

Predicting Muscularity-Related Behavior, Emotions, and Cognitions in Men:
The Role of Psychological Need Thwarting, Drive for Muscularity, and
Mesomorphic Internalization

Christian Edwards^a, David Tod^b, Gyoza Molnar^a, and David Markland^c

^aUniversity of Worcester, ^bLiverpool John Moores University, ^cBangor University

Author Note

Christian Edwards, Institute of Sports & Exercise Science, University of Worcester, Worcester, United Kingdom; David Tod, School of Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, United Kingdom; Gyoza Molnar, Institute of Sports & Exercise Science, University of Worcester, Worcester; David Markland, School of Sport, Health and Exercise Sciences, Bangor University, Bangor, United Kingdom.

Correspondence concerning this article should be addressed to Christian Edwards, Institute of Sports & Exercise Science, University of Worcester, Henwick Grove, Worcester, WR2 6AJ.

E-mail: C.Edwards@worc.ac.uk

Abstract

We examine the relationships that internalization, need thwarting (NT), and drive for muscularity (DFM), along with their interactions, had with weightlifting, muscle dissatisfaction (MD), and muscle-related-worry (MRW). A sample of 552 men ($M_{AGE} = 20.5$ years, $SD = 3.1$) completed the Psychological Need Thwarting Scale, the Internalization subscale of the male version of the Sociocultural Attitudes Towards Appearance Questionnaire, the Drive for Muscularity Scale-Attitudes subscale, the Male Body Attitudes Scale-Muscularity subscale, the Body Change Inventory-Worry subscale, and an inventory assessing weightlifting behavior. DFM significantly predicted weightlifting, MRW, and MD. Internalization significantly predicted weightlifting and MRW. NT significantly predicted weightlifting and MD, and its relationship with MRW approached significance. The interaction terms did not predict weightlifting or MRW. The NT/DFM and NT/Internalization interaction terms predicted MD. These results highlight the role of NT in predicting appearance variables in men.

Keywords: Male Body Image; Internalization; Self-Determination Theory; Need Thwarting.

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The muscular ideal physique represents a standard many men internalize as being associated with social, physical, and psychological benefits (Pope, Phillips, & Olivardia, 2000). Internalization involves the integrating of the muscular ideal into one's identity (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), and is related with the drive for muscularity, or the desire to build a muscular physique (DFM, Karazsia & Crowther, 2010). Both internalization and DFM predict appearance-related behaviors, cognitions, and emotions, including muscle dissatisfaction, excessive weightlifting, and restrictive dieting (Edwards, Tod, & Molnar, 2014; Karazsia & Crowther, 2010). Research has shown, however, that these relationships are moderate in strength (Tod & Edwards, 2015; Tylka, 2011). Self-Determination Theory variables may help improve the prediction of appearance-related behaviors, cognitions, and emotions in men (SDT; Deci & Ryan, 2000).

Basic psychological needs theory (BPNT; Deci & Ryan, 2000), as one possibility, suggests the satisfaction of psychological needs (autonomy, competency, and relatedness) leads to well-being. Autonomy, which refers to volition, is described as regulation by the self. Competency is the degree individuals feel effective in interacting with their environment. Relatedness is the extent individuals feel connected to their social environment (Deci & Ryan, 2000). When social environments are pressuring, controlling, or unsupportive, need satisfaction is thwarted, increasing the likelihood people will experience compensatory behaviors, thoughts, and emotions. In SDT, compensatory behaviors refer to actions individuals take as defensive adaptations for their thwarted needs (e.g., when one's need for competence is thwarted it may be that they are overly controlling of aspects of their life, Deci & Ryan, 2000). Some cross-sectional research reveals that need thwarting (NT) predicts appearance-related variables (e.g., body dissatisfaction and unhealthy weight-control

behaviors) in young women (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Thøgersen-Ntoumani, Ntoumanis, & Nikitaras, 2010). The relationships NT has with appearance-related variables in men remains to be examined. In men, where a lean muscular physique is the hegemonic ideal (Galli, Petrie, Reel, Chatterton, & Baghurst, 2014; Hildebrandt, Schlundt, Langenbucher, & Chung, 2006), NT may predict weightlifting, muscle dissatisfaction (MD), and muscularity-related worry (MRW). We hypothesized that needs thwarting (NT), internalization, and DFM predicts weightlifting, MD, and MRW.

In addition, these predictors may interact to predict weightlifting, MD, and MRW. Two advantages exist for examining predictor interactions. First, such research helps build theories that better describe the complexity of people's experiences. For example, all men in Western societies are exposed to the muscular ideal, but not all internalize it to the same degree or engage in muscularity-related behaviors, emotions, and cognitions. Perhaps men who experience NT may internalize the muscular ideal, viewing it as a way to attain competence, autonomy, and relatedness (Frederick & Haselton, 2007). Significant interactions may increase the variance accounted for in physique change behaviors (e.g., weightlifting), negative thoughts (e.g., MD), and negative emotions (e.g., MRW). Second, greater understanding of the interactions among predictor variables may inform the identification of, and help given to, people experiencing issues detrimental to their wellbeing (i.e., MD and MRW). We hypothesized that NT, internalization, and DFM interaction terms would predict weightlifting, MD, and MRW.

Body image theorists argue greater knowledge will emerge when researchers measure various outcome variables (Thompson, 2004). Cognitive behavioral approaches and social learning models, such as those described by Cash (2011), Festinger (1954), and Thompson et al. (1999), suggest that there are behavioral, emotional, and cognitive consequences to body-

related self-perceptions. To capture these recommendations, our criterion variables were MRW, MD, and self-reported weightlifting engagement.

The purpose of the current study was to examine the relationships that internalization, NT and DFM, along with their interactions, had with self-reported weightlifting, MD, and MRW. We hypothesized that NT, internalization, and DFM predict weightlifting, MD, and MRW. We also hypothesized that NT, internalization, and DFM interactions terms also predict weightlifting, MD, and MRW.

Method

Participants

An institutional human research ethics committee approved the study prior to data collection. Before participating, volunteers received a written explanation of the study's purpose, risks, safeguards, and benefits before signing informed consent documents. Participants were 552 undergraduate men ($M_{AGE} = 20.58$ years, $SD = 3.58$) attending sports-related courses at universities in the United Kingdom. Ninety percent of participants identified as English, 3% as Welsh, 1% as Irish, 1% as Scottish, and 5% as other. The majority took nutritional supplements (61%) and engaged in sport, physical activity, weight training, or combinations of all three (99%).

Measures

Drive for muscularity. The Drive for Muscularity Scale-Attitudes subscale (DMS-A, McCreary & Sasse, 2000) measures men's desire to be muscular, consisting of 7 items with a 6-point Likert-type scale from 1 (*always*) to 6 (*never*). Evidence demonstrates acceptable internal consistency, test-retest reliability, and validity (McCreary, 2007). In our sample, Cronbach's alpha was .90 (95% confidence interval [CI] .88-.91).

Internalization of the mesomorphic ideal. The Internalization subscale of the revised male version of the Sociocultural Attitudes Towards Appearance Questionnaire

(SATAQ-IR, Thompson et al., 1999) assesses the tendency to internalize societal mesomorphic ideals, containing 11 items rated on a 5-point Likert-type scale from 1 (*completely disagree*) to 5 (*completely agree*). Evidence has revealed acceptable internal consistency and validity (Tylka, 2011). In this sample, Cronbach's alpha was .86 (95% CI .84-.88).

Need thwarting. The 12-item Psychological Need Thwarting Scale (PNTS, Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) measures autonomy, competence, and relatedness NT on a 7-point Likert-type scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The stem ("In my life") and items used in the current study focused on a person's life. Evidence has revealed acceptable reliability and validity for both men and women (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). The current Cronbach's alpha was .84 (95% CI .80-.86).

Muscle dissatisfaction. The Male Body Attitudes Scale-Muscularity subscale (MBAS-M, Tylka, Bergeron, & Schwartz, 2005) assesses men's dissatisfaction with their current muscularity levels with 8-items on a 6-point Likert scale from 1 (*never*) to 6 (*always*). The MBAS-M has demonstrated acceptable internal consistency, reliability, and validity (Tylka et al., 2005). The current Cronbach's alpha was .88 (95% CI .86-.89).

Muscle related worry. The 2-item Body Change Inventory-Worry subscale (BCI-W, Ricciardelli & McCabe, 2002) assesses men's tendency to worry about changing behaviors to increase muscle with a 6-point Likert-type scale from 1 (*never*) to 6 (*always*). The BCI scale has demonstrated acceptable reliability and validity (Ricciardelli & McCabe, 2002). The correlation between the two items was .72.

Demographic questionnaire. The demographic questionnaire asked participants to identify their age, national identity, number and duration of weightlifting sessions per week, supplement use, and physical activity engagement. The number of weightlifting sessions per

week was multiplied by the duration to provide a weekly weightlifting total (McGuigan, 2012).

Procedure

Participants received a pack containing a study information sheet, the questionnaires presented in a counterbalanced order, and a written informed consent sheet. Participants completed the questionnaires anonymously and their participation took approximately 20 minutes.

Data Analysis

We calculated Pearson's correlation coefficients. We used hierarchical multiple regression, and assessed potential multicollinearity finding that tolerance statistics were acceptable. Predictor variables were centred prior to calculating the interaction terms. In the first step we included the centred predictor variables, before adding the interaction terms in the second step. Following Jaccard and Turrisi's (2003) guidelines, (a) the hierarchical F test indicated the presence of an interaction, (b) the difference in R^2 indicated interaction strength, and the interaction term's unstandardized coefficient assisted interpretation of the interaction. When interaction terms were significant, but there was a change in the significance of individual predictors, following Kluytamans, van de Schoot, Mulder, and Hoijtck's (2012) guidelines we calculated Bayes factor to assess which regression model was best supported by the data.

Results

Table 1 presents descriptive and correlation results. Internalization correlated with DFM, NT, weightlifting, MD, and MRW. DFM correlated with NT, weightlifting, MD, and MRW. NT correlated with MD and MRW. Weightlifting correlated with MD and MRW. MD correlated with MRW.

Table 2 presents the results from the regression analysis. DFM significantly predicted weightlifting, MRW, and MD. Internalization significantly predicted weightlifting and MRW. NT significantly predicted weightlifting and MD, and its relationship with MRW approached significance ($p = .05$). The interaction terms did not predict weightlifting or MRW. The NT/DFM and NT/Internalization interaction terms predicted MD. Bayes factor revealed for MD that Model 1 (including only the individual predictors) received 3.86 times more support than an unconstrained model, Model 2 (with the interaction terms included) received 8.11 times more support than an unconstrained model, and Model 2 received 2.10 times more support than Model 1. Although arbitrary Bayes factor cut-off scores exist, Kluytamans et al. (2012) recommend researchers make theory-informed decisions regarding Bayes factor interpretation. In the discussion, we identify how the significant interaction terms extend theory.

Discussion

The current study demonstrates that NT correlates with, and predicts, appearance related variables in men. As one novel increment, this study has broadened the number of variables correlated with the DFM, internalization, MD, and MRW. These results parallel the existing cross-sectional research in women, and identify the potential role of SDT variables for extending research on men's body image. Although we tested NT, future research may explore the relationships psychological needs satisfaction (e.g., autonomy, competency, or relatedness) have with appearance variables in men. However, the novel inclusion of NT advances knowledge and provides avenues for future research in the following ways.

First, the significant NT/Internalization interaction term may provide insights into why internalization does not always predict MD as strongly as theory would suggest. Previously, researchers have made somewhat simplistic, but theoretically intuitive, interpretations, arguing men who internalize the dominant male physique ideal will

experience MD (Tylka, 2011). The current results suggest that the relationship between internalization and MD is more complex. Although internalization predicted other criterion variables in the expected direction, it was a non-significant predictor of MD. The NT/Internalization interaction term, however, significantly predicted MD. The inclusion of NT to social-cultural explanations for MD may help broaden their explanatory power by considering individuals' characteristics: they may help researchers identify which types of men may experience MD.

Second, DFM's interaction with NT was also a significant negative predictor of MD. BPNT suggests that people who consider that their basic psychological needs for competence, autonomy, and relatedness are being thwarted by pressuring, controlling, or unsupportive environments will likely search for ways to cope or adopt strategies that allow them to gain need satisfaction (Deci & Ryan, 2000). For these men, most of whom engaged in sport, the DFM may be one such strategy. Normative messages often link muscularity to masculinity and success at sport (Galli et al., 2014; Mahalik et al. 2003; McCreary, Saucier, & Courtenay, 2005). According to these norms, muscular men are capable of handling physical challenges they encounter, and are physically competent (Galli et al., 2014; Mahalik et al. 2003). Given these messages, it is plausible that men who believe their needs are being thwarted may develop a DFM and the interaction between these variables leads to lower MD. Although we interpret the results, in line with BPNT theory, that NT moderated the relationship DFM had with MD, the direction of causality was not established and perhaps DFM moderated the relationship NT had with MD, and this question represents a future line of inquiry. Nevertheless, the current results demonstrate that psychological NT interacts with DFM and helps provide justification for future research.

Similarly, NT was a significant negative predictor of weightlifting. This finding makes sense from a BPNT perspective. Weightlifting is one activity that men have control

over and can feel autonomous and competent in doing. Further, weightlifting allows men to achieve a muscular body. A muscular body may allow them to achieve competence, autonomy, and relatedness in other areas of their lives (e.g., for sportsmen muscularity may allow for competency at sport). Greater engagement in weightlifting may lead men to believe their needs are less thwarted. The cross-sectional design, however, means causality cannot be inferred and the direction of tested relationships should be viewed with caution.

The vast majority of research in the area has been descriptive, and in some cases for good reasons. It may be unethical, for example, for experiments that involve interventions designed to increase the thwarting of men's psychological needs because of the known potential negative health consequences. Although psychologists conduct graded exposure experiments in which negative states are induced (e.g., anxiety), it is currently unknown what level of needs thwarting exposure is likely to induce "safe" versus "unsafe" consequences beyond what participants may experience in the course of their daily lives. Given that such experiments should not currently be approved in the absence of supported guidelines, descriptive research represents the best evidence available to guide theory development and practical applications. As an exploratory study we aimed to gain insights into the role of NT in appearance related variables in men. Our results justify the need for more extensive, expensive, and invasive research. For example, there are various types of descriptive research methods (e.g., qualitative, longitudinal) and each has strengths and weaknesses. To illustrate, although longitudinal time-lag studies may allow for variables measured at earlier time points to predict variables at later time points, they may suffer from increased drop-out rate and loss of statistical power. Adopting a variety of methods may help account for the limitations of specific methods.

We sampled undergraduate sports students. Although knowledge about this population has value, it limits the generalizability of the findings to other student and

community samples. Further, we asked participants to identify their national identity. We did not ask participants to identify their ethnicity or sexual orientation. Perhaps the pathways tested in the current study may be different for men who are often marginalized (e.g., gay men or men of color) compared with those who are not. Examining whether the pathways tested in the present study exist among other groups will contribute to knowledge. Second, we measured appearance-related variables that are potentially health compromising. Currently it is unknown what represents unhealthy levels of MRW, weightlifting, or MD. These measures need to be calibrated against real world behaviors. Future research may examine the role of NT, DFM, and internalization in predicting other appearance focussed behaviours in men (e.g., disordered eating, steroid use).

Nevertheless, in addition to advancing theory, the current findings have applied value through the identification of risk factors associated with MD (Tylka, 2011). Environments in which messages and images about the ideal muscular physique are prevalent, and men are prevented from satisfying their basic needs, may be breeding grounds for dissatisfaction and worry. Such patterns are observed in elite male aesthetic sports where athletes' training, lifestyle, and nutrition, are closely monitored and decisions are made or heavily influenced by others (e.g., coach; Galli et al., 2014). Given that sport has a strong masculine ethos and where size and muscle influence success, it may be a suitable place to test hypotheses regarding internalization, NT, DFM, and muscle-related thoughts, emotions, and actions.

Investigators have developed knowledge about men's muscularity-related perceptions. The current study has found that the relationships among NT, internalization, behavior, thoughts, and feelings are multifaceted. The role of needs thwarting provides a way to develop understanding and has applied value. Assistance or prevention strategies based on simple relationships between internalization, DFM, and outcomes may not be effective when

muscularity-focused issues may be tied to basic human needs. Optimal help will consider the various ways that the muscular ideal appeals to a male's fundamental being.

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Table 1

Means (\pm SD) and Correlations among the Measured Variables

	Mean (SD)	1	2	3	4	5	6
1. SATAQ-IR	3.04 (\pm 0.08)	1.0					
2. DMS-A	3.55 (\pm 1.19)	.59*	1.0				
3. PNTS	2.51 (\pm 1.09)	.27*	.28*	1.0			
4. WL	127.72 (\pm 123.72)	.26*	.26*	-.003	1.0		
5. MBAS-M	3.34 (\pm 1.09)	.50*	.77*	.28*	.13*	1.0	
6. BCI-W	4.38 (\pm 1.99)	.43*	.49*	.23*	.29*	.43*	1.0

Note: * $p < .01$; DMS-A = Drive for Muscularity Scale-Attitude subscale, SATAQ-IR = Sociocultural Attitudes Towards Appearance Questionnaire-Internalization subscale, PNTS = Psychological Need Thwarting Scale, WL= Weightlifting, MBAS-M = Male Body Attitudes Scale-Muscularity subscale, BCI-W = Body Change Inventory-Worry subscale.

Table 2

Moderated Hierarchical Regression Analyses

Variable	R	R ²	ΔR^2	B (SE B)	β	sr ²	p
Weightlifting							
Step 1	.31	.10	.10				.001
PNTS				-.97 (.41)	-.10	.009	.017
SATAQ-IR				2.45 (.71)	.18	.020	.001
DMS-A				19.05 (5.28)	.19	.022	.001
Step 2	.31	.10	.002				.774
Muscle related worry							
Step 1	.53	.28	.28				.001
PNTS				.01 (.01)	.08	.005	.050
SATAQ-IR				.05 (.01)	.21	.028	.001
DMS-A				.58 (.08)	.35	.076	.001
Step 2	.53	.28	.005				.288
Muscle dissatisfaction							
Step 1	.77	.60	.60				.001
PNTS				.01 (.01)	.06	.003	.030
SATAQ-IR				.01 (.01)	.06	.002	.106
DMS-A				.66 (.03)	.72	.327	.001
Step 2	.78	.61	.01				.001
PNTS				.01 (.01)	.05	.002	.068
SATAQ-IR				.01 (.01)	.06	.002	.099
DMS-A				.66 (.03)	.72	.328	.001
DMS-A X SATAQ-IR				.01 (.01)	.04	.001	.189
DMS-A X PNTS				-.01 (.01)	-.12	.009	.001
SATAQ-IR X PNTS				.01 (.01)	.12	.009	.001

Note: DMS-A = Drive for Muscularity-Attitude subscale, SATAQ-IR = Sociocultural

Attitudes Towards Appearance Questionnaire-Internalization subscale, PNTS =

Psychological Need Thwarting Scale.