

# Physical Perceptions and Self-Concept in Athletes with Muscle Dysmorphia Symptoms

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**Abstract.** Individuals affected by Muscle Dysmorphia (MD; body image disorder based on the sub estimation of muscle size), practice weightlifting in order to alleviate their muscular dissatisfaction. Although physical activity is associated with increased physical self-perception, we assume that this was not reproduced in full in people with MD. The study sample consisted of 734 weightlifters and bodybuilders, 562 men and 172 women, who completed the *Escala de Satisfacción Muscular*, the Physical Self-Concept Questionnaire, and from whom measures of body fat and Fat-Free Mass Index (FFMI) were obtained. The results showed that people suffering from MD symptoms, overall, have poorer physical self-concept perceptions ( $F = 18.46 - 34.77, p < .01$ ).

Received 14 May 2013; Revised 11 September 2013; Accepted 6 November 2013

**Keywords:** muscle dysmorphia, physical self-concept, fat-free mass index.

Many authors agree on the view that physical activity positively affects self-concept (Balaguer & García-Merita, 1994; Sonstroem, 1997; Zulaika & Goñi, 2002), and more specifically, physical self-concept, especially in the perceptions of sport ability, physical condition and strength, both in amateur (Contreras, Fernández, García, Palou, & Ponseti, 2010; Esnaola, 2005; Moreno, Cervelló, & Moreno, 2008) and elite athletes (Aróstegi, Goñi, Zubillaga, & Infante, 2013). However, there is evidence that this relationship does not always occur in the same direction (Ries, 2011; Valdez & Guadarrama, 2008).

Some studies have found a relationship between certain physical activities and poorer physical self-concept, especially in relation to the perception of physical attractiveness and body satisfaction (Baile, Monroy, & Garay, 2005; Camacho, Fernández, & Rodríguez, 2006; Fernández, Contreras, García, & González, 2010). However, research indicates that is not the sport itself that is linked to these perceptions but rather the low prior dissatisfaction or the aesthetic motivations in the practice of such sport that relate to a poorer physical and general self-concept (Fernández et al., 2010).

Muscle dysmorphia is a body image disorder in which the affected individual perceives himself with less muscle mass than he/she actually has (Pope, Katz, & Hudson, 1993). Due to the dissatisfaction and /or

distortion, these individuals suffer from regarding their muscles and physical appearance, weightlifting exercise becomes a way to alleviate or lessen the negative thoughts that burden their minds (Baile, 2005; Olivardia, 2001; Pope, Phillips, & Olivardia, 2000). Therefore, one of the predominant features in this disorder, aside from their own distorted body image, is bodybuilding dependence (Sokolova, González-Martí, Contreras, & Fernández, 2013), which is practiced to palliate the body dissatisfaction that individuals affected by this disorder suffer from.

Weightlifting is presented in this disorder as the predominant physical exercise. Practicing such sport becomes a lifestyle for these individuals, dedicating more than five hours a day to it in order to increase their muscle mass and consequently feel better about their physical appearance (González-Martí, Fernández, & Contreras, 2012; Olivardia, 2001; Pope et al., 2000).

Therefore, the aim of this study is to determine the physical perception and self-concept held by individuals with symptoms of muscle dysmorphia disorder. In this regard, two hypotheses arise. The first hypothesis is based on the argument that self-concept, physical self-concept and its physical attractiveness subdomain will be devalued in people with symptoms of muscle dysmorphia as a result of the muscle dissatisfaction these individuals suffer from and other psychological factors associated with the disorder. The second hypothesis is that the perceptions of these individuals in relation to sport ability, physical condition and strength will be positive, since literature reports that the practice of physical exercise increases such perceptions in the individual (Esnaola, 2005).

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## Method

### Participants

A total of 734 weightlifters and bodybuilders took part in this study, 562 men and 172 women. The average age reported by the participants was 30.92 years ( $SD = 9.41$ ). The sample had an average height of 1.71 m ( $SD = 8.47$ ), 73.73 kg ( $SD = 12.07$ ) of average weight, a body fat percentage of 14.71 % ( $SD = 6.36$ ) and a FFMI muscle level of 21.12 kg/m<sup>2</sup> ( $SD = 3.06$ ). Participants performed an average of 7.83 hours per week of strength training ( $SD = 3.7$ ).

### Instruments

In order to obtain body fat values using anthropometric measurements and following the standards of the International Society for the Advancement of Kinanthropometry (ISAK; Marfell-Jones, Olds, Stewart, & Carter, 2006), the height, weight, and skinfold measurements of the participants were taken. Six skinfold (triceps, anterior thigh, suprailiac, abdominal, pectoral and subscapular) measurements were taken for male participants and three measurements (triceps, anterior thigh and suprailiac) for female participants. Once these data were obtained, they were entered into the formula created by Jackson and Pollock (1978), in order to know the actual percentage of body fat of the participants. For male participants, the following formula was used [% Body Fat =  $0.217x - 0.00029x^2 + 0.133y - 5.73$ ], whereas, for female participants, the following formula [% Body Fat =  $0.445x - 0.001x^2 + 0.563y - 0.553$ ] was applied. This equation involves two unknown variables, the first, "x", corresponds to the sum of the percentage of fat found in the participant's skinfolds, while the "y" variable is the participant's age in years (Jackson & Pollock, 1978). Thus, the actual fat percentage of the sample is obtained.

In order to assess the participants' current level of musculature, the Fat-Free Mass Index (FFMI; Kouri, Pope, Katz, & Oliva, 1995) formula was applied, which yields the level of fat-free mass, once the current percentage of body fat is known. After obtaining this percentage given by the Jackson and Pollock (1978) formula, the data were entered into the FFMI equation: [weight (100 - %body fat)] / 100(Height<sup>2</sup>) for the female gender, and [6.1 + (1.8 - H)] is added to the male gender equation. The weight of the participant in this equation is introduced in kilograms (kg) and the height in meters (m). The FFMI result reflects the level of musculature the participant has at the time of measurement. The evaluation of a remarkable level of muscle mass for women was established at  $\geq 18$  kg/m<sup>2</sup> and  $\geq 22$  kg/m<sup>2</sup> for men (Pope et al., 2000), so that the average between these two levels is 20 kg/m<sup>2</sup> of FFMI, which represents a muscular physique.

To detect the level of muscle dissatisfaction, the *Escala de Satisfacción Muscular* questionnaire (ESM; González-Martí, Fernández, Contreras, & Mayville, 2012) was used. This instrument is the only validated version available in Spanish that detects symptoms of muscle dysmorphia. This questionnaire consists of 19 items divided into five scales, *bodybuilding dependence*, *muscle checking*, *substance use*, *injury* and *muscle (dis)satisfaction*. The answers are registered through a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The final score of a participant is the result of the sum of the items of the ESM and is categorized according to the level of muscle satisfaction that each participant has. For its calculation, the inversion of the scores in the *muscle (dis)satisfaction* scale should be taken into account, since the items in this scale are formulated negatively. Consequently, category 1 (total score between 19 and 38) would represent a participant satisfied with his musculature. Category 2 (total score between 39 and 57 points) would reflect a slight muscular dissatisfaction. Category 3 (with a score between 58 and 76) would correspond to a participant with moderate muscle dissatisfaction. Finally, a participant classified in category 4 (score of  $\geq 77$ ), would present severe muscle dissatisfaction. Category 3 would correspond to the population at risk of suffering from muscle dysmorphia, while category 4 would show those participants that are possibly affected by this disorder, as a result of the high score obtained on the ESM scale (González-Martí, Hernández-Martínez, Fernández, & Contreras, 2013). The reliability coefficient for the total questionnaire found in this study was Cronbach's alpha .90.

To evaluate the participants' physical self-concept, the Physical Self-Concept Questionnaire (CAF; Goñi, Ruíz de Azúa, & Liberal, 2004) was used. This questionnaire was designed based on Fox and Corbin's (1989) model and consists of 36 items divided into six scales. Four of them are specific, such as *physical attractiveness*, *physical condition*, *sport ability* and *strength*, and two of these scales are more general, *general physical self-concept* and *general self-concept*. The *sport ability* scale assesses the individuals' perception of qualities ("I'm good at"; "I have qualities"), personal skills ("I see myself able to"; "I am capable of") and willingness towards sports. The *physical condition* scale assesses the individuals' perceptions about their fitness and confidence in their physical state. The items in the *strength* scale intend to assess the participants' self-perceptions on feeling strong, capable of lifting weight, confident before performing exercises that require strength and willingness to perform these exercises. The *physical attractiveness* scale evaluates the perception of physical self-appearance, safety and satisfaction with body image. The *general physical self-concept* scale

attempts to measure perceptions of positive feelings and opinions (happiness, satisfaction, pride and confidence) of physical state. Finally, the *general self-concept* scale assesses satisfaction with oneself and with life in general. Regarding the completion of this questionnaire using a 5-point Likert-type scale, ranging from 1 (*false*) to 5 (*true*), reflects all the answer choices. The reliability coefficient for this instrument found in this study was Cronbach's alpha .95.

### Procedure

Initially, 27 sports centers were contacted to inform them of the purpose of this study and its procedure, but only 13 gyms in the provinces of Madrid, Valencia, Murcia and Albacete volunteered to take part in this research. After obtaining authorization and enabling a private space within each location to carry out the data collection, contact was established with the users of these centers. The participant selection criteria consisted in apparently possessing a muscular physique. Once chosen, the participant was informed about the objective of this research, and its voluntary and anonymous nature. If the participants agreed to take part, they were asked to sign an informed consent form. Data collection started with recording the participant's height, weight and skinfold and entering these data into the corresponding body fat and FFMI formulas. Later, the ESM and the CAF questionnaires were administered. The total duration of data collection did not exceed 15 minutes per participant.

### Statistical Analysis

With the aim of knowing those participants potentially affected by muscle dysmorphia, an analysis of variance was carried out to compare the scores obtained on the different scales of CAF and FFMI, depending on the *Escala de Satisfacción Muscular* category each

participant belonged to. In addition, a correlation analysis was carried out to investigate the relationship between the current FFMI variables, the scales composing the ESM and the CAF scales. These analyses were carried out using the statistical analysis program SPSS, version 20.0.

## Results

### Descriptive and differential analyses

Table 1 shows how the average scores achieved by participants in the CAF scales decrease as the *Escala de Satisfacción Muscular* category increases. Therefore, participants who may be affected by muscle dysmorphia (category 4 ESM) obtained the lowest scores in relation to the CAF scales, reaching, however, the highest scores in terms of their current level of musculature (FFMI = 26.34 kg/m<sup>2</sup>).

The results obtained in the ANOVA, shown in Table 1, report that there are significant differences between the means of the CAF and current FFMI scales based on the *Escala de Satisfacción Muscular* categorization ( $p < .05$ ). The *general self-concept* scale showed the greatest difference between means according to this categorization ( $F = 34.77$ ). In order to find out between which categories of the ESM these significant differences are established, a post-hoc analysis was implemented. Table 2 shows that participants belonging to category 4 of the ESM, that is, those suffering with severe muscle dissatisfaction or those that may have muscle dysmorphia, perceived themselves as having less *sport ability*, *physical condition* and *strength* than participants in the rest of the other categories. However, these participants also possess a higher FFMI than the remaining participants who are satisfied, slightly dissatisfied, or moderately dissatisfied with their musculature.

Furthermore, participants satisfied with their musculature (category 1) considered themselves more

**Table 1.** Means scores of CAF, and current FFMI scales according on the categorization of the ESM

	Categories				ANOVA	
	ESM					
CAF Scales	1	2	3	4	F	Sig.
Sport ability	23.04	22.67	21.17	14.00	18.46	.001*
Physical condition	22.21	21.41	19.95	12.40	20.38	.001*
Physical Attractiveness	22.37	20.67	18.14	11.90	31.72	.001*
Strength	20.41	20.52	19.59	11.20	12.36	.001*
General physical self-concept	23.96	22.36	19.98	12.40	28.35	.001*
General self-concept	25.01	23.78	21.09	13.30	34.77	.001*
Current FFMI	20.60	21.57	21.78	26.34	17.38	.001*

\* $p < .01$ .

**Table 2.** Post-hoc (HSD Tukey) analysis between CAF, FFMI scales based on the ESM categorization

CAF Scales	Significant mean differences ESM Categories
Sport ability and physical condition	1 > 3 / 4 < 1, 2, & 3
Physical Attractiveness, general physical self-concept and general self-concept	1 > 2, 3 & 4 / 2 > 3 & 4 / 3 > 4
Strength	4 < 1, 2, & 3
FFMI	1 < 2 & 3 / 4 > 1, 2, & 3

Note: 1 = muscular satisfaction; 2 = mild muscular dissatisfaction; 3 = moderate muscular dissatisfaction (sample at risk of suffering from muscular dysmorphia) and 4 = severe muscular dissatisfaction (participants suffering from muscular dysmorphia).

\* $p < .05$ .

physically attractive, having a better general physical self-concept and general self-concept than the rest of the participants in other categories of the ESM. In addition, this group considered themselves to have more sport ability and physical condition to perform sports in comparison with participants who have moderate muscle dissatisfaction (category 3). However, those satisfied with their musculature showed a lower FFMI than participants who are mildly or moderately dissatisfied with their musculature.

In relation to those participants with a mild muscle dissatisfaction, they felt more physically attractive, and showed improvement in the two self-concepts compared to participants belonging to the population at risk of suffering muscle dysmorphia (category 3) and those who may suffer it (category 4). In turn, participants in category 3 perform better on these three CAF factors in comparison to members of category 4.

### Correlation Analyses

Table 3 reports on the results found in the correlation analysis between the variables of the current FFMI, the scales that make up the ESM and the CAF scales. It shows a slight negative relationship between the variables of bodybuilding dependence, muscle checking, substance use and injury with all the CAF scales, with

the exception of the strength scale. The most significant negative relationship occurs with the general self-concept scale, a fact that demonstrates the relationship of these behaviors with a devalued self-concept.

The muscle (dis)satisfaction variable obtained the highest negative correlations especially regarding physical attractiveness ( $r = -.638$ ), strength ( $r = -.529$ ) and general physical self-concept ( $r = -.567$ ), demonstrating that those participants dissatisfied with their muscles have more devalued physical perceptions, physical attractiveness and general physical self-concept of themselves. It is also observed that the total score obtained in the ESM correlated negatively with all CAF scales, of which the negative correlation between general physical self-concept ( $r = -.356$ ) and physical attractiveness ( $r = -.361$ ) should be highlighted.

### Discussion

The aim of this study was to assess the physical self-concept that participants possibly affected by muscle dysmorphia held of themselves. That is, the intention of this study was to know the physical perceptions of a rarely studied group of athletes in the field of physical activity and sport psychology, with features that make it unique in relation to the study of physical self-concept and body image. In response to this objective, it has been observed that those

**Table 3.** Correlation analysis between current FFMI and the ESM and CAF scales

	Sport ability	Physical condition	Physical attractiveness	Strength	General physical self-concept	General self-concept
Fat-Free Mass Index	-.045	-.022	-.071	.061	-.034	-.103**
Bodybuilding dependence	-.097**	-.112**	-.201**	.022	-.183**	-.227**
Muscle checking	-.098**	-.119**	-.177**	-.010	-.158**	-.216**
Substance use	-.195**	-.207**	-.258**	-.078*	-.238**	-.275**
Injury	-.118**	-.122**	-.193**	-.019	-.163**	-.196**
Muscular (dis)satisfaction	-.469**	-.494**	-.638**	-.529**	-.567**	-.500**
Total ESM	-.235**	-.256**	-.361**	-.130**	-.323**	-.356**

\*\* $p < .01$ .



participants classified in category 4 of the *Escala de Satisfacción Muscular*, i.e. those that may be suffering from muscle dysmorphia, perceived themselves with less sport ability, physical condition, physical attractiveness, strength, general physical self-concept and general self-concept, compared to the other participants of this study. However, this group was the one that reported the highest FFMI.

The results of this study demonstrate that the lower the total score on the *Escala de Satisfacción Muscular*, the better physical perceptions the participants have of themselves. That is, if the individual does not have any dissatisfaction and /or distortion regarding his/her musculature, then the individual shows better perceptions across all subdomains of physical self-concept.

Many people that start a physical activity such as weightlifting want to improve their physical appearance by increasing their musculature, especially in the case of men. Many of them are driven by the aesthetic canon imposed by society. This affects the way in which people live with their bodies, showing vulnerability to sociocultural influences that inevitably affect the physical self-concept (Rodríguez-Fernández, González-Fernández, & Goñi-Grandmontagne, 2013). In this context, taken to the extreme, participants suffering from muscle dysmorphia perform weightlifting with an extrinsic objective, that is, with an aesthetic motivation resulting from body dissatisfaction, using weightlifting as a means to become larger and more muscular, but not necessarily stronger. The absence of a significant relationship between the *bodybuilding dependence* scale and the *strength* scale proves this.

Due to the nature of the weightlifting exercise, an increase in FFMI or level of musculature occurs, and thus, the physical perceptions and the physical self-concept should increase, since one of the goals that lead these athletes to choose weightlifting is achieved. However, when the FFMI is too high, it becomes a negative aspect to consider, since in this case it relates to a low physical self-concept (González-Martí, 2012). The findings of this study indicate that up to a certain level of FFMI, the physical self-concept is positive, but when it is too high, the relationship is inverse and negative, as can be observed in Table 1 and 3 respectively. These results agree with Esnaola (2008), in relation to the data found on the perception of the subdomains of physical self-concept in a population that does not practice sport. Esnaola's (2008) study reported, on the whole, that these scores were higher compared with those obtained in this study with the sample that suffers from muscle dysmorphia, that is, with a high FFMI although participants do not perceive it that way. Similarly, Contreras et al. (2010) obtained poorer perceptions of all subdomains of physical self-concept in relation to those individuals that practice one or

more sports, in a sample of non-athletes and former athletes.

According to the results obtained by Fernández et al. (2010), people dissatisfied with their musculature practice weightlifting in order to improve their appearance and consequently enhance their self-concept, as reflected by the findings of this study. In addition, the results found by these authors in relation to the participants in their research who practiced bodybuilding activities obtained lower scores in their perception of *physical attractiveness* relative to other athletes. Therefore, it is necessary, when studying the physical self-concept of an individual, to know the reasons why they practice such physical activity (Fernández et al., 2010). These aspects would explain the little or no relationship of this sub-dimension of physical self-concept with the practice of physical activity found by other authors (Esnaola, 2005; Goñi, Ruíz, & Rodríguez, 2005).

In agreement with Fernández et al. (2010), the idea that practicing weightlifting does not improve perceptions of the scales of *physical attractiveness* and *general physical self-concept* is corroborated. The negative relationships found in this study between the *bodybuilding dependence* variable with *physical attractiveness*, *general physical self-concept* and *general self-concept*, indicate that participants reduce their perception of these subdomains as practicing weightlifting becomes an obsession. In this case, people with muscle dysmorphia symptoms would represent this situation because *bodybuilding dependence* is one of the characteristic features of this disorder (Sokolova et al., 2013).

In the present study, negative relationships have been found between all scales composing the CAF and the total score of the *Escala de Satisfacción Muscular*. The result found in the *muscle (dis)satisfaction* scale, which reported high negative correlations with all CAF scales is determinant. This was also found by McFarland and Kaminski (2009) in their study conducted to establish the relationship between muscle dysmorphia, self-concept, anxiety and depression, reporting relationships between symptoms of muscle dysmorphia and lower perception of self-concept, increased symptoms of depression and greater anxiety symptoms. These results indicate that a person with muscle dysmorphia will show a low self-concept, greater likelihood to suffer symptoms of depression and anxiety (Wolke & Saupona, 2008). Moreover, similar results to the study by Ebbeck, Watkins, Concepcion, Cardinal, and Hammermeister (2009) were found regarding the negative correlation existing between muscle dysmorphia and general self-concept.

Following assessment of the obtained results, the first hypothesis is accepted, since participants who exhibit muscle dysmorphia symptoms, as a result of their high score on the *Escala de Satisfacción Muscular*,

possess a more devaluated self-concept and physical self-concept and a worse perception in the *physical attractiveness* subdomain. However, the second hypothesis in this study is rejected, as these participants obtained lower scores in all subdomains of physical self-concept, in comparison to other participants, and not just in the *physical attractiveness*.

In conclusion, people suffering from muscle dysmorphia symptoms have more devaluated perceptions in all subdomains of physical self-concept, compared to participants not suffering from this disorder. That is, these individuals, despite their intense training, perceive themselves as having less *sport ability* and *physical condition* to practice sports, and with less *strength* and *physical attractiveness*. In addition, they show worse perceptions in their *general physical self-concept*, and consequently their self-concept is also devaluated (*general self-concept*). Therefore, weightlifting, like all other physical exercises, can be associated with better physical perceptions coinciding with the improvement observed in all previous studies linking physical activity and physical self-concept (Aróstegi et al., 2013; Fernández et al., 2010). Only an excessive concern over body related to a muscular dysmorphic disorder would be associated with worse perceptions, which supports the fact that the practice of such sports is linked to worse physical perceptions and self-concept only when a prior disorder or dissatisfaction exists. In this case, sport is the way these dissatisfied individuals use to try to alleviate their dissatisfaction.

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