Relationships among Bodybuilding Dependence, Muscle Satisfaction, Body Image-Quality of Life, and Coping in Males

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Abstract

Objectives: The purpose of this study was to examine relationships among bodybuilding dependence, muscle satisfaction, body image-related quality of life, and body image-related coping strategies, and test the hypothesis that muscularity concerns may predict quality of life via coping strategies.

Design: Participants (294 males, M_{age} = 20.5 years, SD = 3.1) participated in a cross-sectional survey.

Methods: Participants completed questionnaires assessing muscle satisfaction, bodybuilding dependence, body image-related quality of life, and body image-related coping.

Results: Quality of life was significantly related with the two measures of muscularity concerns and body image coping ($p < .05$). Muscularity concerns were correlated with body image coping ($p < .05$). Mediation analysis revealed that bodybuilding dependence and muscle satisfaction each predicted quality of life both directly and indirectly via body image coping strategies.

Conclusions: These results provide preliminary evidence regarding the ways that muscularity concerns might influence body image-related quality of life.

Keywords: Body image, Size perception, Weight training, Resistance training, Self-Assessment, Appearance

i. Introduction

Researchers have recognized over the last 20 years that muscularity is typically a chief concern among males dissatisfied with their bodies[1]. Muscle dysmorphia has been proposed as an extreme expression and involves individuals preoccupied with the concern they are insufficiently large and muscular, and consumed by weightlifting, dieting, drug use, and other activities aimed at increasing size and definition[2]. Researchers have studied both individuals diagnosed with the condition and people less afflicted with the disorder[3,4]. Both foci have applied value. Understanding, for example, how symptoms interact with other variables in subclinical populations may help identify at-risk individuals. Nevertheless, the majority of studies on the topic have been correlational and exploratory. One way to advance knowledge is to examine the how muscle dysmorphia symptoms interact with other variables to predict consequences.

One potential consequence of muscular preoccupation is lowered quality of life. To date, mixed results have emerged regarding the relationship between quality of life and muscle dysmorphia characteristics[5]. The quality of life measures used, however, have been either general assessments or focused on mental health. A clearer picture may emerge if researchers employ measures that assess life areas influenced by body image, for example, the Body Image Quality of Life questionnaire[6].

Similarly, muscle dysmorphia has been correlated with behaviours, such as exercise, steroid use, muscle checking, and appearance control[3,7,8]. These behaviors may represent broader approaches to coping, some of which might be interpreted as adaptive and some maladaptive. Cash, Santos, and Williams[9], for example, identified three categories of body image-related coping. Avoidance refers to attempts to leave or evade stressful body image situations, such as distressed males who do not shower at a gym after working out so they do not reveal their bodies to others. Appearance fixing involves altering appearance to disguise

a perceived defect, such as males who wear oversized clothing to hide their body shapes. Positive rational acceptance includes strategies encouraging acceptance of the defect, self-care, or rational self-talk, such as males who refute negative thoughts by telling themselves they are healthy despite not being the shape they would prefer. To date these styles of coping have not been examined with respect to muscle dysmorphia symptoms, but doing so will help examine body image coping and muscularity concerns from a more theoretical perspective than has been done currently.

Although examining relationships muscle dysmorphia symptoms have with body image-related quality of life and coping will advance knowledge, further development will result from testing the indirect relationships muscle dysmorphia symptoms have with quality of life via coping strategies[10]. Modern mediation theory allows for variables to predict other factors via direct and multiple indirect pathways simultaneously. Such analyses contribute to theory building and represent an advance over the exploratory correlational designs that have characterised much of the research in the area to date.

In summary, the purposes of the current study were to (a) explore relationships muscle dysmorphia characteristics have with body image-related quality of life and body image-related coping strategies, and (b) examine if muscle dysmorphia symptoms predict quality of life via direct and indirect pathways. We hypothesized that muscle dysmorphia characteristics would be correlated with body image-related quality of life and body image-related coping strategies. We also hypothesized that there would be significant indirect pathways from muscle dysmorphia to quality of life via coping.

ii. Methods

Before starting the study, we obtained institutional human research ethics committee approval. Prior to participating, volunteers received a written explanation of the study's purpose, risks, safeguards, and benefits before providing written informed consent.

Participants included 294 male (M_{age} = 20.5 years, SD = 3.1) who weight trained 2.5 (SD = 1.7) times a week and of whom 69% were consuming nutritional supplements. Participants completed the muscle appearance satisfaction scale (MASS), the body image quality of life inventory (BIQLI), the body image coping strategies inventory (BICSI), and a demographic questionnaire.

The MASS has 19 items[11], rated on a 5-point Likert scale, from 1 (definitely disagree) to 5 (definitely agree). The five subscales include bodybuilding dependence, muscle checking, muscle satisfaction, substance use, and willingness to train when in pain. High scores on the MASS subscales indicate greater bodybuilding dependence, more muscle checking behaviour, increased substance use, willingness to train when in pain and muscle satisfaction (unless reversed scored). Evidence exists for internal consistency and test-retest reliability, along with construct, divergent, and convergent validity[11]. In the current study we used only the bodybuilding dependence and muscle satisfaction scales. Cronbach's alpha for bodybuilding dependence was .88 (95% Confidence Intervals [CI] = .86-.90) and .80 (95% CI = .76-.84) for muscle satisfaction.

The BIQLI has 19 items designed to measure the influence body image has on quality of life[6]. Participants rate the influence of their body image on various aspects of life (e.g., relationships, emotions, grooming activities) using a 7-point bipolar scale from -3 to +3, allowing for a negative, positive, or neutral influence. The BIQLI yields a total overall score. Evidence for the BIQLI's reliability and validity has been reported elsewhere[6,12,13]. The Cronbach's alpha in the current study was 0.93 (95% CI = .92-.94).

The BICSI has 29 items assessing avoidance, appearance fixing, and positive rational acceptance[9]. Participants respond on a 4-point Likert-type scale from 1 (definitely not like me) to 4 (definitely like me). Higher scores indicate greater engagement in these strategies. Evidence for the reliability and validity of the BICSI has been reported elsewhere[9,13]. The

current Cronbach's alpha for appearance fixing was .89 (95% CI = .87-.91), avoidance

was .70 (95% CI = .64-.75), and rational acceptance was .80 (95% CI = .76-.83).

The short demographic questionnaire was used to record participant's age, number of

year's weight training experience, weight training frequency, and consumption of nutritional

supplements. These data were used to describe the sample.

Participants received a packet containing the information sheet, written informed

consent form, and the questionnaires presented in a counterbalanced fashion to avoid order

effects. Participants completed the questionnaires anonymously in approximately 10 min

after which they were debriefed. During the debriefing the expected results were

communicated and subjects had the opportunity to give contact details so they could receive a

copy of the findings if desired.

There was less than 2% missing data and Little's test indicated they could be

considered missing completely at random. The hot deck approach is recommended as the

imputation method of choice[14] and was used in the current study. The questionnaires were

scored so that higher values reflected greater bodybuilding dependence, muscle satisfaction,

quality of life, and engagement in coping strategies. Pearson's correlation coefficients,

corrected for scale unreliability[15], were calculated. Hayes'[10] regression-based mediation

analysis guidelines and PROCESS macro for SPSS (http://afhayes.com/) were implemented

to test the direct and indirect pathways. In keeping with Hayes'[10] guidelines, 95% bias

corrected and accelerated bootstrapped confidence intervals were used to determine if the

effects were statistically different from zero. Bootstrapped confidence intervals do not

require the assumptions of homoscedasticity or residual normality to be satisfied and are

considered more suitable and powerful indicators than traditional inferential tests[10,16].

Prior to the main analysis, regression diagnostics were computed to assess the

presence of bias in the results and to assess the satisfaction of regression assumptions. There

was no evidence of predictor multicollinearity because tolerance values were well above 0.2 and variance inflation factor values were close to 1[16]. Cook's and Mahalanobis distances were inside cutoff values indicating no influential cases, and these values, along with residual plots, indicated no obvious outliers[16]. The Durbin-Watson tests were non-significant indicating that residuals were independent. Homoscedasticity and residual normality was not assessed because bootstrapping was employed to calculate confidence intervals and does not require these assumptions[10].

iii. Results

Table 1 presents the means, standard deviations, and correlations among the variables. Body image quality of life correlated positively with bodybuilding dependence and muscle satisfaction, and negatively with appearance fixing, avoidance, and rational acceptance. Appearance fixing correlated positively with avoidance, rational acceptance, and bodybuilding dependence, and negatively with muscle satisfaction. Avoidance correlated positively with rational acceptance and bodybuilding dependence and negatively with muscle satisfaction. Rational acceptance correlated positively with body building dependence and negatively with muscle satisfaction.

Table 2 presents the results from the main mediation analysis. After accounting for each coping strategy, bodybuilding dependence and muscle satisfaction were significant direct predictors of body image-related quality of life ($P < 0.005$). Bodybuilding dependence also predicted quality of life via each of the 3 indirect pathways containing one of the coping strategies, as indicated by the bootstrapped 95% confidence intervals not including zero. Muscle satisfaction also predicted quality of life via one indirect pathway: that which contained avoidance coping.

iv. Discussion

Results indicated that bodybuilding dependence and muscle satisfaction predicted body image quality of life directly and indirectly via body image coping. After accounting for the direct pathway, all 3 coping strategies provided an indirect pathway between bodybuilding dependence and quality of life. The only indirect pathway, however, between muscle satisfaction and quality of life involved avoidance coping.

These results advance current knowledge by revealing that the relationship bodybuilding engagement has with quality of life may be complex and consist of multiple pathways. Such findings are coherent with current mediation theory: variables may relate to others via multiple pathways. Also, these different pathways may be in opposite directions[10]. In current study, for example, bodybuilding engagement was associated directly and positively with increased quality of life, perhaps because participants believed they were actively improving their physiques and expected psychological or social rewards. At the same time, however, if bodybuilding engagement elicits increased maladaptive body image coping (e.g., avoidance behaviours) then its second pathway to quality of life may be negative. These findings may help explain the inconsistent findings from previous research.

The previous mixed results may have been due, at least partly, to a failure to acknowledge the various pathways by which the constructs may relate. Depending on the sample or situation different pathways may be more salient than others leading to mixed results. In addition, previous work has used global muscle dysmorphia measures. Muscle dysmorphia, however, represents a cluster of characteristics and each may relate to quality of life in different ways. Regarding future research, investigators could use qualitative or thought listing designs to examine the perceptions and cognitions associated with the muscularity concerns and quality of life relationships. Also measures that examine multiple characteristics of the condition may advance understanding.

Muscle satisfaction had a positive direct relationship with quality of life and also a negative indirect relationship via avoidance coping. There is evidence to help interpret these findings. Previous research has revealed that some males who weight train may be selective in who they reveal their bodies to, because they may be inaccurately labelled as steroid abusers when they are not consuming such substances[17,18]. Such inaccurate accusations arise from misperceptions among uninformed people in the general population regarding steroid use. It is conceivable that individuals, who might otherwise be satisfied with their physiques (representing the positive direct relationship observed above), may engage in avoidance behavior in certain circumstance and given the adjustments they have to make, might feel a lowered quality of life (representing the negative indirect relationship observed above). Again, the multiple and opposite indirect pathways between muscle satisfaction and quality of life is coherent with modern mediation theory[10].

The current findings provide suggestions for future research on muscle dysmorphia beyond the specifics of body image-related quality of life and coping. It is conceivable that relationships muscle dysmorphia have with other variables may also be characterized by multiple pathways. Such possibilities have not been examined, but may be a reason for the inconsistent results observed with other variables such as self-esteem and body mass index[19]. To assist in explaining conflicting results, researchers could examine alternative pathways by which variables mediate and moderate each other. Such research will add depth to current understanding by stimulating the development of fine-grained and multifaceted theories.

Another future research avenue is the need to calibrate the measures used in the current study against real world metrics to help interpret results. The current study reveals how scores on quality of life measures change relative to the other inventories. Calibrating what these changes mean will help researchers translate these results for lay people. For example, being able to say that a one unit change on a quality of life scale is associated with

an *x* number of additional training sessions a week, sessions that last on average an *x* number of minutes longer, or an *x*% increase in the likelihood of using illegal substances will help people interpret the results.

We acknowledge that causality cannot be inferred from the results due to a descriptive design. This is a common limitation across the muscle dysmorphia literature and one not easily avoided, in some cases for sound reasons. It would be unethical, for example, for researchers to encourage muscularity concerns in participants to find out the detrimental consequences, when those effects include drug abuse and social dysfunction. Given such experimental research is unethical, descriptive research represents the best evidence available to guide theory development in muscle dysmorphia. Although research will likely continue to be mostly descriptive, employing various types of descriptive studies (e.g., longitudinal, qualitative) will help to address the limitations inherent in each design.

v. Conclusions

Over the last 20 years investigators have developed an impressive body of knowledge regarding the perceptions males have regarding their muscularity levels. The current study has revealed that the relationships muscularity concerns have with quality of life is complex and multifaceted. Such findings have applied value for mental health care professionals who help individuals. Assistance or prevention strategies based on simple relationships between variables may not be entirely effective when muscular dissatisfaction may be related to quality of life and other consequences (e.g., drug use, excessive exercise) via multiple and conflicting pathways. Instead, the best help will consider the various ways by which muscularity concerns may influence people's lives.

vi. Practical Implications

- Attempts to help males with their muscularity concerns need to be multifaceted

- The current study suggests that relapse prevention training would be useful when helping men with their muscularity concerns

- Muscular dissatisfaction prevention programmes will benefit from educating males about adaptive coping strategies for dealing with their concerns

vii. Acknowledgements

viii. References

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ix. Tables

Table 1

Means (± SD) and Correlations among the Variables

	Mean	*SD*	1	2	3	4	5
1. BIQoL	1.41	0.84					
2. AF	1.28	0.65	-.13[a]				
3. A	0.80	0.46	-.43[a]	.48[a]			
4. RA	1.36	0.49	-.14[a]	.53[a]	.63[a]		
5. BD	2.43	1.03	.14[a]	.46[a]	.22[a]	.26[a]	
6. MS	2.83	0.88	.24[a]	-.33[a]	-.20[a]	-.11[a]	.10

Note: [a]$P < .05$; A = avoidance, AF = appearance fixing, BD = bodybuilding dependence,

BIQoL = body image quality of life, MS = muscle satisfaction, RA = rational acceptance

Table 2

Direct and Indirect Effects of Bodybuilding Dependence and Muscle Satisfaction on Body Image-related Quality of Life

	Effect (SE)	95% CI
Bodybuilding Dependence		
Appearance Fixing		
Direct BD effect	0.172[a] (0.053)	0.068-0.276[b]
Indirect AF effect	-0.068 (0.027)	-0.128--0.020[b]
Avoidance		
Direct BD effect	0.154[a] (0.046)	0.062-0.245[b]
Indirect A effect	-0.047 (0.020)	-0.091--0.010[b]
Rational Acceptance		
Direct BD effect	0.132[a] (0.049)	0.034-0.230[b]
Indirect RA effect	-0.026 (0.015)	-0.050--0.004[b]
Muscle Satisfaction		
Appearance fixing		
Direct BD effect	0.181[a] (0.059)	0.064-0.300[b]
Indirect AF effect	0.018 (0.018)	-0.016-0.057
Avoidance		
Direct BD effect	0.158[a] (0.055)	0.050-0.261[b]
Indirect A effect	0.055 (0.021)	0.019-0.101[b]
Rational acceptance		
Direct BD effect	0.198[a] (0.057)	0.085-0.310[b]
Indirect RA effect	0.011 (0.010)	-.002-0.039

Note: [a]$P<.005$, [b]significant pathway based on 95% accelerated and bias corrected bootstrapped confidence intervals, A = avoidance, AF = appearance fixing, BD = bodybuilding dependence, BIQoL = body image quality of life, MS = muscle satisfaction, RA = rational acceptance