The Disordered-Eating, Obsessive-Compulsive, and Body Dysmorphic Characteristics of Muscle Dysmorphia: A Bimodal Perspective

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Muscle dysmorphia (MD) is a proposed subtype of body dysmorphic disorder whereby individuals have a pathological preoccupation with their muscular build and leanness. MD remains an under-recognized and misunderstood disorder, and is currently disputed in the extant literature. This paper

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proposes that MD be reanalyzed through a bimodal lens that accounts for the diverse, spectrum-based characteristics of the disorder while concomitantly considering for the temporal, continuum-based characteristics of the disorder as a means to better contextualize the operationalization of MD symptoms. It is suggested that MD behaviors exist in cyclical formats of both severity and practice whereby the goals of the individual influence the nature and activities illustrative of MD. Therefore, it is theoretically plausible to consider MD behaviors in a bimodal perspective where frequency as well as severity are salient factors. Future research should address the temporal, continuum-based component of MD through increased longitudinal and qualitative studies.

Keywords: muscle dysphoria, body image, eating disorders, obsessive compulsive anxiety disorder

Muscle dysmorphia (MD) is a proposed subtype of body dysmorphic disorder whereby individuals have a pathological preoccupation with their muscular build (Pope Jr., Gruber, Choi, Olivardia, & Philips, 1997). Individuals with MD perceive themselves as being insufficiently muscular and lean; therefore, they may adopt practices of compulsive weightlifting, disordered eating, and the use of anabolic androgenic steroids and other harmful substances as a means to ameliorate perceived flaws in their physique (Baghurst, 2012; Olivardia, 2007; Olivardia, Pope Jr., & Hudson, 2000). Individuals with MD typically suffer from severe social and vocational impairments, where strict exercise, diet, and valetudinarian procedures interfere with the pursuit of interpersonal relationships or maintenance of occupations (Olivardia, 2001).

Muscle dysmorphic individuals also experience extreme distress in situations where their musculature is exposed to others, and may take precautions to avoid such demanding situations (Grieve, Truba, & Bowersox, 2009) by utilizing excessive and concealing clothing as a means to mask their perceived flaws in muscularity (Olivardia, 2007). Baghurst and colleagues (2014) found that certain body parts such as the arms and chest might be flaunted in a gym setting while other areas are hidden. Further, they suggested that fat protection might be a more applicable term than physique protection. Such concern about real or perceived flaws may explain why individuals

with MD have been found to frequently participate in body checking behaviors where they will consult mirrors and other reflective surfaces to engage in a self-evaluation of their own musculature (Murray & Baghurst, 2014; Olivardia). The etiology of MD continues to be under researched and is not well understood (Baghurst & Lirgg, 2009). Researchers have yet to develop any evidenced-based arguments sufficient enough to constitute as complete or even partial diagnostic criteria suitable for the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association [APA], 2013).

The purpose of this article is to further the extant knowledge of MD by proposing the disorder be viewed through a bimodal lens that considers both spectrum- and continuum-based behaviors. The intent is to better contextualize the behaviors of MD by concomitantly considering them in terms of diverse, spectrum-based systems, as well as a spatial continuum-based system bracketed by disordered eating, obsessive-compulsive, and body dysmorphic dimensions. This perspective is influenced by the work from past researchers and the chosen classificatory dimensions are structured through previous research findings.

There is ongoing controversy regarding how MD should be classified. Generally, researchers are trying to delineate whether MD is a body dysmorphic, eating, or obsessive-compulsive disorder. Further, MD may best classified in a broader subcategory such as eating disorders not otherwise specified or as an obsessive-compulsive spectrum disorder (Maida & Armstrong, 2005; Suffolk, 2013). Considering these three potential classifications are salient and largely acknowledged in the extant literature (see Chung, 2001; Hildebrandt, Schlundt, Langenbucher, & Chung, 2006; Murray et al., 2012), it is logical to use them as brackets to illustrate the spectrum-based component of the proposed bimodal approach to MD. It is important to note that an aim of this article is not to provide a singular classification for MD. Rather it draws from putatively acknowledged muscle dysmorphic behaviors and likely classificatory assertions in the extant literature and illustrates their association with broader spectrums in a non-diagnostic paradigm to operationalize a behavioral dimension to the proposed bimodal perspective.

The Eating Disorder Spectrum

Muscle dysmorphia was originally termed *reverse anorexia* by Pope Jr. et al. (1993) due to the disorder's striking parallels with anorexia nervosa. Morgan (2000) succinctly defined muscle dysmorphia as "a preoccupation with overall muscularity and drive to gain weight without gaining fat" (p. 1373). Adiposity becomes of viable interest to individuals with MD, as an excess cover of fatty tissues over a certain portion of the body diminishes the definition and muscularity of that physical part. This may account as to why Olivardia et al. (2000) found that men with MD (n = 23) scored similarly on all of the Eating Disorder Inventory (EDI) subscales from Garner, Olmstead, and Polivy (1983). However, researchers have indicated that the goals of the individual in question may impact the balance between a desire for muscularity and desire for thinness (Dacey, Corley, & Adcok, 2010; Skemp, Mikat, Schenck, & Kramer, 2013; Suffolk, 2013). Therefore, it is pertinent to consider how these drives are affected by a variety of goals, including sport and athletic influences, which go beyond appearance-related and aesthetic aspirations.

Bratland-Sanda and Sundgot-Borgen (2012) examined eating disorders in athletes and found that sports which emphasize a lean physique presented higher frequencies of dieting behavior. Sports such as wrestling, boxing, and bodybuilding are all considered *weight-class* sports and have rules that reinforce rapid weight-loss requirements prior to competition. Furthermore, sports such as bodybuilding are considered aesthetic sports where the size, symmetry, and the definition of a person's physique are evaluated by a panel of judges. These sports create *body paradigms* through aesthetical evaluation, and therefore are likely to make athletes more prone to eating and body image disorders (Bratland-Sanda & Sundgot-Borgen).

Cella et al. (2012) investigated MD in male competitive bodybuilders (n = 217) in comparison to general fitness practitioners (n = 98). They found that 21 of the bodybuilders (17.6%) exhibited a significant preoccupation and dissatisfaction with their muscularity, 42 (35.3%) followed a high-protein diet and used vitamin supplements to improve performance, 43 (36.1%) indicated they had used anabolic pharmacological substances, and 9 (7.6%) stated that they endeavored to avoid

situations in which their body might be seen by others. These results for the bodybuilders was considerably higher than those for the controls, and Cella and colleagues concluded that the practice of bodybuilding is a sport that is strongly associated with the proposed criteria of MD when compared to regular fitness practice. In addition to MD, these findings are also partially congruent with the current literature on bodybuilding and the development of an eating disorder. Goldfield, Harper, and Blouin (1998) previously reviewed the existing literature and determined that bodybuilding likely potentiates the risk of developing an eating disorder. However, body image is also a salient factor in both eating disorders and MD.

Although bodybuilders are a frequent choice for MD research, it is not surprising that they exhibit characteristics of MD and their use in MD research should be treated with caution. Their primary goal is to gain muscle mass while reducing body fat, and must do so by supplementing, following a rigorous diet, and sometimes, ingesting steroids and laxatives (Baghurst & Lirgg, 2009). Further, they are placed in competitively evaluative conditions that may account for the need to cover their physiques, especially as competitions near. The migration of bodybuilders from other competitive sports has been documented as a primary reason why both male (Parish, Baghurst, & Turner, 2010) and female (Baghurst, Parish, & Denny, 2014) bodybuilders took up the sport. Therefore, while MD features may be evident, the underlying purpose of competing as opposed to a principal or causal motivator (i.e. body image disturbance) may impact not only their desire to pursue such sports, but also influence a fluctuating nature of muscle dysmorphic symptoms.

Choi, Pope Jr., and Olivardia (2002) examined MD in weightlifters (n = 24) using a control group without MD (n = 30) and incorporating Cash's (2000) Multidimensional Body-Self Relations questionnaire. They found that those with MD do have poorer body image perceptions than controls. Additionally, weightlifters with MD expressed an extreme concern over gaining fat, and indicated that they considered themselves to be less healthy than the control group. Alternatively, Lamanna, Grieve, Derryberry, Hakman, and McClure (2010) theorized that MD is the "male form of eating disorders" (p. e23). They assessed societal influences and muscle dysmorphia/eating disorder symptoms in a sample of men (n = 101) and women (n = 247) to compare if MD in men

is etiologically similar to eating disorders in women. It was found that MD and eating disorders were etiologically similar, and that sociocultural influences about appearances predicted body dissatisfaction in both men and women.

The findings from these studies help to illustrate that: (a) two athletic groups (bodybuilders and weightlifters) are believed to be at high risk for developing MD, and (b) dietary behaviors and a drive for thinness are not only often integral to MD, but that MD and eating disorders are believed to be etiologically similar. However, it is important to note that despite an abundance of literature relevant to bodybuilders and weightlifters, MD symptomology can manifest in other demographics including general fitness enthusiasts (Thomas, Tod, and Lavallee, 2011) and college students (Olivardia, Pope Jr., & Hudson, 2000), lending some credence to the notion that MD behavior may be more resultant from underlying body image disturbances than influenced by the rigors of competitive sport.

Much of the research by Murray supports the conceptualization of MD as an eating disorder. In one study, Murray et al. (2012) assessed 21 male MD patients, 24 male anorexic patients, and 15 male gym controls using the Eating Disorder Examination-Questionnaire the Muscle Dysmorphic Disorder Inventory, and the Compulsive Exercise Test. The researchers found that participants with anorexia nervosa and participants with MD exhibited widespread similarities across dimensions of body image disturbance, disordered eating, and exercise behavior. From these findings the authors concluded that disordered eating behaviors and attitudes in those with MD harbor a similar severity with those found in individuals with anorexia nervosa.

Murray and Touyz (2013a) acknowledged that MD displays marked similarities with body dysmorphic disorder, but have stated that because MD is partially comprised of food and exercise related psychopathology in conjunction with weight and image-related concerns, MD should be analyzed with an eating disorder lens to conform to the DSM-V rules of diagnostic criteria. Murray, Rieger, Touyz, and De la Garza Garcia (2010) extensively reviewed the literature of MD, eating disorders in men, exercise, and weight concerns. They found that a majority of studies assessing for eating disorders in men used measures originally created for women, which may have diminished

the face validity of any resulting data and research intended to assess aspects of disordered eating symptomology associated with MD in men. Furthermore, the authors indicated that it is not uncommon for men suffering from MD to be currently suffering or have had suffered in the past from a type of eating disorder (i.e., anorexia nervosa, bulimia nervosa, binge eating). The authors also asserted that MD may be better suited for the *eating not otherwise specified disorders* category of the DSM.

Murray and Touyz (2013b) provided support for the claim that MD maintains apparent eating disorder classificatory characteristics by distributing a clinical vignette depicting an individual afflicted with the symptoms of MD to 100 clinical practitioners. A majority of the practitioners (94%) categorized these symptoms as MD or an eating disorder phenotype rather than a variant of obsessive-compulsive disorder or body dysmorphic disorder. The data suggest that clinician-observed symptoms of MD are significantly similar to the symptoms of disordered eating. In a similar study, Murray, Rieger, and Touyz (2011) published a case report where a 32-year old Lebanese man with MD experienced significant distress during a period of religious fasting mandated by the Muslim faith. Muscle dysmorphic symptoms increased in severity during this fasting period, and it was concluded that symptoms of MD do not only exist, but can intensify when eating practices are controlled. This study, in addition to providing evidence to the characteristics of MD, also supports a cyclical nature to MD and illustrates how such symptoms can and do fluctuate in relation to situational and even cultural variables such as available diet and religion. This fluctuation in relation to external influence may also be integral to understand motivational and perhaps etiological aspects of MD.

These studies lend support to the belief that MD may be best conceptualized as an eating disorder. However, the compulsive and ritualistic exercise regimens of individuals with MD are a putative component of the disorder, and there is question as to whether dietary and even disordered eating behaviors are influenced by an underlying and unhealthy obsession.

The Obsessive Compulsive Disorder Spectrum

Although body image concerns and disordered eating are believed to be strong components of MD, there are some researchers who believe that MD is largely comprised of obsessive compulsive behaviors that overshadow a specific and central body dysmorphic disorder. The DSM-V indicates that obsessive-compulsive disorder is characterized by the presence of obsessions and or compulsions, and that

> obsessions are recurrent and persistent thoughts, urges, or images that are experienced as intrusive and unwanted, whereas compulsions are repetitive behaviors or mental acts that an individual feels driven to perform in response to an obsession or according to rules that must be applied rigidly (APA, p. 235).

Muscle dysmorphia could be considered as a disorder where individuals experience preoccupations with body image and strong desires to exercise (intrusive thoughts and urges) as well as the engagement in repetitive workouts and dietary practices (compulsive behaviors) which, in this context, closely relates to the aforementioned APA guidelines. Furthermore, MD may be categorized as an obsessive-compulsive disorder supported, in part, because of the similarities that anorexia nervosa and MD share with obsessive-compulsive disorders (Chung, 2001). Specifically, MD and anorexia nervosa are accompanied by apparent obsessive-compulsive activity, and these two disorders may warrant a completely separate category. According to Chung, if MD were to be classified as an obsessive-compulsive disorder, then "muscle dysmorphia is looked upon as a behavioral disorder, which therefore has its treatment strategies centered on modifying behavior" (p. 572). However, if MD were to be recognized as a subtype of body dysmorphic disorder, that classification would suggest that a hypermasculine phenotype is "abnormal." Therefore, clinical attention would be placed on a preoccupation with vague definitions of normal and abnormal physical build with a multitude of intervening factors including societal standards of beauty as well as one's genetic disposition, diet, and general lifestyle activities. Alternatively, if MD were conceptualized as a form of obsessive-compulsive disorder, the clinical attention would be focused on the extreme and repeated behaviors. Therefore, there is a distinction between classificatory

efficiency and efficacious treatment of MD which is unique mostly due to the comorbid symptoms of the disorder. Chung acknowledged the comorbidity MD shares with obsessive-compulsive disorders and posited that collective foci on treating the obsessive-compulsive aspect of MD will better address the specific behaviors associated with the disorder.

Support for MD to be considered as an obsessive-compulsive disorder has been well documented. For example, Muller, Dennis, Schneider and Joyner (2004) examined a psycho-behavioral model of MD (see Lantz, Rhea & Cornelius, 2002) in a sample of college athletes (n = 106). The modified Adult Self-Perception Scale was also used to assess constructs such as global self-worth, obsessive-compulsive disorder, depression, perfectionism, intelligence, sociability, physical appearance, and intimate relationships. Subgroups were identified as weightlifters/bodybuilders, athletes who played contact sports, and athletes who played non-contact sports. The weightlifter/bodybuilder group was found to exhibit behaviors that align with MD, and that this group was: (a) more likely to consume dietary supplements, (b) consume a greater number of meal replacement and protein shakes, (c) restrict diet to lose fat, (d) frequently check their body, (e) think about taking steroids, and (f) display perfectionistic traits. It is important to note that data did not reveal significant differences with regard to obsessive-compulsive disorder between any of the three groups; however, the authors asserted that behaviors associated with weightlifting and bodybuilding appear compulsive in nature. Although it was recognized that it is possible for athletes to engage in *normative* dietary and exercise regimens, MD seemed to emerge when athletes obsessed about diet and exercise, and therefore agreed with Chung (2001) that MD is best classified as an obsessive-compulsive disorder. This emergence is another buttress for the cyclical and temporal nature of MD, and if considering the disorder in terms of an obsessive-compulsive classification, it becomes imperative to address causal factors influencing the obsessive behavior subsequently exacerbating the muscle dysmorphic symptomology in order to address etiological components of MD.

More recently, Chandler, Grieve, Derryberry, and Pegg (2009) examined a possible relationship between anxiety, obsessive-compulsive symptoms, and MD in a group of 97 college-

aged men using an abbreviated version of the Yale Brown Obsessive-Compulsive Scale. Trait anxiety and obsessive-compulsive disorder were strongly related to and predictive of several factors of MD, including social physique anxiety, trait anxiety, and obsessive-compulsive features. These findings support past research where a positive correlation was found to exist between symptoms of MD and variables such as anxiety and obsessive-compulsive disorder (e.g., Maida & Armstrong, 2005). Furthermore, previous researchers have also found a strong correlation between excessive exercise and high levels of obsessive-compulsive symptoms (Gulker, Laskis, & Kuba, 2001), which lends credence to the suggestion that the obsessive-compulsive comorbidity of MD may be an instrumental consideration with regard to the classification of MD.

It is possible that individuals with MD can be categorized by an obsessive compulsion to exercise and engage in meticulous dieting strategies. Proponents of an obsessive-compulsive oriented nomenclature for MD emphasize the behavioral obsession with exercise and dieting as well as the repetitive nature of weightlifting. However, Pope Jr. and colleagues (1997) emphasized a central preoccupation with muscularity as the driving influence for classifying MD as a subtype of body dysmorphic disorder. Further, it is possible that ritualistic behavioral components of MD, such as dieting and exercise, are outlets for an underpinning body image disturbance. As previously noted, the extensive use of bodybuilders within the MD literature clouds its classification, for many of the characteristics required to be a successful bodybuilder are similar to those that might be displayed by someone who is exhibiting muscle dysmorphic behaviors.

The Body Dysmorphic Disorder Spectrum

The relationship between MD and body dysmorphic disorder is understudied, and controversy exists as to whether or not MD can be considered a type of body dysmorphic disorder due to the possibility of of eating or obsessive-compulsive disorders being integral to muscle dysmorphic symptoms. According to the DSM-V, any type of sequaelae must be absent for a diagnosis of body dysmorphic disorder (APA, 2013). Although body dysmorphic disorder is currently considered

a subtype of obsessive-compulsive disorder (APA), it isn't clear if MD-associated compulsive symptoms are sufficiently centralized to classify MD into a specific body dysmorphic disorder niche. However, comparison studies have been conducted on characteristics of MD and body dysmorphic disorder that suggest a level of concomitance. For example, Hitzeroth, Wessels, Zungu-Dirwayi, Oosthuizen, and Stein (2001) assessed the presence of body dysmorphic disorder and MD in a group of 28 amateur and competitive bodybuilders in South Africa using structured diagnostic interviews. Over half (53.6%) of participants were considered muscle dysmorphic and were more likely to have comorbid body dysmorphic disorder associated with preoccupations that were not related to muscularity. These findings are geographically similar to those of Martin and Govender (2012) who found positive correlations between masculine ideology and a drive for muscularity in South African adolescent boys.

Hildebrandt, et al. (2006) asserted that body image disturbance is central to MD symptomology in perceptual, cognitive, emotional, and behavioral terms, and that MD is a pathological subtype of body dysmorphic disorder. The proximity of eating disorders, obsessive-compulsive disorders, and body dysmorphic disorders within the context of diagnosis are indicated by the DSM, and explained:

> Body dysmorphic disorder in particular has received support as an OCSD [obsessive compulsive spectrum disorder], and the clinical features and phenomenology of MD are consistent with this conceptualization. In addition, a significant number of patients with MD have current or past eating disorder diagnoses and increased eating disorder symptomology, which further support placement of MD within an obsessive compulsive (OC) spectrum because both anorexia nervosa and bulimia nervosa are comorbid with OCD. This overlap between OCD and eating disorders appears to extend beyond simple comorbidity.... Thus, the comorbidity pattern previously described in patients with MD and research identifying eating disorders and body dysmorphic disorder as OCSDs suggest that MD is best conceptualized as a subtype of body dysmorphic disorder and part of a larger OC spectrum (p.128).

Hildebrandt and colleagues (2006) further noted the underlying factor that contributes toward the development of MD, body dysmorphic disorder, eating disorders, and obsessive-compulsive disorder, is likely to be body image disturbance. They examined body image disturbance in a group of male weightlifters (n = 237) and using latent class analysis, were able to identify dysmorphic, muscle-concerned, fat-concerned, normal-behavioral, and normal groups. The dysmorphic group had the highest desire to decrease adiposity while also increasing muscularity. Furthermore, this group displayed a multifaceted body image disturbance consistent with the diagnostic criteria for MD previously defined by Pope Jr. et al. (1997) and supported the theory that MD is a subtype of body dysmorphic disorder.

Researchers have also found significant relationships between MD and body dysmorphic attitudes. To better explore the possible (dis)connection between the two disorders, Pope et al. (2005) reviewed the history of 63 men with body dysmorphic disorder and compared those rated as maintaining a history of MD with those rated as having body dysmorphic disorder but not a history of MD. They found that of the 14 men who had been rated as having MD, 12 (86%) had a history of non-muscle-related body dysmorphic disorder. Furthermore, nine of these men had current MD and current non-muscle-related body dysmorphic disorder while two men with past MD had current non-muscle-related body dysmorphic disorder. Additionally, the men with MD reported hair and skin were second and third concerns respectively, with muscularity ranking as a primary concern for all participants within the MD group. Men with both body dysmorphic disorder and MD were similar to those with body dysmorphic disorder but not MD with regard to delusionality, a preoccupation with non-muscle-related parts of the body and non-muscle dysmorphia-related body dysmorphic disorder behaviors. However, the authors also noted that the group with MD was more likely to engage in compulsive behaviors and exhibited greater psychopathology.

The three aforementioned categories of body dysmorphic disorders, obsessive compulsive disorders and eating disorders largely illustrate the spectrum of behaviors putatively believed to be associated with MD. Whether or not MD belongs in one category over another has yet to be empirically established, but the breadth of such associated characteristics is indicative of

the extensive comorbidity of MD which appears strikingly more complex than a singular eating disorder, obsessive compulsive disorder, or body dysmorphic disorder. Therefore a bimodal approach is posited in order to contextualize such intricate and overlapping symptomology as well as to organize the evident and varying comorbidity heavily influenced and fluctuated by situational and environmental variables.

A Proposed Bimodal Approach to Conceptualizing MD Characteristics

The difficulty in both definitively classifying and understanding the etiology of MD is likely resultant from other serious medical issues that often coexist with MD. Specifically, it has been found that more than half (53%) of the individuals with MD report lifetime histories of bipolar or major depressive disorder (Olivardia, et al., 2000). In the same study, 29% percent of the participants reported having eating disorders such as anorexia nervosa, bulimia nervosa, and binge eating disorder. Considering co-occurring disorders in combination with conceptualizing MD as a continuum where individuals with various personal and athletic goals use different means and behaviors to achieve their desired physique, it is perceivably complicated to understand the specific characteristics of MD. Along a continuum, individuals may infrequently engage in periods of body-checking and rigid dietary behaviors with relatively little emphasis on regular exercise (Ebbeck, Watkins, Concepcion, Cardinal, & Hammermeister, 2009; Pope, Philips & Olivardia, 2002). However, across a symptomological comorbid spectrum, individuals with MD may choose to engage in ritualistic workout routines resultant from body dissatisfaction, check their appearance in reflective surfaces, conceal their physique, use performance enhancing substances, misuse over-the-counter supplements, experience extreme distress of weight-gain, or pay meticulous attention to diet to the point of physiologically unhealthy and habitual eating regimens (Pope et al., 2005). Theoretically, both cases could constitute as MD despite symptomological differences in frequency and severity. This exemplified variance of muscle dysmorphic symptom manifestation may help to explain why researchers and clinicians have been unable to agree on how MD ought to be

classified as a clinically diagnosable entity. Furthermore, this variability in the presentation of muscle dysmorphic symptoms is a crucial area of future muscle dysmorphic research which would most likely benefit through the utilization of the proposed bimodal framework that considers for temporal and frequency-oriented behaviors as well as symptomological characteristic presentation. Therefore, rather than endeavoring to separate both examples of MD, it is logical to consider both frequency and severity-based muscle dysmorphic symptom manifestations as a temporal amalgamation influenced by personal goals, situational variables, and perceptions of aesthetics. Thus, we propose that a person has the ability to adjust their level of involvement in, as well as the nature of, muscle dysmorphic behaviors based on their relative self-evaluation and current motivations via mitigating/exacerbating symptomological influence. For example, an individual may partake in extreme caloric reduction and intense cardiovascular exercise as a response to perceived adiposity masking their musculature. That same individual may later partake in extreme caloric increase and intense anaerobic exercise as a response to insufficiently large musculature. Therefore, MD symptoms are not static and must be considered in cyclical and fluid requisites.

A salient and putative etiological model for MD was postulated by Grieve (2007) whereby body dissatisfaction was considered a central tenet of the model whilst maintaining dual pathways with other constructs including body distortion, negative affect, and low self-esteem. Grieve issued an important caveat; the model was conceptualized for subclinical levels of MD and should be applied to those who are at risk for developing the disorder.

This position is fundamental in indicating barriers to understanding the etiology of MD in numerous ways. First, Grieve (2007) hypothesized that MD exists along a continuum whereby certain individuals can experience body and muscular dissatisfaction, engage in rigid dietary behaviors, and vigorously exercise without clinical MD. Grieve explained this position through an eating disorder lens, and indicated that many women who do not have eating disorders do have subclinical levels of eating disorder symptoms. Approaching MD in terms of an eating-disorder-parallel may improve the collective understanding of the disorder by shifting the symptomological focus from clinically expected behaviors to underlying motivations that influence the severity of

these behaviors. Furthermore, this aforementioned eating disorder lens is applicable in supporting the temporal dimension of MD through an acknowledgement of symptomological fluidity not singularly influenced by participation in sport or physiological preoccupation but also underlying body image disturbance and environmental influence. However, because there are no established diagnostic criteria for MD, there is no definitive way in which researchers or practitioners can establish a sub-clinical level, and therefore a specific and striking barrier to both the diagnostic recognition and etiological understanding of MD is that a proposed continuum can only be conceptually structured. Without any diagnostic criteria, it is therefore logical for researchers and clinicians to adopt a bimodal perspective that considers for symptoms that are largely recognized through research in the current field of MD in order to adequately assess and contextualize the likely characteristics of MD. This contextualization is then likely to lead to a more accurate identification of MD in patients as well as samples of participants in future research studies.

One reason as to why an established bimodal approach should be considered in relation to MD is because the practicality and tenets of a bimodal perspective are beginning to manifest in the muscle dysmorphic literature (see Skemp et al., 2013). Specifically, Thomas et al., (2011) conducted a quantitative study using a within-subjects crossover design to assess the variability of muscle dysmorphic symptoms in relation to weight training (n = 30). The authors found that the participants' drive for size, appearance tolerance, and functional impairment were significantly higher on rest days when compared to training days. Therefore, Thomas and colleagues concluded that muscle dysmorphic symptoms maintain state-like properties and asserted that these symptoms are likely to fluctuate in relation to situational and environmental variables. Thus, mental health practitioners as well as researchers would benefit from considering a temporal dimension of MD in concomitance with the character of the presented symptoms as understanding the nature of these situational and environmental variables may contribute to better understanding of the true etiology of MD

The Temporal Dimension: Practical Applications of the Model in Psychometry, Design, and

Demographics

It is important to note that the purpose in composing this article is not to suggest a diagnostic classification for MD, but rather posit and encourage the adoption of a bimodal perspective considerate of the temporal as well as the behavioral manifestations of MD which may ultimately help researchers to reach a sufficient classification for the disorder. While a majority of the extant literature supports the classification of MD as a subtype of body dysmorphic disorder, our overarching position is that, regardless of how one wishes to categorize MD, the salient obsessive-compulsive, eating disorder, and generalized body dysmorphic disorder behaviors exhibited by individuals with MD must be taken into strong consideration concomitantly with the frequency of such said behaviors in order to better direct future research that aims to clinically classify MD as a legitimate disorder. Although this position may seem basic and straightforward, this position has never been explicitly mentioned in muscle dysmorphic literature and has yet to be adopted by most researchers. Attention to this bimodal approach also maintains practical applications to both researchers and clinicians in several ways.

Popular measures used to establish the presence of MD such as the Muscle Appearance Satisfaction Scale (Mayville, Williamson, White, Netemeyer, & Drab, 2002) and the Muscle Dysmorphia Inventory (Rhea, Lantz, & Cornelius, 2004) are restricted to Likert-scaled items that address attitudes subtypical of MD. This is problematic when applying the proposed bimodal perspective because attitudes and the established subscales of these measures could be considered relative to the immediate or situational spectrum of MD and not the continuum.

A measure that incorporates the proposed bimodal approach by utilizing, for example, Likert-scaled items addressing attitudes as well as interval-scaled items addressing frequency (symptom manifestation in terms of hours, days, weeks, months, etc.) would theoretically be much more psychometrically indicative of MD through a continuum/spectrum amalgamation than addressing attitudes alone. A measure of this structure and caliber could also provide some benefit to researchers who are not in a position to conduct any type of longitudinal research with their

sample, as the temporal element proposed by the application of the bimodal perspective is at least partially integral to the measure.

The adoption of the bimodal perspective is not only applicable to psychometric improvement in the field of MD research, but also in areas of design and demographics. Longitudinal research would provide data pertaining to how muscle dysmorphic symptomology fluctuates throughout a period of time. Including "frequency-specific" as well as temporal items in a demographic assessment could augment this research. Specifically, demographic items pertaining to constructs such as exercise frequency, dietary frequency, and body comparison frequency would add an element of frequency-specific data in addition to any measures that assess attitudes alone, albeit over a length of time or in cross-sectional format. This frequency-based integration has yet to be saliently incorporated in muscle dysmorphic research. Further, as it is possible for individuals to engage in muscle dysmorphic behaviors in cyclic fashion with potential mitigations and exacerbations including weightlifting/bodybuilding competition preparation and athletic involvement, a temporal agent is a practical integration.

Temporal questionnaire items that ascertain whether or not an individual is preparing for any type of competition or may be in an athletic "off-season" are important pieces of information that would likely help to explain surfaced fluctuations in muscle dysmorphic behaviors (Todd & Lavallee, 2010). Theoretically, an athlete would not exhibit the same type of dietary, exercise, and physique-oriented behaviors in an off-season when compared to preparation for a competition or sporting event. However, the presence of MD may remain intact in the form of behavioral spectrum-based behaviors in preparatory periods and passive, underlying body image disturbances in non-preparatory periods. This passive/active conceptualization of MD is a unique perspective afforded by the bimodal approach and is further discussed in the subsequent heading. Ultimately, a failure to consider for this temporal dimension is likely to contribute to a misidentification of MD. False "negatives and positives" with regard to MD have been identified as a salient problem in muscle dysmorphic research as most studies rely on measures that singularly address the presence of behaviors and respective attitudes without considering for variables such as frequency, fluctuation

in sport participation, or spatial motivation (Todd & Lavallee, 2010).

From a clinical perspective, inquiring as to whether an individual is currently preparing for any type of athletic competition or is simply an "active individual" without sport affiliation could help to establish a valid presence of MD and certainly how MD ought to be treated relative to the specific individual. This point is significant considering the absence of diagnostic validation with regard to MD, and despite this absence, MD remains a disorder that needs to be efficaciously identified and treated by clinicians. Therefore in the absence of valid diagnostic criteria, it is logical for clinicians to adopt a bimodal perspective in order to ascertain potential motivators for muscle dysmorphic behavior on a case-by-case basis whereby specific behavior as well as the frequency of that behavior contributes toward accurate assessment. Specifically, application of the bimodal perspective may consider for individuals exhibiting muscle dysmorphic behaviors influenced by an underlying body image disturbance in contrast with individuals exhibiting muscle dysmorphic behaviors largely influenced by the mandates of sport. Although this example illustrates MD in both cases, the differentiating constructs of underlying influence and motivation for the same maladaptive behaviors stands to have salient impacts on the way in which both cases are treated. Furthermore, dichotomizing or at least treating each case as an independent example offers the ability to assess emergent muscle dysmorphic symptoms in terms of a situational influence versus an internalized influence which may be instrumental in (de)establishing MD as a subtyical body dysmorphic disorder. This perspective is likely to also help clinicians differentiate the exhibition of MD from other similar or subtypical disorders including exercise dependence (Weinstein & Weinstein, 2014) and fitness supplement abuse (Backhouse, Whitaker, & Petróczi, 2013).

Applying a Bimodal Perspective to the Conceptual Understanding of Muscle Dysmorphia: Passive versus Active Symptomology

An important tenet of the bimodal approach is that MD may be exhibited in cyclic formats with varying involvement in exercise and dietary regimens, but with relatively static negative

internalization resultant from a constant underlying body image disturbance. In using this proposed bimodal approach as a theoretical framework to conceptualize MD, two distinct categories of muscle dysmorphic affliction emerge which are relative to both spectrum and continuum dimensions: Passive muscle dysmorphic symptoms and active muscle dysmorphic symptoms. Passive MD could be considered in terms of internalization, negative effect, and emotional disturbances which include depression, physique anxiety, low self-esteem, anxiety, global psychopathology (see Maida & Armstrong, 2005; McFarland & Kaminski, 2009; Wolke & Supona, 2008), media internalization (see Cafri, Blevins & Thompson, 2006), drive for muscularity, self-objectification (see Grieve & Helmick, 2008), and muscle dissatisfaction (see Maida & Armstrong, 2005; Olivardia et al, 2000) resultant from a negative body image appraisal. Passive behaviors such as physique concealment (Baghurst et al., 2014), body comparison, mirror-checking, and functional impairment (see Cafri, Olivardia & Thompson, 2008) would logically also conform to this category. Alternatively, operational behaviors including (excessive) exercise (see Cafr et al., 2008; Pope et al., 2005), participation in power sports (see Baghurst and Lirgg, 2009), seeking a vocation in athleticism (Pope et al., 1997) supplement or steroid abuse (see Pope et al., 2005: Olivardia et al., 2000), appearance control (see Olivardia, et al., 2000), and strict or physically harmful dietary regimens (Hitzeroth, et al., 2001), would be more indicative of active MD. In both cases, it is not clear how these behaviors fluctuate over time or how the frequency of these active behaviors alter in relation to sporting, fitness, or passive-muscle dysmorphic motivations and goals.

In conclusion, when considering MD in terms of passive/active responses, no research has addressed if one response increases when the other decreases. This is a viable avenue for future research grounded by the bimodal model as understanding the interplay between these two categories could impact the treatment methods applied in addressing MD. Despite copious ambiguity regarding the etiology of MD, the disorder persists in many athletic arenas and must be recognized in terms of the putative scope afforded by research efforts. Therefore, a more expansive framework such as the proposed bimodal approach is useful for researchers, clinicians, and ultimately those struggling with MD.

Conclusion

The positions illustrated in this manuscript support both the necessity for, and difficulty associated with conceptualizing MD along a continuum as well as a spectrum. This article is intended to provide extant insight into the dynamic of MD and support that the nature of the disorder ought to be contextualized in temporal- and characteristic-based dimensions as a means to structure future research that could potentially sway the collective classificatory conceptualization of MD to one legitimate niche. Strict dietary strategies and habitual exercise have been found to be components of many athletes and fitness practitioners, but the point at which these behaviors become disordered eating and ritualistic bouts of physical activity is not well understood. Furthermore, it is possible that affective and behavioral components are salient portions of muscle dysmorphic symptomology, but it is also important to consider perceptual and situational influences and how they relate to body image disturbances and subsequently MD. Therefore, the classification of MD should be approached with a consideration for the range of behaviors associated with the disorder as well as a temporal agent accounting for the frequency of such behaviors. Although there is an abundance of literature supporting the obsessive-compulsive, disordered eating, and body dysmorphic behaviors of MD, we suggest that further longitudinal research in how behaviors fluctuate over time and in response to life-events in order to address the continuum-based component of MD. We also suggest that future researchers endeavor to apply this bimodal perspective in psychometric efforts, demographic assessment construction, and general design construction to better ascertain the accurate symptomological nature of MD in the absence of definitive classificatory and diagnostic criteria.

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