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Sexual orientation differences in pathways from sociocultural and objectification constructs to body satisfaction: The U.S. Body Project I

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David A. Fredericka: Conceptualization, Methodology, Formal analysis, Supervision, Funding acquisition. **Vivienne M. Hazzard:** Formal analysis. **Lauren M. Schaefer:** Formal analysis. **Rachel F. Rodgers:** Formal analysis. **Allegra R. Gordon:** Formal analysis. **Tracy L. Tylkag:** Formal analysis. **Jamie-Lee Pennesi:** Formal analysis. **Lexie Convertino:** Formal analysis. **Michael C. Parent:** Formal analysis. **Tiffany A. Brown:** Formal analysis. **Emilio J. Compte:** Formal analysis. **Catherine P. Cook-Cottone:** Formal analysis. **Canice E. Crerando:** Formal analysis. **Vanessa L. Malcarne:** Formal analysis. **Jason M. Nagata:** Formal analysis. **Marisol Perez:** Formal analysis. **Eva Pilar:** Formal analysis. **J. Kevin Thompson:** Formal analysis. **Stuart B. Murray:** Formal analysis, Supervision, Funding acquisition.

Conflict of interest

None.

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Abstract

Objectification theory and the tripartite influence model provide useful frameworks for understanding the body image experiences of men and women. However, there is little systematic investigation of how sexual orientation moderates the links between these constructs and body image satisfaction. It has been hypothesized, for example, that the associations of surveillance (i.e., monitoring of one's appearance due to objectification by others) would be strongest for groups targeted by the male gaze (e.g., gay men, lesbian women, and bisexual men and women). Here we proposed an integrated sociocultural model and examined these pathways in multigroup structural equation models in a national sample of heterosexual, bisexual, and lesbian women (*n*s = 5395; 598; 213, respectively), and heterosexual, bisexual, and gay men (4869; 194; and 194, respectively) aged 18–65 years. Sexual orientation moderated some of these pathways. The most consistent pattern was that appearance pressures were internalized to a greater extent among bisexual participants. The pathways to poorer body image were generally similar among heterosexual and gay/lesbian men and women. These findings highlight the importance of examining sexual orientation-specific influences on body image across diverse groups, as well as the commonalities in the experiences of men and women across sexual orientations.

Keywords

Body image; Sexual orientation; Objectification theory; Tripartite influence model; Media effects

1. Introduction

Striking differences have been observed in body image between heterosexual and sexual minority men, defined as men who identify as gay, bisexual, or another label. Across studies, gay men are more likely to report body dissatisfaction (Frederick & Essayli, 2016; Frederick, Sandhu, Morse, & Swam, 2016; Frederick et al., 2020; Morrison, Morrison, & Sager, 2004), and sexual minority men are more likely to report disordered eating patterns (Murray et al., 2017) when compared to heterosexual men. In addition, gay men are more likely than heterosexual men to feel judged based on their appearance, think often about how they look, engage in appearance-based social comparison, and feel pressure from the media to be attractive (Frederick & Essayli, 2016). In contrast, findings for women have been less consistent, with some studies finding small differences in body image across sexual orientation groups, and others finding no differences (Frederick et al., 2016; Frederick et al.,

2020; Henn, Taube, Vocks, & Hartmann, 2019; Moore & Keel, 2003; Moreno-Domínguez, Raposo, & Elipe, 2019; Morrison et al., 2004; Peplau et al., 2009).

When examining the processes underlying individual and group differences in body dissatisfaction, researchers have often turned to models that emphasize the roles played by sociocultural pressures to attain a thin/lean and athletic/muscular ideal (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Although sociocultural models have demonstrated considerable utility in heterosexual men and women (Keery, Van den Berg, & Thompson, 2004; Shroff & Thompson, 2006; Tylka, 2011), our understanding of how relationships among key constructs in explanatory body image models vary according to sexual orientation is limited by generally small sample sizes and a paucity of research evaluating these relationships among sexual minority subgroups (e.g., gay, lesbian, bisexual), with a few exceptions (e.g., Brewster et al., 2014; Engeln-Maddox Miller, & Doyle, 2011; Hazzard et al., 2019; Huxley, Halliwell, & Clarke, 2015; Tylka & Andorka, 2012; Wiseman & Moradi, 2010).

Therefore, the aim of this study was to extend our knowledge by examining the usefulness of an integrated sociocultural model of body satisfaction and body image quality of life across different sexual orientation subgroups of men and women, and to compare the strength of expected associations across those groups.

1.1. Sociocultural perspectives on body image and sexual orientation

1.1.1. The tripartite influence model and internalization of appearance ideals

—Sexual orientation is an important aspect of identity that is connected to body image and sociocultural factors that shape body image (Dahlenburg, Gleaves, Hutchinson, & Coro, 2020). Sociocultural theory identifies how social messages (e.g., from the media) communicate information about valued appearance ideals, and ultimately exert pressure on individuals to pursue those ideals.

One sociocultural approach, the tripartite influence model (Thompson et al., 1999), focuses attention in particular on how appearance pressures are communicated and amplified by media, peers, and family. For example, media messages often promote a lean and muscular appearance for men (termed the muscular/athletic ideal) by disproportionately portraying such bodies in media images (Burch & Johnsen, 2020; Frederick et al., 2005), whereas slender women, or slender women with large breasts and waist-to-hip ratios (termed the thin-ideal), are often featured in popular media (Burch & Johnsen, 2020; Roberts & Muta, 2017; Seifert, 2005).

Some meta-analyses of quantitative studies find a small immediate increase in women's body dissatisfaction after exposure to thin-ideal media (Grabe et al., 2008; Groesz et al., 2002; Want, 2009), whereas others find this effect more notably for women who initially have poor body image prior to the exposure (Ferguson, 2013). In qualitative studies, many women have reported comparing themselves to these ideal images and feeling dissatisfaction as a result (Frederick et al., 2017). Meta-analyses on men's body image after exposure to media have been mixed, with some finding a small average effect (Barlett, Vowels, & Saucie, 2008), and others finding no significant effect (Ferguson, 2013).

Studies drawn from primarily heterosexual samples find that many men express attraction to relatively slender women (Swami et al., 2010) and women express attraction to relatively toned and muscular men (Frederick & Haselton, 2007; Gray & Frederick, 2012; Sell, Lukazsweski, & Townsley, 2017), while gay men report even greater attraction to muscular partners (Cordes, Vocks, & Hartmann, 2021). In parallel, many people express a desire to change their appearance to become more attractive to potential partners (Frederick et al., 2007). According to the tripartite influence model, these messages lead people to endorse and internalize the valued appearance ideals as a personal standard (Thompson & Stice, 2001), which is hypothesized to lead to poor body image because few people can or do attain these narrow ideals through healthy means.

People of all sexual orientations face sociocultural appearance pressures, but it is not entirely clear how these pressures differ by sexual orientation. Some past research has found that gay men are more likely than heterosexual men to internalize the thin-ideal (Legenbauer et al., 2009; Yean et al., 2013) and conventional appearance standards (Carper, Negy, & Tantleff-Dunn, 2010; Gigi et al., 2016; Jankowski, Diedrichs, & Halliwell, 2014), whereas another study found no differences in appearance pressures or thin-ideal internalization between gay/bisexual men and heterosexual men (Carels et al., 2021). Some research has found that heterosexual men engaged in more internalization of the muscular-ideal than gay men (Carels et al., 2021), other research found no difference (Gigi et al., 2016; Jankowski et al., 2014), and other research finds greater internalization by gay men (Carper et al., 2010). In the current dataset, gay men reported greater thin-ideal internalization, peer appearance pressures, and media appearance pressures, but also lower muscular/athletic ideal internalization than heterosexual men (Frederick, Pila, et al., 2022). Bisexual men reported greater media pressures and lower muscular/athletic ideal internalization, but no differences from heterosexual men on other measures. Thus, some differences have been found in appearance pressures and endorsement across sexual orientations, although the patterns emerging are often not clear or consistent.

Findings among women have been more mixed. Some research has found that lesbian women were less likely to internalize appearance norms than heterosexual women (Bergeron & Senn, 1998; Share & Mintz, 2002), but other authors found no differences (Huxley et al., 2015). In the current dataset, lesbian women and heterosexual women reported similar levels of peer, media, and family pressures, with lesbian women reporting slightly lower thin-ideal internalization and slightly higher muscular/athleticism internalization (Frederick, Pila, et al., 2022). Bisexual women only differed from heterosexual women in perceived pressures, reporting slightly fewer peer, media, and family pressures.

The differences in mean levels on these traits suggests that the experience of these pressures may differ across groups, making it valuable to understand how these pressures are differentially linked to body image satisfaction in each group.

1.1.2. Objectification theory—Like other sociocultural theories, objectification theory (Fredrickson & Roberts, 1997) highlights how cultural messages influence body image, placing particular focus on the impact of women's sexual objectification in mainstream culture. Objectification theory posits that experiencing recurrent sexual objectification, such

as exposure to hypersexualized media images, or sexualized comments, gaze, or violence (Kozee, Tylka, Augustus-Horvath, & Denchik., 2007; Schaefer & Thompson, 2018), leads women to view themselves as sexual objects who are primarily valued for their appearance or sexuality. These objectifying experiences are theorized to evoke concerns about how their bodies are being judged by others and promotes body surveillance, the routine monitoring of how one appears from an outsider's viewpoint, which can lead to increased body image disturbances as people start to detect or imagine flaws in their appearance (Fredrickson & Roberts, 1997; Moradi, 2010; Schaefer & Thompson, 2018).

Objectification theory can shed light on several pathways that might place sexual minorities at differential risk of poorer body image outcomes. As objectification theory was originally developed, in part, to understand the cultural practices that may account for elevated rates of body image disturbance and disordered eating among women, this theory particularly considers the impact of being the recipient of the sexualized male gaze. People who are placed within the male gaze are predicted to experience the highest levels of body surveillance and poorest body image outcomes. Given this, people who are routinely targeted by the male gaze from heterosexual, gay, and bisexual men, such as heterosexual women and some subgroups of sexual minority men and women (e.g., gay men, bisexual men and women), may be most vulnerable to the male gaze and its theorized negative effects. It is also possible that other groups are impacted. For example, some heterosexual men may perceive that gay and bisexual men are sexually objectifying them. Yet, in some past research, gay men report feeling judged based on their appearance and thinking about their appearance more often throughout the day than heterosexual men (Frederick & Essayli, 2016). Of note, patterns within the current dataset (Frederick, Pila, et al., 2022) were more mixed. Although gay men reported greater surveillance than heterosexual men, bisexual men did not differ from heterosexual men.

Lesbian women in the current dataset reported lower surveillance and bisexual women reported slightly higher surveillance than heterosexual women. Looking at other research, lesbian women reported lower surveillance than heterosexual women in one study (Engeln-Maddox et al., 2011), but the reverse was found in another study (Kozee & Tylka, 2006). Thus, findings examining how levels of body surveillance vary across sexual orientation and gender appear to be somewhat mixed, suggesting the need for continued work in this area.

1.1.3. Associations of tripartite and objectification constructs to body satisfaction across sexual orientations—

Observed differences in experiences of body satisfaction, objectification processes, and sociocultural influences across sexual orientation groups for men – and in some cases for women – highlight the importance of examining how sexual orientation moderates the associations between these constructs. Although a growing body of research has supported the usefulness of explanatory models of body image grounded in sociocultural theory (Girard, Chabrol, & Rodgers, 2018; Rodgers, Chabrol, & Paxton, 2011; van den Berg, Thompson, Obremski-Brandon, & Coovert, 2002; Yamamiya, Shroff, & Thompson, 2008), very few integrated models of body image have been tested across different sexual orientation groups of men or women.

One study examining elements of the tripartite influence model across sexual orientation groups among women found that appearance pressures and thin-ideal internalization were more strongly associated with body image concerns among bisexual women compared to lesbian and heterosexual women (Hazzard et al., 2019), while another study found that thin-ideal internalization was more strongly related to weight satisfaction for lesbian or bisexual women than for heterosexual women (Huxley et al., 2015). Among men, although models of body image grounded within the tripartite influence framework have been supported separately among heterosexual (Girard et al., 2018; Tylka, 2011) and sexual minority men (Tylka & Andorka, 2012), little work has examined the ways in which these models may vary across sexual orientation groups. However, as several studies have indicated that gay men reported greater effects of media on their body image than heterosexual men (Austin et al., 2004; Carper et al., 2010; McArdle & Hill, 2009), there is reason to believe that appearance pressures may more negatively impact certain sexual orientation subgroups than others.

Although separate studies have demonstrated support for objectification theory among heterosexual (Davids, Watson, & Gere, 2019; Mitchell & Mazzeo, 2009; Moradi, 2010; Tylka & Hill, 2004) and sexual minority groups (Brewster et al., 2014; Wiseman & Moradi, 2010), research comparing model pathways across sexual orientation groups among both men and women is scarce. However, one study found that body surveillance was significantly related to poorer body image in heterosexual women, lesbian women, and gay men, but not heterosexual men (Engeln-Maddox et al., 2011). These findings suggest that this pathway from surveillance may emerge from the increased risk associated with being in the male gaze, but further investigation is clearly needed.

1.3. Aims and hypotheses

In sum, there is a paucity of research evaluating theoretical models of body image grounded in the tripartite and objectification frameworks across sexual orientation groups, and existing studies are inconclusive. The current study tested an integrated model of body image across a large sample of heterosexual, bisexual, and gay/lesbian men and women. The proposed model built upon well- supported sociocultural models of body image (Rodgers et al., 2011; van den Berg et al., 2002; Yamamiya et al., 2008) and included pressures from the media, peers, and family members as predictors of the internalization of appearance ideals. Given the rising importance of muscularity as a valued dimension of appearance across all genders (Duggan & McCreary, 2004; Rodgers et al., 2018), both thinness-related internalization and muscularity-related internalization were included. In addition, internalization of appearance ideals was proposed to contribute to body surveillance, consistent with integrated sociocultural models of body image and eating disturbance (Fitzsimmons-Craft, 2011).

Two different body image dimensions were included as outcomes in the proposed model. The first, appearance satisfaction, represents an evaluative component of body image, similar to the body dissatisfaction construct frequently included in sociocultural models (van den Berg et al., 2002). The second was body image quality of life, which has been emerging as an important body-image related construct to assess, given its relevance in

terms of general well-being and functioning (Cash & Fleming, 2002). Body image quality of life assesses people's perceptions of the positive and negative impacts that a person's body image has on their self-experiences and different life contexts. Given previous work has documented direct relationships, as well as indirect ones, between appearance pressures from various sources and body image outcomes (Hazzard et al., 2019; van den Berg et al., 2002), our proposed model also included direct paths from media and family pressures to the body image outcome variables. Direct paths from peer pressures to body image outcomes were not expected because prior analyses with this dataset for men and women overall, and across different weight (BMI) groupings, did not reveal these paths (Frederick, Tylka, Rodgers, Pennesi, et al., 2022; Frederick, Tylka, Rodgers, Convertino, et al., 2022).

Based on the predictions of sociocultural and objectification theories and the previous work described above, the following hypotheses were formulated:

1.3.1. Hypothesis 1: variations in associations among men—

We expected that among men, the models predicting body image outcomes would vary across sexual orientation groups (heterosexual, bisexual, and gay), with relationships tending to be weakest among heterosexual men.

1.3.2. Hypothesis 2: variations in associations among women—

We expected that among women, the models predicting body image outcomes would vary across sexual orientation groups (heterosexual, bisexual, and lesbian), with relationships tending to be weakest among lesbian women.

2. Method

2.1. Participants

Data were drawn from the U.S. Body Project I, described below in the Procedure section. The sample was restricted to include only participants who completed the full survey and who fit the following criteria: (a) reported currently living in the United States; (b) completed all key body image items; (c) were aged 18–65; (d) had body mass indexes (BMI) ranging from 14.50 to 50.50 based on self-reported height and weight. Data were collected in 2016, and only Mechanical Turk participants with greater than 95% HIT approval rate were allowed to complete the survey. To check attentiveness, we used various methods such as exploring the consistency of participant answers to reverse-coded items with positive-coded items within scales. The high internal consistency reliability estimates for each of our scales, and the expected strengths of variable correlations also provide evidence that participants were engaged when completing the measures and that the data are trustworthy. Age and BMI restrictions were placed on the sample to prevent outliers or mis-entered values from having undue influence on the effect size estimates. A total of 13,518 people clicked on the survey, 12,571 answered the first question, and 12,151 completed the full survey. An additional 531 participants were excluded because they had BMIs below 14.5 or above 50.50, were younger than 18 or older than age 65, and/or were not currently living in the United States. After applying the inclusion criteria, this created the base dataset for The U.S. Body Project I of 11,620 participants. For more detailed demographics and a

discussion of how the current sample compares to nationally representative datasets, please see Frederick and (Frederick, Crerand, et al., 2022).

We then further restricted the sample to include only participants who self-identified as heterosexual, bisexual, gay, or lesbian. Only these participants were included because they were the only sexual orientation groups that met or came very close to meeting the suggested minimum sample size of 200 for structural equation modeling (SEM; Kelloway, 2015). As a result, 9 men and 47 women identifying as asexual and 27 men and 74 women identifying with other sexual orientation labels were excluded from the present analyses. After applying this additional inclusion criteria, the analytic sample was comprised of 5257 men and 6206 women for a total of 11,463 participants. Key demographic characteristics of the sample are shown in Table 1.

2.2. Procedure and overview of the U.S. Body Project I

The first author's university institutional review board approved the study. Adult participants were recruited via Amazon Mechanical Turk, a widely used online panel system used by researchers to access adult populations (Berinsky, Huber, & Lenz, 2012; Buhrmester, Kwang, & Gosling, 2011, Kees Berry, Burton, & Sheehan, 2017; Paolacci, Chandler, & Ipeirotis, 2010; Robinson Rosenzweig, Moss, & Litman, 2019). Participants were paid 51 cents for taking the survey. The survey was advertised with the title "Personal Attitudes Survey" and the description explained that "We are measuring personal attitudes and beliefs. The survey will take roughly 10–15 min to complete." The general wording of the advertisement was used to avoid selectively recruiting people particularly interested in body image. After clicking on the advertisement, the participants read a consent form providing more details about the content of the study, including that it would contain items related to sex, love, work, and appearance. They were then given the option to continue with the survey or exit.

After providing informed consent, participants completed the numerical textbox questions (e.g., hours per week worked, number of times in love, sex frequency per week, longest relationship), followed by appearance evaluation (Cash, 2000), measures of sociocultural appearance concerns (Schaefer et al., 2015), face satisfaction (Frederick, Kelly, et al., 2016), overweight preoccupation (Cash, 2000), body image quality of life (Cash & Fleming, 2002), body surveillance (McKinley & Hyde, 1996), and finally demographics.

This manuscript is part of a series of papers emerging from The U.S. Body Project I. This project invited over twenty body image and eating disorder researchers, four sexuality researchers, and six computational scientists to apply their content and data-analytic expertise to the dataset. This project resulted in the following set of 11 papers for this special issue. The first two papers examine how demographic factors (gender, sexual orientation, BMI, age, race) are related to body satisfaction and overweight preoccupation (Frederick, Crerand, et al., 2022) and to measures derived from objectification theory and the tripartite influence model, including body surveillance, thin-ideal and muscular/athletic ideal internalization, and perceived peer, family, and media pressures (Frederick, Pila, et al., 2022). The second set of papers examine how these measures and demographic factors

predict sexuality-related body image (Frederick, Gordon, et al., 2022) and face satisfaction (Frederick, Reynolds, et al., 2022).

The third set of papers use structural equation modelling to examine the links between sociocultural appearance concerns and body satisfaction among women and across BMI groups (Frederick, Tylka, Rodgers, Pennesi, et al., 2022), among men and across different BMI groups (Frederick, Tylka, Rodgers, Convertino, et al., 2022), across ethnic groups (Frederick, Schaefer, et al., 2022) and across sexual orientations (current paper).

The fourth set of papers focus on measurement issues by examining measurement invariance of the scales across different demographic groups (Hazzard, Schaefer, Thompson, Rodgers, & Frederick, 2022) and conducting a psychometric evaluation of an abbreviated version of the Body Image Quality of Life Inventory (Hazzard, Schaefer, Thompson, Murray, & Frederick, 2022). Finally, the last paper uses machine learning modeling to compare the effectiveness of nonlinear machine learning models versus linear regression for predicting body image outcomes (Liang et al., 2022).

2.3. Measures

For all of the scales described below, the factor structures for the scales show measurement invariance across genders and sexual orientation in the current dataset (Frederick, Hazzard, Schaefer, & Thompson et al. 2022).

2.3.1. SOCIOCULTURAL ATTITUDES TOWARDS APPEARANCE QUESTIONNAIRE-4—

Participants completed the Sociocultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4; Schaefer et al., 2015), which measures appearance pressures and appearance ideal internalization. This measure contains five subscales assessing perceived appearance pressures from family, peers, and media, as well as internalization of the thin ideal and muscular ideal. An example of an appearance pressure item was “I feel pressure from the media to look in better shape.” The thin-ideal internalization subscale consists of five items (e.g., “I want my body to look very thin”) but one item was inadvertently omitted (“I want my body to look like it has little fat”), leading us to utilize the remaining four items among women. In a separate sample of 819 men and women, the 4- and 5- item versions of the scale were strongly correlated with one another, at $r = 0.985$, $p < .001$.

However, given that men may desire to have low body fat but do not typically endorse wanting to be thin (Ridgeway & Tylka, 2005), we used one item assessing desire for leanness (“I want my body to look very lean”) and one item assessing desire for low body fat (“I think a lot about having very little body fat”) to estimate lean-ideal internalization instead of thin-ideal internalization among men. While the muscular/athletic ideal internalization subscale includes five items, three items are cognitive (e.g., “It is important for me to look athletic,” “I think a lot about looking muscular,” and “I think a lot about looking athletic”) and two are behavioral (“I spend a lot of time doing things to look more muscular,” “I spend a lot of time doing things to look more athletic”). To be consistent with the thin- ideal internalization measure that assesses only cognitive aspects of this internalization, we selected only the three cognitive items from the muscular-ideal

internalization measure. Responses were recorded on a 5-point Likert scale (1 = *Definitely Disagree*; 5 = *Definitely Agree*). Higher subscale scores indicate greater levels of perceived pressures or internalization. Cronbach's α was.70–0.96 for all subscales in all sexual orientation groups among men, and α was.87–0.97 for all subscales in all sexual orientation groups among women. Each of the four family appearance items individually loaded onto the "Family Appearance Pressures" latent variable, each of the four peer appearance items individually loaded onto the "Peer Appearance Pressures" latent variable, and each of the four media appearance items individually loaded onto the "Media Appearance Pressures" latent variable. For women, each of the four thin-ideal internalization items individually loaded onto the "Thin-Ideal Internalization" latent variable; for men, each of the two lean-ideal internalization items individually loaded onto the "Lean-Ideal Internalization" latent variable. For both women and men, each of the three cognitive muscular-ideal internalization items individually loaded onto the "Muscular-Ideal Internalization" latent variable.

2.3.2. Objectified Body Consciousness Scale - Body Surveillance Subscale

—Participants completed the 8-item Surveillance subscale of the Objectified Body Consciousness Scale (OBCS-Surveillance; McKinley & Hyde, 1996), which assesses the extent to which people monitor how they appear to others (e.g., "During the day, I think about how I look many times"). Responses were recorded on a 7-point Likert scale with response options ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*), where higher scores indicate greater levels of surveillance; α = 0.84–0.89 in all sexual orientation groups among men, and α = 0.86–89 in all sexual orientation groups among women. Each of the eight body surveillance items individually loaded onto the "Body Surveillance" latent variable.

2.3.3. MULTIDIMENSIONAL BODY-SELF RELATIONS QUESTIONNAIRE - APPEARANCE EVALUATION SUBSCALE

—Appearance satisfaction was assessed with the 7-item Appearance Evaluation subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRQ-Appearance Evaluation; Brown, Cash, & Mikulka, 1990; Cash, 2000), which measures feelings of physical attractiveness and satisfaction with one's appearance (e.g., "I like my looks just the way they are"). Responses were recorded on a 5-point Likert scale with response options ranging from 1 (*Definitely Disagree*) to 5 (*Definitely Agree*), where higher scores indicate more positive evaluations of appearance; α = 0.93 in all sexual orientation groups among men, and α = 0.93 in all sexual orientation groups among women. Each of the seven appearance satisfaction items individually loaded onto the "Appearance Satisfaction" latent variable.

2.3.4. BODY IMAGE QUALITY OF LIFE INVENTORY

—Participants completed the 19-item Body Image Quality of Life Inventory (BIQLI; Cash & Fleming, 2002), which assesses participant's beliefs about how their bodies affect their lives. Participants indicated whether their feelings about their bodies had positive, negative, or no effects on various aspects of their lives (e.g., "My day-to-day emotions," "How confident I feel in my everyday life," and "How happy I feel in my everyday life."). Participants responded on a 7-point Likert scale (1 = *Very Negative Effect*, 2 = *Moderate Negative Effect*, 3 = *Slight Negative*

Effect, 4 = *No Effect*, 5 = *Slight Positive Effect*, 6 = *Moderate Positive Effect*, 7 = *Very Positive Effect*), where higher scores represent more positive perceived effects of body image on quality of life. Due to small numbers endorsing very negative and very positive effects among some sexual minority groups, responses were collapsed to 1 = *Moderate or Very Negative Effect*, 2 = *Slight Negative Effect*, 3 = *No Effect*, 4 = *Slight Positive Effect*, 5 = *Moderate or Very Positive Effect*; α = 0.96 in all sexual orientation groups among men, and α = 0.95–96 in all sexual orientation groups among women. Each of the 19 body image quality of life items individually loaded onto the "Body Image Quality of Life" latent variable.

2.3.5. Sexual orientation identity—Participants self-reported their sexual orientation identity based on the following question: "[Sexual Orientation (select one):]" with the options "Heterosexual," "Gay/Lesbian," "Bisexual," or "Other (please specify)."

2.3.6. Other demographics—Participants self-reported their sex, age, race from a long list of options which for this paper were collapsed into categories (White, Black, Hispanic, Asian, Other), height in feet and inches, and weight in pounds. BMI was calculated using the self-reported height and weight data.

2.4. Data analysis

Descriptive statistics and internal consistency were computed with SPSS 25. We examined the skewness and kurtosis of every individual item in the dataset. The vast majority of variables had values with +/− 1.0, and all were within +/− 1.6, indicating general univariate normality. Looking at that the aggregated scales (e.g., the four-item peer pressure scale), all values were within +/− 1.0, with the exception of kurtosis for media pressure (−1.27).

Latent variable SEM was conducted using Mplus 8.3. As the sample contained only participants that completed the full survey, there were no missing data. Estimation via weighted least squares with mean and variance adjustment (WLSMV) was used for SEM as has been recommended for ordinal data (Brown, 2015), and the Mplus DIFFTEST procedure (the χ^2 difference test for WLSMV estimation) was used to compare nested models.

Multi-group SEM was used to test for sexual orientation differences in models predicting appearance satisfaction and body image quality of life previously identified for women (Frederick, Tylka, Rodgers, Pennesi, et al., 2022) and men (Frederick, Tylka, Rodgers, Convertino, et al., 2022) in the U.S. Body Project I. Adequacy of model fit was judged by the following fit indices: comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root-mean square residual (SRMR). Values ≥ 0.95 for CFI, ≤ 0.06 for RMSEA, and ≤ 0.08 for SRMR indicate good model fit (Hu & Bentler, 1999). Values of.90 or higher for CFI, up to.10 for RMSEA, and up to.10 for SRMR indicate acceptable but mediocre model fit (Bentler, 1990; Browne & Cudeck, 1993; Hu & Bentler, 1995; MacCallum, Browne, & Sugawara, 1996; Schermelleh-Engel & Müller, 2003). Models were deemed to have adequate fit if most fit indices examined (i.e., at least two out of three) suggested acceptable fit, given evidence that individual fit indices and their associated cutoffs vary as a function of numerous factors (e.g., sample size, degrees of freedom, factor loadings; Brown, 2015).

Following examination of the measurement models in men and women, structural models were examined. In the first step, all structural paths were free to vary for each sexual orientation group (fully variant model). Then, all structural paths were constrained across sexual orientation groups (fully invariant model). A chi-square difference test between the fully variant and fully invariant models was used to determine whether at least one pathway differed by sexual orientation. Chi-square difference tests were then used to compare the fully invariant model with models that relaxed one pathway at a time for all sexual orientation groups. For pathways that differed by sexual orientation at a significance level of.05, chi-square difference tests were used to compare fully invariant models with models that relaxed those pathways one at a time for heterosexual versus bisexual, bisexual versus gay/lesbian, and heterosexual versus gay/lesbian participants. Significance thresholds were corrected for multiple comparisons using False Discovery Rate (FDR) procedures (Benjamini & Hochberg, 1995) with an FDR of Q = 0.10; all results with *p*'s < 0.05 retained significance with this correction.

3. Results

3.1. Measurement models

The measurement models provided adequate fit to the data among men (CFI = 0.938, RMSEA = 0.076 with 90% *CI* = 0.075–0.077, SRMR = 0.056), $\chi^2(1196, N = 5257) = 37{,}617.08$, $p < .001$, and women (CFI = 0.948, RMSEA = 0.080 with 90% *CI* =0.080–0.081, SRMR = 0.054), $\chi^2(1297, N = 6206) = 53{,}013.68$, $p < .001$. In men, item factor loadings were all significant (all *p*'s < 0.001) and ranged from.82 to.94 for the family pressure latent variable,.90 to.93 for the peer pressure latent variable,.95 to.96 for the media pressure latent variable,.66 to.94 for the lean-ideal internalization latent variable,.83 to.92 for the muscular-ideal internalization variable,.57 to.82 for the body surveillance latent variable,.80 to.89 for the appearance satisfaction latent variable, and.69 to.91 for the body image quality of life latent variable. In women, item factor loadings were all significant (all *p*s < 0.001) and ranged from.84 to.95 for the family pressure latent variable,.90 to.95 for the peer pressure latent variable,.96 to.97 for the media pressure latent variable,.76 to.98 for the thin-ideal internalization latent variable,.83 to.97 for the muscular- ideal internalization variable,.47 to.87 for the body surveillance latent variable,.80 to.89 for the appearance satisfaction latent variable, and.67 to.93 for the body image quality of life latent variable.

3.2. Structural models

3.2.1. Appearance satisfaction model among men—Among men, the fully variant structural model predicting appearance satisfaction demonstrated adequate fit (CFI = 0.960, RMSEA = 0.075 with 90% *CI* = 0.074–0.076, SRMR = 0.067) and significantly better fit than the fully invariant model, $\Delta\chi^2(26, N = 5257) = 98.12$, $p < .001$, indicating that at least one path differed in strength between sexual orientation groups. Fig. 1 presents standardized path estimates for each sexual orientation group from the fully variant model predicting appearance satisfaction among men. Nine paths differed by sexual orientation; these paths are bolded in Fig. 1, and the sexual orientation differences observed for each of these paths are described below.

3.2.1.1. Sexual orientation differences in paths to internalization of appearance ideals.: Differences by sexual orientation were observed for paths from family appearance pressures to lean-ideal internalization, $\Delta\chi^2(2, N = 5257) = 22.65$, $p < .001$, peer appearance pressures to lean-ideal internalization, $\Delta\chi^2(2, N = 5257) = 17.68$, $p < .001$, and media appearance pressures to lean-ideal internalization, $\Delta\chi^2(2, N = 5257) = 21.27$, $p < .001$. The path from family appearance pressures to lean-ideal internalization differed significantly for bisexual men compared to heterosexual men, $\Delta\chi^2(1, N = 5063) = 33.44$, $p < .001$, and gay men, $\Delta\chi^2(1, N = 388) = 9.75$, $p = .002$, such that a non-significant positive association was observed for gay men, whereas a non-significant negative association was observed for gay men and a significant negative association for heterosexual men. Paths from peer and media appearance pressures to lean-ideal internalization were stronger for bisexual men compared to heterosexual men, $\Delta\chi^2_{peer}(1, N = 5063) = 38.00$, $p < .001$, $\Delta\chi^2_{media}(1, N = 5063) = 23.20$, $p < .001$, and gay men, $\Delta\chi^2_{peer}(1, N = 388) = 8.41$, $p = .004$, $\Delta\chi^2_{media}(1, N = 388) = 8.27$, $p = .004$.

Differences by sexual orientation were also observed for paths from peer appearance pressures to muscular-ideal internalization, $\Delta\chi^2(2, N = 5257) = 32.61$, $p < .001$, and media appearance pressures to muscular-ideal internalization, $\Delta\chi^2(2, N = 5257) = 27.79$, $p < .001$. Compared to heterosexual men, the path from peer appearance pressures to muscular-ideal internalization was stronger for both bisexual men, $\Delta\chi^2(1, N = 5063) = 21.38$, $p < .001$, and gay men, $\Delta\chi^2(1, N = 5063) = 12.80$, $p < .001$. The path from media appearance pressures to muscular-ideal internalization was stronger for bisexual men than heterosexual men, $\Delta\chi^2(1, N = 5063) = 21.39$, $p < .001$, and weaker for gay men than heterosexual men, $\Delta\chi^2(1, N = 5063) = 5.92$, $p = .02$.

3.2.1.2. Sexual orientation differences in paths to appearance satisfaction.: Differences by sexual orientation were observed for paths from media appearance pressures to appearance satisfaction, $\Delta\chi^2(2, N = 5257) = 16.87$, $p < .001$, lean-ideal internalization to appearance satisfaction, $\Delta\chi^2(2, N = 5257) = 11.28$, $p = .004$, muscular-ideal internalization to appearance satisfaction, $\Delta\chi^2(2, N = 5257) = 8.71$, $p = .01$, and body surveillance to appearance satisfaction, $\Delta\chi^2(2, N = 5257) = 7.49$, $p = .02$. These paths were stronger for heterosexual men than bisexual men, $\Delta\chi^2_{media}(1, N = 5063) = 15.83$, $p < .001$, $\Delta\chi^2_{lean\text{-}ideal}(1, N = 5063) = 10.41$, $p = .001$, $\Delta\chi^2_{muscular\text{-}ideal}(1, N = 5063) = 7.67$, $p = .006$, $\Delta\chi^2_{surveillance}(1, N = 5063) = 8.13$, $p = .004$.

3.2.2. Body image quality of life model among men—Among men, the fully variant structural model predicting body image quality of life demonstrated adequate fit (CFI = 0.953, RMSEA = 0.068 with 90% *CI* =0.067–0.069, SRMR =0.067) and significantly better fit than the fully invariant model, $\Delta\chi^2(26, N = 5257) = 68.63$, $p < .001$, indicating that at least one path differed in strength between sexual orientation groups. Fig. 2 presents standardized path estimates for each sexual orientation group from the fully variant model predicting body image quality of life among men. Eight paths differed by sexual orientation; these paths are bolded in Fig. 2, and the sexual orientation differences observed for each of these paths are described below.

3.2.2.1. Sexual orientation differences in paths to internalization of appearance ideals.: Differences by sexual orientation were observed for paths from family appearance pressures to lean-ideal internalization, $\Delta\chi^2(2, N = 5257) = 23.09$, $p < .001$, peer appearance pressures to lean-ideal internalization, $\Delta\chi^2(2, N = 5257) = 19.83$, $p < .001$, and media appearance pressures to lean-ideal internalization, $\Delta\chi^2(2, N = 5257) = 16.17$, $p < .001$. The path from family appearance pressures to lean-ideal internalization was significantly weaker for bisexual men compared to heterosexual men, $\Delta\chi^2(1, N = 5063) = 31.07$, $p < .001$, and gay men, $\Delta\chi^2(1, N = 388) = 7.34$, $p = .007$, whereas paths from peer and media appearance pressures to lean-ideal internalization were significantly stronger for bisexual men compared to heterosexual men, $\Delta\chi^2_{peer}(1, N = 5063) = 44.78$, $p < .001$, $\Delta\chi^2_{media}(1, N = 5063) = 14.62$, $p < .001$, and gay men, $\Delta\chi^2_{peer}(1, N = 388) = 9.29$, $p = .002$, $\Delta\chi^2_{media}(1, N = 388) = 6.52$, $p = .01$.

Differences by sexual orientation were also observed for paths from peer appearance pressures to muscular-ideal internalization, $\Delta\chi^2(2, N = 5257) = 34.54$, $p < .001$, and media appearance pressures to muscular-ideal internalization, $\Delta\chi^2(2, N = 5257) = 16.99$, $p < .001$. Compared to heterosexual men, the path from peer appearance pressures to muscular-ideal internalization was stronger for both bisexual men, $\Delta\chi^2(1, N = 5063) = 29.64$, $p < .001$, and gay men, $\Delta\chi^2(1, N = 5063) = 13.34$, $p < .001$. The path from media appearance pressures to muscular-ideal internalization was stronger for bisexual men than heterosexual men, $\Delta\chi^2(1, N = 5063) = 10.78$, $p = .001$, and weaker for gay men than heterosexual men, $\Delta\chi^2(1, N = 5063) = 6.76$, $p = .009$.

3.2.2.2. Sexual orientation differences in paths to body image quality of life.: Differences by sexual orientation were observed for paths from family appearance pressures to body image quality of life, $\Delta\chi^2(2, N = 5257) = 6.46$, $p = .04$, media appearance pressures to body image quality of life, $\Delta\chi^2(2, N = 5257) = 7.87$, $p = .02$, and lean-ideal internalization to body image quality of life, $\Delta\chi^2(2, N = 5257) = 7.79$, $p = .02$. These paths were stronger for heterosexual men than bisexual men, $\Delta\chi^2_{family}(1, N = 5063) = 3.94$, $p = .047$, $\Delta\chi^2_{media}(1, N = 5063) = 7.52$, $p = .006$, $\Delta\chi^2_{lean\text{-}ideal}(1, N = 5063) = 7.07$, $p = .008$.

3.2.3. Appearance satisfaction model among women—Among women, the fully variant structural model predicting appearance satisfaction demonstrated adequate fit (CFI =0.981, RMSEA =0.065 with 90% *CI*=0.064–0.066, SRMR =0.055) and significantly better fit than the fully invariant model, $\Delta\chi^2$ (26, $N = 6206$) = 55.36, $p < .001$, indicating that at least one path differed in strength between sexual orientation groups. Fig. 3 presents standardized path estimates for each sexual orientation group from the fully variant model predicting appearance satisfaction among women. Six paths differed by sexual orientation; these paths are bolded in Fig. 3, and the sexual orientation differences observed for each of these paths are described below.

3.2.3.1. Sexual orientation differences in paths to internalization of appearance ideals.: Paths from family appearance pressures to thin-ideal internalization, $\Delta\chi^2(2, N = 6206) = 11.50$, $p = .003$, and from peer appearance pressures to thin-ideal internalization, $\Delta\chi^2(2, N = 6206) = 9.28$, $p = .01$, differed by sexual orientation. Both of these paths were

stronger for bisexual women than heterosexual women, $\Delta\chi^2_{family}(1, N = 5993) = 10.59$, $p = .001$, $\Delta\chi^2_{peer}(1, N = 5993) = 8.65$, $p = .003$.

3.2.3.2. Sexual orientation differences in paths to appearance satisfaction.: Differences by sexual orientation were observed for paths from family appearance pressures to appearance satisfaction, $\Delta\chi^2(2, N = 6206) = 6.27$, $p = .04$, media appearance pressures to appearance satisfaction, $\Delta\chi^2(2, N = 6206) = 6.90$, $p = .03$, thin-ideal internalization to appearance satisfaction, $\Delta\chi^2(2, N = 6206) = 10.97$, $p = .004$, and from body surveillance to appearance satisfaction, $\Delta\chi^2(2, N = 6206) = 9.39$, $p = .009$. The direct path from family appearance pressures to appearance satisfaction was stronger for heterosexual women than bisexual women, $\Delta\chi^2(1, N = 5993) = 4.33$, $p = .04$. Compared to lesbian women, the direct path from media appearance pressures to appearance satisfaction was stronger for both heterosexual women, $\Delta\chi^2(1, N = 5608) = 7.00$, $p = .008$, and bisexual women, $\Delta\chi^2(1, N = 811) = 4.00$, $p = .046$. Finally, paths from thin-ideal internalization to appearance satisfaction and from body surveillance to appearance satisfaction were both stronger for bisexual women than heterosexual women, $\Delta\chi^2_{thin\text{-}ideal}(1, N = 5993) = 10.01$, $p = .002$, $\Delta\chi^2_{surveillance}(1, N = 5993) = 9.43$, $p = .002$.

3.2.4. Body image quality of life model among women—Among women, the fully variant structural model predicting body image quality of life demonstrated adequate fit (CFI = 0.966, RMSEA = 0.069 with 90% *CI* = 0.069–0.070, SRMR = 0.063) and significantly better fit than the fully invariant model, $\Delta\chi^2(20, N = 6206) = 51.51$, $p < .001$, indicating that at least one path differed in strength between sexual orientation groups. Fig. 4 presents standardized path estimates for each sexual orientation group from the fully variant model predicting body image quality of life among women. Five paths differed by sexual orientation; these paths are bolded in Fig. 4, and the sexual orientation differences observed for each of these paths are described below.

3.2.4.1. Sexual orientation differences in paths to internalization of appearance ideals.: Paths from family appearance pressures to thin-ideal internalization, $\Delta\chi^2(2, N = 6206) = 11.00$, $p = .004$, and from peer appearance pressures to thin-ideal internalization, $\Delta\chi^2(2, N = 6206) = 8.12$, $p = .02$, differed by sexual orientation. The path from family appearance pressures to thin-ideal internalization was stronger for bisexual women than heterosexual women, $\Delta\chi^2(1, N = 5993) = 10.08$, $p = .002$, while the path from peer appearance pressures to thin-ideal internalization was slightly stronger for heterosexual women than for bisexual women, $\Delta\chi^2(1, N = 5993) = 7.82$, $p = .005$.

3.2.4.2. Sexual orientation differences in paths to body surveillance.: The path from thin-ideal internalization to body surveillance differed by sexual orientation, $\Delta\chi^2(2, N = 6206) = 6.41$, $p = .04$, such that the path was significantly stronger for bisexual women than heterosexual women, $\Delta\chi^2(1, N = 5993) = 6.35$, $p = .01$.

3.2.4.3. Sexual orientation differences in paths to body image quality of life.: Direct paths from family appearance pressures to body image quality of life, $\Delta\chi^2(2, N = 6206) = 7.97$, $p = .02$, and from media appearance pressures to body image quality of life, $\Delta\chi^2(2, N = 6206) = 13.96$, $p < .001$, also differed by sexual orientation. The path from

family appearance pressures to body image quality of life was stronger for heterosexual women than bisexual women, $\Delta\chi^2(1, N = 5993) = 5.16$, $p = .02$, and the path from media appearance pressures to body image quality of life was significantly different for both heterosexual women, $\Delta\chi^2(1, N = 5608) = 15.31$, $p < .001$, and bisexual women, $\Delta\chi^2(1, N = 811) = 6.30$, $p = .01$, compared to lesbian women, such that significant inverse associations were observed for heterosexual and bisexual women, while a non-significant positive association was observed for lesbian women.

4. Discussion

4.1. Overview of findings

4.1.1. Overall patterns—The present study examined differences across sexual orientations in an integrated sociocultural model of body image. Overall, the proposed models predicting appearance satisfaction and body image quality of life provided satisfactory fits to the data among both men and women. This aligned with prior research grounded in the tripartite influence model and objectification theory demonstrating these well-established pathways to body image (Davids et al., 2019; Girard et al., 2018; Rodgers et al., 2011; Tylka & Andorka, 2012; Tylka & Hill, 2004; van den Berg et al., 2002). Results indicated important similarities and differences in the relationships between sociocultural factors and body image constructs examined across men and women with different sexual orientations.

As hypothesized, our findings confirmed that the strength of the variable pathways varied according to sexual orientation, suggesting that the influence of sociocultural pressures on aspects of body image might be related to a person's sexual orientation. Furthermore, almost all of the statistically significant pathways between variables had effect sizes that exceeded $\beta = 0.10$. In all models, for all sexual orientation groups, the pathways from muscular-ideal and lean-ideal internalization to body surveillance exceeded $\beta = 0.20$ for men, and the thin-ideal internalization to surveillance path exceeded $\beta = 0.20$ for women. The paths from body surveillance to appearance satisfaction and body image quality of life exceeded $\beta = 0.20$ for men and women. In terms of sociocultural appearance pressures, peer pressure was the one variable that was linked to thin-ideal internalization and muscular-ideal internalization at the $\beta = 0.20$ threshold for men and women. These effect sizes suggest the importance of investigating these associations further as potential targets for interventions.

Somewhat counter to our hypotheses that relationships between constructs would be weakest among heterosexual men and lesbian women, the majority of differences observed were between heterosexual and bisexual groups in both men and women. Few differences were observed for gay or lesbian groups. Broadly, differential patterns by sexual orientation observed in men versus women suggested that peer and media appearance pressures were internalized to a greater extent among bisexual men than heterosexual men, while family appearance pressures were internalized to a greater extent among bisexual women than heterosexual women. As very few sociocultural models of body image have previously been tested across different sexual orientation groups among men or women, the results of this study advance our understanding of how sociocultural factors may differentially relate to body image according to sexual orientation. These findings highlight a need

for research exploring the ways that bisexual individuals in particular may be made vulnerable by sociocultural influences, which may include bisexual-specific experiences such as anti-bisexual stereotypes and stigma (Dodge et al. 2016). A more detailed summary and interpretation of results is provided below.

4.1.2. Key patterns for men—Many of the pathways did not vary by sexual orientation among men. For example, patterns were similar for pathways from family pressure and appearance satisfaction, media pressure and body surveillance, muscular- and lean-ideal internalization with body surveillance, muscular-ideal internalization and body image quality of life, body surveillance and body image quality of life. One conclusion from these findings is that many of the factors shaping body image are shared among men, regardless of sexual orientation. For example, experiencing high media pressures could equally negative effects on all groups of men. This does not mean, however, that gay men and heterosexual men have the same experiences with media. Gay men might be more influenced by certain types of media and content (e.g., social media featuring sexualized male bodies), whereas heterosexual men might be more influenced by other types of media and content (e.g., mainstream media). For example, in qualitative studies, some gay and bisexual men emphasize how objectification is extensive on dating apps such as Grindr (Tran et al., 2020), whereas heterosexual men may face less objectification on dating apps. Understanding variation in the experiences underlying the constructs in these pathways is important, even if the pathways themselves do not differ significantly by sexual orientation.

In contrast with our hypotheses, there were many pathways where heterosexual men did not show the weakest relationships compared to gay and bisexual men. For example, heterosexual men did not demonstrate the weakest pathways for media pressure and muscular-ideal internalization, family pressure and body image quality of life, media pressure and appearance satisfaction, muscular-ideal internalization and appearance satisfaction, or body surveillance and appearance satisfaction. Given the well-established higher rates of body dissatisfaction and disordered eating among sexual minority men (Frederick & Essayli, 2016; Murray et al., 2017), we had expected that these pathways might be stronger among these men than among heterosexual men, but they were not. One explanation for this apparent conundrum is the importance of considering the absolute levels of these sociocultural appearance concerns across each sexual orientation group, not just relative levels among men within each group. In past research, more sexual minority men than heterosexual men report sociocultural appearance concerns, such as greater media pressures (Austin et al., 2004; Carper et al., 2010; McArdle & Hill, 2009). In the current dataset, compared to heterosexual men, gay men reported greater body surveillance, thin-ideal internalization, peer pressures, media pressures, leanness cognitions, social comparison, self-objectification, and monitoring of their appearance (Frederick, Pila, et al., 2022). These sociocultural appearance concerns are frequently harmful for any man who is relatively high on them. The fact that more gay men have higher absolute levels of these concerns – as opposed to gay men being more sensitive to these concerns creating stronger links between these concerns and body dissatisfaction – could explain their greater body dissatisfaction.

One finding of note was that bisexual men demonstrated consistent internalization of appearance pressures from multiple sources. For example, the paths from peer and media appearance pressures to lean-ideal internalization were stronger for bisexual men compared to both heterosexual and gay men, while the path from media pressures to muscular-ideal internalization was stronger for bisexual men compared to heterosexual men. Additionally, the association of peer pressure to muscular-ideal internalization was stronger for bisexual men than for heterosexual men. This finding is consistent with previous research indicating sexual minority men are more susceptible to internalizing appearance ideals advertised in the media (Gigi, Bachner-Melman, & Lev-Ari, 2015). One possibility worth exploring in future research are the reasons for this stronger connection between pressures and internalizations for bisexual men. Bisexual men can face stigma and pressures from gay and heterosexual communities, providing dual sources of stresses and expectations to manage, which can influence many aspects of mental health and health behaviors (Polihronakis, Velez, & Brewste, 2021).

Finally, for all groups of men, body surveillance was linked to lower body image quality of life and lower body satisfaction. These findings reaffirm the applicability of some objectification theory constructs for understanding men's body image concerns (Brewster et al., 2014; Frederick, Forbes, Grigorian, & Jarcho, 2007; Wiseman & Moradi, 2010). Furthermore, for all groups of men, greater muscular-ideal internalization was linked to lower body image quality of life and lower appearance satisfaction. These findings reaffirm the pressures placed on men to appear formidable and athletic. Studies of heterosexual men emphasize their desires to become more muscular stems from their desires to become more attractive to potential partners, healthier, stronger, and better at sports (Frederick et al., 2007). Furthermore, muscularity is tied social conventions about masculinity and the importance of men being physical tough and athletic. While these pressures likely also apply to gay and bisexual men, these men further face social stigmas pertaining to their sexual orientation. These men are more likely to report more body dissatisfaction when they also report greater internalized homophobia (Brennan, Craig, & Thompson, 2012; Kimmel & Mahalik, 2005), and greater fear of being stigmatized (Kimmel & Mahalik, 2005).

4.1.3. Key patterns for women—Numerous pathways did not vary by sexual orientation (e.g., peer pressure and muscular-ideal internalization, media pressure and muscular-ideal internalization, media pressure and thin-ideal internalization, thin-and muscular-ideal internalization and body surveillance in the appearance satisfaction model, muscular-ideal internalization and appearance satisfaction, body surveillance and body image quality of life). These results highlight the utility of objectification theory and tripartite model constructs for understanding body image concerns among diverse groups, and are consistent with the proposal that sociocultural influences have a cascade of negative effects among women who identify with diverse sexual orientation groups.

Similar to the results for men, bisexual women evidenced especially elevated vulnerability to sociocultural influences in the current study. Pathways between several variables being stronger among bisexual women relative to other groups (e.g., family and peer pressure to thin-ideal internalization, thin-ideal internalization and appearance satisfaction, body surveillance and appearance satisfaction, media pressure and appearance satisfaction). These

findings are generally consistent with previous research documenting stronger relationships between peer appearance pressures, thin-ideal internalization, and body image outcomes among bisexual women compared with heterosexual women (Hazzard et al., 2019). Similar to bisexual men, bisexual women face stigma regarding the stability and validity of their identities as a form of minority stress (Meyer, 2003). They can face appearance-related pressures from male and female partners, potentially increasing and diversifying the social expectations they attempt to manage. This potentially greater sensitivity to family, peer, and media pressures among bisexual women highlights the need for continued research and interventions among bisexual women.

Past research has generally found that lesbian women report greater body satisfaction than heterosexual women, but these effect sizes are typically small, and sometimes not significant (Dahlenburg et al., 2020). This led us to hypothesize that lesbian women would demonstrate the weakest pathways compared to other groups. Although the relationships between media pressure and both body image outcomes (appearance satisfaction and body image quality of life) were weaker among lesbian women, no other significant group differences involving lesbian women emerged. This contrasts with previous research indicating that lesbian women may experience greater protection against peer appearance pressures and thin ideal internalization compared with heterosexual or bisexual peers (Hazzard et al., 2019).

We consider two possible explanations for these different patterns between peer appearance pressures and thin ideal internalization in the current dataset versus Hazzard et al. (2019). The first is that Hazzard et al. (2019) relied on an undergraduate sample, whereas the current study relied on adults. It is possible that compared to adult lesbian woman across the United States, undergraduate lesbian women are more commonly in an environment where they are surrounded by LGBTQ peers who are more supportive of their identities and gender expressions, including those related to their appearance. The second is that the models contained somewhat different variables (e.g., Hazzard et al. included dietary restraint, shape/weight overvaluation, and a different measure of body satisfaction, and did not include surveillance). It is possible that the inclusion of eating-related measures and the exclusion of surveillance modified some of the pathway strengths observed in their study versus the current study. Replicating and extending the current study by incorporating disordered eating measures along with body surveillance in college versus adult samples would help clarify the stability of these findings, and identify groups who might have buffers against the negative impacts of peer pressures.

4.2. Implications of findings

Taken together, results from the present study and previous research suggest two key patterns. First, appearance pressures seem to be internalized to a greater extent among bisexual individuals compared with heterosexual individuals, specifically with regard to media appearance pressures for men and family appearance pressures for women. A possible explanation for this pattern could be related to complexities of a bisexual identity. Many people are dismissive of bisexual identity or do not consider it a valid identity (Dodge et al. 2016); this stigmatization likely contributes to additional mental health burdens for bisexual men and women (Bostwick, 2012; Chan, Operario, & Mak, 2020; Hatzenbuehler,

2014; Hatzenbuehler & Pachankis, 2016). Notably, antibisexual stigma can be perpetrated by both heterosexual and lesbian or gay individuals or communities (Arnett, Frantell, Miles, & Fry, 2019), which can leave bisexual individuals with reduced access to social support and community resources, both of which can mitigate the effects of stigma on adverse mental health outcomes (Frost & Meyer, 2012). This stigma can also contribute to an ongoing process in which some bisexual men and women experience uncertainty about their sexual orientation (Taylor, 2017). Past research has found that feeling less certainty over one's identity or self-concept can increase susceptibility to internalization of appearance ideals (Vartanian & Dey, 2013). These experiences may be more salient on average for bisexual men and women, potentially increasing the risk of negative influence from external appearance pressures.

The second key pattern is that links between internalization of the thin-ideal, body surveillance, and lower appearance satisfaction appear to be stronger among bisexual individuals than heterosexual individuals. Given that bisexual individuals may be subject to objectification by both males and females – who may have different appearance preferences – it has been posited that bisexual individuals may experience more complex relationships regarding self-objectification (Yean et al., 2013). Additionally, Brewster et al. (2014) found bisexual-specific minority stressors (e.g., antibisexual discrimination and internalized biphobia) to be stronger predictors of body surveillance than sexual objectification experiences, suggesting that for bisexual individuals, sexual orientation-based discrimination is a more salient sociocultural factor than gender-based objectification. Thus, it may be that for bisexual individuals who have heightened awareness of how their appearance is viewed by others, experiencing pervasive bisexual stigma may intensify the links between sociocultural appearance concerns and body dissatisfaction.

4.3. Limitations and strengths

While the present study advances understanding in this important area of research, the study has limitations that must be noted. First, the sample was drawn from a non-clinical, non-probability sample of Mechanical Turk users living within the United States, and therefore results may not be generalizable to clinical populations, to the U.S. general population, or to individuals from other countries or cultures (for a more detailed discussion of how this sample compares to national samples, see Frederick, Crerand, et al., 2022). Importantly, while there are multiple dimensions of sexual orientation (i.e., attraction, behavior, identity), the present study used only identity to define sexual orientation. Additionally, while the SATAQ-4 (Schaefer et al., 2015) used in the present study measures peer appearance pressures, the revised version of this scale (SATAQ-4R; Schaefer, et al., 2017) contains separate subscales assessing appearance pressures from peers and significant others (including romantic partners). Given the demonstrated relevance of signifciant others to gay men's body image and internalizaiton of appearance ideals (Tylka & Andorka, 2012) future work using the SATAQ-4R could provide valuable information that the present study was unable to capture. The cross-sectional nature of the data precludes the ability to establish temporality or causality in the models examined. Finally, our demographics include a measure of BMI, but it is important to note that BMI can be influenced by a multitude

of factors and can be inappropriately used as is an indicator of an individual's actual health status (see, Tomiyama et al. 2016).

These identified limitations are balanced by several notable strengths. The current study takes advantage of a large, diverse community dataset collected from men and women across all 50 states. In doing so, our study was able to examine sexual minority subgroups (i.e., gay, lesbian, bisexual) separately, overcoming important limitations of previous studies. A major strength of the current project is that the heterosexual, bisexual, gay, and lesbian participants were all recruited through the same mechanism without reference to their sexual orientation, which overcomes a limitation of studies that recruit solely on the basis of sexual minority identity (e.g., through community listservs). This allowed for the rare opportunity to simultaneously examine how pathways between body image predictors and outcomes varied across sexual orientations.

4.4. Concluding comments

The present study examined sexual orientation differences among men and women in an integrated sociocultural model of body image that combined elements of the tripartite influence model and objectification theory. Results indicated important similarities and differences in the relationships between sociocultural factors and body image outcomes by sexual orientation among men and women. Notably, compared with heterosexual men and women, bisexual men and women experienced stronger links between appearance ideal internalization and body image outcomes. These findings identify bisexual men and women as particularly vulnerable to sociocultural predictors of body image, making them important groups to target for intervention.

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References

Austin SB, Ziyadeh N, Kahn JA, Camargo CA Jr., Colditz GA, & Field AE (2004). Sexual orientation, weight concerns, and eating-disordered behaviors in adolescent girls and boys. Journal of the American Academy of Child & Adolescent Psychiatry, 43, 1115–1123. 10.1097/01.chi.0000131139.93862.10 [PubMed: 15322415]

Arnett JE III, Frantell KA, Miles JR, & Fry KM (2019). Anti-bisexual discrimination as insidious trauma and impacts on mental and physical health. Psychology of Sexual Orientation and Gender Diversity, 6, 475–485. 10.1037/sgd0000344

Barlett CP, Vowels CL, & Saucier DA (2008). Meta-analyses of the effects of media images on men's body-image concerns. Journal of Social and Clinical Psychology, 27(3), 279–310. 10.1521/jscp.2008.27.3.279

Benjamini Y, & Hochberg Y.(1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. Journal of the Royal Statistical Society Series B Methodological, 57(1), 289–300.

Berinsky AJ, Huber GA, & Lenz GS (2012). Evaluating online labor markets for experimental research: Amazon.com's mechanical turk. Political Analysis, 20, 351–368. 10.1093/pan/mpr057

Bentler PM (1990). Comparative fit indexes in structural models. Psychological Bulletin, 107, 238–246. [PubMed: 2320703]

Bergeron SM, & Senn CY (1998). Body image and sociocultural norms: A comparison of heterosexual and lesbian women. Psychology of Women Quarterly, 22, 385–401. 10.1111/j.1471-6402.1998.tb00164.x

Bostwick W.(2012). Assessing bisexual stigma and mental health status: A brief report. Journal of Bisexuality, 12, 214–222. 10.1080/15299716.2012.674860 [PubMed: 24683314]

Brennan DJ, Craig SL, & Thompson DE (2012). Factors associated with a drive for muscularity among gay and bisexual men. *Culture, Health &* Sexuality, 14(1), 1–15. 10.1080/13691058.2011.619578

Brewster ME, Velez BL, Esposito J, Wong S, Geiger E, & Keum BT (2014). Moving beyond the binary with disordered eating research: A test and extension of objectification theory with bisexual women. Journal of Counseling Psychology, 61, 50–62. [PubMed: 24188653]

Brown TA (2015). Confirmatory Factor Analysis for Applied Research (second ed.). New York, NY: Guilford Press,.

Brown TA, Cash TF, & Mikulka PJ (1990). Attitudinal body image assessment: Factor analysis of the Body-Self Relations Questionnaire. Journal of Personality Assessment, 55, 135–144. 10.1080/00223891.1990.9674053 [PubMed: 2231236]

Browne MW, & Cudeck R.(1993). Alternative ways of assessing model fit. In Bollen KA, & Long JS (Eds.). Testing Structural Equation Models Newbury Park, CA: Sage. 10.1177/0049124192021002005

Buhrmester M, Kwang T, & Gosling SD (2011). Amazon's mechanical Turk: A new source of inexpensive, yet high-quality, data? Perspectives on Psychological Science, 6, 3–5. 10.1177/1745691610393980 [PubMed: 26162106]

Burch RL, & Johnsen L.(2020). Captain Dorito and the bombshell: Supernormal stimuli in comics and film. Evolutionary Behavioral Sciences, 14, 115–131. 10.1037/ebs0000164

Carels R, Shonrock AM, Miller JC, Byrd JR, Carraway M, Sall KE, Wuensch KL (2021). Weight stigma and sociocultural attitudes toward appearance among heterosexual and sexual minority individuals. Unpublished manuscript. ⟨https://assets.researchsquare.com/files/rs-726389/v1/8951a191–899c-4967-b3dd-99e7cafb0f1d.pdf?c=1631886874⟩.

Carper TLM, Negy C, & Tantleff-Dunn S.(2010). Relations among media influence, body image, eating concerns, and sexual orientation in men: A preliminary investigation. Body Image, 7, 301–309. 10.1016/j.bodyim.2010.07.002 [PubMed: 20739233]

Cash TF (2000). The Multidimensional Body-Self Relations Questionnaire user's manual. Available from the author at ⟨www.body-images.com⟩.

Cash TF, & Fleming EC (2002). The impact of body-image experiences: Development of the body image quality of life inventory. The International journal of eating disorders, 31, 455–460 10.1002/eat.10033. [PubMed: 11948650]

Chan RC, Operario D, & Mak WW (2020). Bisexual individuals are at greater risk of poor mental health than lesbians and gay men: The mediating role of sexual identity stress at multiple levels. Journal of Affective Disorders, 260, 292–301. 10.1016/j.jad.2019.09.020 [PubMed: 31521866]

Cordes M, Vocks S, & Hartmann AS (2021). Appearance-related partner preferences and body image in a German sample of homosexual and heterosexual women and men. Archives of Sexual Behavior, 1–12. 10.1007/s10508-021-02087-5 [PubMed: 33507424]

Dahlenburg SC, Gleaves DH, Hutchinson AD, & Coro DG (2020). Body image disturbance and sexual orientation: An updated systematic review and meta-analysis. Body Image, 35, 126–141. 10.1016/j.bodyim.2020.08.009 [PubMed: 32987246]

Davids CM, Watson LB, & Gere MP (2019). Objectification, masculinity, and muscularity: A test of objectification theory with heterosexual men. Sex Roles, 80, 443–457. 10.1007/s11199-018-0940-6

Dodge B, Herbenick D, Friedman MR, Schick V, Fu TC, Bostwick W, ... Sandfort TGM (2016). Attitudes toward bisexual men and women among a nationally representative probability sample of adults in the United States. PLoS ONE, 11. 10.1371/journal.pone.0164430

Duggan SJ, & McCreary DR (2004). Body image, eating disorders, and the drive for muscularity in gay and heterosexual men: The influence of media images. Journal of Homosexuality, 47, 45–58. 10.1300/J082v47n03_03 [PubMed: 15451703]

Engeln-Maddox R, Miller SA, & Doyle DM (2011). Tests of objectification theory in gay, lesbian, and heterosexual community samples: Mixed evidence for proposed pathways. Sex Roles, 65, 518–532. 10.1007/s11199-011-9958-8

Ferguson CJ (2013). In the eye of the beholder: Thin-ideal media affects some, but not most, viewers in a meta-analytic review of body dissatisfaction in women and men. Psychology of Popular Media Culture, 2, 20–37. 10.1037/a0030766

Fitzsimmons-Craft EE (2011). Social psychological theories of disordered eating in college women: Review and integration. Clinical Psychology Review, 31, 1224–1237. 10.1016/j.cpr.2011.07.011 [PubMed: 21903047]

Frederick DA, Buchanan GM, Sadehgi-Azar L, Peplau LA, Haselton MG, Berezovskaya A, & Lipinski RE (2007). Desiring the muscular ideal: Men's body satisfaction in the United States, Ukraine, and Ghana. Psychology of Men and Masculinity, 8, 103–117. 10.1037/1524-9220.8.2.103

Frederick DA, Daniels EA, Bates ME, & Tylka TL (2017). Exposure to thin-ideal media affect most, but not all, women: Results from the perceived effects of media exposure scale and open-ended responses. Body Image, 23, 188–205. 10.1016/j.bodyim.2017.10.006 [PubMed: 29132044]

Frederick DA, & Essayli JH (2016). Male body image: The roles of sexual orientation and body mass index across five national U.S. studies. *Psychology of Men &* Masculinity, 17, 336–351. 10.1037/men0000031

Frederick DA, Fessler DMT, & Haselton MG (2005). Do representations of male muscularity differ in men's and women's magazines? Body Image, 2, 81–86. 10.1016/j.bodyim.2004.12.002 [PubMed: 18089177]

Frederick DA, Forbes GB, Grigorian K, & Jarcho JM (2007). The UCLA Body Project I: Gender and ethnic differences in self-objectification and body satisfaction among 2,206 undergraduates. Sex Roles, 57, 317–327. 10.1007/s11199-007-9251-z

Frederick DA, Garcia JR, Gesselman AN, Mark KP, Hatfield E, & Bohrnstedt G.(2020). The Happy American Body 2.0: Predictors of affective body satisfaction in two U.S. national Internet panel surveys. Body Image, 32, 70–84. 10.1016/j.bodyim.2019.11.003 [PubMed: 31830668]

Frederick DA, & Haselton MG (2007). Why is muscularity sexy? Tests of the fitness indicator hypothesis. Personality and Social Psychology Bulletin, 33, 1167–1183. 10.1177/0146167207303022 [PubMed: 17578932]

Frederick DA, Kelly MC, Latner JD, Sandhu G, & Tsong Y.(2016). Appearance concerns among White and Asian American women: Sociocultural predictors of body, face, and eye satisfaction. Body Image, 16, 113–125. 10.1016/j.bodyim.2015.12.002 [PubMed: 26808353]

Frederick DA, Pila E, Malcarne VL, Compte EJ, Nagata JM, Best CR, Brady JP, Brown TA, Crerand CE, Convertino AD, Cook-Cottone CP, Gordon AR, Parent MC, Pennesi J-L, Perez M, Reynolds TA, Rodgers RF, Schaefer LM, Thompson JK, Tylka TL, & Murray SB (2022). Demographic predictors of objectification theory and tripartite influence model constructs: The U.S. Body Project I. Body Image, 40, 182–189. 10.1016/j.bodyim.2021.12.012 [PubMed: 34972020]

Frederick DA, Reynolds TA, Barrera CA, Alley J, Garcia JR, & Murray SB (2016). Demographic and sociocultural predictors of face image satisfaction: The U.S. Body Project I. Body Image, 41, 1–16. 10.1016/j.bodyim.2022.01.016

Frederick DA, Sandhu G, Morse PJ, & Swami V.(2016). Correlates of appearance and weight satisfaction in a US national sample: Personality, attachment style, television viewing, self-esteem, and life satisfaction. Body Image, 17, 191–203. 10.1016/j.bodyim.2016.04.001 [PubMed: 27172812]

Fredrickson BL, & Roberts TA (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. Psychology of Women Quarterly, 21(2), 173–206. 10.1111/j.1471-6402.1997.tb00108.x

Frederick DA, Crerand CE, Brown TA, Perez M, Best CR, Brady JP, Compte EJ, Convertino AD, Cook-Cottone CP, Gordon AR, Malcarne VL, Nagata JM, Parent MC, Pila E, Pennesi J-L, Reynolds TA, Rodgers RF, Schaefer LM, Thompson JK, Tylka TL, & Murray SB (2022). Demographic predictors of body image satisfaction: The U.S. Body Project I. Body Image, 41, 1–16. 10.1016/j.bodyim.2022.01.011 [PubMed: 35228101]

Frederick DA, Gordon AR, Cook-Cottone CP, Brady JP, Reynolds TA, Alley J, Garcia JR, Brown TA, Best CR, Brady JP, Crerand CE, Compte EJ, Convertino AD, Malcarne VL, Nagata JM, Parent MC, Perez M, Pila E, Pennesi J-L, Rodgers RF, Schaefer LM, Thompson JK, Tylka TL, & Murray SB (2022). Demographic and sociocultural predictors of sexuality-related body imageand sexual frequency: The U.S. Body Project I. Body Image, 41, 109–127. 10.1016/j.bodyim.2022.01.010 [PubMed: 35247866]

Frederick DA, Schaefer LM, Hazzard VM, Rodgers RF, Tylka TL, Ong LQ, Pennesi J-L, Convertino AD, Parent MC, Brady JP, Brown TA, Brady JP, Crerand CE, Compte EJ, Cook-Cottone CP, Gordon AR, Malcarne VL, Nagata JM, Perez M, Pila E, Thompson JK, & Murray SB (2022). Racial identity differences in pathways from sociocultural and objectification constructs to body satisfaction: The U.S. Body Project I. Body Image. 10.1016/j.bodyim.2022.01.019

Frederick DA, Tylka TL, Rodgers RF, Convertino AD, Pennesi J-L, Parent MC, Brady JP, Brown TA, Brady JP, Crerand CE, Compte EJ, Cook-Cottone CP, Gordon AR, Malcarne VL, Nagata JM, Perez M, Pila E, Schaefer LM, Thompson JK, & Murray SB (2022). Pathways from sociocultural and objectification constructs to body satisfaction among men: The U.S. Body Project I. Body Image, 41, 84–96. 10.1016/j.bodyim.2022.01.018 [PubMed: 35247867]

Frederick DA, Tylka TL, Rodgers RF, Pennesi J-L, Convertino AD, Parent MC, Brady JP, Brown TA, Brady JP, Crerand CE, Compte EJ, Cook-Cottone CP, Gordon AR, Malcarne VL, Nagata JM, Perez M, Pila E, Schaefer LM, Thompson JK, & Murray SB (2022). Pathways from sociocultural and objectification constructs to body satisfaction among women: The U.S. Body Project I. Body Image.

Frost DM, & Meyer IH (2012). Measuring community connectedness among diverse sexual minority populations. Journal of Sex Research, 49, 36–49. 10.1080/00224499.2011.565427 [PubMed: 21512945]

Gigi I, Bachner-Melman R, & Lev-Ari L.(2015). The association between sexual orientation, susceptibility to social messages and disordered eating in men. Appetite, 99, 25–33. 10.1016/j.appet.2015.12.027 [PubMed: 26725149]

Girard M, Chabrol H, & Rodgers RF (2018). Support for a modified tripartite dual pathway model of body image concerns and risky body change behaviors in French young men. Sex Roles, 78, 799–809.

Grabe S, Ward LM, & Hyde JS (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. Psychological Bulletin, 134, 460–476. 10.1037/0033-2909.134.3.460 [PubMed: 18444705]

Gray PB, & Frederick DA (2012). Body image and body type preferences in St. Kitts, Caribbean: A cross-cultural comparison with U.S. samples regarding attitudes towards muscularity, body fat, and breast size. Evolutionary Psychology, 10, 631–655. 10.1177/147470491201000319 [PubMed: 22995446]

Groesz LM, Levine MP, & Murnen SK (2002). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. International Journal of Eating Disorders, 31(1), 1–16. 10.1002/eat.10005 [PubMed: 11835293]

Hatzenbuehler ML (2014). Structural stigma and the health of lesbian, gay, and bisexual populations. Current Directions in Psychological Science, 23, 127–132. ⟨10.1177/0963721414523775⟩.

Hatzenbuehler ML, & Pachankis JE (2016). Stigma and minority stress as social determinants of health among lesbian, gay, bisexual, and transgender youth: research evidence and clinical implications. Pediatric Clinics, 63, 985–997. 10.1016/j.pcl.2016.07.003 [PubMed: 27865340]

Hazzard VM, Schaefer LM, Schaumberg K, Bardone-Cone AM, Frederick DA, Klump KL, ... Thompson JK (2019). Testing the Tripartite Influence Model among heterosexual, bisexual, and lesbian women. Body Image, 30, 145–149. 10.1016/j.bodyim.2019.07.001 [PubMed: 31323438]

Hazzard VM, Schaefer LM, Thompson JK, Murray SB, & Frederick DA (2022). Measurement invariance of body image measures by age, gender, sexual orientation, race, and weight status: The U.S. Body Project I. Body Image. 40, 285–294. 10.1016/j.bodyim.2022.01.004 [PubMed: 35085864]

Hazzard VM, Schaefer LM, Thompson JK, Rodgers RF, & Frederick DA (2022). An abbreviated 10-item, two-factor version of the Body Image Quality of Life Inventory (BIQLI-10): The U.S. Body Project I. Body Image, 40, 285–294. 10.1016/j.bodyim.2022.01.004 [PubMed: 35085864]

Henn AT, Taube CO, Vocks S, & Hartmann AS (2019). Body image as well as eating disorder and body dysmorphic disorder symptoms in heterosexual, homosexual, and bisexual women. Frontiers in Psychiatry, 10(531), 1–11. 10.3389/fpsyt.2019.00531 [PubMed: 30723425]

Hu L, & Bentler P.(1995). Evaluating model fit. In Hoyle RH (Ed.). Structural Equation Modeling. Concepts, Issues, and Applications. London: Sage.

Hu LT, & Bentler PM (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6, 1–55. 10.1080/10705519909540118

Huxley CJ, Halliwell E, & Clarke V.(2015). An examination of the tripartite influence model of body image: Does women's sexual identity make a difference? Psychology of Women Quarterly, 39, 337–348. 10.1177/0361684314554917

Jankowski GS, Diedrichs PC, & Halliwell E.(2014). Can appearance conversations explain differences between gay and heterosexual men's body dissatisfaction? Psychology of Men and Masculinity, 15(1), 68–77. 10.1037/a0031796

Kelloway EK (2015). Using Mplus for Structural Equation Modeling: A Researcher's Guide. Thousand Oaks, CA: SAGE Publications Inc,10.4135/9781483381664

Keery H, Van den Berg P, & Thompson JK (2004). An evaluation of the Tripartite Influence Model of body dissatisfaction and eating disturbance with adolescent girls. Body Image, 1, 237–251. 10.1016/j.bodyim.2004.03.001 [PubMed: 18089156]

Kees J, Berry C, Burton S, & Sheehan K.(2017). An analysis of data quality: Professional panels, student subject pools, and Amazons Mechanical Turk. Journal of Advertising, 46, 141–155. 10.1080/00913367.2016.1269304

Kimmel SB, & Mahalik JR (2005). Body image concerns of gay men: the roles of minority stress and conformity to masculine norms. Journal of Consulting and Clinical Psychology, 73(6), 1185–1190. 10.1037/0022-006X.73.6.1185 [PubMed: 16392992]

Kozee HB, Tylka TL, Augustus-Horvath CL, & Denchik A.(2007). Development and psychometric evaluation of the interpersonal sexual objectification scale. Psychology of Women Quarterly, 31, 176–189. 10.1111/j.1471-6402.2007.00351.x

Kozee HB, & Tylka TL (2006). A test of objectification theory with lesbian women. Psychology of Women Quarterly, 30(4), 348–357. 10.1111/j.1471-6402.2006.00310.x

Legenbauer T, Vocks S, Schäfer C, Schütt-Strömel S, Hiller W, Wagner C, & Vögele C.(2009). Preference for attractiveness and thinness in a partner: Influence of internalization of the thin ideal and shape/weight dissatisfaction in heterosexual women, heterosexual men, lesbians, and gay men. Body Image, 6(3), 228–234. 10.1016/j.bodyim.2009.04.002 [PubMed: 19443281]

Liang D, Frederick DA, Eiroa-Lledo E, Rosenfield NS, Berardi V, Linstead E, & Maoz U.(2022). Examining the utility of nonlinear machine learning versus linear regression analyses for predicting body image outcomes: The U.S. Body Project I. Body Image, 41, 32–35. 10.1016/j.bodyim.2022.01.013 [PubMed: 35228102]

MacCallum RC, Browne MW, & Sugawara HM (1996). Power analysis and determination of sample size for covariance structure modeling. Psychological Methods, 1, 130–149. 10.1037//1082-989X.1.2.130

McArdle KA, & Hill MS (2009). Understanding body dissatisfaction in gay and heterosexual men: The roles of self-esteem, media, and peer influence. Men and Masculinities, 11, 511–532. 10.1177/1097184×07303728

McKinley NM, & Hyde JS (1996). The objectified body consciousness Scale: Development and validation. Psychology of Women Quarterly, 20, 181–215. 10.1111/j.1471-6402.1996.tb00467.x

Meyer IH (2003). Prejudice, social stress, and mental health in lesbian, gay and bisexual populations: Conceptual issues and research evidence. Psychological Bulletin, 129, 674–697. 10.1037/0033-2909.129.5.674 [PubMed: 12956539]

Mitchell KS, & Mazzeo SE (2009). Evaluation of a structural model of objectification theory and eating disorder symptomatology among European American and African American undergraduate women. Psychology of Women Quarterly, 33, 384–395. 10.1111/j.1471-6402.2009.01516.x [PubMed: 20221314]

Moore F, & Keel PK (2003). Influence of sexual orientation and age on disordered eating attitudes and behaviors in women. International Journal of Eating Disorders, 34, 370–374. 10.1002/eat.10198 [PubMed: 12949929]

Moradi B.(2010). Addressing gender and cultural diversity in body image: Objectification theory as a framework for integrating theories and grounding research. Sex Roles, 63, 138–148. 10.1007/s11199-010-9824-0

Moreno-Domínguez S, Raposo T, & Elipe P.(2019). Body image and sexual dissatisfaction: Differences Among heterosexual, bisexual, and lesbian women. Frontiers in Psychology, 10. 10.3389/fpsyg.2019.00903

Morrison MA, Morrison TG, & Sager C-L (2004). Does body satisfaction differ between gay men and lesbian women and heterosexual men and women?: A meta-analytic review. Body Image, 1, 127–138. 10.1016/j.bodyim.2004.01.002 [PubMed: 18089146]

Murray SB, Nagata JM, Griffiths S, Calzo JP, Brown TA, Mitchison D, ... Mond JM (2017). The enigma of male eating disorders: A critical review and synthesis. Clinical Psychology Review, 57, 1–11. 10.1016/j.cpr.2017.08.001 [PubMed: 28800416]

Paolacci G, Chandler J, & Ipeirotis PG (2010). Running experiments on Amazon Mechanical Turk. Judgment and Decision Making, 5, 411–419. 10.2139/ssrn.1626226

Peplau LA, Frederick DA, Yee CK, Maisel N, Lever J, & Ghavami N.(2009). Body image satisfaction in heterosexual, gay, and lesbian adults. Archives of Sexual Behavior, 38, 713–725. 10.1007/s10508-008-9378-1 [PubMed: 18712469]

Polihronakis CJC, Velez BL, & Brewster ME (2021). Bisexual men's sexual health: A test of minority stress theory. Psychology of Men & Masculinities, 22(1), 201–215. 10.1037/men0000304

Ridgeway RT, & Tylka TL (2005). College men's perceptions of ideal body composition and shape. Psychology of Men & Masculinity, 6, 209–220. 10.1037/1524-9220.6.3.209

Roberts A, & Muta S.(2017). Representations of female body weight in the media: An update of Playboy magazine from 2000 to 2014. Body Image, 20, 16–19. 10.1016/j.bodyim.2016.08.009 [PubMed: 27842289]

Robinson J, Rosenzweig C, Moss AJ, & Litman L.(2019). Tapped out or barely tapped? Recommendations for how to harness the vast and largely unused potential of the Mechanical Turk participant pool. Plos One, 14, Article 0226394. 10.1371/journal.pone.0226394

Rodgers R, Chabrol H, & Paxton SJ (2011). An exploration of the tripartite influence model of body dissatisfaction and disordered eating among Australian and French college women. Body Image, 8, 208–215. 10.1016/j.bodyim.2011.04.009 [PubMed: 21664887]

Rodgers RF, Franko DL, Lovering ME, Luk S, Pernal W, & Matsumoto A.(2018). Development and validation of the female muscularity scale. Sex Roles, 78, 18–26. 10.1007/s11199-017-0775-6

Seifert T.(2005). Anthropomorphic characteristics of centerfold models: Trends towards slender figures over time. International Journal of Eating Disorders, 37, 271–274. 10.1002/eat.20086 [PubMed: 15822083]

Schaefer LM, Burke NL, Thompson JK, Dedrick RF, Heinberg LJ, Calogero RM, ... Swami V.(2015). Development and validation of the sociocultural attitudes towards appearance questionnaire-4 (SATAQ-4). Psychological Assessment, 27, 54–67. 10.1037/a0037917 [PubMed: 25285718]

Schaefer LM, Harriger JA, Heinberg LJ, Soderberg T, & Thompson JK (2017). Development and validation of the sociocultural attitudes towards appearance questionnaire-4-revised (SATAQ-4R). International Journal of Eating Disorders, 50, 104–117. 10.1002/eat.22590 [PubMed: 27539814]

Schaefer LM, & Thompson JK (2018). Self-objectification and disordered eating: A meta-analysis. International Journal of Eating Disorders, 51, 483–502. 10.1002/eat.22854 [PubMed: 29517805]

Schermelleh-Engel K, & Müller H.(2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. Methods of Psychological Research, 8, 28–74. ⟨http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.509.4258&rep=rep1&type=pdf⟩.

Sell A, Lukazsweski AW, Townsley M, Cues of upper body strength account for most of the variance in men's bodily attractiveness Proceedings of the Royal Society B: Biological Sciences 284 2017 284 doi: 10.1098/rspb.2017.1819.

Share TL, & Mintz LB (2002). Differences between lesbians and heterosexual women in disordered eating and related attitudes. Journal of Homosexuality, 42, 89–106. 10.1300/J082v42n04_06

Shroff H, & Thompson JK (2006). Peer influences, body-image dissatisfaction, eating dysfunction, and self-esteem in adolescent girls. Journal of Health Psychology, 11, 533–551. 10.1177/1359105306065015 [PubMed: 16769734]

Swami V, Frederick DA, Aavik T, Alcalay L, Allik J, Anderson D, ... Zivcic- Becirevic I.(2010). The attractive female body weight and female body dissatisfaction in 26 countries across 10 world regions: Results of the International Body Project I. Personality and Social Psychology Bulletin, 36, 309–325. 10.1177/0146167209359702 [PubMed: 20179313]

Taylor J.(2017). Bisexual mental health: A call to action. Issues in Mental Health Nursing, 39, 83–92. 10.1080/01612840.2017.1391904 [PubMed: 29286831]

Thompson JK, Heinberg LJ, Altabe M, & Tantleff-Dunn S.(1999). Exacting Beauty: Theory, Assessment, and Treatment of Body Image Disturbance. American Psychological Association 10.1037/10312-000

Thompson JK, & Stice E.(2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. Current Directions in Psychological Science, 10, 181–183. 10.1111/1467-8721.00144

Tran A, Kaplan JA, Austin SB, Davison K, Lopez G, & Agénor M.(2020). "It's all outward appearance-based attractions": A qualitative study of body image among a sample of young gay and bisexual men. Journal of Gay & Lesbian Mental Health, 24(3), 281–307. 10.1080/19359705.2019.1706683

Tylka TL (2011). Refinement of the tripartite influence model for men: Dual body image pathways to body change behaviors. Body Image, 8, 199–207. 10.1016/j.bodyim.2011.04.008 [PubMed: 21664886]

Tylka TL, & Andorka MJ (2012). Support for an expanded tripartite influence model with gay men. Body Image, 9, 57–67. 10.1016/j.bodyim.2011.09.006 [PubMed: 22036192]

Tylka TL, & Hill MS (2004). Objectification theory as it relates to disordered eating among college women. Sex Roles, 51, 719–730. 10.1007/s11199-004-0721-2

van den Berg P, Thompson JK, Obremski-Brandon K, & Coovert M.(2002). The tripartite influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. Journal of Psychosomatic Research, 53, 1007–1020. 10.1016/S0022-3999(02)00499-3 [PubMed: 12445590]

Vartanian LR, & Dey S.(2013). Self-concept clarity, thin-ideal internalization, and appearance-related social comparison as predictors of body dissatisfaction. Body Image, 10, 495–500. 10.1016/j.bodyim.2013.05.004 [PubMed: 23809858]

Want SC (2009). Meta-analytic moderators of experimental exposure to media portrayals of women on female appearance satisfaction: Social comparisons as automatic processes. Body Image, 6, 257–269. 10.1016/j.bodyim.2009.07.008 [PubMed: 19716779]

Wiseman MC, & Moradi B.(2010). Body image and eating disorder symptoms in sexual minority men: A test and extension of objectification theory. Journal of Counseling Psychology, 57, 154–166. 10.1037/a0018937 [PubMed: 21133567]

Yamamiya Y, Shroff H, & Thompson JK (2008). The tripartite influence model of body image and eating disturbance: A replication with a Japanese sample. International Journal of Eating Disorders, 41, 88–91. 10.1002/eat.20444 [PubMed: 17968899]

Yean C, Benau EM, Dakanalis A, Hormes JM, Perone J, & Timko CA (2013). The relationship of sex and sexual orientation to self-esteem, body shape satisfaction, and eating disorder symptomatology. Frontiers in Psychology, 4, 887. 10.3389/fpsyg.2013.00887 [PubMed: 24348441]

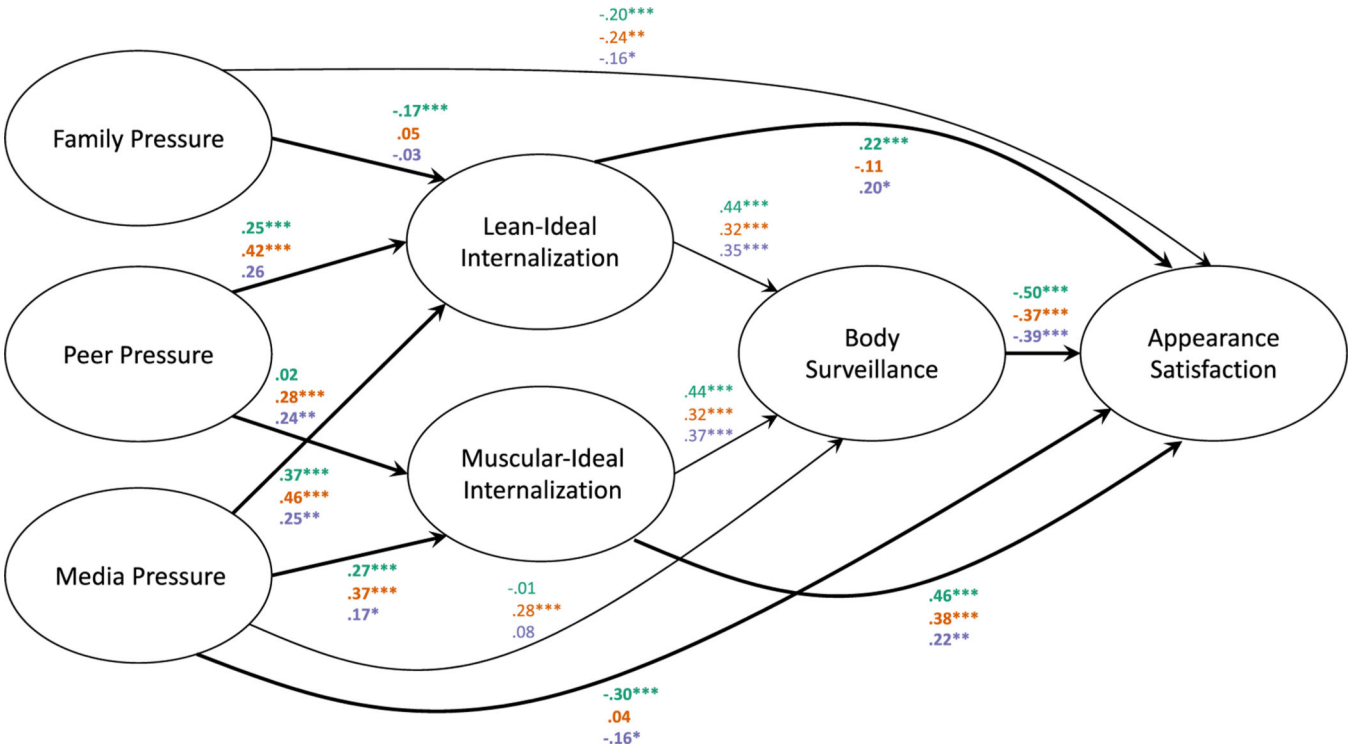

Fig. 1. Model Examining Appearance Satisfaction Among Men.

Note. Multi-group structural equation model estimates for appearance satisfaction by sexual orientation among men. Standardized path estimates are listed in the following order: heterosexual (green font), bisexual (orange font), gay (purple font). Paths that differed in strength between sexual orientation groups are bolded. * $p < .05$, * * $p < .01$, * ** $p < .001$. (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.)

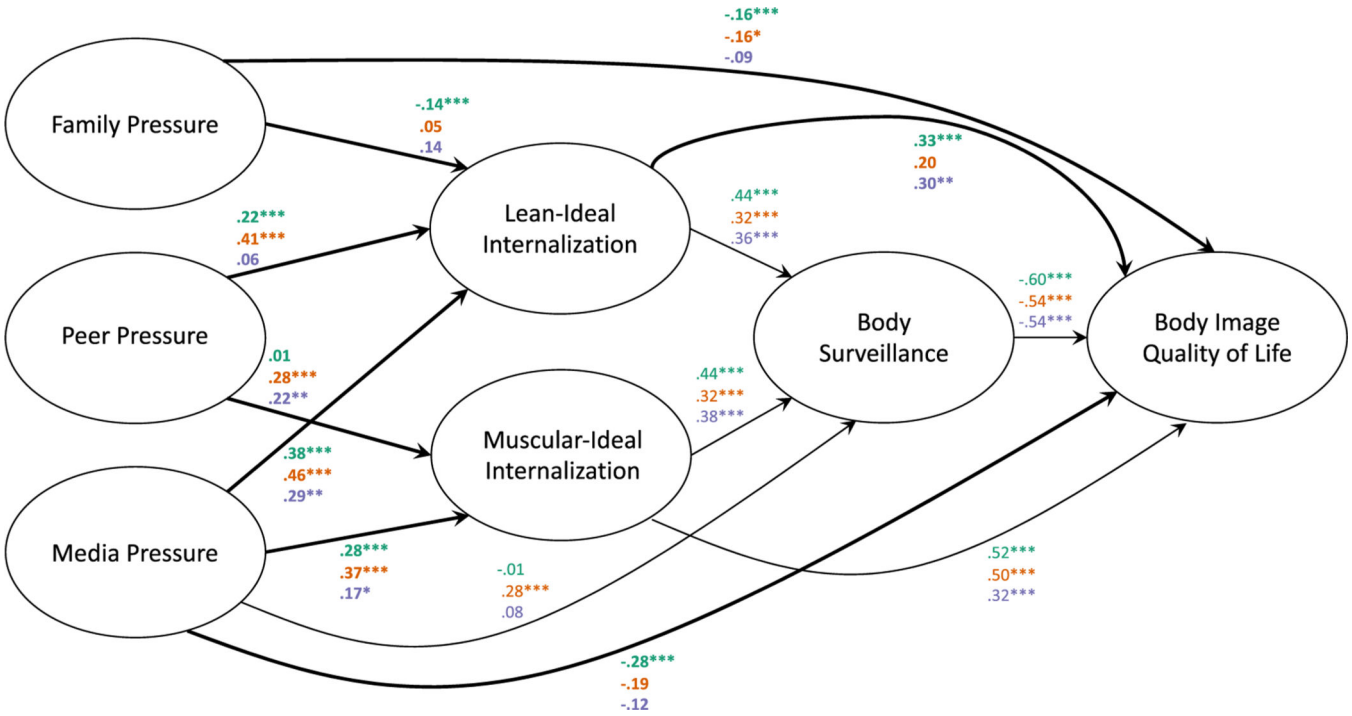

Fig. 2. Model Examining Body Image Quality of Life Among Men.

Note. Multi-group structural equation model estimates for body image quality of life by sexual orientation among men. Standardized path estimates are listed in the following order: heterosexual (green font), bisexual (orange font), gay (purple font). Paths that differed in strength between sexual orientation groups are bolded. * $p < .05$, * * $p < .01$, * ** $p < .001$. (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.)

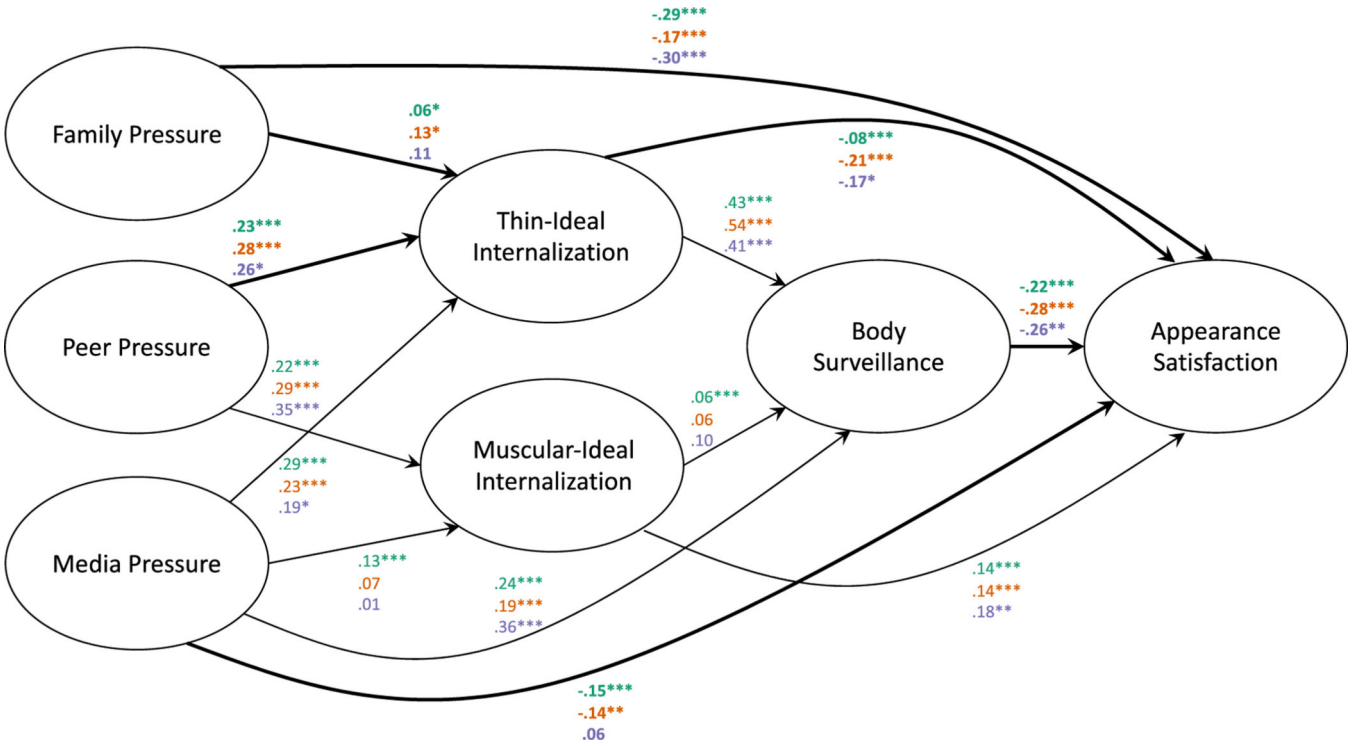

Fig. 3. Model Examining Appearance Satisfaction Among Women.

Note. Multi-group structural equation model estimates for appearance satisfaction by sexual orientation among women. Standardized path estimates are listed in the following order: heterosexual (green font), bisexual (orange font), lesbian (purple font). Paths that differed in strength between sexual orientation groups are bolded. * $p < .05$, * * $p < .01$, * ** $p < .001$. (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.)

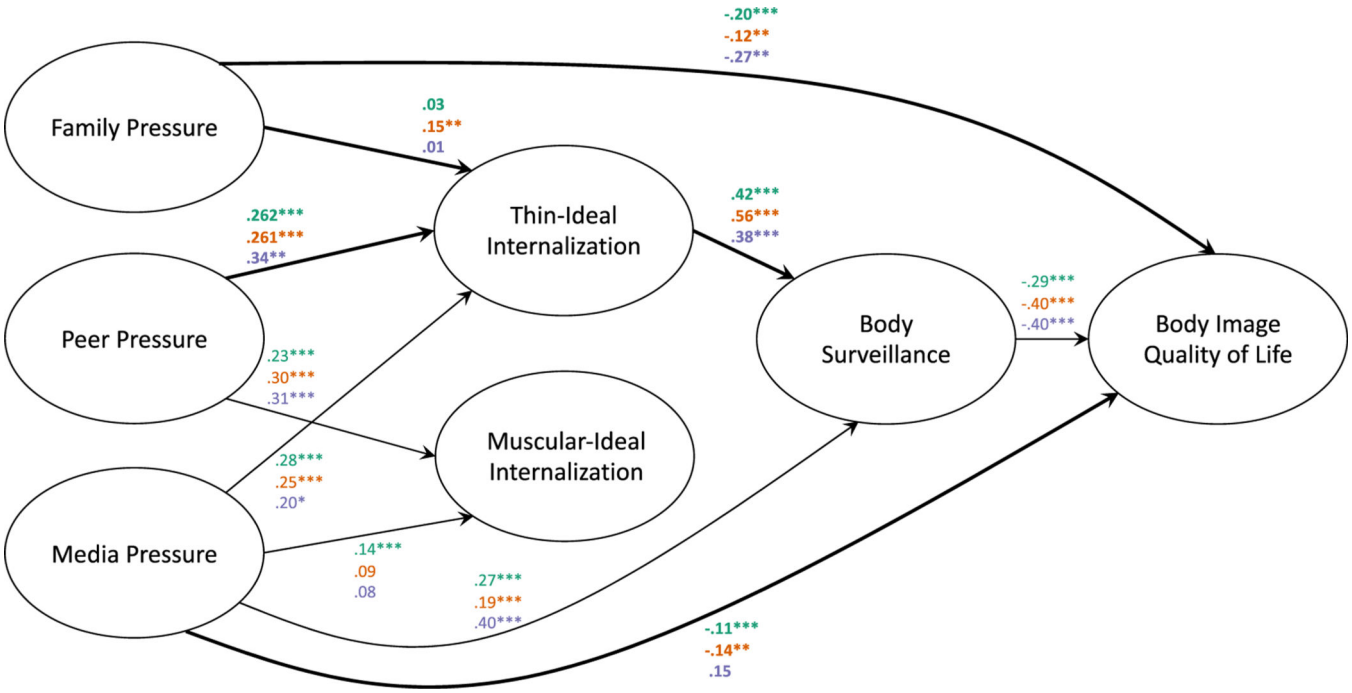

Fig. 4. Model Examining Body Image Quality of Life Among Women.

Note. Multi-group structural equation model estimates for body image quality of life by sexual orientation among women. Standardized path estimates are listed in the following order: heterosexual (green font), bisexual (orange font), lesbian (purple font). Paths that differed in strength between sexual orientation groups are bolded. * $p < .05$, * * $p < .01$, * ** $p < .001$. (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.)

Table 1

Sample Characteristics.

	Hetero-sexual Men	Gay Men	Bisexual Men	Hetero-sexual Women	Lesbian Women	Bisexual Women
N	4869	194	194	5395	213	598
Age (*M*, *SD*	33.2 (9.9)	31.7 (9.9)	30.9 (10.6)	36.0 (11.3)	33.5 (11.6)	29.0 (7.7)
BMI (*M*, *SD*	27.5 (5.6)	27.3 (6.3)	28.2 (6.2)	27.5 (6.7)	28.1 (7.1)	28.9 (7.7)
Hours Worked Per Week (*M*, *SD*)	36.5 (14.1)	30.8 (16.4)	32.2 (16.2)	30.7 (16.1)	34.4 (14.0)	29.5 (16.6)
Race (%) White	74.4%	78.8%	77.4%	76.0%	78.9%	74.2%
Black	5.1%	3.6%	4.6%	3.2%	3.8%	3.0%
Hispanic	5.6%	6.2%	4.1%	7.6%	7.0%	7.4%
Asian	7.4%	2.6%	3.6%	5.8%	2.8%	3.2%
Other	7.5%	8.8%	10.3%	7.4%	7.5%	12.2%
Education (%) Some High School or Less	0.5%	1.0%	0.0%	0.6%	1.0%	0.8%
High School Degree	9.2%	15.5%	17.0%	8.8%	9.6%	10.5%
Some College	32.1%	34.0%	40.2%	31.5%	34.9%	40.8%
College Degree	44.4%	37.6%	33.0%	44.9%	42.0%	37.5%
Advanced Degree	13.8%	11.9%	9.8%	14.2%	12.5%	10.4%
Relationship (%) Cohabitating	14.5%	23.2%	18.0%	17.6%	34.7%	27.6%
Married	34.0%	9.3%	17.5%	47.0%	18.8%	25.0%
Widowed	0.3%	0.5%	0.0%	0.9%	0.5%	0.0%
Dating One Person	20.3%	16.5%	18.6%	15.1%	18.3%	22.7%
Dating Multiple	3.1%	3.6%	4.1%	1.4%	0.5%	4.3%
Not Involved	27.8%	46.9%	41.8%	18.0%	27.2%	20.4%