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Gynecomastia: Psychological Correlates and a Test of the Tripartite Influence Model of Body Image

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Gynecomastia: Psychological Correlates and a Test of the

Tripartite Influence Model of Body Image

by

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ABSTRACT

Gynecomastia is the proliferation of breast tissue in men. The purpose of this study was to compare psychological functioning across three groups of participants: treatment seeking men with gynecomastia, non treatment seeking men with gynecomastia, and men without gynecomastia. Though very little research has been done with this population, some research suggests poor psychological outcomes of gynecomastia. MANCOVA was used to test differences in psychological functioning across the three groups, and multiple regression was used to predict quality of life from psychological variables. Significant differences emerged between groups, with men with gynecomastia reporting worse psychological functioning. Additionally, no theoretical model for body image currently exists for men with gynecomastia. As such, the Tripartite Influence Model of Body Image was examined in this population through used of mediation analyses. Results confirmed partial support of this model for this population. This study was the first to examine treatment seeking status as a potential moderator of psychological functioning in men with gynecomastia and provides a theoretical model of body image to guide future research in this area

INTRODUCTION

Gynecomastia is excess glandular growth of breast tissue in males that can affect either one (unilateral) or both (bilateral) sides of the chest. Gynecomastia is a normal and common occurrence that is estimated to affect 30 to 70% of males at some point in their life with three distinct periods of increased incidence: neonatal period, adolescence, and old adulthood (Cakan & Kamat, 2007; Gikas & Mokbel, 2007; Johnson, Kermott, & Marod, 2011; Nordt & DiVasta, 2008; Nydick, Bustos, Dale, & Rawson, 1961). In a recent review of evaluation and treatment options, Johnson and colleagues (2011) found prevalence rates of 60-90% in neonates, 50-60% in adolescents, and 70% in older men (ages 50 to 69). Despite its high prevalence rates, gynecomastia corrects itself in approximately 90% of cases within 3 years of onset (Cakan & Kamat, 2007; Gikas & Mokbel, 2007; Nydick et al., 1961). However, even if 90% of cases resolve on their own within a few years, there are still roughly 3 to 6% of males who develop permanent breasts to varying degrees, and it is not unreasonable to suggest that even temporary development of opposite sex characteristics could have lasting consequences. Minimal research has been done in this area, but some research has suggested psychological consequences in the domains of depression, anxiety, disordered eating, and self-esteem.

Depression and Anxiety

Storch (2004) was the first to directly examine depression and anxiety in a case study of 2 adolescent males aged 15 and 17. During regularly scheduled clinic visits, both boys were given the Children's Depression Inventory (CDI; Kovacs, M., 1992), Social Anxiety Scale for Children-Revised (SASC-R; La Greca & Stone, 1993), and the Asher Loneliness Scale (Asher,

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Hymel, & Renshaw, 1984) while their mothers were given the Child Behavior Checklist (CBCL; Achenbach, 1991). Compared to their peers, both boys with gynecomastia reported significantly elevated depressive symptomatology, patient A reported increased social anxiety, and patient B reported increased loneliness and had increased externalizing and internalizing symptoms based on his mother's CBCL. Internalizing symptoms can be defined as symptoms focused inward such as depressed mood, worry, or fear, and they have previously been associated with other physical differences such as macromastia (excessive breast growth in females; Iwuagwu, Stanley, Platt, Drew, & Walker, 2006) and pectus excavatum (a rib cage deformity appearing as a sunken in chest; Ji et al., 2011) which makes it reasonable to assume that gynecomastia patients also experience these symptoms.

A recent study by Kinsella and colleagues (2012) also examined depression and anxiety symptoms in adolescents with gynecomastia. The study consisted of 24 adolescents aged 12 to 18 with gynecomastia who were assessed through the CDI, Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997), CBCL, and clinical interviewing. Results from the psychological measures were compared to population norms, and the clinical interviews were used for diagnostic purposes. Scores on the CDI, MASC, and CBCL were significantly higher than population norms (Kinsella et al., 2012). All of the participants received a *Diagnostic and Statistical Manual of Mental Disorders - IV* (DSM-IV) diagnosis with adjustment disorder being most common (79.2%), followed by anxiety disorder (16.7%), dysthymia (16.7%), generalized anxiety disorder (4.2%), and social phobia (4.2%; Kinsella et al., 2012). It is important to note that adjustment disorder is a response to either an acute or chronic stressor, and psychological distress should dissipate within six months of removal of the acute stressor, though distress can persist beyond six months for chronic stressors (4th ed.; *DSM-IV*;

American Psychiatric Association, 1994). Distress was assumed to subside if gynecomastia was corrected. Though most participants received a diagnosis of adjustment disorder due to distress being associated with an anatomical change, many of those cases included DSM modifiers for depression, anxiety, or both.

Kinsella and colleagues (2012) also listed several maladaptive coping mechanisms in their sample such as wearing several shirts, wrapping the chest in plastic wrap or duct tape, walking with slumped shoulders and arms crossed, self-starving, restricting physical and social activities, and avoiding school. Other studies have previously noted that adolescents often report restricting activities that might expose the chest and socially withdrawing due to gynecomastia (Schonfeld, 1962; Money & Lewis, 1982; Rosen et al., 2010). Several of these coping mechanisms could leave potentially long lasting consequences. For example, poor posture could lead to chronic back pain, and self-starving could impede proper physical development, especially for adolescents.

Disordered Eating, Self-Esteem, and Quality of Life

The area of disordered eating in the gynecomastia population has had mixed results. Fisher and Fornari (1990) found support for disordered eating in adolescent males with gynecomastia. This case report of 2 white males aged 16 and 17 revealed symptoms of bulimia and anorexia nervosa. The first boy reported normal development until age 10 at which point he developed gynecomastia and became overweight. Though unhappy, he remained stable for five years but became focused on losing weight to reduce breast size and started vomiting after meals and engaging in frequent and vigorous exercise (Fisher & Fornari, 1990). The second boy also reported vigorous exercise and vomiting in order to reduce breast size. These two case reports

suggest that adolescents with gynecomastia are at risk for engaging in these risky behaviors when dissatisfied with their body shape.

A more recent study however found more disordered eating thoughts and behaviors in adolescents with gynecomastia compared to adolescents without gynecomastia, but BMI seemed to be accounting for this difference (Nuzzi et al., 2013). Nuzzi and colleagues (2013) conducted a study looking at physical and psychological consequences of gynecomastia in adolescents. They utilized a prospective case-control design in which 47 patients with gynecomastia were compared to 92 healthy controls on measures of disordered eating, self-esteem, and quality of life. Gynecomastia patients were also rated on severity of their condition (grade I – IV) based on Rohrich's grade-severity scale (Rohrich et al., 2003). All participants completed the Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982), Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), and Short Form-36 Version 2 (SF-36 V2; Ware, 2000). Though the gynecomastia group scored significantly higher on the EAT than the control group, those differences disappeared once BMI was accounted for, and neither group reported clinical levels of disordered eating (Nuzzi et al., 2013). These findings suggest that disordered eating may be more attributable to weight status versus gynecomastia, though the results are unclear.

In terms of self-esteem and quality of life, Nuzzi and colleagues (2013) found significantly lower scores on the RSES in the gynecomastia group versus the control group and significantly lower scores on the general health, social functioning, and mental health domains of the SF-36 V2 in the gynecomastia group versus the control group after accounting for BMI. These findings suggest that gynecomastia is associated with psychosocial consequences regardless of weight status. Similarly, when Nuzzi and colleagues (2013) accounted for severity of gynecomastia within the case group, there were no differences in any measures suggesting

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that psychosocial consequences of gynecomastia occur at all levels of severity. Post-operation data for this study has not yet been published, but a previous study has used the same measures to look at outcomes of surgical treatment for gynecomastia.

Davanco and colleagues (2009) conducted a prospective study examining the effects of surgical correction on self-esteem and quality of life in gynecomastia patients. Their sample consisted of 33 gynecomastia patients aged 18 to 50 with 2 to 21 years of gynecomastia progression, and they were given the RSES and Short Form-36 (SF-36; McHorney, Ware, & Raczek, 1993) before and after undergoing an adenectomy (removal of breast glandular tissue) and liposuction. While there was not a significant change in self-esteem, there was a change in the general health, functional capacity, social aspects, vitality, and mental health domains of the SF-36 (Davanco et al., 2009). Regarding the non-significant change in self-esteem, there are several possible explanations for this result. First, since the study included people who had gynecomastia from 2 to 21 years ($M = 17$ years), it could be that chronic gynecomastia could leave lasting impacts on self-esteem even after correction of the physical difference. Second, the age range for the study was 18 to 50, so it could be that developmental period plays a role in the effectiveness of surgery's ability to influence self-esteem. Third, the average score for participants was 6.36 ($SD = 3.50$) out of 30, and the max score was 13 out of 30. These scores are very low, and perhaps surgery alone is not enough to influence severely reduced self-esteem. Regarding quality of life, this is the only prospective study to show quality of life improvements resulting from surgical correction of gynecomastia. It will be interesting to see if post-operation data from Nuzzi and colleagues will find significant improvement in self-esteem and similar domains of quality of life.

Body Image and the Tripartite Influence Model

Body image has sparsely been examined in the gynecomastia population. Some research has suggested that poor body image in this population influences negative outcomes such as depression and social withdrawal (Kinsella et al., 2012; Schonfield, 1962). Some research has also suggested that sociopsychological pressures to be masculine impact body image in this population for both adolescents and adults (Schonfield, 1962; Wassersug & Oliffe, 2009). Though some qualitative data is available to suggest men with gynecomastia suffer from poor body image, there is currently no theoretical model used to explain body dissatisfaction in men with gynecomastia. The Tripartite Influence Model (TIM) however may provide a viable theoretical model for examining body image in this population.

The TIM suggests that one's view of his or her body is influenced by family, peers, and media and that this relationship is also mediated by appearance comparisons and internalization of appearance ideals (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). The TIM has been used extensively with females to examine how sociocultural influences impact one's body image and has focused primarily on the thin ideal; however it has also been modified for males. In males, the TIM has been used primarily to explain sociocultural factors related to body image concerning muscularity-oriented body dissatisfaction. Research guided by the TIM has shown that body change behaviors such as weight lifting and steroid use in adolescent boys is influenced by family, peers, and media through social comparisons (Smolak, Murnen, & Thompson, 2005). Additional research conducted by Karazsia & Crowther, (2009) has shown both internalization of a mesomorphic or muscular ideal and social comparison to mediate the relationship between social influences and body dissatisfaction. While much of the research

examining the TIM in men has focused specifically on muscularity, a broader approach focusing on masculinity may provide a better fit for this population.

The Current Study

     Aim One. Very little research has focused on the psychological aspects of gynecomastia. While some studies have examined potential psychological consequences of gynecomastia, many have been limited to case studies or limited by small sample sizes. In addition, past research has qualitatively highlighted that gynecomastia patients experience body dissatisfaction due to breast development, but has yet to examine body image quantitatively. Lastly, no research to date has compared psychological functioning of treatment seeking and non treatment seeking men with gynecomastia; however, it may be beneficial to know if there are differences in psychological functioning between these groups. Thus, the first aim of this study was to examine psychological functioning in the domains of depression, anxiety, disordered eating, self-esteem, and body image across three groups: (1) men with gynecomastia currently seeking treatment, (2) men with gynecomastia who are not currently seeking treatment, and (3) men without gynecomastia. Specifically, it was hypothesized that men with gynecomastia, when compared to men without gynecomastia, would exhibit (a) elevated levels of depression symptomatology; (b) elevated levels of anxiety symptomatology; (c) more eating pathology; (d) reduced self-esteem; (e) lower appearance evaluation; and (f) greater chest dissatisfaction. Exploratory aims were to examine if (g) treatment seekers and non treatment seekers differed in psychological functioning and (h) any psychological variables predicted quality of life in men with gynecomastia.

     Aim Two. The Tripartite Influence Model (TIM) suggests that one's view of his or her body is influenced by appearance pressures from family, peers, and media and that this relationship is also mediated by appearance comparisons and internalization of appearance ideals

(Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Though research regarding the TIM in males has been primarily used to explain muscularity-oriented body dissatisfaction, there is reason to believe that this model could explain body dissatisfaction in men with gynecomastia through a broader approach focusing on masculinity. Past research has suggested that men experience body dissatisfaction from their gynecomastia and that social influences of body image in this population may be linked to concerns regarding masculinity (Schonfeld, 1962; Wassersug & Oliffe, 2009). Thus, the second aim of this study is to examine if the TIM offers a viable explanation of how body dissatisfaction, specifically chest dissatisfaction, develops in men with gynecomastia.

Lastly, the social literature examining issues related to gender suggests a unique predictor of negative outcomes for men: gender role conflict (GRC). Under this theory, it is believed that the socialization of and adherence to traditional male gender roles can lead to intra and interpersonal conflict for men (O'Neil, Good, & Holmes, 1995). Four domains of traditional male gender roles exist under this theory: success, power, and competition, such that men are socialized to compete with other men in achievement; restricted emotionality, such that men are socialized to hide emotions; restricted affectionate behavior between men, such that men are socialized to feel uncomfortable expressing care for other men; and conflict between work and family relationships.

Past research has indicated that men higher in GRC also endorse higher levels of drive for muscularity (McCreary, Saucier, & Courtenay, 2005), a construct comprised of attitudes and behaviors consistent with a desire to increase muscle mass. Additionally, previous body image research has indicated that muscularity is one facet of masculinity (Leit, Gray, & Pope, 2001), and has used this understanding to examine how GRC influences other facets of body image

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(Schwartz & Tylka, 2008). Given the literature on GRC, it seems consistent with theory that GRC may play a role in the internalization of masculine appearance ideals, such that men adhering to more traditional male gender roles who perceive pressures to appear more masculine might also more strongly internalize a masculine appearance. As such, an exploratory aim was to test GRC as a moderating variable for the relationship between sociocultural appearance pressures and internalization of a masculine chest in the TIM of body image for gynecomastia.

METHOD

Participants

Participants consisted of three groups: (1) treatment seeking men with gynecomastia recruited through an outpatient surgery center in Florida and an online gynecomastia forum, (2) non treatment seeking men with gynecomastia recruited from an online gynecomastia forum, and (3) undergraduate university students without gynecomastia recruited from a large southeastern university. Data was collected for age, BMI, ethnicity, and sexual orientation. A total of 228 men took part in this study. Groups consisted of 46 treatment seekers, 71 non treatment seekers, and 111 healthy controls. Sample size varied by analysis due to missing data. Mean age for the total sample was 29.20 ($SD = 14.98$). Mean BMI for the total sample was 26.21 ($SD = 5.37$). Age and BMI significantly differed across groups. See Appendix A for Table 1 describing demographic characteristics in detail by group.

Procedure

Groups 1 and 2. Treatment seeking and non treatment seeking men with gynecomastia participated through an online survey hosted by SurveyMonkey. Participants recruited from the outpatient surgery center were given an iPad for survey completion upon consenting to participate. Participants recruited from the forum were given a link to the survey through a forum post and consented to participate online.

Group 3. Undergraduate students without gynecomastia were recruited through the psychology participant pool of the university. Participants were given a link to the survey and

consented to participate online. Participants received extra credit points for completion of the survey.

Measures

Participants completed the psychological measures listed below. Reliability analyses were run for full sample, gynecomastia sample, and healthy control sample separately.

Patient Health Questionnaire – 9 (PHQ-9). The PHQ-9 (Kroenke, Spitzer, & Williams, 1999) is a self-report depression severity scale commonly used in medical settings with questions pertaining to the nine depression criteria based on the *Diagnostic and Statistical Manual of Mental Disorders - IV* (DSM-IV). The measure consists of 10 items, with the first 9 items asking the patient how often they have been bothered by each problem over the last two weeks and an additional item at the end for patients who checked off any of the symptoms asking: "How difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?" One question asks about suicidal ideation. All participants were given information on potential resources for suicidal ideation at the end of questionnaires. Each question is answered on a scale of 0 (not at all) to 3 (nearly every day), and the measure is scored by adding the scores for the first 9 questions with a possible score of 0 to 27. The total score indicates depression severity with 1-4 indicating minimal depression, 5-9 indicating mild depression, 10-14 indicating moderate depression, 15-19 indicating moderately severe depression, and 20-27 indicating severe depression. Internal consistency was good to excellent, with Cronbach's alphas ranging from 89 to .90 based on sample.

State Trait Anxiety Index – Y Form (STAI-Y). The STAI-Y (Spielberger, 1983) is a self-report measure of state and trait anxiety (S-Anxiety and T-Anxiety respectively). The measure consists of two forms, Y-1 and Y-2. Y-1 consists of 20 S-Anxiety questions asking

participants to rate how they feel "right now" on a scale of 1 (not at all) to 4 (very much so), and Y-2 consists of 20 T-Anxiety questions asking participants to rate how they feel "generally" on a scale of 1 (almost never) to 4 (almost always). The S-Anxiety questions of the measure are able to reflect a certain situation rather than how the person feels "right now." As such, the questions regarding S-Anxiety were changed from "right now" to "when your chest is exposed (wearing a thin shirt, a tight shirt, or no shirt at all)." A sample statement for the S-Anxiety questions is, "I feel self-confident." A sample statement for the T-Anxiety questions is, "I feel like a failure." Scores can range from 20 to 80 for each form by summing the weighted scores. Items 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20 on form Y-1 are reverse coded. Items 21, 23, 26, 27, 30, 33, 34, 36, and 39 on form Y-2 are reverse coded. Higher scores on form Y-1 (S-Anxiety) indicate greater state anxiety while higher scores on form Y-2 (T-Anxiety) indicate greater trait anxiety. Internal consistency for the state portion was excellent, with Cronbach's alphas ranging from .95 to .97 based on sample. Internal consistency for the trait portion was excellent, with Cronbach's alphas ranging from .94 to .97 based on sample.

Eating Disorders Inventory – Drive for Thinness and Bulimia (EDI-DT and B). The EDI (Garner, Olmstead, and Polivy, 1983) is a self-report multidimensional measure of feelings, attitudes, and behaviors regarding eating. For the purpose of this study, the two subscales that will be used to examine eating pathology are drive for thinness (DT) and bulimia (B). Both subscales consist of 7 items totaling to 14 items. Participants are asked to rate how often each statement applies on a scale from 1 (always) to 6 (never). A sample statement is: "I think about dieting." For all but the first item, when a participant indicates 1, 2, or 3, his score is 3, 2, or 1, respectively for that item while indicating 4, 5, or 6 earns a score of 0. The first item is reverse scored. Subscale scores are then summed. Total scores can range from 0 to 42 and subscale

scores can range from 0 to 21. Full-scale internal consistency was good to excellent, with Cronbach's alphas ranging from .89 to .93 based on sample.

Rosenberg Self-Esteem Scale (RSES). The RSES (Rosenberg, 1965) is a commonly used measure of global self-esteem. The measure consists of 10 statements pertaining to self-esteem and self-worth to be rated on a 4-point scale ranging from strongly agree to strongly disagree. A sample statement is: "I feel that I have a number of good qualities." Strongly agree is weighted at 0, and strongly disagree is weighted at 3. Items 2, 5, 6, 8, and 9 are reverse coded, and scoring consists of summing the scores. Total scores can range from 0 to 30. Higher scores indicate greater self-esteem. Internal consistency was excellent, with Cronbach's alphas ranging from .92 to .93 based on sample.

Multidimensional Body Self-Relations Questionnaire – Appearance Evaluation Scale (MBSRQ-AE). The AE subscale of the MBSRQ (Brown, Cash, & Mikulka, 1990) is a seven item measure of global appearance evaluation. Participants are asked to rate their agreement with seven statements concerning how they feel about their body or appearance on a scale from 1 (definitely disagree) to 5 (definitely agree). A sample statement is: "My body is sexually appealing." Scores are averaged, and items 6 and 7 are reverse scored. Total scores can range from 1 to 5, and higher scores indicate greater appearance evaluation. Internal consistency was good to excellent, with Cronbach's alphas ranging from .89 to .92 based on sample.

Chest Satisfaction Questionnaire (CSQ). The CSQ is a seven item measure of chest satisfaction created for this study. Similar to the MBSRQ-AE, participants are asked to rate their agreement with seven statements concerning how they feel about their chest on a scale from 1 (definitely disagree) to 5 (definitely agree). A sample statement is: "I am comfortable with the shape of my chest." Scores are averaged, and item 4 is reverse coded. Total scores can range

from 1 to 5, and higher scores indicate greater chest satisfaction. Internal consistency was excellent, with Cronbach's alphas ranging from .92 to .95 based on sample. See appendix H for the full measure.

Short Form – 36 Version 2.0 (SF-36 V2). The SF-36 V2 (Ware, Kosinski, & Dewey, 2000) is a widely used measure of quality of life that measures multiple domains of quality of life. For the purpose of this study, six of the eight subscales will be used: bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH). These subscales were picked based on topics of interest for this study as well as past research suggesting domains relevant to gynecomastia (Davanco et al., 2009; Nuzzie et al., 2013). These subscales total to 21 items. Statements related to physical health, mental health, and quality of life are rated on 5- to 6-point likert scales. A sample item is: "During the past 3 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?" Domain scores are transformed into scaled scores ranging from 0 to 100. Higher scores indicate greater quality of life. Full-scale internal consistency was good to excellent, with Cronbach's alphas ranging from .89 to .92 based on sample.

Brief Tripartite Questionnaire – Gynecomastia (BTQ-G). The BTQ-G is a modified and abbreviated version of the Sociocultural Attitudes Towards Appearance Questionnaire – 4 (SATAQ-4; Thompson et al., 2011). It is an 18 item measure of sociocultural pressures to have a masculine chest specific to gynecomastia. The measure consists of six items pertaining to internalization of a masculine appearance, six items pertaining to social appearance comparisons, and six items pertaining to appearance pressures from family, peers, and the media (two

questions in each category). Full-scale internal consistency was excellent, with Cronbach's

alphas ranging from .93 to .94 based on sample. See Appendix I for the full measure.

Gender Role Conflict Scale – Short Form (GRCS-SF). The GRCS-SF (Wester, Vogel,

O'Neil, & Danforth, 2012) is an abbreviated version of the Gender Role Conflict Scale (O'Neil,

Helms, Gable, David, & Wrightsman, 1986). The measure consists of 16 items designed to

measure the socialization of traditional male gender roles that can lead to conflict for men. The

scale is comprised of four subscales that reflect different areas of gender role conflict: success,

power, and competition; restricted emotionality; restricted affectionate behavior between men;

and conflict between work and family relationships. Statements are rated on a 6-point likert scale

that ranges from 1 (strongly disagree) to 6 (strongly agree). A sample item is: "I do not like to

show my emotions to other people." Scores are averaged and can range from 1 to 6. Higher

scores indicate greater adherence to traditional male gender roles. Full-scale internal consistency

was good, with Cronbach's alphas ranging from .87 to .88 based on group.

DATA ANALYSES

Aim One

The first aim of this study was to compare psychological functioning across three groups: (1) treatment seeking men with gynecomastia, (2) non treatment seeking men with gynecomastia, and (3) men without gynecomastia. To examine this, mean scores on the PHQ-9, STAI subscales, EDI, RSES, MBSRQ-AE, CSQ, and SF-36 V2 were compared across the three groups through use of MANCOVA with a bonferoni correction and age and BMI as covariates. Pillai's Trace was used for multivariate tests. Multiple regression was used to predict quality of life from psychological variables in the two gynecomastia groups. An additional model was tested with age and BMI included as predictors. Lastly, a correlation matrix was created for all variables used in the above analyses. SPSS 22 was used for these analyses.

Aim Two

The second aim of the study was to examine the TIM in the population of men with gynecomastia (groups 1 and 2). Reliability analyses were first run on different item clusters for the BTQ-G. Moderated mediation was then used to analyze direct and indirect effects between variables. The model included one independent variable (sociocultural appearance pressures), one dependent variable (chest satisfaction), two mediators (appearance comparisons and internalization of a masculine chest), and one moderator (gender role conflict). An examination of the c, a, b, and c' paths were used to determine mediation. Mediation occurs when paths c, a, and b are significant and c' is either reduced or no longer significant when accounting for the

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mediator. See Appendix E for a visual depiction of the model that was tested. SPSS 22 and

Hayes' PROCESS macro were used for these analyses.

RESULTS

Aim One

MANCOVA was used to examine group differences in depressive symptoms, state and trait anxiety, eating pathology, self esteem, appearance evaluation, chest satisfaction, and quality of life using age and BMI as covariates. Multivariate tests for group $F(16, 376) = 8.31, p < .001$, age $F(8, 187) = 5.49, p < .001$, and BMI $F(8, 187) = 7.76, p < .001$ were significant. Pairwise comparisons revealed significant group differences on all outcome variables, such that both groups of men with gynecomastia reported worse psychological functioning than healthy controls on most variables and treatment seeking status influenced some variables. Significant differences also emerged between the two gynecomastia groups. See Appendix B for Table 2 showing group means and significant group differences.

Using a combined sample of men with gynecomastia (both treatment seeking and non treatment seeking), multiple regression was used to predict quality of life from depressive symptoms, state and trait anxiety, eating pathology, self esteem, appearance evaluation, and chest satisfaction. The overall model was significant, $F(7, 84) = 40.79, p < .001, R^2 = .75$. Depressive symptoms, trait anxiety, and appearance evaluation were significant predictors of quality of life. A second model was tested with the addition of age and BMI as predictors. The new overall model was significant, $F(9, 79) = 35.00, p < .001, R^2 = .78$. After inclusion of age and BMI, appearance evaluation was no longer a significant predictor of quality of life and BMI approached significance $p = .06$. See Appendix C for Table 3 showing beta weights and

significance values of individual predictors. See Appendix D for Table 4 displaying a correlation matrix for the gynecomastia sample.

Aim Two

Internal consistency of the separate item clusters of the BTQ-G ranged from good to excellent, with Cronbach's alphas being .95, .90, and .89 for internalization, appearance comparison, and appearance pressure items respectively. The sample size for all model testing analyses was 108. Moderated mediation was used to test the TIM in men with gynecomastia. Gender role conflict was not a significant moderator of the relationship between sociocultural appearance pressures and internalization of a masculine chest, $t(104) = -.84$, $p = .40$. As such, the moderator was removed from the model and mediation was used to test the TIM.

The overall model for the c path was significant, $F(1,106) = 27.34$, $p < .001$, $R^2 = .21$, such that perceived appearance pressure negatively predicted chest satisfaction, $b = -.44$, $t(106) = 14.93$, $p < .001$. The overall model for the a path was significant for appearance comparisons, $F(1,106) = 35.33$, $p < .001$, $R^2 = .25$, and internalization, $F(1,106) = 38.41$, $R^2 = .27$ $p < .001$, such that perceived appearance pressure positively predicted both appearance comparisons, $b = .53$, $t(106)$, 5.94, $p < .001$, and internalization, $b = .57$, $t(106) = 6.20$, $p < .001$. The overall model for the b and c' paths was significant, $F(3, 104) = 46.09$, $p < .001$, $R^2 = .57$, with internalization negatively predicting chest satisfaction, $b = -.56$, $t(104) = -6.81$, $p < .001$, while appearance comparisons was not a significant predictor, $b = -.09$, $t(104) = -1.00$, $p = .32$. Lastly, the c' path was not significant, $b = -.07$, $t(104) = -.96$, $p = .34$, indicating that perceived appearance pressures no longer predicted chest satisfaction after accounting for the mediators. Additionally, correlations were run between BTQ-G subscales and other model variables. See Appendix F for the final model with path coefficients and Appendix G for the correlation table.

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DISCUSSION

Aim One

Past research has indicated potential psychological consequences of gynecomastia including depression and anxiety (Kinsella et al., 2012; Storch, 2004), low self-esteem (Davanco et al., 2009; Nuzzi et al., 2013), eating pathology (Fisher & Fornari, 1990; Nuzzi et al., 2013), and poor body image (Kinsella et al., 2012; Schonfeld, 1962; Wassersug & Oliffe, 2009). Gynecomastia often develops during adolescence, a crucial time for the maturation of physical and mental health. As such, it makes sense that a typically gender incongruent shift in one's body can have a lasting impact on psychological well-being. Given this information, original hypotheses were that, compared to men without gynecomastia, men with gynecomastia would endorse (a) elevated levels of depression symptomatology; (b) elevated levels of anxiety symptomatology; (c) more eating pathology; (d) reduced self-esteem; (e) lower appearance evaluation; and (f) greater chest dissatisfaction. All hypotheses were supported, with eating pathology being only partially supported. Additionally, it makes sense that not everyone will have the same experience from gynecomastia, and that differences in psychological functioning among men with gynecomastia can vary. As such, differences based on treatment seeking status of men with gynecomastia were examined and discussed below.

MANCOVA was used to examine group differences in psychological functioning among treatment seekers, non treatment seekers, and men without gynecomastia. After accounting for age and BMI, several group differences emerged for the outcome variables. Regarding depression, treatment seekers were the most depressed, followed by non treatment seekers and

healthy controls respectively. This finding could suggest that men seeking treatment for their gynecomastia are more distressed by it. Of note, scores below 9 and 15 on the PHQ-9 indicate minimally and moderately depressed, respectively (Kroehnke, Spitzer, & Williams, 2001). This suggests that on average, only treatment seeking men with gynecomastia endorsed moderate levels of depression.

A similar pattern of group differences emerged for state anxiety (when chest is exposed) and chest satisfaction, two more specific facets of body image for this population, such that treatment seekers were less satisfied with and more anxious about their chest, followed by non treatment seekers and healthy controls. Previous research has indicated maladaptive coping mechanisms to hide the appearance of one's chest (Kinsella et al., 2012; Money & Lewis, 1982; Rosen et al., 2010; Schonfeld, 1962), and these findings may suggest that anxiety regarding one's appearance may contribute to these maladaptive coping mechanisms. In line with the depression findings, this suggests that treatment seekers endorse greater concerns regarding the appearance of their chest and may be more inclined to seek treatment for such reasons. It is however still unclear whether these concerns were present prior to gynecomastia, or if these concerns resulted from gynecomastia.

Group differences in other variables emerged, however in a somewhat different pattern. Treatment seekers and non treatment seekers endorsed significantly more trait anxiety and lower appearance evaluation than healthy controls, but did not significantly differ from each other. Interestingly, these two variables can be considered more general or overall counterparts to state anxiety and chest satisfaction. This may suggest that on a broader level, treatment seekers and non treatment seekers show similar levels of anxiety and appearance evaluation, but on a more specific level, treatment seekers endorse more chest-related concerns. Several explanations for

the difference in these two findings exist. First, it could be that treatment seekers exhibit a higher severity of gynecomastia, such that it is more noticeable and distressing. This would explain why treatment seekers endorse more chest-specific concerns but similar levels of general anxiety and appearance-related concerns. Second, it could be that treatment seekers are more hyper-focused on their chest, resulting in greater distress. Whether this attentional bias is due to severity or other artifacts remains unclear.

A similar pattern of results emerged for self-esteem and quality of life, such that treatment seekers and non treatment seekers reported lower self-esteem and quality of life compared to healthy controls, but did not significantly differ from each other. This finding is consistent with past research suggesting lower self-esteem and quality of life compared to healthy controls (Nuzzi et al., 2013). However, self-esteem and quality of life did not differ between treatment seekers and non-treatment seekers.

Lastly a unique pattern of results emerged for eating pathology, such that treatment seekers endorsed significantly more eating pathology than non treatment seekers and healthy controls, while non treatment seekers and healthy controls did not differ from each other. Eating pathology often functions as a means to change shape or weight, as such, it makes sense that treatment seekers, who are actively trying to change their chest's appearance, would exhibit the highest levels of eating pathology. One case report highlighted eating pathology as a means to reduce gynecomastia in two adolescent boys (Fisher & Fornari, 1990). Similarly, Nuzzi and colleagues (2013) found elevated levels of eating concerns in gynecomastia patients compared to healthy controls; however, this was attributed to BMI. Interestingly, treatment seekers in this sample endorsed the highest levels of eating pathology, even after accounting for BMI. This

suggests that gynecomastia may uniquely contribute to eating pathology, highlighting a male population that may be at risk for eating pathology.

Multiple regression was used to predict quality of life from outcome variables in a sample of men with gynecomastia. The first model without age and BMI revealed three significant predictors of quality of life: depressive symptoms, trait anxiety, and appearance evaluation. Of the three predictors, depressive symptoms was the strongest predictor, followed by trait anxiety and appearance evaluation respectively. The regression was run a second time with the inclusion of age and BMI as predictors. In this model, only depressive symptoms and trait anxiety emerged as significant predictors while BMI approached significance at $p = .06$. Both variables were inversely related to quality of life, such that fewer depressive symptoms and lower trait anxiety were associated with greater quality of life.

Several interesting observations emerged from the regression analyses. First, it appears that the broader indices of psychological functioning were most predictive of quality of life in men with gynecomastia in this sample. So while men with gynecomastia may report more specific chest concerns such as anxiety when their chest is exposed or dissatisfaction with the appearance of their chest, these factors may not impact quality of life as strongly as overall depressive or anxiety symptoms. Second, body image related variables were not predictive of quality of life after inclusion of age and BMI into the model. Additionally, BMI approached significance as an inversely related predictor, and appearance evaluation was no longer a significant predictor of quality of life. It is not uncommon for BMI to account for eating or body image concerns, and previous research in this population has found at least eating concerns to be accounted for by BMI (Nuzzi et al., 2013). This suggests that BMI may have been driving the

relationship between appearance evaluation and quality of life; however, more power may have been needed to detect this.

Aim Two

Moderated mediation analyses indicated that GRC was not a significant moderator of the relationship between appearance pressures and internalization of a masculine chest. While past research may support the notion that GRC moderates the relationship between sociocultural appearance pressures and internalization of a masculine chest, it may be that these pressures promote internalization regardless of the degree to which men adhere to masculine gender roles. After removal of GRC from the model, the TIM was partially supported. Sociocultural appearance pressures influenced appearance comparisons, internalization, and chest satisfaction in the expected direction, such that men who reported more perceived appearance pressures also indicated more appearance comparisons, greater internalization of a masculine chest, and reduced chest satisfaction. However, only internalization was predictive of chest satisfaction and accounted for the relationship between appearance pressures and chest satisfaction.

Despite being unable to account for the relationship between appearance pressures and chest satisfaction, appearance comparisons was strongly associated with chest satisfaction, such that men who reported more appearance comparisons also reported less chest satisfaction. It is evident that appearance comparisons negatively impact body satisfaction in men (Myers & Crowther, 2009), and previous research has found the TIM to be a good explanation of muscularity-oriented body dissatisfaction in men (Karazsia & Crowther, 2009; Tylka, 2011). Some differences exist between these studies however. For example, previous support for the TIM in men has included both attitudinal and behavioral components to body dissatisfaction (Karazsia & Crowther, 2009), and others have adjusted the TIM for men by removing

appearance comparisons (Tylka, 2011). This suggests that a behavioral component to chest

satisfaction may be missing from the tested model or that other factors may be more influential

than appearance comparisons. As such, future research is needed to distinguish whether

methodological reasons account for the lack of mediating role of appearance comparisons, or if

this relationship may be overshadowed by internalization of masculine appearance ideals in men

with gynecomastia.

CONCLUSION

Some limitations exist for this study. First, previous research has collected data on gynecomastia severity; however, this study was unable to do so. Information regarding gynecomastia severity may help shed light on group differences between treatment seekers and non treatment seekers in the future. Second, age and BMI significantly varied between groups, resulting in dissimilar groups. However, both age and BMI were used as covariates to address this problem. Third, this research was purely correlational in nature, making it difficult to determine the direction of relationships.

Overall, this study provides several unique areas for future research in the population of men with gynecomastia. This study was the first to distinguish between treatment seekers and non treatment seekers, and several group differences in psychological functioning emerged when comparing treatment seekers, non treatment seekers, and healthy controls. This highlights the need to examine treatment seeking status as a potential moderator in future studies, as treatment seekers often reported worse psychological functioning. Additionally, only depressive symptoms and trait anxiety significantly predicted quality of life, suggesting that broader indices of mental health may be more indicative of quality of life than specific chest concerns for men with gynecomastia. Future research should continue to examine predictors of quality of life in this population, as this is likely to be a concern for men presenting for treatment. Lastly, while body image has been studied qualitatively in previous research, this was the first study to quantitatively examine body image related variables such as overall appearance evaluation and chest satisfaction in this population. Additionally, this was the first test of a theoretical model for

examining body image in this population, and the Tripartite Influence Model was partially

supported as an explanation of how chest dissatisfaction may develop in men with gynecomastia.

This model incorporates sociocultural appearance pressures, internalization of appearance ideals,

and appearance comparisons as unique factors that contribute to body image. While appearance

comparisons were not found to significantly mediate the relationship between appearance

pressures and chest satisfaction in this sample, future research is needed to examine if this model

fits for this population.

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APPENDICES

Appendix A - Demographic Variables

Table 1

Demographic Variables

Variable	Tx Seekers (46)	Non Tx Seekers (71)	Healthy Controls (111)
Age	29.57 (10.61)[a]	41.52 (18.23)[b]	20.64 (3.94)[c]
BMI	26.58 (3.72)	28.29 (6.55)[a]	24.81 (4.75)[b]
Ethnicity			
African American	2 (4.30)	2 (2.80)	11 (9.90)
Asian	5 (10.90)	3 (4.20)	10 (9.00)
Native Hawaiian	-	3 (4.20)	-
Hispanic or Latino	5 (10.90)	1 (1.40)	21 (18.90)
White	31 (67.40)	57 (80.30)	55 (49.50)
Mixed	2 (4.30)	5 (7.00)	13 (11.70)
Other	1 (2.20)	1 (1.40)	1 (.90)
Sexual Orientation			
Heterosexual	42 (91.30)	59 (83.10)	101 (91.00)
Homosexual	2 (4.30)	5 (7.00)	5 (4.50)
Bisexual	2 (4.30)	5 (7.00)	4 (3.60)
Asexual	-	-	1 (.90)

Notes. Age and BMI are reported as M (SD). Ethnicity and sexual orientation are reported as # (% of group). Means[abc] in each row with different superscript letters are significantly different from each other ($p < .001$).

Appendix B - Group Means and Significant Differences for Outcome Variables

Table 2

Group Means and Significant Differences for Outcome Variables

Variable	Tx Seekers	Non Tx Seekers	Healthy Controls
PHQ-9	10.00 (.93)[a]	8.50 (.98)[b]	5.14 (.62)[c]
STAI-S	57.25 (2.24)[a]	46.92 (2.35)[b]	36.56 (1.48)[c]
STAI-T	51.95 (2.09)[a]	46.31 (2.19)[a]	36.94 (1.38)[b]
EDI	43.13 (2.06)[a]	35.88 (2.15)[b]	29.51 (1.36)[b]
RSES	16.15 (1.02)[a]	17.98 (1.06)[a]	23.12 (.67)[b]
MBSRQ-AE	2.36 (.13)[a]	2.67 (.14)[a]	3.59 (.09)[b]
CSQ	1.66 (.14)[a]	2.33 (.14)[b]	3.73 (.09)[c]
SF-36 V2	56.90 (2.50)[a]	62.75 (2.61)[a]	68.49 (1.65)[b]

Notes. See method section for variable abbreviations. Tx = treatment. Standard error is reported within parentheses. Means[abc] in each row with different superscript letters are significantly different from each other ($p < .05$-$.001$).

Appendix C - Regression Table for Both Models Predicting Quality of Life

Table 3

Regression Table for Both Models Predicting Quality of Life

	Model 1		Model 2	
Predicter	*B*	*SE B*	*B*	*SE B*
PHQ-9	-1.30***	.29	-1.30***	.29
STAI-S	.00	.09	.05	.09
STAI-T	-.54**	.17	-.62***	.17
EDI	-.02	.08	-.01	.08
RSES	-.18	.27	-.24	.29
MBSRQ-AE	3.30*	1.56	2.09	1.64
CSQ	-1.37	1.19	.40	1.33
Age			-.09	.07
BMI			-.36	.19

Notes. Adjusted R^2 for models 1 and 2 are .75 and .78 respectively. *$p < .05$. **$p < .01$. ***$p < .001$.

Appendix D - Correlation Matrix for Study Variables in a Sample of Men with

Gynecomastia

Table 4

Correlation Matrix for Study Variables in a Sample of Men with Gynecomastia

	PHQ-9	STAI-S	STAI-T	EDI	RSES	MBSR Q-AE	CSQ	SF36 V2	BTQ	GRCS-SF	Age	BMI
PHQ-9	1	.67***	.86***	.57***	-.75***	-.47***	-.38***	-.84***	.39***	.33**	-.36***	.03
STAI-S		1	.77***	.54***	-.68***	-.52***	-.51***	-.65***	.50**	.33**	-.38***	.14
STAI-T			1	.58***	-.87***	-.49***	-.42***	-.84***	.42***	.33**	-.42***	-.00
EDI				1	-.53***	-.44***	-.33**	-.53***	.45***	.29**	-.26*	.17
RSES					1	.52***	.35***	.73***	-.29**	-.30**	.40***	.02
MBSR Q-AE						1	.66***	.44***	-.48***	-.26**	.40***	-.25*
CSQ							1	.29**	-.69***	-.26**	.56***	-.00
SF36 V2								1	-.31**	-.33**	.28**	-.12
BTQ									1	.28**	-.63***	-.05
GRCS-SF										1	-.21*	.12
AGE											1	.26**
BMI												1

Notes. Correlations are for men with gynecomastia (treatment seekers and non treatment seekers). Ns range from 89 to 117 due to missing data. *$p < .05$. **$p < .01$. ***$p < .001$.

Appendix E - Proposed Paths for the Test of the Tripartite Influence Model in Men with
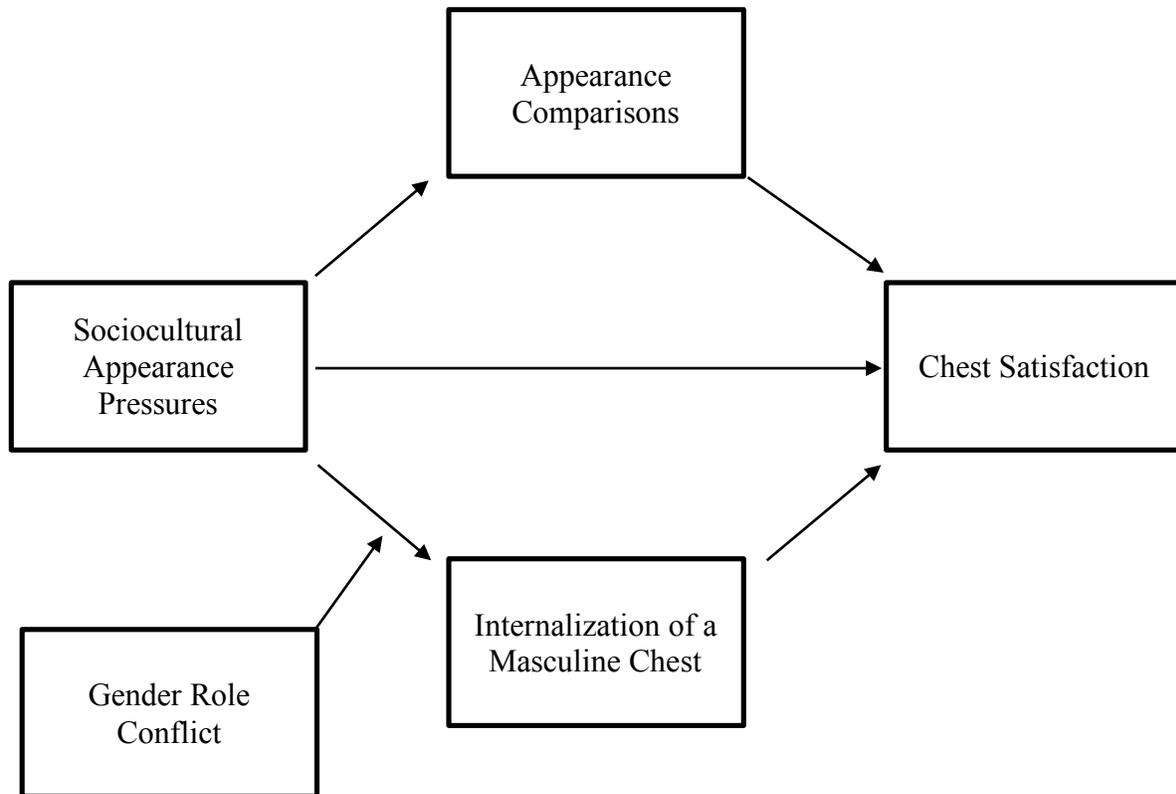
Gynecomastia

Figure 1. Proposed paths for the test of the Tripartite Influence Model in men with Gynecomastia.

Appendix F - Final Paths Coefficients and Standard Errors for the Tripartite Influence
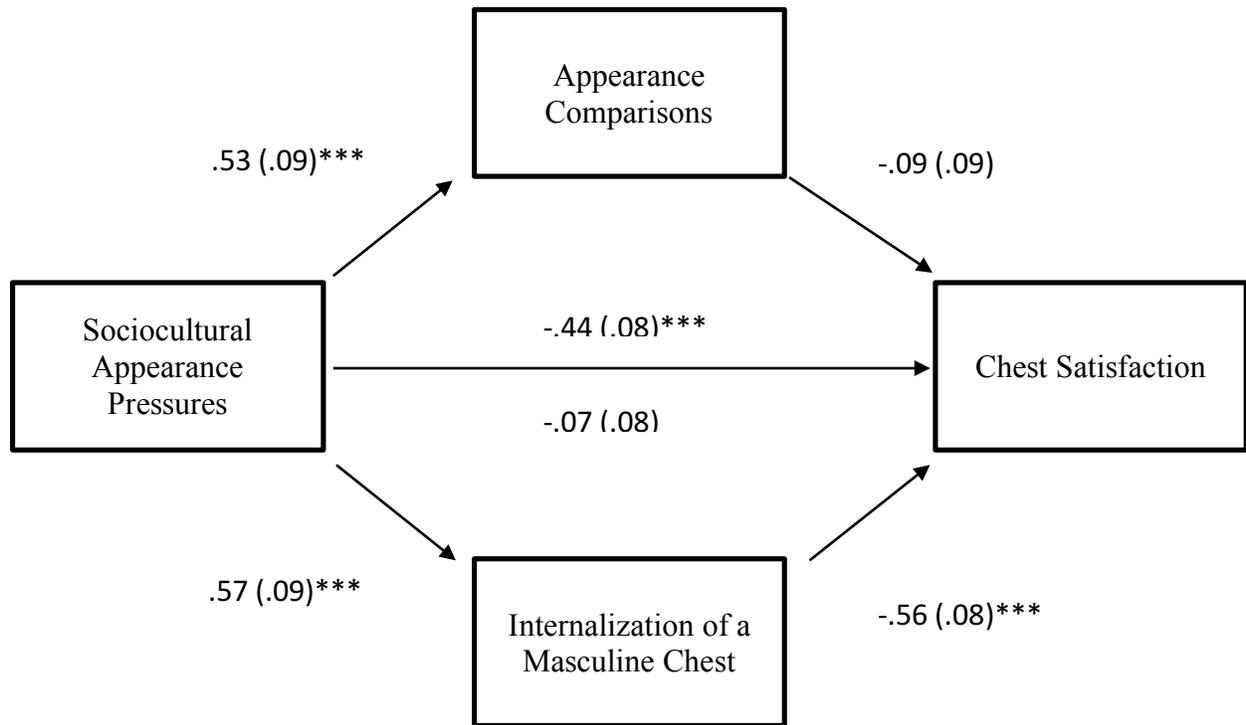
Model in Men with Gynecomastia

Figure 2. Final path coefficients and standard errors for the Tripartite Influence Model in men with Gynecomastia.

Appendix G - Correlation Matrix for Model Variables

Table 5

Correlation Matrix for Model Variables

	BTQ-G-INT	BTQ-G-AC	BTQ-G-PRES	CSQ	GRCS-SF
BTQ-G-INT	1	.71***	.52***	-.75***	.25**
BTQ-G-AC		1	.50***	-.59***	.24*
BTQ-G-PRES			1	-.45***	.22*
CSQ				1	-.26**
GRCS-SF					1

Notes. Correlations are for men with gynecomastia (treatment seekers and non treatment seekers). N = 108 *p* < .05. **p* < .01. ***p* < .001.

Appendix H - Chest Satisfaction Questionnaire (CSQ)

Instructions: Using the scale below, please circle the number that best matches your agreement with the following statements.

Definitely Disagree	Mostly Disagree	Neither agree nor disagree	Mostly agree	Definitely agree
1	2	3	4	5

1. I am comfortable with the shape of my chest.   1 2 3 4 5

2. I am comfortable with the size of my chest.   1 2 3 4 5

3. I am comfortable with the symmetry of my chest.   1 2 3 4 5

4. My chest is unattractive.*   1 2 3 4 5

5. My chest looks good in motion.   1 2 3 4 5

6. I am satisfied with the appearance of my chest.   1 2 3 4 5

7. I like the way my chest looks with a shirt on.   1 2 3 4 5

8. I like the way my chest looks without a shirt on.   1 2 3 4 5

Appendix I - Brief Tripartite Questionnaire – Gynecomastia (BTQ-G)

<u>Directions</u>: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

<div align="center">

Definitely Disagree = 1
Mostly Disagree = 2
Neither Agree Nor Disagree = 3
Mostly Agree = 4
Definitely Agree = 5

</div>

1. I think a lot about having a more masculine chest.	1	2	3	4	5
2. I want a flatter chest.	1	2	3	4	5
3. It is important for me to have a more masculine chest.	1	2	3	4	5
4. I want my chest to be more muscular.	1	2	3	4	5
5. I spend a lot of time doing things to make my chest look flatter.	1	2	3	4	5
6. I spend a lot of time doing things to make my chest appear more muscular.	1	2	3	4	5
7. I compare the appearance of my chest to those of other men when being physically active (consider being at the gym, exercising, or playing sports).	1	2	3	4	5
8. I compare the appearance of my chest to those of other men at social gatherings (consider parties, concerts, sporting events, or other social gathering).	1	2	3	4	5
9. I compare the appearance of my chest to those of other men when my chest is exposed (consider wearing revealing clothes, swimming, or being at the beach).	1	2	3	4	5

The following three questions pertain to your family members (consider parents, siblings, or other relatives).

10. I feel pressure from my family members to have a more masculine chest.	1	2	3	4	5
11. I feel pressure from my family members to have a flatter chest.	1	2	3	4	5
12. I compare the appearance of my chest to those of my male family members.	1	2	3	4	5

The following three questions pertain to your peers (consider friends, classmates, or social contacts).

13. I feel pressure from my peers to have a more masculine chest.	1	2	3	4	5
14. I feel pressure from my peers to have a flatter chest.	1	2	3	4	5
15. I compare the appearance of my chest to those of my peers.	1	2	3	4	5

The following three questions pertain to the media (consider television, magazines, the internet, movies, billboards, or advertisements).

16. I feel pressure from the media to have a more masculine chest.	1	2	3	4	5
17. I feel pressure from the media to have a flatter chest.	1	2	3	4	5
18. I compare the appearance of my chest to those of men portrayed in the media.	1	2	3	4	5