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Development of Muscularity and Weight Concerns in Heterosexual and Sexual Minority Males

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Abstract

Objective—To examine the development of muscularity and weight concerns among heterosexual and sexual minority males in adolescence.

Method—Participants were 5,868 males from the Growing Up Today Study, a US prospective cohort spanning ages 9–25 years. Generalized estimating equations were used to test sexual orientation differences in the development of muscularity concerns, weight gain attempts, and weight and shape concern.

Results—Desire for bigger muscles increased slightly each year across adolescence ($\beta = .10$, 95% C.I. = .09, .11) regardless of sexual orientation, but gay and bisexual participants reported greater desire for toned muscles than completely and mostly heterosexual males ($\beta = .39$, 95% C.I. = .21, .57). Desire for toned muscles did not change with age. Attempts to gain weight increased three-fold across adolescence, with up to 30% reporting weight gain attempts by age 16. Although underweight males (the smallest weight status class) were most likely to attempt to gain weight, most of the observed weight gain attempts were by healthy (69%) and overweight/obese (27%) males, suggesting that most attempts were medically unnecessary and could lead to overweight. Sexual minority participants were 20% less likely to report weight gain attempts than completely heterosexual participants. Weight and shape concern increased with age, with gay and bisexual participants experiencing a significantly greater increase than heterosexual males.

Conclusions—Sexual orientation modifies the development and expression of male weight and muscularity concerns. The findings have implications for early interventions for the prevention of obesity and eating disorder risk in heterosexual and sexual minority males.

Keywords

Body Image; Muscularity/Weight Concern; Gay/Bisexual; Masculinity; Adolescence

Negative body image and body dissatisfaction are connected to a host of deleterious outcomes, including disordered weight control behaviors (e.g., vomiting, fasting, diet pill

use) and eating disorders (Field, Austin, Striegel-Moore, et al., 2005; Paxton, Norris, Wertheim, Durkin, & Anderson, 2005). Most research on body image issues has focused on thinness concerns in girls and women; the literature on body image issues in boys and men is still emerging. Early work focused on men's body image issues highlighted the disproportionately greater prevalence of anorexia and bulimia nervosa diagnoses among sexual minority men (i.e., gay and bisexual) compared to heterosexual men (Carlat, Camargo, & Herzog, 1997; Kane, 2010; Siever, 1994). In addition, males overall have been found to report less body dissatisfaction and disordered weight control behaviors than females (Field, Austin, Camargo, et al., 2005; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). Delayed research interest in body image concerns in males may be a cause and consequence of tacit assumptions that body image concerns are limited to women and sexual minority men and that body image concerns are primarily linked to the expression of femininity (Blashill, 2011; Murnen & Smolak, 1997).

Over the past decade, researchers have recognized that the psychosocial context of body image concerns differs profoundly by gender and that studies focusing only on concerns with body weight may have underestimated body image concerns and eating disorder risk among males (Jones, 2004; McCreary & Sasse, 2000; Presnell, Bearman, & Stice, 2004). Whereas media images and advertisements reinforce the notion that thinness is central to women's physical attractiveness, content analyses have demonstrated that boys and men are inundated with images of unattainable muscularity (Bartlett, Vowells, & Saucier, 2008). In addition, because traits such as power and strength are typically associated with masculinity (O'Neil, 2008) -- particularly in Western cultures -- appearance ideals for men center on stature and muscularity (Cafri et al., 2005; McCabe & Ricciardelli, 2004; McCreary & Sasse, 2000), with the prevailing ideal being "characterized by well-developed chest and arm muscles, with wide shoulders tapering down to a narrow waist" (p. 30 Pope, Phillips, & Olivardia, 2000). Consistent with this muscular ideal, research in both small- and large-scale studies of male adolescents reveal that being too small or thin (i.e., in the underweight BMI range) and being too large or fat (i.e., in the overweight/obese BMI range) are both associated with body dissatisfaction (Austin, Haines, & Veugelers, 2009; Calzo et al., In press; Kostanski, Fisher, & Gullone, 2004). Muscularity concern is common among middle- and high school-aged male youth, with some longitudinal evidence suggesting that muscularity concern may increase from mid- through late adolescence (Jones, 2004; Jones, Bain, & King, 2008). Short-term longitudinal work also indicates that concerns with weight and shape may begin to increase in mid-adolescence, suggesting that the muscular ideal may shift from being primarily focused on bigger muscles in early adolescence to also being focused on tone and definition in older adolescence and young adulthood (McCabe & Ricciardelli, 2004). However, most research on male body image has been restricted to particular age periods (e.g., middle- school, college) and is underpowered to examine differences according to sexual orientation. As a consequence, little research to date has examined the development of muscularity and weight concerns from early adolescence through young adulthood among both heterosexual and sexual minority males.

High levels of muscularity and weight concerns may motivate males to engage in health-compromising behaviors to achieve ideal body appearance. Recent U.S. national data indicate that the lifetime prevalence of adolescent male anabolic steroid use (approximately 4%) is comparable to the combined lifetime prevalence of anorexia and bulimia nervosa in adolescent females (Johnston, O'Malley, Bachman, & Schulenberg, 2010; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Such statistics do not include the use of other legal substances to increase body size and muscularity, such as creatine, prohormones, and popular supplements (e.g., protein shakes). In the US national Growing Up Today Study, 12% of adolescent males reported using products to build muscles and improve appearance in the last year, and 4.7% used products at least weekly (Field, Austin, Camargo, et al.,

2005). As many as 13–26% of adolescent and adult males restrict their diet to decrease weight (Chao et al., 2008; Neumark-Sztainer & Hannan, 2000), and 21–47% modify their diet to *gain weight* and increase muscles (McCreary & Sasse, 2000, 2002; Ricciardelli & McCabe, 2003). Beyond the connection between attempts to gain weight and risk for overweight, restrictive dieting increases risk for future weight gain and the development of disordered weight control behaviors (Field et al., 2003). Research on the prevalence and development of male muscularity and weight concerns can thus provide critical information about the antecedents and correlates of obesity and eating disorder risk behaviors in males.

Sexual orientation disparities in weight status and disordered weight control behaviors suggest that sexual orientation may modify the development or presentation of male body image concerns. Sexual minority males represent only 2–4% of the U.S. male population (Chandra, Mosher, Copen, & Sionean, 2011), but as many as 14–42% of males seeking treatment for eating disorders are gay and bisexual (Andersen, 1999; Carlat, et al., 1997). Since the minority of those with a psychiatric disorder seek treatment, results from clinical samples can be challenging to generalize. However, results from non-clinical and population-based samples indicate that sexual minority adolescent and young adult males engage in more purging and weight restrictive behaviors and are less likely to be overweight and obese than heterosexual males (Austin et al., 2004; Austin, Ziyadeh, Corliss, Haines, et al., 2009; Austin, Ziyadeh, Corliss, Rosario, et al., 2009; Russell & Keel, 2002; Wichstrom, 2006).

Several explanations have been proposed to account for male sexual orientation disparities in eating disorders, disordered weight control behaviors, and weight status. Gender development research suggests that adolescents become increasingly gender stereotyped in their attitudes and behaviors as they conform to adult role expectations (Galambos, Berenbaum, & McHale, 2009). Thus, males in general may express greater concerns with muscularity as they traverse adolescence. However, sexual minority males may exhibit less conformity to traditional masculine gender role norms than heterosexual males (Dunne, Bailey, Kirk, & Martin, 2000; Rieger, Linsenmeier, Gygaz, & Bailey, 2008). Greater identification with femininity may augment the expression of body image concerns in general among sexual minority men. The idealized body types within contemporary US gay male communities may further affect the content of gay males' body image concerns and exert differential risk for eating disorders and weight status outcomes. Recent research indicates that adult gay men may be more likely than heterosexual men to express both muscularity and body fat concerns, further supporting the hypothesis that gay men's concerns with muscularity center more on leanness (i.e., moderate muscularity with low body fat) than heterosexual men's muscularity concerns (Feldman & Meyer, 2007; Halkitis, Moeller, & DeRaleau, 2008; Kane, 2010; Tylka & Andorka, 2012). Other research on young adult men has found that although there are only slight sexual orientation differences in muscle and body fat dissatisfaction, body fat dissatisfaction predicts psychological distress and disordered weight control behaviors above and beyond muscle dissatisfaction, potentially evincing the salience of weight and shape concern to gay men's body image (Blashill, 2010; Smith, Hawkeswood, Bodell, & Joiner, 2011). Extensive social science research and feminist scholarship has identified that women's attempts to be sexually attractive to men may cause them to become fixated on their physical appearance (i.e., internalizing the "male gaze"; Wood, 2004). Because gay and bisexual men also desire to be sexually attractive to men, gay and bisexual men may be more focused on their physical attractiveness to partners and thus more concerned about muscularity and thinness than heterosexual men (Russell & Keel, 2002; Wood, 2004). Longitudinal research analyzing sexual orientation subgroup differences can further elucidate the extent to which heterosexual and sexual minority males present different levels of muscularity and weight concern across adolescence and into adulthood.

Using data from a longitudinal cohort of adolescent males living throughout the US, this study examined the prevalence and development of four body image concerns: desire for bigger muscles; desire for toned/defined muscles; attempts to gain weight; and concern with weight and shape (i.e., thoughts about thinness and concern with body fat). Because the prevalence of eating disorders and disordered weight control behaviors increases across adolescence for both girls and boys (Hay, Mond, Buttner, & Darby, 2008; Swanson, et al., 2011), we hypothesized that weight and muscularity concerns would also increase with age. This intensification process could be driven, in part, by changes in weight status and changes in outward physical appearance due to pubertal development relative to peers (Cafri, van den Berg, & Thompson, 2006; Field et al., 2001). Controlling for weight status and pubertal development, we hypothesized that sexual minority males would report higher levels of desire for toned/defined muscles and concerns with weight and shape than heterosexual males, and that heterosexual males would report higher levels of desire for bigger muscles and attempts to gain weight than sexual minority males. We expected greater increases with age in desire for toned/defined muscles and weight and shape concern in sexual minority males in comparison to heterosexual males and that heterosexual males would exhibit greater increases with age in desire for bigger muscles and weight gain attempts than sexual minority males.

Method

Study Participants

The Growing Up Today Study (GUTS) began in 1996 and was designed to investigate the antecedents and correlates of nutritional behaviors, physical activity, and weight change in youth. Participants were ages 9–14 years at baseline and were children of women in the Nurses' Health Study II. After receiving parental consent, children were enrolled in the GUTS cohort if they returned questionnaires at baseline ($N = 16,882$). Participants completed questionnaires annually from 1996–2001 and every two years after 2001. In 2001, online versions of the questionnaires were made available. The Brigham and Women's Hospital institutional review board approved this study.

The present analysis included male participants if they provided at least one wave of data about their sexual orientation between 1999–2005, one wave of height and weight data for the calculation of body mass index (BMI), and at least one wave of data for each of the key muscularity and weight concern variables. Of the 7,843 boys who enrolled at baseline, 1,918 were excluded for missing all waves of sexual orientation data, 51 for missing all waves of BMI data, and six for missing all waves of one or a combination of the muscularity and weight concern variables. In total, 5,868 fit the inclusion criteria (74.8% of the original cohort). The majority of the boys included in the analyses (76.7%) contributed data for at least five of the seven waves. Self-identified sexual orientation in 1999 and in 2005 were not associated with number of waves of participation (p 's = .89, .89, respectively).¹ Approximately 93% of the analysis sample described their race/ethnicity as White. At recruitment approximately 14% of participants resided in the Western United States, 36% in the Midwest, 14% in the South, and 36% in the Northeast.

¹Attrition analyses consisted of baseline comparisons between respondents and non-respondents for the 1997–2003 waves. Results indicate that non-respondents were older at baseline (beta range = .19–.49 years), reported greater desire for bigger muscles (beta range = .09–.14), were more concerned with weight and shape (beta range = .09–.14), and reported more attempts to gain weight (for non-respondents in comparison to respondents in 2003 only; O.R. = 1.25, 95% C.I. = 1.08, 1.45). There were no differences between 2005 respondents and non-respondents on 1996 baseline data.

Measures

Sexual orientation—Sexual orientation was assessed in 1999, 2001, 2003, and 2005 using an item adapted from the Minnesota Adolescent Health Survey (Remafedi, Resnick, Blum, & Harris, 1992). Participants selected a statement that best described their sexual feelings: (i) completely heterosexual (attracted to persons of the opposite sex); (ii) mostly heterosexual; (iii) bisexual (equally attracted to men and women); (iv) mostly homosexual; (v) completely homosexual (gay, attracted to persons of the same sex); (vi) not sure. Responses of “not sure” were coded as missing. Responses of “mostly homosexual,” “completely homosexual,” or “bisexual” were too few to analyze separately; therefore, these responses were recoded as “gay/bisexual.” In 1999, when participants were 11–19 years old, 42 (1%) self-identified as gay/bisexual, 142 (3.3%) as mostly heterosexual, and 3,835 (88.2%) as completely heterosexual. In 2005, when participants were 17–25 years old, 115 (3%) self-identified as gay/bisexual, 237 (6.1%) as mostly heterosexual, and 3,508 (90.5%) as completely heterosexual.

Weight status—BMI (kg/m^2) was calculated at each wave using self-reported height and weight. Previous research on self-reported height and weight have found that adolescents provide valid information (Goodman, Hinden, & Khandelwal, 2000). Participants were coded into underweight, healthy weight, and overweight/obese BMI categories at each wave using International Obesity Task Force standards (Cole, Bellizzi, Flegal, & Dietz, 2000).

Pubertal development—Stage of pubertal development was assessed from 1996–1999 using Tanner Stage based on self-reported pubic hair growth (from 1 = No pubic hair to 5 = Hair has spread out to the thighs, like a grown man) (Tanner & Whitehouse, 1976). Studies have validated self-assessment of maturation in youth with this and similar measures (Neinstein, 1982). Relative pubertal development was calculated by standardizing Tanner scores at age 14 (the youngest age at which all participants could report Tanner stage; $M = 0$, $SD = 1$). Higher values represent more advanced development and lower values represent more delayed development relative to GUTS males.

Muscularity and weight concerns—Items adapted from the McKnight Risk Factor Survey (Shisslak et al., 1999) measured muscularity and weight concerns. Participants indicated how often they experienced a particular concern in the past year (1 = Never to 5 = Always). From 1996–1999, desire for muscularity was assessed as thoughts about wanting to have bigger muscles. From 2001–2005 we assessed desire for toned or defined muscles. From 1996–1999 and in 2003 participants indicated how often they tried to gain weight. Responses to the weight gain attempt question were strongly positively skewed. For example, from 1996–1999, 80–85% of participants indicated no attempts to gain weight, approximately 10% reported “A little”, and 1–6% endorsed “sometimes”, “a lot”, or “always”. Because it was rare for participants to report *any* attempt to gain weight, we recoded the variable into a binary variable: any weight gain attempts (1 = A little to Always) vs. no attempts (0 = Never). Weight and shape concern consisted of the mean of three items assessed from 1996–1999 and 2001–2005: (1) thought about wanting to be thinner; (2) worried about having fat on your body; and (3) felt fat (range of Cronbach α 's across waves = .89–.92).

Analysis

To examine the development of concerns across age rather than across waves, the dataset was converted from a “person-level data file” to a “person-period data file,” in which each participant contributed a person-period observation for the age they were for each questionnaire they completed (Singer & Willett, 2003). Hypotheses were tested with longitudinal regression using generalized estimating equations (GEE) (Ballinger, 2004;

Hanley, Negassa, Edwardes, & Forrester, 2003; Liang & Zeger, 1986) in SAS (version 9.1, PROC GENMOD), accounting for the correlation of repeated measures within the individual and clustering by siblings within the same family. GEE analyses do not require an equal number of observations at each time-point and all data from all time points are included in analyses to generate population average betas and odds ratios. Region of residence and weight status were modeled as time-varying categorical covariates. Age was modeled as continuous time-varying covariate. Due to the limited racial/ethnic diversity of the cohort, race/ethnicity data were not included in the models. Sexual orientation was updated each wave that participants provided a valid response and treated as a time-varying class variable with completely heterosexual as the referent group. Additional analyses examined whether gay/bisexual males differed from mostly heterosexual males. Because participants were not asked sexual orientation in the 1996–1998 waves, orientation reported in 1999 was assigned to these years. Sensitivity analyses showed that the magnitude and direction of the effect of sexual orientation on the muscularity and weight concern outcomes did not differ when sexual orientation was not back-assigned to 1996–1998, thus the analyses presented include sexual orientation back-assigned. Although muscularity and weight concerns were expected to increase linearly with age, analyses also tested non-linearity in the development of concerns. Age-by-sexual orientation interaction terms tested whether sexual orientation modified the development of concerns, but were dropped from models if insignificant. Models examining the development of desire for bigger muscles included observations from ages 9–19 years (analysis $n = 17,171$), and models examining the development of desire for toned and defined muscles included observations from ages 14–25 ($n = 7,347$). Models examining the development of attempts to gain weight included observations from ages 9–22 years ($n = 18,853$), and models examining the development of concern with weight and shape included observations from ages 9–25 years ($n = 23,647$). Pubertal development did not predict body image concerns and was thus dropped from all analyses. GEE analyses (presented in Table 2) adjusted for significant geographic region and weight status effects.

Results

Muscularity concerns

Table 1 displays descriptive statistics for the sample by age (grouped into age categories for summary purposes). Desire for bigger muscles exhibited a very small yet significant increase with each year increase in age ($\beta = .10$, 95% C.I. = .09, .11) regardless of sexual orientation (Table 2, Figure 1). Desire for toned and defined muscles did not change with age, but gay and bisexual participants reported significantly greater desire for toned and defined muscles than completely heterosexual participants ($\beta = .39$, 95% C.I. = .21, .57). Mostly heterosexual participants also reported significantly less desire for toned and defined muscles than gay and bisexual participants ($\beta = -.30$, 95% C.I. = $-.49, -.10$).

Weight gain attempts

The odds of attempting to gain weight increased linearly by 30% for each year increase in age (O.R. = 1.33, 95% C.I. = 1.26, 1.40), but there was also a small yet significant quadratic age effect (O.R. = .99, 95% C.I. = .986, .994; Table 2). Plotted population estimates (Figure 1) indicate that attempts to gain weight increased in early adolescence before reaching a plateau in young adulthood. Sexual orientation did not modify the development of weight gain attempts (i.e., no significant age-by-sexual orientation interaction), but completely heterosexual participants consistently reported more attempts to gain weight throughout adolescence than gay/bisexual and mostly heterosexual participants (who did not differ from each other). The odds of gay/bisexual and mostly heterosexual participants reporting attempts to gain weight were over 20% less than that of completely heterosexuals (O.R. = .

77, 95% C.I.= .62,.95). To further clarify this concerning overall increase in weight gain attempts across adolescence, additional analyses examined the distribution of weight gain attempts by weight status to explore whether attempts to gain weight are linked to underweight status. Between ages 16–22, 31.4% of males reported attempts to gain weight. When analyzed by weight status, 53.8% of participants in the underweight BMI category, 35.4% of participants in the healthy weight BMI category, and 16.5% of participants in the overweight/obese BMI category attempted to gain weight between ages 16–22. Overall, underweight males were significantly more likely to attempt to gain weight than healthy weight (O.R.= 2.23, 95% C.I.= 1.96, 2.54) and overweight/obese males (O.R.= 6.45, 95% C.I.= 5.49, 7.58). However, because few participants in the sample were in the underweight BMI category, the vast majority of observed weight gain attempts were by healthy weight (68.7%) and overweight/obese (27.1%) participants.

Weight and shape concern

Concerns with thinness and body fat increased with age, and the detection of a significant sexual orientation-by-quadratic-age effect indicated that sexual orientation modified the development of weight and shape concern. Both mostly heterosexual and completely heterosexual participants experienced a significant, slight increase in weight and shape concern across adolescence and into young adulthood, with no significant between-group differences. However, the development of weight and shape concern was significantly different for gay/bisexual participants. GEE population estimates (Figure 1) indicated that at age 13 years gay/bisexual participants reported levels of concern that were similar to mostly heterosexual participants and .21 units higher than completely heterosexual participants. Weight and shape concerns among gay/bisexual participants were higher at progressively older ages, such that by ages 18–22 the gay/bisexual participants reported levels of concern that were greater than mostly heterosexual and completely heterosexual participants. Interestingly, the sexual orientation subgroup differences at the age 25 time point diminished in size and levels of concern between the sexual orientation subgroups approached convergence.

Discussion

This study expands understanding of how muscularity and weight concerns change across early adolescence and young adulthood for males and is among the first we are aware of to document change in concerns from early adolescence through young adulthood in both heterosexual *and* sexual minority males. Overall, desire for bigger muscles and concerns with weight and shape exhibited small, but significant increases across adolescence. Attempts to gain weight increased three-fold across adolescence. Because only a small percentage of participants were categorized to the underweight BMI category, the vast majority of weight gain attempts were made by youth who were in the healthy and overweight/obese BMI categories. The prospective design and sample size of the study also enabled us to examine whether sexual orientation modifies the development and expression of muscularity and weight concerns. As expected, gay and bisexual participants reported greater desire for toned/defined muscles and greater concern with weight and shape than completely heterosexual participants. Completely heterosexual participants reported more attempts to gain weight than gay and bisexual and mostly heterosexual participants. The results provide new insight into the potential antecedents of male sexual orientation disparities in clinical eating disorders, disordered weight control behaviors, and overweight/obesity.

The findings regarding the steady increase in desire for bigger muscles and concern with weight and shape across adolescence is consistent with previous literature (McCabe & Ricciardelli, 2004), but on average, the levels of desire for bigger or toned/defined muscles

and concern with weight and shape in the sample overall were in the low- to mid-point range of the five-point scales. Because body image concerns are perceived in Western cultures as feminine concerns, boys and men in general are not socialized to openly discuss body dissatisfaction or body image concerns (Pope, Phillips, & Olivardia, 2000). Thus, it is possible that the participants in our sample did not feel comfortable endorsing higher-level response options on the muscularity and weight concern questions. Assessing the effects of conformity to masculinity and femininity norms in future studies is a critical next step in this research, particularly amidst evidence that gender expression may be associated with response patterns in body image concern questionnaires (Blashill, 2011; Murnen & Smolak, 1997).

The substantial number of males reporting attempts to gain weight in late adolescence and young adulthood -- despite already being in the healthy or overweight/obese weight range -- is troubling. The findings potentially highlight the pervasiveness of perceptions of being too small and widespread societal pressure on males to increase body size as a means to enhance their masculine appearance (e.g., to appear more athletic; to appear strong and tough in the face of physical bullying victimization by older brothers or other boys) (McCreary, Hildebrandt, Heinberg, Boroughs, & Thompson, 2007; Pope, et al., 2000). The results have important implications for obesity prevention work with males. The internalization of masculine norms regarding stature and size may make some men less receptive to prevention messages focused on reducing body size. Weight gain attempts increased steadily between ages nine and 16, thus indicating the need for early interventions.

In an effort to account for sexual orientation disparities in eating disorders and weight status, researchers have proposed multiple mechanisms -- including gender expression, sex differences in romantic partner preferences, the internalization of the male gaze, and involvement within the gay and bisexual male communities (Blashill, 2011; Halkitis, et al., 2008; Murnen & Smolak, 1997; Wood, 2004). These factors suggest that sexual orientation differences in weight and muscularity should intensify as minority sexual orientation identities emerge, as sexual minority males become more involved with gay or bisexual communities, or as they identify more strongly with gay or bisexual male appearance ideals (Tylka & Andorka, 2012). The development of minority sexual orientation identities typically begins in early- to mid-adolescence with the emergence of same-sex attractions (Calzo, Antonucci, Mays, & Cochran, 2011). Thus, sexual orientation differences in weight and muscularity concerns may not be expected to appear until mid-adolescence. Although we did not explicitly link the development of muscularity and weight concerns to sexual orientation identity development or community involvement, our study provides empirical evidence in support of the temporal elements of this developmental framework.

Heterosexual and sexual minority males both experienced an increase in desire for *bigger* muscles across adolescence, but gay and bisexual male youth exhibited greater overall desire for *toned/defined* muscles from mid-adolescence through young adulthood than completely heterosexual males, which is consistent with previous cross-sectional research on adult gay and bisexual males (Blashill, 2010; Smith, et al., 2011; Tylka & Andorka, 2012). Beginning in mid-adolescence, gay and bisexual male youth also experienced a more rapid increase in weight and shape concern than completely heterosexuals.

Despite having adequate power to detect moderate sexual orientation subgroup differences, it is important to note that the effect of minority sexual orientation on desire for toned/defined muscles and weight and shape concern was relatively small. It is possible that the small effect may be due to the composition of the sample, which consists of youth who were not recruited in clinical settings or on the basis of sexual orientation. Previous researchers have noted that the reliance on clinical and community samples of sexual minority males may exaggerate estimates of muscularity and weight concerns in sexual minority males and

overstate the effect of minority sexual orientation (e.g., Kane, 2010). Nevertheless, the consistently greater concern with muscle tone and definition and the intensification of concern with weight and shape across adolescence among gay and bisexual men may help explain the greater prevalence of disordered weight control behaviors among sexual minority males compared to heterosexual males. Incorporating assessments of gender conformity, gay and bisexual community involvement, and self-objectification can further clarify the contextual and intra-psychic factors that engender the development of sexual orientation disparities in weight and muscularity concerns. The results also suggest that minority sexual orientation is not uniformly associated with unhealthy weight-related behaviors. In particular, sexual minority males had 20% lower odds of attempting to gain weight than completely heterosexual participants, suggesting that sexual minority identity may be protective against weight gain attempts in males.

A notable advantage of the current study was the ability to examine the development of muscularity and weight concerns among a range of minority sexual orientation subgroups, including males who describe themselves as mostly heterosexual. Previous research with GUTS data has indicated that mostly heterosexual adolescent males exhibit greater engagement in disordered weight control behaviors than completely heterosexual males (Austin, et al., 2004; Austin, Ziyadeh, Corliss, Rosario, et al., 2009). The findings from this study extend upon this previous research by revealing that mostly heterosexual males exhibit their own unique pattern of concerns. By not identifying as gay or bisexual, mostly heterosexual males might be less likely to identify with gay and bisexual male community norms regarding leanness. However, as sexual minorities, mostly heterosexual males may also be less likely to identify with traditional masculine norms regarding muscularity.

There are several limitations with the current study that warrant consideration. First, the sample was limited in racial/ethnic and socioeconomic diversity, reducing generalizability. Recent epidemiologic data indicate that Black and Latino adolescent males are a greater risk for bulimia, binge eating disorder, and all forms of disordered weight control behaviors than White adolescent males (Chao, et al., 2008; Swanson, et al., 2011) and that indicators of low socioeconomic status may be positively associated with eating disorder symptoms in males (Austin et al., 2011). Second, as is the case with many large-scale, multi-wave, epidemiologic studies, restrictions on survey length and attempts to minimize participant burden constrained our ability to assess body image concerns in greater depth. The muscularity and weight gain attempts variables were measured with single-items, thus limiting the opportunity to examine nuance in participants' concerns (e.g., Do the desires to gain weight center on increasing muscle mass or body fat?). Incorporating multi-item, in-depth measures of the constructs (e.g., the Drive for Muscularity Scale, McCreary & Sasse, 2000) in prospective research could replicate and expand upon the findings of the current study. Third, the desire for bigger muscles item was dropped after 1999, potentially obscuring our understanding of whether and how desire for bigger muscles changes in young adulthood. Fourth, the sample lacked power to examine bisexual males separately. Bisexual males have been found to exhibit greater levels of psychological distress than gay males (Dodge & Sandfort, 2007) and may thus express different levels of body image concerns than gay males. Fifth, because BMI is an indicator of weight status, there may be some misclassification due to the inability to account for overweight due to excess body fat or overweight due to muscle mass. The association between objective indices of muscularity (not available in this study) and the expression of muscularity and weight concerns is an important research area that future studies should address. Finally, as a longitudinal study, it is possible that attrition at later waves may bias some of the estimates reported. However, attrition analyses indicated that bias may be in the direction of underestimating the magnitude of concerns in the sample (i.e., the estimates reported for later ages may be more conservative because of the exclusion criteria).

This study has several notable strengths. No research thus far has examined the development throughout adolescence and young adulthood of body image concerns in heterosexual and sexual minority males in a prospective study. Sexual minority participants were not selected on the basis of sexual orientation, thus our study sample does not present the biases inherent in research with samples recruited through clinical settings or sexual minority youth community venues. Though the number of sexual minority participants in the sample may be lower than clinical or community-based studies that specifically target these populations, the proportion of the sample identifying as sexual minorities by young adulthood is en par with recent US nationally representative data of adults (Chandra, et al., 2011). The repeated-measures design of the study substantially increased the power to conduct sexual orientation subgroup comparisons. As a non-clinical sample in general, the data provide important information about the extent of muscularity and weight concerns in a large, generally healthy population of adolescent and young adult males across the United States. Sexual orientation identity was asked at very young ages and updated with each wave of assessment, thus enabling us to assess how sexual orientation may modify the expression and development of body image concerns from early adolescence through young adulthood. Finally, we assessed multiple types of muscularity and weight concerns, generating a rich portrayal of how the phenomenology of body image concerns overlaps and diverges for heterosexual and sexual minority male youth.

The findings highlight new directions for future research. More research is required examining the co-development of muscularity and weight concerns with the onset of disordered weight control behaviors and obesity. Additionally, to further understand how sexual orientation modifies the expression and development of muscularity and weight concerns, future research should link trajectories of concerns to sexual minority identity development and gay/bisexual community assimilation. The findings also have important public health implications for the prevention of obesity and eating disorders in heterosexual and sexual minority males. Attempts to gain weight—a risk factor for overeating, steroid use, and overweight/obesity—increased threefold across adolescence, with heterosexual males reporting more weight gain attempts than sexual minority males. Concern with weight and shape—a potential risk factor for the adoption of disordered weight control strategies—increased dramatically for gay and bisexual participants starting in mid-adolescence. The results from this study suggest the need for early-adolescent interventions to prevent the development of weight and shape concerns and the potentially health-threatening behaviors that may ensue.

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Figure 1.

Estimated muscularity and weight concern values by age and sexual orientation from generalized estimating equations in male participants from the Growing Up Today Study (adjusting for geographic region of residence and weight status).

Demographic Characteristics and Observed Mean Weight and Muscularity Concerns for Male Participants in the Growing Up Today Study

Table 1

	Summarized by Age Group in Years (Observations <i>n</i>) ^a						
	9–11 (<i>n</i> = 5306)	12–13 (<i>n</i> = 7113)	14–15 (<i>n</i> = 5935)	16–17 (<i>n</i> = 4496)	18–19 (<i>n</i> = 3775)	20–22 (<i>n</i> = 3811)	23–25 (<i>n</i> = 670)
Sexual Orientation (%[<i>n</i>])							
Completely Heterosexual	4641 (96.5%)	6335 (95.7%)	5333 (94.7%)	4070 (94.1%)	3455 (93.2%)	3431 (90.9%)	603 (90.3%)
Mostly Heterosexual	131 (2.7%)	212 (3.2%)	211 (3.8%)	178 (4.1%)	165 (4.5%)	228 (6.0%)	43 (6.4%)
Gay/Bisexual	38 (.8%)	74 (1.1%)	79 (1.5%)	79 (1.8%)	87 (2.4%)	116 (3.1%)	22 (3.3%)
Past-Year Concerns							
Bigger Muscles (<i>M</i> [<i>SD</i>])	2.48 (1.19)	2.66 (1.15)	2.95 (1.13)	3.06 (1.14)	3.10 (1.29)	--	--
Completely Heterosexual	2.50 (1.20)	2.66 (1.15)	2.97 (1.13)	3.09 (1.15)	3.08 (1.34)	--	--
Mostly Heterosexual	2.50 (1.06)	2.86 (1.09)	2.87 (1.09)	2.91 (1.03)	3.33 (.58)	--	--
Gay/Bisexual	2.47 (1.39)	2.69 (1.17)	3.07 (1.08)	2.96 (1.00)	3.00 (–)	--	--
Toned Muscles (<i>M</i> [<i>SD</i>])	--	--	3.00 (1.06)	3.10 (1.03)	3.12 (1.02)	3.08 (1.03)	3.00 (1.04)
Completely Heterosexual	--	--	3.02 (1.07)	3.10 (1.03)	3.11 (1.02)	3.06 (1.03)	2.96 (1.04)
Mostly Heterosexual	--	--	3.06 (1.09)	3.10 (1.08)	3.20 (.95)	3.08 (1.03)	3.34 (.94)
Gay/Bisexual	--	--	3.71 (.95)	3.59 (.76)	3.58 (1.05)	3.50 (1.00)	3.35 (.81)
Attempt Wt. Gain (% [<i>n</i>]) ^b	712 (13.5%)	1096 (16.1%)	1155 (24.3%)	867 (32.1%)	425 (30.9%)	312 (30.6%)	--
Completely Heterosexual	633 (13.8%)	981 (16.2%)	1055 (24.7%)	810 (32.8%)	410 (31.8%)	287 (30.9%)	--
Mostly Heterosexual	16 (12.3%)	41 (19.6%)	40 (21.7%)	26 (24.3%)	8 (17.8%)	11 (26.2%)	--
Gay/Bisexual	5 (13.2%)	12 (16.9%)	12 (17.4%)	14 (26.4%)	5 (15.6%)	10 (25.6%)	--
Weight & Shape (<i>M</i> [<i>SD</i>])	1.57 (.84)	1.64 (.91)	1.62 (.90)	1.64 (.89)	1.81 (.94)	1.92 (.96)	2.07 (.99)
Completely Heterosexual	1.58 (.84)	1.64 (.90)	1.61 (.88)	1.62 (.85)	1.78 (.91)	1.89 (.94)	2.04 (.96)
Mostly Heterosexual	1.68 (.92)	1.94 (1.13)	1.82 (1.04)	1.91 (1.00)	2.10 (1.17)	2.15 (.99)	2.27 (1.20)
Gay/Bisexual	1.51 (.85)	1.83 (1.09)	2.19 (1.22)	2.58 (1.19)	2.60 (1.34)	2.56 (1.25)	2.32 (1.08)
Weight Status (%[<i>n</i>])							
Underweight	673 (13.1%)	672 (9.8%)	333 (6.2%)	167 (4.6%)	118 (4.1%)	75 (2.6%)	6 (1.1%)
Healthy Weight	3191 (61.9%)	4453 (64.9%)	3843 (71.0%)	2628 (72.2%)	1958 (67.8%)	1746 (60.3%)	290 (53.2%)
Overweight/Obese	1292 (25.1%)	1740 (25.4%)	1239 (22.9%)	845 (23.2%)	811 (28.1%)	1074 (37.1%)	249 (45.7%)
Geographic Region (%[<i>n</i>])							
West	763 (14.4%)	1035 (14.6%)	879 (14.8%)	758 (16.9%)	592 (15.7%)	610 (16.0%)	113 (16.9%)

	Summarized by Age Group in Years (Observations n^a)						
	9–11 ($n = 5306$)	12–13 ($n = 7113$)	14–15 ($n = 5935$)	16–17 ($n = 4496$)	18–19 ($n = 3775$)	20–22 ($n = 3811$)	23–25 ($n = 670$)
Midwest	1907 (35.9%)	2548 (35.8%)	2106 (35.5%)	1560 (34.7%)	1314 (34.8%)	1282 (33.6%)	223 (33.3%)
South	704 (13.3%)	1029 (14.5%)	891 (15.0%)	638 (14.2%)	547 (14.5%)	577 (15.1%)	114 (17.0%)
Northeast	1932 (36.4%)	2501 (35.2%)	2059 (34.7%)	1540 (34.3%)	1322 (35.0%)	1342 (35.2%)	220 (32.8%)

Note:

^a Ages are grouped here to provide summary descriptive statistics only. Longitudinal analyses examined changes across adolescence with each year of age as the unit of time

^b Sexual orientation percentages refer to percent within sexual orientation subgroup attempting to gain weight at each age.

Table 2

Results from GEE Analyses of the Development of Desire for Muscularity, Attempts to Gain Weight, and Weight and Shape Concern in Male Participants from the Growing Up Today Study (Participants n= 5,867)

	Desire for Bigger Muscles Ages 9–19 Years (Obs. n = 17,171)			Desire for Toned/Defined Muscles Ages 14–25 Years (Obs. n = 7,374)			Attempts to Gain Weight* Ages 9–22 Years (Obs. n = 18,853)			Concerns with Weight and Shape Ages 9–25 Years (Obs. n = 23,647)		
	β	95% C.I.		β	95% C.I.		O.R.	95% C.I.		β	95% C.I.	
Gay/Bisexual	-.06	-.27, .16		.39	.21, .57		.70	.48, 1.02		-.65	-.94, -.37	
Mostly Heterosexual	.00	-.12, .12		.09	-.01, .20		.80	.62, 1.03		.15	-.09, .39	
Age	.10	.09, .11		-.01	-.02, .00		1.33	1.26, 1.40		-.01	-.02, .00	
Age ²							.99	.99, .99		.00	.00, .00	
Gay/Bisexual × Age										.27	.17, .36	
Mostly Heterosexual × Age										.02	-.05, .09	
Gay/Bisexual × Age ²										-.01	-.02, -.01	
Mostly Heterosexual × Age ²										-.00	-.01, .00	

	df	χ^2	p	df	χ^2	p	df	χ^2	p	df	χ^2	p
Sexual Orientation	2	0.25	.88	2	17.70	<.0001	2	6.70	<.05	2	14.25	<.001
Age	1	294.51	<.0001	1	3.69	.05	1	105.78	<.0001	1	16.16	<.0001
Age ²	--	--	--	--	--	--	1	24.71	<.0001	1	4.52	<.05
Sexual Orientation × Age	--	--	--	--	--	--	--	--	--	2	19.54	<.0001
Sexual Orientation × Age ²	--	--	--	--	--	--	--	--	--	2	13.46	<.01

Note: "--" indicates that the variable was not included in the final model because it did not significantly predict the outcome or improve the fit of the model. Completely heterosexual is the referent for sexual orientation analyses. Models adjust for geographic region of residence and weight status.

* Gay/Bisexual and Mostly Heterosexual participants did not differ significantly on weight gain attempts. When combined as a group, sexual minority participants had lower odds than Completely Heterosexual of attempting to gain weight (O.R. = .77, 95% C.I. = .62, .95)