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Body image is defined as the subjective mental images individuals have of their bodies and their attitudes regarding levels of satisfaction with appearance (Cash & Smolak, 2011). Body dissatisfaction is a specific component of body image and results from the level of discrepancy individuals perceive between their actual bodies (e.g., appearance, weight, size/shape) and societal ideals (Mayo & George, 2014; Pompper, Soto, & Piel, 2007); higher levels of perceived discrepancy generally are related to more dissatisfaction. Although initial body dissatisfaction studies focused primarily on women’s experiences (e.g., Cash & Deagle, 1997; Thompson & Heinberg, 1999), men experience such concerns, although not in exactly the same way as women, and researchers have started to examine its relationship to their psychological health and physical well-being (Brewster, Sandil, DeBlarere, Breslow, & Eklund, 2016; Engeln, Sladek, & Waldron, 2013; Griffiths et al., 2016; Murray & Touyz, 2012; Murray, Griffiths, Mond, Kean, & Blashill, 2016). For men, the manifestation of the societal pressures about appearance and body is a desire to be taller, larger, and more muscular. Thus, masculinity and leanness are central to men’s body satisfaction, their conception of masculinity, and even their overall identity. If they fall short of these masculine body ideals, men can experience body dissatisfaction, eating disorders, and general psychological distress, such as low self-esteem and depression (Phares, Steinberg, & Thompson, 2004; Pope, Kouri, & Hudson, 2000; Wasylkiw, Currie, Meuse, & Pardoe, 2010; Watkins, Christie, & Chally, 2008), and engage in behaviors that they believe may bring them closer to the ideals, including weight training and the use of
muscle building supplements (e.g., creatine, anabolic-androgenic steroids; Parent & Moradi, 2011).

**Theoretical Framework**

Objectification theory was developed to explain how women’s socialization experiences, particularly being sexualized and objectified, could lead them to view themselves through the lens of their bodies and experience heightened levels of psychological distress and eating (Fredrickson & Roberts, 1997; Smolak & Murnen, 2008). The process of objectification occurs when women are sexualized and regularly are exposed to sociocultural pressures/ideals about body, weight, and appearance. Through the internalization of these ideals women become more body focused and begin to self-objectify, perceiving and valuing themselves as objects to be viewed and evaluated, and engaging in behaviors such as body monitoring and body checking (Fredrickson & Roberts, 1997). As women compare themselves to internal and external body and appearance ideals (Festinger, 1954), they may experience heightened levels of bodily shame, increased anxiety, a disconnection from their bodies, and difficulties being present in the moment (Moradi, 2010). Over time experiencing these states, women may become depressed or engage in a range of disordered eating behaviors (Fredrickson & Roberts, 1997; Noll & Fredrickson, 1998).

Recently, researchers have used objectification theory with men, demonstrating that they also are susceptible to objectifying socialization experiences and resultant psychological distress (Grieve & Helmich, 2008; Michaels, Parent, & Moradi, 2012; Noll & Fredrickson, 1998; Parent & Moradi, 2011; Schwartz, Grammas, Sutherland, Siftert, & Bush-King, 2010; Vandenbosh & Eggermont, 2013). It is the extent of awareness, and more so the internalization of image ideals that predict the extent for risk for body dissatisfaction and subsequent maladaptive behaviors.
For men, self-objectification behaviors focus on preserving masculine ideals, which is characterized by a preoccupation with muscularity and maintenance of a lean physique (i.e., drive for leanness).

The internalization of male body ideals (i.e., lean and muscular) and ensuing self-evaluation potentially promote body dissatisfaction, increased levels of negative mood states, and susceptibility to maladaptive behaviors in an attempt to fit the cultural ideal of the perfect male body. In fact, Griffiths et al. (2016) found more definitive associations between body dissatisfaction and psychological distress in men compared to women. Men, specifically those with muscle-focused preoccupations, have higher levels of related psychopathologies (i.e., depression, lower self-esteem, attempted suicide, dissatisfaction with life), and a higher usage of legal and illicit substances, including anabolic steroids, despite an objective awareness that body maintenance behaviors could have detrimental effects on their physical and mental health (Cafri, Strauss, & Thompson, 2002; McCreary & Sasse, 2000; McCreary, Hildebrandt, Heinberg, Boroughs & Thompson, 2007; Pope, Gruber, Choi, Olivardia, & Phillips, 1997; Pope et al., 2000; Pope et al., 2005).

**Appearance and Performance Enhancing Drug Usage**

Appearance and performance enhancing drugs (APEDs) is an inclusive term used to describe a broad category of substances that are used to improve or perfect physical appearance, general health, or performance (Lieberman et al., 2015; McCreary et al., 2007). APEDs include everything from anabolic-androgenic steroids (AAS) to legal over-the-counter dietary supplements and ergo/thermogenics (e.g., protein powders, vitamins, meal replacements, herbs, fat burning drugs, analgesics) and illicit ergo/thermogenics (e.g., thyroid hormones; Hildebrandt,
Langenbacher, Carr, & Sanjuan, 2007; McCreary et al., 2007; “Supplement Usage”, 2010). The use of APEDs is extensive and can vary across groups of individuals. For example, a survey by the Nutritional Business Journal in 2010 found that 88% of respondents over the age of 30 years (N = 2,032) reported taking supplements and spending $430 annually (“Supplement Usage”, 2010). Further, college students are more likely to use dietary supplements (e.g., vitamins protein, herbal) than the general population (Lieberman et al., 2015), and whites, more so than any other ethnic group, are more likely to use APEDs (Fennell, 2004; Hildebrandt et al., 2007), and men, compared to women, are more likely to use muscle-building supplements (e.g., creatine, anabolic-androgenic steroids; Fennell, 2004; Hildebrandt, Harty, & Langenbacher, 2012; Irving, Wall, Neumark-Sztainer, Story, 2002; McCreary et al., 2007).

In addition to extensive physical effects associated with APED use (e.g., acne, gynecomastia, alopecia, testicular atrophy), researchers have identified their effects on psychological functioning, including dysphoria (e.g., depression, anxiety, low self-esteem; Olivardia, Pope, Borowiecki, & Cohane, 2004) and hyperarousal (e.g., aggression; Hall, Hall, & Chapman, 2005). APEDs may exacerbate negative psychological behaviors in at risk individuals (e.g., athletes, youth), such as eating and weight concerns, illicit substance abuse, body image disturbances and negative affect (Irving et al., 2002; Raudenbush & Meyer, 2003). Legal APED usage (e.g., dietary supplements) has been associated with increased use of illicit APEDs (e.g., anabolic steroids; Hildebrandt et al., 2012; Karazsia et al., 2013). Illicit APED (e.g., anabolic steroids) usage is particularly harmful. Anabolic-androgenic steroid users, compared to non-users, generally report lower self-esteem, as well as higher levels of depression and personality disorders or traits (e.g., mania, hypomania; Bahrke, Yesalis, Kopstein & Stephens, 2000; Irving, et al., 2002; Pope & Katz, 1994). Murray et al. (2016) reported distinctive dysfunctionality (e.g.,
eating disorder symptomology, muscle dysmorphia) in men whose primary reason for using anabolic-androgenic steroids was to cope with appearance-related issues (e.g., weight and shape concerns).

APED usage may also be the result of psychopathologies developed earlier in life (e.g., appearance fixations). For example, in a study of 233 male weightlifters Pope et al. (2012) found that adolescent body image disorder represented a compelling risk factor for anabolic-androgenic steroid use later in life. Muscle-related body dissatisfaction can also be experienced as a symptom of withdrawal from APEDS (e.g., steroids) because usage improves body image (Cafri et al., 2005a). Withdrawal from steroids may also result in major depression, thereby promoting dependence (Pope & Katz, 1992). In support of this idea, Parent and Moradi (2008) found that internalization of cultural standards of attractiveness was consistent with the objectives of objectification theory and men’s drive for muscul arity and predilection to use anabolic-androgenic steroids. However, body shame and body surveillance were not significantly related to drive for muscul arity nor the propensity to use anabolic-androgenic steroids, demonstrating the importance of internalization to men’s drive for muscul arity and intent to use steroids. Despite the plethora of negative side effects of APEDs, the indirect benefits (relief of body image concerns) appear to outweigh the consequences for many users, explaining their popularity and continued use (Bahrke, et al., 2000; Hildebrandt et al., 2007).

Sexual Orientation

Although gay and heterosexual men experience the body in essentially the same way (Smith, Hawkeswood, Bodell, & Joiner, 2011; Tiggeman et al., 2007), there appears to be a stronger emphasis on physical appearance in the gay community. Although heterosexual, in comparison to gay, men are more likely to ascribe being physically attractive with having a
muscular physique (because of its association with masculinity), the ideal gay body is thinner and leaner, both in terms of what the gay men report wanting for themselves and what they find most attractive in others (Martins, Tiggemann, & Churchett, 2008; Murray & Touyz, 2012; Peplau, Frederick, Yee, Maisel, Lever, & Ghavami, 2009; McCreary et al., 2007; Smith et al., 2011). Immersion within the gay community, with its heightened focus on having a lean, but muscular, body and being attractive in terms of overall appearance (e.g., well-groomed, youthful face, stylishly dressed), may result in increased internalization of such ideals, and engagement in compensatory behaviors, such as appearance checking (self-objectification) and body manipulation (e.g., dieting), and dissatisfaction with body size and shape (Cash & Smolak, 2011; Drummond, 2006; Martins et al., 2008; Parent & Moradi, 2011; Schwartz & Andsager, 2011; Smith et al., 2011; Tiggeman, Martins, & Kirkbride, 2007).

Consistent with objectification theory, gay, compared with heterosexual, men have a greater tendency to self-objectify (Engeln-Maddox, Miller, & Doyle, 2011; Kozak, Frankenhauser, & Roberts, 2009; Martins, Tiggemann, & Kirkbride et al., 2007; Michaels, et al., 2013) and be dissatisfied with their bodies, and are more likely to resort to behaviors such as excessive and unhealthy exercise practices (e.g., Boroughs & Thompson, 2002; Cash and Smolak, 2011; Levesque & Vichesky, 2006; Martins et al., 2008; McArdle & Hill, 2007; Murray & Touyz, 2012; Schwartz & Andsager, 2011). According to Lanzieri and Hildebrandt (2016), gay media intentionally generates hypermasculine physiques to attract more male attention. These hypermasculine images (i.e., men who are lean and muscular) are subsequently internalized and used for self-evaluation by gay men who see their bodies, and those of other gay men, as objects to be consumed.
Although no studies have found that gay men are more likely than heterosexual and bisexual men to use APEDs, other studies have demonstrated that gay boys and men are at a higher risk for anabolic steroid usage and attempts to gain weight (Blashill & Safren, 2014, \( gay = 635 \), \( heterosexual = 16,615 \); Blashill, Calzo, Griffiths, & Murray, 2016, \( gay = 462 \), \( heterosexual = 5,786 \)). In a sample of 326 sexual minority men, Brewster et al. (2016) found that internalized standards of attractiveness was positively related to a drive for muscularity and body surveillance. Furthermore, drive for muscularity was positively related to intention to use AAS and compulsive exercise.

Being immersed in such an appearance and physique focused subculture, combined with experiences of social oppression and homonegativity, also may affect gay men’s general psychological well-being (Fawkner & McMurray, 2002). In general, gay men are at a higher risk of psychiatric morbidity including depression, mood disorders, and anxiety, compared with heterosexual men (e.g., Cochran, Sullivan, & May, 2003; King et al., 2008). For example, Cochran et al. (2003) found that gay men are three times more likely to meet the criteria for major depression than were heterosexual men.

**Purpose**

There are few empirical studies that have examined APED usage and sexual orientation in relation to men’s body image concerns and psychological well-being within the framework of objectification theory. Further, although the use of licit, illicit, and illegal APEDs is a relatively common health issue for men (Barhke et al., 2000; Hildebrandt, Varangis, & Lai, 2012; “Supplement Usage”, 2010), most studies focus on men’s use of anabolic-androgenic steroids (AAS) and the risks associated with their usage (e.g., Barhke et al., 2000; Parent & Moradi, 2011; Pope et al., 2012), rather than considering the more common types of APEDs that men
may use and making a distinction between substances that help develop musculature and those that promote leanness. Consistent with objectification theory, we predicted an interaction between sexual orientation and APED use, such that gay men who used APEDs would report the most distress across our measures of body image, internalization, and psychological well-being.

**Methods**

**Participants**

The final sample for our study was comprised of 683 men; $M_{age} = 23.19$ years ($SD = 7.59$) and $M_{bmi} = 25.31$ kg/m$^2$ ($SD = 5.38$). In terms of ethnicity, 151 (22.11%) reported being Hispanic/Latino. In terms of race, the majority were White (66.2%, $n = 452$), followed by 64 (9.4%) who were Asian/Pacific Island, 54 (7.9%) Black, 14 (2.0%) Native American, 10 (1.5%) Middle Eastern, and 29 (4.2%) Biracial; 60 (8.8%) selected “other.” Most were single (81.6%, $n = 557$), though 110 (16.1%) indicated being either married or in a domestic partnership. In terms of education, 464 (67.9%) were enrolled in college; the others had earned an associate’s degree (9.2%, $n = 63$), bachelor’s degree (12.6%, $n = 86$), master’s degree (7.2%, $n = 49$), or doctorate or other professional degree (3.1%, $n = 21$). Reported household incomes were: less than $25,000 (43.0%, $n = 294$), $25,000 to $49,999 (18.6%, $n = 127$), $50,000 to $74,999 (12.6%, $n = 86$), $75,000 to $99,999 (8.8%, $n = 60$), and $100,000 or more (17.0%, $n = 116$). Regarding sexual orientation, 78.6% ($n = 537$) identified as heterosexual and 21.4% ($n = 146$) as gay.

**Instruments**

**Demographics and muscle enhancing supplements.** At the survey’s end, the men provided their current age, current weight and height, ethnicity, race, educational level, relationship status, and annual household income.
To determine the men’s APED use, we asked three questions. First, “Have you ever used creatine, protein supplements or similar nutritive products to increase strength and muscularity?” Second, “Have you ever used anabolic steroids, like testosterone derivatives, or non-steroidal anabolics, like Human Growth Hormone (HGH), Insulin-like Growth Factor or Insulin for muscle building purposes?” Third, ”Have you ever used fat-burners, weight cutting drugs, and/or diet pills to lose weight and be leaner?” The men responded yes/no to each question.

**Sexual orientation.** We used the one-item Kinsey Sexual Orientation Scale (Kinsey, Pomery, & Martin, 1948; Kinsey, Pomery & Martin, 2003). From seven response options, ranging from 0 (exclusively heterosexual with no homosexual contact) to 3 (bisexual) to 6 (exclusively homosexual with no heterosexual contact), the men selected the description that best captured their current orientation. Consistent with previous research (Tiggeman et al., 2007), the men who selected any of the three “homosexual” responses or who chose any of the three “heterosexual” responses were classified as gay or heterosexual, respectively; the men who self-identified as “bisexual” were excluded (n = 23).

**Body image.** The 25-item Body Parts Satisfaction Scale for Males (BPSS-M; McFarland & Petrie, 2012) assesses men’s satisfaction with their upper body (17 items), legs (4 items), and face (4 items). Men rate their satisfaction with the leanness (e.g., “leanness of arms”) and muscularity (e.g., “muscularity of upper legs) of specific body parts and with aspects of their overall body (e.g., “overall muscle tone and definition”); each item is rated from 1 (extremely dissatisfied) to 6 (extremely satisfied). The total score for each factor is the mean of those items; higher scores indicate greater satisfaction. Among male undergraduates, McFarland and Petrie (2012) reported Cronbach’s alphas and test-retest reliabilities of .87 and .58 (Face), .94 and .70 (Legs), and .97 and .72 (Upper Body), respectively; alphas from this study were .78 (Face), .91
They also provided extensive data on the scale’s construct and incremental validity, demonstrating significant relationships with dietary/restrictive eating behaviors, negative affect and self-esteem beyond what was explained by drive for muscularity.

The four-item Body Shame Scale (Andrews, 1995; Tripp & Petrie, 2001) assesses feelings of shame associated with one’s body. On items such as “I feel ashamed of my body or some part of it,” the men responded from 1 (definitely disagree) to 5 (definitely agree). Total score is the mean of the four items; higher scores indicate more shame. Tripp and Petrie (2001) reported a Cronbach’s alpha of .90 among female undergraduates and provided evidence for the scale’s validity, including significant relationships with measures of body dissatisfaction, body shape concerns, and disordered eating (e.g., bingeing). The Cronbach’s alpha from this study was .93.

The six-item Drive for Leanness scale (Smolak & Murnen, 2008) assesses a desire for low body fat and a toned physique. On items such as “I think the best looking bodies are well-toned” the men responded from 1 (never) to 6 (always). Total score is the mean of the items; higher scores indicate a stronger drive. Smolak and Murnen (2008) reported Cronbach’s alpha of .83 in a sample of men, and data regarding the scale’s validity and differentiation from measures of drive for muscularity and drive for thinness. Alpha in the current study was .88.

The 13-item Muscle Dysmorphic Disorder Inventory (MDDI; Hildebrandt, Langenbucher, & Schlundt, 2004) assesses preoccupation with muscularity along three dimensions: drive for size (5 items; desire for increased size and strength), appearance intolerance (4 items; negative beliefs about one’s body and resulting appearance anxiety), and functional impairment (4 items; negative emotions resulting from not being able to maintain exercise routine). Men responded to each items from 1 (never) to 5 (always). Total score for
each dimension is the mean of the items; higher scores indicate higher levels in each area.

Hildebrandt et al. (2004) reported Cronbach’s alphas that have ranged from .77 to .85, and provided extensive information on the scale’s validity. Alphas from the current study were .89 (Size), .85 (Appearance), and .88 (Functional).

**Internalization.** Five items from the Internalization-General subscale and five items from the Athletic subscale of the Sociocultural Attitudes Toward Attractiveness Questionnaire – 3 (SATAQ-3; Thompson et al., 2004) assess identification with general sociocultural and athletic ideals of attractiveness. On items such as “I try to look like sport athletes,” the men responded from 1 (*strongly disagree*) to 5 (*strongly agree*). Total score for each dimension is the mean of those items; higher scores indicate greater internalization. Karazsia and Crowther (2008) reported Cronbach’s alphas of .94 (General) and .85 (Athletic) and significant correlations with measures of negative affect, drive for muscularity, and physical appearance comparisons; alphas from the current study were .93 (General) and .90 (Athletic).

**Psychological well-being.** The nine-item Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) assesses current level of depressive symptomatology. On items such as “feeling, down, depressed or hopeless” the men indicated the extent to which they had been feeling that way during the last two weeks on scale from 0 (*not at all*) to 3 (*nearly every day*). Total score is the sum of the nine items; higher scores indicate greater depressive symptomatology. Kroenke et al. reported a Cronbach’s alphas that ranged from .86 to .89; alpha from the current study was .90. Across multiple samples, they also established the scale’s criterion related (e.g., sensitivity and specificity for diagnosis were 88%) and construct validity.

The 12-item Neuroticism subscale from the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1989) contrasts adjustment or emotional stability with maladjustment or neuroticism
(emotional lability). On each item, the men responded from 1 (strongly disagree), to 5 (strongly agree). Total score is the sum of the items and can range from 12 (low neuroticism) to 60 (high neuroticism). Costa and McCrae (1992) reported a Cronbach’s alpha of .86; alpha for the current study was .87. This subscale is correlated with the revised version of the NEO Personality Inventory Neuroticism domain scale ($r = .89$), and with a neuroticism measure based on adjective self-reports ($r = .62$; Costa & McCrae, 1992), demonstrating its validity.

The 5-item Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) assesses overall satisfaction with life. On items such as “I am satisfied with my life” the men responded from 1 (strongly disagree) to 7 (strongly agree). Total score is the sum of the items and can range from 5 (low satisfaction) to 35 (high satisfaction). Diener et al. (1985) reported Cronbach’s alpha of .87; alpha for the current study was .88. Diener et al. (1985) have provided extensive information about the scale’s validity.

**Procedure and Data Analysis**

After receiving approval from the researchers’ university IRB, men were solicited from a university located in the south-central U.S. as well as from social media websites (e.g., Facebook, Reddit) to participate in a study on men’s body image and psychological health. The men accessed a secure website where they provided consent and then anonymously completed the previously described measures in about 30 minutes. University student participants received extra credit points.

Initially, 1015 men entered the website and completed the consent form. Of these, 280 were deleted because they left five or more questionnaires completely blank; an additional five who completed all questionnaires were dropped because they failed the three validity check questions. There were no missing data at the individual item response level for the remaining
participants. Each measure’s distributional properties (e.g., skewness, kurtosis, outliers) were within normal ranges so no transformations were made to the data.

We examined the men’s responses to the three APED use questions to determine their frequency of use. Only 19 men admitted using steroids and all of them also responded affirmatively to the question regarding the use of creatine, protein, etc. Further, only 24 men used only leanness products (i.e., responded affirmatively to the use of fat-burners, etc., but denied using either creatine or anabolic steroids). We then dropped the men who had only used leanness products \((n = 24)\), because including them would have made groupings too small for our analyses, and we did not create a separate category of only anabolic steroid use for the same reason. Based on these responses, we created three groups: (a) used neither leanness nor muscle-building supplements \((n = 306)\); (b) used only muscle building products \((n = 278)\); and (c) used both leanness and muscle building products \((n = 99)\). Thus, our independent variables were APED use (three levels) and sexual orientation (heterosexual vs. gay). Our dependent variables were body image concerns (i.e., body satisfaction, body shame, drive for leanness, muscle dysmorphia), internalization (i.e., general and athletic), and psychological well-being (i.e., neuroticism, depression and satisfaction with life). To determine the relationships of sexual orientation and APED use to these outcomes, we used a series of MANCOVAs in which BMI served as the covariate. Alpha was set at .01 for all analyses.

**Results**

Across all analyses for the dependent variables, the sexual orientation by use of leanness/muscle products interactions were not significant \((ps > .29)\). Thus, we present only findings for the main effects.

**Body Image**
For the body image measures the MANCOVAs for the BMI covariate, Wilk's Λ = .618, \(F(8, 669) = 51.69, p = .000\), partial \(\eta^2 = .382\), APED use, Wilk's Λ = .828, \(F(8, 1338) = 8.18, p = .000\), partial \(\eta^2 = .089\), and sexual orientation, Wilk's Λ = .896, \(F(8, 669) = 9.74, p = .000\), partial \(\eta^2 = .104\), were significant. Regarding APED use, there were no significant differences in terms of the men’s satisfaction with their bodies, \(F(2, 676) = 1.60, p = .202\), partial \(\eta^2 = .005\), faces, \(F(2, 676) = 0.02, p = .98\), partial \(\eta^2 = .000\), nor legs, \(F(2, 676) = 1.24, p = .29\), partial \(\eta^2 = .004\). The men did differ significantly, however, on body shame, \(F(2, 676) = 7.43, p = .001\), partial \(\eta^2 = .022\), drive for leanness, \(F(2, 676) = 33.83, p = .000\), partial \(\eta^2 = .091\), functional impairment, \(F(2, 676) = 9.16, p = .000\), partial \(\eta^2 = .026\), drive for size, \(F(2, 676) = 23.36, p = .000\), partial \(\eta^2 = .065\), and appearance intolerance, \(F(2, 676) = 25.18, p = .000\), partial \(\eta^2 = .069\).

The men who used both leanness and muscle-building products reported higher levels of shame associated with their bodies than did those who did not use either product (Cohen’s \(d = .46\)) or used only muscle products (Cohen’s \(d = .59\)). Men who used both products were more focused on achieving a lean physique than those using only muscle products (Cohen’s \(d = .26\)), who in turn scored higher than the men using neither (Cohen’s \(d = .61\)). Regarding the MDDI Functional Impairment scale, men who used both products scored higher than did those who did not use or only used muscle products (Cohen’s \(d’s = .50\) and \(.72\), respectively). In terms of their internal drive to be bigger and more muscular, the men who used both products or just muscle products did not differ significantly from each other; both groups, however, scored higher than the men who used neither (Cohen’s \(d’s = .39\) and \(.62\), respectively). Finally, the men who used both products were more intolerant of how they looked than those using only muscle products (Cohen’s \(d = .38\)), who scored higher than the men who used neither (Cohen’s \(d = .46\)). See Table 1 for adjusted means and SEs.
Regarding the men’s sexual orientation, there were no significant differences in terms of the men’s satisfaction with their faces, $F(1, 676) = 4.40, p = .036$, partial $\eta^2 = .006$, satisfaction with their legs, $F(1, 676) = 3.69, p = .06$, partial $\eta^2 = .005$, drive for size, $F(1, 676) = 4.76, p = .03$, partial $\eta^2 = .007$, and appearance intolerance, $F(1, 676) = 0.18, p = .67$, partial $\eta^2 = .000$. The men did differ significantly, however, on satisfaction with their bodies, $F(1, 676) = 34.97, p = .000$, partial $\eta^2 = .049$, body shame, $F(1, 676) = 44.18, p = .000$, partial $\eta^2 = .061$, drive for leanness, $F(1, 676) = 18.37, p = .000$, partial $\eta^2 = .026$, and functional impairment, $F(1, 676) = 41.87, p = .000$, partial $\eta^2 = .058$. Compared to their heterosexual counterparts, gay men were less satisfied with their body size/shape (Cohen’s $d = -.53$), more ashamed of their bodies (Cohen’s $d = .58$), more focused on being lean (Cohen’s $d = .41$), and more impaired in carrying out daily tasks when they did not work out (Cohen’s $d = .56$). See Table 1.

**Internalization**

For the internalization measures the MANCOVA for BMI was not significant, Wilk’s $\Lambda = .995, F(2, 675) = 1.74, p = .176$, partial $\eta^2 = .005$; the main effects for APED use, Wilk’s $\Lambda = .912, F(4, 1350) = 15.72, p = .000$, partial $\eta^2 = .045$ and sexual orientation, Wilk’s $\Lambda = .940, F(2, 675) = 21.67, p = .000$, partial $\eta^2 = .060$, were. Regarding APED use, there were significant differences in men’s internalization of general, $F(2, 676) = 16.41, p = .000$, partial $\eta^2 = .046$, and athletic, $F(2, 676) = 30.46, p = .000$, partial $\eta^2 = .083$, appearance ideals. For sexual orientation, similar significant differences emerged: general, $F(1, 676) = 42.77, p = .000$, partial $\eta^2 = .059$, and athletic, $F(1, 676) = 17.64, p = .000$, partial $\eta^2 = .025$.

The men who used both products were more likely to internalize general and athletic appearance ideals than were those who used only muscle products (Cohen’s $d$’s = .36 and .30, respectively); in turn, men who used muscle products reported higher levels of internalization in
these two areas than the men who used none (Cohen’s d’s = .29 and .51, respectively). Gay, compared to heterosexual, men were more likely to internalize general (Cohen’s d = .58) and athletic (Cohen’s d = .36) appearance ideals. See Table 2.

**Psychological Well-Being**

Neither BMI, Wilk's Λ = .985, F (3, 673) = 3.24, p = .022, partial η² = .014, nor APED use, Wilk's Λ = .990, F (6, 1346) = 1.105, p = .357, partial η² = .005, were significant; sexual orientation, however, was, Wilk's Λ = .961, F (3, 673) = 9.12, p = .000, partial η² = .039. For sexual orientation, there were significant differences in their life satisfaction, F (1, 675) = 7.48, p = .006, partial η² = .011, and neuroticism, F (1, 675) = 25.33, p = .000, partial η² = .036; they did not differ significantly in depressive symptomatology, F (1, 675) = 5.20, p = .023, partial η² = .008. Gay men were less satisfied with their lives (Cohen’s d = -.27) and more emotionally reactive (e.g., anxious; Cohen’s d = .47) than the heterosexual men. See Table 3.

**Discussion**

Although we predicted an interaction between APED use and sexual orientation, none existed within our sample. Instead, only main effects were supported, suggesting that each may represent an independent risk in terms of men’s body image concerns and psychosocial functioning. The internalization, and pursuit, of the perfect male body (muscular and lean) may heighten men’s focus on their bodies, lead them to monitor their appearance, and, for some, engage in purposeful behaviors designed to achieve male societal physique ideals (Strelan & Hargereaves, 2005; Tiggemann & Kuring, 2004). And gay men, due to their immersion in an appearance focused subculture, may be particularly vulnerable. APED use may increase vulnerability as well, as men use such substances in pursuit of an internalized ideal of which they fall short.
Because muscularity and body shape are at the center of the male body ideal with a focus on strength, dominance, masculinity, and overall attractiveness (Engeln et al., 2013; Ferguson, 2013; Olivardia et al., 2004; Pompper et al., 2007), it is not surprising that the men who used both leanness and muscle-building products reported the highest levels of internalization and those who used just muscle building products also internalized both ideals more than the no-use group. Our findings are consistent with other research (e.g., Karazia et al., 2013; Parent & Moradi, 2012) that has found direct relationships between the internalization of an athletic ideal and a predilection to use licit (e.g., protein, creatine) and illicit (e.g., AAS) muscle enhancing supplements. Individuals with high levels of internalization, regardless of type, have a set of rigid appearance standards that they believe they must follow. And, because both sets of ideals generally are unattainable for many men, they may resort to more drastic measures, such as the use of multiple types of APEDs.

With the exception of their general satisfaction with their bodies, the men who used leanness and muscle-building products, particularly together, demonstrated higher levels of body shame, stronger drives to be leaner as well as more muscular, more difficulty accepting a missed workout, and more anxiety (and negative thoughts) about their physical appearance compared to the men who used neither. The pursuit of muscularity, in both male athletes (Cafri et al., 2005a; Raudenbush & Meyer, 2003) and non-athlete males (e.g., Cafri et al., 2005a; McCreary et al., 2007), has been associated with the abuse of weight-gaining substances and an increased risk of legal and illicit androgenic-anabolic steroid, and prohormone, usage. Regardless of sexual orientation, men who are pursuing masculine body ideals (leanness and muscularity) may resort to APEDs to help sculpt their physiques and, as they engage in this process, experience high levels of shame about the current state of their bodies.
Previous research has demonstrated that the drive for perfection and body dissatisfaction in men are associated with lower self-esteem and higher levels of depression and anxiety, which can be reduced through deliberate attempts to alter body shape, such as through dieting or weight lifting (Adams, Turner, & Buck, 2005; Cafri et al., 2002; McFarland & Kaminiski, 2009). Contrary to our expectations, however, APED use was not significantly related to the men’s psychological well-being (i.e., satisfaction with life, neuroticism, depression). Neumark-Sztainer, & Eisenberg (2014) found that men with high concerns about muscularity reported lower levels of depressive symptomatology compared to those with high concerns about thinness. Thus, muscularity pursuits, rather than thinness, may serve as a buffer against psychological distress. The majority of existing literature is specifically concerned with anabolic-androgenic steroid usage, which has shown to be directly associated with aggression and depression (Cafri et al., 2005a; Pope & Katz, 1994; Pope et al., 2000). However, little is known about the psychological well-being of men who use other types of supplement (e.g., OTC fat burners, creatine, protein supplements), which were the products primarily used by the men in our sample (only 19 men reported using anabolic steroids or HGH and these men also used legal muscle building supplements). From our findings, there does not appear to be negative effect (in terms of psychological well-being) in the use of legal APEDs to achieve a leaner and/or more muscular physique.

The gay men in our sample reported higher levels of internalization, both athletic and general, and more body image concerns (across four of the eight outcomes), compared to the heterosexual men. These findings are consistent with past research demonstrating that the gay culture, which is very body-focused, hypermasculinized, and concerned with overall physical appearance, creates pressures that may lead to not only internalization (e.g., Lanzieri &
Hildebrandt, 2016; Martins et al., 2007; Tiggemann et al., 2007), but also dissatisfaction and shame associated with current body size and shape and a drive to be leaner and more muscularly defined (Martins et al., 2008; Mayo & George, 2014; Murray & Touyz, 2012). Because of these pressures within the gay community, gay men’s drive for leanness may be a sign of body image pathology and sexual self-objectification and not simply the pursuit of a healthy body (Smolak & Murnen, 2008). The gay men in our sample, compared to their heterosexual counterparts, experienced only higher levels of functional impairment (i.e., behaviors related to maintaining exercise routines and negative emotions resulting from routine deviation), but not higher levels of drive for size nor negative feelings and anxiety about their bodies. These findings support research that indicates gay men are more concerned with losing weight and being lean compared to heterosexual men (Duggan & McCreary, 2004; McArdle & Hill, 2007), and suggests that regardless of sexual orientation, men have an equally high pursuit of a larger, more muscular body.

The gay men in our sample, compared to their heterosexual counterparts, experienced only higher levels of functional impairment (i.e., behaviors related to maintaining exercise routines and negative emotions resulting from routine deviation), but not higher levels of drive for size nor negative feelings and anxiety about their bodies. These findings support research that indicates gay men are more concerned with losing weight and being lean compared to heterosexual men (Duggan & McCreary, 2004; McArdle & Hill, 2007), and suggests that regardless of sexual orientation, men have an equally high pursuit of a larger, more muscular body.

The gay men in our study also reported higher levels of psychological distress, specifically lower satisfaction with life and higher neuroticism. Research has shown that gay men exhibit
elevated levels of neuroticism because of social prejudice, experiences of discrimination, and even genetic variation (Feinstein, Goldfried, & Davila, 2012; Zietsch et al., 2011). These findings may also be explained by the relationship of body image to such psychopathologies. For example, neuroticism has been directly connected to body image concerns (e.g., appearance satisfaction and investment; Swami, Hadji-Michael & Furnham, 2008), and found to moderate the body dissatisfaction – bulimic symptomatology relationship, increasing its strength (Brannan & Petrie, 2008). Thus, a heightened level of neuroticism may interact with self-objectifying behaviors to ultimately increase gay men’s risk of body image concerns (e.g., dissatisfaction, drive for leanness). Further, the gay men in the current study expressed lower satisfaction with life (SWL) compared to their heterosexual counterparts. Gay men’s lower satisfaction with life may be caused by gay-related stress, such as internalized homophobia, discrimination, and social oppression (Bachman & Simon, 2014). Life satisfaction can also be affected by feelings of marginalization, rejection, and isolation within the gay community if men do not approximate the inflexible gay, mesomorphic standards of attractiveness (Lanzieri & Hildebrandt, 2016; Wood, 2004), which supports other studies that have demonstrated significant negative correlations between SWL, anxiety, neuroticism, and body image (Diener & Larsen, 1992; Diener et al., 1985; Larsen, Deiner & Emmons, 1985; McCrae & Sadava, 2001).

This study had limitations that warrant discussion. First, although diverse, our sample was one of convenience and may not represent all gay or heterosexual men. Thus, caution must be taken in generalizing our findings. Second, all data are based on self-report, and the men may have underreported their attitudes and behaviors on certain measures (e.g., admitting to being dissatisfied with certain body parts or acknowledging use of illegal APEDs). Thus, our findings may underestimate the strength of some of the relationships among the variables. Third, our data
are cross-sectional, thus we cannot determine directionality of the relationships. As these relationships become better established, using longitudinal methodologies to track their development and/or changes will be important. Finally, we had an insufficient number of men who reported use of illegal APEDs or only using leanness related products, thus we could not include them in the study. Although the percentage of men who fell within each APED use category may reflect population trends, by not sampling sufficiently for the two excluded categories we were unable to comment on how these men may have fared in relation to the others on the internalization, body image and psychological well-being outcomes we assessed. In future studies, researchers may need to oversample for the two excluded categories (e.g., sample weightlifters) to ensure sufficient numbers.

Our findings suggest rather strong relationships between APED use (particularly the reported use of both leanness and muscularity products) and higher levels of internalization and body image concerns; no relationships were noted with psychological well-being. Further, gay men, who often experience pressures from within their community to achieve hypermasculinized body ideals, reported more body image concerns, greater internalization, and more psychological distress than the heterosexual men. In spite of the limitations of the current study, the findings offer valuable insights that may be useful in clinical practice and future research. A longitudinal study could explore long-term usage of licit APEDS and whether their usage leads to the use of illicit APED usage (e.g., anabolic steroids; see Hildebrandt et al., 2012). Future studies could also examine other demographic variables, such as ethnicity and age, at a greater depth and breadth. Such studies could provide more understanding of how membership in minority subpopulations, comparable to sexual orientation, affects masculine ideologies and APED usage.
### Table 1

*Adjusted Means and Standard Errors by Use of Leanness/Muscle Products and Sexual Orientation for Body Image Measures*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Neither (n=306)</th>
<th>Muscle (n=278)</th>
<th>Lean/Musc (n=99)</th>
<th>Gay (n=146)</th>
<th>Heterosex (n=537)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sat-Face</td>
<td>4.35 (.06)</td>
<td>4.36 (.07)</td>
<td>4.33 (.10)</td>
<td>4.26 (.08)</td>
<td>4.44 (.04)</td>
</tr>
<tr>
<td>Sat-Body</td>
<td>3.57 (.07)</td>
<td>3.66 (.08)</td>
<td>3.43 (.11)</td>
<td>3.27 (.08)a</td>
<td>3.84 (.05)b</td>
</tr>
<tr>
<td>Sat-Legs</td>
<td>4.16 (.08)</td>
<td>4.14 (.09)</td>
<td>3.93 (.13)</td>
<td>3.96 (.10)</td>
<td>4.18 (.06)</td>
</tr>
<tr>
<td>Shame</td>
<td>2.87 (.08)a</td>
<td>2.83 (.09)a</td>
<td>3.38 (.12)b</td>
<td>3.40 (.10)a</td>
<td>2.65 (.06)b</td>
</tr>
<tr>
<td>Leanness</td>
<td>3.86 (.06)a</td>
<td>4.43 (.07)b</td>
<td>4.71 (.10)c</td>
<td>4.53 (.08)a</td>
<td>4.14 (.05)b</td>
</tr>
<tr>
<td>MDDI-FI</td>
<td>2.56 (.07)a</td>
<td>2.45 (.07)a</td>
<td>2.85 (.10)b</td>
<td>2.97 (.08)a</td>
<td>2.36 (.05)b</td>
</tr>
<tr>
<td>MDDI-DS</td>
<td>2.39 (.06)a</td>
<td>2.99 (.07)b</td>
<td>2.85 (.10)b</td>
<td>2.84 (.08)</td>
<td>2.65 (.05)</td>
</tr>
<tr>
<td>MDDI-AI</td>
<td>1.46 (.06)a</td>
<td>1.90 (.07)b</td>
<td>2.20 (.09)c</td>
<td>1.87 (.08)</td>
<td>1.84 (.04)</td>
</tr>
</tbody>
</table>

*Note:* Sat = Body Parts Satisfaction Scale-Men subscales for Face, Body, and Legs (scores can range from 1, *extreme dissatisfaction*, to 6, *extreme satisfaction*). Shame = Body Shame Scale (scores can range from 1, *low shame*, to 5, *high shame*). Leanness = Drive for Leanness Scale (scores can range from 1, *low drive*, to 6, *high drive*). MDDI = Muscle Dysmorphic Disorder Inventory subscales for
Functional Impairment (FI), Drive for Size (DS) and Appearance Intolerance (AI) (scores can range from 1, low, to 5, high, on each subscale)

\(^{a,b}\) means that do not share a common superscript are significantly different at \(p < .01\). Means that do not have any superscripts associated with them are not significantly different from each other. Mean comparisons were made separately among the three leanness/muscle product groups and between the two categories of sexual orientation.
Table 2

*Adjusted Means and Standard Errors by Use of Leanness/Muscle Products and Sexual Orientation for Internalization Measures*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Neither (n=306)</th>
<th>Muscle (n=278)</th>
<th>Lean/Musc (n=99)</th>
<th>Gay (n=146)</th>
<th>Heterosex (n=537)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>2.98 (.07)(^a)</td>
<td>3.31 (.08)(^b)</td>
<td>3.69 (.11)(^c)</td>
<td>3.65 (.09)(^a)</td>
<td>3.00 (.05)(^b)</td>
</tr>
<tr>
<td>Athletic</td>
<td>2.99 (.07)(^a)</td>
<td>3.57 (.07)(^b)</td>
<td>3.84 (.10)(^c)</td>
<td>3.67 (.08)(^a)</td>
<td>3.27 (.05)(^b)</td>
</tr>
</tbody>
</table>

*Note:* General and Athletic = subscales from the Sociocultural Attitudes Toward Attractiveness Questionnaire – 3 (scores can range from 1, *low internalization*, to 5, *high internalization*).

\(^a\)^\(^b\) – means that do not share a common superscript are significantly different at \(p < .01\). Means that do not have any superscripts associated with them are not significantly different from each other. Mean comparisons were made separately among the three leanness/muscle product groups and between the two categories of sexual orientation.
### Table 3

**Adjusted Means and Standard Errors by Use of Leanness/Muscle Products and Sexual Orientation for Psychological Well-Being Measures**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Neither (n=306)</th>
<th>Muscle (n=278)</th>
<th>Lean/Musc (n=99)</th>
<th>Gay (n=146)</th>
<th>Heterosex (n=537)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sat-Life</td>
<td>23.15 (.48)</td>
<td>22.95 (.53)</td>
<td>22.43 (.75)</td>
<td>21.90 (.60)(^a)</td>
<td>23.79 (.35)(^b)</td>
</tr>
<tr>
<td>Dep.</td>
<td>6.63 (.42)</td>
<td>6.78 (.47)</td>
<td>8.45 (.66)</td>
<td>7.98 (.53)</td>
<td>6.60 (.31)</td>
</tr>
<tr>
<td>Neurot.</td>
<td>33.32 (.64)</td>
<td>33.75 (.71)</td>
<td>35.68 (1.00)</td>
<td>36.56 (.80)(^a)</td>
<td>31.93 (.46)(^b)</td>
</tr>
</tbody>
</table>

**Note:** Sat-Life = Satisfaction with Life Scale (scores can range from 5, *low satisfaction*, to 35, *high satisfaction*). Dep = Patient Health Questionnaire-9 (scores can range from 0, *few depressive symptoms*, to 27, *high depressive symptoms*). Neurot. = Neuroticism subscale from the NEO-Five Factor Inventory (scores can range from 1, *low drive*, to 6, *high drive*). 

\(^a\)^, \(^b\)^ – means that do not share a common superscript are significantly different at \(p < .01\). Means that do not have any superscripts associated with them are not significantly different from each other. Mean comparisons were made separately among the three leanness/muscle product groups and between the two categories of sexual orientation.
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Founded in 1892, the University of Rhode Island is one of eight land, urban, and sea grant universities in the United States. The 1,200-acre rural campus is less than ten miles from Narragansett Bay and highlights its traditions of natural resource, marine and urban related research. There are over 14,000 undergraduate and graduate students enrolled in seven degree-granting colleges representing 48 states and the District of Columbia. More than 500 international students represent 59 different countries. Eighteen percent of the freshman class graduated in the top ten percent of their high school classes. The teaching and research faculty numbers over 600 and the University offers 101 undergraduate programs and 86 advanced degree programs. URI students have received Rhodes, Fulbright, Truman, Goldwater, and Udall scholarships. There are over 80,000 active alumnae.

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