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Men and muscularity research: a review

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Abstract

Over the past 25 years, understanding males' interest in and outcomes of muscularity has developed into a major area of study. Research has been fueled by the development of measures of both the attitudinal and behavioral aspects of a desire to increase muscularity. Our research purpose was to critically assess muscularity research. Using a database search, the ancestry approach, and searching key journals, we identified empirical refereed journal articles with men as participants published from 2000 to 2019 to serve as our data. Our analyses revealed several individual characteristics (e.g., perfectionism, holding to traditional masculine norms) and socio-cultural influences (e.g., media, verbal commentary) that fueled men's desire to be muscular. In experimental research, exposure to muscular male ideal images has resulted in low body image scores for young men in investigations that utilized pre-test, post-test designs. In survey research, muscularity was positively related to several risky behaviors or behaviors that could become risky if taken to the extreme. Overall, the reviewed research was conducted in western countries and researchers primarily utilized non-probability samples of undergraduate men. Recommendations for future research are provided.

Keywords: Body image, Media, Men, Muscularity, Objectification, Personality, Well-being

Body image is people's perceptions of, thoughts and feelings about, and behaviors toward their bodies and one way to measure it is through assessments of body satisfaction (Grogan 2008). Body dissatisfaction involves identifying differences between individuals' self-assessments of their bodies and their physical ideals that result in negative views of the body (Grogan 2008). Negative perceptions of the body have resulted in damaging psychological states and risky behaviors including disordered eating, low self-esteem, anxiety, and depression (McCabe & Ricciardelli 2004). Thus, understanding body image and how it impacts everyday experience is important.

Research on body image concerns and women has often focused on dissatisfaction with weight and the related drive for thinness. In contrast, while on average many men may be satisfied with their weight,[1] current research on body image concerns and men has focused on muscularity (McCreary 2012). Muscularity refers to the degree to which the muscles in a body are developed

[1] Silberstein et al. (1988) found that roughly equal numbers of men were dissatisfied because they wanted to lose weight (be smaller) as those who were dissatisfied because they wanted to gain weight (be larger). However, because previous researchers averaged discrepancy scores, the scores cancelled each other out, making it appear that men were, on average, satisfied with weight. See also Gardner (2002) for comments on discrepancy scores in the context of children's body image assessments.

(Edwards et al. 2014) and is a key factor in body dissatisfaction in men (Jampel et al. 2015). While this area of research is growing, it has only been a major focus of research for the past 25 years.

The purpose of this paper was to perform a narrative critical literature review (Jessen & Lacey 2006) of muscularity research published from 2000 through 2019 that recruited males as participants. Our objective was to provide a 360-degree view of muscularity research. Thus we organized this review into two parts: antecedents of muscularity (i.e., muscularity as a dependent variable) and consequences of muscularity (i.e., muscularity as an independent or predictor variable). We identified the twenty year time frame due to the development of a key measure of muscularity, the Drive for Muscularity (DFM) scale[2] (McCreary & Sasse 2000) in 2000 that served as a major impetus for muscularity research. A second purpose was to evaluate the generalizability of the research. Specific research questions addressed were as follows: (1) What variables have been studied as antecedents of muscularity? (2) What variables have been studied as consequences of muscularity? (3) What age groups participated in research addressing antecedents and consequences of muscularity? (4) To what extent are the findings of this research generalizable? We were specifically interested in participant's average age or age range because young men (i.e., college age) may differ from mature men[3] (i.e., men age 40, 50, 60 and beyond) with respect to antecedents and consequences of muscularity.

Literature review

Reviews of muscularity research with male participants

This influx of research on muscularity has resulted in several researchers reviewing, evaluating, and synthesizing this literature. An early example is Cafri and Thompson (2004) who reviewed and evaluated males' body image and measures used for assessment. Measures were selected for review if they had items that: (a) evaluated a muscular appearance; (b) focused on upper torso features; and (c) if the items assessed attitudes/behaviors (e.g., disordered eating) the items related to a muscular bodily appearance. They conclude that the most effective male body image measures reviewed are the DFM, the somatomorphic matrix, and a variation of the somatomorphic matrix; it was suggested that increasing the use of these measures might result in more accurate measures of male body image.

Researchers also completed analyses focused on the consequences of a desire to increase muscularity. For example, Ricciardelli and McCabe (2004) reviewed research on adolescent boys and found that some of the same factors associated with disordered eating (i.e., alcohol and other drug use, body image concerns, body mass index, pubertal growth, negative affect, perfectionism, self-esteem) were also associated with the pursuit of muscularity. Cafri et al. (2005) reviewed research on the physical and psychological consequences and risks associated with striving for a muscular ideal; they focused on steroid use, ephedrine use, and dieting. They conclude that such behaviors indeed do pose significant psychological and health risks and suggest several ideas for future researchers to pursue (e.g., development of more precise measures of behaviors, use of longitudinal designs, recruitment of older groups of male participants).

[2] Other researchers have subscales called drive for masculinity. In this paper we use Drive for Muscularity and DFM to mean the scale developed and published by McCreary and Sasse (2000).

[3] For example, as a result of their review Cafri et al. (2005) call for future studies including older groups of males when researching men and muscularity.

Researchers (Barlett et al. 2008; Blond 2008) meta-analyzed and reviewed research on males' exposure to muscular media images and the effect on body image variables. Barlett et al. considered both survey and experimental research in their meta-analyses, while Blond considered only experimental research. These authors found that exposure to muscular images in the media was associated with (in survey research) or led to (experimental research) negative body image outcomes including body dissatisfaction, lower self-esteem, and psychological disorders (e.g., depression). In addition, Barlett et al. also found that self-reported exposure to muscular images was related to behavioral outcomes (e.g., excessive exercising).

Murray and Touyz (2012) reviewed research on males' body image disorders. They noted that males' body dissatisfaction generally results in either a drive for enhanced thinness which may lead to anorexia nervosa or a drive for enhanced muscularity which may result in muscle dysmorphia.[4] Accordingly, they reviewed research that investigated factors associated with males' body image disorders that predisposed them to a pursuit of thinness or a pursuit of muscularity. They suggest that males' gender role endorsement might be one such factor.

Edwards et al. (2014) focused their review on research utilizing the DFM scale and conducted with either males or females. They reported that variables repeatedly related to DFM included gender (males indicating a higher drive for muscularity than females), anxiety, and body shame. Behaviors related to DFM included activities designed to increase muscle size such as dietary manipulation and resistance training.

Two reviews focused on body image disturbances. Parent (2013) reviewed research that examined body image disturbances involving muscularity (e.g., muscle dysmorphia) and made treatment recommendations. Finally, a narrowly focused review was completed by Lavender et al. (2017). Their review examined males' eating disorders (ED) related to (a) weight loss (i.e., traditional ED) and (b) muscularity (i.e., cycling between calorie restriction and increased calorie volume from protein). They called for research on the prevention and treatment of males' eating disorders stemming from both sources.

Each of these reviews provides a critical summary of knowledge of different research directions within muscularity research. They provide frameworks for future research as they synthesize the state of information as well as identify inconsistencies, knowledge gaps, and unanswered questions. As such, they move inquiry forward.

However, in some of the reviews it is not always apparent whether participants in reviewed studies are men, teen boys, or boys. Thus, it is not always clear which results apply to which participant age groups.[5] This point needs clarification because most research on men and body dissatisfaction is based on college-aged men and it is questionable whether or not such research can be generalized to middle-aged and older men (Grogan 2008; McCabe & Ricciardelli 2004). For example, an early study found that older men ($M_{age} = 53$) selected figures as ideal that were much thinner than the figures selected to represent their current body size, whereas college men selected figures as ideal that were somewhat larger than their current body size (Lamb et al. 1993);

[4] Muscle dysmorphia has been defined as a special type of body dysmorphic disorder characterized by a pathological preoccupation with one's degree of muscularity (Pope et al. 1997).

[5] McCabe and Ricciardelli (2004) is an exception and organize their review by whether participants in a study were pre-adolescent boys, adolescent boys, or men.

the authors suggested that the older men may have been dissatisfied with their level of fat. Furthermore, in their review Murray and Touyz (2012) highlight the importance of age, noting that it has been shown to affect males' body image concerns. Finally, in their meta-analysis of media effects on body image, Barlett et al. (2008) found that age of male participants moderated the relationship between exposure to muscular images (in correlational and experimental research) and body image variables.

The current review is not focused solely on instrument development (Cafri & Thompson 2004), boys or male adolescents (Ricciardelli & McCabe 2004), or on consequences and risks associated with striving for a muscular ideal (Thompson et al. (2005); nor is it primarily about male body image disorders (Murray & Touyz 2012), research utilizing only the DFM scale (Edwards et al. 2014), or body image disturbances (Parent 2013; Lavender 2017). Like Barlett et al. (2008) and Blond (2008), we reviewed research on muscularity as an independent or predictor variable (including but not limited to exposure to muscular media images) and its effects. However, our review also focused on the antecedents of muscularity; hence our review was broader in terms of topics and covered a longer span of time.

Method

To locate empirical research published in refereed journals focusing on the two muscularity topics identified, multiple databases were searched (e.g., Psych Info, Google Scholar, Academic Search Premier, Web of Science) using six key terms: muscularity, muscular, muscle building, muscle, men, and women. The ancestry approach, an approach that entails examining cited research in a located article as a source for additional research on the topic was also employed (Blue, 1995). A search was also conducted of key journals (e.g., *Psychology of Men & Masculinities, Body Image*) wherein the focus of the journal was congruent with the topic of muscularity. The current review was limited to journal articles reporting empirical research, published in English with adult male participants, and that included muscularity as a variable. Of those articles located through the search, those that had participants under 18 years of age,[6] (i.e., adolescents or preadolescents), that were focused only on women, or that did not analyze men's and women's responses separately were not considered in this review. Also excluded from this review was research focused on scale development. A list of all included studies is available from the authors.

Results

To take a 360-degree view of muscularity research, our review is organized into two broad categories: research investigating antecedents of muscularity and research investigating consequences of muscularity. Within each section a brief description of representative studies is presented that includes major findings, theoretical framework employed, sample size and location, and participant age. Each set of representative studies is followed by a summary of reported results and suggestions for future research. Finally, we conclude with limitations of this body of work.

[6] Age of majority in most U.S. states is 18.

Antecedents of muscularity

In this section, our focus was on research in which a muscularity variable was the dependent variable. Recognizing that all individuals exist in multiple spheres of influence simultaneously but that researchers typically do not investigate all spheres of influence simultaneously; the following section is organized into two broad categories: personal characteristics and socio-cultural influences as motivators for muscularity. Personal characteristics include attributes such as personality or holding specific attitudes and beliefs. Socio-cultural influences include factors such as feeling threatened, media influences, objectification experiences, or verbal commentary.

Personal characteristics

Researchers have identified specific personal characteristics that might underlie a desire for muscularity. Davis et al. (2005) reasoned that since narcissism, neuroticism, and perfectionism were personality traits that were all associated with a desire for thinness in women, these same traits might be linked to a drive for muscularity in men. These researchers had 100 undergraduate men (M_{age} = 22.8 years) recruited from a Canadian university complete measures of these three traits, along with scales assessing to what extent participants had an appearance orientation or a fitness orientation (i.e., degree of investment in and time spent on), and the DFM scale. Neuroticism, perfectionism, having a fitness orientation, and an appearance orientation were all significant predictors of DFM. Eight years later drawing their sample from undergraduate men (n = 339) enrolled in British universities (M_{age} = 20 years) and employing Cash's cognitive-behavioral model of body image, Tod and Edwards (2013) replicated the finding that DFM was linked to having an appearance orientation.

Egalitarianism, (i.e., the belief that social status and other resources should be distributed equally within social groups), has also been studied relative to muscularity. Price et al. (2011) conducted research with men (n = 56; M_{age} = 20 years) and women[7] (n = 62; M_{age} = 21.3 years) who were recruited at a British university. The researchers used evolutionary theory and argued that "traits which enhance one's social status should inspire others to treat one relatively well and thus allow one to benefit from inequality" (p. 636). Thus, men who met the physical ideal of muscularity should experience enhanced social status, and therefore should expect to gain positive rewards from others due to their muscular appearance and expect to be treated better than non-muscular men. Their research supported their reasoning; that is, British men with muscular upper bodies indicated a preference for social inequality, indicated they should receive special treatment, and indicated a preference for unequal outcomes.

Researchers have also investigated specific attitudes and beliefs that men may hold for their influence on desire for muscularity. Steinfeldt et al. (2011) employed social comparison theory in their mixed method study designed to investigate the extent to which holding traditional masculine norms was related to DFM in college football players (n = 197; M_{age} = 19.39 years) in the United States. The degree to which participants held masculine norms was measured by having participants agree with statements reflective

[7] Women's results not reported in this review.

of traditional norms for men in U.S. society (e.g., "I tend to keep my feelings to myself," "My work is the most important part of my life"). The quantitative study revealed that masculine norms of risk taking, emotional control, and primacy of work were related to drive for muscularity. When asked why the participants wanted to be muscular, the qualitative study revealed their reasons were primarily tied to improving their athletic abilities as football players. Participants also noted the social benefits of being muscular including improved appearance, sexual appeal, and conforming to social pressures to meet a physical ideal.

Gattario et al. (2015) studied young men drawn from universities located in the United States ($n=192$; $M_{age}=19.21$ years), the United Kingdom ($n=141$; $M_{age}=20.5$ years), Australia ($n=160$; $M_{age}=21.88$ years), and Sweden ($n=142$; $M_{age}=21.25$ years); the researchers also found that the more participants reported conforming to masculine norms, the higher their drive for muscularity. Earlier, Mc Creary et al. (2005) in two studies with young men ($n=157$; $n=527$) recruited from a Canadian university ($M_{age}=20$ years), had their participants complete a questionnaire with measures of gender-typed traits and behaviors along with the DFM. Results of Study 1 revealed participants who were high in unmitigated agency (i.e., being more concerned with the self than with others) had high levels of DFM. In addition, those participants who reported acting in male-valued and male sex-specific ways (i.e., behavior that is equally desirable for men and women but more stereotypic of men) also had a high DFM. Results of Study 2 revealed men who held traditional gender-type beliefs also wanted to be muscular. Finally, Swami and Vorasek (2013) in their study of 327 British men ($M_{age}=32.30$) found that DFM was predicted by holding sexist attitudes toward women, hostility toward women, and objectification of women.

Summary and future research

To date researchers have documented that personal attributes such as perfectionism and risk taking as well as holding specific beliefs and attitudes (e.g., holding to masculine norms, objectifying women, holding sexist attitudes) fuels desire for muscularity. All of this research was conducted with men located in westernized cultures (e.g., Canada, U.S., United Kingdom, Australia). Moving forward it could be useful to investigate personal values for their possible role in shaping attitudes and behaviors concerning muscularity. Understanding value orientations is important because research indicates value orientations can predict behavior as well as behavioral predispositions (Rokeach 1973). Studying relationships between muscularity and values (e.g., egalitarianism, a sense of accomplishment) within a range of cultural contexts might prove useful.

Socio-cultural influences: threats to masculinity

A range of socio-cultural influences have been studied for their influence on men's desire to be muscular. In early research, Mills and D'Alfonso (2007) studied 66 undergraduate men ($M_{age}=19.94$ years) recruited in Canada whose masculinity was either threatened or reassured. As compared to the unthreatened men, men whose masculinity was threatened reported feeling less muscular as well as dissatisfied with their bodies. Consistent with Mills and D'Alfonso and ten years later, Lee-Won et al. (2017), in their research with 238 undergraduate men ($M_{age}=20$ years), recruited U.S. participants for a study

to understand how people create online personae. Participants customized an avatar that looked like themselves utilizing a scale that varied degree of muscle definition. Participants who experienced a threat to their masculinity created self-resembling avatars that were more muscular than did unthreatened men. However, Frederick et al. (2017) also studying undergraduate men ($n = 193$; $M_{age} = 20$ years) from the U.S. reported that the threatened men were satisfied with their muscularity but the reassured men were dissatisfied.

Summary and future research

Some research teams investigated whether men who experienced a threat to their masculinity would desire to be muscular or would produce a representation of themselves that was muscular. Their results have been inconsistent. Perhaps the inconsistency is tied to how the threat to masculinity was operationalized. Lee-Won et al (2017) operationalized threat by manipulating test results and telling the threatened men they performed more like the average woman than like the average man. Frederick et al. (2017) operationalized threat by having participants complete a masculinity scale and then telling them their score indicated they were more masculine than 19% of other men. Different operationalizations of threat to masculinity could evoke different responses in men. For example, telling a man he is a weakling might have a greater effect on muscularity than telling him he cannot spell as good as women can. Researchers may need to identify what specific threats to what aspects of masculinity result in men increasing their desire for muscularity (Frederick et al. 2017).

Moving forward, Frederick et al. (2017) noted that identifying how different threats to masculinity impact men's feelings about their bodies is worth further study to clarify whether these threats produce a reliable effect. With the explosion of recognized categories of gender, it would also be beneficial to investigate whether the influence of threats is similar across gender categories (i.e., non-binary, gender-neutral, agender, transgender, cisgender). It might also be useful to employ qualitative research strategies to identify relevant mediators and moderators to the association between threat to masculinity and muscularity.

Socio-cultural influences: media

Nearly twenty years ago, Vartanian et al. (2001) investigated the influence of susceptibility to appearance-related mass media, experience with being teased about appearance, and exposure to peers who complained about their own appearance on U.S. undergraduate men's ($n = 111$)[8] satisfaction with two aspects of their bodies: muscularity/fitness and thinness. Susceptibility to appearance related mass media was operationalized to include use of fashion magazines and fitness/body-building magazines as well as exposure to televised appearance-related messages (e.g., advertisements). Participants indicated how important these media sources were to them as well as how often they viewed this content. Each media type was not analyzed separately. Of these variables, both susceptibility

[8] Information on age was not reported by participant sex.

to appearance-related mass media and frequency of experiencing teasing were important to predicting muscle/fitness dissatisfaction.

Subsequently, utilizing survey designs and convenience samples, multiple research teams have studied the media as an influence on attitudes and behaviors related to muscularity. In early research the focus was on documenting that simple exposure (i.e., reading) to men's magazines (e.g., *Maxim, Esquire, Men's Health, Stuff*) or on documenting that viewing image-related television (i.e., programs containing information about male physical ideals) fueled a desire to increase muscularity. For example, Hatoum and Belle (2004) centered their research on time spent viewing male-directed magazines in their research with 89 undergraduate men drawn from the U.S. (M_{age} = 19.46 years). The more time participants spent viewing male-directed magazines the more concern they expressed about their muscularity. In addition, compared to men with low levels of exposure, men that spent high amounts of time viewing men's magazines were more likely to take supplements to build muscle, spend time exercising, hold gym memberships, have a high desire for muscularity, and endorse positive attitudes and behaviors related to muscularity and fitness.

Duggan and McCreary (2004) reported similar findings with 96 men[9] who were either heterosexual or gay and recruited from Internet sites. As participants' level of viewing and purchasing male fitness and muscle magazines increased, so did their DFM. Ten years later, Crambitt and Pritchard (2013) used social comparison theory and replicated this finding with 126 undergraduate men (M_{age} = 21.5 years) drawn from the U.S. Specifically, the more time participants spent reading men's health magazines or watching image-focused television, the higher their DFM.

Subsequently, researchers shifted attention to identifying the mechanisms by which exposure to physical ideals via the media exerted influence. Key to the media's influence appears to be internalization of physical ideals (i.e., internalized socio-cultural standards of appearance). For example, investigating both media use and internalization of media ideals with 161 undergraduate men (M_{age} = 22.17 years) recruited in the United Kingdom, Giles and Close (2008) reported the effect of use of men's lifestyle magazines on the attitudinal component of DFM was mediated by internalization of media ideals. Similarly, the effect of use of men's magazines on the behavioral component of DFM was partially mediated by internalization of media ideals. Similar findings were reported one year later by Daniel and Bridges (2010) with 244 undergraduate men (M_{age} = 21.35 years) recruited in the U.S., by Cramblitt and Pritchard (2013), by Davids et al. (2019) in a sample of 473 men[10] recruited via MTurk, and by Schneider et al. (2016) with young Austrian men (n = 249; M_{age} = 25.9 years) who were weight trainers.

As internalization of physical ideals is important to DFM, what factors precede internalization? This question was addressed by Stratton et al. (2015) in their research with young men (n = 307) (M_{age} = 27 years) from Australia. Utilizing the tripartite influence model, they found that both peer influences (i.e., encouragement from friends to become muscular) and media exposure led to internalization. Thus, the extant research suggests that viewing media sources that promote a muscular physique and having friends that

[9] No information on participant age reported.

[10] No information on participant age reported.

promote this physique leads to internalization of a muscular ideal which consequently results in body comparisons that can fuel DFM.

Summary and future research

In summary, susceptibility to appearance-related mass media and teasing predicted muscle dissatisfaction. In addition, researchers found that the more time males spent reading magazines, the more muscular concern they expressed, the more muscle-building related behaviors they practiced, and the higher their desire for muscularity. Such media effects on desire for muscularity were partially mediated by internalization of media ideals.

Moving forward, researchers may want to consider other antecedents to internalization of a muscular ideal. One possible antecedent that could exert an influence is self-concept clarity. Self-concept clarity refers to the extent to which beliefs about the self are clearly and confidently defined, internally consistent, and stable (Campbell et al. 1996). Perhaps internalization of muscular ideals varies as a result of level of individuals' self-concept clarity. Being raised in a family environment that encouraged muscularity and fitness could also contribute to the internalization of a muscular ideal as well as experiences in educational environments (e.g., organized sports, dance, cheerleading, fraternities, sororities) that promoted fitness and associated muscularity. A qualitative research strategy could be useful in identifying other variables that promote internalization of muscularity ideals.

Socio-cultural influences: objectification

Davids et al. (2019) framed their research with objectification theory and tested experiences of sexual objectification as a direct influence on DFM with heterosexual college men in the United States. Sexual objectification experiences did have a direct impact on DFM and internalization of physical ideals was a partial mediator of this effect. Earlier, Hallsworth et al. (2005) used objectification theory to examine relationships between self-objectification and desire for muscularity. Their participants were body builders ($n = 31$; $M_{age} = 28.89$ years), weightlifters ($n = 17$; $M_{age} = 27.6$ years), and a control group of young men ($n = 35$, $M_{age} = 26.43$ years). Bodybuilders experienced significantly higher levels of self-objectification than either the weightlifters or the control group. Body builders also reported significantly higher levels of body dissatisfaction and desire for muscularity than did control participants. Across all participants, self-objectification was significantly associated with self-surveillance and also had a direct relationship with desire for muscularity. In contrast, Daniel and Bridges (2010), who framed their study utilizing objectification theory, reported no significant effects for participants' level of self-objectification on DFM with their sample of 244 undergraduate men ($M_{age} = 21.35$ years) studying in the United States.

Also interested in the influence of objectification, Johnson et al. (2007) used an experimental design to test their hypothesis that simple exposure to objectified images of both men and women propelled DFM with 90 undergraduate men ($M_{age} = 22.43$ years) studying in Canada. Their hypothesis was not supported.

Summary and future research

Research findings on the impact of objectification are mixed. Part of the inconsistent results could be due to which aspect of objectification was studied (i.e., self- versus other-objectification). Inconsistent results may also result from whether the researchers studied objectification as a state or a trait of their participants as well as how these variables were operationalized in the research. For example, Johnson et al. (2007) exposed their participants to objectified images of men and women. This procedure has been used to evoke a state of self-objectification in research participants (Lennon & Johnson 2015). These muscularity researchers did not conduct a manipulation check to determine if self-objectification was evoked in their participants. Thus, it could be assumed that participants may have experienced it or may not. Either way, without controlling for this possible effect on the dependent variable, results could be inconsistent. Another contributor could be differences in the operationalization of self-objectification as a trait. Hallsworth et al. (2005) utilized the Self-Objectification Questionnaire devised by Noll and Fredrickson (1998) to assess individual differences in self objectification with women. Measures designed for use by women may not be as reliable or valid when used with men. Finally, other research by Davids et al. (2019) suggests that objectification may not be as relevant for men as for women and research by Schwartz et al. (2010) may imply that objectification does not apply to heterosexual men.

However, it has been noted that men are increasingly sexually objectified and that drive for muscularity may be an outcome (Szymanski et al. 2011). They suggested that researchers might attempt to identify environments in which objectification of men occurs and study the extent to which objectification is relevant to men in those surroundings. One such environment that is reported to be sexually objectifying for men is modeling (Mears 2011); hence, that might be a context in which future researchers could study the extent to which objectification theory applies to men.

Moving forward, self-objectification examined as a mediator or moderator may be useful in explaining the influence of both personal and other socio-cultural influences (family members, peers, participation in various social groups) on desire for muscularity. More research is needed to examine whether or under what circumstances objectification might explain men's muscularity attitudes and behaviors.

Socio-cultural influences: verbal commentary

Researchers interested in the influence of verbal commentary on individuals' desire to be muscular centered their work on determining to what extent positive and negative comments made by friends, family members, and other important influencers exerted an impact. For example, Nowell and Ricciardelli (2008) had 214 men enrolled in an Australian university ($M_{age} = 22.5$ years) complete a questionnaire with measures of body dissatisfaction, muscularity concerns, verbal commentary relating to body appearance, self-esteem, and social desirability. Frequent negative comments were associated with attitudes toward muscularity but not actual behaviors. However, frequent positive comments were associated with behaviors concerning muscularity but not attitudes. With a sample of U.S. based undergraduate athletes ($n = 183$, $M_{age} = 20.34$ years) representing a range of sports, Galli et al. (2015) also reported muscularity was motivated by

comments from coaches and teammates as well as by individuals' thoughts concerning how well the required uniform looked on their bodies. Another study (Vartanian et al. 2001) found that frequency of teasing about appearance was associated with muscle/fitness dissatisfaction.

Summary and future research

Research on the impact of positive or negative comments on desire for muscularity is limited. What does exist suggests that positive comments may result in individuals acting on those comments but negative comments may stop at the level of thought, that is, contribute only to developing negative body image. Additional research is needed to further support this interpretation. Research is also needed to clarify how men actually interpret positive and negative comments from family and peers. For example, both positive and negative comments have been found to be harmful to women's body image (Herbozo et al. 2017; Tiggemann and Boundy 2008). Is the same true for men? Do positive comments motivate or reinforce men's behaviors? To what extent are comments from either family or peers important? Researchers might also want to assess the initial level of muscularity and/or muscle satisfaction of individuals participating in their research as a baseline to assess the impact of verbal comments. Obtaining a baseline would be useful in both pretest-post-test experiments as well as longitudinal studies. Implementing a mixed method approach to addressing these questions should also prove beneficial as this research strategy would enable deeper inquiry into the extent of the impact of verbal comments on muscularity.

Socio-cultural influences: ethnicity

A few research teams have centered their research on ethnicity as a possible explanation for differences in drive for muscularity in men. For example, Jung et al. (2010) drew a sample of college men from a university in Hong Kong ($n=109$) and a university located in the mid-Atlantic region of the U.S. ($n=114$). As compared to the U.S. sample, the Hong Kong sample selected less muscular figures to represent their actual body, their ideal body, the body they perceived as desired by other men, and the body they perceived as most attractive to women. The Hong Kong participants scored lower on drive for muscularity, associated fewer positive traits with muscularity, and reported higher satisfaction with their level of muscularity overall than did the U.S. participants. Subsequently, studying only Asian undergraduate men ($n=338$) living in the U.S., Cheng et al. (2016) reasoned that these men may want to be muscular due to their acculturation to western ideals for men. Participants who wanted to be muscular also wanted to look like the male images featured in the media and adhered to athletic body ideals. In addition, participants who experienced racism also indicated positive attitudes toward muscularity.

Summary and future research

Recent research focused on ethnicity and muscularity is mixed. When Asian college men are compared to U.S. college men, the U.S. men scored higher on DFM and were less satisfied with their muscularity. However, in a sample of U.S. college students of Asian ethnicity those who scored higher on DFM adhered to muscular body ideals, aspired to

achieve the look of male media images, and reported more racism experiences. Thus, the acculturation of U.S. college men of Asian ethnicity may contribute to their DFM.

There is limited research on possible differences in desire for muscularity tied to ethnicity. What results exist suggest that experience in western cultures may be key to explaining desire for muscularity in non-western men. This supposition warrants investigation. As most of the research conducted to this point in time is based in data drawn from samples of predominantly young, white men, research on muscularity could be advanced with samples of men representing greater diversity in terms of ethnicity and cultural context.

Consequences of muscularity

In this section, research is presented wherein a muscularity variable was the independent or predictor variable. Hence, our interest was in the dependent or criterion variables influenced by muscularity in the studies. Most researchers studying the influence of muscularity focused on body image (e.g., affective, cognitive, behavioral) and other psychological variables (e.g., well-being, self-concept, emotion), and psychological disorders (e.g., eating disorder symptoms). However, since dependent variables so influenced vary by research strategy, we categorize and discuss the literature as a function of research strategy in this section.

Body image: experimental research

Experimental researchers have found effects of muscularity primarily on affective body image variables (e.g., body satisfaction, body esteem). In this research, researchers often operationalized muscularity by showing participants media figures (e.g., video game characters, action figures, magazine images, advertising images, or music video clips) that varied in level of muscularity. Just as exposure to thin ideal images is associated with lower body image scores in young women (e.g., Yu 2014), some researchers have found that exposure to muscular male ideal images is associated with lower body image scores for young men. However, results have been inconsistent. Sometimes such effects are only found with certain groups of men and sometimes no such effects are found. Closer inspection shows that all researchers who found significant effects for all groups of men on muscularity used a pretest post-test design.

Barlett and Harris (2008) conducted an experiment, varied muscularity, and used the Tripartite Influence Model to explain the effects of exposure to ideal media images. They tasked 51 U.S. college men ($M_{age} = 19.22$) to play a video game with either a muscular or a non-muscular character. Participants completed measures of body image, played the video game, and then completed the body image measures again. Body esteem decreased for men who played the game with a muscular character; also after playing with the muscular character participants were less satisfied with their own muscularity, while their positive thoughts, feelings, and behavioral intent toward muscularity increased. Similarly, Mulgrew and Volcevski-Kostas (2012) showed music video clips of muscular or less muscular male singers to 90 Australian men who were either undergraduates or community members ($M_{age} = 26.55$). Anger and body image were assessed prior to and after the experimental manipulation. Body satisfaction and muscle satisfaction decreased

for those in the muscular condition, while their anger increased after exposure. These researchers were guided by self-schema theory.

Lorenzen et al. (2004) showed muscular or non-muscular images of men from magazine ads to 104 U.S. college men ($M_{age}=20.2$). Body satisfaction was assessed before and after exposure to the ads. Body satisfaction decreased for men exposed to muscular images, but not for those exposed to non-muscular images. Using a similar design, Hobza and Rochlen (2009) exposed 81 U.S. undergraduate men ($M_{age}=21.68$) to magazine ads with images of muscular men or household items (e.g., toothpaste, electronic devices). Participants completed measures of body esteem, state self-esteem, and drive for muscularity both before and after image exposure. As compared to those exposed to ads for household items, those exposed to muscular men scored lower on body esteem, but not on state self-esteem, or drive for muscularity. The authors cited social comparison theory to explain men's desire for muscularity.

In some experimental research, only some of the participants were affected by muscular stimuli (Arbour et al. 2006; Halliwell et al. 2007; Mulgrew and Cragg 2017). For example, Arbour and Martin Ginis exposed 63 Canadian college men to muscular ($M_{age}=21.56$) or hyper-muscular male ($M_{age}=22.34$)[11] images from fitness magazines or body-building magazines, respectively. The men completed measures of body dissatisfaction and muscle dissatisfaction before and after exposure to the experimental stimuli. Men who originally scored high in muscle dissatisfaction increased their body dissatisfaction after exposure to the muscular images, but not after exposure to the hyper-muscular images. Men who initially did not score high in muscle dissatisfaction were not affected by the manipulation. The authors cited the cognitive-behavioral model of body image (Cash 2002) as their theory base.

Mulgrew and Cragg (2017) cite sociocultural and social comparison theories to explain effects of media's muscular ideal on men's body dissatisfaction. They exposed 116 Australian college and community men ($M_{age}=40.92$) to music video clips in a pretest post-test design. In the muscular condition the male lead singers were muscular, in the average condition the male lead singers were less muscular, while the control condition featured no humans. Participants were divided into three groups: young ($M_{age}=22.82$), middle-aged ($M_{age}=43.10$), and older ($M_{age}=63.74$) and completed measures of mood, overall body satisfaction, muscle tone satisfaction, upper body satisfaction, fitness satisfaction, and confidence. The older and middle-aged men were not affected by the muscularity of the lead singers. However, as compared to the young men in the average or control conditions, the young men exposed to the muscular condition had worse overall body satisfaction, worse muscle tone satisfaction, worse upper body satisfaction, and reduced confidence after exposure.

In another study in which not all men were affected by the manipulation of muscularity, Halliwell et al. (2007) exposed 116 U.K. male gym-users ($M_{age}=28.62$) to ads for after shave. The dependent variable was negative body-focused affect, a measure of anxiety related to body sites (e.g., muscle tone, stomach). Some ads depicted muscular men with the after shave, while others featured no men. The participants were divided into

[11] Overall sample mean age not provided.

two groups: regular exercisers and non-exercisers. As compared to the exercisers, the non-exercisers had higher negative body-focused affect after exposure to the ads with muscular models.

Some researchers have found no effects for muscular variations on body image variables (Barlett et al. 2005; Diedrichs and Lee 2010; Lane et al. 2019; Michaels et al. 2013). Participants (82 U.S. college men; $M_{age\ =}$ 18.9) in Barlett et al.'s experiment handled action figures that differed in muscularity (highly muscular, moderately muscular, control group) and then completed measures of body esteem, self-esteem, and body satisfaction. Their overall Manova for muscularity was non-significant. Diedrichs and Lee exposed 330 Australian college men ($M_{age} = 18.62$) to ads with male models who differed in muscularity or to a control ad with no models. No effects for muscularity were found on body image. These researchers used social comparison theory in their work. As part of a study examining effects of the muscular ideal on attentional biases in men, Lane et al. conducted research in which stimuli depicted muscular men or neutral images. Sixty college and community Australian men ($M_{age} = 31.98$) completed measures of body image and mood. Analyses found no differences on body image or mood as a function of muscularity. This research was guided by the Tripartite Influence Model. Using objectification theory, Michaels et al. exposed 140 U.S. college men ($M_{age} = 19.41$) to images of muscular shirtless men or to images of inanimate objects. Several body image variables were assessed and none differed as a function of muscularity.

Summary and future research

In sum, when muscularity had an effect on measures of affective body image, pretest post-test designs were used and participants were young men. In other research muscularity influenced affective body image for some men (e.g., those who had muscular concerns to begin with, non-exercising men) but not all. None of the research reported here found effects for muscularity on behaviors (e.g., restrained eating, performance on math tests). This finding is consistent with the results of a meta-analysis of experimental research on men's body image (Barlett et al. 2008) that noted no behavioral outcomes assessed in the experiments analyzed.

Moving forward, researchers interested in identifying consequences of muscularity might assess changes over time in behavioral frequency (e.g., number of hours of exercise sessions per week) as a function of a muscularity manipulation. Behavioral intent related to exercising or dieting could be studied as a function of a muscular manipulation using a pretest post-test design. Finally, while in the reported studies self-esteem was unaffected by muscularity manipulations, it is possible that such manipulations might influence other psychological variables such as emotions or mood.

To move experimental research on muscularity forward, researchers might design experiments that compare results using pretest post-test designs to post-test only designs with the same muscularity manipulation; this would allow researchers to clearly determine whether or not significant effects for muscularity are artifacts of study design. Finally, since most of this research is based on small samples of young college men, to advance this field, researchers could recruit male participants that are middle-aged or older for experimental studies of men and muscularity.

Body image: survey research

Survey researchers have also found ample evidence that muscularity is related to body image variables including affective body image (e.g., social physique anxiety) and cognitive body image (body comparisons), as well as emotion, symptoms of eating disorders, and attractiveness ratings. For example, Grossbard et al. (2013) surveyed 230 U.S. college men[12] who completed DFM, and measures of depressed mood, drive for thinness, and eating disorder symptoms. DFM was positively related to eating disorder symptoms.

McCreary and Saucier (2009) modeled the relationships among DFM, body comparisons, and social physique anxiety, a type of anxiety experienced when people anticipate that their bodies will be devalued. Using Cash's cognitive behavioral model (2002), the researchers surveyed 182 Canadian college men[13]; higher scores on DFM predicted muscle-related comparisons and body comparisons, which in turn predicted social physique anxiety. Also, DFM directly predicted a small amount of variance in social physique anxiety, hence body comparisons did not fully mediate the relationship between DFM and social physique anxiety. Martin et al. (2006) also studied social physique anxiety and muscularity using self-presentation theory. Participants were 98 U.S. college men ($M_{age} = 22.9$). Participants who perceived muscularity as beneficial reported greater social physique anxiety than those who perceived muscularity to be less beneficial.

Perceptions of discrepancies due to differences between actual and ideal levels of muscularity were of interest to Mackowiak et al. (2019). They studied the extent to which congruence between actual and ideal muscularity perceptions would relate to positive emotions such as body-related pride. They cited the process model of self-conscious emotions as their framework. Participants were 294 men ($M_{age} = 34.8$) recruited from Amazon's Mechanical Turk (MTurk) who completed an online survey containing measures of actual and ideal muscularity and two types of body-related pride. Both types of pride were greatest when people's scores for actual and ideal muscularity were either both high or both low (i.e., when discrepancies were small) and were lowest when the magnitude of the discrepancies increased.

Summary and future research

In summary, in samples of mostly college men, desire for muscularity has been related to negative outcomes. DFM has been positively related to eating disorder symptoms, tendency to make body comparisons, and social physique anxiety. Positive perceptions of muscularity are also positively related to social physique anxiety. Finally, as compared to men with small discrepancies between actual and ideal perceptions of muscularity, those men with large discrepancies tend to report less body-related pride.

Survey researchers studying the influence of muscularity have expanded beyond a focus on affective body image dependent variables. However, additional work on the influence of muscularity on cognitive body image, symptoms of psychological disorders (e.g., eating disorder symptoms), and emotion could be beneficial. Researchers interested in actual and ideal muscularity may wish to study the influence of muscularity

[12] No age information was provided.

[13] Mean age not provided.

discrepancies[14] to advance what is known. Finally, researchers could pay attention to sampling procedures: (a) expand beyond reliance on college student samples, (b) recruit large numbers of participants, (c) collect data from probability samples.

Body image behaviors: survey research

Survey researchers have studied a variety of behaviors predicted by Drive for Muscularity (DFM) in men. Such behaviors have included weightlifting, binge drinking, muscle-building product use, dieting, and use of performance enhancing substances. For example, Edwards et al. (2016) surveyed 552 U.K. college men ($M_{age} = 20.58$) who completed measures of DFM and information about weightlifting frequency. DFM was a significant predictor of weightlifting behaviors. Litt and Dodge (2008) conducted a longitudinal survey of 161 U.S. college men,[15] used the DFM scale, assessed weightlifting frequency, and use of performance enhancing substances. DFM positively influenced weightlifting behaviors and use of performance enhancing substances. Eik-Nes et al. (2018) conducted a prospective cohort study that investigated outcomes of a DFM over time. They surveyed 2460 U.S. men ($M_{age} = 25.6$) in 2013 and in 2014. They assessed dieting behavior within the last year, binge drinking frequency within the last year, and use of muscle-building products in the last year. Higher scores on DFM assessed in 2013 predicted more binge drinking, more frequent dieting behavior, and greater use of muscle-building products in 2014. Instead of assessing behaviors related to DFM, Parent and Moradi (2011) assessed behavioral intent as part of their analysis. They surveyed 270 college men ($M_{age} = 19.30$) and found that DFM had positive direct effects on steroid use intent and on outcomes expected from steroid use (e.g., If I used anabolic steroids, I would be more confident).

Some individuals become preoccupied with their muscularity and worry that their bodies are too small. The term muscle dysmorphia describes a condition in which this type of preoccupation becomes pathological and may be related to the internalization of an unattainable cultural standard of attractiveness for men focused on muscularity (Jampel et al. 2015). Special populations of individuals may be more prone to develop muscle dysmorphia given their lifestyles or activities (e.g., weight trainers, sexual minority men) and may engage in risky behaviors in the process. Robert et al. (2009) were interested in the relationship between drive for muscularity and muscle dysmorphia and focused their research on a sample of 55 Canadian male weight trainers ($M_{age} = 24.06$). Since previous researchers examining these variables have studied competitive weightlifters, the authors decided to concentrate on recreational weight trainers and recruited them from a university fitness center or from undergraduate courses at a university. Participants completed measures of muscle dysmorphia and a modified version of drive for muscularity containing three subscales: attitudes, training behaviors, and diet. Training behaviors and diet were both positively related to characteristics of muscle dysmorphia. Subsequently, Jampel et al. investigated muscle dysmorphia[16] in a group of sexual

[14] However, researchers have noted problems with using discrepancy scores (Cafri and Thompson 2004; Cafri 2010; Silberstein et al. 1988; Vartanian 2012).

[15] Age information not provided.

[16] Jampel et al. (2015) used a different measure of muscle dysmorphia than the one used by Robert et al. (2009) and named their variable muscularity disturbance; however the instrument they used is called the Muscle Dysmorphic Disorder Inventory (Hildebrandt et al. (2004).

minority men who, they argued, may be especially concerned with muscularity since a muscular body could compensate for stereotypes of sexual minority men as unmanly. The researchers assessed methamphetamine use in a sample of 97 U.S. men (M_{age} = 47.5) who were living with HIV. A positive relationship was found between muscle dysmorphia (muscularity disturbance) and methamphetamine use. In sum, individuals who may be preoccupied with muscularity or worry that their bodies are too small (e.g., recreational weight trainers, sexual minority men) have been found to engage in behaviors (dieting and training behaviors, methamphetamine use) that can entail risks.

Summary and future research

In summary, survey researchers caution that there are very real behavioral consequences associated with the pursuit of muscularity. DFM is positively related to several risky behaviors or behaviors that could become risky if taken to the extreme. Specifically, individuals preoccupied with muscularity or worried that their bodies are too small (e.g., recreational weight trainers, sexual minority men) have been found to engage in behaviors that entail physical risks (dieting, extreme training behaviors, methamphetamine use).

Future researchers might follow the example of Eik-Nes et al. (2018) and collect large representative samples that are also longitudinal. Researchers could also investigate the long term health outcomes associated with frequent dieting, use of muscle-building products, and use of performance-enhancing substances. It could also be useful to determine the extent to which individual difference variables are associated with risky behaviors.

Well-being and self-concept: survey research

Non-pathological muscle dissatisfaction has also been studied as an influence on well-being, quality of life, and self-concept. For example, Griffiths et al. (2019) surveyed 2733 sexual minority individuals who primarily (99.1%) identified as male; none were women. Participants (M_{age} = 33.93) were recruited from a social network smartphone application for sexual minority individuals and were mostly Australian. Muscle dissatisfaction, body fat dissatisfaction, height dissatisfaction, and penis size dissatisfaction were all negatively related to psychological quality of life, a measure of well-being used to assess mental health problems. Muscularity dissatisfaction was the strongest predictor. Others have studied similar variables. For example, using the minority stress model, Matera et al. (2019) surveyed 385 Italian men (M_{age} = 28.6) recruited from universities and community locations. The authors were interested in men's dissatisfaction with muscularity, sexual orientation, and eudaimonic well-being, a type of well-being based on living a good life. Like Griffith et al. muscularity dissatisfaction was negatively related to (eudaimonic) well-being.

Parent and Bradstreet (2017) studied muscularity using social identity theory. Participants were 204 U.S. heterosexual college men (M_{age} = 19.68) and 197 U.S. gay or bisexual men (M_{age} = 35.33) recruited from online social networking groups. DFM, self-concept, depression symptoms, and eating disorder symptoms were assessed. Global self-concept was used to mean an overall evaluation of one's body. For both groups of men, greater desire for muscularity, a DFM subscale, was related to poorer physical and global

self-concepts. A second DFM subscale, muscularity behaviors, was positively related to physical self-concept in both groups of men.

Summary and future research

These studies show that even when dissatisfaction with muscularity (i.e., desire for more muscularity) is non-pathological, it may be associated with negative outcomes in terms of self-concept, well-being, and quality of life. Thus, dissatisfaction with muscularity is associated with both potential physical risks (risky behaviors) and psychological risks.

Future researchers could determine the extent to which muscularity dissatisfaction is directly related to risky behaviors or if the relationship is mediated by risky psychological outcomes. Longitudinal research of these variables would offer an opportunity for a detailed assessment of whether or not psychological risk associated with muscularity dissatisfaction predicts risky behaviors at a future point in time.

Limitations with this body of work

One overall limitation of the survey research addressing antecedents of muscularity and consequences of muscularity, is researchers' reliance on non-probability samples of young men when utilizing survey research designs. While there are distinct advantages to using non-probability samples in research (e.g., cost savings, time savings), use of non-probability samples makes generalization impossible because the sample drawn is not representative of a population. Results from non-probability samples may be difficult to replicate calling into question the validity of all of these findings. As research in muscularity has moved beyond its nascent stage, in the future researchers utilizing survey and ex post facto designs are encouraged to draw probability samples that will enable generalization and increase external validity.

A second limitation with this body of research is that quantitative research strategies (i.e., survey, experiment) dominate. Qualitative strategies including phenomenological designs, observational research, and ethnographies can illuminate issues of muscularity and may offer detailed explanations for behavior that can remain hidden by quantitative approaches.

A third limitation is the research on antecedents and consequences of muscularity has taken place primarily in westernized cultures. Researchers have focused on young adult men as well. Not only might the results of survey research be difficult to replicate because of the use of non-probability sampling, the results of all of the research reported herein might also not be applicable to men representing different cultural backgrounds and any man over the age of 30.

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