The Game of Steroids? An Assessment of the Impact of Sport Participation on Steroid Use among High School Students

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Abstract

Allegations of steroid use among professional athletes have permeated the world of sports for decades. In recent years, however, American athletes have become more scrutinized for alleged steroid use due to increased political involvement and heightened media coverage of the topic. A reason for the attention given to steroid use by professional athletes is out of concern that young athletes who play sports use steroids. This research will examine 1) the relationship between student participation on sports teams and steroid use among high school students, and 2) whether this relationship changed from 1999 to 2005, a time period that captures the increased scrutiny given to athletes and their alleged steroid use. This research utilizes data from the 1999 and 2005 Youth Risk Behavior Survey (YRBS) to address the impact of participation on sports teams on steroid use among high school students. Ordinary least squares regression was performed to test the hypotheses that sport participation increases steroid use among high school students and that the relationship between sport participation and steroid use changed from 1999 to 2005. The results suggest the impact of sport participation on steroid use among high school students is significant and positive in 1999 but not significant in 2005; the results also suggest there is a change in the relationship between sport participation and steroid use over time.

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Introduction

Allegations of high-level athletes using steroids are nothing new in the world of sports. For years, athletes have been disqualified from events or even banned from their sport due to positive drug tests. The Canadian sprinter Ben Johnson was stripped of his gold medal at the 1988 Seoul Olympics after he tested positive for the anabolic steroid called Stanozol (Babad 1988). Five years later, Johnson received a life ban from athletics after failing a second drug test (Rowbottom 1993). In 1998, the director of the Festina team admitted he provided cyclists with illegal drugs to enhance performance in the Tour de France (CNN/Sports Illustrated 1998). The Festina teammates allegedly consumed drugs such as amphetamines, steroids, and EPO to get a competitive edge (Abt 1998). Clearly, steroid scandals have permeated sports for years. But in recent times, with increased political involvement and heightened media coverage, American athletes have become more scrutinized for alleged steroid use–mainly out of concern that young athletes use steroids.

The intention of this research is to assess 1) the relationship between student participation on sports teams and steroid use among high school students, and 2) whether this relationship changed from 1999 to 2005. During this six year time span, the political scrutiny of steroid use among professional athletes intensified, the media highlighted the problem, best-selling books were written on the subject, and pressure was exerted on U.S. sports leagues to implement tougher drug testing programs. This research will assess whether the influence of sport participation on steroid use among high school students changed from 1999 to 2005, a time period that captures the increased scrutiny given to athletes and their alleged steroid use.

This paper will begin with an explanation of the harms and benefits associated with steroid use, and why athletes put their reputation, as well as their career, in jeopardy to use these substances. A brief discussion of government investigations into steroid use will provide a context for the increased attention given to the problem of "juicing" in professional sports. Concern for young athletes' use of steroids will be highlighted as a reason why the media and government have covered the topic of steroids. An explanation of the study's research methods will be followed by an analysis of the findings and a discussion of the study's limitations. Finally, this paper will conclude with an assessment of the effect of sport participation on steroid use and will suggest how future research may continue to explore the topic.

The Benefits and Risks of Steroids

Since 1991 androgenic anabolic steroids, which are synthetic versions of the hormone testosterone, have been classified as Schedule III drugs under the Controlled Substances Act (Drug Enforcement Administration [DEA] 2004). The classification as Schedule III implies steroids are available legally by prescription and have medical purposes (National Institute on Drug Abuse [NIDA] 2008). Possession of anabolic steroids, as well as the sale of these drugs, is illegal without a prescription. Physicians may prescribe steroids to men who produce low levels of testosterone, for example, or to patients with low red blood cell counts (DEA 2004). Veterinarians also utilize steroids and administer these drugs to animals, as steroids may help an animal gain weight or treat anemia (DEA 2004).

The name itself describes why athletes use anabolic steroids. Androgenic means "promoting masculine characteristics" and anabolic refers to "tissue building" (DEA 2004). Anabolic steroids aid athletes in increasing muscle mass and strength, and very importantly, steroids help athletes recover from intense workouts with less fatigue or soreness (Fainaru-Wada and Williams 2007). Athletes consume steroids by injecting the substances into muscles, consuming the steroids orally, or by applying creams to the skin (DEA 2004). Once administered, traces of steroids may remain in the body from a couple of days to over a year, depending on the substance (DEA 2004).

Although steroids can help athletes achieve greater strength and endurance, there are serious side effects with steroid use, and the long term effects are not clear. For men, side effects include baldness, development of breasts, painful erections, and the loss of functioning testicles (DEA 2004). For women, steroids may cause facial or body hair, a deepened voice, a reduction in breast size, an enlarged clitoris, and menstrual irregularities (DEA 2004). Both men and women who use steroids may suffer from acne and bloating, in addition to feelings of hostility and mood swings. Steroids are powerful substances that can have a major impact on the body. Fainaru-Wada and Williams (2007) illustrate the power of steroids as they chronicle changes in Barry Bonds' body, despite his denial of steroid use, and assert that his cleat size increased, as well as his jersey and hat size, over the last decade. There is also great concern that steroids cause negative health effects for youths who are still developing. Steroids, for instance, may stunt a child's growth by closing the growth plates in the bones (DEA 2004).

Concern for Steroid Use among Youths

President George W. Bush's State of the Union Address on January 20, 2004, highlighted the need to address steroid use among professional athletes. In addition to stating that children "need good examples" to "make right choices" and that some professional athletes are not living up to this standard, Bush asserted that "the use of performance-enhancing drugs like steroids in baseball, football, and other sports is dangerous, and it sends the wrong message–that there are shortcuts to accomplishment, and that performance is more important than character" (The White House 2004). He continued by calling on "team owners, union representatives, coaches, and players to take the lead, to send the right signal, to get tough, and to get rid of steroids now" (The White House 2004). With its inclusion in such a prominent speech, the problem of steroid use was catapulted into the political arena.

Congress heeded Bush's request and began investigating professional sports and steroid use. In March 2005, the Government Reform Committee in the House of Representatives initiated hearings on steroid use in professional baseball, which was followed by investigations into the NFL's steroid use (Murphy 2005; Shapiro 2005). Although the hearings surrounding steroid use in baseball did not occur until 2005, a federal jury in 2003 began an investigation of BALCO (Bay Area Laboratory Cooperative) which allegedly supplied prominent athletes with steroids and other performance enhancing drugs (Jung 2005). The BALCO investigation received a large amount of media attention because many famous athletes were associated with the organization, such as Barry Bonds who was an endorser of BALCO (Fainaru 2004).

It is beyond this research's realm to assess whether professional athletes are using steroids. However, it is clear that increased attention has been given to the alleged problem of steroid use by professional athletes–whether or not the claim is actually valid. Fear that young athletes look up to their favorite players who use steroids is reason for the increased scrutiny.

Research Questions and Hypotheses

The increased attention given to steroid use by professional athletes begs the question of whether participation on sports teams by high school students increases steroid use. After all, a primary reason steroid use by professional athletes has been highlighted is out of concern that young athletes use steroids. High school athletes may look up to professional

athletes as role models and mirror their behavior. Young athletes who believe professional athletes use steroids may feel pressure to use steroids themselves to improve their performance and to increase the likelihood of becoming a professional athlete. This research presents two questions: What impact does participation on sports teams have on steroid use among high school students? And, has the relationship between sport participation and steroid use changed from 1999 to 2005, when steroid use by professional athletes grabbed national headlines?

The first research hypothesis presented in this paper is that participation on sports teams increases steroid use among high school students. Athletes are under pressure to perform at high levels. Athletes not only compete with players on other teams but also with their own teammates to earn starting positions and be key players. Steroids enable students to increase their strength and their muscle mass, as well as improve their endurance to become a stronger athlete. The second research hypothesis is that the relationship between sport participation and steroid use changed between 1999 and 2005. This research paper hypothesizes that the impact of sport participation on steroid use in 1999 is different from the impact of sport participation on steroid use in 2005. The relationship between young athletes and steroid use may have changed during this time frame when the national attention dedicated to steroid use by professional athletes increased. Young athletes may have learned about steroids in the news and wanted to try the substances; or, high school athletes may have learned the negative consequences of steroid use and stopped using the drugs.

Research Design

Ordinary least squares regression was performed to assess the impact of sport participation on steroid use.[18] A regression analysis, regressing steroid use on sport participation with control variables, was performed on the 1999 and 2005 datasets of the Youth Risk Behavior Survey (YRBS). The linear regression for the 1999 dataset contained 13,133 observations, compared to 10,846 observations in 2005. Both analyses, clearly, have a large number of observations. Since the population of interest is high school students and the units of analysis are students, robust estimates of the standard error were used in the regression to correct for likely heteroscedasticity, which occurs when the variance of the stochastic term is not constant across all observations (Langbein 2006).

[18] The data was run with several estimation techniques, including tobit and logistic regression in addition to linear regression. The linear model provided the best goodness of fit.

The YRBS includes questions on lifetime steroid use and involvement on sports teams (see table 1). Table 1 reports the original wording of questions and responses. The outcome measure, steroid use, is the number of times a student reports taking steroids in his lifetime without a doctor's prescription. This study, however, computed the midpoint of each category for the responses to lifetime steroid use. Taking the midpoint of each category results in the following coding for lifetime steroid use: 1 = 0 times, 2 = 1.5 times, 3 = 6 times, 4 = 14.5 times, 5 = 29.5 times, and 6 = 40 or more times. The survey also presents a question on how many sports teams a student played on during the past twelve months. Sport participation is defined as the number of sports teams a student played on during the past year, where 1 = 0 teams, 2 = 1 team, 3 = 2 teams, and 4 = 3 or more teams.

Table 1. Question Wording with Coding, 1999 & 2005 YRBS

Question Wording	Coding
During the past 12 months, on how many sports teams did you play?	1 = 0 teams 2 = 1 team 3 = 2 teams 4 = 3 or more teams
During your life, how many times have you taken steroid pills or shots without a doctor's prescription?	1 = 0 times 2 = 1 or 2 times 3 = 3 to 9 times 4 = 10 to 19 times 5 = 20 to 39 times 6 = 40 or more times

Thirteen control variables were used in each regression. Four variables controlled for demographic characteristics including age, gender, grade, and ethnicity. Age is coded where 1= 12 years or younger, 2 = 13 years old, 3 = 14 years old, 4 = 15 years old, 5 = 16 years old, 6 = 17 years old, and 7 = 18 years old or older. Gender is coded 1 for female and 2 for male. Grade is coded where 1 = 9th grade, 2 = 10th grade, 3 = 11th grade, 4 = 12th grade, and 5 = ungraded or other grade. The ethnicity variable derives from the question, "How do you describe yourself?," where 1 = American Indian/Alaska native, 2 = Asian, 3 = Black or African American, 4 = Hispanic or Latino, 5 = Native Hawaiian/other Pacific Islander, 6 = white, 7 = multiple-Hispanic, and 8 = multiple-non-Hispanic. One variable controlled for height, in meters, and another variable controlled for weight, in kilograms.

Nine variables controlled for "risky behavior" since students who engage in risky behavior may be more likely to use steroids. The variable "cigarette" measures whether a student has ever tried cigarette smoking, coded as 1 for yes and 2 for no. "Alcohol" refers to how many days a student has had at least one drink of alcohol in his/her lifetime. The variable "pot" measures how many times a student reported using marijuana during his/her life, while the variables "cocaine," "heroin," and "meth" measure how many times a student has used cocaine (including powder, crack, or freebase), heroin, or methamphetamines (also called speed, crystal, crank, or ice), respectively, in his/her lifetime. "Sex" measures whether a student has ever had sexual intercourse, coded as 1 for yes and 2 for no.

Analysis and Findings

Descriptive statistics were computed for each variable of interest, including the treatment variable, the outcome variable, and the control variables for students in 1999 and 2005. In 1999, the average times a student had tried steroids without a doctor's prescription was 0.43 times compared to 0.45 in 2005 (See table 2). Thus, mean lifetime steroid use is higher in 2005 than 1999. The average number of sports teams that a high school student played on dropped from 1.98 teams in 1999 to 1.95 teams in 2005. While the average times a student tried steroids increased from 1999 to 2005, the average number of teams a student played on decreased.

A comparison of means test was performed on each variable to assess differences in the 1999 and 2005 datasets. A t-test was conducted by using aggregated data from both datasets. Aggregated data from 1999 and 2005 was used to compare the mean steroid use in 1999, for example, to the mean steroid use in 2005. This procedure was duplicated for each variable (See table 2). The results suggest that lifetime steroid use is not statistically significant at the .05 level. The mean lifetime steroid use among high school students in 1999 is not significantly different from the mean lifetime steroid use in 2005. Several variables are statistically significant at the .05 level, including lifetime cigarette and alcohol use, and the number of teams a student played on (as indicated by the variable "sport"). Age and ethnicity, as well as weight, are statistically significant at the .05 level.

Table 2. Comparison of Means, All Students, 1999 & 2005 YRBS

	1999			2005			
Variable	**n**	**Mean**	**Std. Dev.**	**n**	**Mean**	**Std. Dev.**	**p. value**
Steroid	15349	0.434	3.540	13917	0.459	3.598	.536
Sport	15183	1.983	1.085	13202	1.956	1.063	.039*
Age	15318	5.210	1.218	13867	5.185	1.217	.017*
Gender	15273	1.487	0.499	13857	1.480	0.499	.263
Grade	15296	2.509	1.118	13858	2.524	1.115	.255
Ethnicity	15208	5.479	1.564	13686	4.937	1.606	.000*
Meters	14456	1.694	0.100	13119	1.694	0.103	.975
Kilograms	14456	67.016	16.154	13119	68.192	16.878	.000*
Cigarette	14888	1.297	0.457	13168	1.442	0.496	.000*
Alcohol	15349	23.921	34.121	13917	20.127	31.527	.000*
Pot	15349	16.368	32.210	13917	14.379	30.438	.000*
Cocaine	15349	1.195	5.782	13917	1.073	5.520	.064
Heroin	15349	0.341	3.306	13917	0.345	3.266	.932
Meth	15349	0.836	4.841	13917	0.706	4.451	.017*
Sex	14469	1.459	0.498	12360	1.477	0.499	.003*

** Significant at the p < .05 level*

In order to examine the potential differences between athletes and non-athletes, a new variable called "athlete" was generated from the "sport" variable. The "sport" variable measures sport participation by reporting the number of sports teams a student played on during the past year, where 1 = 0 teams, 2 = 1 team, 3 = 2 teams, and 4 = 3 or more teams. The variable "athlete" was created by including all students who played on at least one team as athletes, and students who did not play on any teams as non-athletes (where athlete = 1 and non-athlete = 0). The "athlete" variable was created in both datasets.

In 1999, the mean lifetime steroid use was higher for athletes than non-athletes, as the lifetime steroid use for athletes was 0.50 times on average

compared to 0.35 times on average for non-athletes (see table 3). Athletes are taller on average than non-athletes and weigh more, on average, compared to non-athletes. The mean weight of athletes is 67.60 kilograms compared to 66.32 kilograms for non-athletes, and the mean height of athletes is 1.70 meters while non-athletes have a mean height of 1.67 meters. While the mean lifetime use of cigarettes, alcohol, and heroin is higher for athletes than non-athletes, the mean lifetime use of marijuana, cocaine, and methamphetamines is higher for non-athletes.

Table 3. Comparison of Means, Non-Athletes and Athletes, 1999 YRBS

	Non-Athletes			Athletes			
Variable	**n**	**Mean**	**Std. Dev.**	**n**	**Mean**	**Std. Dev.**	**P-value**
Steroid	7123	0.357	3.179	8226	0.500	3.824	.013*
Age	7106	5.293	1.215	8212	5.139	1.217	.000*
Gender	7081	1.410	0.492	8192	1.553	0.497	.000*
Grade	7096	2.586	1.123	8200	2.442	1.109	.000*
Ethnicity	7055	4.473	1.540	8153	4.670	1.580	.000*
Meters	6622	1.678	0.098	7834	1.707	0.099	.000*
Kilograms	6622	66.325	16.571	7834	67.601	15.770	.000*
Cigarette	6916	1.287	0.452	7972	1.305	0.460	.016*
Alcohol	7123	23.198	33.895	8226	24.546	34.306	.014*
Pot	7123	17.393	33.243	8226	15.480	31.262	.000*
Cocaine	7123	1.347	6.196	8226	1.065	5.395	.002*
Heroin	7123	0.287	3.011	8226	0.389	3.542	.056
Meth	7123	0.940	5.137	8226	0.746	4.568	.013*
Sex	6705	1.458	0.498	7764	1.460	0.498	.810

** Significant at the p < .05 level*

A comparison of means test was performed to assess the potential differences among non-athletes and athletes in 1999. According to table 3, the difference in the mean lifetime steroid use among non-athletes and athletes is significant at the .05 level. There is also a significant difference in height and weight among non-athletes and athletes. The mean age of non-

athletes is statistically different from the mean age of athletes. Lifetime cigarette, alcohol, marijuana, and cocaine use are also statistically significant differences among non-athletes and athletes.

Table 4. Comparison of Means, Non-Athletes and Athletes, 2005 YRBS

	Non-Athletes			Athletes			
Variable	**n**	**Mean**	**Std. Dev.**	**n**	**Mean**	**Std. Dev.**	**P-value**
Steroid	6788	0.475	3.686	7129	0.445	3.513	0.620
Age	6769	5.266	1.219	7098	5.108	1.210	0.000*
Gender	6758	1.421	0.493	7099	1.537	0.498	0.000*
Grade	6762	2.596	1.125	7096	2.455	1.100	0.000*
Ethnicity	6666	4.824	1.622	7020	5.045	1.583	0.000*
Meters	6367	1.680	0.100	6752	1.707	0.104	0.000*
Kilograms	6367	67.844	17.333	6752	68.520	16.432	0.022*
Cigarette	6194	1.401	0.490	6974	1.479	0.499	0.000*
Alcohol	6788	19.714	31.454	7129	20.519	31.594	0.132
Pot	6788	16.407	32.454	7129	12.447	28.252	0.000*
Cocaine	6788	1.199	5.772	7129	0.953	5.266	0.008*
Heroin	6788	0.369	3.387	7129	0.321	3.147	0.392
Meth	6788	0.815	4.756	7129	0.602	4.136	0.004*
Sex	5978	1.465	0.498	6382	1.488	0.499	0.012*

** Significant at the p < .05 level*

An examination of the 2005 data indicates mean lifetime steroid use is higher for non-athletes than athletes, with athletes having tried steroids without a prescription 0.44 times on average compared to 0.47 times on average by non-athletes (see table 4). Athletes on average are taller and heavier than non-athletes. The mean height of athletes is 1.70 meters while the mean height of non-athletes is 1.68 meters. Athletes weigh 68.52 kilograms on average compared to the mean weight of 67.84 kilograms for non-athletes.

In 2005, the difference in lifetime steroid use is not significant at the .05 level. However, there are statistically significant differences among non-athletes and athletes, including age, gender, grade, height, and weight. The results suggest that the variables lifetime cigarette, marijuana, cocaine, and methamphetamines use are significant as well. Although the mean steroid use among non-athletes is not statistically different from the mean steroid use among athletes, the results suggest significant differences occur among athletes and non-athletes in 2005.

Turning to the multiple regression findings, the regression coefficient ($\hat{b}$) for sport participation is 0.06 for the 1999 dataset (see table 5). The coefficient of 0.06 suggests that for each additional team a student plays on, the number of times that a student has taken steroids over his lifetime increases by 0.06 times, on average. The results from the 1999 dataset indicate that the relationship between sport participation and steroid use is positive and significant at the .05 level. Lifetime alcohol, cocaine, heroin, and methamphetamines use are all positive and significant at the .05 level, as is gender.

According to the 2005 data, the effect of sport participation on steroid use is not significant at the .05 level. The finding that the impact of sport participation on steroid use is not significant is a positive finding for high school sports programs. Several of the control variables for risky behavior are significant, including lifetime cocaine, heroine, and methamphetamines use.

Since the units of analysis are students, the R-squared in both regressions is low. The R-squared in the regression for the 1999 and 2005 dataset, respectively, is 0.33 and 0.19. This descriptive statistic of 0.33 means that all of the independent variables in the regression explain 33% of the variance in steroid use; an R-squared of 0.19 suggests that all the independent variables explain 19% of the variance in steroid use.

Collinearity exists when independent variables are highly correlated and thus the impact of one variable cannot be separated from another variable's effect on the dependent variable (Langbein 2006). Collinearity is more likely when most of the independent variables are not significant. The variance inflation factor (VIF) is one way to test for collinearity. The VIF for the 1999 dataset is 1.78 and the VIF for the 2005 dataset is 1.92. Since the VIFs are under 10, collinearity does not appear to be a problem.

Table 5. The Impact of Sport Participation on Steroid Use, Ordinary Least Squares Regression with Robust Standard Errors, 1999 & 2005 YRBS

	1999				2005			
Variable	**Coef.**	**Std. Err.**	**t**	**P-value**	**Coef.**	**Std. Err.**	**t**	**P-value**
Sport	0.068	0.023	2.91	0.004*	0.031	0.026	1.17	.242
Age	-0.009	0.041	-0.24	0.811	-0.080	0.050	-1.58	.114
Gender	0.146	0.056	2.59	0.010*	-0.005	0.064	-0.08	.934
Grade	-0.071	0.049	-1.44	0.149	-0.018	0.050	-0.36	.721
Ethnicity	0.000	0.014	0.01	0.995	0.017	0.017	1.00	.316
Meters	-0.711	0.383	-1.85	0.064	0.432	0.377	1.15	.252
Kilograms	0.003	0.002	1.80	0.072	0.000	0.001	0.10	.920
Cigarette	0.051	0.029	1.75	0.080	-0.094	0.048	-1.96	.050
Alcohol	0.002	0.000	2.31	0.021*	0.001	0.001	1.48	.139
Pot	0.001	0.001	1.31	0.192	0.001	0.001	1.55	.122
Cocaine	0.040	0.015	2.54	0.011*	0.035	0.016	2.20	.028*
Heroin	0.479	0.055	8.58	0.000*	0.376	0.069	5.42	.000*
Meth	0.103	0.023	4.33	0.000*	0.065	0.024	2.72	.007*
Sex	-0.124	0.034	-3.67	0.000*	-0.199	0.043	-4.57	.000*
n	13133				10846			
R-squared	0.337				0.198			

** Significant at the p < .05 level.*

The impact of sport participation on steroid use among high school students in 1999 is significant. Although the (two-tailed) p-value of .004 associated with sport participation suggests the impact is significant, the magnitude of the regression coefficient assesses whether the impact of sport participation on steroid use is substantively meaningful. Sport participation's regression coefficient of 0.06 indicates that for each additional team a student plays on, the number of times that a student has taken steroids over his lifetime increases by only 0.06 times, on average. While statistically significant, the result lacks practical significance.

The main finding is the impact of sport participation on steroid use among high school students is significant in 1999 and not significant in 2005. Regressions from both years utilized very large datasets (1999 dataset, n = 13,133; 2005 dataset, n = 10,846). When a large dataset is used, it is not surprising to find significant results. Thus, the finding from the 2005 dataset that the relationship is *not* significant is important to note–that is, that the relationship between sport participation and steroid use changed from being significant in 1999 to not being significant in 2005 suggests that something has occurred within that time frame. The change in significance must be emphasized.

Limitations

Simultaneity, when a two way correlation exists between the dependent variable and the independent variable, is a standard threat to causal claims (Langbein 2006). Sport participation may be associated with steroid use because athletes are more likely than non-athletes to increase muscle mass and improve their athletic performance. But students who take steroids (for weight loss or to improve their build for non-athletic purposes) may participate in sports because of their steroid use which gives them an advantage over the other players. If simultaneity does exist, the impact of sport participation on steroid use will be biased.

Type of sport is an omitted variable, which suggests the estimates of the impact of sport participation on steroid use may be biased. A limitation of this study is the lack of information regarding type of sport. This data does not distinguish between team sports, such as soccer or football, and individual sports, such as diving. Also, sports may differ in terms of what type of body build is desired. Gymnasts, for example, do not want bulky muscle mass but prefer lean, sculpted bodies. A gymnast's lean body contrasts greatly to the body build of a linebacker in football. Finally, it is important to note that students may underreport use of steroids or other drugs due to the sensitivity of the information. Athletes especially may fail to disclose drug use because of the negative consequences associated with using drugs, such as being suspended from sports teams.

Conclusion

Athletes such as Barry Bonds have enabled the problem of steroid abuse in professional sports to gain national headline status. With the federal investigations of BALCO, the discussion of a stricter drug testing program in the Major League Baseball (MLB), the release of the Mitchell Report, and the

acknowledgment of steroid use by track superstars such as Marion Jones, the topic of steroid use has expanded beyond the realm of sports and continues to be a topic of debate in the world of politics (Bowen 2007; Jung 2005; Sheinin 2005, 2007). The intensified scrutiny of steroid use by non-sports organizations developed out of concern for steroid use among young athletes, and this concern continues to be apparent.

This study examined the impact of sport participation on steroid use among high school students in 1999 and 2005. While the results were significant in 1999, suggesting the effect of sport participation on steroid use is significant, the results in 2005 were not significant. Why the change? A possible explanation is from 1999 to 2005, the topic of steroid use by professional athletes evolved from a political non-issue into a topic of congressional hearings. High school athletes may have learned the health effects associated with steroid use, or they may have seen their favorite players disgraced and learned there are consequences associated with steroid use. Alternatively, high school athletic programs may have implemented more rigorous drug testing programs in light of the problem in professional sports. How steroid use among high school students has changed should be further explored by subsequent research.

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The Effect of Socioeconomic Status on the Number of Women in State Legislatures

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Abstract

Women legislators in the United States are more likely than their male counterparts to include legislation concerning women, children, and families among their top priorities (Thomas 1991; Reingold 1992; Swers 1998). Additionally, women are more successful in their efforts to pass these bills into law. These findings have important implications because they suggest that states with more female legislators will have more bills introduced and passed concerning traditional women's issues. Yet there is a wide range in the number of women serving in legislatures, with a high of 37.2% in Vermont and a low of 8.8% in South Carolina. So the question remains, what causes this variation among states?

To answer this question, I used data collected by the Institute for Women's Policy Research concerning the socioeconomic status of women in each state. By running a multivariate regression using this data and the number of women in a state legislature, I was able to test whether the status of women has an effect on the number of women in the legislature. Additionally, I ran models including the number of women in leadership positions and the number of Democratic and Republican members of legislatures to test the effect of the status of women on these variables. The theory behind the tests is that a higher socioeconomic status of women in the electorate creates a larger candidate pool for women. Overall, the results suggest that the socioeconomic status of women does have an influence on the number of women in a state legislature. I conclude that increasing women's socioeconomic status, particularly the level of education, will help to increase the amount of women in legislatures.