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Factor structure and psychometric properties of a Romanian translation of the drive for Muscularity Scale (DMS) in university men

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ABSTRACT

We examined the psychometric properties of a Romanian translation of the 15-item Drive for Muscularity Scale (DMS). Male university students from Romania ($N = 343$) completed the DMS, as well as measures of self-esteem, body appreciation, and muscle discrepancy. Exploratory factor analysis indicated that DMS scores reduced to two factors that related to muscularity-oriented attitudes and behaviours, with both first-order factors loading onto a higher-order factor. However, confirmatory factor analysis indicated that a model with two first-order factors and a higher-order factor had poor fit. A two-factor model without a higher-order construct achieved acceptable but mediocre fit. Scores on the two-factor DMS model had adequate internal consistency and demonstrated acceptable convergent validity (significant correlations with self-esteem, body appreciation, and muscle discrepancy). These results provide support for a two-factor model of DMS scores in a Romanian-speaking sample and extends the availability of the DMS to a rarely-examined linguistic group.

1. Introduction

The ideal male physique in many socioeconomically developed settings is muscular and toned (Karazsia, Murnen, & Tylka, 2017; Leit, Pope, & Gray, 2001; Pope, Phillips, & Olivardia, 2000; Swami & Tovée, 2005) and a large proportion of men in these sites report a discrepancy between their current and desired levels of muscularity (e.g., Edwards, Tod, Morrison, & Molnar, 2012; Frederick et al., 2007; McCreary, 2007; Schneider, Rollitz, Voracek, & Henning-Fast, 2016). Findings such as these have led some scholars to propose that an important component of men's body image is *drive for muscularity*, or a perception of having an underdeveloped musculature combined with a desire to increase muscle mass (McCreary, 2012; Morrison, Morrison, Hopkins, & Rowan, 2004). Higher drive for muscularity in men is reliably associated with a range of negative outcomes, including lower psychological well-being, higher rates of anabolic steroid and supplement use, and disordered eating (e.g., Lavender, Brown, & Murray, 2017; Parent, 2016; Parent & Bradstreet, 2017).

A number of scales have been developed to assess the drive for muscularity construct in men (for reviews, see Cafri & Thompson, 2007; Tod, Morrison, & Edwards, 2012), but the most widely-used of these measures is McCreary and Sasse's (2000) Drive for Muscularity Scale (DMS). The DMS is a self-report measure consisting of 15 items that are rated on a 6-point scale ranging from 1 (*Always*) to 6 (*Never*). Principal components analysis (PCA) with data from Canadian men suggested that DMS scores reduced to two first-order factors, termed Muscularity-Oriented Body Image Attitudes (7 items) and Muscularity-Oriented Behaviours (7 items; McCreary, Sasse, Saucier, & Dorsch, 2004). In this study, one item (#10: "I think about taking anabolic steroids") was found to have very little variability and was omitted from the subscale calculations. In other studies, however, Item #10 has been found to load onto the Behaviours subscale (McPherson, McCarthy, McCreary, & McMillan, 2010). In addition, some studies have indicated that both subscales loaded onto a single higher-order DMS factor (McCreary et al., 2004; McPherson et al., 2010).

McCreary et al. (2004) also reported that DMS subscale and total scores had adequate internal consistency coefficients (Atti-

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tudes α = .88, Behaviours α = .81). Reviews of the measure also highlight good test-retest reliability coefficients, as well as acceptable patterns of concurrent, convergent, and discriminant validity in English-speaking samples (McCreary, 2007; Tod et al., 2012). In addition, the two-factor structure of DMS scores has been supported through confirmatory factor analysis (CFA) in sexual minority men from the United States, with all items loading onto their respective factors (DeBlaere & Brewster, 2017). In contrast, however, recent research has questioned the factorial validity of DMS scores in Asian American men (Keum, Wong, DeBlaere, & Brewster, 2015). More specifically, these authors reported that the 15 DMS items provided poor fit to the data using CFA and that exploratory factor analysis (EFA) suggested the removal of three behavioural items (Items #4, 5, 10). A more recent study of Asian American men indicated through CFA that a fourth item (Item #12) should also be removed for the two-factor model of DMS to achieve good fit (Cheng, McDermott, Wong, & La, 2016).

The results of studies with Asian American men suggest that the parent factor structure of DMS scores may not present good fit in some social identity groups (Cheng et al., 2016; Keum et al., 2015). However, a complementary body of work has examined the factorial validity of DMS scores in non-English-speaking samples and presents equivocal findings. For example, CFA studies have reported that the original two-factor model had good fit in Argentinian university students (Compte, Sepúlveda, de Pellegrin, & Blanco, 2015), Spanish adolescents (Sepúlveda, Parks, de Pellegrin, Anastasiadou, & Blanco, 2016), German weight-training men (Waldorf, Cordes, Vocks, & McCreary, 2014), and Italian heterosexual and gay men (Nerini, Matera, Baroni, & Stefanile, 2016). With the exception of Nerini et al. (2016), who did not include Item #10 in their analyses, all other studies have reported that Item #10 loads onto the Behavioural subscale. Likewise, EFA with principal-axis factoring with Malaysian Malay men indicated that DMS scores reduced to two dimensions mirroring the parent study, with Item #10 again loading onto the Behavioural subscale (Swami, Barron, Lau, & Jaafar, 2016).

In contrast, a CFA of DMS scores in Brazilian men indicated that the parent two-factor model achieved poor fit (Campana, Gomes, Swami, & da Silva, 2013). Three items (Items #7, 9, 10) had high residuals and the two-factor model was reported to have good fit following the removal of these items. Campana et al. (2013) also tested a novel three-factor model consisting of Muscularity Concern, Muscularity Investment, and Ambiguity of Muscularity Investment subscales, but found that it had poorer fit compared to the modified two-factor model. In addition, Escoto et al. (2013) examined the factor structure of DMS scores in Mexican university students using EFA and reported that the Attitudes subscale mirrored its parent version, with all 7 items having adequate factor loadings. However, the Behaviour subscale reduced to two dimensions reflecting substance intake and training adherence. A CFA with a sample of Mexican men provided support for this revised three-factor model, although internal consistency coefficients for the Behavioural dimensions were less-than-adequate (Escoto et al., 2013; but see Escoto Ponce de León et al., 2018, who reported adequate internal consistency coefficients for all three factors in Mexican bodybuilders). Escoto et al. (2013) also reported, using CFA, that the parent two-factor model of DMS scores had good fit.

These translational studies have also indicated that the two DMS subscales have adequate internal consistencies and good patterns of convergent, concurrent, and discriminant validity (Campana et al., 2013; Compte et al., 2015; Escoto et al., 2013; Nerini et al., 2016; Sepúlveda et al., 2016; Swami et al., 2016; Waldorf et al., 2014). However, one equivocal issue relates to the fit of a higher-order dimension of drive for muscularity scores (that is, the extent to which the two first-order DMS factors adequately load onto a higher-order dimension). Most translational studies have not examined fit of this higher-order dimensionality (Campana et al., 2013; Compte et al., 2015; Escoto et al., 2013; Waldorf et al., 2014). Conversely, Nerini et al. (2016) reported that the higher-order dimensionality had good fit in Italian men, while Sepúlveda et al. (2016) found that a model that included the higher-order factor had poor fit in Spanish adolescents. Thus, examining the higher-order dimensionality of the DMS scores would be useful direction for future research.

1.1. The present study

As a contribution to the literature reviewed above, we sought to examine the factor structure and psychometric properties of a Romanian (*limba română* or лимба ромынэ in Moldovan Cyrillic) translation of the DMS. Doing so is important for a number of reasons. First, there remains a dearth of research on body image in the Romanian context (Swami, Tudorel, Goian, Barron, & Vintila, 2017). This is notable because Romanian is spoken by around 24 million people as a first language, mainly in Romania and Moldova (where it has official status), as well as by several million more as a second language (European Commission, 2012). The availability of a translation of the DMS would, therefore, allow for more systematic investigations of the drive for muscularity construct in a population that has traditionally been neglected within the body image literature. Validation of a Romanian version of the DMS would also provide scholars with an appropriate tool to investigate the relationships between drive for muscularity and potential negative outcomes, such as poorer psychological well-being and negative health behaviours, in Romanian-speaking populations.

Second, Romania remains at an early stage of the nutrition transition (Popescu-Spineni, Glavce, David-Rus, Manuc, & Roville-Sausse, 2011), with ongoing changes to diet (e.g., increased intake of foods rich in carbohydrates and saturated fats) and dietary habits that are contributing to increasing rates of obesity (Ulijaszek & Koziel, 2007). Despite, or possibly concomitant to these trends, Romanian boys may desire bodily bigness in order to conform to traditional appearance ideals that celebrate male strength and masculinity (Mocanu, 2013). Indeed, despite recent social and political changes, it has been suggested that cultural norms and traditions have not changed at the same pace (Gavreliuc, 2012), with men expected to appear masculine through bodily expression, primarily in terms of muscularity and self-accomplishment (Mîndruţ, 2006). Recent studies have also suggested that a desire for greater muscularity may have been heightened in Eastern European men (e.g., Babusa, Czeglédi, Túry, Mayville, & Urbán, 2015), possibly as result of a "crisis of masculinity" taking root in a region experiencing social and economic transitions, as well as changing consumerist patterns following the fall of the Iron Curtain (Matlak, 2014).

Because it is difficult to know how these issues might impact on latent dimensionality of DMS scores in Romanian participants, we adopted a two-step strategy (Worthington & Whittaker, 2006) to examine the factor structure of a Romanian translation of the DMS. Based on the framework of classical test theory, we began by using EFA to examine the factor structure of Romanian DMS scores. This allowed us to explore latent dimensionality without any *a priori* limitations in terms of modelling. Next, for the purposes of cross-sample validation, we examined the fit of the model derived from EFA using confirmatory analytic methods. Although we acknowledge that other models have been proposed in the literature (e.g., Campana et al., 2013; Escoto et al., 2013), we also note that these models have either not been supported through CFA or suffer from psychometric limitations (e.g., poor internal consistency coefficients). Thus, we did not examine the fit of these alternative models in the present work. Moreover, the present two-step strategy allows us to determine the most appropriate DMS model for use in the present sample and eliminates the likelihood of