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Anabolic steroid use and body image psychopathology in men: Delineating between appearance- versus performance-driven motivations

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ABSTRACT

Objective: Anabolic androgenic steroid (AAS) use has been robustly associated with negative body image, and eating- and muscularity-oriented psychopathology. However, with AAS being increasingly utilized for both appearance and athletic performance-related purposes, we investigated whether comorbid body image psychopathology varies as a function of motivation for usage.

Method: Self-reported motivation for current and initial AAS use was recorded amongst 122 AAS using males, alongside measures of current disordered eating and muscle dysmorphia psychopathology.

Results: Those reporting AAS for appearance purposes reported greater overall eating disorder psychopathology, $F(2, 118) = 7.45, p = 0.001, \eta_p^2 = 0.11$, and muscle dysmorphia psychopathology, $F(2, 118) = 7.22, p < 0.001, \eta_p^2 = 0.11$, than those using AAS primarily for performance purposes. Additionally, greater dietary restraint, $F(2, 116) = 3.61, p = 0.030, \eta_p^2 = 0.06$, functional impairment, $F(2, 118) = 3.26, p = 0.042, \eta_p^2 = 0.05$, and drive for size, $F(2, 118) = 10.76, p < 0.001, \eta_p^2 = 0.15$, was demonstrated in those using AAS for appearance purposes.

Discussion: Motivation for AAS use may be important in accounting for differential profiles of body image psychopathology amongst users. Men whose AAS use is driven primarily by appearance-related concerns may be a particularly dysfunctional subgroup.

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1. Introduction

Anabolic-androgenic steroids (AAS) are a group of drugs, including testosterone and synthetic derivatives, that increases the synthesis of protein and promote the development of secondary male sex characteristics. Chronic use of AAS is associated with cardiovascular, endocrine, metabolic, neurologic, psychiatric, infectious, hepatic, renal, and musculoskeletal disorders, as well as early mortality (Kanayama et al., 2009; Pope et al., 2014). There is now well-recognized evidence linking AAS use to long-term risk of dyslipidemia, cardiomyopathy, major mood disorders, aggression,

violence, and AAS dependence (e.g., Pope et al., 2014; Kanayama et al., 2008; Thiblin et al., 2015). Estimates indicate that between 2.9% and 4% of Americans have used AAS at some point in their lives, nearly double the rate of heroin use, and boys and men are much more likely to use AAS compared to girls and women (e.g., Pope et al., 2014). Dependence is also common, with 23% to 57% of individuals who used subsequently developing AAS dependence (Kanayama et al., 2008).

Motivations to use AAS, however, differ from motivations for use of other substances, as appearance and performance motivations, versus desires for intoxication, are the most common reasons for use (Cohen et al., 2007; Parkinson and Evans, 2006). For example, in a sample of 500 men who use AAS, increasing muscle mass, improving physical appearance, and increasing strength were rated as the top three motivations for AAS use (Ip et al., 2011). These results largely mirror those found in a sample of nearly 2000 men who

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use AAS, who also identified increasing muscle mass, increasing strength, and looking good, as the top three motivations for use (Cohen et al., 2007). These findings suggest that most men who use AAS are likely doing so to enhance appearance (e.g., muscularity), performance (e.g., strength), or both.

Negative body image is a primary risk factor for AAS use (Field et al., 2014; Van den Berg et al., 2007; Cafri et al., 2006; Kanayama et al., 2006; Riciardelli and McCabe, 2004). For example, Cafri et al. (2006) found that a desire for increased muscularity was significantly associated with AAS use among young adult men. Recently, Jampel et al. (2016) found that perceiving oneself as either very underweight or very overweight was associated with AAS use, suggesting that males who use AAS may do so to gain muscularity and/or reduce body fat. Relatedly, among men who use AAS, many report decreasing fat to be an important motivation (Ip et al., 2011; Cohen et al., 2007). These findings are consistent with sociocultural theories, suggesting that internalization of largely unattainable body image ideals may drive AAS use among men (McCreary et al., 2007; Parent and Moradi, 2011). The internalization of this masculine, muscular ideal may lead to shame in one's own appearance, which may be manifested in pathological eating and exercise behaviors, including symptoms of eating disorders (EDs; such as anorexia and bulimia nervosa) and muscle dysmorphia (MD). Indeed, in a recent cross-sectional cohort study of male weightlifters, ED pathology (e.g., drive for thinness, symptoms of bulimia, body dissatisfaction), and elevated symptoms of MD were strongly predictive of AAS use (Pope et al., 2012).

To our knowledge, no study has examined ED pathology and symptoms of MD among men who use AAS as a function of AAS motivations. Given that changing appearance and improving performance appear to be the primary motivations for AAS use, it would be of interest to consider whether and to what extent associations with EDs and related psychopathology might differ as a function of which of these different motivations is predominant. The goal of the current study was to address this issue by examining associations between motivations for AAS use and the occurrence of EDs and related pathology in a sample of males reporting current or recent AAS use. We hypothesized that men who state their motivation for AAS use relates primarily to concerns about appearance would report greater ED and MD symptoms compared to men who primarily use AAS for performance reasons.

2. Methods

2.1. Participants

Participants were 122 males who self-reported current or recent AAS use. Recruitment occurred through specialist needle exchange centers in which clean needles were obtained for self-administered AAS injections ($n=46$), and in bodybuilding gymnasiums ($n=76$), in the north of England. Sensitivity analyses revealed no significant differences in MD or ED psychopathology (including all subscale and total/global scores), or in age or lifetime duration of anabolic steroid use, between participants recruited from specialist needle exchanges and participants recruited from bodybuilding gymnasiums (all p 's > 0.05), allowing the conflation of recruitment sites. All participants responded to study advertisements, which were placed in gymnasiums or needle exchange centers and referred to an anonymous study of body image and steroid use. Once informed consent was obtained, a series of self-report questionnaires were completed. Ethical approval for this study was granted by the University of California, San Francisco.

Participants' ages ranged from 17 to 48 years with a mean of 29.38 years ($SD=7.11$). Most participants (83.6%) identified as being heterosexual, 3.3% identified as being gay/bisexual, while 13.1% did

not indicate their sexual orientation. Participants' total duration of AAS use ranged from less than 1 year to 36 years with a mean of 4.64 years ($SD=6.19$) and a median of 2 years. Participants were also asked how long it had been since they had last used AAS, with recent AAS use operationalized as having used steroids within the past 365 days (1 year). This broad catchment area for defining recent use was intended to accommodate the discontinuous nature of ongoing AAS use, which is characterized by intermittent 'cycling on' and 'cycling off' in attempting to mitigate the medical risks of continuous AAS use (Casavant et al., 2007; Cohen et al., 2007). Two participants who reported that they had last used steroids more than 365 days ago were excluded on the basis that they were not recently using AAS. Subsequently, participants' responses ranged from less than 1 day ago (implying that had used AAS earlier that day) to 365 days ago with a mean of 30.55 days ($SD=71.67$) and a median of 4 days.

2.2. Measures

2.2.1. Androgenic anabolic steroid use. Participants' motivation for AAS use was assessed via three forced-choice items in which participants were asked to indicate whether their current and initial AAS use was undertaken primarily for: (i) appearance purposes; (ii) athletic performance purposes; or (iii) both appearance and athletic performance purposes. Participants were also asked to indicate the duration of their AAS use, and their most recent dose.

2.2.2. Muscle Dysmorphia Disorder Inventory (MDDI). The MDDI (Hildebrandt et al., 2004) is a 13-item measure that indexes the core aspects of MD symptomatology, including the drive for size, appearance intolerance, and functional impairment. All items are designed to correspond to the proposed diagnostic criteria for MD, and the MDDI yields strong psychometric properties (Hildebrandt et al., 2004). In the present study, the MDDI demonstrated adequate internal consistency (Cronbach's α range across subscales = 0.84 to 0.90).

2.2.3. Eating Disorder Examination-Questionnaire (EDE-Q). The EDE-Q (Fairburn and Beglin, 1994) is a widely-used, 36-item, self-report measure designed to assess the occurrence and frequency of key attitudinal and behavioral components of ED psychopathology over the previous 28 days; namely dietary restraint, eating concern, weight concern and shape concern. A global score indicating overall levels of ED pathology is derived from the 22 items assessing core attitudinal features and this score has been found to have strong psychometric properties in both community and clinical samples of adolescent and young adult women (Mond et al., 2004). However, the EDE-Q, which was designed and validated in samples of female ED patients, may lack sensitivity in indexing ED psychopathology in males, particularly as applied to muscularity- rather than thinness-oriented concerns and associated behaviors (Murray et al., 2010, 2016). In the current study, this limitation was addressed by reversing the polarity of certain gender specific items of the EDE-Q, as has been outlined in previous research addressing male ED psychopathology (Murray et al., 2012). For example, the item "Have you had a definite fear that you might gain weight or become fat" was amended to read "Have you had a definite fear that you might lose weight or become not muscular enough" (Murray et al., 2012). In the present study, the modified EDE-Q demonstrated adequate internal consistency (Cronbach's α range across subscales = 0.74 to 0.88).

2.3. Statistical analyses

The normality of the data were established by calculating Z-scores for kurtosis and skewness statistics and checking them for

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