

The Attitudes of Track and Field Throwers toward Performance Enhancing Drug Use and Drug Testing

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Abstract

The practice of enhancing athletic performance through the use of ergogenic aids or by extraneous artificial means is as old as competitive sport itself. Although the abuse of such substances has been historically problematic, very little research assessing the attitudes of strength/power athletes concerning ergogenic aids exists. As national anti-doping organizations (NADOs) adopt preventative measures to complement detection-based deterrence methods, understanding athlete attitudes towards drugs in sport will take on a new importance. This study was conducted to measure athlete attitudes in the sport of track and field (specifically throwers) toward performance enhancing drug (PED) use and drug testing. The results suggest that both attitude (mean = 1.20 ± 0.91) and behavioral intent (mean = 1.27 ± 1.5) of throwers in the United States are supportive of the anti-doping movement. However, the score on subjective norm (mean = -0.18 ± 1.03) was negative suggesting that track and field throwers perceive doping as a problem in elite-level (professional or post-collegiate) track and field. The conclusions of the present study support previous research findings: negative attitudes towards doping and positive attitudes in support of drug testing.

Key words: Competition, Doping, Anabolic Steroids

Introduction

Currently one cannot open a major newspaper without frequently reading about human growth hormone, anabolic steroids, or testosterone use by well-known "branded" athletes (Kraska, Bussard, & Brent, 2009; Noakes, 2004; Sandomir, 2005). Fan support for the establishment of new drug testing procedures and policies, combined with congressional involvement reinforced the perception of public disagreement with the use of performance enhancing drugs (PEDs) in the United States (Hoffman, et al., 2009; Kraska, et al., 2009). According to the International Olympic Committee's (IOC's) official statistics, annually 1–2% of all doping tests are found positive for illegal drug use (Mottram, 1999). It is possible that the real prevalence of doping among athletes is considerably higher than this (Bents, Tokish, & Goldberg, 2004; Laure, 1997; Mottram, 1999; Scarpino, et al., 1990; Yesalis & Bahrke, 1995).

Studies concerning children and adolescents report a doping prevalence between 3 and 5% (Laure, 1997). Wroble, Gray, and Rodrigo, (2002), conducted a survey of 1,553 pre-adolescent (10 to 14 year-old) athletes from 34 states and found a much lower anabolic steroid (AS) usage percentage among 10-14 year olds (0.9% male) and (0.2% female). In an investigation by Stigler and Yesalis, (1999), that surveyed 873 Indiana high school football players, 6.3% admitted to using AS. Among adult athletes, in self-

reported-use studies, doping prevalence has been estimated to be 5–15% (Laure, 1997). However, projected-use studies, where subjects have been asked about the practice of other athletes, report a mean prevalence of 15–25% (Laure, 1997; Yesalis, Buckley, & Anderson, 1990). While estimates of actual PED usage vary, it appears to be an intensifying concern in athletics from the high-school level and beyond (Gough, 1989; Stigler & Yesalis, 1999).

Numerous studies have reported that an athlete's drug use in sport could be credited to a complex interaction of personal and environmental factors (Dodge & Jaccard, 2007; Nicholson & Agnew, 1989; Tricker, Cook, & McGuire, 1989). Possible contributing environmental factors include attitudes of peer group, parents, coaches, accessibility to drugs, and cultural norms and values (Polich, Ellichson, Reuter, & Kahan, 1984; Tricker & Connolly, 1997). In a 1991 study by Anshel, interviews were conducted with elite athletes to try to understand the possible reason or reasons why they might choose to use a PED. Anshel reported three categories of reasoning: (1) physical, (2) psychological/emotional and (3) social. The physical reasons identified by athletes were pain reduction, rehabilitation from injury, heightened energy/arousal, relaxation/lower arousal, and weight reduction. The psychological/emotional reasons they cited included a fear of failure and combating low self-confidence. Finally, the social reasons included modeling after sport heroes and gaining support among their peers (Anshel, 1991; Oriard, 1982).

Fuller and LaFountain (1996) conducted an investigation into the motivation and justification of athletes who admitted to steroid use. Fifty athletes ages 15 to 40 years old participating in weight lifting, football, wrestling, and bodybuilding revealed how they rationalized the use of performance-enhancing drugs, breaking the law, and exposing their bodies to health risks. Athletes' self-reported reasons for taking PEDs included fears that competitors have a chemically or medically enhanced, unfair advantage.

A later study by Strelan and Boeckmann (2003) expounded on this data by further delineating deterrents (costs) and benefits (enhanced performance) to PED use by athletes. They postulate that use of the theory of criminal decision making (deterrence theory) is as applicable in doping situations as it is to understanding why people disobey the law. Athletes, akin to criminals, are likely to use a cost-benefit analysis. Through their research, they developed the Drugs in Sport Deterrence Model (DSDM), and presented it as a platform for a more systematic understanding of what influences the decisions of elite athletes in deciding whether or not to use PEDs.

Athletes cited teammates/peers and coaches as the most important sculptors of attitudes toward the use of PEDs. This finding is in alignment with the idea of "significant others" as presented by Coakley (2007). "Significant others" can influence athletes' behavior regardless of their personal disapproval of PED use. For example, coaches are viewed as having a strong influence in regulating athletes' attitudes and behavior (Anshel, 1991; Orlick,

1990). Gould, Diffenbach, and Moffett, (2002), suggested that coaches play crucial roles in developing achievement goals for athletes and mentoring athletes' development while also having the potential to indirectly model the positive skills and characteristics athletes need for success. Coaches could be one of the more important agents in preventing drug use among athletes (Dubin, 1990; Fung, 2003). Laure, Thouvenin, and Lecerf (2001) found that 98.1% of surveyed track and field coaches in France believed they have a role in preventing doping.

Attitudes of Athletes Towards PED Use and Drug Testing

One's attitude toward a given issue or entity can be impacted by personality traits, previous experiences, environmental factors, and characteristics of the attitude object (McGuire, 1985). In a study by Alaranta, et al., (2006), over 90% of the athletes thought sport performance can be improved by using banned substances. However, the vast majority of the athletes were not in favor of doping. Almost all the athletes (96.9 %) believed that it is possible to make it to the international top in their sport without doping. In the same study, the authors found that the risk of doping appears to be highest in speed and power sports and lowest in sports emphasizing motor skills.

Diacin, Parks and Allison (2003) conducted interviews with NCAA Division I and Division III male athletes to measure their attitudes toward drug use and drug testing. The athletes were asked open-ended questions, as opposed to collecting data using an ordinal instrument, so that a more complete understanding of the athletes' opinions could be gathered. The results of that study supported the findings of previous studies indicating that most athletes have a negative attitude toward drug use (Schneider & Morris, 1993; Tricker & Connely, 1997). However, the validity of such surveys has been called into question as many athletes may have feared expressing their true feelings, even if anonymity and confidentiality were guaranteed (Alaranta, et al., 2006; Pope, Katz, & Champoux, 1988).

In regard to attitudes toward drug testing, previous studies have also shown inconsistent results (Gaskins & deShazo, 1985; Schneider & Morris, 1993). Abdenour, Miner, and Weir, (1987), reported that PED testing was a deterrent to drug usage among intercollegiate football players, but that players remained concerned about the accuracy of the tests. Participants in Diacin et al.'s (2003) study supported athlete drug testing and identified factors that influenced their perceptions of the use of performance-enhancing substances. Their data showed that female athletes were more supportive of testing programs than males, testing by schools and the NCAA was supported but conference-wide testing programs were not and finally that in general the athletes questioned were indifferent to drug testing. Additional themes were privacy issues related to drug testing and negotiating the meaning of fairness. Analysis revealed ambiguities and contradictions between athletics and academics, areas in which intercollegiate athletes simultaneously function. From the interviews conducted, three themes emerged: (1) factors influencing athletes' perception of drug use, (2) privacy issues related to drug testing, and (3) negotiating the meaning of fairness (Diacin, et al., 2003).

Why is Attitude Measurement Important to Drugs in Sport?

The primary rationale for why attitude measurement is important to understanding drug use in sport is that attitudes become a surrogate for otherwise unobservable behavior (Judge, Gilreath, & Bellar, 2010). Detection-based deterrence, where the risk of a positive test is meant to deter use (secondary prevention), is difficult and costly due to the diversity of molecular structure testosterone-related drugs and is rapidly becoming obsolete with the danger of undetectable gene-doping (Mazanov, 2006; Miah, 2004). Gene doping adds new genes or manipulates an athlete's own genes that control muscle growth and development of strength, for example. New genes could be added to cells and tissues using a targeted virus or other delivery method but researchers are also preparing for the possibility that an athlete's own genes could be modified by treatment with genetic elements or even drugs. Another substance that may already be escaping the drug testing policy is Human Growth Hormone (HGH); this substance is especially problematic because it is currently being used by athletes while gene doping is still just a looming trend. HGH detection is unreliable because of its natural occurrence in the body (Unal & Unal, 2004).

The current anti-doping policy has received much criticism for its elite focus, sanction-based approach and associated costs (Savulescu, Foddy, & Clayton, 2004). The alternative is to deter use by stopping it before it starts by primary prevention; referred to by Mazanov, (2006) as prevention-based deterrence. The World Anti-Doping Agency (WADA) has invested over \$7 million in research to develop gene-doping screening tests (WADA, 2008), but also supports an extensive education and outreach program to warn athletes and their coaches about the risks of using fledgling genetic technologies without medical supervision. Attitudes therefore become one mechanism towards explaining drug use behavior in sport. That is, it is the relationship between attitude and behavior that makes attitudes attractive to drug use in sport research (Mazanov, 2006). Goldberg, et al., (1996), demonstrated the effectiveness of prevention based deterrence with a peer-taught, team-based approach that was an effective avenue to improve adolescent behaviors and reduce drug use risk factors.

The Importance of Measuring the Attitudes of Track and Field Throwers

The sport of track and field and the throwing events in particular has had more than its fair share of doping offenses since Olympic testing programs started during the 1960's. For an extended period of time, doping violations became a trend. Some notable violators amongst throwers within the United States include: 1999 world shot put champion C. J. Hunter, 1992 Gold medalist in the shot put Mike Stulce, 1992 shot put silver medalist Jim Doehring, current American record holder in the discus Ben Plucknett and 1996 Gold medalist in the shot put and current American record holder Randy Barnes. Other violators include: Scott Boothby (hammer), John McEwen (hammer), Marcus Clavelle (shot put), Melissa Price (hammer), Kevin Toth (shot put), Gregg Tafrales (shot put) and Serene Ross (javelin) just to name a few (USATF, n.d). The question is why have so many American throwers utilized PEDs?

During the time of East Germany's state-sponsored drug program, their research indicates that the lone use of AS can have significant effects on speed and power events like the throws in track and field. Their research shows that AS can have a significant

impact on performance, especially when one considers that at the elite level medals are determined sometimes by centimeters. The potential impact of AS is as follows: shot put (2.5-5 meters), hammer throw (6-10 meters), javelin (8-15 meters) and discus (10-20 meters) (Franke & Berendonk, 1997). From the data we can see that the intrinsic (sense of accomplishment and being the best one can be) and extrinsic (sponsorships, prize money, medals) rewards that would be associated with AS use would be substantial. Thus, the risk of doping appears to be highest in speed and power sports like throwing (Alaranta et al., 2006) High school athletes could use PEDs to earn future scholarship money, junior college athletes could use PEDs to earn future Division I scholarship money, and collegiate athletes could use PEDs to advance to the Olympic and professional level. Data indicates that the population at risk of PED use is much broader than previously believed (Buckley, Yesalis, Friedl, Anderson, & Streit, 1988).

Currently, there is a paucity of social science research on the issues of drugs in sport (Mazanov, 2006). Many gaps in the literature still exist; little data concerning the attitudes of specific groups of athletes on the topic of PED use and testing is presently available (Diacin, et al., 2003). A better understanding of how specific sport groups think in terms of doping, especially in a sport with such high doping violation presence is important. The purpose of the present study is to examine the attitudes and perceptions of track and field throwers in the United States on PED use and drug testing.

Method

Participants

Participants were 240 track and field athletes (throwers) from the United States representing the sport at all levels from high school to the professional/elite level (Table 1). Track and field throwers participate in: the shot put, discus, javelin, hammer and weight throw events. The elite level athletes participating in the study were post-collegiate and ranked in the top 50 in the world by the International Athletics Association Federation (IAAF) annual descending order list. The subjects range in age from 18 to 29. The sample is comprised of 141 males and 99 females (mean age = 20.7 ± 2.6 yr) from high school to professional. Among ethnicity, 11.7% of the participants were African American (n = 28), 83.3% were Caucasian (n = 200), 3.3% were Hispanic (n = 8) and less than 2% (n = 4) were Middle Eastern. Of the 240 throwers, 164 represented the sport at the NCAA Division I level. A total of 28 athletes represented the NCAA Division II, NCAA Division III and Junior College (NJCAA) levels. A total of 48 athletes represented the sport at either the high school (24) or elite/professional (24) levels. There was a high degree of uniformity (i.e. no difference) in the attitudes of the participants towards doping, thus for the present investigation results will be reported for the total sample.

Instrument

A survey of 35 questions was formulated to assess favorable attitudes, unfavorable attitudes, unfavorable subject norm, favorable intent behavior, unfavorable intent behavior, and drug testing attitudes. In developing this study and in constructing the questionnaire for data collection, the Theory of Planned Behavior (Ajzen & Fishbein, 1988; Fung, 2003) was used as a guiding framework. Preliminary demographical information was assessed through five questions representing the first section of the survey labeled "default section." The questionnaire was designed to gather basic as well as specific information. A peer researcher who had experience in this exact line of inquiry first reviewed the instrument. Subsequently, the survey was reviewed for clarity and content validity by a four-member panel of experts and practitioners. The instrument was then piloted on a group of 40 track and field club athletes and demonstrated good construct validity (Chronbach's Alpha >0.750). These research questions have also been previously used on a group of track and field coaches and demonstrated good construct validity. A post-hoc principal component factor analysis performed on the results of the present investigation revealed high construct validity within grouped questions. Responses to all questions, excluding preliminary demographical information, were achieved through a 5-point likert scale (strongly disagree, disagree, no comment, agree, and strongly agree). All procedures were approved by the university's IRB prior to the collection of any data.

Procedure

An email explaining the study was sent to 279 male and female throws coaches in the United States with a hyperlink to the online survey. The throws coaches were asked to forward the survey to their athletes. In order to improve response rates, a second reminder was emailed two weeks following the initial contact. Questionnaires were anonymous and informed consent was implied upon submission. Responses were recorded online through the Survey Monkey online survey tool (www.surveymonkey.com). In an effort to increase the number of responses to the survey, a global group was created via www.facebook.com called "On the Juice." The description of the group on its web page explained to invited members a general idea of the purpose of the study and the content of the survey. A bulletin was also posted on a second social networking website, www.myspace.com, with the exact same description as was provided on Facebook to the invitees of the "On the Juice" group.

Data Analysis

Data were collected for the duration of one month, upon the conclusion of which 240 surveys were completed in full. Incomplete surveys were filtered out using built-in data analysis features on www.surveymonkey.com. Means and standard deviations of the key constructs were calculated and Spearman's rho correlation coefficients were run among the key constructs of the study. The raw score from each category was transformed to allow for parallel comparison. Scores on key constructs were achieved through converting Likert scaling strongly disagree (-2), disagree (-1), no comment (0), agree (1), and strongly agree (2) to numbers. The level of significance for all statistical analyses was set apriori at alpha < 0.05. All statistical analyses were performed

Table 1. Demographic Data

	Mean	SD	Minimum	Maximum
Age (yrs.)	20.71	2.69	18	29
Competitive	5.56	3.55	1	15
Experience (yrs.)				

N=240

with a modern statistical software package (SPSS version 17.0 for Macintosh).

Results

Scores on attitude, subjective norm, and intent behavior were calculated. Positive scores reflected support for the anti-doping program. Negative scores, on the other hand, supported the use of doping to gain an advantage over other athletes. The mean scores for attitude, subjective norm, and behavioral intent were 1.20 ± 0.91, -0.18 ± 1.03, and 1.27 ± 1.5, respectively (Table 2). Both attitude and behavioral intent of throwers in the United States were supportive of the anti-doping movement. The score for subjective norm was negative and suggests the subjects in the present study perceive doping as a problem in the track and field community. Spearman's rho (r_s) correlation coefficients were run among the key constructs of the study (Table 3). Behavioral intent is significantly correlated to attitude ($r_s = 0.334$, $p = .000$) but not to subjective norm ($r_s = .056$, $p = .483$).

Table 2. Means and Standard Deviations Major Constructs

	Attitude	Subjective Norm	Behavioral Intent
Mean of Raw Score	1.20	-0.18	1.27
Standard Deviation of Raw Score	0.91	1.03	1.52

Table 3. Correlations among Major Constructs

	Attitude	Subjective Norm	Behavioral Intent
Attitude r_s	---	.002	.334*
Subjective Norm r_s	.002	---	.056

*Significant correlation at $p < .001$

Tables 4-6 show the response pattern of participants to questions on attitude, subjective norm, and behavioral intent, respectively. For all questions measuring attitudes toward performance enhancing drug use, the majority of all participants displayed unfavorable attitudes toward performance enhancing drug use (81.6%) (Table 4). The second section of the survey labeled "unfavorable subjective norm" captured the perceived prevalence of drug use in the throwing events (Table 5). The subject perception was that drug use had not saturated the sport (61.7%), although the majority (73.4%) either agreed or strongly agreed that doping is a serious problem in international sports. In the "favorable intent behavior section," results suggested that athletes would report known drug users (58.3%) regardless of their relationship with the abusers (49.2%). The section for "unfavorable intent behavior" (Table 6) measured the overall likelihood that an athlete would use a banned substance and the likelihood they would use drugs under the influence of various situational variables that might affect their decisions such as if their teammates used drugs, they perceived their competition was using drugs, or in the absence of threats against use (no testing program/no sanctions for use). In this section, all participants showed strong moral character in their unwillingness

to use performance enhancing drugs regardless of the situational variables (over 80% unwillingness to use PEDs for each situational variable presented). But, it was also noted that (84.1%) of the subjects admitted to using creatine, a legal substance with some research supporting its ergogenic effects regarding strength and performance. The majority of participants (70.5%) in this study identified strength as the most important factor for success in the throwing events.

Table 4. Thrower's Attitudes on Doping

Items	Strongly Agree %	Agree %	No Comment %	Disagree %	Strongly Disagree %
Favorable Attitudes					
Doping is not only a problem in sport but a social problem	18.30	56.70	6.70	11.70	6.70
Sanctions imposed on doping cases are not stringent enough now a days	20.00	41.70	15.00	21.70	1.70
Unfavorable Attitudes					
Athletes can use drugs to enhance performance if it does not hurt his/her health	1.70	13.30	3.30	38.30	43.30
Refusal to take performance enhancing drugs equals to refraining from being an elite athlete	3.30	3.30	1.70	23.30	68.30
Scientific research should develop drugs that can pass tests of doping control	6.70	15.00	16.70	23.30	38.30

Table 5. Subjective Norms on PED use

Items	Strongly Agree %	Agree %	No Comment %	Disagree %	Strongly Disagree %
Unfavorable Subject Norms					
Most achievement records in sport are related to doping	6.70	23.30	15.00	45.00	10.00
Doping is a serious international problem in sports	26.70	46.70	16.70	8.30	1.70
Doping is a serious problem in American sports	10.20	47.50	11.90	22.00	8.50

Table 6. Athletes' Behavioral Intent

Items	Strongly Agree %	Agree %	No Comment %	Disagree %	Strongly Disagree %
Favorable Intent Behavior					
I would take positive actions against friends or relatives who are on a banned substance	5.10	44.10	22.00	18.60	10.20
Unfavorable Intent Behavior					
I would work with a medical team to produce a high quality banned substance	1.70	5.10	5.10	22.0	66.10
I would find ways to assist my friends, relatives, or significant other to get a hold of a banned substance	0.00	3.40	3.40	22.0	71.20

The results for the last section, "drug testing attitudes," contained athlete perceptions about current drug testing programs. Most of the participants (67.8%) did not report a belief that the current protocols for which athletes get tested are fair. An interesting dichotomy of this section showed that overwhelmingly, athletes felt that drug testing was the most effective method of preventing/controlling PED use in sport (Figure 1), yet in the very next question, an even larger majority agreed that drug testing does not catch all athletes who cheat (Figure 2). From this section, we can also gather that participants don't believe that drug testing is an invasion of privacy (81.4%) and accept drug testing as a part of participation. Lastly, athletes also favored the first time offender two-year ban (56%) and supported the second positive test life time ban (71.2%).

Figure 1: Drug Testing is the Most Effective Method of Preventing/Controlling Performance Enhancing Drugs in Sport

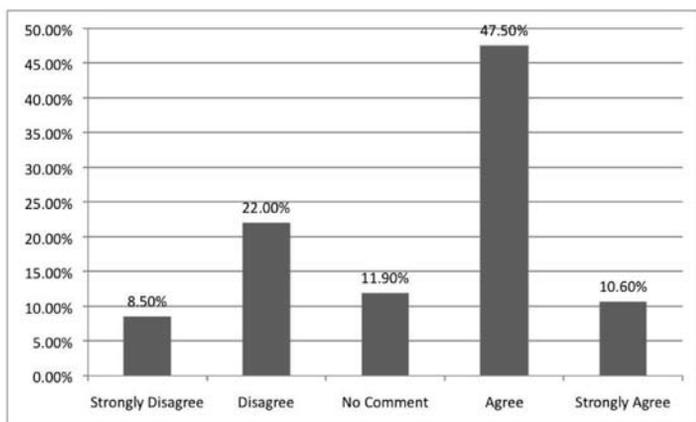
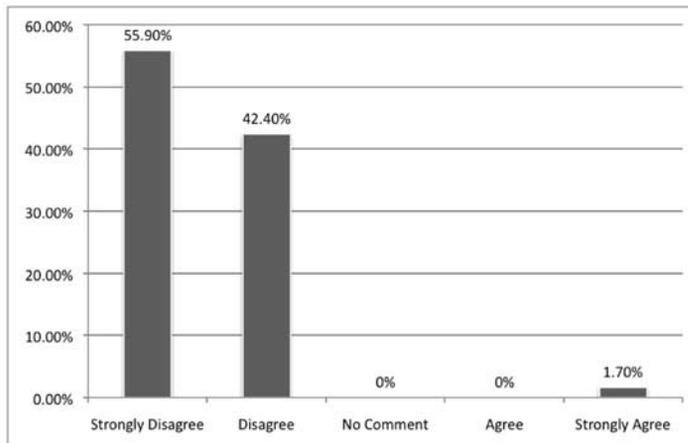


Figure 2: Drug Testing Catches All Athletes that Cheat



Discussion

An athlete's decision to use PEDs in sport has been credited to a complex interaction of personal and environmental factors (Nicholson & Agnew, 1989; Tricker, et al., 1989) that make the problem a difficult one to study. Self-reported questionnaires, and limited comparable data combined with the secrecy that surrounds a prohibited practice creates difficulty in assessing result reliability (Alaranta et al., 2006). Investigations done in the area of PED use in sport illustrate that most of the athletes have a strong attitude in opposition to the use of drugs in sport (Alaranta et al., 2006; Mugford, 1993), however, some experts suppose that these attitudes may be the consequence of social desirability (Petroczi, 2007; Petroczi & Nepusz, 2006). That is, the athletes are reporting what they think NADOs want to hear rather than their true attitude towards drugs in sport issues. Survey research investigating a prohibited practice has limitations: answers may be intentionally false as the subjects questioned may not wish to reveal their true feelings, even if anonymity and confidentiality are guaranteed by the investigators. Thus, these results should be interpreted with caution.

The results of the present study are in partial agreement with the Theory of Planned Behavior (Ajzen & Fishbein, 1988), namely that the level of intentions to perform a particular behavior depends on the individual's attitude towards the behavior (Ajzen, 1991). This theory has been successfully used to predict intentions to use PEDs among collegiate athletes in a similar study (Allemeier, 1996). However, the relationship between subjective norm and behavioral intent was not significant in the present study. A plausible reason for the discrepancy is that the participants were mostly collegiate athletes who may not perceive themselves as having any significant influence or involvement with the doping problem more commonly found in and associated with elite level athletes. The three survey items utilized to gather data on the subjective norms in our study were focused towards drug use among elite level athletes and failed to capture the subject's opinions on drug use issues in their present level of competition. These questions should be refined for future study.

Although the majority of participants (70.5%) in this study identified strength as the most important factor for success in the throwing events (Franke, & Berendonk, 1997) and (84.1%) admitted to using creatine (a legal substance), they supported the

anti-doping movement. This is based on their attitude (mean = 1.20 ± 0.91) and behavior intent (mean = 1.27 ± 1.5) scores. It appears the throwing athletes utilized legal ergogenic aids like creatine to help improve performance. But, using nutritional supplements have been found to increase the likelihood of subsequent doping (Laure & Binsinger, 2007).

The majority of the athletes interviewed did not believe that drug testing was an invasion of privacy, a change from 10 years earlier (University of Colorado v. Derdeyn, 1993) when the University of Colorado lost its appeal to reinstate its drug testing program after a lower court enjoined them based on the 4th Amendment right of reasonable search and seizure. In contrast to previous research (Diacin, et al., 2003) and (Donovan, Egger, Kapernick, & Mendoza, 2002), the participants in the present study indicated that their decision to use PEDs would not be influenced by their teammates or competitors (reference groups). This conclusion could be a result of several factors. Participants in the present study could: (1) consider PED use unnecessary because they are happy with their level of performance, regardless of who close to them might use or condone, their use, (2) they could have all been optimists/inner-directeds (Donovan et al., 2002), (3) or perhaps they were not completely honest. Further investigation is needed to uncover the source of these perceptions.

A final point of discussion in the present study versus previous investigations lies in our subjects' response to a single question: "If you knew you would not get caught, would you use a banned performance enhancing drug?" In 1995 a poll was conducted in which 198 athletes of either Olympic caliber or aspiring Olympians were asked if they would use a banned performance enhancing drug given the guarantees of not getting caught and winning. Only 3 of those athletes said they would not use a drug (Bamberger & Yaeger, 1997). One half of that question was proposed to the participants in the present study, leaving the guarantee of winning out, and 81.3% said they would not use the drug. The discrepancy in this data could be explained by the demographic of the survey sample; the majority of the subjects are college athletes who may not have athletic aspirations beyond graduation. A second reason for this difference could be our underestimation that the power of guaranteed success (winning) might have on this decision.

Through this research we definitely gain a snapshot of the attitudes track and field throws athletes have toward PEDs; specifically: attitudes for and against use, perceived prevalence of use, and issues related to drug testing. The results show a negative attitude in favor of PED use and a positive attitude against use, perceived prevalence of use is low, and drug testing is viewed as an acceptable practice.

Recommendations

New anecdotes of PED use and the associated ramifications including public admonishment, suspension, the stripping of Olympic medals, and even jail may have altered PED usage, but it is still widespread in sports. Throwers in track and field understand the importance of strength in their performance (Franke & Berendonk, 1997) and are willing to use legal ergogenic aids like creatine to improve their performance. This research supports an unwillingness of throwers to engage in the use of PEDs and the acceptance of drug testing as a valid means of policing the sport.

This investigation hopes to act as a springboard for future analysis as it represents only a modest beginning point for a further and far more sophisticated dialogue on the notion of PED use in all sports.

The threat of new "undetectable" performance enhancers, which are entering the market daily, underlines the importance of further research directed at understanding the perceptions of competitive athletes. The trend of PED use in sport is likely to continue far into the future. The WADA has already outlined their definition of gene doping, which will likely be a serious concern in the future as science comes closer to being able to cure genetic illness through gene therapy (Unal & Unal, 2004). Gene doping would replace the need for athletes to use performance enhancing drugs by an introduction of genes that would help the body produce the performance enhancing effects of these drugs on its own. Examples include the gene for erythropoietin (EPO), insulin-like growth factor-1 (IGF-1) and others. This type of doping would avoid detection by current testing measures by duplicating genes that are naturally present in the human body, much the same way that HGH detection is currently at best unreliable because of its natural occurrence in the body (Unal & Unal, 2004).

Professional organizations and national governing bodies are scrambling to modify current practices and develop new PED testing policies and procedures. Sport governing bodies are also designing and implementing educational programs to target varying groups from elite athletes to young emerging talents focusing on the principles of performance enhancement and fair play (Petróczi & Aidman, 2008). The existing anti-doping policy has received a great deal of criticism for its elite focus, sanction-based approach and associated costs (Petróczi & Aidman, 2008). The issue merits further investigation of the attitudes of elite athletes to see how the incentives (money, fame, etc.) associated with being successful at the elite level would likely change these attitudes (Judge, et al., 2010).

Deterrence starts with understanding the probable reason or reasons why athletes might decide to use a PED. Further research should be performed by evaluating motives from different demographical groups of athletes, specifically elite athletes. Longitudinal research to investigate the attitudes of athletes toward PED use and drug testing over the period of their athletic career would be beneficial.

Barring a cultural shift that would change the societal view of athletes as moral heroes with so much financial gain (Oriard, 1982), the truth is we are not likely to stop this epidemic of PED use in sport unless multiple factors that contribute to their use are addressed. The literature reveals a few options: (1) increase testing so that the perception of getting caught is greater, (2) remove the substantial rewards associated with a high level of success, (3) decriminalize PED use in sport, and/or (4) remove dirty coaches/programs from the sport for life (Dixon, 2008). However, none of these positions alone would completely eliminate doping in sports as different things motivate people, and the temptations to use PEDs come from many angles. Until we are ready to remove the substantial rewards (prize money, recognition/fame, etc.), we can improve existing doping control programs by increasing the number of people being tested, increasing the legitimacy of the selection process by testing a variety of athletes in all sports, and imposing

sanctions on coaches/clubs that have a legacy of doping (Judge, et al., 2010). It is clear that better testing methods and programs must be developed for strength/power athletes to have complete confidence that the playing field is level. But, controlling doping only by tests is not sufficient. It is through education and research that we can mitigate the abuse of PEDs by athletes (Hoffman, et al., 2009). A profound change in the attitudes is needed, which have to be monitored frequently.

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