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Anabolic–Androgenic Steroids: User Characteristics, Motivations, and Deterrents

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The use of anabolic–androgenic steroids (AAS) is increasing internationally. The present study addresses the paucity of information regarding the characteristics and motivations of AAS users. This sample of 100 AAS (94% male) users was unlike other samples of Australian illicit drug users. They were typically male, well educated, and employed and had a higher disposable income than the general Australian population. They were also involved in rigorous training directly related to their AAS use. Recreational drug use was low, with gay participants largely responsible for the polydrug use among this sample. The main motivations for AAS use were improved physical appearance and increased size. Different subgroups of users had varied expectations about the psychological effects of AAS use that were also important in motivating use. Concern about physical health was the main deterrent to use. This information will be useful in the development of educational initiatives.

Anabolic–androgenic steroid (AAS) use is increasing internationally. The 1995 Australian National Drug Strategy Household Survey (Commonwealth Department of Health and Family Services [CDHFS], 1996) indicated a twofold increase in the estimated prevalence of AAS use since 1993 (Commonwealth Department of Human Services and Health, 1994), with 28,800 people reporting use in the preceding 12 months. In the United States, it is estimated that there are more than 1 million current or former AAS users (Yesalis, Kennedy, Kopstein, & Bahrke, 1993), whereas in Canada, it is estimated that 83,000 young people age 11–18 years have used AAS at least once in the preceding year (Melia, 1994).

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The nonmedical use of AAS has gained widespread attention because of its use by elite athletes (Todd, 1987; Yesalis, Courson, & Wright, 1993). Athletes who use AAS are motivated by a desire to succeed and the subsequent rewards, financial or otherwise. Described as a "win-at-all-cost" approach, this resolution is reinforced by a belief that competitors are also using (Brower, 1989; Wagram, Curry, & Cook, 1995). However, recent evidence suggests that AAS use is not restricted to the sporting elite (Buckley et al., 1988). Despite being the most visible population of AAS users, it is hypothesized that they represent the smallest subgroup (Shapiro, 1994).

Three additional groups have been identified. A large proportion of AAS users are more concerned with the improvement of physical appearance than performance enhancement (Brower, 1989). Labeled as *aesthetes,* this group includes competitive and recreational bodybuilders, models, and aspiring actors and those with highly appearance-sensitive lifestyles, such as gay men (Brower, 1989; Dart, 1991; Shapiro, 1994). Although a similar win-at-all-cost attitude is observed in competitive bodybuilders, not all aesthetes are driven by the glory of victory. Many simply seek improvements to their appearance (Gridley & Hanrahan, 1994).

Brower (1989) has suggested that these individuals may have an underlying motivation to improve their self-confidence, because an attractive physical appearance promotes social acceptance, admiration, and opportunity.

The functional use of AAS to assist with the execution of employment duties has also been reported (Shapiro, 1994). This group includes bodyguards, security personnel, construction workers, police, firefighters, members of the armed forces, and gang members (Brower, 1989; Dart, 1991; Mugford, 1995; Shapiro, 1994). The functional use of AAS may be based on a perception that survival depends on physical capabilities (Dart, 1991). Dart (1991) has suggested that the use of AAS may give this group "the physical edge they fear they lack" (p. 18). A final group of AAS users are adolescents (Brower, 1989; Yesalis, 1993). At a time when they search for an identity, many strive to reach the same physical stature of individuals portrayed in the popular media. Adolescent users may succumb to the pressures placed on them by society (Brower, 1989).

There is a paucity of information about the characteristics and motivations of AAS users in Australia and internationally. The few studies that have been conducted indicate that Australian AAS users are typically male and well educated, with most in full-time employment and earning above-average incomes (Mugford, 1995; Plowright, 1993).

In a sample of 167 users in Sydney, Australia, and Canberra, Australia, containing a large proportion of competitive sportspersons, Plowright (1993) found that the main motivation for use was for physical performance, followed closely by aesthetic appeal of improved physique. A smaller Australian study, with a lower proportion involved in competitive sport, identified the main motivation as being improved appearance (Gridley & Hanrahan, 1994). Other researchers have identified the specific changes to physical appearance desired as being increased (muscle) size and increased weight (Beel, 1996; Mugford, 1995).

Recent interest has centered on the possibility of a "reverse anorexia syndrome" contributing to AAS use (Pope, Katz, & Hudson, 1993; Schwerin et al., 1996). Pope et al. (1993) has suggested that this is characterized by a "perception that oneself is small and weak, when one is actually large and muscular" (p. 406).

It has been argued that AAS use will continue as long as the general population admires sporting champions and an attractive physique (Yesalis & Bahrke, 1995). In the 1995 Australian National Drug Strategy Household Survey (CDHFS, 1996), 96% of respondents believed that nonmedical use of AAS was unacceptable. However, public opinion, education through scare tactics, and legal interventions have had little effect in deterring AAS use (Beel, 1996; Moss, Panzak, & Tarter, 1992; and Yesalis & Bahrke, 1995).

The present study aimed to increase our understanding of AAS users. Specifically, the study aimed to (a) provide information regarding the demographics and personal characteristics of AAS users in Australia, (b) determine the motivations for use and expectations about the effects, and (c) examine possible deterrents to AAS use.

Method

Participants

The sample consisted of 100 men and women recruited from New South Wales (NSW) and the Australian Capital Territory (ACT). The sample was predominantly male (94 men; 94%) with only 6 women (6%) participating. The majority of the sample were Australian citizens (89%). The remainder were New Zealand, English, American, and Turkish citizens residing in Australia.

Measures

We constructed a detailed questionnaire specifically for this study. It assessed demographics, patterns of use, sources of AAS, physical and psychological effects, general expectations and motivations for using, opinions and attitudes, weight-training activity, information sources, recreational drug use behavior and history, and deterrents. The questionnaire was designed so that it could be used in a structured interview context or by self-completion. The questionnaire is available from Richard Peters.

Procedure

All participants were volunteers who were reimbursed for out-of-pocket expenses up to the value of $30. Recruitment took place from September 1996 to

May 1997, through advertisements in major, local, and special interest newspapers; an Australian "muscle" magazine; gymnasiums; needle exchanges; and retail outlets supplying sporting goods. In addition, recruitment through radio interviews and by word of mouth was used.

Participants contacted the researchers by telephone and were screened for eligibility for the study. The entry criterion was AAS use in the previous 12 months or intention to recommence use in the near future. Meetings were arranged at locations determined by the participant, where either the interview was conducted or the participant was given the questionnaire for self-completion. Twenty-seven questionnaires were self-completed, and the remainder were conducted by one of the research team. Participants provided informed consent in keeping with National Health and Medical Research Council guidelines and received a copy of the signed form on completion. The interviews took between 45 and 150 min to complete. The study was approved by the University of NSW Committee for Experimental Procedures Involving Human Subjects.

Data Analysis

The analyses were primarily descriptive in nature and were performed by means of SPSS for Windows (Version 6; 1993). Means, and medians for highly skewed data, are reported for continuous data. Categorical variables are described in percentages. When comparisons were carried out, *t* tests were used for comparisons between continuous data, *F* tests for group differences, and odds ratios (OR) with corresponding 95% confidence intervals (CI) for categorical data.

Results

Demographics

One hundred persons volunteered for this study. The participants ranged in age from 18 to 50 years, with a median of 27 years (M = 29.2 years, SD = 6.9). Ninety-four percent of the sample were male. Nearly one third of the sample (30%) were gay or bisexual.

The mean years of formal education were 14.2 (SD = 3.3, range = 9–26). More than one third of the sample (35%) had completed or were undertaking a university education, whereas a further 33% had earned diplomas or trade certificates. Two participants were currently attending secondary school. The majority of the sample were in full-time employment (73%), and a further 13% were in part-time employment. Only 5% of the sample were unemployed, with the remainder being students or retired. More than one third of the sample (38%) worked in management (e.g., company directors, managers, professionals, and paraprofessionals), and 14% worked in the security or fitness industries. Other occupations included salesperson or office clerk (12%), laborer (9%), and tradesperson (8%). Forty-two percent had worked in a job where they believed that physical appearance or strength were important for their ongoing employment. This sample also had a substantially higher disposable income than the general Australian population, with only 27% earning less than A $30,000 (U.S. $19,800) per annum; a further 36% earned in excess of A $40,000 (U.S. $26,400) per annum.

Anabolic–Androgenic Steroid Use

The average age at first use of AAS was 25.1 years (SD = 6.3; range = 14–46). Regular use of AAS commenced typically 1 year after participants' first use (M = 25.9; SD = 6.3; range = 17–46 years). The number of years of regular use was 3.6 (SD = 3.2; range = 1 month to 16 years).

Alcohol and Other Drug Use

The majority of the sample were nonsmokers (68%). The average number of cigarettes per day among smokers was 11.4 (SD = 8.4). Frequency of alcohol consumption were as follows: "never" (21%), "rare" (29%), "monthly" or a "couple per month" (22%), "weekly" or "couple per week" (27%), and "daily" (1%). The median number of drinks per drinking occasion was 2.5 (M = 4.0, SD = 4.9). Only 6% of the sample indicated that they would usually have more than eight standard drinks when drinking. Reports of experience with and recent use of other illicit drugs are provided in Table 1.

There were significant differences in patterns of other drug use between the gay and heterosexual participants in the sample. Compared with heterosexuals, gay participants were 10 times (OR = 10.6, 95% CI = 3.3, 33.8) more likely to have ever used amphetamines; 7

Table 1
Percentage of Sample That Used Other Illicit Drugs

Drug	Ever used	Ever injected[a]	Current regular use[b]	Current occasional use[c]
Amphetamines	51	6	11	25
Cocaine	43	4	5	26
Ecstasy	49	3	18	20
Heroin	9	5	1	3
Methadone	2	1		
Marijuana	70		17	24
Hallucinogens	36			
Inhalants	20		4	

[a]Only 14% of the sample had injected a drug other than anabolic–androgenic steroids. [b]One or more times per month. [c]One to five times per year.

times (OR = 7.3, 95% CI = 2.7, 19.8) more likely to have ever used cocaine; 15 times (OR = 15.9, 95% CI = 4.4, 58.3) more likely to have ever used ecstasy; 7 times (OR = 7.5, 95% CI = 2.8, 19.7) more likely to have ever used marijuana; and almost 14 times (OR = 13.9, 95% CI = 4.4, 44.7) more likely to have ever used inhalants.

Training Activity

The median number of years of regular weight-training experience was 5.8 (M = 7.0, SD = 5.0), ranging from 6 months to 27 years. The median number of years of weight training before commencing AAS use was 2.0 (M = 3.4, SD = 3.7). Only 1 participant did not train with weights. For the remainder, the number of training sessions per week while on an AAS cycle was significantly higher than when resting (no AAS use; 5.0 vs 4.4), $t(97) = 7.0$, $p < .001$. The length of each training session was also significantly greater while using AAS than when resting (1.24 hr vs 1.16 hr) $t(97) = 2.5$, $p < .015$.

User Groups

Participants were asked to self-classify by the identified user groups. The proportion of participants within each group were: "body image" (61%), "competitive bodybuilder" (22%), "competitive athlete" (11%), and "occupational" (6%). The body-image group included all recreational (noncompetitive) bodybuilders and weight trainers. Five of the 6 women were competitive bodybuilders; the other was a competitive athlete. A summary of the sample characteristics by user group is presented in Table 2.

There were no gender differences in age, training activities, number of drugs tried, the age of initial experience with AAS, or the duration of regular AAS use. However, female bodybuilders had less experience with other illicit drugs than did male bodybuilders (1.5 different drugs tried vs. 0.4). Marijuana was the only drug used by the female bodybuilders.

Perceptions of Physical Self

Nearly half of the sample perceived their physical attractiveness (49%) and their overall attractiveness (48%) as either "well above average" or "above average." When asked to describe their own build, more than half (57%) believed it was "about right." Twenty-nine percent thought they were "too small," whereas 7% said they were "too big." The remainder were not able to say. Subjective strength ratings indicated that few participants (2%) perceived their strength as "below average." The majority (71%) indicated their strength was "well above average" or "above average," with the remainder (27%) being "average."

Nearly half of the sample (49%) reported that they were not satisfied with their body shape. Twenty-two of these participants had described their build as being too small. However, few considered that their overall appearance (4/22) or their physical appearance (2/22) was below average. Only 1 of these participants indicated that he had below-average strength.

Table 2
Sample Characteristics by User Group

Characteristic	Competitive bodybuilders (n = 22)		Competitive athletes (n = 11)		Body image (n = 61)		Occupational (n = 6)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Demographics								
Age[a]	28.4	6.6	30.5	9.6	29.3	6.6	29.0	7.2
Gay or bisexual[b]	5		27		39		33	
Post-high-school education[b]	73		73		67		50	
Full-time employment[b]	68		64		80		50	
Training								
Weight-training experience[a]	6.4	3.6	9.8	6.4	6.8	5.2	6.3	4.0
Training before AAS use[a]	2.5	1.5	4.2	4.9	3.7	4.0	2.6	2.6
Training days per week	5.0	0.7	5.0	1.0	5.1	0.9	4.4	1.0
Alcohol and other drug use								
Cigarette smoker[b]	27		14		34		33	
Alcohol use: monthly or less[b]	18		27		52		33	
Never used another drug[b]	41		9		15		0	
No. other drugs tried[c]	1.2	1.5	3.1	2.2	3.2	2.4	4.8	2.4
Inject any other drug[b]	5		18		16		17	
AAS use								
Age of first use[a]	23.1	5.2	24.5	7.9	25.9	6.4	25.0	5.0
Duration of regular use[d]	4.5	3.8	5.73	2.1	2.8	3.0	3.6	3.2

Note. AAS = anabolic–androgenic steroids.
[a]In years. [b]Percentage. [c]$F(3, 93) = 6.31, p < .001$. [d]$F(3, 93) = 3.52, p < .02$.

Expectations and Motivations for Use

We asked participants to identify the main motivations to use AAS before their first cycle and their last cycle, to distinguish naive expectations from expectations based on experience of AAS use. These motivations are summarized in Table 3 for the total sample and by user group. The main motivation before the first cycle for the total sample and for three of the four user groups was to improve appearance.

Table 3
Main Motivations to Use AAS Before the First and Most Recent Cycles

Motivation	Competitive bodybuilder (n = 22)		Competitive athlete (n = 11)		Body image (n = 61)		Occupational (n = 6)		Total sample (N = 100)	
	First	Last	First	Last	First	Last[a]	First	Last[b]	First	Last[c]
Improve appearance	45	27	9	18	51	49	67	60	46	40
Increase size	36	41	18	9	34	41	33	20	33	36
Increase strength	5	9	18	0	5	4	0	0	7	5
Improve sporting performance	9	18	27	27	3	2	0	0	6	9
Prevent or recover from injury	0	0	9	9	0	2	0	0	1	2
Decrease body fat	0	5	0	0	0	0	0	0	1	1
Other	0	0	18	18	0	2	0	0	4	6

Note. AAS = anabolic–androgenic steroids. All values are percentages. *Last* columns reflect participants who started more than one cycle of AAS.
[a]n = 49. [b]n = 5. [c]n = 87.

Competitive athletes were the exception, with more motivated by a need to improve sporting performance. Before the most recent cycle, more bodybuilders were motivated by increase in size than by general improvements to appearance, compared with the first cycle. "Other" motivations reported by the competitive athletes were "increased weight" and "something different" before the first cycle and "obtain a psychological edge" and "change muscle quality" before the last cycle (each 9%). Some body-image users were motivated by the need to "increase weight" or as an "alternative to antidepressants" before the last cycle (each 1%). Of the 13 participants who had completed only one cycle, 2 had stopped using AAS. The reasons for ceasing AAS use given by these 2 participants were "I had only planned to do one cycle" and "I reached my goals."

Expectations about the effects of AAS before the first and most recent cycles were also examined. A list of AAS effects was presented, with an opportunity to add additional expectations. Table 4 contains this information separately for the four groups and for the total sample. General expectations regarding improvements to appearance and increased size were the most frequently cited across the total sample. This pattern was observed for the competitive bodybuilders, body-image users, and occupa-

Table 4
Expectations of AAS Use Before the First and Most Recent Cycles

	Competitive bodybuilder		Competitive athlete		Body image		Occupational		Total sample	
Expectation	First ($n = 22$)	Last ($n = 22$)	First ($n = 11$)	Last ($n = 11$)	First ($n = 61$)	Last ($n = 49$)	First ($n = 6$)	Last ($n = 5$)	First ($N = 100$)	Last ($N = 87$)
Physical										
Improve appearance	77	68	45	82	90	82	100	80	83	75
Increase size	82	77	73	45	84	80	100	80	83	78
Increase strength	55	59	82	55	62	47	100	80	65	53
Train harder	41	50	64	64	51	43	67	40	51	47
Decrease body fat	41	55	27	45	33	45	83	20	37	46
Increase energy level	23	27	45	45	20	24	67	0	26	26
Prevent injury	23	36	36	64	21	24	33	40	24	33
Improve sporting performance	18	27	73	45	16	16	17	20	23	24
Psychological										
Reach personal goals	59	64	64	64	41	39	50	40	48	48
Improve self-esteem	27	18	0	27	49	39	67	60	40	33
Attract partners	14	5	18	27	44	29	17	40	33	23
Competitors use	36	45	27	18	13	10	0	0	19	17
Social benefits	14	9	9	0	25	27	0	0	19	10
Increase approval	5	5	9	9	21	14	17	0	17	20
Euphoria	0	5	0	18	11	16	17	0	8	13
Improve job function	0	0	9	9	3	8	67	60	7	9

Note. AAS = anabolic–adrogenic steroids. All values are percentages. *Last* columns reflect participants who started more than one cycle of AAS.

tional users. Increased strength was also important to occupational users. More competitive athletes expected increased strength and improved sporting performance than general improvements to appearance.

Body-image users expected more psychological outcomes than the other groups. This was particularly obvious for improvements to self-esteem, approval from others, and social benefits. There was an overall decline in the frequencies for each expectation from the first to the most recent cycle. Notable exceptions included increases in improved appearance and injury prevention in the competitive athletes. A considerable reduction in the proportion expecting improved sporting performance also was observed in this group.

To further investigate expectations regarding AAS use, the total number of items reported were added (maximum of 16) for both the first and most recent cycles. There were significantly more expectations before first use than before most recent use (Ms = 5.9 vs. 4.9), $t(97) = 2.9$, $p < .005$. Each expectation was classified as either physical or psychological (see Table 4), and separate totals were obtained for each. The number of physical expectations before the first cycle was significantly more than the psychological expectations (Ms = 4.0 vs. 2.3), $t(81) = 10.7$; $p < .001$. The same pattern was observed in the most recent cycle (Ms = 3.4 vs. 1.8), $t(81) = 8.3$, $p < .001$. There was also a significant decrease in the number of expectations within each category from the first to the most recent cycle, $t(97) = 2.6$, $p < .015$, for physical; $t(97) = 2.8$, $p < .01$ for psychological.

Group scores on each of these scales were calculated and are presented in Table 5. There were no group differences on the total number of expectations, or the number of physical expectations, in either the first or most recent cycles. A group difference was found with respect to the number of psychological expectations before the first cycle, $F(3, 78) = 4.14$; $p < .01$. Further tests indicated that the body-image group had more psychological expectations before the first cycle than did any of the other three groups, $t(81) = 2.82$, $p < .008$. This group difference was not present for the most recent cycle.

Anabolic–Androgenic Steroid Information

Nearly two thirds of the sample (64%) sought information about AAS monthly or more frequently. Only 10% did not usually seek information about AAS, with most of these ($n = 7$) being body-image users. The sources of AAS information included friends (64%), "steroid handbooks" (60%), fitness magazines (53%), doctors (42%), medical literature (40%), AAS suppliers or dealers (27%), coaches or trainers (17%), needle exchanges (11%), and gym employees (8%).

Deterrents

On the basis of the extant literature and consultation with key informants, seven pos-

Table 5
Expectations by User Group Before the First and Most Recent Cycles

	Competitive bodybuilders ($n = 22$)		Competitive athletes ($n = 11$)		Body image ($n = 61$)		Occupational ($n = 6$)	
Expectation	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Physical								
First cycle	3.59	1.92	4.45	1.97	3.90	1.75	5.67	1.63
Last cycle	4.00	1.93	4.45	2.63	3.00	2.12	3.00	2.53
Psychological								
First cycle[a]	1.79	.98	1.5	1.58	2.7	1.28	2.33	.82
Last cycle	1.74	0.93	1.90	1.85	1.89	1.86	1.67	1.63
Total								
First cycle	5.14	2.66	5.82	3.34	6.05	2.92	8.00	2.19
Last cycle	5.14	2.66	5.82	3.34	4.51	3.68	4.67	3.93

[a] $F(3, 78) = 4.14$, $p < .01$.

sible deterrents to AAS use were presented to the participants who were asked to indicate the relative likelihood of each one in deterring them from using. These are presented in Table 6 for the user groups and the total sample. The main deterrents to AAS use were "general ill health" and "steroid side effects" rather than legal ("increased criminal penalties" and "greater police attention") or social pressures ("reduced public acceptance"). This overall trend was observed within each user group. A number of other deterrents were offered by the sample, including "if I felt psychologically dependent," "invention of better anabolic substance," "the availability of real steroids was negligible," "if I met my goals," and "if everyone stopped."

Chi-square analysis was used to examine differences between the four user groups and the likelihood of deterring AAS use. No group differences were observed when considering all five response categories (extremely likely, likely, don't know, unlikely, or extremely unlikely) or when response categories were collapsed into *likely* and *not likely*. In addition, no significant differences were observed when user groups were classified as competitive (competitive athletes and bodybuilders) and noncompetitive (body-image and occupational) users. Given the small number of female participants, sex differences were not expected. However, female users were found to be nine times (OR = 9.06, 95% CI = 1.53, 53.54) more likely to consider ceasing AAS use because of increased penalties for use compared with the male users.

Discussion

AAS users in NSW and ACT are a unique subgroup of the illicit-drug-injecting population in Australia, with systematic differences in their demographic profile and reasons for use compared with other illicit drug users.

The AAS users involved in the present study were an older sample of illicit drug users, using AAS for the first time in their mid-20s. This is consistent with other Australian studies (Beel, 1996; Mugford, 1995; Plowright, 1993) but contrasts with international findings that first AAS use typically occurs at age 18 (Yesalis, Kennedy, et al., 1993). Although there are a number of anecdotal reports suggesting that adolescent AAS use is increasing, the general population of AAS users in Australia is typically older. The gay community has been identified in this study as a considerable subgroup of users, with almost one third of respondents preferring same-sex partners.

This sample of AAS users was more likely to be male, well educated, and in full- or part-time work than other groups of illicit drug users recently studied in Australia (Darke, Ross, & Hall, 1996; Topp & Darke, 1997). They also had a substantially higher disposable income than the general Australian population. In addition, unlike other illicit-drug-using groups, they are engaged in rigorous training routines directly related to their primary drug use. Ninety-four percent of the sample were training at least four times per week, with only 1 participant not actively involved in training. Recreational drug use among this sample also was low in

Table 6
Extremely Likely and Likely Deterrents to AAS Use by User Group

Deterrent	Competitive bodybuilders (n = 22)	Competitive athletes (n = 11)	Body image (n = 61)	Occupational (n = 6)	Total sample (n = 100)
General ill health	91	73	79	83	81
AAS side effects	64	91	64	83	68
New information on dangers	36	64	48	50	47
Cost doubling	36	36	23	50	29
Increased criminal penalties	23	27	18	33	21
Greater police attention	18	27	23	33	23
Reduced public acceptance	9	18	7	33	10

Note. AAS = anabolic–androgenic steroids. All values are percentages.

comparison with other illicit-drug-using populations (Darke & Hall, 1995; Swift, Hall, & Copeland, 1997). The gay participants were largely responsible for the level of polydrug use by this sample. Future examination of polydrug use by AAS users should, therefore, investigate differences based on sexual preference.

Delineation of AAS user groups in the past has identified four categories: athletes, aesthetes, occupational, and adolescents. Using this classification, competitive bodybuilders have been grouped with recreational bodybuilders and weight trainers and labeled as *aesthetes* (Brower, 1989; Shapiro, 1994). Differences between these types of users found in the present study suggest a need to separate the two. In the present study, we refer to the noncompetitive aesthetes as *body-image* users. This subgroup still accounted for the majority of AAS use. The high proportion of noncompetitive AAS users found in this study highlights the need to focus public health attention on this group rather than the use of AAS for performance enhancement in sport.

The incidence of AAS use for occupational benefits was low. All of these participants knew of other members of their profession who used AAS, although we cannot speculate as to their motivations. From the 6 participants who were in this group, we have identified security personnel, fitness consultants, and actors as occupations where AAS use may be perceived, by some, to be beneficial.

Speculation about the possibility of a reverse anorexia syndrome, as described by Pope et al. (1993), was neither supported nor contradicted by the present study. An individual experiencing this disorder would have a low physical self-image, a perception of being small and weak. Of the 29% who believed they were too small, only 1 also indicated that he was of below-average strength. The men in this study may have realized that they were stronger than the average person, yet nearly one third of them still thought they were too small, despite using AAS.

This study has demonstrated the need to examine general expectations in addition to main motivations for use. The main motivations reported were predominantly physical and fairly consistent across users. The majority were using to improve appearance (46%) or increase size (33%). This pattern was observed within three of the four subgroups. More competitive athletes were motivated by the need to improve sporting performance than appearance. However, an examination of general expectations indicates a greater propensity for psychological expectations by the body-image users than the other groups. Enhanced self-esteem, increased approval from others, and general social benefits were more commonly reported by this group than by either the competitive bodybuilders or athletes. Although the main motivations for using AAS were physical in nature, this examination of the general expectations highlights the greater need for psychological benefits for those users who are not competitive. This constitutes further evidence for separating the competitive bodybuilders from the aesthetes.

The present sample's view on likely deterrents to AAS use has implications for the development of preventative strategies. In accordance with previous research (Moss et al., 1992), this sample was unlikely to be deterred from AAS use by greater penalties or increased police attention. Education initiatives that highlight the legal ramifications are, therefore, unlikely to be successful as a preventative tool. Scare tactics that highlight the negative side effects are also unlikely to be effective. However, there was some indication that the presentation of new information, or that which the individual is not aware of, may facilitate abstinence or safer patterns of use. Relevant information from credible sources should therefore be made available and continually updated.

The manner in which this information is presented is likely to be as crucial as the information itself. Informing the individual that he or she may experience a particular side effect may not be sufficient to prevent use. These users are waiting for problems to arise before contemplating change. Strategies for prevention must consider this in view of the importance many users place on the perceived benefits. Their resistance to changes in cost is a further example of this commitment.

The present study was not able to identify group differences in the deterrents to AAS use. Because the identification of such information would have important implications for the development of intervention strategies, it is

suggested that more attention be paid to other contributing factors in future research. The list of seven factors examined in this study is probably far from complete. An examination of the deterrent effect of other factors, such as drug-free training routines and changes in the social value system, may differentiate among the groups. The finding that women were significantly more likely to be deterred by increased criminal penalties than men, given the small number of female participants, is particularly important because it suggests differences between the sexes that would warrant further investigation with a greater number of female users.

AAS use is becoming more popular and it is likely to continue in view of the current social value system (Yesalis & Bahrke, 1995). The present study has provided further support for the claim that noncompetitive recreational users make up a large proportion of the AAS-using population. Although physical improvements are the main motivating forces, this group is also more likely to expect psychological benefits. Education strategies that understand these needs, identify specific requirements, and provide nonpharmacologic alternatives to obtain them may help to reduce the number of users in this group and ultimately reduce the AAS-using population.

A cross-sectional study of current AAS users is limited in the type of inference that can be drawn from the study findings. This is particularly true in regard to the prevalence of AAS use among gay men, women, and adolescents in the present study. Although a random sample of the unknown population of AAS users is not feasible, the sample may well represent a group of satisfied users. Dissatisfied users who had ceased using may have been excluded by virtue of the selection criteria, and current users who are unwilling to participate in research may be inherently different from the sample reported here. In addition, although every effort was made to maintain rapport with the participant and despite her or his willingness to disclose polydrug use and gay or lesbian sexual orientation, participants may have withheld information from the interviewers that could distort the findings. Regardless of its methodological limitations, this study provides some of the first Australian data on AAS users that should generate hypotheses that can be more rigorously tested in future research.

References

Beel, A. (1996, March). *The profile, attitudes and behaviours of steroid users: How do they compare to the general population?* Paper presented at the 7th International Conference of Drug Related Harm, Hobart, Australia.

Brower, K. J. (1989). Rehabilitation for anabolic–androgenic steroid dependence. *Clinical Sports Medicine, 1,* 171–181.

Buckley, W. E., Yesalis, C. E., Friedl, K. E., Anderson, W. A., Streit, A. L., & Wright, J. E. (1988). Estimated prevalence of anabolic steroid use among male high school seniors. *Journal of the American Medical Association, 16,* 3441–3445.

Commonwealth Department of Health and Family Services. (1996). *1995 National Drug Strategy Household Survey.* Canberra, Australia: Australian Government Publishing Service.

Commonwealth Department of Human Services and Health. (1994). *1993 National Drug Strategy Household Survey.* Canberra, Australia: Australian Government Publishing Service.

Darke, S., & Hall, W. (1995). Levels of polydrug use among heroin users and regular amphetamine users. *Drug and Alcohol Dependence, 39,* 231–235.

Darke, S., Ross, J., & Hall, W. (1996). Overdose among heroin users in Sydney, Australia: 1. Prevalence and correlates of non-fatal overdose. *Addiction, 91,* 405–411.

Dart, R. C. (1991). Anabolic steroid abuse among law enforcement officers. *Police Chief, 58,* 18.

Gridley, D. W., & Hanrahan, S. J. (1994). Anabolic–androgenic steroid use among male gymnasium participants: Dependence, knowledge and motives. *Sport Health, 12,* 11–14.

Melia, P. (1994). Sport for all: But is it suitable for children? *International Journal of Drug Policy, 5,* 34–39.

Moss, H. B., Panzak, G. L., & Tarter, R. E. (1992). Personality, mood, and psychiatric symptoms among anabolic steroid users. *The American Journal on Addictions, 1,* 217–234.

Mugford, S. (1995). *Development of anabolic steroids (and other anabolic substances) use indicators in Australia* (National Drug Strategy Research Report No. 2). Canberra, Australian Capital Territory, Australia: Assisting Drug Dependants.

Plowright, S. (1993). *Harm minimisation and anabolic steroids results and recommendations of the DRIC Injecting Steroid User Survey.* Canberra, Australian Capital Territory, Australia: Assisting Drug Dependants.

Pope, H. G., Katz, D. L., & Hudson, J. I. (1993).

Anorexia nervosa and "reverse anorexia" among 108 male bodybuilders. *Comprehensive Psychiatry, 34,* 406–409.

Schwerin, M. J., Corcoran, K. J., Fisher, L., Patterson, D., Askew, W., Olrich, T., & Shanks, S. (1996). Social physique anxiety, body esteem, and social anxiety in bodybuilders and self-reported anabolic steroid users. *Addictive Behaviours, 21,* 1–8.

Shapiro, H. (1994). "The pound is strong, inflation is up": A future market for anabolic steroids. *The International Journal of Drug Policy, 5,* 11–14.

Swift, W., Hall, W., & Copeland, J. (1997). *Cannabis dependence among long-term users in Sydney, Australia* (Tech. Rep. No. 47). Sydney, New South Wales, Australia: National Drug and Alcohol Research Centre.

Todd, T. (1987). Anabolic steroids: The gremlins of sport. *Journal of Sport History, 14,* 87–107.

Topp, L., & Darke, S. (1997). The applicability of the dependence syndrome to amphetamine. *Drug and Alcohol Dependence, 48,* 113–118.

Wagram, D. F., Curry, L. A., & Cook, D. L. (1995). An investigation into anabolic androgenic steroid use by elite U.S. powerlifters. *Journal of Strength and Conditioning Research, 9,* 149–154.

Yesalis, C. E. (1993). Incidence of anabolic steroid use: A discussion of methodological issues. In C. E. Yesalis (Ed.), *Anabolic steroids in sport and exercise* (pp. 49–69). Champaign, IL: Human Kinetics.

Yesalis, C. E., & Bahrke, M. S. (1995). Anabolic–androgenic steroids: Current issues. *Sports Medicine, 19,* 326–340.

Yesalis, C. E., Courson, S. P., & Wright, J. (1993). History of anabolic steroid use in sport and exercise. In C. E. Yesalis (Ed.), *Anabolic Steroids in Sport and Exercise* (pp. 3–33). Champaign, IL: Human Kinetics.

Yesalis, C. E., Kennedy, N. J., Kopstein, A. N., & Bahrke, M. S. (1993). Anabolic–androgenic steroid use in the United States. *Journal of the American Medical Association, 270,* 1217–1221.

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