA, & Balsam KF (2017). Gender confirming medical interventions and eating disorder symptoms among transgender individuals. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 36(10), 927–936. doi:10.1037/hea0000497
- Ullemer V, Lundholm C, Örtqvist AK, Gumpert CH, Anckarsäter H, Lundström S, & Almqvist C (2015). Predictors of adolescents' consent to use health records for research and results from data collection in a swedish twin cohort. *Twin Research and Human Genetics: The Official Journal of the International Society for Twin Studies*, 18(3), 256–265. doi:10.1017/thg.2015.21 [PubMed: 25900713]
- Vocks S, Stahn C, Loenser K, & Legenbauer T (2009). Eating and body image disturbances in male-to-female and female-to-male transsexuals. *Archives of Sexual Behavior*, 38(3), 364–377. doi:10.1007/s10508-008-9424-z [PubMed: 19030979]
- Watson RJ, Veale JF, & Saewyc EM (2017). Disordered eating behaviors among transgender youth: Probability profiles from risk and protective factors. *The International Journal of Eating Disorders*, 50(5), 515–522. doi:10.1002/eat.22627 [PubMed: 27862124]
- Witcomb GL, Bouman WP, Brewin N, Richards C, Fernandez-Aranda F, & Arcelus J (2015). Body image dissatisfaction and eating-related psychopathology in trans individuals: A matched control study. *European Eating Disorders Review: The Journal of the Eating Disorders Association*, 23(4), 287–293. doi:10.1002/erv.2362

Highlights

- We present EDE-Q norms for transgender men and women
- The highest subscale scores were for Shape Concerns and Weight Concerns
- Transgender men reported dietary restraint (26%) and objective binge episodes (11%)
- Transgender women reported dietary restraint (28%) and objective binge episodes (13%)

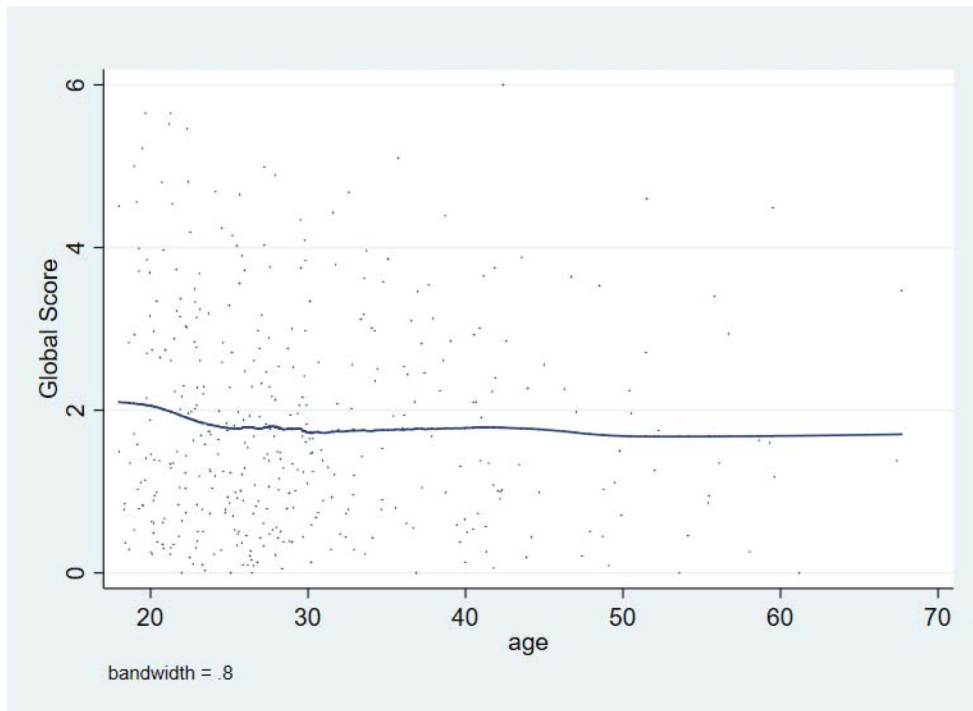


Figure 1.
Lowess plot of age and EDE-Q among transgender men

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

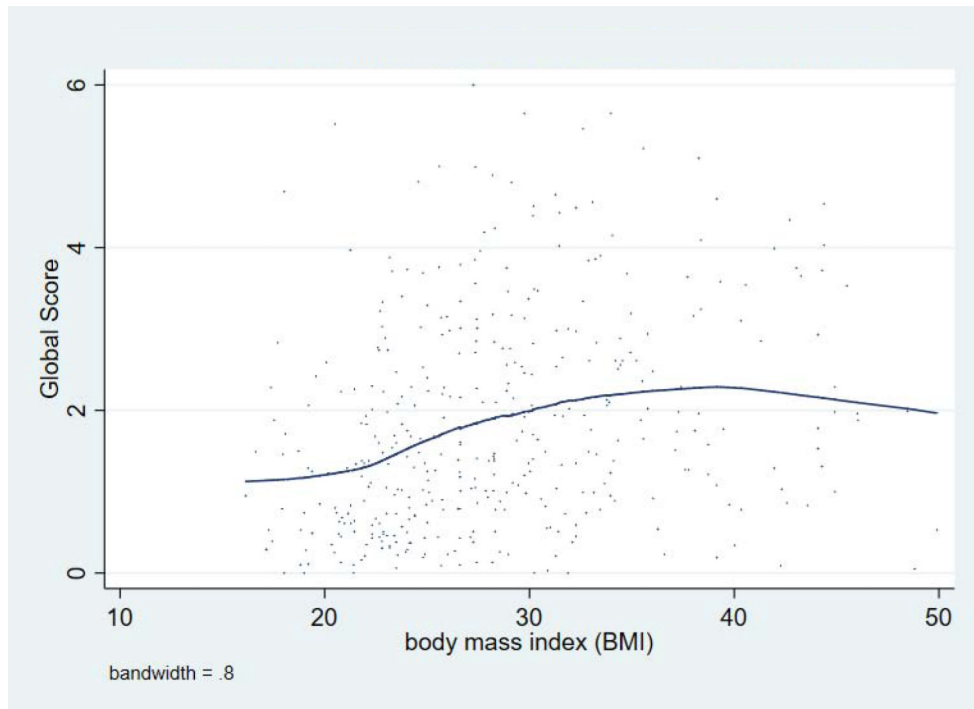


Figure 2.
Lowess plot of body mass index and EDE-Q among transgender men

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

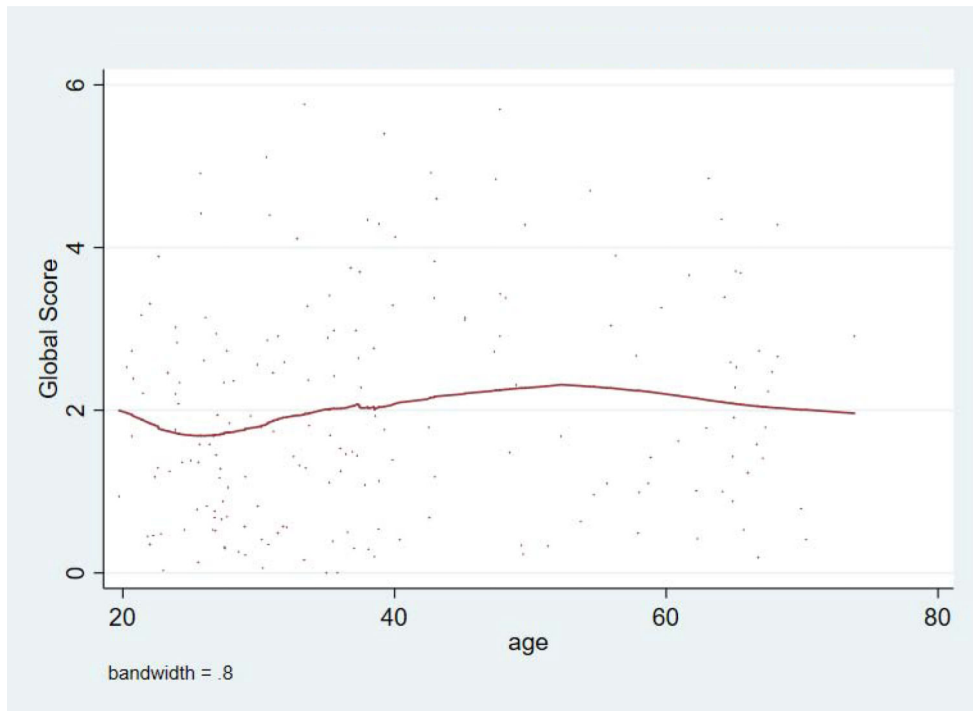


Figure 3.
Lowess plot of age and EDE-Q among transgender women

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

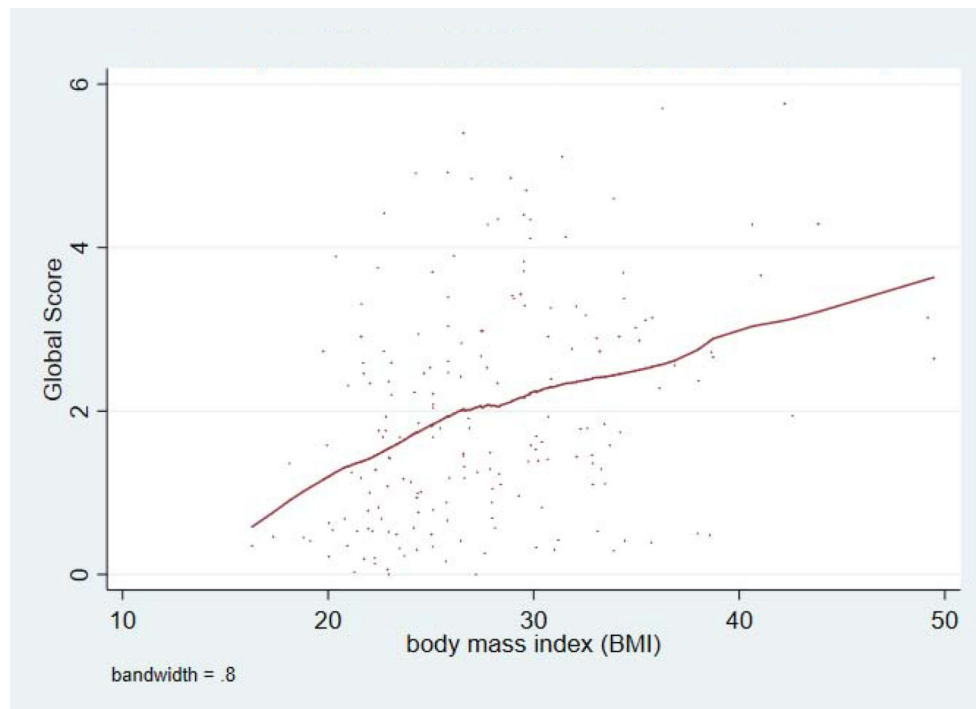


Figure 4.
Lowess plot of body mass index and EDE-Q among transgender women

Table 1.

Demographic characteristics of transgender men (N= 312) and transgender women (N= 172) from The PRIDE Study

	<u>Transgender men</u>	<u>Transgender women</u>
N	<u>312</u>	<u>172</u>
Demographic characteristics	<u>Mean ± SD / %^b</u>	<u>Mean ± SD / %^b</u>
Age, years	30.5 ± 9.7	41.2 ± 14.9
Race/ethnicity		
White	85.5%	88.4%
Hispanic/Latino	3.6%	2.9%
Black/African American	2.2%	0.0%
Asian/Pacific Islander	0.3%	0.6%
Native American	0.3%	0.0%
Mutiracial/Other	8.1%	8.1%
Educational attainment		
College degree or higher	60.5%	56.5%
Body mass index (BMI), kg/m ²	28.7 ± 7.5	28.1 ± 6.5

Table 2.

Distribution of means, standard deviations, and percentile ranks for global Eating Disorder Examination Questionnaire (EDE-Q) Global and subscale scores among transgender men (N= 312) and transgender women (N= 172) from The PRIDE Study.

	Transgender men (N=312)					Transgender women (N=172)				
	<u>EDE-Q R</u>	<u>EDE-Q EC</u>	<u>EDE-Q WC</u>	<u>EDE-Q SC</u>	<u>EDE-Q Global</u>	<u>EDE-Q R</u>	<u>EDE-Q EC</u>	<u>EDE-Q WC</u>	<u>EDE-Q SC</u>	<u>EDE-Q Global</u>
M (SD)	1.33 (1.42)	0.87 (1.19)	2.06 (1.61)	2.65 (1.61)	1.73 (1.28)	1.75 (1.62)	0.87 (1.12)	2.27 (1.63)	3.00 (1.68)	1.98 (1.33)
Range	0-6.00	0-6.00	0-6.00	0-6.00	0-6.00	0-6.00	0-4.8	0-6.0	0-6.0	0-5.7
Percentile rank										
5	0	0	0	0.3	0.1	0	0	0	0.3	0.2
10	0	0	0	0.6	0.3	0	0	0.4	0.8	0.4
15	0	0	0.2	0.9	0.4	0	0	0.4	1.0	0.5
20	0	0	0.4	1.1	0.5	0	0	0.8	1.4	0.7
25	0	0	0.6	1.4	0.7	0.2	0	0.8	1.8	1.0
30	0	0	0.8	1.5	0.9	0.4	0	1.0	2.0	1.1
35	0.2	0.2	1.1	1.8	1.0	0.5	0.2	1.2	2.1	1.2
40	0.4	0.2	1.4	2.0	1.2	0.8	0.2	1.6	2.4	1.4
45	0.6	0.2	1.6	2.3	1.3	1.2	0.2	2.0	2.6	1.5
50	1.0	0.4	1.8	2.5	1.5	1.4	0.4	2.2	2.8	1.8
55	1.2	0.4	2.0	2.8	1.6	1.6	0.4	2.4	3.1	1.9
60	1.4	0.6	2.2	3.0	1.8	2.2	0.6	2.6	3.5	2.2
65	1.6	0.8	2.6	3.3	2.0	2.4	0.8	2.8	3.8	2.4
70	2.0	1.0	3.0	3.5	2.3	2.6	1.0	3.0	4.3	2.6
75	2.4	1.4	3.2	3.9	2.5	3.0	1.4	3.4	4.4	2.9
80	2.6	1.6	3.6	4.3	2.7	3.4	1.8	3.9	4.8	3.1
85	3.0	2.0	4.0	4.6	3.2	3.6	2.2	4.2	5.1	3.4
90	3.5	2.7	4.4	5.0	3.6	4.0	2.8	4.6	5.4	3.9
95	4.0	3.6	4.8	5.4	4.0	4.9	3.3	5.3	5.9	4.6
99	5.6	5.1	6.0	6.0	5.6	6.0	4.8	6.0	6.0	5.5

EDE-Q R, Restraint subscale; EDE-Q EC, Eating Concern subscale; EDE-Q WC, Weight Concern subscale; EDE-Q SC, Shape Concern subscale; EDE-Q Global, Global score; M, Mean; SD, standard deviation.

Table 3.

Proportion of transgender men and women engaging in disordered eating behaviors among transgender men and transgender women in The PRIDE Study

<u>Disordered eating behavior</u>	<u>Transgender men (N=312)</u>		<u>Transgender women (N=172)</u>	
	<u>Any occurrence (%)</u>	<u>Regular occurrence (%)</u>	<u>Any occurrence (%)</u>	<u>Regular occurrence (%)</u>
Dietary restraint	25.5	6.7	27.9	9.9
Objective binge episodes	11.2	6.4	12.8	4.7
Self-induced vomiting	1.6	1.0	1.7	1.2
Laxative misuse	0.3	0.3	0.6	0.6
Excessive exercise	8.0	1.0	8.1	1.7

Regular occurrence of dietary restraint was defined as going for long periods of time (8 h) without eating anything to influence shape or weight for 13 days over the past 28 days. Regular occurrence of excessive exercise was defined as exercising in a driven or compulsive way as a means of controlling weight, shape or amount of fat, or burning off calories for 20 days over the past 28 days. For all other behaviors, regular occurrence was defined as 4 occurrences over the past 28 days.

Table 4.

Comparisons of eating attitudes and disordered eating behaviors in a subsample of transgender men 18-26 years old (n = 143) and transgender women 18-42 years old (n = 109) in The PRIDE Study to age-matched cisgender[^] men from the Lavender *et al.* (2010) sample (N = 404) and cisgender[^] women from Mond *et al.* (2006) sample (N = 5231).

	Transgender men from The PRIDE Study		Cisgender [^] men from Lavender <i>et al.</i> (2010)		Transgender women from The PRIDE Study		Cisgender [^] women from Mond <i>et al.</i> (2006)	
	Mean (standard deviation)	T-test	Mean (standard deviation)	T-test	Mean (standard deviation)	T-test	Mean (standard deviation)	T-test
Eating Attitudes								
EDE-Q Restraint	1.28 (1.41)	1.97	1.04 (1.19)	1.97	1.48 (1.51)	1.33	1.30 (1.40)	1.84
EDE-Q EC	0.94 (1.28)	5.63	0.43 (0.77)	5.63	0.83 (1.08)	0.68	0.76 (1.06)	.497
EDE-Q WC	2.11 (1.71)	6.03	1.29 (1.27)	6.03	2.16 (1.61)	2.53	1.79 (1.51)	.011
EDE-Q SC	2.69 (1.67)	7.74	1.59 (1.38)	7.74	2.86 (1.67)	3.94	2.23 (1.65)	<.001
EDE-Q Global	1.76 (1.36)	6.23	1.09 (1.00)	6.23	1.83 (1.28)	2.56	1.09 (1.00)	.010
Disordered eating behaviors								
		Z-test	Any occurrence (%)	Z-test	Any occurrence (%)	Z-test	Any occurrence (%)	Z-test
Dietary restraint	30.8	1.40	24.0	1.40	26.6	*	3.4	<.001
Objective binge episodes	9.8	3.84	25.0	3.84	11.0	1.72	17.3	.085
Self-induced vomiting	2.1	*	3.2	*	1.8	*	3.0	.773
Laxative misuse	-	-	2.7	-	0.9	*	1.8	.999
Excessive exercise	9.1	5.26	31.4	5.26	7.3	4.81	28.2	<.001

EDE-Q, Eating Disorder Examination-Questionnaire. Any occurrence was defined as 1 episode in the past 28 days. EDE-Q scores were compared using independent samples t-tests. Proportions of disordered eating behaviors were compared with Z-tests or Fisher's exact tests.

[^] Cisgender is presumed here as comprehensive gender assessment was not performed in Lavender *et al.* or Mond *et al.*

* Fisher exact test