

"If everyone is using, shouldn't I?": Perceived norms of
anabolic androgenic steroid use among high school
athletes.

**Report prepared for the World Anti-Doping Agency
March, 2013**

Jules Woolf Ph.D. (University of Windsor/ Western Illinois University)

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Acknowledgements

There are many people that I would like to thank for their support throughout this project. From Western Illinois University I would like to thank Tere North, Angela Tee, Jessica Dunn, Beth Seaton, Amanda Shultz, and Dr. Janet Wigglesworth for their support and help. In addition, my graduate research assistant Ben Hunter was invaluable. His efforts were instrumental in the completion of this project. Finally, I am indebted to my colleague Dr. Doshik Yun for his assistance. Dr. Yun has since moved back to South Korea with his wife to embark on a new career outside of academia. I wish him every success.

I also need to thank Dr. Rajiv Rimal and Ms. Pooja Sripad. Dr. Rimal has been a mentor to me over the years and I am grateful for his guidance. Ms. Sripad, who recently joined the research project, has been a tremendous help with data analysis and will join Dr. Rimal and I as a co-author for a forthcoming publication and conference presentations on this project.

Finally, I need to thank all the young athletes who completed the questionnaire, their coaches, and school administrators and others who facilitated the research.

Thanks are also due to the World Anti-Doping Agency for supporting the research.

Author contact details:

Jules Woolf, Ph.D.
Assistant Professor
University of Windsor
Department of Kinesiology
401 Sunset Avenue
Windsor, Ontario, Canada N9B 3P4

Off: (519) 253-3000 ext. 4270

Fax: (519) 973-7056

Abbreviations

AAS	Anabolic Androgenic Steroids
DN	Descriptive norms
IN	Injunctive norms
IRB	Institutional Review Board
PED	Performance Enhancing Drugs
MLB	Major League Baseball
NBA	National Basketball Association
NFL	National Football League
WIU	Western Illinois University

Executive summary

It is commonly believed that professional athletes are role models for youth. The actions of these athletes are therefore thought to influence the actions of younger generations by providing models of behavior to follow. This belief is frequently espoused when made in connection to the use of performance enhancing substances. Thus if it is the norm that professional athletes use anabolic steroids then it is assumed that younger athletes would imitate this behavior. However this connection has not been systematic researched. In contrast, it may be that others closer to the athlete, such as friends or teammates, exert greater influence.

The model of behavior provided by others may be expressed in two ways. First, there is the perception of what others are actually doing. The conundrum faced by the athlete is therefore, “if everyone else is using anabolic steroids, then why shouldn’t I”. This perception of the frequency of behavior is otherwise known as descriptive normative behavior. In contrast, injunctive normative behavior represents perception of what referent others believe one should do. For instance, a celebrity that promotes a message to stay drug free is communicating an injunctive normative behavior. In this study, descriptive and injunctive norms were investigated to determine the effect of referent others (from friends to professional athletes) on young athletes intentions to use anabolic steroids.

Athletes ($N = 404$) from high school football, baseball, and basketball teams in Illinois and Iowa were recruited to participate in the study. Athletes completed an online survey on their perceptions of descriptive norms, injunctive norms, and their intentions to use anabolic steroids. The results revealed that the perceived normative behavior of friends has the greatest influence on intention to use anabolic steroids. Teammates had the second strongest influences, followed by collegiate athletes and lastly, professional athletes. In addition, descriptive norms appear to matter more than injunctive. In effect, young athletes are influenced by what they believe those closer to them are doing. In contrast, young athletes perception of what others believe they should do matters less, and in fact, in reference to professional or collegiate athletes, does not matter at all. Finally, young athletes perception of the frequency of anabolic steroid abuse by their peers is similar to percentages reported in the academic literature. Perceptions of anabolic steroids abuse among collegiate and professional players was high, but were still relatively conservative considering the prevailing notion that abuse is widespread.

There are three main outcomes from this study:

First, the perceived behavior of those closest to the athlete, such as friends and teammates, is more influential than that of professional or collegiate athletes. While it may seem intuitive that professional

athletes serve as role models when it comes to performance enhancing substances, the reality is different. In particular, what professional or collegiate athletes believe that young athletes should do appears inconsequential. Anti-doping advocates should therefore promote messages that include identifiable and similar others, such as young athletes as role models, rather than professional or collegiate role models.

Second, descriptive norms appear to be more important than injunctive norms. This means that young athletes are more influenced by what they perceive others are doing, rather than what these others believe they should do. Anti-doping advocates should therefore promote messages that focus on what other athletes are doing and the low prevalence of anabolic steroid abuse. In contrast, messages that tell young athletes what they should do, or what others expect of them, may be less influential.

Third, young athletes' perception of anabolic steroid abuse among their peers appears to match reports in the academic literature. Their estimate of the prevalence of abuse does increase as these athletes consider use among other high schools, collegiate, and professional athletes. Anti-doping advocates should therefore promote messages that reinforce the low rates of prevalence among peers, and attempt to correct the misperception of use among more distal others.

Introduction

Periodically high profile and professional athletes are discovered to be using illegal performance-enhancing drugs (PEDs). Researchers have argued that these cases send a message to young athletes that the use of PEDs, such as anabolic androgenic steroids (AAS), are not only accepted, but necessary for athletic success (Calfee & Fadale 2006). Professional athletes may serve as models behavior, however, those closer to the athlete, such as teammates and friends, may also exert an influence. Little is known about the influence of other athletes on young athletes' attitudes towards PED. The use of AAS by adolescents is of concern because these PEDs have been associated with myriad physiological and psychological issues (Casavant *et al.* 2007; Trenton & Currier 2006; Thiblin & Petersson 2004). To address this issue this study investigated the influence of aspirational others and normative beliefs of adolescent football, basketball, and baseball players on intentions to use AAS.

In the USA, longitudinal data from the Monitoring the Future Study and the Youth Risk Behavioral Surveillance System suggests that AAS use among high school students has remained relatively stable. These studies, along with cross sectional studies, report that adolescents' lifetime prevalence rates (i.e., have ever used) of AAS use is approximately 2-5%, although in some states the rates exceed 10% (Eaton *et al.* 2010; Johnston *et al.* 2011; Miller *et al.* 2005; Yesalis *et al.* 1997). In line with these estimates Woolf and Swain (2013) have reported doping experts believe that AAS use among high school athletes likely approximates 5-10%. Considering that nearly six out of ten high school students have played on at least one sports team (CDC 2010) the number of high students potentially being exposed to AAS is significant. Moreover, the rates of AAS among this population are similar to lifetime prevalence rates of cocaine and heroin use, and approximate rates of frequent cigarette smoking by adolescents. This further serves to illustrate the potential gravity of the situation.

The current cultural climate fosters an atmosphere of performance enhancing acceptance. Public perception of AAS use is that they are necessary to obtain a competitive advantage (Becker & Scheufele 2008). Media and television coverage of youth sport where the emphasis is on elite play (e.g., Little League World Series) potentially increases the importance of athletic success and subsequently the desire to use substances to improve performance. Likewise, the growing cost of college tuition also magnifies the importance of obtaining an athletic scholarship – thus the financial rewards of elite sport occur at younger and younger ages.

Adolescent athletes are also more likely to be offered AAS than their peers (Wichstrøm & Pedersen 2001) and not surprisingly AAS usage is associated with sport participation (Lorang *et al.* 2011; Terry-McElrath *et al.* 2011). Of concern is that adolescents are increasingly downplaying the harmfulness

off AAS use (Johnston *et al.* 2011) and a significant number believe that these drugs can be used safely (Laure *et al.* 2004). Moreover, Laure and colleagues (2004) have reported that high school sport students believe that doping abuse is increasing. In sum, there appears to be paradigm developing where steroid use in sport is considered more widespread and a necessity for success.

The issue of AAS among adolescent athletes has drawn the attention of policy makers. Most famously, then President Bush in his 2004 State of the Union speech called for an end to AAS in professional sports and reminded professional athletes that they serve as positive role models for the youth of America. The U.S. Olympic Committee and the United Nations have also taken the position that professional athletes serve as role models and can influence youths' AAS and other drug use (Petersen 2010; Shaw, Whitehead & Giles 2010). In similar fashion, the academic and medical community has supported the idea that athletes are influential role models for youths (Martin, Baron & Magd 2007).

However there is little research to support the contention that professional athletes act as influential role models. There is evidence to demonstrate that an athlete's use of a legal sport supplement (androstenedione, which was legal at the time) does increase adults' intentions to use the same product (Brown, Basil, & Bocarnea 2003). In addition, if individuals aspire to be like a famous athlete then this may cause these same individuals to downplay health concerns related to the athlete's recreational drug use (Brown & Matviuk 2010). However, both of these studies involved adult non-athletes, not adolescent athletes. Adolescents (non-athletes) have reported to feeling desensitized to recreational drug use due to frequent media coverage of drug use by a music celebrity (Shaw, Whitehead, & Giles 2010) and drug use by professional athletes does not appear to affect adolescents' perceptions of the risks associated with drug use (Denham 2009). Famous athletes do appear to influence purchase intentions and behaviors of consumer products, however these role models appear to be less influential than the adolescents' father and mother (Martin & Bush 2000). It is therefore unclear to what extent professional athletes may influence adolescent athletes' intentions to use AAS. In contrast, it may be that people closer to the adolescent, such as friends or teammates, exert a greater influence.

The actions of relevant or referent others, such as friends and teammates, may influence behavior by providing a model for behavior (Tajfel, 1982). The perceived normative behavior of others therefore serves as means to compare one's behavior with others, and potentially to change behavior to conform to the perceived norm. For example, if athletes believe that a high proportion of their teammates use AAS, they may conform to this norm by similarly deciding to use AAS. Within the athletic community, the impact of perceived norms on behavior may be especially influential because these communities tend to

be insular and this creates an appreciable level of social dependency (Martens, Dams-O'Conner, & Beck 2006).

Research on the impact of perceived norms has received considerable attention in the context of young adults and alcohol consumption among their peers. University students tend to overestimate alcohol consumption among other students and therefore social marketing campaigns attempt to correct for this misperception. While some researchers report that correcting these misperceptions does reduce alcohol consumption (Perkins & Craig 2006), research in this area is equivocal (Wechsler *et al.* 2003). One reason for the lack of consistent findings may be in the way that perceived norms are conceptualized (Real & Rimal 2007).

Perceived norms can be differentiated into descriptive norms and injunction norms (Cialdini, Reno, & Kallgren 1990). Descriptive norms are the perceived prevalence of a behavior; while injunctive norms represent perceptions of what influential others expect one to do. That perceived norms can be separated into descriptive and injunctive norms have not always been taken into account in previous research studies. The Theory of Normative Social Behavior (Rimal & Real 2005) separates these two constructs and examines the influence of each. Moreover, this theory states that the relationship between descriptive norms and behavioral intentions is moderated by injunctive norms, outcome expectations, and group identity. Outcome expectations represent the extent to which one believes benefits will accrue from one's actions, which may be personal benefits or benefits that the group receives. In the current study, outcome expectation would be the benefits that the person and their team receive from the use of AAS, such as playing well and winning games. The final construct of this model, group identity, is the extent one feels affinity and attraction to the referent group, which again, in this context is the sport team.

The Theory of Normative Social Behavior provides a suitable model to investigate the effect of descriptive and injunctive norms and intentions to use AAS. Moreover, there has been little research on the potential effect of perceived norms on adolescent athletes' intentions to use AAS. MacKinnon *et al.* (2001) state that high school football players perceive that their coach would be intolerant to AAS use, which represents an injunctive norm (i.e., what their coach expects of the athlete). Dodge and Jaccard (2008) also report that perceived norms, which in their study represented injunctive norms, did predict intentions to abstain from AAS. In addition, Lucidi *et al.* (2008) report that intentions to use doping increased when 'meaningful others' approved of their use, however it is unclear what these authors meant by the term 'meaningful others'. Finally, Denham (2009) provides evidence that as perceived norms of peer AAS use increases, provided that AAS are perceived to be accessible, then adolescents downplay the risks associated with AAS use. In sum, the limited research in this area has not systematic investigated the

impact of perceived norms on athletes intentions to use AAS. It does appear that injunctive norms (i.e., what the athlete perceives others believe they *should* do) influence intentions.

There have been calls from researchers (e.g. Donovan *et al.* 2002; Petroczi & Aidman 2008, Stewart & Smith 2008) for more efforts to investigate the effect of perceived norms on AAS use. However, this has tended to be directed towards AAS use by elite athletes. This may be due to reports that among elite athletes, athletic peers influence one's own use (Kirby, Moran & Guerin 2011; Stewart & Smith 2010). However, there has been little effort to examine the impact of peers or aspirational others on adolescent athletes intentions towards AAS use. This study therefore adds to existing research literature by examining normative influences on intentions to use by AAS with a sample of high school male athletes.

Method

High school male athletes ($N = 404$) were recruited from eight medium to large sized high schools in Illinois and Iowa (M enrollment = 1545; $SD = 803$). Participants played on the school's football, basketball, or baseball team and were aged 14-19 years ($M = 16.06$, $SD = 1.23$). Parental consent (appendix A) was obtained for individuals under the age of 18. In addition, all participants completed an informed assent form (appendix B). The institutional review board approved the protocol (WIU IRB protocol number 258-11).

Participants completed an online survey administered using Qualtrics. The survey was pilot tested with four middle school athletes (age 12-13) to ensure reading comprehension. The participants in the pilot study were therefore younger than the participants in the main study. This was deliberately done as it was assumed that using younger participants to ensure reading comprehension would decrease the likelihood that written information was not understood by participants in the main study. These individuals also provided feedback on definitions and terminology used in the survey. The definition provided to participants for AAS ("Anabolic steroids are illegal substances that are taken to help improve performance in sport or physical activity") was tested and modified accordingly based on the feedback received from the pilot group. The definition for AAS was provided at the start of the survey and was featured at the top each webpage of the survey.

The survey was administered at each school's computer lab. The lab was booked in advance and closed to students who were not participants. Participants were provided instructions verbally before starting the survey. In addition, the opening page of the survey included instructions as well as an assent form for students to complete before being allowed to complete the survey. At least two proctors were

present during data collection and participants were informed of standard computer lab rules (e.g., no talking or interacting with peers). Participants received remuneration of \$10 for completing the survey.

Measures

The dependent variable, “intent to use anabolic steroids” was measured continuously on a 7-point scale. The independent variables of interest, both descriptive and injunctive norms, were also measured continuously on a 7-point scale. In addition, a variable for descriptive norms was recorded as a percentage (i.e., “Out of 100 professional football players how many have ever used anabolic steroids, even once?”). Participants were asked to indicate their percentile estimates in reference to professional, collegiate, other high school, and own school athletes in their identified sport. Respondents recorded their answer by moving a sliding scale that simultaneously showed the corresponding percentage. Thus descriptive norms were collected as a percentage and by using a 7-point scale.

Descriptive norms captured the athlete’s perception of how commonly used anabolic steroids were while injunctive norms elicited how much approval they would gain by using anabolic steroids. Norms recorded using the 7-point scale were measured at different proximity levels to the high school athlete. The different levels of proximity were professional level, college level, team level and friend level. Note that descriptive norms recorded as a percentage were not collected at the friend level because asking athletes to comment on the perceived actions of 100 of their friends was deemed an unsuitable question.

Control variables included perceived risk of anabolic steroid use, individual and team outcome expectations around the benefits of steroid use. The perceived risk variable, measured on a 7-point scale, was a composite index of perceived severity and susceptibility of steroid use ($\alpha=0.975$). This variable captures the athlete’s perception of harmful health consequences that may result from use of AAS. Personal and social expectations around how efficacious AAS would be for the athlete were also measured on a 7-point scale. Appendix C includes a list of the questions used in the online survey.

Exploratory descriptive analysis of the measures and subsequent bivariate and multivariate linear regression models were carried out using STATA 11. Regression analyses were performed with respect to level of normative influence to study the effect of proximity of descriptive and injunctive norms with on intent to use anabolic steroids amongst high school students. Stratified analysis by sport (football, baseball and basketball) was conducted to see how the proximity effects of norms varied amongst different types of athletes.

Results

The study sample (n=404) of athletes was comprised of football (n=222), baseball (114) and basketball players (n=69), and predominantly of Caucasian ethnicity (Table 1). Intention to use anabolic steroids was relatively speaking low amongst all athletes (m=1.23, s.d.=0.80), indicating the low prevalence of intent and use of steroids in the population.

Descriptive and injunctive norms differed substantially by social distance, namely as proximity increased (professional being the most distant to friend being the most proximate), the frequency of reporting the norms decreased. Global F-tests and pairwise comparisons between the norms levels confirmed that they were statistically significantly different from each other. High perceived risk of steroid use (mean=6.04, s.d.=1.27) suggests that high school students are aware of harmful consequences associated with anabolic steroids. Expected team and individual benefits (outcome expectations) were moderately reported (Table 1).

Table 1: Descriptive statistics

Variable	Mean (SD) / Freq (%) (n=404)
Intent to use anabolic steroids	1.23 (0.78)
Descriptive Norm Level	
Professional (Highest)	3.29 (1.38)
College (High)	2.70 (1.23)
Team (Medium)	1.31 (0.73)
Friends (Low)	1.21 (0.57)
Injunctive Norm Level	
Professional (Highest)	2.34 (1.32)
College (High)	2.29 (1.30)
Team (Medium)	1.73 (1.14)
Friends (Low)	1.66 (1.10)
Perceived risk of steroid use	6.04 (1.27)
Expected individual benefits	4.49 (1.72)
Expected team benefits	3.76 (1.87)
Age	16.07 (1.23)
Ethnicity (Caucasian American)	322 (79.9)

Descriptive norms recorded as a percentage of use indicated substantial, and expected differences, among the different sporting levels. In general, high school athletes perceived AAS use to highest among professional athletes and lowest among athletes from their own school (Table 2). Of note is that the mean perception of AAS use by one's own teammates approximates the prevalence rates (i.e., 2-5%) reported from previous research (Eaton *et al.* 2010; Johnston *et al.* 2011; Miller *et al.* 2005; Yesalis *et al.* 1997).

Table 2: Descriptive norms as a percentage (SD) by sport and reference group

Level	Football	Baseball	Basketball	Overall
Professional	31.04 (24.10)	30.47 (17.67)	23.32 (22.05)	29.57 (23.78)
Collegiate	25.05 (21.83)	17.67 (16.51)	17.33 (16.69)	21.66 (19.94)
Other School	14.97 (16.48)	8.78 (11.68)	9.77 (12.56)	12.35 (14.90)
Own School	4.62 (9.64)	3.79 (8.33)	2.35 (4.48)	4.00 (8.62)

Bivariate associations suggested that intent to use anabolic steroids was positively associated with descriptive and injunctive norms (all levels), expected individual benefits and expected team benefits; and negatively associated with perceived risk of steroid use (Table 3). Age and ethnicity were not significantly associated with intent to use steroids and therefore not included in the multivariate regressions.

Table 3: Bivariate and multivariate regressions for all athlete sample (N=404)

Intent to use anabolic steroids amongst all high school athletes						
	SLR ⁱ	MLR 1 ⁱⁱ . Highest Level Norms	MLR 2 ⁱⁱⁱ . High Level Norms	MLR 3 ^{iv} . Medium Level Norms	MLR 4 ^v . Low Level Norms	MLR 5 ^{vi} . Overall norms
Descriptive Norm Level						
Professional (Highest)	0.10***	0.14**				0.1
College (High)	0.11***		0.11*			0.03
Team (Medium)	0.26***			0.17***		0.08
Friends (Low)	0.42***				0.22***	0.15*
Injunctive Norm Level						
Professional (Highest)	0.09***	0.03				-0.02
College (High)	0.10***		0.05			-0.04
Team (Medium)	0.19***			0.16**		0.02
Friends (Low)	0.22***				0.17***	0.19**
DNXIN (interaction per level)		0.23	0.57***	0.03	0.19	n/a
Perceived risk of steroid use	-0.14***	-0.21***	-0.20***	-0.15**	-0.14**	-0.14**
Expected individual benefits	0.07**	-0.04	-0.02	-0.03	-0.02	-0.05
Expected team benefits	0.07***	0.16*	0.15 [#]	0.13	0.11	0.12
RMSE		0.74	0.75	0.73	0.71	0.71
R-squared		0.1	0.1	0.14	0.17	0.19

Note: all coefficients reported are standardized betas. Multivariate regressions control for all variables shown, minus age and ethnicity. ⁱSimple linear regression (bivariate associations). ⁱⁱMultiple linear regression for professional norms. ⁱⁱⁱMultiple linear regression for college norms. ^{iv}Multiple linear regression for team norms. ^vMultiple linear regression for friend norms. ^{vi}Multiple linear regression for overall/combined norms.

[#]Marginally significant at 0.1

*Significant at 0.05

**Significant at 0.01

***Significant at 0.001

Multivariate regressions showed that not only do sources of normative influence, for both injunctive norms (IN) and descriptive norms (DN) matter, but that the greater the social proximity,

stronger the norms (Table 3). Each type of DN and two of the four INs (team and friend levels) appear to have an influence on intentions, but when all sources are considered jointly, only norms emanating from friends appear to matter. The patterns of association across norms levels with intent to use steroids suggest that DNs have greater influence on intentions compared to INs.

Stratified analysis by sport type showed similar but some varied findings with respect to norms. In particular, the gradient of closer proximity and stronger normative influence appeared to be consistently replicated across football, baseball and basketball athletes. Amongst football players, only DN norms appeared to influence though INs were not significantly associated with intent to use steroids (Table 4). Amongst baseball and basketball players, both DNs and INs were influential, though only at closer proximity levels (Table 5, Table 6).

Table 4: Multivariate associations for football players (N=222)

Intent to use anabolic steroids amongst football players					
	MLR 1ⁱ. Highest Level Norms	MLR 2ⁱⁱ. High Level Norms	MLR 3ⁱⁱⁱ. Medium Level Norms	MLR 4^{iv}. Low Level Norms	MLR 5^v. Overall norms
Descriptive Norm Level					
Professional (Highest)	0.21**				0.1
College (High)		0.22***			0.13
Team (Medium)			0.27***		0.16 [#]
Friends (Low)				0.25***	0.11
Injunctive Norm Level					
Professional (Highest)	0.02				-0.01
College (High)		0.03			-0.04
Team (Medium)			0.02		-0.11
Friends (Low)				0.07	0.18 [#]
DNXIN (interaction per level)	0.45	0.80***	0.18	0.39	
Perceived risk of steroid use Expected individual benefits	-0.27***	-0.26***	-0.22***	-0.21***	-0.20**
Expected team benefits	0.01	0.03	0.01	0.05	-0.02
RMSE	0.12	0.13	0.15	0.12	0.15
R-squared	0.69	0.69	0.68	0.68	0.66
	0.17	0.17	0.19	0.2	0.21

Note: all coefficients reported are standardized betas. Multivariate regressions control for all variables shown, minus age and ethnicity. ⁱMultiple linear regression for professional norms. ⁱⁱMultiple linear regression for college norms. ⁱⁱⁱMultiple linear regression for team norms. ^{iv}Multiple linear regression for friend norms. ^vMultiple linear regression for overall/combined norms.

[#]Marginally significant at 0.1

*Significant at 0.05

**Significant at 0.01

***Significant at 0.001

Table 5: Multivariate associations for baseball players (N=114)

Intent to use anabolic steroids amongst baseball players					
	MLR 1 ⁱ . Highest Level Norms	MLR 2 ⁱⁱ . High Level Norms	MLR 3 ⁱⁱⁱ . Medium Level Norms	MLR 4 ^{iv} . Low Level Norms	MLR 5 ^v . Overall norms
Descriptive Norm Level					
Professional (Highest)	0.02				0.02
College (High)		-0.05			-0.04
Team (Medium)			0.08		0.02
Friends (Low)				0.18*	0.18
Injunctive Norm Level					
Professional (Highest)	0.03				-0.06
College (High)		0.1			-0.02
Team (Medium)			0.34***		0.1
Friends (Low)				0.34***	0.28 [#]
DNXIN (interaction per level)		0.4	-0.37	0.05	
Perceived risk of steroid use	-0.17 [#]	-0.17 [#]	-0.11	-0.12	-0.11
Expected individual benefits	-0.04	-0.02	-0.01	-0.07	-0.06
Expected team benefits	0.22	0.2	0.06	0.07	0.07
RMSE	0.98	0.98	0.93	0.91	0.93
R-squared	0.08	0.09	0.17	0.21	0.22

Note: all coefficients reported are standardized betas. Multivariate regressions control for all variables shown, minus age and ethnicity. ⁱMultiple linear regression for professional norms. ⁱⁱMultiple linear regression for college norms. ⁱⁱⁱMultiple linear regression for team norms. ^{iv}Multiple linear regression for friend norms. ^vMultiple linear regression for overall/combined norms.

[#]Marginally significant at 0.1

*Significant at 0.05

**Significant at 0.01

***Significant at 0.001

Table 6: Multivariate associations for basketball players (N=69)

Intent to use anabolic steroids amongst basketball players					
	MLR 1 ⁱ . Highest Level Norms	MLR 2 ⁱⁱ . High Level Norms	MLR 3 ⁱⁱⁱ . Medium Level Norms	MLR 4 ^{iv} . Low Level Norms	MLR 5 ^v . Overall norms
Descriptive Norm Level					
Professional (Highest)	0.03				-0.07
College (High)		0.07			0.07
Team (Medium)			0.37***		0.21
Friends (Low)				0.46***	0.32*
Injunctive Norm Level					
Professional (Highest)	0.01				0.07
College (High)		0.01			-0.21
Team (Medium)			0.34**		0.37*
Friends (Low)				0.05	-0.1
DNXIN (interaction per level)	-0.59	-0.62	1.75***	0.2	
Perceived risk of steroid use	-0.31*	-0.30*	-0.18 [#]	-0.18	-0.14
Expected individual benefits	-0.29	-0.27	-0.16	-0.11	-0.04
Expected team benefits	0.17	0.14	-0.09	0.01	-0.14
RMSE	0.31	0.3	0.26	0.27	0.26
R-squared	0.12	0.13	0.34	0.32	0.4

Note: all coefficients reported are standardized betas. Multivariate regressions control for all variables shown, minus age and ethnicity. ⁱMultiple linear regression for professional norms. ⁱⁱMultiple linear regression for college norms. ⁱⁱⁱMultiple linear regression for team norms. ^{iv}Multiple linear regression for friend norms. ^vMultiple linear regression for overall/combined norms.

[#]Marginally significant at 0.1

*Significant at 0.05

**Significant at 0.01

***Significant at 0.001

A sub-finding also suggests that perceived risk is was also strongly associated with decreased intention to use steroids for the overall population of athletes (Table 3). In the stratified analysis, perceived risk was more influential in lowering intentions to use steroids amongst football and basketball players compared to baseball players (Table 4, Table 5, & Table 6).

Discussion

The notion that professional athletes are role models for youth is axiomatic. However, the results from this study demonstrate, that at least in the context of PEDs and AAS, this is not the case. Instead, those who are closer to the athlete, their friends, and their teammates, are more influential. This is an important finding because it signals that the use of professional athletes as spokespeople for anti-doping campaigns is unlikely to be as persuasive as using individuals closer to the athlete's reference group. Moreover, as indicated in the results, injunctive norms do not influence intentions to use AAS when the source of these norms is distal to the athlete. Thus, the adolescent athlete is not influenced by what professional or collegiate athletes believe they should do.

The different impact of injunctive norms and descriptive norms is also informative. Previous research has hinted that injunctive norms are influential to adolescents' decision making (Dodge & Jaccard 2008; Lucidi *et al.* 2008; MacKinnon *et al.* 2001). That is, adolescent athletes are influenced by what they believe others think they should do. The results from this study suggest that it is only proximal influences, such as friends and teammates that matter in this regard. Moreover, when taken together, it is descriptive norms and not injunctive norms that appear to matter most. In essence, it is not what others believe they should do but what others are actually doing that influence behavior. This also suggests that rather than telling adolescent athletes what they should do, anti-doping advocates should be emphasizing the extent of normative use – provided normative use is low.

An additional implication of this finding is that potentially, if perceived descriptive norms among their peers are high, adolescent athletes may well be influenced to use AAS. In essence, adolescents are confronted with the conundrum that if they believe that everyone else is using then why shouldn't they also use. In line with this statement, Pappa and Kennedy (2012) have reported that young adult track athletes who have used PEDs also describe PEDs use as a common practice among competitors. The concern therefore is whether adolescents also perceive PEDs use to be normalized among their peers. In this study, athletes from three mainstream power based sports report that AAS use among their teammates to be approximate 2-5%. This is consistent with percentages reported in academic literature (Eaton *et al.* 2010; Johnston *et al.* 2011; Miller *et al.* 2005; Yesalis *et al.* 1997). It would therefore appear that adolescent athletes hold relatively accurate perceptions of AAS use among their own cohort. While these estimates of prevalence of use are relatively low, they indicate that adolescents believe some will dope. Because of the potential influence of descriptive norms anti-doping advocates should reinforce the perception that AAS use among adolescent athletes is very low.

However, of concern is that these athletes believe that the prevalence of AAS use at other high schools is relatively high (approximately 8 – 15%). This would be more in line with the estimates provided by Woolf and Swain (2013). If adolescent athletes believe that other high school students are using then this may influence their own decision to use.

Nor surprisingly as adolescent athletes consider normative use of AAS among more distal reference groups (i.e., college and professional athletes) their estimations of use increase. While these estimates may appear high they do not appear to be extremely exaggerated. Football and baseball have historically been tied to instances of PEDs abuse and the perception that 'everyone is using' appears commonplace in modern media. Still, the estimates provided by the athletes in this study appear to be high. For instance, Horn, Gregory and Guskiewicz (2009) report that 9.1% of retired NFL players

reported using AAS during their career. In addition, according to the Mitchell Report (2007) 5-7% of MLB players were detected using PEDs as part of an anonymous testing program implemented in 2003. If these numbers are accurate and have remained stable over the last decade, then we can conclude that adolescent athletes' estimates of AAS use by professional athletes is overly high and does not match reality. It may well be that the presence of an availability heuristic (Tversky & Kahneman 1973), where high profile reports of doping scandals, serve to magnify the perception that instances of AAS use is more widespread than they actually are. While it appears the descriptive norms are more influential at proximal points of reference, descriptive norms at distal points of reference still exert influence. It would therefore be appropriate for anti-doping advocates to challenge the perception that doping abuse is widespread in sport.

In conclusion, adolescent athletes are influenced by the perceived descriptive norms of others, particularly those closest to them, i.e., friends and teammates. In contrast, the perceived behavior of professional and collegiate athletes is not as influential. Moreover, injunctive norms at these reference levels do not influence adolescent athletes' intentions to use AAS. Messages from professional or collegiate athletes on what adolescent athletes should do are likely to be ineffective. Instead, the results from this study suggest that adolescent athletes are influenced more by what they perceive to be descriptive normative behavior among their peers. Moreover, their perception in this regard appears to match reports in the literature. While this is beneficial in that these norms are relatively low, it is of concern that cultural influences are promoting a society based on performance enhancement. Anti-doping advocates should therefore seek to reinforce the message that a minority of athletes, particularly at the high school level, are engaged in doping abuse.

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Appendix A: Parental Permission Form

Dear Parent:

I am from the Department of Kinesiology at Western Illinois University. I am conducting a research study on teenage athletes' thoughts and feelings on anabolic steroids in sport. I would like to include your child in my research study. Your child was selected as a possible participant because he is a current varsity athlete. The study will take place in a computer lab at your child's high school. If your child takes part in this project, it should take approximately 20-35 minutes to complete the research study.

If your child takes part in this project, he/she will be asked to do the following activities: Complete a web survey where they will answer a series of questions related to anabolic steroid use in their sport.

This research has the following risks: Your child will be asked to answer questions anonymously on anabolic steroids use in sport. This may cause them some discomfort because anabolic steroids is a controversial subject.

The research has the following benefits: Your child may develop a deeper understanding of their beliefs and feelings of anabolic steroids. In addition, the results from this study will enable researchers to have a better understanding of the ways in which student-athletes view anabolic steroids. In turn this may help us develop strategies to promote a doping free culture in high school athletics.

Your child will receive the following payment/reimbursement: Upon completion of the study your child will receive \$10.

The information in this research will be kept confidential. Your child's name will not be linked or associated in anyway with their answers. In additional, their answers will be combined with answers from other students. This will make it impossible to identify your child with the answers they provide. Research data will be stored in a secure location. All data will be stored on a computer hard drive that is password protected. The data will be made available only to the persons conducting the research. No reference will be made in oral or written reports that could link your child to the research.

Your child's participation in this project is completely voluntary. In addition to your permission, your child will also be asked if he or she would like to take part in this project. Only those children who have parental permission and who want to participate will do so, and any child may stop taking part at any time. You are free to withdraw your permission for your child's participation at any time and for any reason without penalty.

We look forward to working with your child. We think that our research will be enjoyable for the children who participate.

If there are any questions at any time about the study or the procedures, please contact:

Approved Consent Form
Western Illinois University
Institutional Review Board
Dates 8/30/10 - 8/29/11 AJT

Jules Woolf
Department of Kinesiology
Western Illinois University
(309) 298-1981
J-Woolf@wiu.edu

This project has been reviewed and approved by the WIU Institutional Review Board. Questions concerning your rights as a participant in this research may be directed to Angela J. Tee, IRB Administrator, at (309) 298-1191 or IRB-Administrator@wiu.edu.

Please indicate your consent by signing and dating in the space below.

Parent/Guardian's Printed Name	Signature	Date
Investigator's Printed Name	Signature	Date

Please have your child return this signed form to their athletic director by [date]. You should also keep the second copy of this form for your records.

Approved Consent Form
Western Illinois University
Institutional Review Board
Dates 8/30/10 - 8/29/11 AJT

Appendix B: Child Assent Form

NB: The assent form will appear on the first page of the online survey.

Perceived norms of anabolic androgenic steroid use among high school athletes.

Purpose:

You are being asked to be in a research study. A research study is a special way to find out about something. Your parent/guardian knows about the study, but you can decide if you want to be in it or not. In this research study we want to ask you about anabolic steroids in sport. Anabolic steroids are illegal substances that are taken by athletes or other individuals to help improve performance in sport or physical activity.

If you decide to participate in the study, you will be asked to participate in a brief survey that you will take online from a computer. The survey will take you about 20-35 minutes to complete.

Risks/Discomforts:

Some things may make you uncomfortable, such as being asked questions about anabolic steroids. The risk in this study is not greater than that experienced in normal daily activities.

Benefits:

The researcher hopes this study will help you become aware of your feelings and beliefs about anabolic steroids. The researcher also hopes to share any benefits that may happen with other student athletes, so that other students can be helped as well. We also hope to learn something that will help other people some day.

Confidentiality:

When we are done with the study, we will write a report about what we found out. Other people will not know if you are in my study. I will put things I learn about you together with things I learn about other students so no one can tell what things came from you. When I tell other people about my research, I will not use your name, so no one can tell who I am talking about.

Participant Rights:

If you want to stop, that's OK and nobody will be angry or disappointed. You do not have to participate in this study and can quit the study at any time. If you don't want to participate in the online survey or if you don't want your information used in the research just let me know and it will not be used.

Questions:

If you have any questions about the study please contact Jules Woolf, (309) 298-1981 or J-Woolf@wiu.edu.

This project has been reviewed and approved by the WIU Institutional Review Board. Questions concerning your rights as a participant in this research may be directed to Angela Tee, IRB Administrator, at (309) 298-1191 or IRB-Administrator@wiu.edu.

If you agree to be in the study, please click "next" below.

NEXT

Approved Consent Form
Western Illinois University
Institutional Review Board
Dates 8/30/10 - 8/29/11 AJT

Appendix C: Survey questions

NB: the following is a list of the questions included in the survey. The online version of the survey included formatting features (e.g., slide scales, instructions to take a break if needed, messages of encouragement to read each question carefully, etc.) that are not featured here. In addition, the questions in the online version were framed based on each participant's declared primary sport. In the version below this feature is replaced with "<sport>" to indicate where the primary sport (i.e., football, baseball, or basketball) would be stated. A space between sets of questions indicates a new web page. To ensure that the survey was reader friendly each web page typically was limited to a set of three questions (indicated by **Q:**) using a large sized font and liberal spacing.

Q: Which one of the following is your primary sport?

One fixed choice option - football, baseball, basketball

**NB: unless otherwise indicated all remaining items were prefaced with the question:
"How much do you agree or disagree with the following statements"**

A 7-point Likert type scale was used anchored with 1= Strongly disagree and 7 = strongly agree

- Q:** Many professional <sport> players use anabolic steroids.
Anabolic steroids use is common among professional <sport> players
The majority of professional <sport> players are using anabolic steroids
- Q:** Many college <sport> players use anabolic steroids.
Anabolic steroids use is common among college <sport> players
The majority of college <sport> players are using anabolic steroids
- Q:** Many <sport> players at other high schools use anabolic steroids.
Anabolic steroids use is common among <sport> players at other high schools
The majority of <sport> players at other high schools are using anabolic steroids
- Q:** Many of my teammates on my school's <sport> team use anabolic steroids.
Anabolic steroids use is common among my teammates on my school's <sport> team
The majority of my teammates on my school's <sport> team are using anabolic steroids
- Q:** Many of my friends use anabolic steroids.
Anabolic steroids use is common among my friends
The majority of my friends are using anabolic steroids
- Q:** Out of every 100 professional <sport> players, how many do you think have ever used anabolic steroids, even once?
- Q:** Out of every 100 college <sport> players, how many do you think have ever used anabolic steroids, even once?
- Q:** Out of every 100 high school <sport> players at other schools, how many do you think have ever used anabolic steroids, even once?
- Q:** Out of every 100 high school <sport> players at your school, how many do you think have ever used anabolic steroids, even once?
- Q:** Many professional <sport> players would approve of the use anabolic steroids.
The majority of professional <sport> players would be supportive of the use of anabolic steroids
Many professional <sport> players are supportive of the use of anabolic steroid.

- Q:** Many college <sport> players would approve of the use anabolic steroids.
The majority of college <sport> players would be supportive of the use of anabolic steroids
Many college <sport> players are supportive of the use of anabolic steroid.
- Q:** Many of my coaches would approve if I used anabolic steroids.
My coaches would be supportive if I used anabolic steroids
My coaches would like it if I used anabolic steroids
- Q:** Many of my family members would approve if I used anabolic steroids.
My family would be supportive if I used anabolic steroids
My family would like it if I used anabolic steroids
- Q:** Many of my teammates on my school's <sport> team would approve if I used anabolic steroids.
My teammates on my school's <sport> team would be supportive if I used anabolic steroids
My teammates on my school's <sport> team would like it if I used anabolic steroids
- Q:** Many of my friends would approve if I used anabolic steroids.
My friends would be supportive if I used anabolic steroids
My friends would like it if I used anabolic steroids
- Q:** When someone criticizes my school's <sport> team it feels like a personal insult
I am very interested in what others think about my school's <sport> team,
My school <sport> team's, success is my success
When someone praises my school's <sport> team it feels like a personal compliment
If a story in the media criticized my school's <sport> team I would feel embarrassed
- Q:** I think professional <sport> players are respectable.
I think professional <sport> players are inspiring.
I look up to most professional <sport> players.
I think highly of professional <sport> players.
- Q:** I think college <sport> players are respectable.
I think college <sport> players are inspiring.
I look up to most college <sport> players.
I think highly of college <sport> players.
- Q:** I think my school's <sport> players are respectable.
I think my school's <sport> players are inspiring.
I look up to most my school's <sport> players.
I think highly of my school's <sport> players.
- Question:** How similar are you to your school's <sport> players?: (1= very dissimilar; 7 – very similar)
In the way you think?
In the way you behave?
In personality?
How similar are your goals to the goals your school's <sport> players have?
- Question:** How much do you agree with the following statements?
I intend to use anabolic steroids in the near future.
I will use anabolic steroids in the near future.
I plan to use anabolic steroids in the near future.

I intend to use anabolic steroids. (Yes/No/not sure)
- Q:** Anabolic steroids have serious health consequences
anabolic steroids are dangerous

Anabolic steroids have very harmful side effects
 if I were to use anabolic steroids I would be harming my health
 if I were to use anabolic steroids I would have bad side effects

- Q:** What are the chances that you would have serious health consequences if you regularly used anabolic steroids? (anchored with 1= highly unlikely; 7 = highly likely]
- Q:** Using anabolic steroids will improve my sport performance
 I will be a more successful athlete if I use anabolic steroids
 If I use anabolic steroids I can improve my potential
- Q:** By using anabolic steroids I can help my team win
 If I use anabolic steroids I could help the coach win more games
 If I use anabolic steroids my team will be more successful
- Q:** I would like to know what it is like to use anabolic steroids
 I am curious to use anabolic steroids
 The idea of trying anabolic steroids interests me

Semantic Differential Questions using sliding scale

***Question:** Anabolic steroids are:

Q: Bad	1	2	3	4	5	6	7	Good
Q: Foolish	1	2	3	4	5	6	7	Wise
Q: Unfavorable	1	2	3	4	5	6	7	Favorable
Q: Negative	1	2	3	4	5	6	7	Positive

How much do you agree or disagree with the following statements?

- Q:** Using anabolic steroids to improve sport performance is cheating.
 It is wrong to use anabolic steroids to improve sport performance
 Athletes who use anabolic steroids are cheaters
- Q:** How much have you used anabolic steroids (1 = not at all; 7 = a great deal)
 How often do you use anabolic steroids (1 = not at all; 7 = a great deal)
- Q:** Have you ever used an illegal performance enhancing substance? (Y/N)
- Q:** Are you currently using an illegal performance enhancing substance? (Y/N)
- Q:** Are you currently using anabolic steroids? (Y/N)
- Q:** Would you be willing to be tested for anabolic steroids in the next 7 days? (Y/N)

Following this question was the response “Thank you for your response. Just so as you know, we will not be conducting any testing for anabolic steroids.”

The next three questions were anchored with 1= very unlikely; 7 = very likely]

- Q:** How likely do you believe that you will receive an athletic scholarship to a major University?
 How likely do you believe that you will receive an athletic scholarship to any University or College?
 How likely do you believe that you will play professionally in your sport?

Question: How much do you agree with the following statements?

I would like to explore strange places

I would like to take off on a trip with no pre-planned route or timetables

I get restless when I spend too much time at home

I prefer friends who are excitingly unpredictable

I like to do frightening things

I would like to try bungee jumping

I like wild parties

I would love to have new and exciting experiences, even if they are illegal

Question: Please provide the reasons why you use or do not use anabolic steroids (open response)

Q: what is your age (fixed response from 13 - 19)

what is your gender (fixed response)

what is your ethnicity (fixed response with option for open response for 'other')