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# Heterosexual women rate perceived anabolic steroid-using men as less attractive for long-term romantic relationships

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## ABSTRACT

**Background:** Physical attractiveness is a major motive for anabolic-androgenic steroid (AAS) use. Since majority of AAS users are men, we investigated heterosexual women's ratings of the physical, sexual and romantic attractiveness of AAS-using and non-using men.

**Methods:** A sample of 112 AAS-non-using heterosexual women (age range: 15–81,  $M = 29.61$  years) was randomized to two independent conditions: food ( $n = 50$ ) and AAS ( $n = 62$ ). After exposure to a vignette (varied in AAS use or food consumption) and the target image of a moderately muscular man (same across conditions), participants in both conditions rated their respective target on physical, short-term sexual, and long-term romantic attractiveness. We compared ratings of the two targets using an independent  $t$ -test.

**Results:** Compared to the non-using target, the AAS-using target received lower ratings ( $t = -2.61, p < .05$ , Cohen's  $d = 0.50$ ) on long-term romantic attractiveness.

**Conclusion:** Heterosexual women rate perceived AAS-using men as less attractive for long-term romantic relationships. Preventive and harm reduction interventions may benefit from highlighting this finding.

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Anabolic-androgenic steroids; attractiveness; mate preference; romantic relationship; sexual relationship

## Introduction

A major motive for anabolic-androgenic steroid (AAS) use is physical and romantic or sexual attractiveness (Sagoe, Pallesen, & Andreassen, 2014). Persons with such motive, referred to as esthetic (Evans-Brown & McVeigh, 2008), body image (Enaker, 2013), or cosmetic (Evans-Brown et al., 2012) users mainly use AAS to enhance their appearance or body image and attract potential partners. In one study, esthetic or cosmetic AAS use “... increased and enhanced [users'] confidence and love life, as they claimed having a defined, muscular physique allowed them to meet and have sexual relations with more partners” (Petrocelli et al., 2008, p. 1194). Since men comprise the majority of AAS users (Sagoe et al., 2014; Sagoe & Pallesen, 2018), it is important to understand heterosexual women's evaluations of the attractiveness of AAS-using men. However, to our knowledge, no previous study has been conducted on this topic. We therefore conducted an experimental study of how heterosexual women evaluate the physical, sexual and romantic attractiveness of AAS-using men. Observers negatively construe the personality and social image of perceived AAS users (Chantal et al., 2013, 2009; Griffiths et al., 2016; Sagoe et al., 2016; Schwerin & Corcoran, 1992, 1996; Van Raalte et al., 1993; Yu et al., 2015). Accordingly, we hypothesized that the perceived AAS-using target will receive lower ratings on physical, short-term sexual, and long-term romantic attractiveness compared to the non-using target.

## Methods

### Participants

The sample consisted of 112 AAS non-using heterosexual women. Their ages ranged from 15 to 81 ( $M = 29.61$ ,  $SD = 11.02$ ) years. We randomized them to two different conditions: food ( $n = 50$ ) and AAS ( $n = 62$ ). Other participant characteristics are presented in Table 1.

### Measures

#### Demographics

Our questionnaire assessed participants' age, sex, marital status, highest education, and sexual orientation (Kinsey Scale; Kinsey et al., 1948).

#### Vignette

The following vignette (Sagoe et al., 2016, 2017) was presented in both conditions with differences only in what was consumed by N the protagonist: “*The alarm clock rang. N put it in a 5-minute snooze. He repeated this six times before getting up. He showered, ate breakfast and got ready to go to the reading hall. At the bus stop he met a fellow student. N said hello to his fellow student and began a lively conversation with him. The bus arrived and N entered. After a few stops, a man with a big dog got onto the bus. N noticed that the sight of the big dog gave him some palpitations and discomfort. When the bus stopped at the reading hall, there was a lady with a pram*

**Table 1.** Participants' characteristics ( $N = 112$ ) and ratings of the food and AAS targets.

Variable	N (%)	Food	AAS
		( $n = 50$ )	( $n = 62$ )
		$n$ (%)	$n$ (%)
<b>Participant characteristics</b>			
<b>Relationship status</b>			
Married/cohabitant/partner/girlfriend	61 (54.50)	25 (50.00)	36 (58.10)
Single/divorced/separated/widow	51 (45.50)	25 (50.00)	26 (41.90)
<b>Sexual orientation (Kinsey Scale)<sup>‡</sup></b>			
Predominantly heterosexual, incidentally homosexual	87 (77.70)	39 (78.00)	48 (77.40)
Predominantly heterosexual, but more than incidentally homosexual	15 (13.40)	6 (12.00)	9 (14.50)
Equal heterosexual and homosexual	8 (7.10)	4 (8.00)	4 (6.50)
Predominantly homosexual, but more than incidentally heterosexual	2 (1.80)	1 (2.00)	1 (1.60)
<b>Highest education</b>			
Basic school	8 (7.10)	3 (6.00)	5 (8.10)
High school	26 (23.20)	11 (22.00)	15 (24.20)
Vocational	3 (2.70)	3 (6.00)	0 (0.00)
Bachelor or equivalent	43 (38.40)	20 (40.00)	23 (37.10)
Master or equivalent	27 (24.10)	11 (22.00)	16 (25.80)
Doctorate/PhD	4 (3.60)	2 (4.00)	2 (3.20)
Other	1 (0.90)	0 (0.00)	1 (1.60)
	Range	$M$ ( $SD$ )	$M$ ( $SD$ )
Age	15–81	30.10 (12.31)	29.21 (9.95)
Physical attractiveness	1–5	3.46 (0.91)	3.23 (1.02)
<b>Target ratings</b>			
Physical attractiveness	1–7	4.94 (1.04)	4.60 (0.98)
Short-term sexual attractiveness	1–7	2.94 (1.89)	2.66 (1.89)
Long-term romantic attractiveness	1–7	<b>2.92</b> (1.66)	<b>2.15</b> (1.42)

<sup>‡</sup>Kinsey et al. (1948).

\* $p = .010$ .

next to N. N did not offer to help her off the bus with the pram, and hurried instead off. When N finally came to the reading hall, he sat down at his usual place. He had sorted textbooks and notes in a neat and tidy order on the shelf in front of him. At 12:00, N went for a lecture. The lecture was about various complicated theories, but N followed closely nevertheless. When N returned to the dormitory the afternoon, one of those he lived with started to clean the kitchen. Despite the fact that it actually was this person's turn to be in charge of the kitchen, N helped still with the cleanup. N enjoyed working out and he later packed his training bag with what he needed to work out in the fitness center. Prior to this, he took [food (1st condition), anabolic steroid (2nd condition)]. He chose the shortcut across the cemetery on the way to training, even though it was dark and the cemetery was poorly lit. This did not bother him. On his way into the gym, he noticed some posters that were put up there for some courses in creativity. N had no interest and did not read the posters further. He then entered the fitness center and trained. After returning home from training, N went through his usual evening routine and went to bed".

### Target's image

The image of N presented with the vignette was a young moderately muscular Caucasian man (see supplemental file 1). The image was obtained from a bodybuilding website.

### Physical attractiveness

Participants provided ratings of their personal physical attractiveness on a scale ranging from 1 (less attractive than average) to 5 (more attractive than average). In addition, they provided ratings of the physical attractiveness of the target on a scale ranging from 1 (less attractive than average) to 7 (more attractive than average).

### Sexual and romantic attractiveness

Participants indicated their preference for a short-term sexual relationship (e.g., one-night-stand, friends with benefits) with the target on a scale ranging from 1 (unlikely) to 7 (very likely). They also indicated their preference for a long-term romantic relationship (e.g., girlfriend, cohabitant, marriage) with the target on a scale ranging from 1 (unlikely) to 7 (very likely).

### Procedure

Recruitment of participants was via posts on social media. A URL redirection link in the social media posts consecutively randomized prospective participants to one of the two questionnaire sets. In each questionnaire set, the first page briefly presented information about the study and instructions for completing the questionnaire. Next, participants were presented the image of the target (same) and the relevant vignette adjusted only by food (1st condition) or AAS (2nd condition). Participants then completed the other study measures. Each participant responded to only one of the conditions thereby yielding two independent groups. The questionnaire was available in Google Forms (Google Inc.) from March 6 to March 21, 2019.

### Statistical analysis

For power analysis, setting alpha to .05, power to .70, and Cohen's  $d$  to 0.50, at least 39 participants were required in each condition in order to detect significant effects. The inclusion criteria for the study was that participants: a) be female, and b) have a degree of heterosexual orientation [score 0 (exclusively heterosexual) to 5 (predominantly homosexual, incidentally heterosexual) on the Kinsey scale; Kinsey, Pomeroy, & Martin, 1948]. We used descriptive statistics to explore sample characteristics, and an independent t-test to compare ratings of the two targets on physical, short-term sexual and long-term romantic attractiveness of the target. The power analysis was conducted using G\*Power 3 (Faul et al., 2009) and the statistical analysis using SPSS version 25 (IBM Corp.).

### Results

There was no significant difference in participant characteristics across conditions (see Table 1). Results of the comparison of participants' ratings indicated no between-group differences in participants' self-rated physical attractiveness ( $t = -1.29$ ,  $p = .201$ ) or physical attractiveness ratings for targets ( $t = -1.78$ ,  $p = .076$ ). Additionally, no difference was observed ( $t = -0.78$ ,  $p = .439$ ) in participants' ratings of the short-term sexual attractiveness of the food and AAS targets. However, on long-term romantic attractiveness, there was a higher rating ( $t = -2.61$ ,  $p < .05$ ) of the food target

( $M = 2.92$ ,  $SD = 1.66$ ) compared to the AAS target ( $M = 2.15$ ,  $SD = 1.42$ ) with a medium effect size (Cohen's  $d = 0.50$ ).

## Discussion

We conducted an experimental investigation of how heterosexual women evaluate the physical, sexual and romantic attractiveness of AAS-using and non-using men. Although no difference was observed in ratings of the physical and short-term sexual attractiveness of the AAS-using and non-using targets, our sample of heterosexual women rated the AAS-using target as less attractive for long-term romantic relationships. The latter finding, consistent with our hypothesis, is in line with previous results indicating the debilitating effect of observers' perceived AAS use on the construal of the personality and social image of AAS users (Chantal et al., 2013; Griffiths et al., 2016; Sagoe et al., 2016; Yu et al., 2015). The disapproval and illegalization of AAS use in Norway (Breivik et al., 2009; Pallesen et al., 2014) are plausible explanations for the present finding. Interventions against AAS use and doping are largely in sporting contexts and there is a lack of such interventions in the general population (Bates et al., 2017). Additionally, AAS use and related interventions that emphasize social disapproval may be beneficial in preventing AAS use and doping (Petróczi et al., 2014). Hence, preventive and harm reduction interventions may benefit from highlighting the enervating effect of men's AAS use on their long-term romantic attractiveness in a heterosexual context.

To our knowledge, this is the first experimental study on heterosexual women's evaluations of the physical as well as sexual and romantic attractiveness of AAS-using and non-using men. Although multiple factors such as education, intelligence, personality and ideology (Furnham, 2009), complimentary language (Gao et al., 2017), wealth and status (Barrett et al., 2002) influence men's physical attractiveness and sexual selection to heterosexual women, our study highlights the enervating effect of perceived AAS use in a heterosexual context. Additionally, participants in the present experiment were AAS-non-using heterosexual women and the target image was of a young moderately muscular Caucasian man. Hence, results may not be generalizable to AAS-using gay men and other ethnic-racial groups. It is also important to replicate the present experiment using a female target and a heterosexual male sample, and samples of AAS-using men and women. Replications of the present study are also warranted in non-Western cultural contexts, and jurisdictions where AAS use is decriminalized.

## Disclosure of potential conflict of interest

The authors report no conflicts of interest.

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