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Exposure to Media Predicts Use of Dietary Supplements and Anabolic-Androgenic Steroids  
among Flemish Adolescent Boys

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### Abstract

This study examined whether different types of media affect the use of dietary proteins and amino acid supplements, and intent to use anabolic-androgenic steroids. A random sample of 618 boys aged 11-18 years from eight schools in the Flemish part of Belgium completed standardized questionnaires as part of the Media and Adolescent Health Study. The survey measured exposure to sports media, appearance-focused media, fitness media, use of dietary supplements and intent to use anabolic-androgenic steroids. Data were analyzed using logistic regressions and are presented as adjusted odds ratios (OR) and 95% confidence intervals (CI). 8.6% indicated to have used dietary proteins, 3.9% to have used amino acid supplements, and 11.8% would consider using anabolic-androgenic steroids. After adjusting for fitness activity, exposure to fitness media was associated with the use of dietary proteins (OR = 7.24, CI = 2.25 – 23.28) and amino acid supplements (5.16, 1.21 – 21.92; 44.30, 8.25 – 238). Intent to use anabolic-androgenic steroids was associated with exposure to fitness media (2.38, 1.08 – 5.26; 8.07, 2.55 – 25.53) and appearance-focused media (6.02, 1.40 – 25.82; 8.94, 1.78 – 44.98). Sports media did not correlate with the use of dietary supplements and intent to use anabolic-androgenic steroids. Specific types of media are strong predictors of the use of supplements in adolescent boys. This provides an opportunity for intervention and prevention through the selection of fitness media as a communication channel. Health practitioners should also be aware that the contemporary body culture exerts pressure not only on girls but also on boys.

**Keywords:** adolescent boys, dietary supplements, anabolic-androgenic steroids, appearance-focused media, sports media, fitness media

**List of Abbreviations**

OR	Odds Ratios
CI	Confidence Interval
DS	Dietary Supplements
AAS	Anabolic-Androgenic Steroids
BMI	Body Mass Index

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A substantial population of adolescent boys are involved in unhealthy practices to enhance sport performance and muscular appearance [8, 22, 24, 34]. Specific concerns have been raised regarding boys' use of dietary supplements (DS) and anabolic-androgenic steroids (AAS). Scholars [10] have argued that adolescent use of DS "in non-pharmacologic doses for the purpose of improving sports performance" (e.g., dietary proteins and amino acid supplements) [1] may lead to unpredictable physiological consequences and may act as a "stepping stone" to more harmful types of supplement use [16]. AAS, i.e., derivatives of testosterone used to increase muscle size and strength [2], have in adult populations [12, 28] been related to adverse effects on the liver, serum lipids and the reproductive [2] cardiovascular, and musculoskeletal systems [1]. Behavioral problems associated with AAS use are illicit drug use [3, 21, 27], smoking and alcohol consumption [3].

One in eight 12-to-18-year-old American boys reported the use of DS, such as protein shakes and amino acid supplements [13]. Mattila et al. [23] noted an increase in the use of dietary proteins, with 9% of adolescent boys reporting protein use in 1991 and 17% in 2005. Half a percent of adolescent boys in Europe [23] to 1.7% in the US [37] have used AAS in the past year, whereas the lifetime prevalence was observed to be 3% for Swedish 16- and 17-year-olds [26] and 4.8% for adolescent boys in the US [11].

It is important to identify the factors that may encourage the use of these products. Mass media have been criticized for promoting the use of DS and AAS among adolescents [32, 34]. However, only a few studies have reported relationships between media use and the use of products to improve appearance, muscle mass or strength [13], particularly AAS [22]. This research did not differentiate according to the type of media content; rather, it examined the relationship between overall mass-media exposure and supplement use. This study aims to

examine the relationship in more detail based on the hypothesis that the impact of media can differ depending on the type of media consumed.

One mechanism used to explain the influence of media on individuals' behaviors is the well-documented ability of media to alter the perceived social norm [4]. Media content that emphasizes the importance of an attractive appearance gradually attributes a normative status to attractiveness among those who are frequently exposed to these messages. In line with this mechanism, the emphasis on a male ideal of thinness and muscularity [35] in popular magazines [29] and television programs [14] has been shown to affect body-related norms and body satisfaction in adolescent boys [5], as well as their desire to use body-change strategies, such as supplement intake [30]. We therefore expect an effect of appearance-focused media on the use of supplements.

This mechanism has been shown to be stronger when the media content represents achievement and success [4]. This finding may explain why sports media could stimulate the use of DS and AAS, as media coverage of sports emphasizes the athletic, muscular ideal [18] and links it to an image of success reserved for the most physically fit [7]. Therefore, this study specifically evaluated the relationship between exposure to appearance-focused and sports media and the use of DS and AAS.

A different mechanism may hold for media that address exercising and muscle training. This type of media content not only focuses on physical training but also contains information about performance-enhancing products [32]. Studies have found that adolescents use these media to gather information regarding DS and AAS [31, 33]. As targeted information-seeking has been shown to exert an influence on health-related behaviors [25], adolescent boys' use of fitness media as an information source suggests that the consumption of these media may encourage the use of DS and AAS. This impact may be reinforced by the finding that the information offered by fitness media is often inaccurate and disregards the

associated risks of supplement use [32]; these media highlight the benefits and underexpose the disadvantages. Therefore, we expect to find that fitness media predict the use of DS and AAS.

## **Methods**

### **Subjects**

We used data from the Media and Adolescent Health Study. To ensure representation of different parts of Flanders, the Dutch-speaking part of Belgium, and of Flanders' different schooling levels, we targeted schools located in various regions and schools that provided diverse types of schooling [9]. Schools within target groups were randomly selected and contacted until the target sample of 500 respondents was assured. The size of the target sample was based on prior research [6]. Next, all seventh- and tenth-grade classes in the eight selected schools were visited during a regularly scheduled classroom period and asked to complete a structured pencil-and-paper questionnaire. The study was presented as an omnibus study on the leisure habits of youngsters. Respondents were informed that all answers would be treated anonymously. The study was approved by the ethics committee of the faculty (IRB) with which we are affiliated. Informed consent was obtained from the legal guardians of the children in the study.

Seven hundred eighty-five students were enrolled and had consent, but 167 students were sick or absent on the day of the study. The final sample size was thus 618 students. The mean age was 15.05 years ( $SD = 1.57$ ). Of the respondents' fathers, 2.6% has no degree, 40.7% completed elementary or high school education and 56.7% finished professional or academic college education; 2.1% of the mothers has no degree, 31.7% obtained an elementary or high school degree and 66.2% finished a professional or academic college education.

### **Measures**

**Exposure to sports media.** Respondents indicated on a 5-point scale how frequently they watched each of four popular sports programs on television (e.g., ‘The Sport News’), and how many times they visited sports websites and read sports magazines (e.g., ‘Sport Magazine’). Answers were scored as follows: *never* (1), *rarely* (2), *one to two times per month* (3), *one to two times per week* (4), and *(almost) every day* (5).

**Exposure to appearance-focused media.** Respondents indicated on a 5-point scale (*never* = 1; *(almost) every day* = 5) how frequently they watched music videos and 15 popular television shows that focused on appearance (e.g., ‘I Used to be Fat’), visited sex sites (i.e., sites with pictures or videos in which people have sex), and read celebrity magazines (e.g., ‘Story’), youth magazines (e.g., ‘Joepie’), men’s magazines (e.g., ‘Playboy’) and health magazines (e.g., ‘Men’s Health’). Those media [38, 20] have been shown to place strong visual emphasis on beauty ideals and can therefore be classified as appearance-focused media.

**Exposure to fitness media.** Participants indicated on a 5-point scale (*never* = 1; *almost every day* = 5) how often they visited fitness sites (i.e., sites with information about fitness) and read fitness magazines (e.g., ‘Health & Fitness’).

For each of these three exposure measures, the items were summed and divided by the total of the items. These estimates of exposure were again recoded into a categorical variable with five categories for the purpose of the analysis.

**Use of DS.** Participants were asked whether they had ever used dietary proteins and amino acid supplements to enhance their sport performance (*no* = 0; *yes* = 1).

**Intention to use AAS.** As AAS are illegal, participants were asked whether they *planned* to use AAS in the future (rather than whether they currently used or had used AAS). This item was measured using three response categories, i.e., *no* (0), *yes* (1) or *maybe* (2) but recoded into a dichotomous variable with two response categories, i.e., *no* (0) and *yes or maybe* (1), for the purpose of the analysis.



**Control variables.** Respondents answered questions regarding their age, educational level of their parents (*no degree* = 1; *elementary* = 2; *high school* = 3, *professional or academic college* = 4), weight, height and fitness activity (*no* = 0; *yes* = 1).

### Data analysis

Binary logistic regression analyses were used to predict DS and AAS use based on exposure to sports media, appearance-focused media and fitness media. Of the control variables (i.e., age, body mass index (BMI), education parents, fitness activity) only fitness activity significantly associated with all types of media exposure, DS use and intention to use AAS. As a result, the logistic regression analyses adjusted for adolescents' fitness activity.

In order to detect potential differences between schools, z-tests were run regarding the use of dietary proteins ( $z = .89$ ;  $p = .38$ ;  $\rho = 2\%$ ), amino acid supplements ( $z = 1.23$ ;  $p = .22$ ;  $\rho = 21\%$ ) and intention to use AAS ( $z = .52$ ;  $p = .61$ ;  $\rho = 3\%$ ). As this analyses showed that the cross-school variance was not significant, multilevel models were not further developed [19].

Analyses were performed using SPSS 20.0. All results reported were two-sided and differences at P-values of  $\leq .05$  were accepted as significant.

## Results

### Descriptive data

The average BMI was 20.22 ( $SD = 3.10$ ). One third of the participants (29.2%) engaged in fitness activity. The descriptive data regarding all types of media exposure, DS use and intention to use AAS are summarized in table 1.

[Table 1 about here]

### Media Exposure and DS Use

Table 2 shows the results of two binary logistic regression analyses predicting the use of dietary proteins and amino acid supplements. The model for dietary proteins showed that boys who used fitness media one to two times per month were more than seven times more

likely to have ever used dietary proteins than non-users of such media (OR: 7.24; 95% CI: 2.25 – 23.28). The model for amino acid supplements showed that boys who rarely used fitness media were approximately five times more likely to have ever used amino acid supplements than boys who never used fitness media (OR: 5.16; 95% CI: 1.21 – 21.92). Boys who used fitness media one to two times per month were more than 44 times more likely to have ever used amino acid supplements (OR: 44.30; 95% CI: 8.25 – 238). Exposure to sports and appearance-focused media was not related to the use of DS.

### **Media Exposure and Intention to Use AAS**

Table 2 shows that boys who rarely used appearance-focused media were six times more likely to consider the use of AAS (OR: 6.02; 95% CI: 1.40 – 25.82) than boys who never used those media. Additionally, boys who used appearance-focused media one to two times per month were almost nine times more likely to consider the use of AAS (OR: 8.94; 95% CI: 1.78 – 44.98). Furthermore, boys who rarely used fitness media were more than twice as likely to consider the use of AAS (OR: 2.38; 95% CI: 1.08 – 5.26) than boys who never used fitness-media. Boys who used fitness media one to two times per month were eight times more likely to consider the use of AAS (OR: 8.07; 95% CI: 2.55 – 25.53). Exposure to sports media was not related to the use of DS.

[Table 2 about here]

### **Discussion**

This study found support for the concern that adolescent boys use supplements to enhance performance in sports or to improve their appearance. Similar to the results of Field et al. [13] and Mattila et al. [23], our study found that 8.6% of the boys had ever used dietary proteins and that 3.9% had used amino acid supplements. In addition, 11.8% of the boys intended to use AAS. Adolescent boys' use of supplements is related to exposure to

appearance-focused media and fitness media. This study provides the first empirical evidence that this impact differs according to type of media.

Findings showed that boys who rarely used fitness media were approximately five times more likely to have ever used amino acid supplements and more than twice as likely to consider the use of AAS compared to boys who never used fitness media. Furthermore, compared to boys who never used fitness media, boys who used fitness media one to two times per month were approximately seven times more likely to have ever used dietary proteins, approximately 44 times more likely to have ever used amino acid supplements, and approximately eight times more likely to consider the use of AAS.

Only fitness content in the media was a consistent predictor for all supplements. There are at least two ways to interpret this finding. First, the explicit attention fitness media give to the use of performance-enhancing products directly encourages boys to use DS and AAS, perhaps in combination with the tendency of these media to underexpose the adverse consequences of supplement use. This interpretation suggests that prevention efforts and attempts at regulation could focus on fitness media. Prevention and/or regulation may be needed to reduce the amount of attention given to supplements in fitness media (both in editorial content and in advertising) and to balance the attention given to the expected, desired consequences of supplement use with explicit consideration of their harmful side effects. Second, the finding that exposure to fitness media is strongly associated with the use of supplements does not necessarily indicate a causal relationship. The use of performance-enhancing products may rather be part of a lifestyle that includes the use of fitness media [20, 23]. This interpretation, however, still implies that fitness media may be suitable communication channels for prevention purposes. Although fitness media may not be directly responsible for encouraging the use of these products, the present study at least demonstrates

that they may be used to reach (future) users of performance-enhancing products. This knowledge may prove valuable to organizations and governments planning prevention efforts.

Appearance-focused media are also related to the use of supplements. Boys who rarely used appearance-focused media or used it one to two times per month were six to nine times more likely to consider the use of AAS, which is the product most likely to be used for muscle development. This finding may have important implications. Whereas previous research [17] reported that appearance-focused media may lead to, for instance, disordered eating patterns in adolescent girls, this study supports the fairly recent understanding that such effects may not be restricted to girls. Western society, and mass media in particular, have been shown to consider male appearance standards as important cues for success in life or for sexual attractiveness [15]. Appearance worries and related appearance-modification behaviors, such as power-lifting and the use of beauty products have been found to be part of modern young men's lives [15, 36]. Although the present study does not allow causal statements, it seems to offer additional evidence that this body culture may be related to the use of AAS and suggests that this relationship is independent of the influence of fitness media and sports media. This finding indicates not only that a culture of attractiveness also exists in boys and that this culture is distinct from a culture of performance and physical achievement but also that society's emphasis on attractiveness can be part of a process that is at least related to harmful conduct among adolescent boys. It is important that educators, practitioners and organizations concerned with the well-being of young people fully understand this phenomenon.

The use of sports media was not a significant predictor in the present study. In spite of previous research that indicated the prominence in sports media of body ideals [18] and achievement and success [7], the use of supplements was not higher in boys who frequently consumed sports media. One explanation may be that sports media report extensively on the use of doping substances and tend to portray the use of these products as objectionable, a form

of cheating and even as criminal behavior. Such disapproving media reports may counterbalance the appealing image of physical strength and success. Although the findings of this study were strengthened by its focus on different types of media content, the study was limited in some respects. For example, because this study was cross-sectional, future experimental and longitudinal studies will be needed to explore the temporal and causal order of the impact of media exposure on supplement use. In addition, the study focused on dietary proteins and amino acid supplements, because previous research indicated that these supplements have been popular among adolescent boys [6, 23]. Future research should expand the variety of substances explored and examine the relationship between media exposure and other types of DS.

The purpose of this study was to gain a more detailed picture of the use of supplements and the influence of mass media thereon. To this end, we distinguished among three types of media and identified fitness media as a particularly strong predictor of the use of DS and AAS. We showed that there is an important difference between the indirect influence of media that attach importance to attractiveness and appearance and the more direct impact of media that provide relevant and affirmative information on supplements. The distinction among different types of content further revealed that the relationship between media and the use of supplements is not necessarily straightforward and causal. The findings point to processes embedded in a lifestyle or in a society-wide culture, which places the relationship between media and the use of supplements in another, more specific light.

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### **Conflict of interest**

The authors declare that there are no conflicts of interest.

### References

1. American Academy of Pediatrics, Committee on Sports Medicine and Fitness (2005) Use of performance-enhancing substances. *Pediatrics* 111:1103-1106. doi: 10.1542/peds.2005-0085
2. Bahrke MS, Yesalis CE (2004) Abuse of anabolic androgenic steroids and related substances in sport and exercise. *Curr Opin Pharmacol* 4:614-620. doi: 10.1016/j.coph.2004.05.006
3. Bahrke MS, Yesalis CE, Kopstein AN, Stephens, JA (2000) Risk factors associated with anabolic-androgenic steroid use among adolescents. *Sports Med* 29:397-405. doi: 10.2165/00007256-200029060-00003
4. Bandura A (2002) Social cognitive theory of mass communication. In: Bryant J, Zillmann D (eds) *Media effects: Advances in theory and research*. Lawrence Erlbaum, Hillsdale, New Jersey, pp 121-153
5. Bartlett CP, Vowels CL, Saucier DA (2008) Meta-analyses of the effect of media images on men's body-image concerns. *J Soc Clin Psychol* 27:279-310. doi: 10.1521/jscp.2008.27.3.279
6. Bell A, Dorsch KD, McCreary DR, Hovey R (2004) A look at nutritional supplement use in adolescents. *J Adolesc Health* 34:508-516. doi: 10.1016/j.jadohealth.2003.07.024
7. Bissell KL, Zhou P (2006) Must-see TV or ESPN: Entertainment and sports media exposure and body-image distortion in college women. *J Commun* 54:5-21. doi: 10.1111/j.1460-2466.2004.tb02610.x
8. Cafri G, Thompson JK, Ricciardelli L, McCabe M, Smolak L, Yesalis C (2005) Pursuit of the muscular ideal: Physical and psychological consequences and putative risk factors. *Clin Psychol Rev* 25:215-239. doi: 10.1016/j.cpr.2004.09.003

9. Department of Education, Flanders, Belgium (2012) Education in Flanders. <http://www.ond.vlaanderen.be/onderwijsaanbod>. Accessed 1 October 2012.
10. Dorsch KD, Bell A (2005) Dietary supplement use in adolescents. *Current Opinion in Pediatrics* 17:653-657. doi: 00008480-200510000-00017
11. Eaton DK, Kann L, Kinchen S, Ross J, Hawkins J, Harris WA, Lowry R, McManus T, Chyen D, Shanklin S, Lim C, Grunbaum J, Wechsler H (2005) Youth risk behavior surveillance: United States, 2005. *MMWR Surveill Summ* 55:1-108. doi: 10.1111/j.1746-1561.2006.00127.x
12. Evans NA (2004) Current concepts in anabolic-androgenic steroids. *Am J Sports Med* 32:534-542. doi: 10.1111/j.1746-1561.2006.00127.x
13. Field AE, Austin SB, Camargo CA, Taylor CB, Striegel-Moore RH, Loud KH, Colditz GA (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. doi: 10.1542/peds.2004-2022
14. Fouts G, Vaughan K (2000) Television situation comedies: Male weight, negative references, and audience reactions. *Sex Roles* 46:439-442. doi: 10.1023/A:1020469715532
15. Frederick DA, Buchanan, GM, Sadehghi-Azar L, Peplau LA, Haselton MG, Berezovskaya A, Lipinski RE (2007) Desiring the muscular ideal: Men's body satisfaction in the United States, Ukraine, and Ghana. *Psychol Men Masculinity* 8:103-117. doi: 0.1037/1524-9220.8.2.103
16. Green GA, Catlin DH, Starcevic B (2001) Analysis of over-the-counter dietary supplements. *Clin J Sport Med* 11:254-259. doi: 00042752-200110000-00008
17. Harrison K (2000) The body electric: Thin-ideal media and eating disorders in adolescents. *J Commun* 50:119-143. doi: 10.1111/j.1460-2466.2000.tb02856.x

18. Harrison K, Fredrickson BL (2011) Women's sports media and self-objectification in adolescent girls. The International Communication Association, Washington, DC.
19. Heck RH, Thomas SL, Tabata LN (2012) Multilevel modeling of categorical outcomes using IMB SPSS. Routledge, New York
20. Heider D, Harp D (2002) New hope or old power: Democracy, pornography and the Internet. *Howard J Commun* 13:285-299. doi: 10.1080/10646170216119
21. Kokkevi A, Fotiou A, Chileva A, Nociar A, Miller P (2008) Daily exercise and anabolic steroids in adolescents: A cross-sectional European study. *Subst Use Misuse* 43:2053-2065. doi:10.1080/10826080802279342
22. Martinsen M, Bratland-Sanda S, Eriksson AK, Sundgot-Borgen J (2010) Dieting to win or to be thin? A study of dieting and disordered eating among adolescents elite athletes and non-athlete controls. *Br J Sports Med* 44:70-76. doi: 10.1136/bjism.2009.068668
23. Mattila VM, Parkkari J, Laakso L, Pihlajamäki H, Rimpelä A (2009) Use of dietary supplements and anabolic-androgenic steroids among Finnish adolescents in 1991-2005. *Eur J Public Health* 20:306-311. doi: 10.1093/eurpub/ckp124
24. McCreary D (2007) The drive for muscularity. In: Thompson JK & Cafri G (eds) *The muscular ideal: Psychological, social, and medical perspectives*. American Psychological Association, Washington, pp 87-106
25. Niederdeppe J, Hornik R, Kelly B, Frosch L, Romantan A, Stevens RS, Barg FK, Weiner JL, Schwartz JS (2007) Examining the dimensions of cancer-related information seeking and scanning behavior. *Health Commun* 22:153-167. doi: 10.1080/10410230701454189



26. Nilsson S, Baigi A, Marklund B, Fridlund, B (2001) The prevalence of the use of androgenic anabolic steroids by adolescents in a country of Sweden. *Eur J Public Health* 11:195-197. doi: 10.1093/eurpub/11.2.195
27. Pallesen S, Josendal O, Johnson BH, Larse S, Molde H (2006) Anabolic steroid use in high school students. *Subst Use Misuse* 41:1705-1717. doi: 10.1080/10826080601006367
28. Pope HG Jr, Katz DL (1994) Psychiatric and medical effects of anabolic-androgenic steroid use. A controlled study of 160 athletes. *Arch Gen Psychiatry* 51:375-582. doi: 10.1001/archpsyc.1994.03950050035004
29. Ricciardelli L, Clow KA, White P (2010) Investigating hegemonic masculinity: Portrayals of masculinity in men's lifestyle magazines. *Sex Roles* 63:64-78.
30. Ricciardelli L, McCabe M (2003) Sociocultural and individual influences on muscle gain and weight loss strategies among adolescent boys and girls. *Psychol Schools* 40:209-224. doi: 10.1007/s11199-010-9764-8
31. Rowe S, Toner D (2003) Dietary supplement use in women: The role of the media. *The J Nutr* 133:2008s-2009s.
32. Shaw P, Zhang V, Metallinos-Katsaras, E (2009) A content analysis of the quantity and accuracy of dietary supplement information found in magazines with high adolescent readership. *J Altern Complement Med* 15:159-164. doi: 10.1089/acm.2008.0323
33. Smith J, Dahm DL (2000) Creatine use among a select population of high school athletes. *Mayo Clin Proc* 75:1257-1263. doi: 10.4065/75.12.1257
34. Smolak L, Murnen S, Thompson JK (2005) Sociocultural influences and muscle building in adolescent boys. *Psychol Men Masculinity* 6:227-239. doi: 10.1037/1524-9220.6.4.227

35. Spitzer BL, Henderson KA, Zivian MT (1999) Gender differences in population versus media body sizes: A comparison over four decades. *Sex Roles* 40:545-565. doi: 10.1023/A:1018836029738
36. Strelan P, Hargreaves, D (2005) Reasons for exercise and body esteem: Men's responses to self-objectification. *Sex Roles* 53:495-503. doi: 10.1007/s11199-005-7137-5
37. van den Berg P, Neumark-Sztainer D, Cafri G, Wall M (2007) Steroid use among adolescents: Longitudinal findings from project EAT. *Pediatrics* 119:476-486. doi: 10.1542/peds.2006-2529
38. Vandebosch L, Vervloessem D, Eggermont S (2013) "I might get your heart racing in my skin-tight jeans": Sexualization on music entertainment television. *Communication Studies* 64:178-194. 10.1080/10510974.2012.755640

Table 1

*Distribution of media exposure, use of dietary proteins and amino acid supplements and intent to use anabolic-androgenic steroids*

	% ( <i>n</i> )
<b>Exposure to sports media</b>	
Never	25.8 (139)
Rarely	31.5 (170)
One to two times per month	24.5 (132)
One to two times per week	15.8 (85)
(almost) every day	2.4 (13)
<b>Exposure to appearance-focused media</b>	
Never	22.4 (116)
Rarely	67.7 (351)
One to two times per month	9.8 (51)
One to two times per week	0.2 (1)
<b>Exposure to fitness media</b>	
Never	78.6 (456)
Rarely	15.2 (88)
One to two times per month	5.3 (31)
One to two times per week	0.9 (5)
Ever used dietary proteins (powder or shakes)	8.6 (53)
Ever used amino acid supplements	3.9 (24)
Intent to use anabolic-androgenic steroids	11.8 (73)

*n* = number of respondents

Table 2

*Predictors of the use of dietary proteins and amino acid supplements and intent to use anabolic-androgenic steroids*

	OR (95% CI) for dietary protein use	OR (95% CI) for amino acid supplement use	OR (95% CI) for intent to use anabolic- androgenic steroids
Fitness activity			
No			
Yes	1.0 (referent)	1.0 (referent)	1.0 (referent)
	5.69 (2.55-12.69)**	23.23 (2.82-191.31)*	.74 (.35-1.54)
Exposure to sports media			
Never	1.0 (referent)	1.0 (referent)	1.0 (referent)
Rarely	1.43 (.48-4.19)	.54 (.09-3.38)	2.42 (.84-6.95)
One to two times per month	1.41 (.45-4.38)	1.01(.18-6.37)	1.93 (.63-5.95)
On to two times per week	1.17 (.34-4.38)	.29 (.04-2.35)	2.07 (.65-6.56)
(almost) everyday	2.69 (.34-20.96)	.00 (.00)	5.93 (1.14-30.79)
Exposure to appearance-focused media			
Never	1.0 (referent)	1.0 (referent)	1.0 (referent)
Rarely	1.08 (.40-2.94)	.90 (.18-4.43)	6.02 (1.40-25.85)*
One to two times per month	.70 (.17-2.86)	.63 (.07-5.39)	8.94 (1.78-44.98)**
One to two times per week	.00 (.00)	.00 (.00)	.00 (.00)
Exposure to fitness media			
Never	1.0 (referent)	(1.0) (referent)	(1.0) (referent)
Rarely	2.06 (.87-4.90)	5.16 (1.22-21.92)*	2.38 (1.08-5.26)*
One to two times per month	7.24 (2.25-23.28)**	44.30 (8.25-238)**	8.07 (2.55-25.53)**
On to two times per week	.00 (.00)	.00 (.00)	.00 (.00)

All models were adjusted for fitness activity; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$