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The Stigma of Anabolic Steroid Use

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Abstract

Little is known about the stigma of anabolic steroid use despite clear implications for treatment-seekers and for public policy development. We investigated the predictors of steroid stigma and contextualized the results by comparing steroids with marijuana. Undergraduates (N = 304) completed measures of drug stigma, exposure to drug users, and history of drug use. Participants stigmatized steroid use more than marijuana use—a very large effect. Participants reported less exposure to steroid users. Nevertheless, 15% of participants reported having a steroid-using friend. History of drug use, but not exposure to steroid users, predicted lower steroid stigma. Drug use and exposure both predicted lower marijuana use stigma. The amount of stigma expressed toward steroids is commensurate with that of "hard" drugs, such as heroin, likely constituting a formidable barrier to treatment. The public's difficulty empathizing with male body image insecurities may partially explain why exposure to steroid users did not predict lower stigmatization.

Keywords

steroids, anabolic steroids, steroid stigma, marijuana, marijuana stigma, illicit drugs, illicit drug stigma, substances stigma

Introduction

Anabolic steroids are illicit drugs used to enhance muscle development and exercise performance. Prolonged use of anabolic steroids has been linked with numerous adverse physical and psychological outcomes, including damage to the cardiovascular system, neuroendocrine system, and to cognition (D'Andrea et al., 2007; Far, Ågren, & Thiblin, 2011; Griffiths, Murray, Mitchison, & Mond, 2016; Kanayama, Hudson, & Pope, 2012; Kanayama, Kean, Hudson, & Pope, 2013; Santora et al., 2006). Anabolic steroid use has also been implicated in the etiology and maintenance of muscle dysmorphia (Rohman, 2009) and forms the basis for a recently proposed psychiatric condition called anabolic-androgenic dependence syndrome (Kanayama, Brower, Wood, Hudson, & Pope, 2009). Reported rates of anabolic steroid use are highly variable, particularly

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among adolescents. This likely reflects, in part, the fact that early prevalence studies may have used ambiguous questions that led participants to confuse illegal anabolic steroids with legal non-anabolic steroids (Kanayama, Boynes, Hudson, Field, & Pope, 2007). More recent studies, using clearer questions, have yielded lower prevalence rates. Thus, lifetime history of illicit anabolic steroid was recently estimated at 2.4% among adolescents living in Australia (Dunn & White, 2011), 1.7% among adolescent males and 1.4% among adolescent females living in America (van den Berg, Neumark-Sztainer, Cafri, & Wall, 2007), and 1% among college students living in America (McCabe, Brower, West, Nelson, & Wechsler, 2007).

However, evidence also suggests that the prevalence of anabolic steroid is rising. Data collected on tertiary students' use of anabolic steroids from 119 colleges in America revealed an increase in lifetime prevalence from 0.36% in 1993 to 0.90% in 2001 (McCabe et al., 2007). Data from the annual Australian Needle and Syringe Program Surveys (ANSPS; Iversen & Maher, 2013) have shown that the proportion of service-users who reported that their most recent injection was anabolic steroids increased nationally from 2% in 2005 to 7% in 2012. Furthermore, there is good evidence that the population prevalence of eating-disorder behavior is increasing in both men and women (Hay, Mond, Buttner, & Darby, 2008; Mitchison, Hay, Slewa-Younan, & Mond, 2014). Certain eating-disorder behaviors, including excessive exercise and extreme dietary restriction, have been linked with anabolic steroid use and with mental illnesses for which anabolic steroid use is common, including muscle dysmorphia (Murray et al., 2012; Pope, Gruber, Choi, Olivardia, & Phillips, 1997).

Available evidence suggests that anabolic steroid use, like all illicit drug use, is stigmatized. Media portrayals of anabolic steroid users are overwhelmingly negative, often connecting steroid use with "doping," cheating in sports, aggression, violence, and criminality, although anabolic steroid users are unlikely to participate in any competitive sport and are very unlikely to have been arrested or convicted of a crime, let alone a violent crime (Cohen, Collins, Darkes, & Gwartney, 2006). Most anabolic steroid users are men in their mid-20s to mid-30s seeking to improve their physical appearance by looking more muscular (Ip, Barnett, Tenerowicz, & Perry, 2011; Kanayama et al., 2012; Kanayama & Pope, 2012). Muscularity-oriented appearance concerns are the preeminent risk factor for anabolic steroid use among adolescents (Parent & Moradi, 2011; Smolak & Stein, 2006) and adults (Kanayama, Barry, Hudson, & Pope, 2006; Parent & Moradi, 2011; Pope, Kanayama, & Hudson, 2012). This risk may be heightened if body image concerns first emerge in adolescence and continue into adulthood (Pope et al., 2012). Anabolic steroids are extremely tempting for men who are dissatisfied with their muscularity because steroids are exceptionally effective at building muscle mass over short periods of time, and do so at a rate that considerably outpaces men who are not on anabolic steroids (Griffiths et al., 2016).

The stigmatization attached to anabolic steroid use might be a double-edged sword. On one hand, stigmatization of illicit drugs may help prevent their uptake (Palamar, 2011). This appears to be the case for marijuana, cocaine, ecstasy, opioids, and amphetamines (Palamar, 2011), and qualitative research conducted with anabolic steroid users suggests that the perceived stigma of steroid use may be a barrier to uptake of the drug (Maycock & Howat, 2005). In view of the serious medical consequences associated with anabolic steroid use, this role of stigmatization may need to be explicated and its public health utility harnessed. On the other hand, the effects of stigmatization on mental health and help-seeking need to be considered. Anabolic steroid users who disclose their use to health care professionals report feeling stigmatized, including being openly ridiculed (Maycock & Howat, 2005). Stigma of this kind may lead to deferral or avoidance of future health care, as has been shown for various physical and mental health problems (Corrigan, 2004). Research in men with body image and eating disorders has shown that increased stigmatization is linked with more severe psychopathology, more negative attitudes about

seeking treatment, and a greater likelihood of being undiagnosed (Griffiths, Mond, Li, et al., 2015; Griffiths, Mond, Murray, & Touyz, 2015a).

To our knowledge, the small body of research that has investigated the prevalence and predictors of illicit drug use stigmatization has not yet included anabolic steroid use. Stigmatization of illicit drugs is widespread, although marijuana, a "soft" drug, attracts less stigmatization than "hard drugs," such as cocaine, ecstasy, opioids, and amphetamines (Palamar, Kiang, & Halkitis, 2011). Evidence also suggests that individuals who report a lifetime history of illicit drug use and/or who report greater exposure to users of illicit drugs have less stigmatizing attitudes toward users of those drugs (Ahern, Stuber, & Galea, 2007). Other factors that likely influence stigma toward users of anabolic steroids include sex (given that anabolic steroid use is confined almost exclusively to males) and participation in competitive sport or regular exercise more generally (given resentment toward individuals who may be seen to be "cheating" their way to better bodies and athletic performance).

With these considerations in mind, the goal of the current study was to add to the existing literature by elucidating the prevalence and predictors of the stigma attached to anabolic steroid use. To contextualize our results, we compared stigma associated with anabolic steroid use with that associated with marijuana use. In this regard, it was hypothesized that a lifetime history of illicit drug use and greater exposure to illicit drug users would predict lower levels of stigmatization of anabolic steroid use and marijuana use. For anabolic steroid users in particular, it was hypothesized that time spent exercising, participation in competitive sports, and participation in weight-training or bodybuilding, would predict higher levels of stigma toward anabolic steroid use.

Method

Study Design and Recruitment of Participants

Participants were recruited via a research participation scheme in which students enrolled in a first-year psychology undergraduate course were offered course credit in return for participating in psychological research. The students were enrolled at the University of Sydney, a large public university located in the center of Sydney, which, in turn, is the most populous city in Australia. In the research participation scheme, students were able to browse a list of psychology research studies with accompanying study descriptions. Students who registered an interest in participating in the present study were directed to an Internet survey that contained the participation information statement and a consent form. The study was described to potential participants as an investigation of young people's attitudes and beliefs about illicit drug users.

The survey was accessed 355 times. Nineteen individuals viewed the consent form and exited the survey without providing a response, 10 participants declined to give consent, and three participants provided consent but did not complete the survey. Of 323 individuals who completed the survey, data were excluded from 19 participants. Three participants were extreme outliers for age and were excluded so that all participants were 25 years of age or younger. Data from a further five participants who failed at least two valid-responding checks (e.g., "Please select *strongly disagree* as your answer to this question") and 11 participants who responded incorrectly to a manipulation check (asking participants to name the two drugs they had been answering questions about) were also excluded. The first part of the survey included demographic questions (sex, age, ethnicity, first language, sexual orientation, and importance of religion) and questions addressing the number of days per week on which participants exercised, whether or not they played any competitive sport, and whether or not they exercised using weights, with bodybuilding and weight-lifting provided as examples. The remainder of the survey comprised measures of personal drug use, exposure to drug users, and stigmatization of drug use (see below).

Table 1. The Proportion of the Study Sample Endorsing Each Response Option for the Items Assessing Their Level of Exposure to Users of Anabolic Steroids and to Users of Marijuana.

Item on the Exposure to Drug Users Scale	Anabolic steroids			Marijuana		
	Yes (%)	No (%)	Not sure (%)	Yes (%)	No (%)	Not sure (%)
I have observed people who use _____ frequently	14.2	75.2	10.6	65.6	28.9	5.6
I have worked with a person who uses _____	6.9	78.9	14.2	46.6	40.0	13.4
I have a friend who uses _____	14.9	74.3	10.9	76.7	19.3	3.9
I have been in a class with a person that uses _____	18.5	51.5	30.0	76.4	10.5	13.1
I have a family member or relative who uses _____	4.6	88.4	6.9	31.1	54.8	14.1
I have lived with a person who uses anabolic steroids _____	2.3	94.4	3.3	27.5	70.8	1.6
People in my neighborhood use _____	17.5	38.3	44.2	50.5	20.0	29.5

Participants

The final sample was comprised of 304 students, including 98 males, 205 females, and one participant who did not indicate his or her gender. The preponderance of females in the sample is typical for psychology both as a field of study and as a profession (Mathews, Stokes, Crea, & Grenyer, 2010). Exploring the attitudes and beliefs of females in addition to males is important because steroid use exists in a social context (Griffiths et al., 2016). For example, male heterosexual steroid users' body image and physical appearance concerns exist in close relation to the attitudes and beliefs of females regarding males, male bodies, and male body-change behaviors. In addition, most male heterosexual steroid users experience problems when attempting to combine anabolic steroid use and a relationship with a female, ostensibly due to divergent attitudes and beliefs regarding steroid use (Maycock & Howat, 2005). Participants' ages ranged from 18 to 25 years with a mean of 19.06 years (SD = 1.41 years). Participants were ethnically diverse: 60.5% were Caucasian, White, or European American, 29.3% were Asian, 4.9% were Middle Eastern, and 5.3% reported Other ethnicities. English was the first language for most participants (81.6%). Participants exercised, on average, 2.74 days per week (SD = 1.79 days). A substantial minority of participants reported that they were currently playing competitive sports (25.3%) and that they currently trained or exercised using weights (32.6%).

Study Measures

History of illicit drug use. Data were collected about participants' lifetime drug use (having used a given drug at any point during one's lifetime) and past-year drug use (having used a given drug during the past year). Drugs assessed included anabolic steroids, cocaine, ecstasy or MDMA, GHB, heroin, ketamine, LSD, marijuana, and PCP. An "other drug" option was also available. Common street names were provided for each drug to ensure participants correctly identified the drugs that they had used. These names were obtained from official fact sheets produced by New South Wales police.

Exposure to drug users. Participant's level of exposure to users of anabolic steroid and marijuana was assessed using the seven-item Exposure to Drug Users Index (Palamar et al., 2011; see

Table 2. The Proportion of the Study Sample Endorsing Each Response Option for the Items Assessing Participant's Own Level of Stigmatization of Anabolic Steroid Use and Marijuana Use.

Item on the Drug User Stigmatization Scale	Drug	Response options				
		Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
Using _____ is morally wrong	Anabolic steroids	5.0	15.8	34.4	34.7	10.2
	Marijuana	21.7	29.9	25.0	18.4	4.9
_____ users should go to prison	Anabolic steroid	19.1	46.9	28.7	4.3	1.0
	Marijuana	36.2	41.1	16.1	6.3	0.3
_____ users are weak-minded	Anabolic steroid	6.6	30.0	35.3	23.4	4.6
	Marijuana	17.1	34.5	27.0	17.8	3.6
_____ users have no future	Anabolic steroid	17.8	50.2	24.4	6.9	0.7
	Marijuana	25.0	42.1	25.3	6.3	1.3
_____ are not well-educated	Anabolic steroid	4.6	35.6	34.3	23.8	1.7
	Marijuana	19.7	41.4	26.0	12.2	0.7
_____ are dishonest	Anabolic steroid	6.6	31.4	29.4	28.4	4.3
	Marijuana	20.7	44.1	26.3	7.9	1.0
_____ make me angry	Anabolic steroid	18.2	32.3	30.7	17.2	1.7
	Marijuana	34.9	34.5	18.1	9.5	3.0

Table 1 for a full item list). Available response options are *yes*, *no*, and *not sure*. *Yes* responses are scored 1 while *no* and *not sure* are scored 0. Scores are summed such that higher scores reflect, within the participant, a firm belief that they have been exposed to users of a particular drug, as opposed to mere suspicion.

Stigmatization of drug users and perceived public stigmatization of drug users. The seven-item Drug Use Stigmatization Scale (Palamar et al., 2011) was used to measure the degree to which participants stigmatized anabolic steroid and marijuana users (see Table 2 for a full item list), while the 10-item Stigma of Drug Users Scale (Palamar et al., 2011) was used to measure participants' beliefs about the degree to which others (i.e., the public) stigmatized anabolic steroid and marijuana users. The two scales have been validated for various illicit drugs, including marijuana, cocaine, ecstasy (MDMA), opioids, and amphetamines (Palamar et al., 2011), but not for anabolic steroids. Given the heterogeneity of the stigma toward users of different illicit drugs, the scale authors have recommended that researchers first establish the validity of the scales for drugs other than those they have studied (Palamar et al., 2011). Analysis was conducted for this purpose in the current study, as described below.

Statistical Analyses

A confirmatory factor analysis (CFA) of the two-factor solution for the data representing the Drug Use Stigmatization Scale (participant's stigmatization) and the Stigma of Drug Users Scale (perceived public stigmatization) was first conducted using MPlus Version 7.7. A weighted least-squares means and variance adjusted (WLSMV) model estimator was used. We tested Palamar's two-factor solution in which the first factor, Participants' Stigmatization, included the original seven items. For the second factor, Perceived Publication Stigmatization, only the first seven items of the Stigma of Drug Users Scale were retained. The final three items were excluded because they produced poor model fit. These exclusions are consistent with the

original scale authors' findings regarding four of the five illicit drugs they tested (Palamar et al., 2011). Cronbach's α for the Drug Use Stigmatization Scale were .81 for anabolic steroids and .90 for marijuana, and for the Stigma of Drug Users Scale, .81 and .86, respectively.

Six simultaneous multiple regression analyses were conducted, three each for anabolic steroids and marijuana, using SPSS Version 22. Exposure to anabolic steroid users was regressed on lifetime use of illicit drugs (no/yes), sex, age, ethnicity, days spent exercising, participation in competitive sports (no/yes), and participation in weight-training (no/yes). Similar analyses were conducted for marijuana use, minus the steroid-specific variables (days spent exercising, participation in competitive sports, and participation in weight-training), which would not be expected to be associated with marijuana use. Because of the high prevalence of marijuana use in the current study sample, the lifetime history of illicit drug use variable was replaced with the lifetime history of marijuana use variable.

Participants' stigmatization of anabolic steroid users was regressed on all the variables included in the regression predicting exposure to anabolic steroid users, and exposure to anabolic steroid users was included as a predictor variable. The same procedure took place for the regression predicting participants' stigmatization of marijuana users; exposure to marijuana users was included as a predictor variable.

Finally, participants' perceptions of others' stigma toward anabolic steroid users was regressed on the same variables as for the regression predicting participants' own stigmatization of anabolic steroids, with participants' stigmatization of anabolic steroids included as a predictor. The same procedure was used for the regression predicting participants' perceptions of others' stigma toward marijuana.

Procedure

Participants initially completed the demographic questionnaire and the history of illicit drug use questionnaire. Subsequent presentation of the questions about anabolic steroid and marijuana users was counterbalanced. The survey took, on average, approximately 20 min to complete. The protocol for the research project was approved by the lead author's institutional review board.

Results

Participant's History of Illicit Drug Use

Approximately half of the sample reported a lifetime history of using an illicit drug (49.0%), and slightly less than half reported a past-year history of using an illicit drug (40.5%). For lifetime illicit drug use, the most common drug used was marijuana (47.4%), followed by ecstasy or MDMA (19.1%), cocaine (12.8%), LSD (10.9%), GHB (2.3%), ketamine (0.9%), amphetamines (0.6%), heroin (0.3%), and anabolic steroids (0.3%). A similar pattern was observed for past-year illicit drug use; marijuana (37.8%), ecstasy or MDMA (16.8%), cocaine (9.5%), LSD (7.9%), GHB (1.3%), heroin (0.3%), ketamine (0.3%), amphetamines (0.3%), and anabolic steroids (0.0%). For the full sample, the mean number of illicit drugs used during participants' lifetime was 0.49 ($SD = 0.50$) and, during the past year, was 0.41 ($SD = 0.49$). For only those participants who reported having used an illicit drug during their lifetime, the mean number of illicit drugs was 1.97 ($SD = 1.25$) and, during the past year, was 1.86 ($SD = 1.11$).

CFA of Stigmatization Scales for Anabolic Steroids

The results of the CFA supported the validity of Palamar and colleagus (2011) drug stigmatization scales as measures of the stigma associated with anabolic steroid use. The observed fit indices ($\chi^2 = 172.77$, root mean square error of approximation [RMSEA] = 0.075, comparative fit

index [CFI] = 0.96, Tucker–Lewis index [TLI] = 0.95) indicated good fit according to accepted criteria (Bentler, 1990; Hair, Anderson, Tatham, & Black, 1998) and were comparable with those reported by (Palamar et al., 2011) for stigma associated with marijuana, cocaine, ecstasy, opioid, and amphetamine use (χ^2s = 270.68-420.48, RMSEAs = 0.078-0.084, CFIs = 0.94-0.96, IFIs [Incremental Fit Index] = 0.94-0.96).

Exposure to Anabolic Steroid Users and Marijuana Users

Descriptive data for participants' level of exposure to anabolic steroid and marijuana users are shown in Table 1. Results from the ANOVA revealed that participants reported significantly less exposure to anabolic steroid users ($M = 0.79$, $SD = 1.25$) than to marijuana users ($M = 3.75$, $SD = 2.19$), $F(1, 301) = 557.20$, $p < .001$, $\eta_p^2 = .65$.

The regression model predicting exposure to anabolic steroid users was non-significant, $R^2 = .05$, $F(7, 288) = 1.98$, $p = .058$, whereas the regression model predicting exposure to marijuana users was significant, $R^2 = .40$, $F(4, 298) = 49.42$, $p < .001$. Participants who reported greater exposure to marijuana users included those participants with a lifetime history of marijuana use ($B = .49$, $p < .001$), and those who reported Caucasian ethnicity ($B = .26$, $p < .001$), whereas sex and age were non-significantly associated with this exposure.

Stigmatization of Anabolic Steroid Users and Marijuana Users

Descriptive data for participants' stigmatization of anabolic steroid and marijuana users is shown in Table 2. Analysis confirmed that participants were significantly more stigmatizing of anabolic steroid users ($M = 2.70$, $SD = 0.65$) than marijuana users ($M = 2.28$, $SD = 0.79$), $F(1, 302) = 106.74$, $p < .001$, $\eta_p^2 = .26$.

The regression model predicting stigmatization of anabolic steroid users was significant, $R^2 = .07$, $F(8, 287) = 2.60$, $p = .009$. Age was found to be positively associated with stigmatization ($B = .13$, $p = .031$), whereas a history of illicit drug use was associated with lower levels of stigmatization ($B = -.24$, $p < .001$). Non-significant predictors included exposure to anabolic steroid users, days of exercise per week, participation in competitive sports, weight-training, sex, and ethnicity.

The regression model predicting stigmatization of marijuana users was also significant, $R^2 = .29$, $F(5, 297) = 24.44$, $p < .001$. A history of marijuana use ($B = -.31$, $p < .001$) and greater exposure to marijuana users ($B = -.31$, $p < .001$) were associated with lower levels of marijuana user stigmatization Non-significant predictors included sex, age, and ethnicity.

Perceptions of the Stigma Toward Anabolic Steroid Users and Marijuana Users

Participants believed that other people held more stigmatizing views toward marijuana users ($M = 3.16$, $SD = 0.65$) than toward anabolic steroid users ($M = 3.06$, $SD = 0.59$), $F(1, 303) = 7.76$, $p = .006$, $\eta_p^2 = .03$.

The regression model predicting other people's stigmatization of anabolic steroids was significant, $R^2 = .25$, $F(9, 286) = 10.35$, $p < .001$. Participants who reported greater stigmatization of anabolic steroid were more likely to believe that other people were more stigmatizing of anabolic steroid users ($B = .43$, $p < .001$), whereas associations with exposure to steroid users, days of exercise per week, participation in competitive sports, weight-training, sex, age, and ethnicity were all non-significant.

The regression model predicting other people's stigmatization of marijuana was also significant, $R^2 = .36$, $F(6, 296) = 27.54$, $p < .001$. Participants who reported greater stigmatization of marijuana users tended to believe that other people were more stigmatizing of marijuana users

($B = .40$, $p < .001$), whereas participants who reported greater exposure to marijuana users tended to believe that other people were less stigmatizing of marijuana users ($B = -.22$, $p < .001$). Nonsignificant predictors included a lifetime history of marijuana use, sex, age, and ethnicity.

Discussion

We aimed to investigate the nature and predictors of stigma toward anabolic steroid use. Three key findings emerged: (a) anabolic steroid use is heavily stigmatized, (b) there is greater stigmatization of steroid users than marijuana users, and (c) greater exposure to steroid users is not associated with reduced stigma toward steroid users, whereas this was the case for marijuana users.

The amount of stigma expressed toward anabolic steroid use was greater than that toward marijuana use and was comparable with previous research that has examined the stigma directed toward hard drugs, including cocaine, ecstasy, opioid, and amphetamine use (Palamar et al., 2011). It appears that the public perceives anabolic steroids as a hard drug rather than as a soft drug. Recent research examining stigma among health professionals corroborates this view, finding that anabolic steroid use was more heavily stigmatized than cocaine use (Yu, Hildebrandt, & Lanzieri, 2015). Interestingly, the public perception of anabolic steroid users as hard drug users conflicts with the beliefs of anabolic steroid users, who view themselves as distinct from other drug users, particularly those who use hard drugs (Dunn, McKay, & Iversen, 2014).

Contrary to our hypothesis, exposure to anabolic steroid users was not associated with stigmatization of anabolic steroid use, unlike for marijuana, for which exposure predicted lower levels of stigmatization. Previous research, using the same measures, has shown that exposure to users is associated with reduced stigmatization for a variety of drugs, including marijuana, cocaine, ecstasy, opioids, and amphetamines (Palamar et al., 2011). Our results replicated the previously found association between exposure to marijuana users and reduced stigmatization of marijuana users (Palamar et al., 2011). Why, then, did exposure to anabolic steroid users not predict reduced stigmatization of anabolic steroid users? Were participants insufficiently exposed to anabolic steroid users? Although participants reported lower exposure to anabolic steroid users than marijuana users, there was sufficient variance in responses, and a substantial minority of participants reported exposure (see Table 1). For example, 15% of participants reported having a friend who uses anabolic steroids. Could it be that only certain kinds of exposure to anabolic steroid users predict stigmatization? We further examined the relationships of each individual item on the exposure to drug users index with anabolic steroid use stigmatization and found none that were significant, arguing against this explanation.

One possible explanation is that people exposed to anabolic steroid users might be more likely to confirm a preconception (or discover) that users are not likeable, implying that exposure to anabolic steroid users may have the potential to increase, rather than reduce, stigmatization. What characteristics of anabolic steroid users might be unlikeable? Body image insecurity is the preeminent motivator for steroid use, and people may struggle to empathize with people with body image and eating issues. Both male and female psychology undergraduates tend to perceive symptoms of muscle dysmorphia as admirable or enviable, including sufferer's ability to control their exercise and diet (Griffiths, Mond, Murray, & Touyz, 2015b), and sufferers of eating disorders and of muscle dysmorphia frequently face the stigma that their illnesses are trivial and/or unimportant (Griffiths, Mond, Murray, & Touyz, 2014, 2015a), perhaps reflecting people's difficulty empathizing with sufferers of severe body image insecurity.

Variables hypothesized to predict the stigma of anabolic steroid use, namely, sex, exercise, competitive sports, and weight-training, did not. Sex, in particular, is surprising, given that anabolic steroid use is confined almost exclusively to men (Ip et al., 2010). Furthermore, it appears that the perception that steroid users are "cheating" or using a shortcut to build better bodies and

succeed athletically did not translate into increased stigmatization. Taken together, these findings highlight the need for research to further investigate the stigma surrounding anabolic steroid use.

Furthermore, it is doubtful that the preponderance of females in the study sample influenced the findings to an appreciable extent. Sex was not associated with stigma toward anabolic steroid use, suggesting that both male and female participants were equally stigmatizing of steroid use. Furthermore, the inclusion of sex in the multiple regression meant that its influence was taken into account when assessing the influence of the other predictors.

Strengths and limitations of the study are noted. This is, to our knowledge, among the first studies to quantitatively examine the nature and predictor of the stigma toward anabolic steroid use. Additional strengths were the inclusion of analyses to confirm the validity of existing drug stigmatization scales for anabolic steroid use, the inclusion of both male and female participants, and the inclusion of marijuana use to contextualize the results. Conclusions drawn from the study, however, are necessarily tentative, given the study limitations. Key limitations included potential selection bias inherent in the recruitment procedure, the reliance on self-report measures of exposure to drug users and personal drug use, and the reliance on a psychology student sample rather than a general population sample. It is reasonable to expect that psychology students hold less stigmatizing attitudes toward individuals with at least certain mental health problems than the general population (Mond, Hay, Rodgers, Owen, & Beumont, 2004; Mond, Robertson-Smith, & Vetere, 2006), but whether similar effects might be observed when considering stigma toward steroid users is unclear.

In conclusion, anabolic steroid use is heavily stigmatized at a level comparable with hard drugs, such as heroin and cocaine. Unlike for marijuana, increased exposure to anabolic steroid users does not predict stigmatization of anabolic steroid use. More research on the predictors of the stigma toward anabolic steroid use is needed to inform public health policy toward steroid users.

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