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Media Exposure, Mediated Social Comparison to Idealized Images of Muscularity, and Anabolic Steroid Use

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This study examined the association between anabolic–androgenic steroid (AAS) use and dominant sociocultural factors, specifically media exposure to idealized images of male muscularity, and mediated social comparison trends among a sample of young Arab adults. The study found evidence that participants more exposed to content that promotes muscularity and those who idealize images of muscularity and perceive them as motivators for achieving muscularity are more likely to be AAS users. It also found that a significant percentage of participants used at least one kind of dietary supplement and that the level of AAS use among health club participants indicates it is a significant public health problem in Lebanon. The study suggests that dealing with this problem requires a unique approach, beyond the typical awareness of risks strategy, since some users were well aware of the risks yet continue to use AAS, and their motivations pertain more to body image and sexuality. A stronger approach that utilizes critical media literacy teaching that ingrains these issues into school and university curricula will have a more lasting impact.

The number and severity of health risks—mental and physical—associated with media exposure and habits continue to increase. Studies have linked media influence to issues as diverse as obesity and sedentary lifestyle, alcohol and tobacco use, violence and aggressive behavior, early

sexual activity, low academic achievement, and attention disorders (see Escobar-Chaves & Anderson, 2008; McIlhaney, 2005). Add to the list a growing host of issues related to body image and self-esteem, including an obsession with achieving a certain idealized body-type through unhealthy habits, such as excessive exercising, unhealthy dieting, the abuse of dietary supplements, and at the far extreme the abuse of anabolic–androgenic steroids (AAS).

AAS are synthetic substances that mimic the effects of the natural male hormone testosterone (Nilsson, Spak, Marklund, Baigi, & Allebeck, 2001). Their effects are

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both anabolic (building muscle) and androgenic (increasing masculine characteristics). AAS have been linked to various health risks, including severe acne, testicular atrophy, reduced sperm count, stunted growth, increased risk of stroke, kidney and liver failure, high blood pressure, enlargement of the heart, and various cardiovascular problems, as well as mood swings, elevated aggression, and other psychiatric disorders.

In 1990, the Anabolic Steroid Control Act made the possession and distribution of AAS for nonmedical purposes a felony in the United States (Sturmi & Diorio, 1998). However, according to the Lebanese Order of Physicians, no similar laws regulate AAS in Lebanon, although they fall under the category of medications that require prescriptions. This means little in a country where mechanisms that enforce regulations and monitor pharmacies remain lax. Moreover, although Lebanon is among the 191 states that adopted the UNESCO (2005) International Convention Against Doping in Sports, it still lacks laws for the monitoring and regulation of doping among nonathletes.

AAS have been used in sports since the 1950s, predominantly in bodybuilding to increase muscle mass, strength, performance, and resistance to fatigue, and their increased demand and acceptance over the years have been driven by a cultural shift that has reframed what was formerly defined as normal to what is now considered pathological and in need of enhancement and intervention (Hoberman, 2005). Recent reports show AAS use is on the rise, with one in five U.S. athletes estimated to be using one form or another (Hall, 2005). Moreover, AAS use has become more prevalent among nonathletes seeking to enhance their body image, a phenomenon linked to low self-esteem and a distorted sense of body image, known in its extreme form as muscle dysmorphia—"a preoccupation with the idea that one's body is not sufficiently lean and/or muscular" (Esco, Olson, & Williford, 2005, p. 76; also see Baird & Grieve, 2006; Denham, 2006; Hatoum & Belle, 2004; Smolak, Murnen, & Thompson, 2005). Studies have shown that in comparison to the norm, people with muscle dysmorphia tend to more likely be linked to psychopathology, have higher AAS and substance-use disorders, have poorer quality of life, and are more at risk for attempting suicide (Olivardia, Pope, & Hudson, 2000; Pope et al., 2005), with sociocultural factors being among the leading causes to such conditions.

An abundance of studies has documented the relationship between media exposure and body image (Agliata & Tantleff-Dunn, 2004; Baird & Grieve, 2006; Farquhar & Wasylikiw, 2007; Harrison, 2000; Swamia, Steadman, & Tovee, 2009), especially in relation to self-esteem and drive for thinness among females (Grabe, Ward, & Hyde, 2008; Vartanian, Giant, & Passino, 2001) and drive for muscularity among males (Duggan & McCreary, 2004; Smolak & Stein, 2006; Thompson, Heinberg, & Altabe, 1999). A growing number of studies suggests media exposure to be a risk factor for body dissatisfaction (Harrison, 2003) and AAS abuse in

Western societies (Denham, 2009; Loópez-Guimerá, Levine, Sánchez nchez-Carracedo, & Fauquet, 2010; McCreary & Sasse, 2000), and at least one study has warned that AAS abuse is becoming a public health problem in parts of the Arab world (Tahtamouni et al., 2008).

Indeed, body dissatisfaction is a growing theme among adolescents and young adults in the Arab region. Mousa, Mashal, Al-Domi, and Jibril (2010) found that body dissatisfaction is a growing social issue among Jordanian adolescent girls. Khraybani (2008) also established a relationship between body image/body dissatisfaction and self-esteem among Lebanese adolescents. Initial evidence indicates that body dissatisfaction among young Arabs may increase their susceptibility to using body enhancement supplements and controlled substances. Tahtamouni et al. (2008), for instance, reported that the prevalence of AAS use among Jordanian athletes reaches 26%.

Media exposure is a key factor to consider. Media consumption of Arab youth tends to be high (Melki, 2010), and media images and messages—especially from Western TV programs, movies, and music—often expose individuals to an overabundance of unrealistic portrayals (Grabe et al., 2008), overly thin female models (Fouts & Burggraf, 1999), and overly muscular male models (Hatoum & Belle, 2004). But while Arab audiences enjoy the same high dose of Western media images and messages (in addition to equally objectifying and unrealistic images in Arab productions), they do not benefit from the widely available awareness programs, consumer protection regulations, and media literacy curricula their Western peers access (Melki, 2013).

Furthermore, in contrast to the abundance of Western scientific research on this topic, Arab researchers and policymakers have not sufficiently paid attention to this issue. Although an increasing number of (mainly Western) studies have linked media exposure to increased supplement and controlled substance use among males, particularly AAS (Morrison, Kalin, & Morrison, 2004; Smolak et al., 2005), there remains a dearth of studies exploring these issues in the Arab world. Thus, the purpose of this study is to examine the association between AAS use and dominant sociocultural factors, specifically media exposure to idealized images of male muscularity, and mediated social comparison trends among a sample of young Arab adults attending fitness centers in Lebanon.

MALE BODY IMAGE AND SOCIOCULTURAL AND SOCIAL COMPARISON THEORIES

Sociocultural and social comparison theories offer an appropriate framework for studying the relationship between media exposure and male body image, the drive for muscularity, the potential use of dietary supplements, and in extreme cases the use of AAS, to fulfill that drive (Duggan & McCreary, 2004; Thompson et al., 1999).

Sociocultural theory emphasizes the effects of pervasive social and cultural values on individual values and behaviors. Social and cultural values, as they pertain to health and the body, that have been constantly redefined over the past century by the medical and pharmaceutical communities (and other industries) and driven by a prevailing consumerist and individualist culture have drastically changed society's perception of what is normal and what is abnormal and thus requires enhancement (Hoberman, 2005). In regard to body image, sociocultural factors commonly include peer and parental influences but more important for this study media influences.

Sociocultural theory as it pertains to media exposure and body image posits that the ubiquitous media images that glorify a thin body ideal for women and a muscular (mesomorphic) body type for men exert tremendous pressures on individuals to strive for achieving such ideal body types. In addition, exposure to these media images—through movies, TV programs, video games, cartoons, advertisements, toys, and so on—sends a consistent message to children and adults about the ideal body type and shape for which they should strive. These media not only provide the ideal but also supply ample information about how to achieve it, sometimes through healthy methods, such as exercising and healthy eating, but often through unhealthy methods, such as strict diet plans, surgical body modification, and dietary supplement and AAS use. More problematic has been the evolution of these ideal body types over the past decades, with females becoming ever thinner and males becoming larger and more muscular—ideal body types that are impossible to achieve for the vast majority of humans. Most of these mediated body types are not representative of their diverse global audiences, especially as they pertain to non-White and non-European and North American audiences, and are furthermore drastically manipulated, edited, and airbrushed for perfection, and therefore extremely difficult if not impossible to attain and maintain in real life (Labre, 2002). Paramount is the fact that many people are not aware of the extent to which these images are manipulated and unrealistic, and many underestimate the difficulty of achieving such body types (Thompson et al., 1999).

Simultaneously, these unrealistic ideal body types have become increasingly ubiquitous and homogeneous across all media (Frederick, Fessler, & Haselton, 2005; Labre, 2002; McCreary & Sasse, 2000; Pope, Olivardia, Gruber, & Borowiecki, 1999). Many individuals tend to perceive these body types, especially those of athletes, as the ideal standard. Brown, Basil, and Bocarnea (2003) even found that parasocial relationships with athlete role models correlate with positive attitudes toward these athletes' actions and behaviors, particularly in regards to steroid and supplement use. Moreover, individuals often engage in comparing their own bodies to these ubiquitous images, a phenomenon further articulated in social comparison theory.

Social comparison theory postulates that in the absence of any other objective external benchmark, people define themselves by comparing themselves to other people in their environment (Crisp & Turner, 2010). In that sense, people engage in “upward comparison” (comparison to someone perceived to be better) and/or “downward comparison” (comparison to someone perceived to be worse). Although downward comparison is associated with higher self-worth and body satisfaction, upward comparison is associated with lower self-esteem and higher body dissatisfaction, especially when the target of comparison is hard to reach. Therefore, in a media-saturated environment rife with unrealistic body types, upward comparison becomes highly problematic.

This study uses sociocultural theory (specifically, factors of media exposure to messages rich in the hypermuscular ideal) in conjunction with social comparison theory (exclusively upward comparison or idealization of mediated images of the hypermuscular body type). It attempts to examine the relationship between AAS use and media exposure and comparison to idealized hypermuscular media body types.

Many studies have supported sociocultural and social comparison theory, particularly as they pertain to media factors and mediated social comparison and their relationship to body image and body dissatisfaction. The majority of these studies have focused on females (Grabe et al., 2008; Thompson et al., 1999). In fact, numerous studies have linked media exposure to negative perceptions of body image and lower self-esteem among women (e.g., Clay, Vignoles, & Dittmar, 2005; Vartanian et al., 2001), to higher rates of female body dissatisfaction (e.g., Bell, Lawton, & Dittmar, 2007; Green & Pritchard, 2003; Harrison, 2003), and to a higher prevalence of eating disorders, such as anorexia and bulimia, among women (e.g., Botta, 2003; Harrison, 2000; López-Guimerá et al., 2010).

In addition, these studies focused on Western populations, and none dealt with Arab audiences, a void partly filled by Mousa et al. (2010), who surveyed 432 Jordanian female students between the ages of 10 and 16 years regarding body image dissatisfaction. They found more than 21% of participants exhibited body image dissatisfaction and negative eating attitudes and behaviors. Their results also indicated that media exposure—in addition to family and peer pressure—was associated with the preoccupation of participants with their body image. Accordingly, Jordanian females “internalized Western body ideals through television, magazines, and the Internet. Media messages may have reflected beliefs regarding physical appearance in the minds of females, particularly adolescents who seek media for information” (p. 49). The importance of this study lies in its consistency with studies that did not sample Arab individuals, thereby confirming the validity of applying some of their findings to Arab females. However, could we also apply the

findings of Western studies that sample males, as delineated in the following literature review, to Arab men?

Media Exposure, Male Body Image, and Body Dissatisfaction

Male body image concerns have recently attracted increased attention (Blond, 2008; Farquhar & Wasylikiw, 2007; Green & Pritchard, 2003; Labre, 2002; Smolak & Stein, 2006; Vartanian et al, 2001). The majority of these studies found parallel trends to those focused on females.

Hatoum and Belle (2004) found that young male adults (18 to 23 years old) displayed substantial body dissatisfaction, including a significant number of men who were within their normal body mass index (BMI). They found that music video consumption was associated with the use of dietary and fitness supplements and that reading male-directed magazines correlated with preoccupation with muscularity and fitness, and associated with increased dietary supplement and beauty products use. These individuals also were more likely to have gym membership, tended to spend more time exercising, held positive attitudes regarding muscularity, and wanted to achieve greater muscularity. Moreover, male-directed magazine and movie consumption was associated with a higher value on female thinness.

Consistently, Farquhar and Wasylikiw (2007) found an association between media exposure and decreased body satisfaction among middle-school males. Men who consumed images that emphasized aesthetic attributes tended to have negative self-evaluations, whereas those who consumed images that emphasized performance attributes tended to have positive self-evaluations. Moreover, Vartanian et al. (2001) established that “appearance-related mass media” predicted body satisfaction and satisfaction with muscularity among male undergraduate students (p. 720). However, Green and Pritchard (2003) could not replicate these results among adult males, and found media influence was not a predictor of body dissatisfaction, which may be due to the age difference in the targeted samples. Nevertheless, this uncertainty in the literature obligates more research on the topic.

In fact, Barlett, Vowels, and Saucier (2008) confirmed the uncertainty of these findings through a meta-analysis that synthesized the relationship between media exposure, negative body image and self-esteem, conformity to the popular muscular/masculine ideal, and engagement in negative behaviors that have severe health risks. Using a sample of 25 studies, they showed only a small negative relationship between media exposure and body image concerns among males. Consistently, Blond’s (2008) review of 15 experimental studies found that exposure to images of idealized male body types had a small but significant effect on body dissatisfaction among men.

Although the literature on media and body image satisfaction reflects some contradictions, it nevertheless offers

overall significant evidence associating media exposure with body image and body dissatisfaction among males. Similar, albeit inconclusive, conclusions are drawn by studies that examine the relationship between media factors and the male drive for muscularity and AAS use.

Media Exposure, the Drive for Muscularity, and AAS Use

The increase in body dissatisfaction, as it pertains to an endemic increase in media exposure to idealized body types, has fueled a greater drive for muscularity among males and has led to an increased risk for individuals to turn to extreme methods, namely, AAS use, to achieve quick results (Baird & Grieve, 2006). The literature provides some evidence of a relationship between media exposure, body dissatisfaction, and a heightened drive for muscularity (Duggan & McCreary, 2004; Smolak & Stein, 2006), and the use of AAS (Field et al., 2005; Iriart, Chaves, & Orleans, 2009; Morrison et al., 2004; Smolak et al., 2005).

Developing a drive for muscularity measurement scale, McCreary and Sasse (2000) examined this drive among high school males and females (age 16–24 years). The study found the drive for muscularity was stronger among males, who were trying to gain both weight and muscle mass. Those who had a high drive for muscularity weight-trained more often, adopted diet regimes to increase muscle mass, and had lower self-esteem and higher levels of depression. McCreary and Sasse believe that men with a high drive for muscularity “may also be at greater risk for using AAS” (p. 302). Building on that study, Duggan and McCreary (2004) examined the relationship between exposure to muscle and fitness magazines, body satisfaction, and drive for muscularity for homosexual and heterosexual men. The study found that regardless of sexual orientation, viewing and purchasing muscle/fitness magazines was positively associated with body dissatisfaction. Those who consumed more muscle/fitness magazines also reported a greater drive for muscularity. Consistently, Smolak and Stein (2006) found sociocultural factors, especially investment in media, were associated with a drive for muscularity among middle school males. However, Hobza and Rochlen (2009) did not find evidence that supports an effect of magazine images of muscular men on college-age men’s drive for muscularity. Their study, nevertheless, did provide evidence of a negative effect on these men’s body esteem.

The literature on media exposure, body image, and AAS use was more consistent, with most studies showing a strong relationship. Connecting body dissatisfaction, media exposure, and AAS use, Morrison et al. (2004) surveyed Canadian high school males and females exploring adolescent body evaluation. They found male participants exercised more often per week and were more likely to use AAS to increase muscle mass. They also found exposure

to idealistic magazines positively correlated with the number of weight gain diets reported among males. The study, however, lacked thorough analysis regarding AAS use and media consumption, partly due to the small number of media consumption variables used.

Further developing the previous work, Field et al. (2005) conducted a cross-sectional analysis of secondary data for adolescents. The authors assessed the prevalence of weight and body shape products such as protein, creatine, growth hormones, and AAS, and the correlates that influence the use of these products, including media consumption. The study found that participants who thought frequently about wanting more defined muscles—thoughts often triggered by media messages—were more likely than their peers to use these products, and the males who read men’s, fashion, or health/fitness magazines were significantly more likely than their peers to use products, such as AAS, to improve appearance or strength.

Expounding on both previous studies, Smolak et al. (2005) looked at various sociocultural factors, including media, peer, and parental influences, on adolescents’ muscle building techniques. The survey of U.S. adolescent males found that media influence emerged as an independent correlate of muscle building, particularly with dietary supplement and AAS use. Furthermore, food supplement and AAS users were more invested than nonusers in the media portrayal of muscularity and were more likely to engage in social comparison and have lower body esteem.

In corroboration, Iriart et al. (2009) used a qualitative approach to explore the reasons behind bodybuilding practices and AAS use. They observed middle- and lower-income bodybuilding gyms in Brazil and conducted 43 interviews with young adult male AAS users. They found participants explicitly connected AAS use with goals to improve body aesthetics to ascertain an ideal body type as portrayed in the media. Many participants even aspired to look like specific stars, such as Arnold Schwarzenegger. Dissatisfaction with one’s real body, as compared to the ideal media standard, in addition to peer pressure, the symbolic capital linked to muscular bodies, and a sense of immediate gratification, all seemed to motivate participants to use AAS.

In sum, the literature indicates that media exposure to muscularity-rich content, as a dominant sociocultural factor, is largely related to a drive for muscularity. Even more consistently, media exposure and body image concerns are related to increased risks for AAS use among men. The literature, however, has mainly focused on Western audiences and only few dealt with non-Western countries, particularly the Arab world, the target of this study.

HYPOTHESES

Therefore, this study tested the following four hypotheses as they build upon sociocultural theory (H1/H2) and mediated

social comparison theory (H3/H4) and pertain to Lebanese gym goers:

- H1: Participants more exposed to media content that promotes muscularity are more likely to be dietary supplements users.
- H2: Participants more exposed to media content that promotes muscularity are more likely to be AAS users.
- H3: Participants who idealize media images of muscularity and perceive them as motivators for achieving muscularity are more likely to be dietary supplements users.
- H4: Participants who idealize media images of muscularity and perceive them as motivators for achieving muscularity are more likely to be AAS users.

METHODS

This study utilized a cross-sectional survey of a convenience sample of young adults selected from various fitness centers across the Greater Beirut area in Lebanon.

The 63-item structured questionnaire measured media exposure to muscularity-rich content, mediated social comparison to idealized muscular images, AAS and supplement use, and demographics. Most variables were adopted from Field et al. (2005), Nilsson et al. (2001), and Tahtamouni et al. (2008) and used nominal or ordinal measures. Media exposure and mediated social comparison variables used a 3-point, closed-ended, ordinal Likert-type scale. Scale items included statements such as “Reading bodybuilding magazines makes me want to have bigger muscles” and “I believe most men/women prefer women/men with big muscles.” The questionnaire, which utilized reverse translation, was available in English and Arabic.

After ascertaining institutional review board approval, researchers generated a comprehensive list of gyms and fitness centers from the greater Beirut area, contacted 40 fitness centers, and were granted access to 30. Employing convenience purposeful sampling, the researchers collected 545 questionnaires that were distributed by hand to gym goers between June 2010 and February 2011. Data from 523 gym attendees were included in this analysis.

Table 1 summarizes the sample characteristics. The mean age was 25.0 ± 6.1 years (range, 18–50 years), with the majority being males (82.2%). Most attendees (78.6%) were residents of the capital city Beirut, not married (89.7%), educated (99.4%), and employed (63.2%). The mean number of days spent at the gym was 4.3 ± 1.3 (range, 1–7), and the mean number of minutes spent exercising every session was 82.4 ± 33.6 (range, 25–300).

Descriptive data are presented as means \pm standard deviations (*SD*) or percentages. Multivariate logistic regression models were constructed to determine the unadjusted and adjusted odds ratios (AOR) and 95% confidence interval (CI)

TABLE 1
Characteristics of the Study Sample ($N = 523$)

Parameter	Value
Age in years, mean \pm SD (range)	25.0 \pm 6.1 (18–50)
Male:female, n/N (%), $N = 510$	419 (82.2): 91(17.8)
Marital status, n (%), $N = 522$	
Married	54 (10.3)
Not married	468 (89.7)
Single	462 (88.5)
Separated/divorced	6 (1.1)
Residence, n (%), $N = 523$	
Beirut (capital)	411 (78.6)
Other	112 (21.4)
Education, n (%), $N = 521$	
No formal education	3 (0.6)
Yes	518 (99.4)
Elementary	4 (0.8)
Middle school	21 (4.0)
High school	44 (8.4)
Technical	36 (6.9)
University	337 (64.7)
Postgraduate	72 (13.8)
Other	4 (0.8)
Employed, n (%), $N = 519$	
No	191 (36.8)
Yes	328 (63.2)
Part-time	71 (13.7)
Full-time	257 (49.5)

for any supplement as well as androgenic–anabolic steroid (AAS) use. A p value of .05 was used for inclusion. Models were adjusted for all responses to each of the two sets of questions, as well as factors that could influence media exposure: age, sex, area of residence (Beirut vs. other), marital status (married vs. not), education status (yes vs. no), and employment status (yes vs. no).

Factor analysis for determining the factor structure of the questionnaire returned four main factors, which together accounted for 52.1% of the total variance (see appendix). The factors can fairly be identified as exposure to feminine media ideals (eigenvalue = 3.4, total variance = 19%), exposure to masculine media ideals (eigenvalue = 2.8, total variance = 15.3%), perceiving media muscularity as incentive (eigenvalue = 1.8, total variance = 10.2%), and idealizing and comparing to media muscularity (eigenvalue = 1.4, total variance = 7.6%). Cronbach's alpha, which was used to assess scale reliabilities, returned an acceptable value of .72. Study limitations include the lack of a random sample. The study may have also missed some unlisted gyms. Finally, some participants may not have been forthcoming about their substance use.

RESULTS

Prevalence of Supplement and AAS Use

Table 2 outlines the frequency of supplement use in the study sample. The frequency of any supplement use was 42.1%.

TABLE 2
Reported Frequency of Supplement and AAS Use

	Protein		Creatine		AAS	
	n	(%)	n	(%)	n	(%)
Current users	152	29.3	56	10.8	17	3.3
Previous users	56	11.8	40	7.7	38	7.4
Current + previous	208	41.1	96	18.5	55	10.7
	$N = 518$		$N = 517$		$N = 512$	

Note. Any supplement and AAS use: 218 (42.1%), $N = 518$.

A history of AAS use was reported in 10.7% of the evaluated gym attendees, while 18.5% reported creatine supplement use, and 41.1% reported protein use.

Characteristics of AAS Users

Gym attendees who had a history of AAS use were all males. They were on average older (28 vs. 24) and had a higher mean weight (89 kg vs. 77 kg), height (181 cm vs. 177 cm), and body mass index (27 vs. 25) compared to attendees with no history of AAS use. In addition, AAS users were less likely than nonusers to report an ideal weight lower than their actual weight (18% vs. 32%) and more likely to report an ideal weight similar to (26% vs. 14%) or higher than (57% vs. 54%) their actual weight. AAS users had lower formal education; 52.7% of AAS users compared to 82.6% of nonusers had a university education. The rate of previous or current smoking (57% vs. 40%) was higher among AAS users. Moreover, AAS users were heavier smokers than non-AAS users (58% vs. 30% smoked more than 4 cigarettes/day). However, AAS users were only slightly more active gym goers than non-AAS users. They went on average 5 days/week, compared to 4 days/week for nonusers, and the average time spent at the gym per visit was almost identical for both groups (81.8 minutes vs. 82.4 minutes).

Among past and current AAS users, 82% said they used it to enhance body image, while 14% said they used it to boost performance. Among previous users ($n = 38$), the main reported reasons for discontinuing AAS were side effects (44.7%), friend's advice (18.4%), and financial reasons (13.2%). Additionally, 78.2% of those who had used or continue to use AAS said they are aware that AAS pose adverse side effects to their health. Among this specific group are 22% who continue to use AAS despite this knowledge. Moreover, 18.9% of past and current AAS users said they had sought medical attention related to AAS use, including two who continued to use AAS.

Hypothesis 1: Media Exposure and Supplement Use

Table 3 summarizes responses to questions regarding media exposure, and Table 4 summarizes the unadjusted odds ratio for supplement (and AAS) use in association with

TABLE 3
Responses to Questions Regarding Media Exposure

Parameter	Never, n (%)	Sometimes, n (%)	Often, n (%)
Read or look through men’s magazines (N = 503)	273 (53.3)	180 (36.9)	50 (9.8)
Read or look through bodybuilding magazines (N = 512)	289 (56.4)	164 (32.0)	59 (11.5)
Read or look through <i>Playboy/Playgirl</i> (or similar) magazines (N = 503)	354 (70.4)	123 (24.5)	26 (5.2)
Watch sports on TV (N = 512)	49 (9.6)	200 (39.1)	263 (51.4)
Watch wrestling/fighting (e.g., WWF) ^a on TV (N = 510)	155 (30.4)	209 (41.0)	146 (28.6)
Watch bodybuilding programs on TV (N = 509)	278 (54.6)	168 (33.0)	63 (12.4)
Read or look through women’s magazines (N = 509)	247 (48.5)	191 (37.5)	71 (13.9)
Read or look through beauty and fashion magazines (N = 500)	241 (48.2)	178 (35.6)	81 (16.2)
Watch televised beauty contests (e.g., Miss/Mr. Lebanon) (N = 510)	252 (49.4)	204 (40.0)	54 (10.6)
Watch televised beauty and fashion programs (N = 511)	272 (53.2)	190 (37.2)	49 (9.6)

^aWWF, World Wrestling Federation.

TABLE 4
Unadjusted Odds Ratios for Supplement and AAS Use in Association With Media Exposure

Parameter	Answered “Sometimes” ^a		Answered “Often” ^a	
	Any supplement and AAS use ^b , OR (95% CI)	AAS use, OR (95% CI)	Any supplement and AAS use ^b , OR (95% CI)	AAS use, OR (95% CI)
Read or look through men’s magazines	1.71 (1.17-2.50)	1.50 (0.79-2.83)	2.54 (1.38-4.70)	2.79 (1.19-6.53)
Read or look through bodybuilding magazines	2.46 (1.65-3.67)	2.54 (1.26-5.12)	10.62 (5.26-21.46)	7.82 (3.62-16.90)
Read or look through <i>Playboy/Playgirl</i> (or similar) magazines	1.97 (1.30-2.99)	1.59 (0.82-3.09)	4.85 (1.98-11.85)	4.42 (1.70-11.47)
Watch sports on TV	1.40 (0.69-2.83)	4.18 (0.54-32.25)	2.41 (1.21-4.78)	6.69 (0.89-50.18)
Watch wrestling/fighting (e.g., WWF) on TV	1.70 (1.09-2.65)	1.82 (0.73-4.50)	2.60 (1.62-4.20)	4.58 (1.92-10.93)
Watch bodybuilding programs on TV	1.55 (1.04-2.30)	3.13 (1.45-6.77)	4.14 (2.30-7.44)	11.96 (5.33-26.80)
Read or look through women’s magazines	0.89 (0.61-1.31)	0.70 (0.37-1.34)	0.80 (0.47-1.39)	0.87 (0.36-2.10)
Read or look through beauty and fashion magazines	0.85 (0.58-1.26)	0.77 (0.40-1.47)	0.57 (0.33-0.97)	0.66 (0.26-1.67)
Watch televised beauty contests (e.g., Miss/Mr. Lebanon)	0.66 (0.45-0.97)	0.67 (0.36-1.26)	0.62 (0.34-1.14)	0.58 (0.19-1.71)
Watch televised beauty and fashion programs	0.63 (0.43-0.93)	0.53 (0.28-1.02)	0.71 (0.38-1.33)	0.45 (0.13-1.53)

Note. AAS, androgenic-anabolic steroids; WWF, World Wrestling Federation; OR, odds ratio; CI, confidence interval.

^aGym attendees who answered “Never” constituted the reference population.

^bProtein, creatine, or AAS use.

media exposure. Hypothesis 1 was supported by the evidence. Gym attendees who sometimes or often read or look through men’s, bodybuilding, or *Playboy/Playgirl* magazines and those who sometimes or often watch sports, wrestling/fighting, or bodybuilding programs on TV were more likely to be supplement users compared to those who never do. In contrast, those who sometimes or often read or look through women’s or beauty and fashion magazines and those who sometimes or often watch televised beauty contests or beauty and fashion programs were less likely to be supplement users compared with those who never do.

After adjusting for age, sex, area of residence, marital status, education status, employment status, and the interdependence between media exposure questions, the only independent and significant predictors for supplement use were reading or looking through bodybuilding magazines

(sometimes, AOR: 2.40, 95% CI: 1.33–4.31 and often, AOR: 10.30, 95% CI: 3.29–32.25) and reading or looking through *Playboy/Playgirl* magazines (sometimes, AOR: 1.97, 95% CI: 1.10–3.51 and often, AOR: 4.27, 95% CI: 1.14–16.01).

Hypothesis 2: Media Exposure and AAS Use

The analysis for AAS use (Table 4) generated similar results that also supported Hypothesis 2. Gym attendees who sometimes or often read or look through men’s, bodybuilding, or *Playboy/Playgirl* magazines and those who sometimes or often watch sports, wrestling/fighting, or bodybuilding programs on TV were also more likely to be AAS users compared with those who never do. In contrast, those who sometimes or often read or look through women’s or beauty and fashion magazines and those who sometimes or often watch

televised beauty contests or beauty and fashion programs were less likely to be AAS users compared with those who never do.

After similar adjustments as already described, the only independent and significant predictor for AAS use was watching bodybuilding programs often (AOR: 8.00, 95% CI: 1.95–32.77).

Hypothesis 3: Media Perception and Motivation and Supplement Use

Table 5 summarizes responses to questions regarding idealizing media images of muscularity and perceiving them as motivators for achieving higher muscularity, and Table 6 summarizes the unadjusted odds ratio for supplement (and AAS) use in association with these variables. Gym attendees

who agreed that reading bodybuilding or fashion and beauty magazines or watching bodybuilding programs on TV makes them want to have bigger muscles were more likely to be supplement users compared with those who disagreed. In addition, those who agreed that they do compare their muscles to the muscles of athletes/models in magazines and use athletes on TV as comparison points to assess whether they are “muscular enough” were more commonly supplement users. However, attendees who agreed that bodybuilders on TV have perfect bodies, or that models in beauty and fashion magazines have perfect bodies, or that most women prefer men who have big muscles were just as likely to be supplement users compared with those who disagreed. Therefore, Hypothesis 3 was only partially supported.

After similar adjustments as already described, agreeing that reading bodybuilding magazines makes them want to have bigger muscles (AOR: 3.51, 95% CI: 1.41–8.73) and

TABLE 5
Responses to Questions Regarding Idealizing Media Images of Muscularity and Perceiving Them as Motivators for Achieving Higher Muscularity

Parameter	Disagree, n (%)	Neutral, n (%)	Agree, n (%)
Reading bodybuilding magazines makes me want to have bigger muscles (<i>N</i> = 496)	211 (42.5)	197 (39.7)	88 (17.7)
Reading fashion and beauty magazines makes me want to have bigger muscles (<i>N</i> = 492)	256 (52.0)	174 (35.4)	62 (12.6)
Watching bodybuilding programs on TV makes me want to have bigger muscles (<i>N</i> = 487)	227 (46.6)	156 (32.0)	104 (21.4)
I can tell if I am muscular enough by looking at the athletes on TV (<i>N</i> = 477)	206 (43.2)	176 (36.9)	95 (19.9)
I compare my muscles to the muscles of athletes in magazines (<i>N</i> = 485)	241 (49.7)	143 (29.5)	101 (20.8)
I think bodybuilders on TV have perfect bodies (<i>N</i> = 492)	252 (51.2)	155 (31.5)	85 (17.3)
I think models in beauty and fashion magazines have perfect bodies (<i>N</i> = 489)	152 (31.1)	144 (29.4)	193 (39.5)
I believe most women prefer men who have big muscles (<i>N</i> = 487)	181 (37.2)	168 (37.2)	138 (28.3)

TABLE 6
Unadjusted Odds Ratios for Supplement and AAS Use in Association With Idealizing Media Images of Muscularity and Perceiving Them as Motivators for Achieving Higher Muscularity

Parameter	Answered “Neutral” ^a		Answered “Agree” ^a	
	Any supplement and AAS use ^b , OR (95% CI)	AAS use, OR (95% CI)	Any supplement and AAS use ^b , OR (95% CI)	AAS use, OR (95% CI)
Reading bodybuilding magazines makes me want to have bigger muscles	1.23 (0.82-1.84)	1.07 (0.53-2.17)	3.11 (1.85-5.21)	2.44 (1.16-5.16)
Reading fashion and beauty magazines makes me want to have bigger muscles	1.51 (1.02-2.25)	1.52 (0.78-2.97)	1.84 (1.05-3.24)	2.21 (0.94-5.16)
Watching bodybuilding programs on TV makes me want to have bigger muscles	1.12 (0.74-1.71)	1.64 (0.77-3.51)	2.30 (1.43-3.70)	2.59 (1.20-5.59)
I can tell if I am muscular enough by looking at the athletes on TV	1.35 (0.90-2.04)	1.19 (0.56-2.51)	1.45 (0.89-2.38)	2.64 (1.24-5.60)
I compare my muscles to the muscles of athletes in magazines	1.47 (0.96-2.25)	2.06 (0.99-4.26)	2.27 (1.41-3.64)	2.90 (1.37-6.13)
I think bodybuilders on TV have perfect bodies	1.16 (0.77-1.74)	1.43 (0.72-2.82)	1.00 (0.61-1.65)	1.89 (0.88-4.06)
I think models in beauty and fashion magazines have perfect bodies	1.07 (0.67-1.70)	0.86 (0.41-1.81)	1.05 (0.68-1.62)	0.68 (0.33-1.41)
I believe most women prefer men who have big muscles	1.01 (0.66-1.55)	1.69 (0.79-3.63)	1.12 (0.71-1.75)	2.11 (0.98-4.55)

Note. AAS, androgenic-anabolic steroids; OR, odds ratio; CI, confidence interval.

^aGym attendees who answered “Disagree” constituted the reference population.

^bProtein, creatine, or AAS use.

comparing their muscles to those of athletes/models in magazines (AOR: 2.09, 95% CI: 1.11–3.91) were the only independent predictors of supplement use by gym attendees.

Hypothesis 4: Media Perception and Motivation and AAS Use

The analysis for AAS use (Table 6) generated only some consistent results. Consistently, participants who agreed that reading bodybuilding or fashion and beauty magazines or watching bodybuilding programs on TV makes them want to have bigger muscles were more likely to be AAS users compared with those who disagreed. Also consistently, those who agreed that they do compare their muscles to the muscles of athletes/models in magazines and use athletes on TV as comparison points to assess whether they are “muscular enough” were more commonly AAS users.

However, in contrast with supplement users, attendees who agreed that bodybuilders on TV have perfect bodies or that most women prefer men who have big muscles were more likely to be AAS users compared with those who disagreed. Moreover, those who agreed that models in beauty and fashion magazines have perfect bodies were less likely to be AAS users compared with those who disagreed. Therefore, Hypothesis 4 was supported by the evidence.

After similar adjustment, the only independent and significant predictor for AAS use was comparing muscles to those of athletes/models in magazines (AOR: 3.42, 95% CI: 1.06–11.05).

CONCLUSION AND DISCUSSION

This study set out to examine the association between AAS use and media exposure to idealized images of male muscularity and mediated social comparison trends among a sample of young Arab adults attending fitness centers in Lebanon. It found a significant percentage of participants (42.1%) used either dietary supplements or AAS (41.1% protein, 18.5% creatine, and 10.7% AAS). The level of AAS use among health club participants, which is comparable to that reported in most other studies (e.g. Kartakoullis, Phellas, Pouloukas, Petrou, & Louizu, 2008; Nilsson et al., 2001; Rachon, Pokrywka, & Suchecka-Rachon, 2006; Tahtamouni et al., 2008), provides evidence that AAS use is a significant public health problem in Lebanon.

AAS users were signified by being male and on average older and bigger in size than nonusers, and were more likely to strive to become even larger or at least to maintain the same size. They were more likely to be smokers and on average heavier smokers than nonusers, but they did not differ significantly from nonusers when it came to the number of visits to the gym per week and the time spent exercising. In addition, they predominantly used AAS for enhancing

body image, as opposed to enhancing performance. The vast majority of them were aware of the adverse side effects of AAS use, yet a significant number of these aware users continued to use AAS, including two users who had sought AAS-related medical attention.

These characteristics draw the picture of a 22- to 35-year-old, relatively large, male AAS user who tends to be focused on his body image but not concerned about his health and therefore not necessarily persuaded by health awareness messages—as evidenced by the heavy smoking and the continued AAS use despite knowledge of their risks. But for what type of body image does this male strive? His media habits may shed a light on that.

AAS users, and supplement users, are more likely to consume media content high in extreme doses of muscularity, especially bodybuilding TV programs and magazines, but also sexually explicit/pornographic content. They are less likely to consume media content that glamorizes thinness and other nonmuscular body types, such as beauty contests, fashion magazines, and programs that typically target women. Additionally, AAS and supplement users tend to perceive media images of muscularity as benchmarks for their own muscularity pursuits, and agree that these media messages encourage them to strive for muscularity. However, AAS users uniquely (compared to supplement users and nonusers) idealize media images of muscularity and are less likely to idealize the body types of models in beauty and fashion magazines. Moreover, AAS users were also uniquely more likely to believe that most women prefer men with big muscles. This last finding may be key to understanding the sexual roots for the drive for AAS and the obsession with the muscular media ideal.

This not only shows a notable difference between AAS and supplement users (and nonusers), but also suggests that dealing with this group requires a unique approach, beyond the typical awareness of risks strategy, especially as those on the extreme end of the spectrum are well aware of the risks yet continue to use AAS. Strategies that emphasize body-image messages and education pertaining to sexuality may be more effective. However, transient awareness campaigns, even those that address these issues, are likely not to be sufficient either.

A more effective approach aims to ingrain these issues into school and university curricula and have a more lasting impact. For example, the ATLAS¹ program for male adolescents and the ATHENA² program for female adolescents have been shown to effectively reduce desire to use AAS, increase awareness of AAS risks, and improve body image perception (Goldberg & Elliot, 2005, p. 74). However, ATLAS and ATHENA focus on high school athletes, engage them during structured athletic training seasons (which do not even exist in some countries), and target

¹Adolescents Training & Learning to Avoid Steroids.

²Athletes Targeting Healthy Exercise & Nutrition Alternatives.

mainly substance abuse. The programs also tend to focus on health awareness and alternatives to unhealthy dieting and supplement use, although they do partially address issues related to mediated body image and satisfaction with athletic performance (Elliot et al., 2004; Elliot et al., 2008; Goldberg & Elliot, 2005). Paramount for the group targeted in this study is the media-fueled obsession with body image enhancement for sexual/romantic ends, as evidenced by the variables related to body enhancement and the perceptions of what women think about men's bodies. An approach more engaging than ATLAS and ATHENA could be media literacy education.

Media literacy curricula have tackled both these issues in a broader context of critical thinking and understanding the influence of media messages on individuals' lives. Media literacy intervention methods have been shown to be effective even with short messages (Halliwell, Easun, & Harcourt, 2011) that may be injected into any courses or lectures, but are more effective in long-term media literacy courses (Irving & Berel, 2001; Jeong, Cho, & Hwang, 2012; Watson & Vaughn, 2006). Media literacy engages the students in critical thinking analysis, debates and discussions, and activities and exercises focused on these matters (Yates, 1999); students debate these issues and hear what others say. It engages in hands-on activities that teach how images and videos are manipulated. This not only removes one of the main incentives of using extreme measures to enhance body image, it also reveals the extent of image manipulation, its ubiquity, and the ease in achieving it. Although students often note their awareness of media manipulation and exaggeration of body image beforehand, these same students are often wowed by the ease and extent of achieving this visual manipulation when they engage in such hands-on exercises. Their views of ideal body image are often challenged when they engage in debates about the matter. Further reinforcing this notion are discussions about the pressures of dealing with one's body and looks, and the opinions of peers about what they perceive as beautiful or attractive, combined with statistics, examples from current media content, and critical analysis exercises.

This cannot be replaced (but it may be supported) by awareness campaigns or even simple lectures. It has been tied to a more complex curriculum that covers other interrelated aspects of how the media work, why media producers create these unrealistic and unrepresentative images, and what the structural, institutional, economic, and cultural factors are that play into these outputs. These media lessons should preferably start at the middle school level, when youth are most vulnerable and struggling to deal with their body images and sexuality and when many youth experience low levels of self-esteem. Media literacy courses or modules at the school and college levels or extensive workshops that offer a holistic critical media literacy approach will have a stronger long-term effect on dissuading men and women from taking extreme unhealthy measures in

their pursuit to achieve unachievable goals, and to build a healthy level of self-esteem and confidence, and reorient their energies toward more productive and healthy lifestyles.

REFERENCES

- Agliata, D., & Tantleff-Dunn, S. (2004). The impact of media exposure on males' body image. *Journal of Social and Clinical Psychology, 23*, 7–22.
- Baird, A. L., & Grieve, F. G. (2006). Exposure to male models in advertisements leads to a decrease in men's body satisfaction. *North American Journal of Psychology, 8*(1), 115–122.
- Barlett, C. P., Vowels, C. L., & Saucier, D. A. (2008). Meta-analyses of the effects of media images on men's body-image concerns. *Journal of Social and Clinical Psychology, 27*, 279–310.
- Bell, B. T., Lawton, R., & Dittmar, H. (2007). The impact of thin models in music videos on adolescent girls' body dissatisfaction. *Body Image, 4*, 137–145.
- Blond, A. (2008). Impacts of exposure to images of ideal bodies on male body dissatisfaction: A review. *Body Image, 5*, 244–250.
- Botta, R. A. (2003). For your health? The relationship between magazine reading and adolescents' body image and eating disturbances. *Sex Roles, 48*, 389–399.
- Brown, W. J., Basil, M. D., & Bocarnea, M. C. (2003). The influence of famous athletes on health beliefs and practices: Mark McGwire, child abuse prevention, and androstenedione. *Journal of Health Communication, 8*, 4–57.
- Clay, D., Vignoles, V. L., & Dittmar, H. (2005). Body image and self-esteem among adolescent girls: Testing the influence of sociocultural factors. *Journal of Research on Adolescence, 15*, 451–477.
- Crisp, R. J., & Turner, R. N. (2010). *Essential social psychology*. London, UK: Sage.
- Denham, B. E. (2006). Effects of mass communication on attitudes toward anabolic steroids: An analysis of high school seniors. *Journal of Drug Issues, 36*, 809–830.
- Denham, B. E. (2009). Determinants of anabolic-androgenic steroid risk perceptions in youth populations: A multivariate analysis. *Journal of Health and Social Behavior, 50*, 277–292.
- Duggan, S. J., & McCreary, D. R. (2004). Body image, eating disorders, and the drive for muscularity in gay and heterosexual men. *Journal of Homosexuality, 47*(3), 45–58.
- Elliot, D. L., Goldberg, L., Moe, E. L., DeFrancesco, C. A., Durham, M. B., & Hix-Small, H. (2004). Preventing substance use and disordered eating: Initial outcomes of the ATHENA (Athletes Targeting Healthy Exercise and Nutrition Alternatives) program. *Archives of Pediatric & Adolescent Medicine, 158*, 1043–1049.
- Elliot, D. L., Goldberg, L., Moe, E. L., DeFrancesco, C. A., Durham, M. B., McGinnis, W., & Lockwood, C. (2008). Long-term outcomes of the ATHENA (Athletes Targeting Healthy Exercise and Nutrition Alternatives) program for female high school athletes. *Journal of Alcohol and Drug Education, 52*, 73–92.
- Esco, M. R., Olson, M. S., & Williford, H. N. (2005). Muscle dysmorphia: An emerging body image concern in men. *Strength and Conditioning Journal, 27*(6), 76–79.
- Escobar-Chaves, S. L., & Anderson, C. A. (2008). Media and risky behaviors. *The Future of Children, 18*(1), 147–180.
- Farquhar, J. C., & Wasylikiw, L. (2007). Media images of men: Trends and consequences of body conceptualization. *Psychology of Men and Masculinity, 8*, 145–160.
- Field, A. E., Austin, S. B., Camargo, C. A., Taylor, C. B., Striegel-Moore, R. H., Loud, K. J., & Colditz, G. A. (2005). Exposure to the mass media, body shape concerns, and use of supplements to improve

- weight and shape among male and female adolescents. *Pediatrics*, *116*, 214–220.
- Fouts, G., & Burggraf, K. (1999). Television situation comedies: Female body images and verbal reinforcement. *Sex Roles*, *40*, 473–481.
- Frederick, D. A., Fessler, D. M., & Haselton, M. G. (2005). Do representations of male muscularity differ in men's and women's magazines? *Body Image*, *2*, 81–86.
- Goldberg, L., & Elliot, D. L. (2005). Preventing substance use among high school athletes. *Journal of Applied School Psychology*, *21*, 63–87.
- Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin*, *134*, 460–476.
- Green, S. P., & Pritchard, M. E. (2003). Predictors of body image dissatisfaction in adult men and women. *Social Behavior and Personality*, *31*, 215–222.
- Hall, R. C. (2005). Abuse of supraphysiologic doses of anabolic steroids. *Southern Medical Journal*, *98*, 550–555.
- Halliwell, E., Easun, A., & Harcourt, D. (2011). Body dissatisfaction: Can a short media literacy message reduce negative media exposure effects amongst adolescent girls? *British Journal of Health Psychology*, *16*, 396–403.
- Harrison, K. (2000). The body electric: Thin-ideal media and eating disorders in adolescents. *Journal of Communication*, *50*(3), 119–143.
- Harrison, K. (2003). Television viewers' ideal body proportions: The case of the curvaceously thin woman. *Sex Roles*, *48*, 255–264.
- Hatoum, I. J., & Belle, D. (2004). Mags and abs: Media consumption and bodily concerns in men. *Sex Roles*, *51*, 397–407.
- Hoberman, J. M. (2005). *Testosterone dreams: Rejuvenation, aphrodisia, doping*. Berkeley, CA: University of California Press.
- Hobza, C. L., & Rochlen, A. B. (2009). Gender role conflict, drive for muscularity, and the impact of ideal media portrayals on men. *Psychology of Men and Masculinity*, *10*, 120–130.
- Iriart, J. A. B., Chaves, J. C., & Orleans, R. G. (2009). Body cult and use of anabolic steroids by bodybuilders. *Cadernos de Saúde Pública*, *25*, 773–782.
- Irving, L. M., & Berel, S. R. (2001). Comparison of media-literacy programs to strengthen college women's resistance to media images. *Psychology of Women Quarterly*, *25*, 103–111.
- Jeong, S., Cho, H., & Hwang, Y. (2012). Media literacy interventions: A meta-analytic review. *Journal of Communication*, *62*, 454–472.
- Kartakoullis, N., Phellas, C., Pouloukas, S., Petrou, M., & Loizou, C. (2008). The use of anabolic steroids and other prohibited substances by gym enthusiasts in Cyprus. *International Review of the Sociology of Sports*, *43*, 271–287.
- Khraybani, I. F. (2008). *The relationship between body image and self-esteem among female and male adolescents in a school in Lebanon*. Unpublished master's thesis. American University of Beirut, Beirut, Lebanon.
- Labre, M. P. (2002). Adolescent boys and the muscular male body ideal. *Journal of Adolescent Health*, *30*, 233–242.
- López-Guimerà, G., Levine, M. P., Sánchez-Carracedo, D., & Fauquet, J. (2010). Influence of mass media on body image and eating disordered attitudes and behaviors in females: A review of effects and processes. *Media Psychology*, *13*, 387–416.
- McCreary, D. R., & Sasse, D. K. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *College Health*, *48*, 297–304.
- McIlhane, J. S. (2005). Problems and solutions associated with media consumption: The role of the practitioner. *Pediatrics*, *116*, 327–328.
- Melki, J. (2010). Media habits of MENA youth: A three-country survey. *Issam Fares Institute Working Paper Series 4*. Beirut, Lebanon: Issam Fares Institute for Public Policy and International Affairs, American University of Beirut.
- Melki, J. (2013). Sowing the seeds of digital and media literacy in Lebanon and the Arab world: The importance of a locally grown and sustainable curriculum. In B. De Abreu & P. Mihailidis (Eds.), *Media literacy education in action: Theoretical and pedagogical perspectives* (pp. 77–86). New York, NY: Routledge.
- Morrison, T. G., Kalin, R., & Morrison, M. A. (2004). Body image evaluation and body image investment among adolescents: A test of socio-cultural and social comparison theories. *Adolescence*, *39*, 571–592.
- Mousa, T. Y., Mashal, R. H., Al-Domi, H. A., & Jibril, M. A. (2010). Body image dissatisfaction among adolescent schoolgirls in Jordan. *Body Image*, *7*, 46–50.
- Nilsson, S., Spak, F., Marklund, B., Baigi, A., & Allebeck, P. (2001). Attitudes and behaviors with regards to androgenic anabolic steroids among male adolescents in a county of Sweden. *Substance Use Misuse*, *40*, 1–12.
- Olivardia, R., Pope, H. G., Jr., & Hudson, J. I. (2000). Muscle dysmorphia in male weightlifters: A case-control study. *American Journal of Psychiatry*, *157*, 1291–1296.
- Pope, H. G., Olivardia, R., Gruber, A., & Borowiecki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders*, *26*, 65–72.
- Pope, C. G., Pope, H. G., Menard, W., Fay, C., Olivardia, R., & Phillips, K. A. (2005). Clinical features of muscle dysmorphia among males with body dysmorphic disorder. *Body Image*, *2*, 395–400.
- Rachon, D., Pokrywka, L., & Suchecka-Rachon, K. (2006). Prevalence and risk factors of anabolic-androgenic steroids (AAS) abuse among adolescents and young adults in Poland. *Social and Preventive Medicine*, *51*, 392–398.
- Smolak, L., & Stein, J. A. (2006). The relationship of drive for muscularity to socio-cultural factors, self-esteem, physical attributes gender role, and social comparison in middle school boys. *Body Image*, *3*, 121–129.
- Smolak, L., Murnen, S. K., & Thompson, J. K. (2005). Socio-cultural influences and muscle building in adolescent boys. *Psychology of Men and Masculinity*, *6*, 227–239.
- Sturmi, J. E., & Diorio, D. J. (1998). Anabolic agents. *Clinics in Sports Medicine*, *17*, 261–282.
- Swamia, V., Steadman, L., & Tovee, M. J. (2009). A comparison of body size ideals, body dissatisfaction, and media influence between female track athletes, martial artists, and non-athletes. *Psychology of Sport and Exercise*, *10*, 609–614.
- Tahtamouni, L. H., Mustafa, N. H., Alfaouri, A. A., Hassan, I. M., Abdalla, M., & Yasin, S. R. (2008). Prevalence and risk factors for anabolic-androgenic steroid abuse among Jordanian collegiate students and athletes. *European Journal of Public Health*, *18*, 661–665.
- Thompson, J. K., Heinberg, L. J., & Altabe, M. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington, DC: American Psychological Association.
- UNESCO. (2005). *International convention against doping in sport 2005*. Retrieved from http://portal.unesco.org/en/ev.php-URL_ID=31037&URL_DO=DO_TOPIC&URL_SECTION=201.html
- Vartanian, L. R., Giant, C. L., & Passino, R. M. (2001). "Allly McBeal vs. Arnold Schwarzenegger": Comparing mass media, interpersonal feedback, and gender as predictors of satisfaction with body thinness and muscularity. *Social Behavior and Personality*, *29*, 711–724.
- Watson, R., & Vaughn, L. M. (2006). Limiting the effects of the media on body image: Does the length of a media literacy intervention make a difference? *Eating Disorders*, *14*, 385–400.
- Yates, B. L. (1999). Media literacy: A health education perspective. *Journal of Health Education*, *30*, 180–184.

APPENDIX: QUESTIONNAIRE FACTOR STRUCTURE ANALYSIS (ROTATED COMPONENT MATRIX)

	<i>Factor Identifications</i>	<i>Factors</i>			
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Read or look through beauty and fashion magazines	Exposure to feminine media ideals	.848			
Watch televised beauty and fashion programs		.828			
Read or look through women's magazines		.748			
Watch televised beauty contests		.732			
Watch wrestling/fighting	Exposure to masculine media ideals		.740		
Watch bodybuilding programs on TV			.719		
Read or look through bodybuilding magazines			.705		
Watch sports on TV			.575		
Read or look through men's magazines			.559		
Watching bodybuilding programs on TV makes me want to have bigger muscles	Perceiving media muscularity as incentive			.859	
Reading bodybuilding magazines makes me want to have bigger muscles				.854	
Reading fashion and beauty magazines makes me want to have bigger muscles				.755	
I think models in beauty and fashion magazines have perfect bodies	Idealizing and comparing to media muscularity				.645
I can tell if I am muscular enough by looking at the athletes on TV					.609
I compare my muscles to the muscles of athletes in magazines					.520
I think bodybuilders on TV have perfect bodies					.499
I believe most women prefer men who have big muscles					.405
Read or look through <i>Playboy/Playgirl</i> (or similar) magazines					.378

Note. Extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in five iterations.