

The American Public's Perception of Illegal Steroid Use

A National Survey

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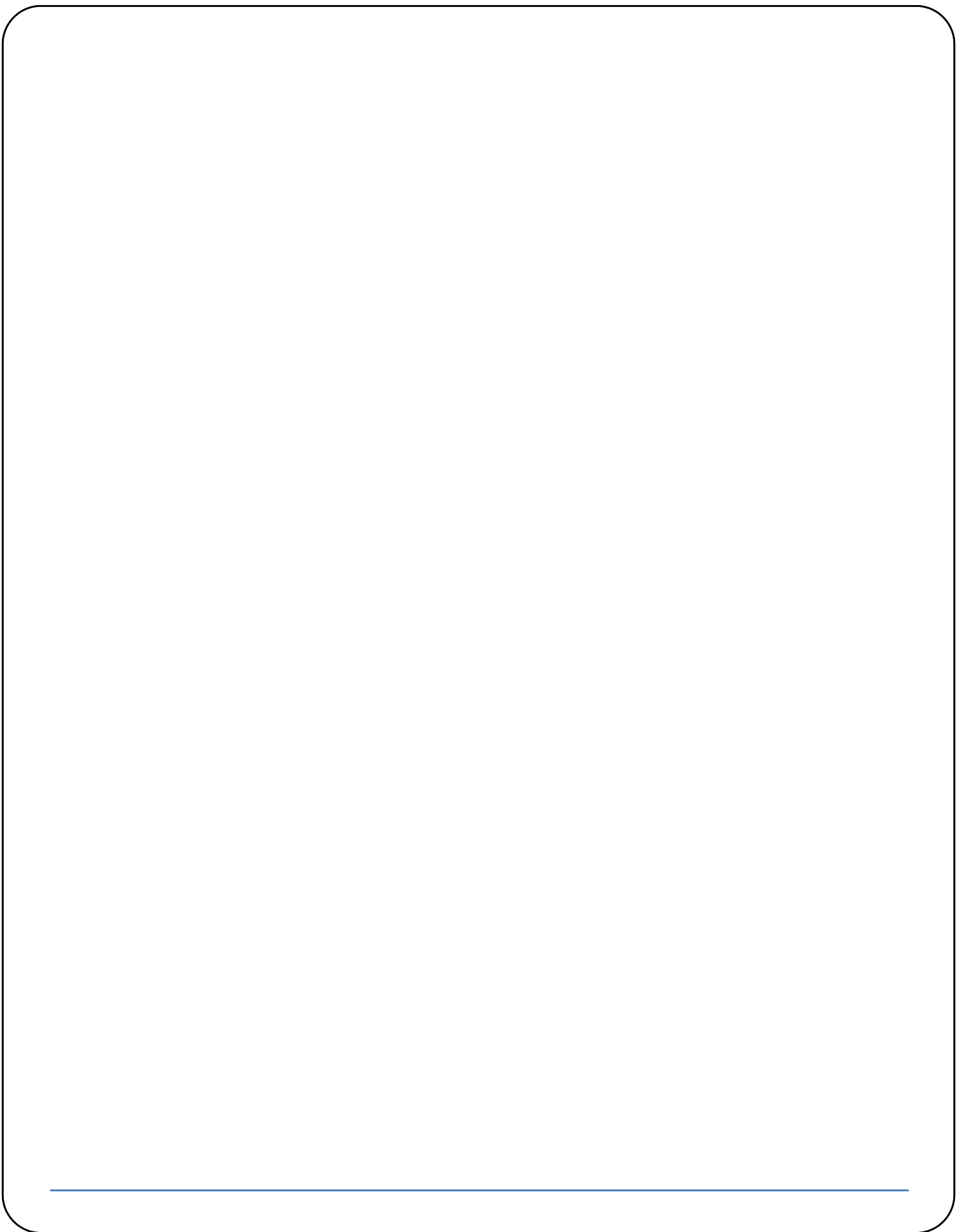


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Background

The use of performance-enhancing drugs, such as anabolic steroids, has received significant attention during the past two decades, in part due to the extensive print and broadcast media coverage of steroid use among professional athletes. Even though their non-medical use is banned by many athletic associations such as the International Olympic Committee, the National Football League, the National Basketball Association, and Major League Baseball (Adams, 2010), athletes have used and abused such drugs for decades. Most recently, Lance Armstrong, a seven-time Tour de France champion, has publicly admitted using performance-enhancing drugs, and was stripped of his seven Tour de France championships, as well as barred for life from competing in Olympics-level sports (Macur, 2012).

While the media has focused almost exclusively on the use of performance enhancing drugs among professional athletes to date, the problem is not confined to the professional arena. According to Monitoring the Future, an ongoing study of youth behaviors funded by the National Institute on Drug Abuse and the National Institutes of Health, the lifetime prevalence rates for steroid use among youth over the past 20 years (1991-2011) range from 1.5-3.3% for 8th, 10th, and 12th graders (Johnston, O'Malley, Bachman, & Schulenberg, 2012). Confirming this finding, the Centers for Disease Control and Prevention (CDC) reports a prevalence rate of steroid use among high school students that ranges from 2.2-6.1% during the same time period (Centers for Disease Control and Prevention, 2012). Similar prevalence rates have also been reported at the state level, such as the 2010 Eating and Activity in Teens (EAT) survey that reported a 5.1% prevalence rate in Minnesota middle and high schools (Eisenberg, Wall, & Neumark-Sztainer, 2012).

Such prevalence rates may seem low compared to those of adolescent experimentation with alcohol (71%; CDC, 2012) and marijuana (40%; CDC, 2012). However, experimentation means one can try it once and never use it again. In contrast, steroid use is usually continuous and cyclic in nature; an individual does not simply try or use steroids once. Most users take steroids in cycles where they are either "on" or "off" the drug over a period of time (generally between four to 18 weeks). In addition, most steroid users complete more than one cycle in their lifetime, with over half completing five or more cycles (Luetkemeier, Bainbridge, Walker, Brown, & Eisenman, 1995). A practice called stacking is also frequently utilized in which users take more than one steroid at a time. When stacking, the user actually takes a dosage that can be anywhere from two to forty

times greater than those used for therapeutic purposes (Luetkemeier et al., 1995). Simply stated, although the percentage of youth who report having used steroids is relatively low, these youth can in fact be exposed to high dosages over long periods of time, which makes steroid use among high school students a more serious problem than it may appear at first glance.

Given this type of use by students, it is not surprising there are many serious negative health effects. When the potentially serious negative health consequences associated with steroid use are considered, the magnitude of this problem among high school students becomes evident (Kanayama, Hudson, & Pope Jr, 2008). The best known negative side effects of steroid use are psychological (Kanayama, Hudson, & Pope Jr, 2010), such as experiencing manic or depressive episodes, and even suicidality, and what has come to be known as “roid rage.” Several case studies describe the violent or aggressive demeanor (i.e. ‘roid rage’) that appears entirely uncharacteristic of the steroid user’s personality off-steroids. In fact, a recent report examining six cases of steroid-induced violence, including three homicides and three violent assaults, showed that all six men returned to a normal mental status within two months of stopping steroid use, which implies a causal link between steroid use and aggression (Hall, Hall, & Chapman, 2005). In addition to these acute psychological effects, there are several potentially severe physical health effects. Studies have linked steroid use to problems with blood pressure, and coronary heart and liver function, damage to the immune system, and in some instances, death. Steroid use has also been linked to impaired sexual functioning and infertility as well as an increased risk of prostate cancer (Kanayama et al., 2010). Finally, a growing literature indicates that users can become addicted to and dependent on steroids (Kanayama, Brower, Wood, Hudson, & Pope, 2010).

Through the surge of news about doping scandals in the media, it is expected that the public is aware of the magnitude of the problem among professional athletes; however, it is uncertain whether the public is aware that the problem often starts when athletes are younger. To this end, the National Baseball Hall of Fame and Museum, the Taylor Hooton Foundation, and the Professional Baseball Athletic Trainers Society partnered with the Center for Social Development and Education and the Center for Survey Research at the University of Massachusetts Boston to conduct the most comprehensive national opinion survey to date to assess the public’s knowledge, perceptions, and beliefs about the use of performance enhancing drugs among adolescents¹. It is hoped that the findings obtained through this survey will provide a foundation for a national dialogue about this problem.

¹ The development of the questionnaire involved a thorough review of the scientific literature, focus groups, and extensive discussions. A description of the questionnaire can be found in Appendix A at the end of the report.

Findings

To understand what the American public knows and believes about adolescent steroid use, we enlisted the help of the Gallup Organization who reached out to approximately 1,000 adults of all ages, all races, all educational levels, and from all geographical regions of the country for phone interviews². The final sample consisted of 1,002 adults aged 18 or older, 52% of which are male. Participant age ranged from 18-96, with a mean of 52.6 (*SD* = 17.7). More detailed demographic information on the sample is presented in Table 1.

Table 1: Participant demographic characteristics

Gender	
Male	52%
Female	48%
Age	
18-34	13%
35-49	28%
50-64	31%
64+	28%
Region	
South	38%
West	23%
Midwest	22%
East	17%
Race/Ethnicity	
Hispanic	6%
White	83%
Black	11%
Asian	4%
American Indian	11%
Other	8%
Education	
No college degree	50%
College degree or more	50%

The findings of the survey have been organized into the nine topic areas covered on the survey including their perceptions of how big a problem steroid use among adolescents is, their beliefs about the likelihood that adolescents would use steroids and their accessibility, their beliefs about the negative health consequences of steroid use and moral implications, to name a few. Below each topic area listed is a description of the survey results.

² More detailed information about sampling and survey development is located in Appendix A.

What is the public's experience with sports?

In general, the majority of the public are involved in sports: three quarters of the public report an interest in sports, and two-thirds report having actively participated in high school sports. Notably, fewer females than males report having participated in high school sports. In addition, a quarter of the public are parents of children between the ages of 5 and 18 who have participated in organized athletics³.

Table 2. Public's experience with sports

	Male	Female	TOTAL
Interested in sports	77%	75%	76%
Participated in HS sports	77%	56%	66%
Have child between 5 and 18 years of age who has participated in sports	29%	22%	26%

What is the public's experience with steroids?

Given that steroids are often prescribed by a doctor for many purposes, such as to treat asthma and back or knee pain, it is not surprising that almost half of the public have taken legal steroids that were prescribed to them by a doctor. As would be expected, younger people (ages 18-29) are less likely to have taken legal steroids in their lifetime, possibly due to the fact that steroids are often prescribed for conditions that occur more frequently as one ages, such as rheumatoid arthritis.

- ❖ 41% of the public has used steroids that were prescribed by a doctor.
 - 27% of people 18-29,
 - 42% of people 30-49,
 - 48% of people 50-64,
 - 41% of people 64 or older have used steroids that were prescribed by a doctor.

³ Of note, 32% of the public are parents. Therefore, 81% of these parents had a child who participated in sports.

On the other hand, one out of five adults personally knows someone that they believe has taken illegal steroids without a prescription⁴. Considering the low self-reported prevalence rates for steroid use that were described in the background section, this is somewhat surprising. Notably, this belief is almost entirely confined to those who are younger, as almost no one over the age of 64 reports knowing someone who has used steroids illegally. There are several possible reasons for this: younger people are more involved in sports (NHIS, 2010), and thus are more likely to be in contact with those who would use steroids. Alternatively, younger people may be more aware of the tell-tale signs of steroid use.

- ❖ 17% of the public think they know someone who has taken steroids without a prescription.
 - 28% of people 18 to 29,
 - 18% of people 30 to 49,
 - 17% of people 50 to 64,
 - 4% of people 64 or older think they know someone who has taken steroids without a prescription.

Considering the implementation of drug abuse programs in high schools over the past several decades, one would expect adults with authority to have cautioned the youth about the dangers of performance-enhancing drugs such as steroids. However, only about a half of the younger generation⁵ ever had a teacher or a coach talk to them about the negative health effects of steroid use. Even fewer report having had a parent talk to them about steroids. Importantly, this question did not clearly indicate at what age or venue the younger generation was informed by adults. It is therefore possible that some of these younger individuals were informed by adults during college, and not in high school. In fact, we know that there is an active conversation about steroids at the university sports level⁶ (National Collegiate Athletic Association Committee on Competitive Safeguards and Medical Aspects of Sports, 2009).

- ❖ 57% of 18 to 29 year-olds had a teacher talk to them.
- ❖ 53% of 18 to 29 year-olds who were involved with sports had a coach talk to them.
- ❖ 32% of 18 to 29 year-olds had a parent talk to them about steroid use.

⁴ Participants were not asked about their personal use without a prescription, since it is an illegal activity, and underreporting would be expected given the methodology (i.e. telephone survey).

⁵ This question was only asked of participants who were between the ages of 18 and 29 ($n = 192$).

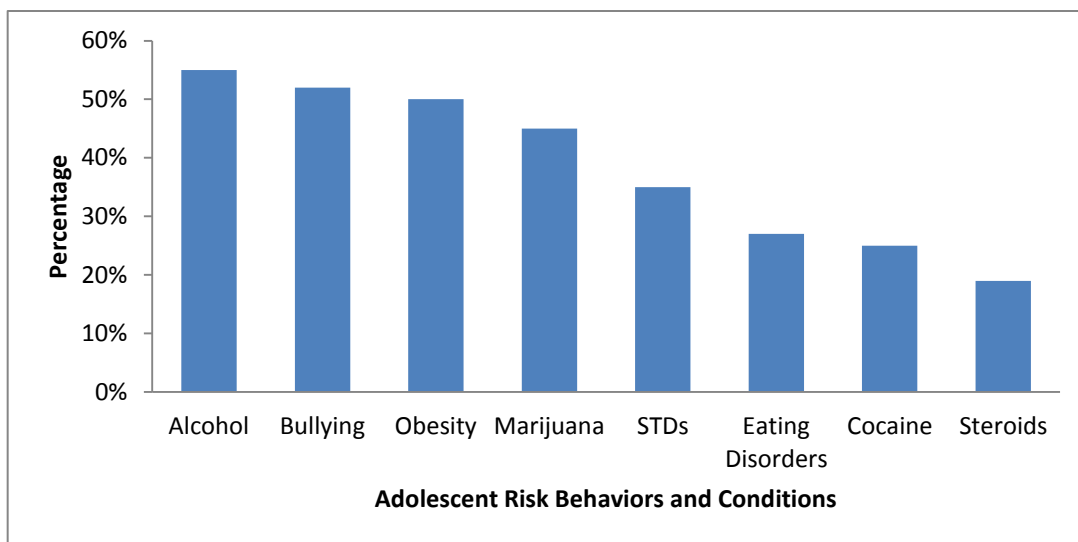
⁶ According to a 2009 survey conducted by the NCAA, 65% of institutions had in operation a drug/alcohol education program for student athletes.

Does the public perceive illegal steroid use as a problem for adolescents?

Strikingly, the public does not perceive steroid use as a problem among adolescents relative to other problems that adolescents may face (e.g. drug and alcohol use, bullying, sexually transmitted diseases, obesity, and eating disorders). In fact, the public perceives steroid use as less of a problem than all other prevalent risk behaviors and conditions among adolescents; it is ranked even lower than eating disorders. This finding is consistent across all regions of the country, all age groups, and even among those who are interested or have participated in sports. As expected, those problems often mentioned in the media, such as alcohol and marijuana use, bullying, and obesity are ranked highest in being a problem for adolescents.

- ❖ Only 19% of the public believe **steroid use** is a big problem among adolescents. In comparison,
 - 55% of the public believe **alcohol use** is a big problem.
 - 52% of the public believe **bullying** is a big problem.
 - 50% of the public believe **obesity** is a big problem.
 - 46% of the public believe **marijuana use** is a big problem.
 - 35% of the public believe **getting STDs**, including HIV/AIDS is a big problem.
 - 27% of the public believe **eating disorders**, such as anorexia/ bulimia are a big problem.
 - 25% of the public believe **cocaine use** is a big problem.

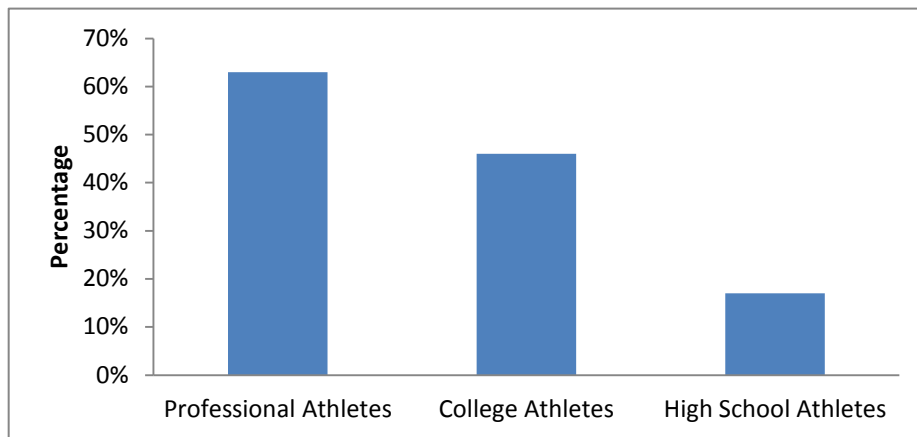
Figure 1. Percentage of people who believe steroid use is a big problem compared to other risk behaviors and conditions.



The above finding might not appear surprising given that the public views steroid use as more of a problem for athletes, and not adolescents in general. However, when asked specifically about steroid use among high school *athletes*, the public still does not perceive it as a big problem. This is in stark contrast to the fact that half of the public believe that steroid use is a big problem among college athletes, and that two thirds of the public believe that it is a big problem among professional athletes.

- ❖ Only 17% of the public believe that steroid use is a big problem among **high school athletes**. In comparison,
 - 46% of the public believe steroid use is a big problem among **college athletes**.
 - 63% of the public believe steroid use is a big problem among **professional athletes**.

Figure 2. Percentage of people who believe steroid use is a big problem for high school athletes, compared to other athletes.



+ What does the public believe adolescents' motivations are for using steroids?

As expected, given the media attention on enhanced athletic performance as a benefit of steroid use, almost half of the public believe that adolescents' desire to enhance their athletic performance is the key motivator⁷. In contrast, the public does not believe that peer pressure is a

⁷ Of note, the question about adolescents' motivation to use steroids was open-ended. The public's responses were coded into the following categories: to enhance athletic performance, to get stronger, to look better physically, to respond to peer pressure, and to improve chances of getting into college with an athletic scholarship. Two independent raters coded the responses, with an agreement of 92%.

major reason for using steroids. These findings are consistent across different age groups and levels of sports involvement.

- ❖ 43% of the public believe that adolescents use steroids to enhance their athletic performance. In contrast,
 - 18% believe that they use steroids to get stronger.
 - 10% believe that they use steroids to look better physically.
 - 8% believe that they use it to respond to peer pressure.
 - 7% believe that they use it to improve chances of getting into college.

In addition to believing that steroid use is about enhancing athletic performance, the public also believes that professional athletes play an important role in influencing adolescents' decision to use steroids. The majority of the public believe that hearing about professional athletes using steroids encourages use among adolescents; the public does not believe it discourages use.

- ❖ 66% of the public believe that hearing about professional athletes' steroid use **encourages** adolescents.
- ❖ 13% of the public believe that hearing about professional athletes' steroid use **discourages** adolescents.

What does the public believe is the likelihood that adolescents use steroids?

Given that almost all of the public *do not* believe that steroid use among adolescents is a big problem, it is surprising that almost two thirds of the public *do* believe that adolescent boys are likely to use steroids. The public does not believe that adolescent girls are likely to use steroids. These findings are consistent across all age groups and levels of sports involvement.

- ❖ 64% of the public believe adolescent *boys* are likely to use steroids.
- ❖ 21% of the public believe adolescent *girls* are likely to use steroids.

Most importantly, the extent to which the public believes that adolescents use steroids influences their perception of steroid use as a problem. The more the public believes that adolescents are likely to use steroids, the more they view steroid use as a problem. In fact, their belief about the likelihood that adolescents use steroids plays a larger role in their sense of how big of a problem steroid use is than their knowledge of the negative consequences of steroids.

- ❖ Complex linear regression analyses show that the public's belief about the likelihood that adolescents use steroids has a strong influence on the public's perception of steroid use as a problem ($\beta = .50$, $t(931) = 16.55$, $p < .001$).

Does the public understand the ways in which adolescents can obtain steroids without a prescription?

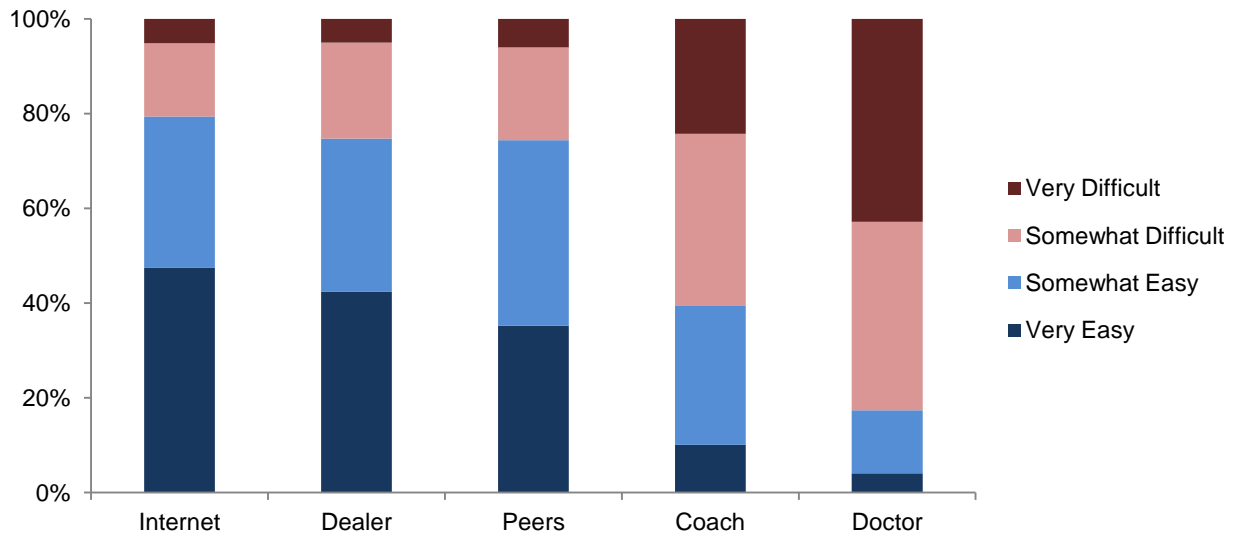
The public believes that steroids, while expensive, are easy to obtain without a prescription from many sources, including the internet, a dealer on the street, or through adolescents' social networks. In contrast, the public believes that it is difficult for students to obtain steroids illegally from coaches or doctors.

- ❖ 73% of the public think that purchasing steroids without a prescription is expensive.
- ❖ 75% of the public think that purchasing steroids without a prescription from the internet, a dealer on the street, or peers is generally **easy**.
- ❖ 62% to 83% of the public believe that purchasing steroids without a prescription from a coach or a doctor is **difficult**.

Regardless of how adolescents obtain steroids, the public unanimously agrees that steroids obtained without a prescription are not as safe as those obtained legally at a pharmacy. These findings are consistent across all regions of the country, all age groups and between those who had been prescribed steroids and those who had not.

- ❖ 89% of the public believe that steroids obtained without a prescription are **not safe**.

Figure 3. Public's perceptions on the accessibility of steroids



Does the public understand the negative health consequences of illegal steroid use?

Considering the finding that the public unanimously agrees that steroids obtained outside of a pharmacy are unsafe, and that even those medications that are obtained from a pharmacy often have listed negative consequences, it is not surprising that the public also unanimously agrees that in general, there are negative health consequences associated with steroid use. However, only half of the public are able to specifically identify a negative consequence⁸. Those who are aware focus on a variety of health consequences ranging from problems with internal organs to socio-emotional problems, to even death. These findings are consistent across all age groups.

⁸ Of note, the question about negative health consequences was open-ended. The public's responses were then coded into the following categories: problems regarding internal organs, socio-emotional or personality problems, sexual or hormonal problems, and other, including acne, addiction, cancer, problems regarding muscles, joints, or bones, or death. Three independent raters coded the responses, with an average agreement of 93%.

- ❖ 97% of the public believe there are negative health effects from using steroids.
- ❖ 57% of the public can name a specific negative health effect.
 - 17% of the public named a problem regarding internal organs, such as heart problems, liver problems, or kidney problems.
 - 10% of the public named a socio-emotional or personality problem, such as aggression, depression, personality changes, or suicide.
 - 7% of the public named a sexual or hormonal problem, such as impotency, or diminished testicular size.
 - 21% of the public named other problems, such as acne, addiction, cancer, problems regarding muscles, joints, or bones, or death.

One possible explanation for this lack of specific knowledge is that as mentioned before, most adults, when in their youth, had not been talked to about the negative health consequences of steroid use by authority figures. Encouragingly, the majority of the younger generation⁹ who did have a teacher or a coach talk to them are aware of specific health effects of steroid use. This finding supports the importance of having educational programming at public schools.

- ❖ 62% of 18-29 year-olds who had a *teacher* talked to them could name a specific health effect.
- ❖ 71% of 18-29 year-olds who had a *coach* talk to them could name a specific health effect.

What does the public believe are the moral implications of illegal steroid use?

While the public has different levels of understanding about the use of steroids among high school students, and most do not see it as a problem, particularly relative to other risk behaviors, they are unanimous in their belief that steroid use for non-medical reasons is **cheating**. This is not surprising since cheating and steroids draws the most attention in the media regarding professional athletes. Interestingly, this belief transcends whether it is an illegal substance; the public does not support the use of steroids, even if it were legal to do so, except for when it is used to help an athlete recover from an injury.

⁹ This question was only asked of participants who were between the ages of 18 and 29 ($n = 192$).

- ❖ 94% of the public believes that using steroids without a prescription to get ahead in school, sports, or for any other reason, is cheating.
- ❖ Even if steroid use without a prescription were legal,
 - 94% of the public would not support its use to improve chances of getting into college.
 - 93% of the public would not support its use to look better physically.
 - 92% of the public would not support its use to make a sports team.
 - 49% of the public would support its use to heal an injury more quickly.

What does the public believe is the best strategy to reduce steroid use among high school athletes?

The public overwhelmingly supports mandatory testing of high school athletes. This is not surprising, considering testing is frequently presented as the main preventative strategy in professional sports by the media. However, when given a choice between mandatory testing and educational programming, the public is divided, with about half supporting educational programming and half supporting mandatory testing. These findings are consistent across all regions of the country, all age groups, and among both parents and non-parents.

- ❖ 75% of the public support mandatory testing of high school athletes.
- ❖ When the public is given a choice...
 - 56% prefer educational programming.
 - 44% prefer mandatory testing.

Importantly, those who are aware of the negative health consequences associated with steroid use and/or believe it is a big problem for high school students are more likely to prefer mandatory testing over educational programming.

- ❖ Complex logistic regression analyses show that:
 - Those who are aware of the negative health consequences are 1.50 times more likely to prefer mandatory testing ($\beta = -.41, SE = .14, p = .004$).
 - Those who believe steroid use among high school athletes is a problem are 1.57 times more likely to prefer mandatory testing ($\beta = -.45, SE = .10, p < .001$).

Summary

The results of this survey reveal a lack of awareness among the public about a problem that exists among adolescents today – the use of performance enhancing drugs. This is true of people throughout the country representing all education levels, those who are and are not interested in sports or are parents of children involved in sports. Perhaps most striking is that the public believes that steroid use ranks last in a list of problems facing adolescents today; behind those issues that receive extensive media coverage such as alcohol and marijuana use and bullying, and even those somewhat less visible such as sexually transmitted diseases and eating disorders. This is somewhat surprising given that almost all of the public understand that there are negative health consequences to steroid use when these substances are obtained illegally, even among young people.

It is possible however that the public perceives the magnitude of a problem in terms of how common or prevalent it appears to be. In the present survey, those in the public who believed adolescents are likely to take steroids were also more likely to view it as a problem. Furthermore, how prevalent the problem is perceived to be is in many ways made more salient if it is given attention by the media. Specifically, extensive media attention has been paid to steroid use among professional athletes, and to a lesser extent, among college athletes. It should not be surprising to discover that the public does in fact believe that the use of performance enhancing drugs is a problem among professional and college athletes. However, in contrast, there is very little attention paid in the media to steroid use among adolescents. This is concerning, since even if every single player in Major League Baseball used steroids, that would be approximately 1,300 users, when in contrast, considering that there are about 16 million private and public high school students in the US (U.S. Department of Education, National Center for Education Statistics, 2012), between 350,000 to almost a million (958,000) students are using steroids illegally (Centers for Disease Control and Prevention, 2012).

Another explanation as to why the public does not view steroids as a problem could be that they view it to be a personal problem, and not a problem for the society as a whole. The use of other substances, such as alcohol and marijuana, have clear and visible repercussions for those who are not directly abusing them (e.g. driving under the influence). In contrast, the societal repercussions of steroid use might not be as clear in the public's mind. However, the moral implications of cheating highlight the impact steroids can have on the society as a whole, and not just on the individual using them. Furthermore, as previously mentioned, one of the common side effects steroid users experience is a violent or aggressive demeanor, which in some cases has been documented to lead to criminal behavior such as violent assaults or homicide (Hall et al., 2005). One could argue that in the high school context, this aggression could manifest itself in the form of bullying, a major public health problem (Nansel, et al., 2001). Clarifying these connections in the public's eyes seems necessary to increase awareness about illegal steroid use as a problem.

There is also very little discussion in the media or evidently among educators and coaches about *when* athletes enter into the world of steroids, or the pathways to steroid use among college and professional athletes, pathways that can easily be forged during the adolescent years. The public seems to believe that the problem starts in college, however the competition for athletic scholarships starts earlier, often in high school, and even in middle school. Of concern, although increasing efforts have been made over the past two decades to educate youth about the dangers of illegal drug use, only half of the younger generation recall being cautioned about steroid use specifically. This is true even for those individuals who were involved in sports during their high school years. This is concerning given that the public overwhelmingly believes that steroids are easy for adolescents to obtain.

In conclusion, there is a clear disconnect between what the public knows and believes about steroids and their perceptions of it as a problem or lack thereof among adolescents. To move forward and educate the public, this disconnect needs to be addressed. There are a number of findings from this survey that provide possible directions for moving forward including the overwhelming sentiment among the public that steroid use is “cheating”, whether these substances are obtained legally or not. As expected, given the extensive media attention given to this issue among professional athletes, there is strong support for mandatory testing, even at the high school level. Interestingly, half of the public also see value in educating adolescents about steroid use if given the choice. It is perhaps the moral view of steroid use as cheating that could provide the foundation for beginning to raise public awareness through educational campaigns, along with clearly articulating the negative consequences of steroid use for young athletes. In addition, it is important that the public understands the likelihood of adolescents to use steroids as well as the reasons that they are likely to use steroids; reasons that are similar to professional athletes’. Moreover, it is important to consider that the majority of the public believes that professional athletes actually encourage, rather than discourage steroid use among adolescents. In other words, from the public’s point of view, each time a story about a professional athlete who is using steroids achieves publicity, a young person is being encouraged, and not discouraged, to use steroids. The extensive media attention given to those professional athletes who achieve great things while using steroids may be contributing to this belief.

It is clear that through the lens of the public, there is much to learn about the use of performance enhancing drugs among adolescents. This argument is supported by an observation made by the Gallup Organization during their conducting of the interviews: the interviews took longer than would be expected of a survey of similar length. To explain this unexpected finding, researchers at Gallup speculated that “respondents typically didn’t know a lot about steroids, so they had to think about their answers”. If programs are to reduce steroid use among adolescents, particularly adolescents attending high school, it is clear that to obtain public support for these programs, the public needs to be educated about this problem. Given the influence of the media in today’s society, be it through radio, television, internet or social media, it is evident that these outlets can play a major role in not only addressing this hidden problem, but also helping to educate the public, including youth.

Directions for Future Research

The implications of this study, outlined above, are extremely important in moving forward with educational efforts to try and solve the steroid problem among adolescents today. However, an understanding of the public's perceptions is not enough on its own to paint a complete picture of this problem. Future studies are warranted to fully understand the issue at hand, and some possibilities are outlined below.

First and foremost, studies exploring the problem from the adolescents' perspective are called for. These could include studies that focus on both users and non-users. To our knowledge, the last comprehensive study focusing on the user's perspective in the United States was conducted nearly 25 years ago (Kusserow, 1990). More studies investigating the onset of use, patterns of use, motivations for use, perceived benefits and harms of use, and awareness of negative health effects of use should be conducted. To our knowledge, no comprehensive studies that focus on the non-user's perspective have been conducted, either. Similar to the complementary model of motivations for abstinence in the alcohol abuse literature (Anderson, Grunwald, Bekman, Brown, & Grant, 2011), one could focus on the non-user's perspective of steroids (i.e. Why do they choose *not* to use steroids?), especially among high-risk groups such as student athletes.

In attempting to completely understand adolescents' motivations for steroid use, it is not sufficient to only focus on their self reports, and thus a more multi-faceted approach is warranted. Previous studies have examined the role that societal expectations and pressures play in leading to lower body satisfaction in adolescent girls and boys (Helfert & Warschburger, 2011). Similarly, studies that explore the role of parents' and coaches' expectations of success, as well as peer influences on adolescents' steroid use should be conducted.

Finally, it is imperative to fully understand the media's role in this problem. Although many of the findings of this study seemed reflective of the media's depiction of steroid use, a content analysis study exploring the ways in which steroids are referred to and discussed in the media would allow us to support these anecdotal arguments and better understand the media's potential influence.

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Appendix A

Sampling

Gallup obtained phone numbers through random digit dialing, a method that includes listed and unlisted numbers in the Continental US. Potential respondents were called during the week as well as on the weekends. Within each household contacted via landline, Gallup interviewers spoke with the adult 18 years of age or older living in the household who has the most recent birthday, providing an additional advantage of statistical randomness. Gallup did not use the same respondent selection procedure when making calls to cell phones because they are typically associated with one individual only.

Weighting

For the sample included in the survey to be representative of the entire American public, it was important to ensure that the demographic characteristics of the total sample matched the latest estimates of the demographic characteristics of the adult population available from the US Census Bureau. Gallup thus assigned each respondent a weight based on their gender, race/ethnicity, age, educational attainment, and region. For example, if the randomly selected sample initially had fewer Black participants than would be expected from the entire population, then each Black participant in the sample was assigned a weight that statistically corrected for this discrepancy. All findings in this report except for standard demographic information are reported using weighted frequencies.

Survey Development

The development of the questionnaire involved an extensive review of the scientific literature, focus groups, and extensive discussions among staff at the Center for Social Development and Education at the University of Massachusetts Boston, Center for Survey Research at the University of Massachusetts Boston, the National Baseball Hall of Fame and Museum, the Professional Baseball Athletic Trainers Society, and the Taylor Hooton Foundation. The questionnaire was designed to document the public's perceptions on the following topic areas:

The public's experience with sports

- To assess the public's experience with sports, questions were asked about their interest in sports in general, their personal participation in high school sports, whether or not they had a school-aged child, and if so, whether the child participated in organized athletics.

The public's experience with steroids

- To assess the public's personal experience with steroids, questions were asked about whether the participant had ever taken steroids that were prescribed to them by a doctor, whether they personally knew anyone that they suspect has taken steroids without a prescription, and whether a person of authority had ever talked to them (such as a teacher, coach, parent) about the possible negative health effects of steroids.

The public's perceptions of steroid use without a prescription as a problem for adolescents

- To assess the public's perception of steroid use as a problem among adolescents, a question was asked about how big of a problem steroid use is for high school students in the context of other problems, such as drug and alcohol use, bullying, sexually transmitted diseases, obesity, and eating disorders. Questions were also asked about steroid use as a problem among high school *athletes*, relative to other athletes (college and professional).

The public's beliefs about adolescents' motivations for using steroids

- To assess the public's perception of adolescent's motivations for using steroids, questions were asked about why adolescents use steroids, and whether they are influenced by professional athletes' steroid use. Of note, the question about adolescents' use of steroids was open-ended.

The public's perception of the likelihood that adolescents use steroids

- To assess the public's perception as to the likelihood of steroid use among high school students, questions were asked about how likely they believed high school boys and girls were to use steroids.

The public's perception of the accessibility of steroids

- To assess the public's perception on how accessible steroids are to high school students, questions were asked about how expensive steroids are and how easy or hard they are to acquire.

The public's perception of the negative health consequences of using steroids

- To assess the public's perception of the negative consequences of using steroids, questions were asked about how safe the public believes steroids are and whether there are negative health consequences associated with illegal steroid use, and if so, what those negative effects are. Of note, the question about negative health consequences was open-ended.

The public's perception of the moral implications of using steroids

- To assess the public's perception of the moral implications of using steroids, questions were asked about whether they consider steroid use cheating, and whether they would support its use if it were legal.

The public's beliefs about reducing steroid use among high school athletes

- To assess the public's beliefs about reducing steroid use among high school athletes, questions were asked about whether the public would support mandatory testing at the high school level. In addition, the public was asked whether they would support programs aimed at educating students about the dangers of steroid use, or mandatory testing, if given a choice.

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