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Abstract

Men are faced with trends that give rise to the desire for a muscular and lean body; this may result in body dissatisfaction. Body dissatisfaction is associated with a plethora of health consequences. Social media has been named as one contributing factor for male body dissatisfaction. Up till now, women have been the focus of body image-related social media studies. Therefore, we conducted a quantitative content analysis of 1,000 relevant Instagram posts that were posted by men (and/or depicted men) to understand how the male body is depicted on Instagram and how user respond to those images. The majority of sampled posts showed high levels of muscularity and leanness. In addition, posts depicting men adhering to this specific body type received significantly more responses (likes and comments). Norms and outcomes related to health (i.e., training to be healthy) were more commonly shown than appearance-related constructs (i.e., training to become attractive), and promotion of physical activity was more common than dietary behavior. However, findings are potential harmful to men's body image, even if one considers that health-related messaging and physical active promotion was prominent. It remains debatable if men need to view very lean and very muscular men to encourage health-related behaviors.

Keywords: male body image, body dissatisfaction, social media, content analysis, social networking sites

Introduction

Nowadays, men are faced with sociocultural influences giving rise to the desire for a muscular and lean body,[1] resulting in men facing body dissatisfaction,[2] which is associated with health consequences such as depression and eating pathology.[3] One of the sociocultural influences playing a role in the development of body dissatisfaction is ideal body type portrayal on media platforms.[4] Men face a standard emphasizing muscularity and leanness in both traditional[5,6] and social media.[4,7] With the ubiquity of social media in everyday life, men now use social media almost as often as women.[8] Platforms allow users to upload their own content and respond to other users' content, enabling users to compare their bodies. Instagram is known for picture-focused content[9] and has therefore been proposed to have a greater impact on body image than other platforms.[10]

Social cognitive theory (SCT)[11,12] may be used to understand Instagram's impact on perceived male body image. SCT proposes that humans guide their behavior, in part, by replicating observed behaviors. In addition, they also learn to associate certain behavioral norms and outcomes by observing others.[11,12] Through modeling, male Instagram users can identify and reinforce their own values about eating, physical activity, and body shape.[13] Simpson and Mazzeo[13] proposed that when behaviors (e.g., exercise) are promoted on social media, users learn to associate both norms (e.g., exercise to enhance appearance) and outcomes (e.g., being attractive) to these behaviors. Furthermore, behaviors are more likely to be replicated when those behaviors are socially rewarded—with functions, such as likes and comments, embodying social rewards on social media. Simpson and Mazzeo[13] found that Pinterest posts promoted appearance-related norms and behaviors more often than health-related ones, while also emphasizing appearance-related outcomes. While their study's focus was on women, it confirmed the suitability of the SCT and its constructs (norms, promoted behaviors, and outcome expectancies) for analyzing social media posts related to body image/appearance.

Simpson and Mazzeo[13] also found that most women within their sample were both thin and athletic. Other similar studies (focused on women and gay men) also clearly show that being thin and muscular for appearance-related reasons is highly promoted on social media platforms.[10,13,14] Based on these previous findings, we hypothesized that the same trend could be observed for men in general on Instagram. Building on these studies, we also hypothesized that being

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lean muscular would be related to higher engagement levels (i.e., more likes and more comments) on Instagram—as those are hypothesized to function as social rewards on Instagram. However, research has yet to analyze body image and appearance-related Instagram content targeting men without focusing on certain subgroups. Therefore, this study proposes the following research questions:

RQ1: How is male body image-related content presented on Instagram and how are SCT constructs represented in this content?

RQ2: How do Instagram users respond to images on Instagram that portray men with varying characteristics?

Methods

The study design is in line with comparable research.[13,15,16] Ethical approval was not required as we only analyzed publicly available data, which is in line with similar studies.[10,13]

Sampling procedure

Random sampling was used to collect 3,184 distinct Instagram posts between March 1 and May 1, 2017. First, posts were collected using the mining tool netlytic.org, which returned a collection of Instagram posts matching a query by selecting distinct hashtags (''#DoYouEvenLift,'' ''#Fit,'' ''#Fitness,'' ''#Fitspo,'' ''#Gym,'' ''#imagreatist,'' ''#MHWeekendChallenge,'' ''#Workout,'' ''#Fitfam'').[17] The selection of hashtags was guided by articles of popular fitness websites.[18–20] All 3,054 posts were manually checked for the inclusion and exclusion criteria described below. Posts that did not fit the criteria were deleted from the file.

Second, a sample of influential male fitness accounts was chosen as mentioned on popular fitness websites.[21,22] This was done as accounts with large fan bases seem to use hashtags much less frequently and still have a major reach.[23] However, netlytic.org does not allow for searching by users.[17] Thus, posts were sampled manually by selecting every fifth post for analysis on April 13, 2017. A post that did not fit the inclusion criteria was discarded and replaced by the following fifth post. Every fifth post that fit the inclusion criteria was sampled until a total of 10 per account was reached, resulting in 130 posts.

We originally collected 3,054 posts through netlytic.org, of which 941 posts were selected by applying the inclusion and exclusion criteria. Subsequently, 130 posts of influential Instagram users were selected manually. After this, the final target of 1,000 posts was exceeded by 71 and thus, 71 posts were randomly deleted. The target of 1,000 posts was based on comparable research[13,15,16] and preplanned in the unpublished protocol of this study. At the end, 130 posts of the distinct accounts were selected for analysis, while 870 were selected from the specified hashtags.

Inclusion and exclusion criteria

This study only focused on picture-based posts. When posts consisted of multiple visuals, only the first picture was coded. A post was discarded if it did not show men and/or was not posted by a man. Internet memes and other types of pictures applying to men were coded as well. If pictures mainly consisted of text and/or an abstract drawing, they were included if they did not explicitly refer to women. If a post was written in a language that was not understood by any of the authors, a free multilingual machine translation service was used.

Variables and reliability

The protocols for coding posts were developed based on existing literature and similar studies.[1,10,12,13] Subsequently, the feasibility of the protocol was tested by applying it to a smaller sample ($n = 20$).

Each post was coded for characteristics and constructs assessed through visuals and text (captions) posted on Instagram. First, every selected post was coded for characteristics which are unique to the platform (e.g., like and comment frequencies) and type of post image.

In addition, SCT constructs were assessed: norms and outcomes associated with behaviors and promoted behaviors. All SCT constructs were divided into subcategories: appearance-related (e.g., training to be good-looking), health-related (e.g., training to be fit), and other-related constructs (e.g., training to feel confident). Coding of SCT constructs was based on all available information, including the picture, hashtags, and the caption. Posts could convey multiple messages (e.g., train to be healthy and sexy). Features of portrayed people were coded if the post showed at least one person. Up to three people were coded in pictures with more than one person in clear focus (people in the background were not coded). If a post showed more than three persons who were all clearly in focus, the first three were coded from left to right. Ethnicity was assessed through text posted alongside the pictures, if this was not possible it was estimated based on the picture. The location and gender of the person(s) in the picture was assessed as shown, which was supplemented by the ''location-feature'' of the platform. Sexual orientation was only coded if mentioned explicitly, while clothing was coded as depicted in the picture. Finally, body type was assessed using an abbreviated version of the somatomorphic matrix.[1] Body types were coded for body fat and muscularity separately.

Two coders were trained in the protocol to establish intercoder reliability. The first author coded all the posts ($N = 1{,}000$), while the second author coded 10 percent of the posts ($n = 100$). Scott's Pi was used to measure intercoder reliability.[24] After pretesting and subsequent changes to the protocol, Scott's Pi was on average 0.94. The individual coefficients were all considered to be reliable, with the lowest coefficient at 0.76. Table 1 shows the coded variables and the individual coefficients.

Data analysis

The data were analyzed using SPSS Statistics 24.[25] Descriptive statistics (frequencies) were used to assess the distributions of depicted people's features and SCT constructs. Spearman's rank-order correlations were run to assess the relationship between ordinal variables (i.e., level of body fat, level of body muscularity, and amount of clothing) and level of engagement (i.e., like and comment frequencies), if preliminary analysis showed the relationship to be monotonic, as assessed by scatterplots. People coded as ambiguous in terms of body fat or muscularity were excluded

Table 1. Variables with Respective Scott's Pi

Measures	*Coding*	*Scott's Pi*
Post liked?	1 = Yes 0 = No	n/a
No. of likes	[In numbers] 0 = No like	n/a
Post commented?	1 = Yes 0 = No	n/a
No. of comments	[In numbers] 0 = No comment	n/a
Location	1 = Public (outside) 2 = Public (gym) 3 = Public (other) 4 = Private (home) 5 = Private (gym) 6 = Cannot tell/other	0.76
Post type	1 = Primarily image 2 = Primarily text 3 = Mix of image and text 4 = Other	1.0
If image, person present	1 = Yes 0 = No	1.0
Multiple people pictured?	1 = Yes 0 = No	1.0
No. of persons (foreground only)	[in numbers] 0 = No person	1.0
Multiple people, all identical characteristics	1 = Yes 0 = No	0.98
Person: gender identity for up to three persons (foreground only)	1 = Male 2 = Female 3 = Transgender 4 = Ambiguous 99 = Not applicable	~0.95
Person: ethnicity for up to three persons (foreground only)	1 = White 2 = Black 3 = Asian 4 = Latino 5 = Other 6 = Ambiguous	~0.89
Person: sexual orientation (as mentioned by the poster) for up to three persons (foreground only)	1 = Mentions heterosexuality 2 = Mentions homosexuality 3 = Mentions bisexuality 4 = Mentions other sexual orientation 99 = Does not mention sexual orientation	~0.97
Person: body type (body fat) for up to three persons (foreground only)	1 = Low 2 = Medium 3 = High 4 = Ambiguous 99 = Not applicable	~0.90
Person: body type (body muscularity) for up to three persons (foreground only)	1 = Low 2 = Medium 3 = High 4 = Ambiguous 99 = Not applicable	~0.90
Person: clothing for up to three persons (foreground only)	1 = Fully clothed 2 = Shirtless 3 = Naked 99 = Not applicable	~0.98
Person: body part shown for up to three persons (foreground only)	1 = Whole body 2 = Whole body but not face 3 = Only face 4 = Specific body part 5 = Only upper body 6 = Only lower body 99 = Not applicable	~0.98

(*continued*)

Table 1. (Continued)

Measures	*Coding*	*Scott's Pi*
Social cognitive theory: norms Appearance: to be thin Appearance: to be muscular Appearance: to be sexy/good-looking Appearance: to eat right to be good-looking Health: to exercise Health: to be fit/healthy Health: to eat right to be healthy Other: to feel confident Other: to feel masculine	1 = Employed 0 = Not employed	~0.89
Social cognitive theory: promoted behaviors Exercise Diet plan Reduce calorie intake Use steroids Use legal substances	1 = Employed 0 = Not employed	~1.0
Social cognitive theory: outcome expectancies Feeling good Feeling masculine Being healthy Being attractive	1 = Employed 0 = Not employed	~0.95

Note: n/a for objective measures.

from correlational analyses to not violate the linearity assumption. For categorical variables (i.e., ethnicity, location, and body part) Kruskal–Wallis H tests were used. Subsequently, pairwise comparisons were performed using Dunn's procedure[26] with a Bonferroni correction for multiple comparisons. In addition, Kruskal–Wallis H tests were also used to find out if pictures portraying men with high muscularity levels and low body fat levels received more engagement (followed by pairwise comparisons). In posts with multiple people, only one person (on the far left) was included in both the Spearman's rank-order correlations and the Kruskal–Wallis H tests. In addition, we also ran sensitivity analyses without those posts included.

Results

People were depicted in 70 percent ($n = 705$) of all posts, with 30 percent ($n = 214$) of those showing multiple persons. The majority of all depicted people were male (86 percent, $n = 796$) and white (55 percent, $n = 509$). Most of the posts showed either the full body (38 percent, $n = 347$) or the upper body (46 percent, $n = 429$) with most being fully clothed (72 percent, $n = 667$).

Only a small fraction depicted high body fat (6 percent, $n = 58$), while the clear majority showed low body fat (62 percent, $n = 572$). Likewise, 41 percent ($n = 378$) of all depicted persons in the posts showed high muscularity, while 17 percent ($n = 156$) showed low muscularity. Combining both body fat and muscularity showed that 35 percent ($n = 322$) of the depicted people had low body fat, while also displaying high muscularity and were the biggest group with a specific body type. Interestingly, the percentage of people with this body composition was nearly identical in terms of percentages (35 percent, $n = 229$) in the subsample of the posts that conveyed a health-related norm, while being more prominent in posts with an appearance-related norm (44 percent, $n = 227$). Table 2 shows the posts' features, while Table 3 shows all features of the depicted persons.

Most posts (82 percent, $n = 824$) promoted at least one norm. Of those, 88 percent ($n = 728$) promoted a health-related norm, 62 percent ($n = 512$) an appearance-related norm, while 33 percent ($n = 270$) promoted another norm. Of all posts, 78 percent ($n = 778$) promoted some form of behavior—86 percent ($n = 670$) exercise, 38 percent ($n = 296$) any form of diet, and 1 percent ($n = 11$) a reduction of calorie intake.

In addition, 53 percent ($n = 531$) conveyed an outcome expectancy in either picture or text. Of those, 32 percent ($n = 173$) conveyed the outcome of feeling good, <1 percent ($n = 3$) indicated feeling masculine, while being healthy was highlighted in 50 percent ($n = 268$) and being attractive in 44 percent ($n = 234$) of the posts.

The vast majority of the posts received at least one like (99.8 percent, $n = 998$) or one comment (88 percent, $n = 880$). Pictures of persons with higher muscularity and lower body fat received significantly more engagement compared to those with lower muscularity and higher body fat, $p < 0.01$. Furthermore, no other ordinal variable (i.e., level of body fat, level of body muscularity, and amount of clothing) was

Table 2. Features of the Posts

Feature	N	*Percentage*
Post type: primarily image	797	80
Post type: primarily text	80	8
Post type: mix of image and text	105	10
Post type: other (e.g., an abstract drawing)	18	2
Post type: before/after picture	23	2
Person present	705	70
Multiple persons present	214	21

Note: Percentages always refer to the whole sample.

Table 3. Features of the Depicted People

Feature	N	*Percentage*
Gender identity		
Male	796	86
Female	106	11
Transgender	1	<1
Ambiguous	19	2
Ethnicity		
White	509	55
Black	96	10
Asian	62	7
Latino	66	7
Other	32	3
Ambiguous	157	17
Sexual orientation (as mentioned by the poster itself)		
Homosexuality	17	2
Not mentioned	905	98
Location		
Public (outside)	227	23
Public (gym)	210	21
Public (other)	63	6
Private (home)	81	8
Private (gym)	5	<1
Ambiguous/other	414	41
Body fat		
High	58	6
Medium	160	17
Low	572	62
Ambiguous	132	14
Body muscularity		
High	378	41
Medium	194	21
Low	156	17
Ambiguous	194	21
Body type		
HFHM	15	2
HFMM	12	1
HFLM	22	2
MFHM	39	4
MFMM	77	8
MFLM	36	4
LFHM	322	35
LFMM	103	11
LFLM	98	11
Ambiguous	198	21
Amount of clothing		
Fully clothed	667	72
Shirtless	245	26
Naked	10	1
Body part shown		
Whole body	347	38
Whole body, but not face	9	1
Only face	62	7
Specific body part	20	2
Only upper body	429	46
Only lower body	3	<1

Note: Percentages always refer to all coded people ($N = 922$).

HFHM, high body fat, high body muscularity; HFLM, high body fat, low body muscularity; HFMM, high body fat, medium body muscularity; LFHM, low body fat, high body muscularity; LFLM, low body fat, low body muscularity; LFMM, low body fat, medium body muscularity; MFHM, medium body fat, high body muscularity; MFLM, medium body fat, low body muscularity; MFMM, medium body fat, medium body muscularity.

found to have a significant and/or monotonic relationship to number of likes, however, there was a very weak relationship between the amount of clothing and the number of comments (see Table 4 for full results). For the categorial variables (i.e., ethnicity, location, and body part shown), we found significant differences in terms of number of likes for location and ethnicity [$H(3) = 28.841$, $p < 0.001$ and $H(3) = 16.146$, $p = 0.006$, respectively]. Pairwise comparisons revealed significant differences only between uncategorized (or coded as other) and outside locations, $p < 0.001$. Posts portraying outside locations received more likes. For ethnicity, pairwise comparisons showed that Latinos received significantly less likes than all the other groups ($p < 0.05$), except the groups that classified as other and ambiguous. In terms of comment frequency, significant differences were found for ethnicity only [$H(3) = 11.111$, $p = 0.049$]. However, pairwise comparisons revealed no significant differences between the different ethnicities.

Both like frequencies [$H(3) = 59.739$, $p < 0.001$] and comment frequencies [$H(3) = 38.573$, $p < 0.001$] were statistically significantly different between body type combinations. *Post hoc* analyses revealed significant differences in like frequencies between: high body fat, low body muscularity (HFLM) and low body fat, high body muscularity (LFHM); medium body fat, high body muscularity (MFHM) and LFHM; medium body fat, medium body muscularity (MFMM) and LFHM; low body fat, medium body muscularity (LFMM) and LFHM; and between low body fat, low body muscularity (LFLM), and LFHM. Notably, the differences in likes were significant in comparison to the two other body type combinations with low body fat. *Post hoc* analysis also revealed significant differences in comment frequencies between LFMM and LFHM, and between LFLM and LFHM, but not between any other body type combinations. Likewise, the differences in comment frequencies were only significant in comparison to the two other body type combinations with low body fat (see Table 5 for complete results).

Table 4. Spearman's Rank-Order Correlation for Main Study Variables

Person's characteristics	*No. of likes*	p	*No. of comments*	p
Level of body fat	−0.20	<0.001	−0.12	0.004
Level of body muscularity	0.26	<0.001	0.23	<0.001
Level of body fat (multiple people excluded)	−0.17	<0.001	−0.12	0.003
Level of body muscularity (multiple people excluded)	0.18	<0.001	0.13	0.001
Level of body fat (women excluded)	−0.18	<0.001	−0.12	0.002
Level of body muscularity (women excluded)	0.18	<0.001	0.12	0.001
Amount of clothing	0.06	0.15	0.09	0.02

Table 5. Pairwise *Post Hoc* Analysis of the Differences in Number of Likes and Comments Among the 10 Body Types

Variable	*Engagement variable*	*Mdn high*	*Mdn low*	*Adj. Sig.*
Body type	Likes	HFMM = 255.17	HFHM = 215.78	1.0
Body type	Likes	MFHM = 259.11	HFHM = 215.78	1.0
Body type	Likes	MFMM = 308.11	HFHM = 215.78	1.0
Body type	Likes	MFLM = 307.79	HFHM = 215.78	1.0
Body type	Likes	LFHM = 406.43	HFHM = 215.78	0.2
Body type	Likes	LFMM = 306.31	HFHM = 215.78	1.0
Body type	Likes	LFLM = 260.57	HFHM = 215.78	1.0
Body type	Likes	Ambiguous = 345.65	HFHM = 215.78	1.0
Body type	Likes	MFHM = 259.11	HFMM = 255.17	1.0
Body type	Likes	MFMM = 308.11	HFMM = 255.17	1.0
Body type	Likes	MFLM = 307.79	HFMM = 255.17	1.0
Body type	Likes	LFHM = 406.43	HFMM = 255.17	1.0
Body type	Likes	LFMM = 306.31	HFMM = 255.17	1.0
Body type	Likes	LFLM = 260.57	HFMM = 255.17	1.0
Body type	Likes	Ambiguous = 345.65	HFMM = 255.17	1.0
Body type	Likes	HFHM = 215.78	HFLM = 211.97	1.0
Body type	Likes	HFMM = 255.17	HFLM = 211.97	1.0
Body type	Likes	MFHM = 259.11	HFLM = 211.97	1.0
Body type	Likes	MFMM = 308.11	HFLM = 211.97	1.0
Body type	Likes	MFLM = 307.79	HFLM = 211.97	1.0
Body type	Likes	LFHM = 406.43	HFLM = 211.97	0.006
Body type	Likes	LFMM = 306.31	HFLM = 211.97	1.0
Body type	Likes	LFLM = 260.57	HFLM = 211.97	1.0
Body type	Likes	Ambiguous = 345.65	HFLM = 211.97	0.46
Body type	Likes	MFMM = 308.11	MFHM = 259.11	1.0
Body type	Likes	MFLM = 307.79	MFHM = 259.11	1.0
Body type	Likes	LFHM = 406.43	MFHM = 259.11	0.004
Body type	Likes	LFMM = 306.31	MFHM = 259.11	1.0
Body type	Likes	LFLM = 260.57	MFHM = 259.11	1.0
Body type	Likes	Ambiguous = 345.65	MFHM = 259.11	1.0
Body type	Likes	LFHM = 406.43	MFMM = 308.11	0.04
Body type	Likes	Ambiguous = 345.65	MFMM = 308.11	1.0
Body type	Likes	MFMM = 308.11	MFLM = 307.79	1.0
Body type	Likes	LFHM = 406.43	MFLM = 307.79	0.87
Body type	Likes	Ambiguous = 345.65	MFLM = 307.79	1.0
Body type	Likes	MFMM = 308.11	LFMM = 306.31	1.0
Body type	Likes	MFLM = 307.79	LFMM = 306.31	1.0
Body type	Likes	LFHM = 406.43	LFMM = 306.31	0.003
Body type	Likes	Ambiguous = 345.65	LFMM = 306.31	1.0
Body type	Likes	MFMM = 308.11	LFLM = 260.57	1.0
Body type	Likes	MFLM = 307.79	LFLM = 260.57	1.0
Body type	Likes	LFHM = 406.43	LFLM = 260.57	<0.001
Body type	Likes	LFMM = 306.31	LFLM = 260.57	1.0
Body type	Likes	Ambiguous = 345.65	LFLM = 260.57	0.26
Body type	Likes	LFHM = 406.43	Ambiguous = 345.65	0.13
Body type	Comments	HFMM = 344.78	HFHM = 243.67	1.0
Body type	Comments	MFHM = 324.45	HFHM = 243.67	1.0
Body type	Comments	MFMM = 333.95	HFHM = 243.67	1.0
Body type	Comments	MFLM = 285.88	HFHM = 243.67	1.0
Body type	Comments	LFHM = 395.35	HFHM = 243.67	1.0
Body type	Comments	LFMM = 304.56	HFHM = 243.67	1.0
Body type	Comments	LFLM = 262.94	HFHM = 243.67	1.0
Body type	Comments	Ambiguous = 331.55	HFHM = 243.67	1.0
Body type	Comments	HFMM = 344.78	MFHM = 324.45	1.0
Body type	Comments	HFMM = 344.78	MFMM = 333.95	1.0
Body type	Comments	HFMM = 344.78	MFLM = 285.88	1.0
Body type	Comments	LFHM = 395.35	HFMM = 344.78	1.0
Body type	Comments	HFMM = 344.78	LFMM = 304.56	1.0
Body type	Comments	HFMM = 344.78	LFLM = 262.94	1.0
Body type	Comments	HFMM = 344.78	Ambiguous = 331.55	1.0
Body type	Comments	HFLM = 270.31	HFHM = 243.67	1.0

(*continued*)

TABLE 5. (CONTINUED)

Variable	*Engagement variable*	*Mdn high*	*Mdn low*	*Adj. Sig.*
Body type	Comments	HFMM = 344.78	HFLM = 270.31	1.0
Body type	Comments	MFHM = 324.45	HFLM = 270.31	1.0
Body type	Comments	MFMM = 333.95	HFLM = 270.31	1.0
Body type	Comments	MFLM = 285.88	HFLM = 270.31	1.0
Body type	Comments	LFHM = 395.35	HFLM = 270.31	0.62
Body type	Comments	LFMM = 304.56	HFLM = 270.31	1.0
Body type	Comments	HFLM = 270.31	LFLM = 262.94	1.0
Body type	Comments	Ambiguous = 331.55	HFLM = 270.31	0.46
Body type	Comments	MFMM = 333.95	MFHM = 324.45	1.0
Body type	Comments	MFHM = 324.45	MFLM = 285.88	1.0
Body type	Comments	LFHM = 395.35	MFHM = 324.45	1.0
Body type	Comments	MFHM = 324.45	LFMM = 304.56	1.0
Body type	Comments	MFHM = 324.45	LFLM = 262.94	1.0
Body type	Comments	Ambiguous = 331.55	MFHM = 324.45	1.0
Body type	Comments	LFHM = 395.35	MFMM = 333.95	1.0
Body type	Comments	MFMM = 333.95	Ambiguous = 331.55	1.0
Body type	Comments	MFMM = 333.95	MFLM = 285.88	1.0
Body type	Comments	LFHM = 395.35	MFLM = 285.88	0.42
Body type	Comments	Ambiguous = 331.55	MFLM = 285.88	1.0
Body type	Comments	MFMM = 333.95	LFMM = 304.56	1.0
Body type	Comments	LFMM = 304.56	MFLM = 285.88	1.0
Body type	Comments	LFHM = 395.35	LFMM = 304.56	0.01
Body type	Comments	Ambiguous = 331.55	LFMM = 304.56	1.0
Body type	Comments	MFMM = 333.95	LFLM = 262.94	1.0
Body type	Comments	MFLM = 285.88	LFLM = 262.94	1.0
Body type	Comments	LFHM = 395.35	LFLM = 262.94	<0.001
Body type	Comments	LFMM = 304.56	LFLM = 262.94	1.0
Body type	Comments	Ambiguous = 331.55	LFLM = 262.94	1.0
Body type	Comments	LFHM = 395.35	Ambiguous = 331.55	0.08

Discussion

This study is one of the first analyses of Instagram content studying the portrayal of men overall and to test for a significant association between body composition and number of posts' responses.

The sample showed a bias for muscular and lean white men. Similar biases were found in previous studies.[10,13,14] Most men shown were both very lean and very muscular (35 percent) and only 6 percent showed high body fat levels. However, worldwide, 37 percent of men have a body mass index >25 kg/m^2,[27] indicating that Instagram content presents a skewed picture of male body composition, in line with other types of media.[1,5] In this way, the platform may be contributing to body dissatisfaction among men. Interestingly, for all levels of muscularity, posts displaying low body fat were most common. Researchers often assume that drive for muscularity is of particular importance to men (compared to women),[28] but these results emphasize body fat being just as important for men.

In addition, most of the posts showed white men, while Instagram's user base seems to be fairly balanced (with slightly more Black users).[29] This could be damaging in terms of body dissatisfaction for ethnic groups (i.e., Asian men) that not only have to contend with their own cultural appearance pressures, but pressures to adhere to western body standards.[30,31] Interestingly, posts depicting Latino men received fewer likes in our sample indicate that posts with nonwhite men may receive less attention.

Our results showed post content with a strong health focus, as the vast majority of posts promoted both health-related norms and outcomes. Outcomes were almost evenly split between health- and appearance-related outcomes, with health-related outcomes being slightly more common. Men might learn to engage in fitness-related behaviors for health-related reasons (through modeling[11–13]), which could act as protective factor against disordered eating.[32] However, men could also conclude that the highly muscular, lean man epitomizes health leading to unhealthy behaviors.[33] Further research is warranted to investigate this.

Exercise was the most frequently shown behavior, while diet was promoted in fewer than 40 percent of the posts. The bias toward physical activity might target users' affiliation motivation to be physically active,[34] but research indicates that a combination of a balanced diet and exercise is needed to achieve a healthy weight.[35] A similar pattern was found by Simpson and Mazzeo,[13] who suggested users may follow the pattern presented on social media and increase time spent exercising without modifying their diet, a process that can be supported by SCT.[11–13] This could lead to discontent and discontinuation of physical activity as goals are not reached.[13,35] Further insights are needed in how users act following exposure to this physical active/nutrition pattern.

Interestingly, some factors linked to male body dissatisfaction were not found to be mirrored on Instagram. For example, in this sample, masculinity is indicated as an overt norm or outcome in few posts, perhaps because masculinity is subliminally conveyed.

Almost all posts elicited likes and comments. Body composition was at least weakly (but significantly) related to engagement; the number of responses rose with increasing

levels of body muscularity and decreasing levels of body fat. Furthermore, the LFHM group received significantly more responses. This might indicate that likes and comments function as social rewards for adhering to the ideal, cultural body shape. This could be particularly dangerous from an SCT perspective, since men could learn to overvalue both high levels of muscularity and low body fat levels through modeling.[11–13]

Strengths, limitations, and recommendations

This content analysis was not only the first to study online content aimed at men in general but it also was the first to test whether an association between body composition and level of engagement was identifiable. Additional strengths were application of a random sample of posts, theory-driven analysis, and employment of both a male and female coder.

A limitation was that this study relied on hashtags to identify promoted norms, behaviors, and outcomes as well as certain characteristics. However, it is not known if this is the optimal way to measure these characteristics on social media content. In addition, both coders were raised in Europe and hashtags were based on English-language words, which could have affected the results. Coders' interpretation also could have affected the findings from this study.

Moreover, content analyses cannot test for causality. Further, qualitative studies (i.e., focus groups) and longitudinal studies are needed to support the findings, particularly since men are still underrepresented in this field.[36] Moreover, only picture-based posts were analyzed—future studies should consider videos.

Conclusion

This study showed that Instagram is clearly saturated with posts depicting very lean and very muscular white men exercising. Posts showing this body type received overwhelmingly positive responses and showed a strong health focus. This is particular concerning considering insights from SCT,[11,12] users could learn that they have to adhere to this standard to be healthy. Despite possible negative consequences, this type of content might help counteract rising societal rates of overweight and obesity.[27] However, it is debatable if users need to perceive highly muscular, lean men being physically active to become physical active themselves. Many interventions aimed at decreasing the negative effects of unrealistic body images still exclusively focus on the female population[37,38]; health educators should consider being more gender inclusive; and the study results could be used to inform an intervention targeting the male population. Furthermore, health professionals may use the results to inform patients with body dissatisfaction of the skewed reality of social media. Finally, this study shows that analyzing social media content regarding male body image is a valuable research field needing further consideration.

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