WOMEN'S SPORTS FOUNDATION

# HOW TENNIS INFLUENCES YOUTH DEVELOPMENT

January 2019

A Women's Sports Foundation Report

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# Acknowledgments

How Tennis Influences Youth Development builds on two previous research projects — *More Than a Sport: Tennis, Education & Health* (2013) and *Teen Sport in America: Why Participation Matters* (2018) — that view teen sports as an educational tool and public health asset. We are deeply indebted to Deborah Slaner Larkin, who originally championed the idea that each sport might make unique contributions to the health and well-being of American youth and that understanding these benefits would ultimately lead to more opportunities for youth to play sports. She was a powerful advocate and supporter for this line of research when she served as the Executive Director of the USTA Serves (now Foundation) and oversaw the development and conduct of the research that resulted in *More Than A Sport: Tennis, Education, and Health*, a first-of-its-kind, nationwide study that compared the educational and health profiles of adolescent tennis participants with participants in other non-contact sports and contact sports, as well as high school students who did not participate in sports. Later, as WSF CEO, she made this line of research an organizational priority, helped conceptualize the project, and made many important contributions to the final report. And now, we also express our appreciation to her for providing invaluable input from the study design phase to the analysis and the writing.

The Women's Sports Foundation is indebted to the study author, Philip Veliz, Ph.D., whose scholarly expertise in the how adolescent behavior is influenced by sports participation brought this project to life. The policy recommendations were written by Deborah Slaner Larkin and Marjorie Snyder, Ph.D., with valuable input from the USTA Foundation, New York Junior Tennis and Learning, and *Tennis* Magazine.

A special note of acknowledgement and appreciation is extended, as well, to Deana Monahan for her editorial and graphic skills.

This report was made possible through a partnership between the Women's Sports Foundation® and the Margaret Fund.

# About the Women's Sports Foundation

The Women's Sports Foundation — the leading authority on the participation of women and girls in sports — is dedicated to creating leaders by ensuring girls access to sports. Founded by Billie Jean King in 1974, our work shapes public attitude about women's sports and athletes, builds capacities for organizations that get girls active, ensures equal opportunities for girls and women, and supports physically and emotionally healthy lifestyles. The Women's Sports Foundation has relationships with more than 1,000 of the world's elite female athletes and is recognized globally for its leadership, vision, expertise and influence. For more information, visit www.WomensSportsFoundation.org.

# About the MARGARET Fund

The MARGARET Fund at the Women's Sports Foundation was created in 2000 to help identify, fund and promote projects that foster gender equality for all in sports.

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## Authorship

This study was authored by Phillip Veliz, Ph.D., Assistant Research Professor at the School of Nursing's Applied Biostatistics Laboratory and Associate Director of the Sport, Health, and Activity Research and Policy Center, University of Michigan.

## Author's Acknowledgments

I am grateful to the Women's Sports Foundation for making this report a reality. Many thanks to Dr. Marjorie Snyder, WSF Senior Director of Research, whose vision, scholarly expertise, and management skills set the stage for a successful project. A special note of acknowledgement and appreciation is extended, as well, to Deana Monahan for her editorial and graphic skills. Finally, special thanks to all the researchers who, over time and across a wide variety of disciplines, have contributed to the growing body of knowledge discussed in this report.

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# EXECUTIVE SUMMARY

In 2012 USTA Serves (USTAF) commissioned the Women's Sports Foundation (WSF) to conduct a research study to compare the education and health profiles of youth tennis participants with participants in other contact and non-contact sports, as well as students who do not participate in sports. The purpose was to provide quantitative research for the USTA, National Junior Tennis and Learning (NJTL) organizations, and other youth-serving sports organizations to determine how tennis participation positively influences the lives of U.S. youth across all socioeconomic levels. *More Than a Sport: Tennis, Education & Health (More Than a Sport)* was released in 2013.

Five years later, the WSF commissioned *Teen Sport in America: Why Participation Matters (Teen Sport Report)* to better understand the impact of sports participation on teen health, well-being and academic achievement. The purpose was to understand how each sport impacts teen well-being and whether the number of sports in which a teen participates influences their health. The report also explored whether sports opportunities overall, as well as individual sports, are accessible to all teens across genders, race and ethnicities, levels of family income, and regions. Finally, we wanted to identify the unique benefits and opportunities for improvement that exist within each sport to maximize the health benefits for teens.

Deborah Slaner Larkin, through the MARGARET Fund at the WSF commissioned the WSF to update the data from *More Than a Sport* and, as it specifically relates to tennis, build on the findings of the *Teen Sport Report* by examining participation and retention levels as well as what combination of sports is associated with the best academic, social, health, and behavioral outcomes among adolescents.

## Methods

The research is based on an analysis of the Monitoring the Future (MTF) nationwide surveys, a federally funded cross-sectional study of American secondary students conducted by researchers at the Institute for Social Research at the University of Michigan.

The Section 1 sample includes eighth-, 10th- and 12th-graders who participated between 2006 and 2016. The sample includes roughly 115,000 adolescents of which approximately 8,000 indicated participating in tennis at a competitive level during the past year (including 54,048 adolescents from the first report, of which 4,278 were tennis players). Nine sports were examined in the initial *More Than a Sport* report. Comparisons were made by sport and between non-participation/contact/non-contact sports and tennis. In the *Teen Sport Report* 20 sports were examined and 15 of those were included in this

report: cross country, baseball/softball, basketball, field hockey, gymnastics, football, ice hockey, lacrosse, soccer, swimming/diving, tennis, track, volleyball, weightlifting and wrestling.

Section 2 consists of roughly 14,000 12th-graders who were surveyed between 2010 and 2015 (roughly 2,500 who were randomly selected to fill out one of six possible forms) from the *Teen Sports Report.* Roughly 700 respondents indicated participating in tennis at a competitive level during the past year. In addition, a group of students that reported the highest levels of every outcome from the *Teen Sport Report* was analyzed.

Section 3 uses the same 12th-grade sample as Section 2. A latent class analysis (LCA) was used to create groups based on measures assessing diet and nutrition, physical activity, substance use, academic achievement, and psychological health.

## Key Findings

1. **Most sports report participation declines.** There has been a small decline among tennis participation for both boys and girls between 2006 and 2016 (boys, 7.8% versus 5.8%; girls, 8.0% versus 6.1).

2. **The diversity of boys who play tennis is increasing.** A notable change in the composition of tennis participants across the two time periods (2006-10 versus 2011-16) was found in the increase in the percentage of boys who identified as "Other Race" (18.8% to 24.2%).

3. **Tennis retains its core participants.** Despite the decline in overall participation rates in tennis among boys and girls across the two time periods, the overall retention rate between eighth and 12th grade increased for both boys (90% to 105%) and girls (60% to 84%).

4. **Most tennis participants play more than one sport.** More than three-quarters (77%) of boys and 58% of girls who participated in tennis also participated in at least one other sport within their school or community. When considering the top 10 most popular sports, boys who played tennis were most likely to participate in soccer and swimming. Girls were most likely to play soccer and lacrosse.

5. **Tennis and school are a good match.** Overall, tennis reported one of the highest rankings with respect to academic achievement (highest or second-highest across five separate measures – percentage of A's, average grade, 10 or more hours of homework per week, college attendance aspiration, and college graduation aspiration). Importantly, these outcomes assessing academic achievement typically increased across the two study periods. In particular, more than 70% of boys and girls who participated in tennis indicated that they would definitely go to and graduate from a four-year college. Overall, tennis ranked the lowest among the 15 sports for both suspension (15.9%) and being sent to the office (24.2%).

6. **Tennis benefits youth from all socioeconomic groups.** Consistent with the first study, the associations presented held for various socioeconomic groups. While adolescents who came from higher SES backgrounds tended to have better academic, behavioral, social, and health outcomes, the impact of tennis was similar across all socioeconomic groups.

7. **Tennis players are less prone to risky behaviors.** Overall, tennis participants had some of the lowest rates of binge drinking, marijuana use, and cigarette use across the 15 different sports: second-lowest for binge drinking, second-lowest for marijuana use, and third-lowest for cigarette use. The prevalence rates for binge drinking, smoking marijuana, and smoking cigarettes dropped between the two study periods among both boys and girls who participated in tennis.

8. **Tennis players are psychologically healthy.** Tennis ranked above average among athletes on all measures of psychological health (self-esteem, loneliness, and self-derogation) with the exception of social support, in which boys who participated in tennis ranked below average when compared to other athletes.

9. **Tennis players engage in healthy eating but need more sleep and physical activity.** Tennis ranked above average among athletes on all measures assessing healthy behaviors (eat breakfast, green vegetables, and fruit every day). However, tennis ranked as one of the lowest with respect to adolescents indicating getting at least seven hours of sleep every day. Tennis also ranked below average among athletes with respect to exercising vigorously every day. Among youth who were physically active for seven days during a typical week, boys who participated in tennis ranked above average among athletes and girls who participated in tennis ranked below average among athletes.

10. **Among the top 10 most popular sports, tennis has the highest of the "healthy high achievers."** Among the group of students who had the highest level of academic achievement, lowest prevalence of substance use, lowest school misbehavior, highest prevalence of health behaviors, and highest level of psychological health (Healthy High Achievers), boys who participated in tennis had the highest percentage across all sports (31.4%) and their girl counterparts ranked sixth (23.4%).

# INTRODUCTION

Sport is the most popular extracurricular activity in the United States (Veliz, Snyder, and Sabo, 2018; Veliz, 2015). While some surveys of youth have found that participation in sport has slightly declined in recent years (Veliz et al., 2018; The Aspen Institute, 1017), youth sport remains a vibrant activity in schools and communities that more than half of all children participate in on a yearly basis (Veliz et al., 2018; Zarrett, Veliz, and Sabo, 2018). Given both the popularity of youth sports and the amount of resources that are invested into these activities by both parents and their children, it is important to know which sports are bringing a solid return on both parents' and children's involvement in these activities – namely, which sports are promoting better health, academic, and social outcomes among participants? This question was the major driver of the original *More Than a Sport* (2013) report that was written several years ago in order to determine how tennis stacked up against other popular sports that youth commonly participate in at school or within their communities. A major finding in the original report was that adolescent tennis players scored better than non-athletes and athletes in other sports with respect to educational achievement and behavioral outcomes, such as reduced substance use and lower rates of suspension from school. Moreover, these positive findings existed across social classes, stretching from poor through well-to-do families. While this earlier study provided needed information on tennis participants, more than five years have passed since the original report, and it is necessary to re-examine these questions with newly collected data to see if what was found in the original report is still true among newer cohorts of adolescent tennis players.

The *How Tennis Influences Youth Development* research initiative builds on secondary analyses of national survey data sets in order to describe and analyze U.S. youth participation in tennis. This report is primarily based on an extensive analysis of the Monitoring the Future (MTF) survey (Miech et al., 2017), a federally funded annual cross-sectional survey of American secondary school students. About 50,000 students across 400 schools are surveyed every year (eighth-, 10$^{th}$- and 12$^{th}$-graders), and pertinent information is gathered related to educational outcomes, health behaviors, social engagement, and substance use. The MTF data survey, therefore, offered an opportunity to systematically study a very large sample of U.S. youth tennis participants between 2006 and 2016, as well as participants in other sports, such as football, swimming, and basketball. The MTF's large sample sizes enabled the researchers to generate detailed demographic profiles of adolescent tennis participants and, also, to test for relationships between tennis participation and various educational and developmental gains when compared to participants in other popular sports.

The major goal of this project is to better understand how tennis and other popular youth sports impact teen well-being, and whether the number of sports in which a teen participates influences their health. In particular, several key research questions guided the analysis to both extend and explore new areas of research with respect to the positive benefits of youth sport participation:

- How does adolescent participation in tennis vary by gender, race/ethnicity, geographic region, urbanicity, and family socioeconomic level (i.e., social class)?
- What do important developmental outcomes that assess healthy types of behaviors, physical activity, substance use behaviors, academic achievement, extracurricular involvement, and psychological health look like among tennis players when compared to participants in other popular sports?
- Given that parents would want some profile of sports to determine which sport (or combination of sports) has the largest impact on positive youth development, what sports tend to have the healthiest (physically, psychologically, and socially) and highest achieving participants?

# SECTION 1: TRENDS IN TENNIS PARTICIPATION BETWEEN 2006 AND 2016

The first major area that this report will cover involves both the participation, race, and demographic profile of youth involved in tennis. These basic demographics are important to lay out because it will help display how popular youth tennis is within the United States, along with how accessible this sport is across important demographic groups. Moreover, the results presented also show how much these demographic profiles have changed over the past decade in order to see potential changes in who is playing tennis. It should be highlighted that this first section uses The Monitoring the Future (2006-16) eighth-, 10th-, and 12th-grade samples to examine the variation in tennis participation by gender, racial/ethnic groups, family socioeconomic levels, urbanicity, geographic region, and grade-level. Roughly 141,000 adolescents were sampled with a little more than 9,000 youth that indicated participating in tennis at a competitive level included in the analyses (Please refer to Appendix A: Sample Size Index on page 46 for the number of respondents used in the report and Appendix B: Measures Index on pages 47-54 for details on the items used in the report).

## Gender

Six percent of all U.S. adolescent males and females participated in tennis in their school or community during the last 12 months (see Figure 1 on following page). Between the first (2006-10) and second (2011-16) time frames, there was a small decline among tennis participation for both boys and girls (boys, 7.8% to 5.8%; girls, 8.0% to 6.1%). While the decline in participation rates in tennis is problematic, overall participation rates in any sport has also declined between 2006 and 2016 by 2% (it should be noted that most sports have seen declines in participation rates during this 11-year period, with exceptions being cross country, lacrosse, and soccer). Examining the gender composition among tennis participants, 48% are boys and 52% are females; it should be noted that the gender composition of tennis participants has remained similar between the two time frames (see Figure 2 on following page).

Figure 1: Tennis Participation Rates (by Gender)

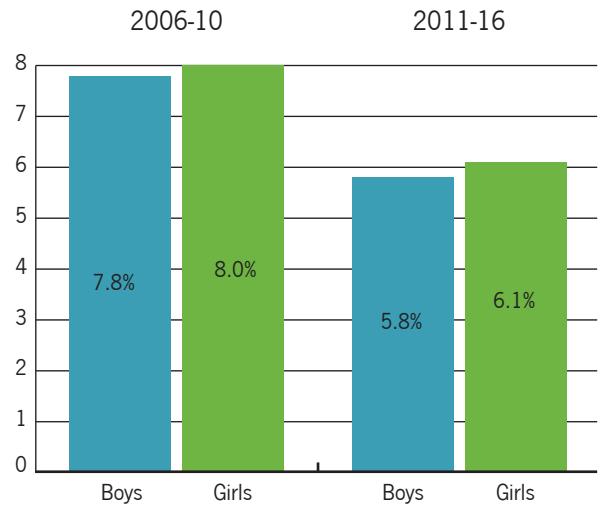
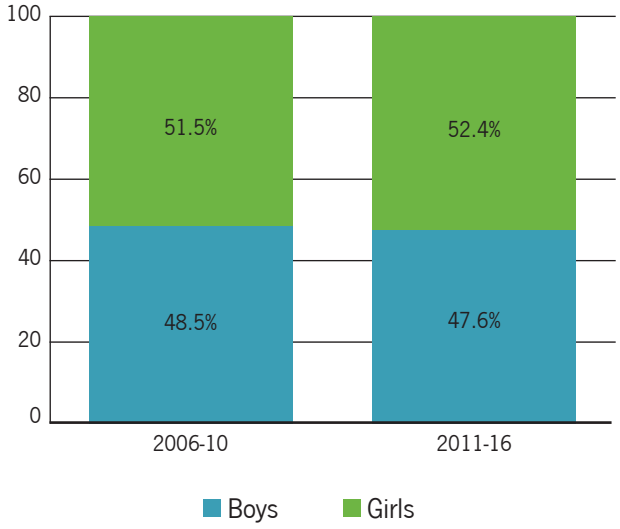



Figure 2: Gender Composition of Tennis Participants (by Year)




## Gender and Race/Ethnicity

Between the two time frames, participation rates in tennis were the largest for both boys and girls who identified as "Other Race," followed by Black girls, White boys, White girls, Hispanic girls, Hispanic boys, and Black boys (see Figure 3 on following page). More than half of tennis participants identified as White, followed by participants who identified as "Other Race," Hispanic, and Black (see Figure 4 on following page). The racial composition of tennis participants has remained similar for girls between the two time frames, while the proportion of boy participants who identify as "Other Race" has increased between the two time frames (see Figure 4).

Figure 3: Tennis Participation Rates (by Race)

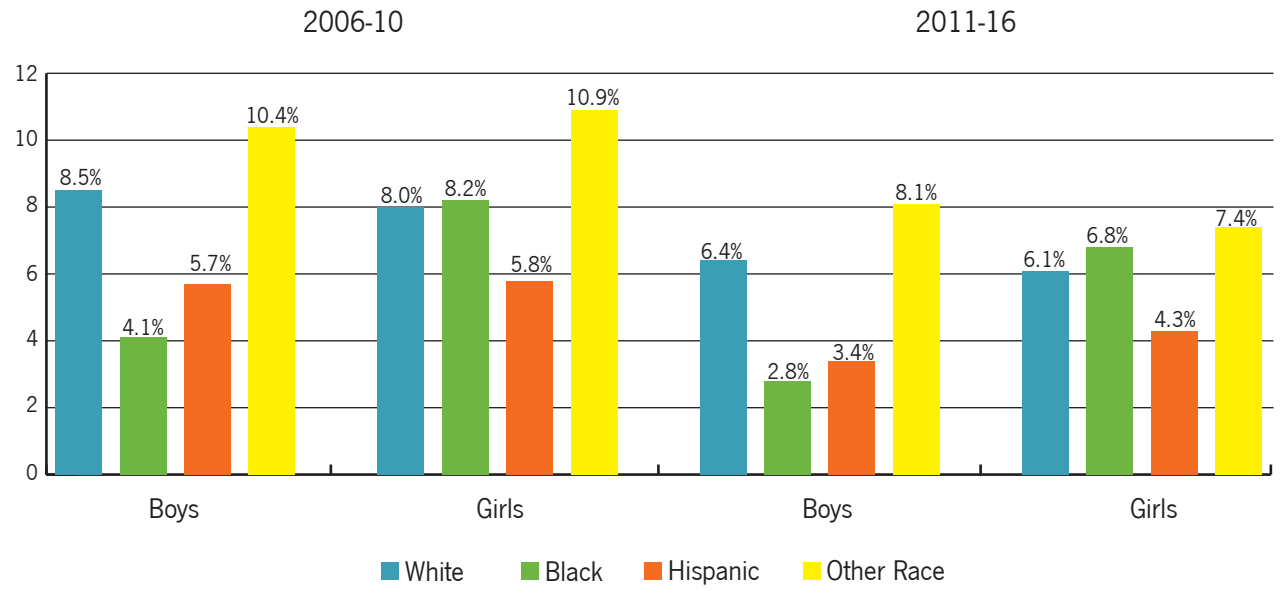
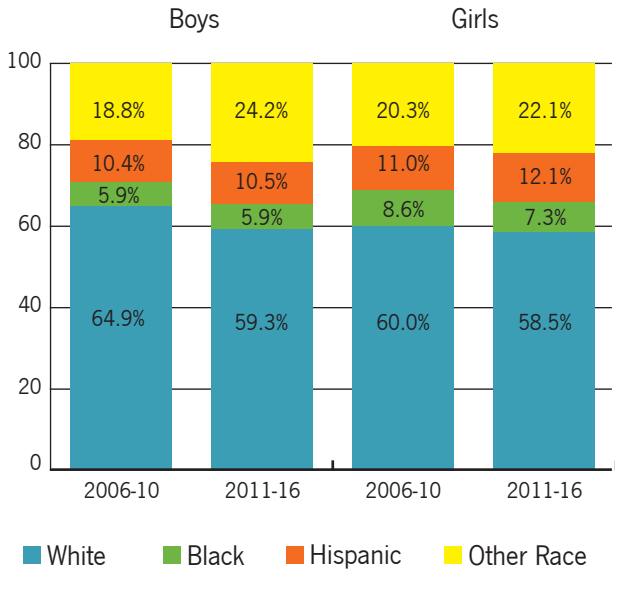



Figure 4: Racial Composition of Tennis Participants (by Year)



## Gender and Parental Socioeconomic Status (SES)[1]

Participation rates in tennis were the largest for both girls and boys from higher SES backgrounds during both the time frames (see Figure 5 on following page). About three out of four tennis participants are from the highest SES backgrounds (i.e., at least one parent has a college degree or higher) among boys and girls (see Figure 6 on following page). The composition of tennis participants by SES increased slightly for adolescents in the highest SES bracket between the two study periods (see Figure 6). While the majority of tennis players come from higher SES backgrounds, it should be noted that the association between participation and positive developmental outcomes is similar across all tennis participants regardless of socioeconomic background; in other words, the association between participating in tennis and positive developmental outcomes is not a spurious association being driven by SES background (Sabo, Veliz, and Rafalson, 2013).

## Gender and Urbanicity

Across the two time periods, participation rates in tennis were the largest for both girls and boys who were from urban areas, followed by suburban areas and rural areas (see Figure 7 on page 12). Half of tennis participants among boys and girls are from suburban areas, followed by participants from urban areas and rural areas (see Figure 8 on page 12). The composition of tennis participants by urbanicity has remained consistent between the two time frames (see Figure 8).

## Gender and Region

Relating to region, participation rates in tennis were the largest for both girls and boys from the East, followed by girls and boys from the West, girls and boys from the South, and girls and boys from the Midwest (see Figure 9 on page 13). One third of tennis participants among girls and boys are from the South, followed by participants from the West, East, and Midwest (see Figure 10 on page 13). The regional composition of tennis participants has remained similar between the two study periods for boys and girls (see Figure 10).

## Retention Rates in Tennis for Boys and Girls

Between the two time frames, eighth-grade boys and girls tended to have the highest participation rates in tennis, followed by 10th-graders and 12th-graders (see Figures 11 and 12 on page 14). Notably the retention rate for tennis participants between eighth and 12th grade increased between the two study periods, despite declines in the overall participation rate. It should be highlighted that tennis is one of a handful of sports studied (i.e., golf, water polo, and weightlifting) that either retained the same or increased the proportion of participants between the eighth and 12th grade[2].

1 SES was based on parents' highest level of education (less than a college degree versus at least one parent has a college degree or higher).

2 For more information on retention/attrition rates across 21 popular U.S. sports, click the following link https://www.womenssportsfoundation.org/wp-content/uploads/2018/01/teen-sport-in-america-full-report-web.pdf

Figure 5: Tennis Participation Rates (by Parental SES)

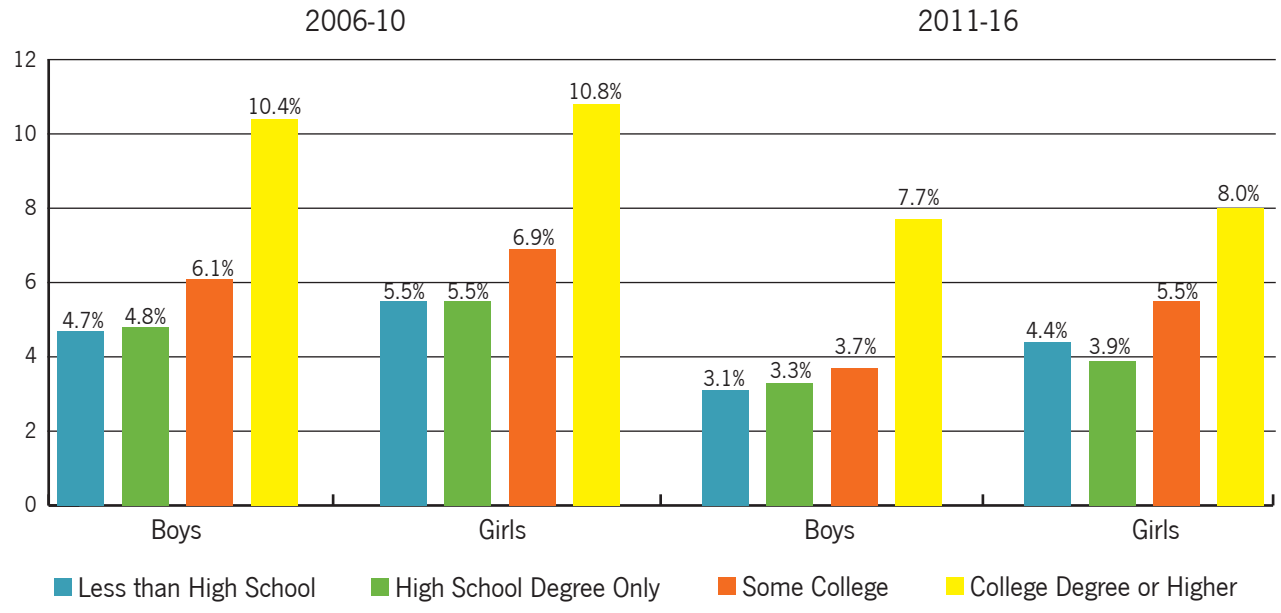



Figure 6: SES Composition of Tennis Participants (by Year)

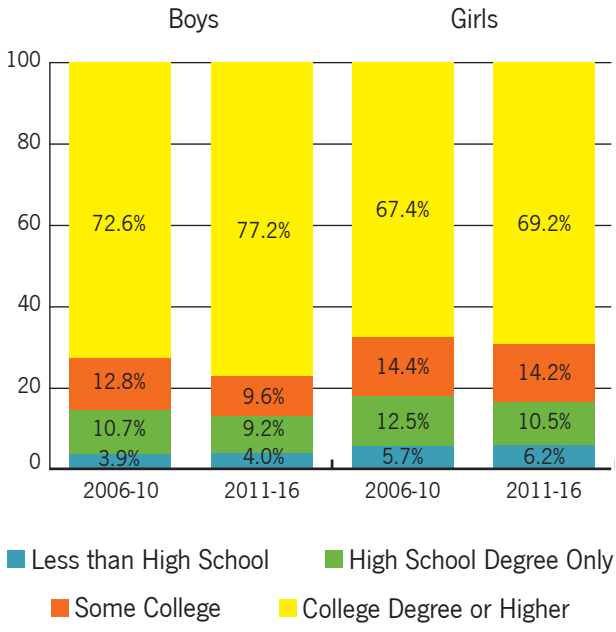


Figure 7: Tennis Participation Rates (by Urbanicity)

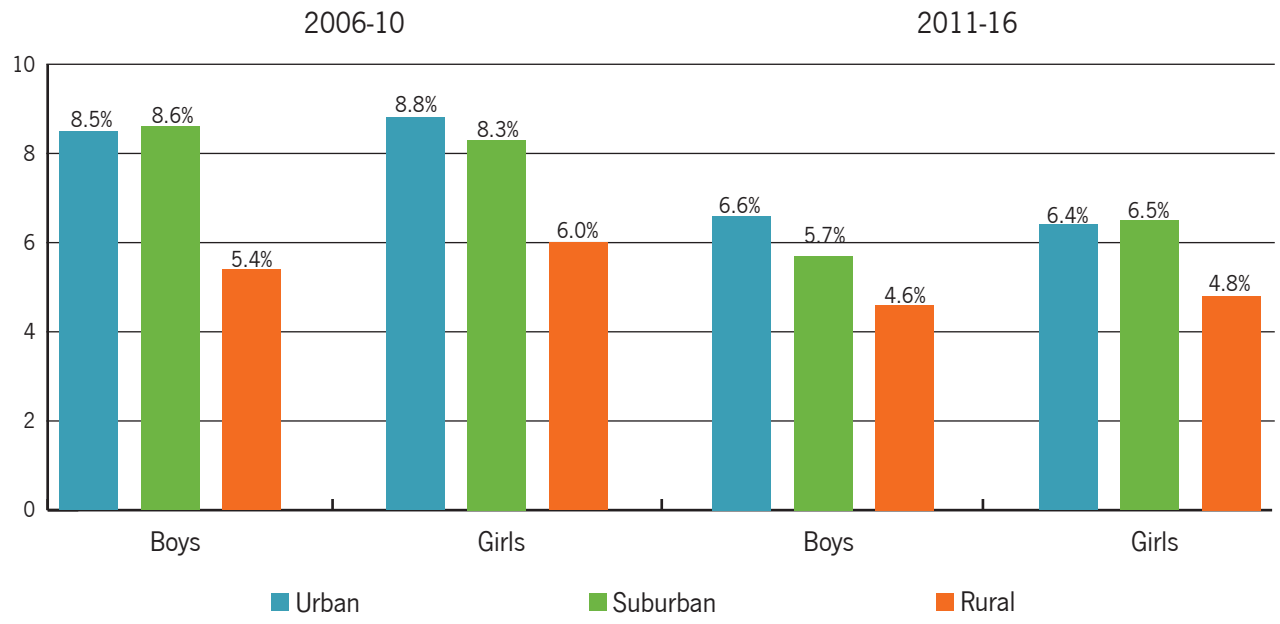



Figure 8: Urbanicity Composition of Tennis Participants (by Year)

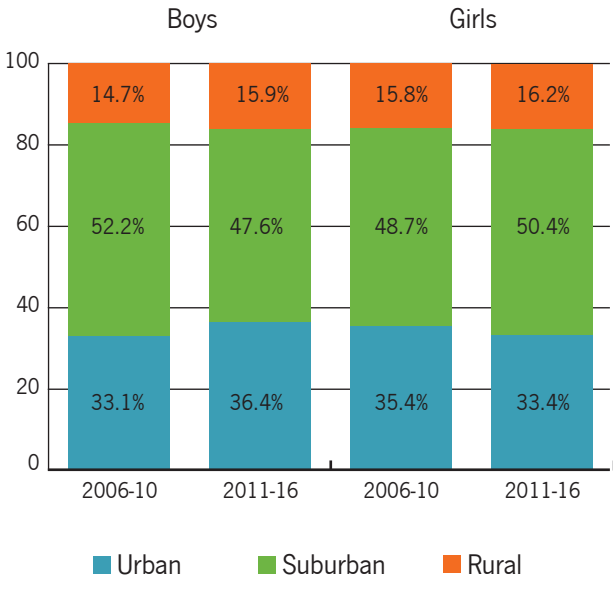


Figure 9: Tennis Participation Rates (by Region)

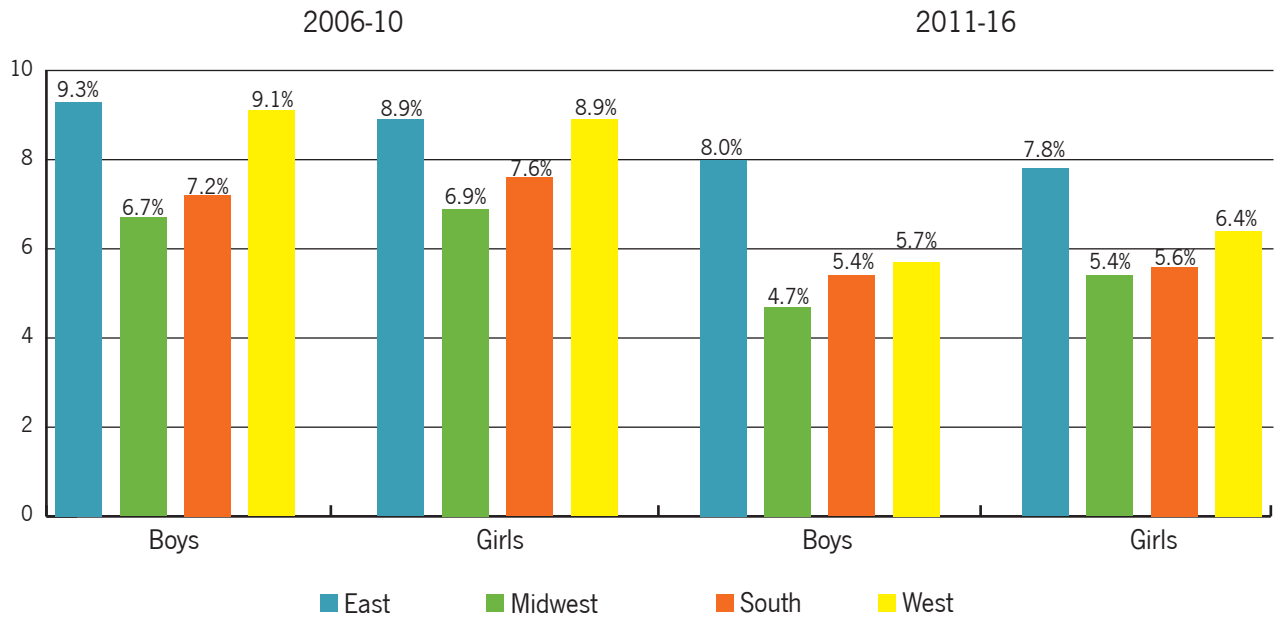



Figure 10: Regional Composition of Tennis Participants (by Year)

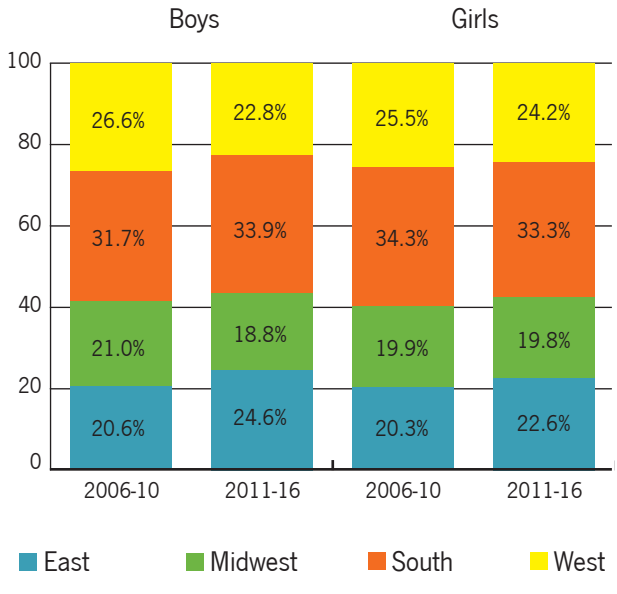
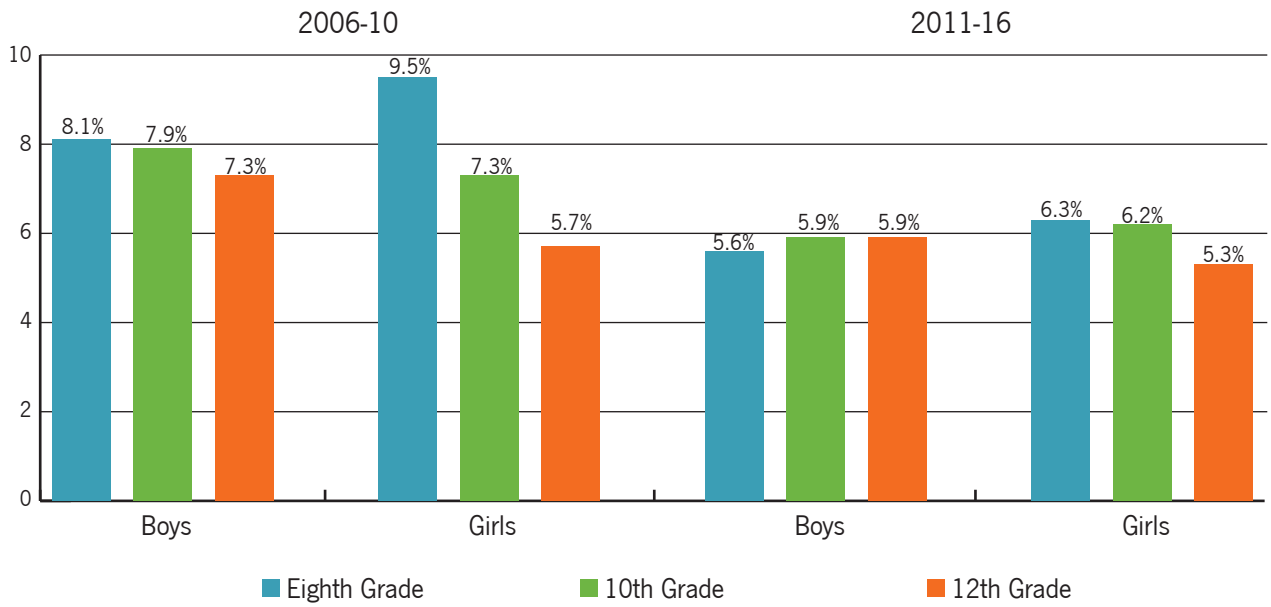
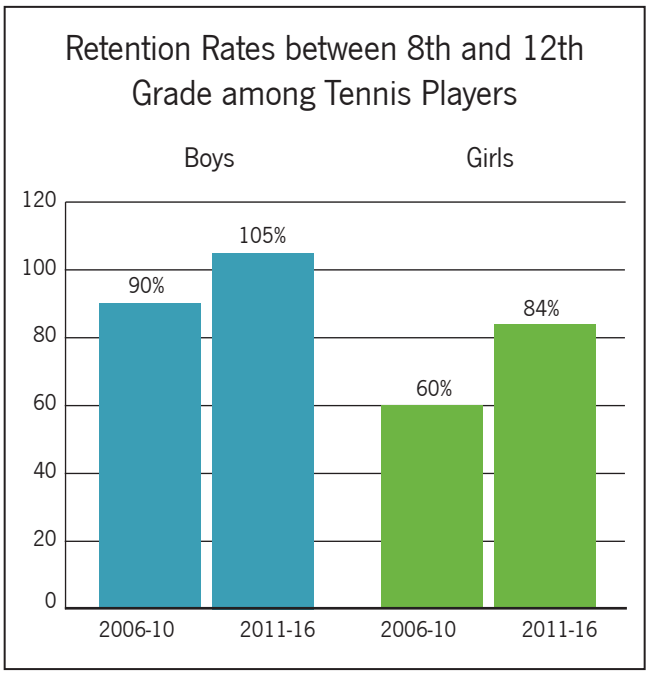


Figure 11: Tennis Participation Rates (by Grade)



# SECTION 2: ASSESSING BEHAVIORS AND OUTCOMES AMONG ADOLESCENT TENNIS PLAYERS

## Assessing Participation, Academic Achievement, Extracurricular Activities, Community Service, and Substance Use

This section assesses the links between high school athletic participation and academic, extracurricular activities, community service, and substance use outcomes. In order to extend our prior research in the original *More Than a Sport* report, we use the same outcomes to assess any potential changes that may have occurred between when the original (2006-10) and new research (2011-16) was conducted. In particular, we discuss how participation in tennis influences these outcomes in comparison with other popular sports (i.e., baseball, basketball, cross country, field hockey, football, gymnastics, ice hockey, lacrosse, swimming, soccer, tennis, track, volleyball, weightlifting, and other sports). Accordingly, this section uses the Monitoring the Future sample of eighth- and 10th-graders who participated between 2006 and 2016 (Form 1 for the eighth- and 10th-grade sample was used). The sample includes roughly 115,000 adolescents, of which approximately 8,000 indicated participating in tennis at a competitive level during the past year (Please refer to Appendix A on page 46 for sample sizes and Appendix B on pages 47-54 for more details on the measures used).

### Participation

The participation rates in different types of sports among boys and girls in the United States between 2006-10 and 2011-16 appear in Table 1 on the following page. While participation in sports for boys declined slightly between the two study periods, participation rates for girls remained consistent at 76%. Between the two time periods we see that the five most popular sports for boys are basketball, football, baseball, weightlifting, and soccer; the five most popular sports for girls are basketball, volleyball, soccer, softball, and track. With respect to tennis, we see declines in participation rates across the two time periods, however, tennis ranked as the ninth-most-popular sport for boys and seventh-most-popular sport for girls.

| Table 1: Participation Rates across Youth Sports in the United States (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 15.2% | 17.3% | Does Not Participate | 23.6% | 24.1% |
| Participates in at least one sport | 84.8% | 82.7% | Participates in at least one sport | 76.4% | 75.9% |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| Basketball | 39.8% | 37.7% | Basketball | 25.4% | 22.0% |
| Football | 40.3% | 35.7% | Volleyball | 22.9% | 23.0% |
| Baseball/Softball | 24.0% | 20.3% | Soccer | 17.4% | 16.8% |
| Weightlifting | 25.0% | 18.9% | Baseball/Softball | 17.3% | 15.5% |
| Soccer | 19.9% | 20.0% | Track | 16.6% | 16.0% |
| Track | 17.1% | 17.1% | Swimming | 11.6% | 9.5% |
| Wrestling | 9.9% | 8.1% | **Tennis** | **8.5%** | **6.3%** |
| Swimming | 9.0% | 7.8% | Gymnastics | 7.2% | 6.1% |
| **Tennis** | **8.0%** | **5.8%** | Weightlifting | 7.1% | 4.9% |
| Volleyball | 6.8% | 5.5% | Football | 5.8% | 4.0% |
| Cross Country | 5.1% | 5.6% | Cross Country | 4.4% | 5.1% |
| Lacrosse | 4.6% | 4.3% | Lacrosse | 2.8% | 2.7% |
| Ice Hockey | 3.5% | 2.8% | Field Hockey | 3.0% | 2.2% |
| Field Hockey | 1.6% | 1.1% | Wrestling | 1.4% | 1.2% |
| Gymnastics | 1.1% | 1.1% | Ice Hockey | 0.8% | 0.6% |

## Academic Achievement

Among boys and girls, tennis players and cross country runners reported the highest average grades (an average grade of a B or A) across the 15 different sports that were assessed (see Table 2). Additionally, among boys and girls, tennis players and cross country runners had the highest proportion of participants who indicated having an average grade of A (see Table 3 on following page). More than half of boys and girls who participated in tennis indicated an average grade of A. Additionally, the average grade among adolescents who participated in these sports increased between 2006-10 and 2011-16.

**Table 2: Average Grade in School among U.S. Adolescents, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | **2006-10** | **2011-16** | | **2006-10** | **2011-16** |
| Does Not Participate | 5.3 | 5.5 | Does Not Participate | 5.7 | 6.0 |
| Participates in at least one sport | 6.0 | 6.3 | Participates in at least one sport | 6.6 | 6.8 |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| Cross Country | 6.8 | 7.0 | Cross Country | 7.1 | 7.4 |
| **Tennis** | **6.7** | **7.0** | **Tennis** | **7.0** | **7.2** |
| Lacrosse | 6.5 | 6.7 | Lacrosse | 6.9 | 7.1 |
| Track | 6.5 | 6.7 | Field Hockey | 6.9 | 7.1 |
| Field Hockey | 6.3 | 6.7 | Track | 6.9 | 7.1 |
| Swimming | 6.3 | 6.6 | Volleyball | 6.7 | 6.9 |
| Volleyball | 6.3 | 6.6 | Soccer | 6.7 | 6.9 |
| Soccer | 6.4 | 6.5 | Swimming | 6.6 | 6.9 |
| Baseball/Softball | 6.3 | 6.5 | Basketball | 6.6 | 6.8 |
| Ice Hockey | 6.1 | 6.4 | Weightlifting | 6.6 | 6.8 |
| Basketball | 6.1 | 6.3 | Baseball/Softball | 6.6 | 6.7 |
| Gymnastics | 6.3 | 6.1 | Gymnastics | 6.5 | 6.7 |
| Weightlifting | 6.0 | 6.2 | Ice Hockey | 6.4 | 6.6 |
| Football | 5.9 | 6.1 | Football | 6.2 | 6.2 |
| Wrestling | 5.8 | 6.1 | Wrestling | 5.6 | 5.8 |
| Grading Scale: D or lower = 0.0-1.00, C = 1.01-4.00, B = 4.01-7.00, A = 7.01 to 9.00 | | | | | |

| Table 3: Percentage of U.S. Adolescents Indicating an Average Grade of A in School, by Type of Sport (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 22.2% | 24.8% | Does Not Participate | 26.3% | 32.5% |
| Participates in at least one sport | 30.8% | 33.7% | Participates in at least one sport | 40.1% | 45.6% |
| Ranked from highest to lowest | | | Ranked from highest to lowest | | |
| **Tennis** | **45.9%** | **50.9%** | Cross Country | 50.7% | 60.8% |
| Cross Country | 46.7% | 50.0% | **Tennis** | **50.1%** | **55.8%** |
| Field Hockey | 36.8% | 43.9% | Field Hockey | 46.2% | 52.8% |
| Track | 38.3% | 41.7% | Track | 45.6% | 51.2% |
| Lacrosse | 38.5% | 40.9% | Lacrosse | 44.5% | 49.9% |
| Volleyball | 37.3% | 41.5% | Soccer | 43.7% | 47.3% |
| Swimming | 36.5% | 42.0% | Volleyball | 42.5% | 48.1% |
| Soccer | 37.4% | 37.8% | Swimming | 42.0% | 48.2% |
| Baseball/Softball | 34.0% | 38.1% | Basketball | 41.3% | 45.6% |
| Ice Hockey | 31.8% | 37.1% | Weightlifting | 41.9% | 44.8% |
| Gymnastics | 37.5% | 31.4% | Baseball/Softball | 40.7% | 44.1% |
| Basketball | 32.8% | 34.8% | Gymnastics | 38.1% | 43.3% |
| Weightlifting | 31.3% | 31.4% | Ice Hockey | 33.7% | 38.9% |
| Football | 28.4% | 30.3% | Football | 30.9% | 33.1% |
| Wrestling | 26.1% | 29.7% | Wrestling | 21.2% | 24.7% |

With respect to aspirations to attend and complete college (a four-year degree), tennis ranked the highest out of the 15 different sports among boys, with more than 75% indicating that they will definitely go to a four-year college and about 70% indicating that they will definitely graduate from a four-year college (see Table 4 below and Table 5 on following page). While tennis ranked lower among girls (third-highest regarding going to college, and fourth-highest regarding graduating college), more than 80% of girls who participated in tennis indicated definitely going to a four-year college and nearly 80% said they were definitely graduating from a four-year college (see Table 4 and Table 5). It should be highlighted that these percentages for aspirations to attend and complete college slightly increased for boys and slightly decreased for girls across the two study periods.

**Table 4: Percentage of U.S. Adolescents Who Said They Definitely Will Go to College, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 46.2% | 49.1% | Does Not Participate | 63.9% | 66.8% |
| Participates in at least one sport | 65.3% | 67.1% | Participates in at least one sport | 80.5% | 80.9% |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| **Tennis** | **75.2%** | **78.1%** | Lacrosse | 84.4% | 86.6% |
| Lacrosse | 74.1% | 77.8% | Cross Country | 84.5% | 86.1% |
| Cross Country | 75.9% | 75.1% | **Tennis** | **85.3%** | **83.6%** |
| Track | 71.9% | 73.0% | Field Hockey | 84.5% | 84.3% |
| Swimming | 70.2% | 74.0% | Track | 84.3% | 83.8% |
| Ice Hockey | 69.8% | 73.9% | Gymnastics | 81.9% | 83.3% |
| Volleyball | 68.9% | 70.4% | Swimming | 81.0% | 82.9% |
| Basketball | 68.0% | 70.3% | Volleyball | 81.4% | 81.1% |
| Baseball/Softball | 68.1% | 69.4% | Weightlifting | 81.0% | 80.6% |
| Soccer | 68.9% | 68.2% | Baseball/Softball | 80.6% | 80.6% |
| Field Hockey | 65.9% | 71.0% | Basketball | 80.5% | 80.4% |
| Gymnastics | 66.2% | 66.7% | Soccer | 80.4% | 79.6% |
| Weightlifting | 66.4% | 66.4% | Ice Hockey | 85.0% | 72.7% |
| Football | 65.0% | 67.4% | Football | 75.1% | 71.2% |
| Wrestling | 60.5% | 62.7% | Wrestling | 67.9% | 66.2% |

| Table 5: Percentage of U.S. Adolescents Who Said They Will Definitely Graduate from a Four-Year University after High School, by Type of Sport (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 41.5% | 43.5% | Does Not Participate | 57.5% | 60.2% |
| Participates in at least one sport | 58.9% | 61.0% | Participates in at least one sport | 74.0% | 75.4% |
| Ranked from highest to lowest | | | Ranked from highest to lowest | | |
| **Tennis** | **69.7%** | **72.7%** | Cross Country | 78.6% | 81.3% |
| Lacrosse | 67.0% | 71.9% | Field Hockey | 79.4% | 80.3% |
| Cross Country | 69.2% | 68.9% | Lacrosse | 78.4% | 80.9% |
| Swimming | 64.4% | 70.0% | **Tennis** | **79.9%** | **77.9%** |
| Track | 65.6% | 66.7% | Track | 78.2% | 78.2% |
| Ice Hockey | 61.1% | 67.9% | Gymnastics | 77.4% | 77.6% |
| Volleyball | 63.2% | 65.0% | Swimming | 75.6% | 78.0% |
| Gymnastics | 58.6% | 67.5% | Volleyball | 74.9% | 75.2% |
| Soccer | 62.5% | 62.4% | Weightlifting | 75.5% | 74.5% |
| Basketball | 60.7% | 63.6% | Baseball/Softball | 74.2% | 74.8% |
| Baseball/Softball | 60.5% | 63.5% | Basketball | 74.0% | 75.0% |
| Field Hockey | 57.1% | 66.5% | Ice Hockey | 79.1% | 69.2% |
| Weightlifting | 59.3% | 60.4% | Soccer | 73.7% | 73.8% |
| Football | 58.2% | 61.2% | Football | 69.4% | 65.9% |
| Wrestling | 55.2% | 58.0% | Wrestling | 63.4% | 59.4% |

Tennis ranked the highest out of the 15 different sports among boys with respect to spending 10 or more hours a week doing homework, while tennis ranked third among girls (see Table 6). In particular, more than 25% of boys and over 30% of girls who participated in tennis indicated spending 10 or more hours a week doing homework. The proportion of boys and girls who indicated spending 10 or more hours a week doing homework slightly increased over the two study periods among tennis participants.

**Table 6: Percentage of U.S. Adolescents Who Indicated Spending 10 or More Hours Doing Homework Throughout the Week, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | **2006-10** | **2011-16** | | **2006-10** | **2011-16** |
| Does Not Participate | 13.0% | 12.7% | Does Not Participate | 15.6% | 17.9% |
| Participates in at least one sport | 18.0% | 18.5% | Participates in at least one sport | 23.6% | 24.5% |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| **Tennis** | **25.8%** | **27.1%** | Lacrosse | 32.1% | 36.0% |
| Lacrosse | 25.2% | 26.3% | Ice Hockey | 33.8% | 31.4% |
| Cross Country | 22.5% | 25.5% | **Tennis** | **30.5%** | **33.0%** |
| Field Hockey | 24.9% | 21.8% | Cross Country | 31.5% | 31.3% |
| Ice Hockey | 20.8% | 25.5% | Field Hockey | 29.0% | 33.6% |
| Swimming | 20.2% | 24.6% | Swimming | 26.9% | 30.4% |
| Volleyball | 22.8% | 21.6% | Soccer | 26.6% | 25.7% |
| Track | 20.9% | 22.3% | Weightlifting | 25.4% | 26.1% |
| Soccer | 21.5% | 21.0% | Track | 25.1% | 25.5% |
| Gymnastics | 26.6% | 15.8% | Gymnastics | 24.7% | 25.3% |
| Weightlifting | 19.3% | 18.9% | Volleyball | 23.8% | 23.8% |
| Baseball/Softball | 18.2% | 19.1% | Basketball | 22.7% | 21.4% |
| Basketball | 18.2% | 18.3% | Baseball/Softball | 21.1% | 21.2% |
| Wrestling | 18.1% | 15.9% | Football | 22.0% | 19.1% |
| Football | 17.1% | 16.2% | Wrestling | 16.1% | 19.9% |

## Misbehavior at School

Tennis ranked the lowest among boys with respect to the percentage of those who indicated either being suspended or being sent to the office because of misbehavior (see Table 7 below and Table 8 on following page). Roughly 20% of boys who participated in tennis indicated being suspended, while 30% of boys who participated in tennis indicated being sent to the office because of misbehavior. Tennis ranked fourth-lowest among girls in regard to indicating being suspended and second-lowest in relation to being sent to the office because of misbehavior (see Table 7 and Table 8). The percentage of girls who participated in tennis indicating being suspended was about 12%, while the percentage of girls who participated in tennis indicating being sent to the office was approximately 17%. Both of these indicators of misbehavior at school declined slightly among boys and girls who participated in tennis between the two study periods.

**Table 7: Percentage of U.S. Adolescents Suspended at Least Once, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | **2006-10** | **2011-16** | | **2006-10** | **2011-16** |
| Does Not Participate | 34.9% | 28.8% | Does Not Participate | 21.9% | 19.6% |
| Participates in at least one sport | 31.9% | 29.6% | Participates in at least one sport | 16.7% | 14.9% |
| **Ranked from lowest to highest** | | | **Ranked from lowest to highest** | | |
| **Tennis** | **22.0%** | **17.8%** | Lacrosse | 10.0% | 9.1% |
| Cross Country | 22.4% | 22.0% | Field Hockey | 10.2% | 10.1% |
| Lacrosse | 26.1% | 21.9% | Cross Country | 12.4% | 9.7% |
| Ice Hockey | 28.1% | 23.3% | **Tennis** | **12.5%** | **11.4%** |
| Volleyball | 26.6% | 27.0% | Soccer | 14.6% | 14.3% |
| Soccer | 27.5% | 26.1% | Volleyball | 15.5% | 15.2% |
| Baseball/Softball | 28.7% | 26.5% | Track | 15.5% | 15.5% |
| Track | 29.9% | 28.1% | Swimming | 16.4% | 15.0% |
| Field Hockey | 31.6% | 27.9% | Baseball/Softball | 16.6% | 15.6% |
| Swimming | 30.7% | 29.9% | Weightlifting | 17.0% | 18.3% |
| Basketball | 32.9% | 31.9% | Basketball | 18.6% | 18.6% |
| Weightlifting | 35.0% | 33.7% | Gymnastics | 18.3% | 20.0% |
| Football | 37.5% | 35.9% | Ice Hockey | 21.6% | 17.7% |
| Gymnastics | 37.6% | 38.0% | Football | 26.4% | 27.3% |
| Wrestling | 41.0% | 39.2% | Wrestling | 32.2% | 34.3% |

| Table 8: Percentage of U.S. Adolescents Who Were Sent to the Office Due to Misbehavior, by Type of Sport (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 42.6% | 31.8% | Does Not Participate | 30.1% | 21.8% |
| Participates in at least one sport | 44.1% | 35.1% | Participates in at least one sport | 25.0% | 19.3% |
| Ranked from lowest to highest | | | Ranked from lowest to highest | | |
| **Tennis** | **34.4%** | **26.8%** | Field Hockey | 22.8% | 12.4% |
| Cross Country | 36.6% | 29.1% | **Tennis** | **20.5%** | **15.2%** |
| Volleyball | 40.5% | 32.5% | Cross Country | 21.0% | 15.7% |
| Soccer | 40.7% | 34.3% | Lacrosse | 23.4% | 16.7% |
| Field Hockey | 44.6% | 30.8% | Soccer | 24.9% | 19.5% |
| Swimming | 41.4% | 34.1% | Swimming | 24.3% | 20.5% |
| Track | 43.8% | 34.3% | Volleyball | 25.8% | 19.6% |
| Baseball/Softball | 43.5% | 35.9% | Track | 25.5% | 20.3% |
| Lacrosse | 46.3% | 34.8% | Baseball/Softball | 26.6% | 21.5% |
| Ice Hockey | 49.5% | 33.2% | Weightlifting | 28.4% | 22.9% |
| Gymnastics | 43.2% | 40.4% | Gymnastics | 27.2% | 24.2% |
| Basketball | 45.8% | 38.1% | Basketball | 28.3% | 23.7% |
| Weightlifting | 47.7% | 39.9% | Ice Hockey | 28.1% | 27.7% |
| Football | 50.2% | 40.8% | Football | 33.4% | 30.5% |
| Wrestling | 54.1% | 45.3% | Wrestling | 43.8% | 42.2% |

## Participation in Sports, Extracurricular Activities, and Community Service

Boys who participated in tennis participated in an average of 4 different sports during the past year (see Table 9). Among girls who participated in tennis, this number was 3 (see Table 9). This ranked fifth for boys and ninth for girls across the 15 different sports. The average number of sports that tennis players participated in during the year slightly declined during the two study periods. Additionally, about 60% of boys and girls who participated in tennis indicated participating in school-based athletics to a considerable or great extent during the past year; this percentage slightly increased over the two study periods (see Table 10 on following page). The percentages of tennis players participating in school-based sports at a considerable or great extent ranked 10th among boys and 12th among girls across the 15 different sports.

**Table 9: Number of Sports that U.S. Adolescents Indicated Participating in During the Past Year, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 0.0 | 0.0 | Does Not Participate | 0.0 | 0.0 |
| Participates in at least one sport | 2.5 | 2.3 | Participates in at least one sport | 2.0 | 1.8 |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| Field Hockey | 7.0 | 6.5 | Wrestling | 4.8 | 4.3 |
| Gymnastics | 6.2 | 5.9 | Football | 4.7 | 4.3 |
| Volleyball | 5.3 | 4.9 | Ice Hockey | 4.7 | 4.0 |
| Swimming | 4.8 | 4.4 | Weightlifting | 4.1 | 3.8 |
| **Tennis** | **4.7** | **4.2** | Field Hockey | 4.1 | 3.4 |
| Lacrosse | 4.6 | 4.0 | Cross Country | 3.7 | 3.4 |
| Ice Hockey | 4.5 | 4.0 | Lacrosse | 3.8 | 3.2 |
| Cross Country | 4.4 | 3.9 | Swimming | 3.6 | 3.2 |
| Wrestling | 4.1 | 4.0 | **Tennis** | **3.6** | **3.1** |
| Weightlifting | 4.0 | 3.9 | Basketball | 3.2 | 3.0 |
| Track | 4.0 | 3.6 | Track | 3.2 | 3.0 |
| Baseball/Softball | 3.9 | 3.5 | Gymnastics | 3.2 | 3.0 |
| Soccer | 3.7 | 3.3 | Volleyball | 3.2 | 2.8 |
| Football | 3.6 | 3.3 | Baseball/Softball | 3.2 | 2.9 |
| Basketball | 3.5 | 3.2 | Soccer | 3.2 | 2.9 |

| Table 10: Percentage of U.S. Adolescents Who Indicated Participating in School-Based Athletics to a Considerable or Great Extent During the Past Year, by Type of Sport (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 2.3% | 1.8% | Does Not Participate | 1.9% | 2.4% |
| Participates in at least one sport | 57.3% | 59.5% | Participates in at least one sport | 53.9% | 57.2% |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| Track | 78.0% | 80.1% | Cross Country | 79.4% | 81.0% |
| Cross Country | 75.1% | 80.3% | Track | 75.0% | 78.7% |
| Lacrosse | 69.7% | 75.1% | Lacrosse | 72.5% | 75.5% |
| Wrestling | 65.4% | 71.8% | Field Hockey | 66.0% | 67.3% |
| Weightlifting | 66.8% | 70.3% | Weightlifting | 63.8% | 68.6% |
| Baseball/Softball | 67.0% | 68.6% | Ice Hockey | 66.3% | 65.5% |
| Football | 65.5% | 69.5% | Baseball/Softball | 63.9% | 67.4% |
| Ice Hockey | 65.9% | 64.1% | Basketball | 62.0% | 68.6% |
| Basketball | 62.5% | 65.0% | Volleyball | 61.8% | 65.8% |
| **Tennis** | **59.5%** | **62.2%** | Gymnastics | 60.5% | 62.4% |
| Soccer | 58.1% | 60.2% | Soccer | 57.8% | 61.1% |
| Swimming | 56.0% | 59.2% | **Tennis** | **57.1%** | **58.2%** |
| Volleyball | 52.2% | 57.6% | Swimming | 51.4% | 55.4% |
| Gymnastics | 48.5% | 51.4% | Wrestling | 44.5% | 49.7% |
| Field Hockey | 46.7% | 43.4% | Football | 37.7% | 42.6% |

Roughly 6% of boys and 10% of girls who participated in tennis indicated being involved in the school newspaper at a considerable or great extent (see Table 11). This ranked fifth for boys and second for girls across the 15 different sports. Furthermore, 30% of boys and 40% of girls who participated in tennis indicated being involved in music or other performing arts at a considerable or great extent during the past year (see Table 12 on following page). This ranked second for both boys and girls across the 15 different sports. Among those who participated in tennis, the percentage who indicated involvement at a considerable or great extent in these extracurricular activities increased slightly for boys and decreased slightly for girls over the two study periods.

**Table 11: Percentage of U.S. Adolescents Who Indicated Participating in the School Newspaper or Yearbook to a Considerable or Great Extent During the Past Year, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 3.0% | 2.3% | Does Not Participate | 4.4% | 5.0% |
| Participates in at least one sport | 4.0% | 4.3% | Participates in at least one sport | 8.5% | 8.3% |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| Gymnastics | 7.7% | 8.7% | Gymnastics | 10.7% | 11.1% |
| Field Hockey | 5.3% | 8.6% | **Tennis** | **11.6%** | **9.9%** |
| Volleyball | 5.6% | 7.0% | Volleyball | 10.6% | 10.9% |
| Swimming | 5.2% | 6.4% | Field Hockey | 13.0% | 8.3% |
| **Tennis** | **5.0%** | **6.6%** | Track | 10.6% | 10.6% |
| Cross Country | 6.0% | 4.8% | Wrestling | 10.7% | 10.1% |
| Track | 5.3% | 5.3% | Football | 10.0% | 10.7% |
| Basketball | 4.7% | 5.0% | Cross Country | 10.1% | 10.5% |
| Wrestling | 4.1% | 5.4% | Basketball | 9.7% | 10.6% |
| Soccer | 4.4% | 5.0% | Baseball/Softball | 9.5% | 10.2% |
| Lacrosse | 4.5% | 4.5% | Swimming | 9.7% | 8.8% |
| Football | 4.0% | 4.9% | Soccer | 9.5% | 8.5% |
| Baseball/Softball | 3.9% | 4.6% | Weightlifting | 9.5% | 8.6% |
| Ice Hockey | 3.8% | 4.4% | Ice Hockey | 9.5% | 7.8% |
| Weightlifting | 3.4% | 4.5% | Lacrosse | 7.4% | 6.6% |

| Table 12: Percentage of U.S. Adolescents Who Indicated Participating in School-Based Music or Other Performing Arts to a Considerable or Great Extent During the Past Year, by Type of Sport (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 19.5% | 21.1% | Does Not Participate | 26.0% | 27.9% |
| Participates in at least one sport | 19.7% | 19.7% | Participates in at least one sport | 35.3% | 34.3% |
| Ranked from highest to lowest | | | Ranked from highest to lowest | | |
| Gymnastics | 31.2% | 30.2% | Swimming | 39.9% | 42.3% |
| **Tennis** | **29.4%** | **30.0%** | **Tennis** | **40.1%** | **39.3%** |
| Swimming | 28.0% | 28.9% | Gymnastics | 39.4% | 39.6% |
| Field Hockey | 27.7% | 28.9% | Cross Country | 38.8% | 38.8% |
| Cross Country | 26.7% | 29.9% | Track | 40.0% | 37.0% |
| Volleyball | 24.9% | 23.1% | Volleyball | 36.8% | 34.9% |
| Track | 23.8% | 23.8% | Field Hockey | 39.6% | 31.3% |
| Soccer | 22.0% | 20.4% | Wrestling | 36.4% | 33.9% |
| Lacrosse | 21.6% | 19.6% | Weightlifting | 34.8% | 34.5% |
| Wrestling | 19.2% | 19.3% | Football | 34.0% | 34.9% |
| Basketball | 19.3% | 17.4% | Soccer | 34.7% | 33.0% |
| Baseball/Softball | 18.7% | 17.3% | Basketball | 34.0% | 33.0% |
| Weightlifting | 17.8% | 18.0% | Ice Hockey | 32.6% | 34.4% |
| Ice Hockey | 16.5% | 19.0% | Baseball/Softball | 33.4% | 32.0% |
| Football | 17.2% | 16.8% | Lacrosse | 33.0% | 32.3% |

Table 13 shows that approximately 80% of boys and girls who are involved in tennis reported being involved in community affairs or volunteer work; the percentage involved in community affairs or volunteer work was similar across the two study periods among boys and girls who participated in tennis. This ranked third for both boys and girls across the 15 different sports.

**Table 13: Percentage of U.S. Adolescents Who Indicated Participating in Community Affairs or Volunteer Work at Least a Few Times per Year, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | **2006-10** | **2011-16** | | **2006-10** | **2011-16** |
| Does Not Participate | 44.8% | 50.1% | Does Not Participate | 53.5% | 56.7% |
| Participates in at least one sport | 67.2% | 70.2% | Participates in at least one sport | 77.8% | 78.7% |
| **Ranked from highest to lowest** | | | **Ranked from highest to lowest** | | |
| Cross Country | 77.8% | 80.9% | Lacrosse | 84.5% | 87.5% |
| Lacrosse | 77.2% | 80.1% | Cross Country | 84.8% | 86.4% |
| **Tennis** | **78.7%** | **77.9%** | **Tennis** | **84.2%** | **84.1%** |
| Swimming | 75.2% | 78.2% | Field Hockey | 83.8% | 83.3% |
| Track | 74.0% | 76.2% | Weightlifting | 83.1% | 84.0% |
| Volleyball | 73.9% | 75.9% | Swimming | 82.0% | 82.5% |
| Ice Hockey | 72.4% | 76.5% | Track | 80.6% | 81.9% |
| Baseball/Softball | 71.4% | 74.1% | Ice Hockey | 80.5% | 81.5% |
| Weightlifting | 69.9% | 73.5% | Gymnastics | 80.2% | 80.7% |
| Soccer | 69.9% | 71.3% | Soccer | 79.6% | 79.9% |
| Basketball | 69.5% | 71.4% | Volleyball | 78.9% | 79.9% |
| Field Hockey | 67.7% | 72.7% | Basketball | 78.1% | 78.6% |
| Wrestling | 67.3% | 71.0% | Baseball/Softball | 77.9% | 78.7% |
| Football | 67.1% | 70.1% | Football | 75.1% | 75.3% |
| Gymnastics | 64.8% | 70.7% | Wrestling | 72.1% | 67.9% |

## Substance Use

Tables 14 through 16 (below and on following pages) show that among boys who participate in tennis, 10% indicated binge drinking, 10% indicated smoking marijuana, and 6% indicated smoking cigarettes during the past month. Tennis ranked either third- or second-lowest among boys across the 15 different sports regarding these common types of substance use. Additionally, Tables 14 through 16 show that among girls who participate in tennis, 10% indicated binge drinking, 7% indicated smoking marijuana, and 5% indicated smoking cigarettes during the past month. Tennis ranked either fourth- or third-lowest among girls across the 15 different sports regarding these common types of substance use. The prevalence rates for each of the substances dropped between the two study periods for both boys and girls who participated in tennis, with the exception of an increase in marijuana use among girls who participated in tennis.

**Table 14: Percentage of U.S. Adolescents Who Indicated Binge Drinking During the Past Two Weeks, by Type of Sport (n = 114,996)**

| | Boys | | | Girls | |
|---|---|---|---|---|---|
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 11.5% | 7.4% | Does Not Participate | 12.2% | 8.7% |
| Participates in at least one sport | 14.2% | 9.2% | Participates in at least one sport | 12.0% | 8.4% |
| **Ranked from lowest to highest** | | | **Ranked from lowest to highest** | | |
| Cross Country | 11.0% | 6.2% | Cross Country | 9.3% | 6.5% |
| **Tennis** | **11.2%** | **7.9%** | Track | 10.1% | 7.2% |
| Soccer | 11.6% | 7.7% | Basketball | 10.5% | 7.8% |
| Field Hockey | 12.4% | 6.8% | **Tennis** | **11.2%** | **7.6%** |
| Volleyball | 11.8% | 7.8% | Volleyball | 11.7% | 7.2% |
| Track | 13.0% | 7.6% | Soccer | 12.4% | 9.2% |
| Basketball | 12.6% | 8.5% | Field Hockey | 12.6% | 9.6% |
| Swimming | 13.5% | 8.1% | Baseball/Softball | 12.6% | 9.9% |
| Baseball/Softball | 15.4% | 9.4% | Swimming | 12.3% | 10.1% |
| Football | 16.3% | 10.5% | Lacrosse | 14.3% | 11.7% |
| Gymnastics | 17.4% | 9.5% | Gymnastics | 14.9% | 12.2% |
| Lacrosse | 18.1% | 12.7% | Football | 16.4% | 12.4% |
| Ice Hockey | 19.0% | 12.1% | Weightlifting | 16.0% | 12.8% |
| Wrestling | 18.1% | 13.8% | Ice Hockey | 18.2% | 18.4% |
| Weightlifting | 19.6% | 12.7% | Wrestling | 21.6% | 15.9% |

| Table 15: Percentage of U.S. Adolescents Who Smoked Marijuana During the Past Month, by Type of Sport (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 13.5% | 12.8% | Does Not Participate | 11.8% | 13.0% |
| Participates in at least one sport | 12.0% | 12.5% | Participates in at least one sport | 8.3% | 9.6% |
| **Ranked from lowest to highest** | | | **Ranked from lowest to highest** | | |
| Cross Country | 9.3% | 9.1% | Cross Country | 7.2% | 6.9% |
| Field Hockey | 11.1% | 8.0% | Track | 6.8% | 7.8% |
| **Tennis** | **10.0%** | **9.5%** | **Tennis** | **6.5%** | **8.3%** |
| Volleyball | 10.3% | 9.4% | Volleyball | 7.0% | 8.3% |
| Soccer | 9.6% | 10.3% | Field Hockey | 8.6% | 7.4% |
| Track | 10.7% | 9.8% | Basketball | 7.6% | 9.6% |
| Baseball/Softball | 11.4% | 11.0% | Soccer | 7.6% | 9.8% |
| Basketball | 11.8% | 12.7% | Swimming | 7.7% | 10.7% |
| Swimming | 13.4% | 12.2% | Baseball/Softball | 8.6% | 10.8% |
| Ice Hockey | 15.2% | 11.8% | Gymnastics | 9.2% | 12.6% |
| Football | 13.6% | 14.3% | Lacrosse | 12.0% | 11.4% |
| Gymnastics | 16.0% | 12.6% | Weightlifting | 11.2% | 15.1% |
| Weightlifting | 15.3% | 15.9% | Football | 10.7% | 15.8% |
| Wrestling | 15.9% | 16.8% | Ice Hockey | 13.6% | 17.6% |
| Lacrosse | 17.6% | 16.3% | Wrestling | 14.1% | 19.2% |

| Table 16: Percentage of U.S. Adolescents Who Smoked Cigarettes During the Past Month, by Type of Sport (n = 114,996) | | | | | |
|---|---|---|---|---|---|
| | Boys | | | Girls | |
| | 2006-10 | 2011-16 | | 2006-10 | 2011-16 |
| Does Not Participate | 14.9% | 8.6% | Does Not Participate | 14.1% | 9.2% |
| Participates in at least one sport | 10.1% | 6.0% | Participates in at least one sport | 8.7% | 5.2% |
| Ranked from lowest to highest | | | Ranked from lowest to highest | | |
| Cross Country | 6.8% | 4.7% | Cross Country | 6.6% | 2.7% |
| **Tennis** | **7.3%** | **4.7%** | Track | 6.2% | 3.8% |
| Track | 7.9% | 4.3% | **Tennis** | **6.5%** | **4.1%** |
| Soccer | 7.9% | 4.5% | Soccer | 6.7% | 4.3% |
| Volleyball | 7.9% | 4.8% | Field Hockey | 8.1% | 3.4% |
| Field Hockey | 8.5% | 5.1% | Lacrosse | 8.7% | 3.6% |
| Basketball | 8.8% | 5.2% | Volleyball | 7.8% | 4.6% |
| Lacrosse | 10.5% | 5.3% | Basketball | 7.6% | 5.1% |
| Baseball/Softball | 9.7% | 6.1% | Swimming | 9.4% | 5.9% |
| Swimming | 10.9% | 6.1% | Baseball/Softball | 10.0% | 7.3% |
| Football | 11.1% | 6.7% | Gymnastics | 10.5% | 7.4% |
| Ice Hockey | 12.5% | 7.9% | Weightlifting | 11.5% | 8.2% |
| Weightlifting | 12.1% | 8.4% | Football | 11.9% | 9.6% |
| Gymnastics | 14.4% | 7.0% | Ice Hockey | 15.9% | 15.1% |
| Wrestling | 13.8% | 9.3% | Wrestling | 19.4% | 17.0% |

# Assessing Healthy Behavior, Physical Activity, and Psychological Outcomes

This section assesses new outcomes that were not included in the original *More Than a Sport* report. In particular, we were interested in assessing certain healthy types of behaviors (e.g., physical activity) that adolescents should engage in on a regular basis, along with psychological outcomes that help shape appropriate mental health during a critical stage of adolescent development. In order to assess these outcomes, we had to draw on roughly 14,000 12th-graders who were surveyed between 2010 and 2015 in the MTF survey (Please refer to Appendix A on page 46 for sample sizes and Appendix B on pages 47-54 for more details on the measures used). Please note that five additional sports were included in the analysis due to additional questions on competitive sport participation being added to the MTF in 2010.

## Healthy Behaviors

Tables 17 through 20 on the following pages provide the results for several health-related behaviors that include the following: eating breakfast every day, eating green vegetables every day, eating fruit every day, and getting at least seven hours of sleep every day. Among adolescents who participated in tennis, 48.2% indicated eating breakfast every day (ranking fifth across 20 different sports), 50.8% indicated eating vegetables every day (ranking fifth across 20 different sports), 62.0% indicated eating fruit every day (ranking sixth across 20 different sports), and 32.2% indicated getting at least seven hours of sleep every day (ranking 16th across 20 different sports). Girls who participated in tennis tended to rank higher than boys who participated in tennis on these measures.

## Physical Activity

Tables 21 and 22 on page 35 provide the results for two indicators of physical activity: exercising vigorously every day and exercising seven days a week (the standard physical activity guideline for children). Among adolescents who participated in tennis, 48.4% indicated exercising vigorously every day (ranking 17th across 20 different sports) and 22.0% indicated exercising seven days a week (ranking 18th across 20 different sports).

Boys who participated in tennis ranked higher on these measures than their female counterparts. Boys and girls who participated in tennis ranked lower than average with respect to exercising vigorously every day when compared to adolescent athletes in general (i.e., participated in at least one sport during the past year). Boys who participated in tennis ranked higher than average with respect to exercising seven days a week when compared to adolescent athletes in general, while girls who participated in tennis ranked lower than average on this measure when compared to the average across all girl athletes.

| Table 17: Percentage of U.S. Adolescents Who Eat Breakfast Every Day, 2010-15 (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 34.0% | Does Not Participate | 32.4% |
| Participates in at least one sport | 42.0% | Participates in at least one sport | 40.7% |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Equestrian | 60.6% | Cross Country | 55.7% |
| Cross Country | 58.4% | Lacrosse | 51.5% |
| Cheerleading | 53.0% | Field Hockey | 50.5% |
| **Tennis** | **50.5%** | Track | 49.4% |
| Track | 48.9% | Weightlifting | 49.1% |
| Water Polo | 48.9% | Golf | 47.7% |
| Lacrosse | 47.5% | **Tennis** | **46.0%** |
| Weightlifting | 46.8% | Crew | 45.7% |
| Golf | 43.8% | Basketball | 42.6% |
| Swimming | 43.6% | Water Polo | 41.5% |
| Baseball/Softball | 43.1% | Cheerleading | 41.4% |
| Wrestling | 42.8% | Swimming | 41.3% |
| Soccer | 42.4% | Football | 41.2% |
| Basketball | 41.8% | Volleyball | 41.0% |
| Football | 40.9% | Soccer | 40.8% |
| Volleyball | 40.3% | Equestrian | 38.0% |
| Ice Hockey | 39.9% | Gymnastics | 37.3% |
| Crew | 34.9% | Baseball/Softball | 34.9% |
| Field Hockey | 30.3% | Ice Hockey | 33.4% |
| Gymnastics | 25.5% | Wrestling | 15.7% |

| Table 18: Percentage of U.S. Adolescents Who Eat Green Vegetables Every Day, 2010-15 (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 31.3% | Does Not Participate | 36.6% |
| Participates in at least one sport | 41.2% | Participates in at least one sport | 45.1% |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Equestrian | 55.0% | Crew | 59.5% |
| Water Polo | 53.3% | Water Polo | 56.7% |
| Crew | 51.2% | Equestrian | 56.4% |
| Cross Country | 51.0% | Golf | 56.3% |
| Lacrosse | 51.0% | Field Hockey | 55.1% |
| Weightlifting | 48.8% | **Tennis** | **54.4%** |
| Swimming | 47.6% | Weightlifting | 52.7% |
| **Tennis** | **47.1%** | Cross Country | 51.5% |
| Track | 46.7% | Swimming | 50.6% |
| Volleyball | 45.4% | Football | 50.6% |
| Wrestling | 44.9% | Soccer | 50.2% |
| Ice Hockey | 44.7% | Gymnastics | 49.5% |
| Soccer | 44.0% | Lacrosse | 48.3% |
| Gymnastics | 42.9% | Volleyball | 47.4% |
| Golf | 42.6% | Track | 47.1% |
| Cheerleading | 40.3% | Ice Hockey | 42.5% |
| Football | 40.2% | Cheerleading | 42.4% |
| Basketball | 39.2% | Basketball | 40.8% |
| Baseball/Softball | 39.1% | Baseball/Softball | 40.6% |
| Field Hockey | 33.4% | Wrestling | 38.7% |

| Table 19: Percentage of U.S. Adolescents Who Eat Fruit Every Day, 2010-15 (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 36.2% | Does Not Participate | 43.3% |
| Participates in at least one sport | 50.6% | Participates in at least one sport | 56.2% |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Water Polo | 69.7% | Water Polo | 70.3% |
| Equestrian | 64.3% | Cross Country | 68.5% |
| Crew | 63.2% | Equestrian | 68.3% |
| Cross Country | 62.2% | Crew | 66.3% |
| Cheerleading | 62.2% | **Tennis** | **65.9%** |
| Lacrosse | 61.3% | Field Hockey | 65.1% |
| Track | 58.8% | Golf | 64.7% |
| Weightlifting | 58.4% | Lacrosse | 64.5% |
| **Tennis** | **58.1%** | Weightlifting | 63.3% |
| Volleyball | 57.3% | Soccer | 62.3% |
| Swimming | 57.3% | Volleyball | 61.9% |
| Wrestling | 56.2% | Swimming | 61.9% |
| Ice Hockey | 55.4% | Football | 60.6% |
| Soccer | 54.6% | Track | 59.7% |
| Gymnastics | 53.4% | Gymnastics | 59.6% |
| Football | 53.1% | Wrestling | 58.2% |
| Field Hockey | 52.6% | Cheerleading | 55.1% |
| Golf | 51.7% | Baseball/Softball | 54.8% |
| Baseball/Softball | 51.5% | Ice Hockey | 54.3% |
| Basketball | 51.2% | Basketball | 53.7% |

| Table 20: Percentage of U.S. Adolescents Who Get Seven Hours of Sleep Every Day, 2010-15 (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 28.5% | Does Not Participate | 25.1% |
| Participates in at least one sport | 36.1% | Participates in at least one sport | 31.8% |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Equestrian | 46.1% | Equestrian | 44.7% |
| Crew | 45.7% | Cross Country | 37.3% |
| Cross Country | 44.4% | Golf | 36.1% |
| Cheerleading | 41.8% | Soccer | 35.9% |
| Water Polo | 41.3% | Baseball/Softball | 34.4% |
| Baseball/Softball | 41.0% | Volleyball | 33.5% |
| Weightlifting | 40.9% | Ice Hockey | 33.2% |
| Golf | 40.6% | Weightlifting | 33.1% |
| Track | 38.9% | Track | 33.1% |
| Soccer | 38.6% | Basketball | 32.8% |
| Lacrosse | 38.2% | Field Hockey | 32.7% |
| Ice Hockey | 37.6% | Lacrosse | 32.4% |
| Football | 36.1% | Cheerleading | 32.1% |
| Swimming | 35.6% | Water Polo | 31.4% |
| Basketball | 35.0% | **Tennis** | **30.7%** |
| Volleyball | 34.7% | Gymnastics | 29.4% |
| Wrestling | 34.1% | Swimming | 28.9% |
| **Tennis** | **33.7%** | Football | 27.2% |
| Gymnastics | 31.8% | Crew | 26.7% |
| Field Hockey | 28.7% | Wrestling | 20.5% |

| Table 21: Percentage of U.S. Adolescents Who Exercise Vigorously Every Day, 2010-15 (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 20.1% | Does Not Participate | 11.6% |
| Participates in at least one sport | 59.4% | Participates in at least one sport | 42.9% |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Track | 78.0% | Lacrosse | 64.5% |
| Weightlifting | 75.3% | Cross Country | 62.9% |
| Lacrosse | 75.1% | Track | 62.0% |
| Water Polo | 75.1% | Water Polo | 61.6% |
| Baseball/Softball | 70.9% | Weightlifting | 59.3% |
| Cross Country | 70.1% | Soccer | 55.3% |
| Wrestling | 69.5% | Gymnastics | 54.1% |
| Football | 67.7% | Basketball | 52.4% |
| Crew | 66.6% | Baseball/Softball | 52.0% |
| Soccer | 62.5% | Wrestling | 48.5% |
| Basketball | 62.3% | Golf | 46.8% |
| Swimming | 60.5% | Football | 46.2% |
| Gymnastics | 60.1% | Field Hockey | 46.1% |
| Volleyball | 59.6% | Swimming | 45.1% |
| Golf | 58.8% | Volleyball | 45.0% |
| Ice Hockey | 58.5% | Crew | 43.4% |
| **Tennis** | **58.3%** | Cheerleading | 40.9% |
| Equestrian | 53.6% | Ice Hockey | 40.2% |
| Cheerleading | 51.7% | **Tennis** | **38.4%** |
| Field Hockey | 50.6% | Equestrian | 38.2% |

| Table 22: Percentage of U.S. Adolescents Who Exercise Seven Days a Week, 2010-15 (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 10.8% | Does Not Participate | 4.7% |
| Participates in at least one sport | 28.5% | Participates in at least one sport | 13.6% |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Crew | 47.5% | Equestrian | 25.7% |
| Baseball/Softball | 42.9% | Ice Hockey | 20.7% |
| Lacrosse | 42.2% | Soccer | 20.6% |
| Water Polo | 39.7% | Weightlifting | 19.7% |
| Ice Hockey | 38.8% | Baseball/Softball | 19.6% |
| Gymnastics | 38.4% | Lacrosse | 19.1% |
| Weightlifting | 37.5% | Football | 18.8% |
| Equestrian | 36.0% | Water Polo | 18.5% |
| Cross Country | 35.1% | Crew | 18.0% |
| Volleyball | 34.9% | Basketball | 17.6% |
| Football | 34.0% | Track | 17.5% |
| Golf | 33.7% | Gymnastics | 17.0% |
| Track | 33.1% | Field Hockey | 15.6% |
| Field Hockey | 32.5% | Swimming | 15.1% |
| **Tennis** | **32.4%** | Volleyball | 14.9% |
| Basketball | 32.0% | Cross Country | 14.9% |
| Wrestling | 31.7% | Golf | 14.6% |
| Swimming | 30.9% | Cheerleading | 12.6% |
| Cheerleading | 30.8% | **Tennis** | **11.7%** |
| Soccer | 29.4% | Wrestling | 11.6% |

## Psychological Health

Tables 23 through 27 (to the right and on following pages) provide the results for psychological health across several important domains: self-esteem, fatalism, self-efficacy, loneliness, self-derogation, and social support. Overall, tennis ranked in the top 10 across all of these domains of psychological health among the 20 sports that were assessed (see also Table 28 on page 39).

Boys who participated in tennis tended to rank higher on these measures than girls who participated in tennis (except for social support). Additionally, boys and girls who participated in tennis ranked higher than average with respect to both adolescents who did not participate in sports and athletes in general (i.e., participated in at least one sport during the past year). The only measure in which this was not the case was with respect to boys regarding social support.

**Table 23: Mean Level of Self-Esteem, 2010-15 (high score = high self-esteem) (n = 14,049)**

| | **Boys** | | **Girls** |
|---|---|---|---|
| Does Not Participate | 3.90 | Does Not Participate | 3.94 |
| Participates in at least one sport | 4.20 | Participates in at least one sport | 4.10 |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Equestrian | 4.51 | Gymnastics | 4.20 |
| Field Hockey | 4.42 | Basketball | 4.19 |
| Volleyball | 4.39 | Lacrosse | 4.19 |
| Crew | 4.33 | Weightlifting | 4.18 |
| Baseball/Softball | 4.33 | Cheerleading | 4.17 |
| **Tennis** | **4.28** | Equestrian | 4.16 |
| Basketball | 4.28 | Track | 4.15 |
| Cheerleading | 4.27 | Cross Country | 4.13 |
| Soccer | 4.27 | **Tennis** | **4.13** |
| Football | 4.27 | Swimming | 4.13 |
| Weightlifting | 4.27 | Volleyball | 4.12 |
| Ice Hockey | 4.26 | Golf | 4.10 |
| Lacrosse | 4.25 | Soccer | 4.09 |
| Golf | 4.23 | Baseball/Softball | 4.06 |
| Track | 4.23 | Field Hockey | 4.06 |
| Cross Country | 4.23 | Crew | 4.05 |
| Swimming | 4.23 | Football | 4.04 |
| Gymnastics | 4.16 | Ice Hockey | 4.02 |
| Wrestling | 4.11 | Water Polo | 3.93 |
| Water Polo | 4.06 | Wrestling | 3.90 |
| Scores range from low = 1 to high = 5 | | | |

| Table 24: Mean Level of Fatalism, 2010-15 (high score = high fatalism) (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 2.48 | Does Not Participate | 2.28 |
| Participates in at least one sport | 2.24 | Participates in at least one sport | 2.17 |
| **Ranked from lowest to highest** | | **Ranked from lowest to highest** | |
| **Tennis** | **2.14** | Field Hockey | 1.93 |
| Volleyball | 2.21 | Cross Country | 1.97 |
| Track | 2.23 | Water Polo | 2.02 |
| Cross Country | 2.23 | Equestrian | 2.04 |
| Soccer | 2.23 | Lacrosse | 2.06 |
| Basketball | 2.24 | **Tennis** | **2.10** |
| Weightlifting | 2.26 | Track | 2.11 |
| Football | 2.27 | Basketball | 2.12 |
| Baseball/Softball | 2.27 | Volleyball | 2.13 |
| Golf | 2.29 | Weightlifting | 2.14 |
| Lacrosse | 2.30 | Golf | 2.14 |
| Swimming | 2.34 | Baseball/Softball | 2.15 |
| Wrestling | 2.35 | Swimming | 2.19 |
| Water Polo | 2.42 | Soccer | 2.19 |
| Ice Hockey | 2.43 | Gymnastics | 2.22 |
| Gymnastics | 2.58 | Cheerleading | 2.22 |
| Cheerleading | 2.89 | Crew | 2.22 |
| Field Hockey | 2.89 | Football | 2.30 |
| Crew | 3.21 | Ice Hockey | 2.44 |
| Equestrian | 3.25 | Wrestling | 2.65 |
| Scores range from low = 1 to high = 5 | | | |

| Table 25: Mean Level of Self-Efficacy, 2010-15 (high score = high self-efficacy) (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 3.56 | Does Not Participate | 3.72 |
| Participates in at least one sport | 3.74 | Participates in at least one sport | 3.82 |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Cross Country | 3.84 | Golf | 3.96 |
| Volleyball | 3.84 | Equestrian | 3.94 |
| Swimming | 3.83 | Weightlifting | 3.91 |
| Weightlifting | 3.78 | Basketball | 3.91 |
| **Tennis** | **3.78** | **Tennis** | **3.90** |
| Baseball/Softball | 3.78 | Cross Country | 3.90 |
| Soccer | 3.77 | Lacrosse | 3.89 |
| Basketball | 3.76 | Gymnastics | 3.87 |
| Track | 3.75 | Cheerleading | 3.87 |
| Water Polo | 3.74 | Volleyball | 3.86 |
| Football | 3.73 | Swimming | 3.86 |
| Wrestling | 3.71 | Field Hockey | 3.85 |
| Golf | 3.70 | Track | 3.84 |
| Lacrosse | 3.64 | Ice Hockey | 3.83 |
| Gymnastics | 3.60 | Water Polo | 3.81 |
| Ice Hockey | 3.56 | Football | 3.79 |
| Field Hockey | 3.53 | Crew | 3.79 |
| Cheerleading | 3.47 | Baseball/Softball | 3.77 |
| Crew | 3.40 | Soccer | 3.76 |
| Equestrian | 3.29 | Wrestling | 3.60 |
| Scores range from low = 1 to high = 5 | | | |

| Table 26: Mean Level of Loneliness, 2010-15 (high score = high loneliness) (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 2.83 | Does Not Participate | 2.96 |
| Participates in at least one sport | 2.53 | Participates in at least one sport | 2.79 |
| **Ranked from lowest to highest** | | **Ranked from lowest to highest** | |
| Baseball/Softball | 2.35 | Field Hockey | 2.60 |
| Volleyball | 2.39 | Lacrosse | 2.63 |
| Lacrosse | 2.40 | Basketball | 2.66 |
| Football | 2.42 | Track | 2.68 |
| Basketball | 2.44 | Water Polo | 2.68 |
| Soccer | 2.46 | Equestrian | 2.68 |
| Field Hockey | 2.46 | Baseball/Softball | 2.71 |
| Golf | 2.48 | Golf | 2.73 |
| Ice Hockey | 2.48 | Soccer | 2.75 |
| Weightlifting | 2.49 | **Tennis** | **2.76** |
| **Tennis** | **2.51** | Cross Country | 2.77 |
| Water Polo | 2.52 | Weightlifting | 2.78 |
| Track | 2.55 | Swimming | 2.80 |
| Swimming | 2.60 | Volleyball | 2.81 |
| Cheerleading | 2.61 | Gymnastics | 2.82 |
| Wrestling | 2.62 | Cheerleading | 2.85 |
| Cross Country | 2.67 | Wrestling | 2.87 |
| Equestrian | 2.68 | Ice Hockey | 2.99 |
| Crew | 2.92 | Football | 3.01 |
| Gymnastics | 2.99 | Crew | 3.04 |
| Scores range from low = 1 to high = 5 | | | |

| Table 27: Mean Level of Social Support, 2010-15 (high score = high social support) (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 3.90 | Does Not Participate | 4.09 |
| Participates in at least one sport | 4.13 | Participates in at least one sport | 4.23 |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| Volleyball | 4.25 | Lacrosse | 4.43 |
| Swimming | 4.24 | Equestrian | 4.41 |
| Soccer | 4.23 | Field Hockey | 4.39 |
| Baseball/Softball | 4.22 | Golf | 4.35 |
| Cross Country | 4.19 | Basketball | 4.30 |
| Golf | 4.17 | **Tennis** | **4.30** |
| Track | 4.16 | Crew | 4.28 |
| Basketball | 4.15 | Soccer | 4.27 |
| Weightlifting | 4.14 | Baseball/Softball | 4.26 |
| Football | 4.14 | Water Polo | 4.24 |
| **Tennis** | **4.12** | Cheerleading | 4.24 |
| Ice Hockey | 4.05 | Weightlifting | 4.23 |
| Wrestling | 4.01 | Volleyball | 4.23 |
| Lacrosse | 4.01 | Cross Country | 4.23 |
| Water Polo | 3.90 | Track | 4.22 |
| Gymnastics | 3.89 | Swimming | 4.20 |
| Cheerleading | 3.89 | Gymnastics | 4.17 |
| Field Hockey | 3.88 | Ice Hockey | 4.06 |
| Equestrian | 3.84 | Wrestling | 3.93 |
| Crew | 3.78 | Football | 3.92 |
| Scores range from low = 1 to high = 5 | | | |

| Table 28: Total Percentages and Rank among Tennis Participants | | |
|---|---|---|
| | **Total** | **Total Rank** |
| Participation Rate in Tennis | 7.1% | 10th |
| **Academic Achievement** | | |
| Average Grade in School | 6.9 (B+) | 2nd |
| Average Grade of A in School | 50.7% | 2nd |
| Definitely Will Go to College | 80.5% | 2nd |
| Definitely Will Graduate from a Four-Year University | 75.1% | 1st |
| 10 or More Hours Doing Homework Throughout the Week | 29.1% | 2nd |
| **Behavior Issues** | | |
| Suspended at Least Once | 15.9% | 1st |
| Sent To The Office Due to Misbehavior | 24.2% | 1st |
| **Extracurricular Involvement** | | |
| Number of Sports that Adolescents Indicated Participating in During the Past Year | 3.9 | 10th |
| Participated in School-Based Athletics to a Considerable/Great Extent During the Past Year | 59.2% | 10th |
| Participated in the School Newspaper or Yearbook to a Considerable or Great Extent During the Past Year | 8.3% | 4th |
| Participated in School-Based Music or Other Performing Arts to a Considerable/Great Extent During the Past Year | 34.7% | 3rd |
| Participates in community affairs/volunteer work | 81.2% | 3rd |
| **Substance Use** | | |
| Binge Drinking During the Past Two Weeks | 9.5% | 3rd |
| Smoked Marijuana During the Past Month | 8.6% | 2nd |
| Smoked Cigarettes During the Past Month | 5.6% | 3rd |
| **Healthy Behaviors** | | |
| Eat Breakfast Every Day | 48.2% | 5th |
| Eat Green Vegetables Every Day | 50.8% | 6th |
| Eat Fruit Every Day | 60.2% | 6th |
| Gets 7 Hours of Sleep Every Day | 32.2% | 16th |
| **Physical Activity** | | |
| Exercises Vigorously Every Day | 48.3% | 18th |
| Exercises 7 Days a Week | 22.0% | 18th |
| **Psychological Health** | | |
| Mean Level of Self-Esteem (ranges from low=1 to high=5) | 4.21 | 8th |
| Mean Level of Fatalism (ranges from low=1 to high=5) | 2.12 | 2nd |
| Mean Level of Self-Efficacy (ranges from low=1 to high=5) | 3.84 | 5th |
| Mean Level of Loneliness (ranges from low=1 to high=5) | 2.63 | 10th |
| Mean Level of Self-Derogation (ranges from low=1 to high=5) | 1.99 | 6th |
| Mean Level of Social Support (ranges from low=1 to high=5) | 4.21 | 9th |

# SECTION 3: WHAT SPORTS TEND TO HAVE THE HEALTHIEST (PHYSICALLY, PSYCHOLOGICALLY, AND SOCIALLY) AND HIGHEST ACHIEVING STUDENTS?

Recent research has shown that people who played tennis tended to live longer than others who did not participate in this type of activity (Oja et al., 2016). It was loosely speculated that this type of sport involves more social interaction, which could be a major factor to help understand how a sport like tennis could help improve health or other types of behavior. For instance, as was shown in Section 1 of this report, about half of tennis participants are girls, making tennis a gender-equitable sport. Given the even split of tennis participants between the sexes, this will no doubt allow for greater interaction between boys and girls when playing this sport and may be a catalyst to develop other skills that are unrelated to tennis. While tennis has been shown to be related to a longer life (Oja et al., 2016), it is necessary to see if youth who participate in tennis also are receiving some health or social boost when compared to other types of sport. In order to answer this question, we sought to determine which sport had the highest percentage of students who excel academically, behaviorally, socially, physically, and psychologically, using a statistical method using latent class analysis (LCA). Please refer to Appendix C on page 55 for details on the LCA.

Based on the percentages (or probabilities) of the 28 items within each estimated latent class (see Table 29 on following page), the five groups were defined in the following manner: (1) "Healthy High Achievers," (2) "Healthy Low Achievers," (3) "High-Risk, Low-Health, Low Achievers," (4) "Low-Health High Achievers," and (5) "Low-Risk, Low-Health, Low Achievers." Table 30 on page 42 provides the results assessing the healthy-high achievers (i.e., the group with that typically scored the best on all the measures) across the 10 most popular sports for boys and girls. In particular, boy tennis participants ranked the highest (31.4%) with respect to the percentage who fell into this group, while girl tennis participants ranked third-highest (23.4%) with respect to the percentage who fell into this group.

## Table 29. Estimated Latent Class Analysis Probabilities and Prevalence of Sources Based on Five Latent Classes

| Estimated LCA probabilities (Mplus Results) Green indicates the best positive result for the predicted probability, red indicates the worst result for the predicted probability | Healthy High Achievers (n = 2061) | Healthy Low Achievers (n = 3086) | High-Risk, Low-Health, Low Achievers (n = 2963) | Low-Health High Achievers (n = 2065) | Low-Risk, Low-Health, Low Achievers (n = 3750) |
|---|---|---|---|---|---|
| **Diet and Nutrition** | | | | | |
| Eats Breakfast Every Day | 60.6% | 45.6% | 23.3% | 44.4% | 26.8% |
| Eats Green Vegetables Every Day | 62.3% | 46.9% | 28.7% | 45.8% | 24.4% |
| Eats Fruit Every Day | 72.5% | 57.0% | 37.5% | 53.4% | 30.5% |
| **Physical Activity** | | | | | |
| Exercises Vigorously Every Day | 58.9% | 49.5% | 34.1% | 35.6% | 24.6% |
| Exercises 7 Days a Week | 23.5% | 22.8% | 16.3% | 13.5% | 9.9% |
| Gets 7 Hours of Sleep Every Day | 46.6% | 46.9% | 20.1% | 27.8% | 21.2% |
| Gets Less Sleep than They Should (Every Day) | 29.9% | 22.6% | 42.1% | 45.0% | 36.3% |
| **Substance Use** | | | | | |
| Past 30-Day Cigarette Use | 7.7% | 4.4% | 48.2% | 5.1% | 7.2% |
| Ever Drink | 60.9% | 63.0% | 100.0% | 56.3% | 54.5% |
| Past 2-Week Binge Drinking | 17.9% | 13.9% | 63.4% | 7.5% | 3.4% |
| Past 30-Day Marijuana Use | 15.7% | 11.5% | 64.4% | 9.5% | 8.1% |
| **Academic Achievement** | | | | | |
| Self-Rated School Ability Above Average | 94.8% | 5.6% | 16.6% | 85.8% | 3.7% |
| Self-Rated Intelligence Above Average | 86.9% | 11.5% | 26.7% | 79.4% | 9.2% |
| Past Month Missed Class Due to Illness | 30.6% | 37.6% | 53.6% | 33.1% | 42.4% |
| Past Month Cut Class (Full Day) | 17.5% | 22.2% | 61.5% | 18.6% | 21.9% |
| Past Month Skipped Class (Partial Day) | 16.6% | 21.9% | 58.1% | 18.2% | 20.1% |
| Average Grade in School A or A | 72.5% | 25.6% | 15.6% | 71.4% | 17.8% |
| Will Graduate from a Two-Year College | 16.0% | 29.3% | 25.9% | 16.9% | 21.5% |
| Will Graduate from a Four-Year College | 86.8% | 63.9% | 42.1% | 82.6% | 41.8% |
| Will Attend Graduate or Professional School | 41.2% | 24.4% | 14.8% | 38.1% | 13.3% |
| **Driving Safety** | | | | | |
| Received a Driving Ticket in the Past Year | 21.3% | 16.1% | 36.3% | 14.6% | 11.8% |
| Was in a Car Accident in the Past Year | 15.7% | 12.3% | 27.2% | 14.4% | 9.4% |
| **Psychological Health** | | | | | |
| Self-Esteem (High) | 82.4% | 68.3% | 29.4% | 24.8% | 14.1% |
| Fatalism (Low) | 73.7% | 55.4% | 20.7% | 26.7% | 7.5% |
| Self-Efficacy (High) | 41.6% | 28.2% | 9.2% | 12.4% | 5.0% |
| Self-Derogation (Low) | 88.9% | 77.7% | 25.9% | 18.3% | 8.1% |
| Loneliness (Low) | 37.4% | 39.7% | 11.7% | 1.3% | 1.5% |
| Social Support (High) | 72.5% | 70.4% | 35.9% | 27.2% | 21.0% |

| Table 30: Percentage of Healthy High Achievers by Different Types of Sports Participation in Top 10 Sports, 2010-15 (n = 14,049) | | | |
|---|---|---|---|
| | **Boys** | | **Girls** |
| Does Not Participate | 8.9% | Does Not Participate | 9.9% |
| Participates in at least one sport | 20.2% | Participates in at least one sport | 16.8% |
| **Ranked from highest to lowest** | | **Ranked from highest to lowest** | |
| **Tennis** | **31.4%** | Lacrosse | 24.3% |
| Cross Country | 30.0% | Cross Country | 23.7% |
| Track | 25.0% | Tennis | 23.4% |
| Soccer | 23.0% | Track | 21.2% |
| Basketball | 22.9% | Volleyball | 19.6% |
| Baseball/Softball | 22.8% | **Swimming** | **19.1%** |
| Lacrosse | 21.0% | Basketball | 18.6% |
| Swimming | 20.7% | Soccer | 17.8% |
| Football | 19.3% | Cheerleading | 15.6% |
| Wrestling | 15.2% | Baseball/Softball | 13.6% |

## Which Other Sports Are Tennis Players Most Likely to Participate in During the Past 12 Months?

It should be noted that more than half of boys (77%) and girls (58%) who participate in tennis also participate in another sport, so it is necessary to figure out which sport these athletes are most likely to also participate in beyond tennis. In order to accomplish this, an exploratory factor analysis was conducted to assess which types of sports cluster together among the 10 most popular sports for boys and girls. The results provided in Table 31 on the following page show that, among boys, there is a relatively strong pattern (i.e., correlation) among tennis participants to also participate in soccer and swimming. Among girls, there is a relatively strong pattern among tennis participants to also participate in lacrosse and soccer.

| Table 31: Factor Analysis to Assess Clusters of Sport Participants by Gender, 2010-15 (n = 14,049) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boys, Factor Loadings | | | | | | | | Girls, Factor Loadings | | | | | | | |
| Eigen Values | 1.77 | 1.56 | 1.52 | 1.43 | 1.32 | 1.27 | 1.21 | Eigen Values | 1.50 | 1.36 | 1.34 | 1.27 | 1.24 | 1.18 | 1.11 | 1.03 |
| Equestrian | .660 | | | | | | | Basketball | .674 | | | | | | | |
| Cheerleading | .604 | | | | | | | Volleyball | .657 | | | | | | | |
| Field Hockey | .545 | | | | | | | Softball | .650 | | | | | | | |
| Gymnastics | .529 | | | | | | | Track | | .784 | | | | | | |
| Crew | .511 | | | | | | | Cross Country | | .783 | | | | | | |
| Football | | .682 | | | | | | Wrestling | | | .720 | | | | | |
| Weightlifting | | .651 | | | | | | Football | | | .557 | | | | | |
| Wrestling | | .613 | | | | | | Ice Hockey | | | .521 | | | | | |
| Baseball | | | .720 | | | | | Weightlifting | | | .331 | | | | | |
| Basketball | | | .637 | | | | | Soccer | | | .292 | | | | | |
| Golf | | | .482 | | | | | Cheerleading | | | | .802 | | | | |
| **Soccer** | | | | **.654** | | | | Gymnastics | | | | .768 | | | | |
| **Tennis** | | | | **.626** | | | | Water Polo | | | | | .787 | | | |
| **Volleyball** | | | | **.605** | | | | Swimming | | | | | .692 | | | |
| Cross Country | | | | | .832 | | | Lacrosse | | | | | | .750 | | |
| Track | | | | | .762 | | | Field Hockey | | | | | | .742 | | |
| Water Polo | | | | | | .803 | | **Tennis** | | | | | | | **.704** | |
| Swimming | | | | | | .733 | | **Golf** | | | | | | | **.623** | |
| Ice Hockey | | | | | | | .748 | Equestrian | | | | | | | | .710 |
| Lacrosse | | | | | | | .677 | Crew | | | | | | | | -.592 |
| Note that 77% of boy tennis participants participate in another sport; 58% of girl participants participate in another sport. | | | | | | | | | | | | | | | | |

# CONCLUSION

The findings discussed in this report provide evidence that tennis participation positively influences the lives of U.S. adolescents. Many of the positive associations between tennis participation and developmental outcomes were similar across both time periods (i.e., 2006-10 versus 2011-16). Moreover, new analyses revealed several new findings that suggest that nearly one out of three adolescents who participate in tennis are both the healthiest and highest achieving students among their peers. Given these positive findings with respect to tennis participants, it may be important to grow tennis participation for other athletes who may be siloed into a single sport, who may predominantly participate in a certain type of sport (i.e., high-contact sports), and among other athletes who are not getting the educational, health, and social benefits that tennis participants are getting. Encouraging these athletes to expand their portfolio as it relates to sports during their off-seasons could encourage healthy development and expand social ties with new peer groups. Based on the findings in this report, tennis players can also clearly benefit from playing other sports that show a strong association with positive developmental outcomes.

While tennis remains a predominantly white sport, gender representation is equitable, and there is some evidence that youth participation is expanding as it relates to other racial groups that are gaining larger representation in the United States. Additionally, and consistent with the first study, the associations presented hold for various socioeconomic groups. While adolescents who come from higher SES backgrounds tend to have better academic, behavioral, social, and health outcomes when compared to adolescents who are from more disadvantaged backgrounds, the impact of tennis is similar across all socioeconomic groups who participate in this sport. Finally, tennis appears to be a sport that many participants stick with over the important developmental period between middle and high school; a period when many adolescents begin to drop out of sport and reduce their levels of physical activity.

Despite the many positive benefits that are linked to tennis participation, tennis players did lag behind those participating in other types of sports for several types of behaviors. In particular, adolescents who participated in tennis indicated not getting enough sleep or engaging in appropriate levels of physical activity. Clearly this needs to be improved and may be linked to tennis participants committing additional hours to academics and other social or school-based extracurricular activities (e.g., lack of sleep due to studying for longer periods of time at night). Coaches and parents of youth tennis players should be aware of this and stress the importance of getting enough sleep and allowing time for physical activity – namely, coaches and parents need to be aware and communicate that

getting enough sleep and physical activity will improve their performance in the classroom and in other areas of their social lives.

Overall, the data from the MTF show a general profile of tennis players as well-rounded, successful at school, and involved with extracurricular activities. Tennis players also appear to be healthy overall and less prone to key adolescent health-risk behaviors than non-athletes and their peers who participate in other sports. Clearly, the data show that tennis is doing an effective job at retaining young participants, as well as helping them to develop friendships, excel on the academic front, and adopt healthy behaviors and may also be the potential catalyst for maintaining a longer and healthier life (Oja et al., 2016). The evidence uncovered here shows that tennis is achieving these objectives and, in the process, serves as a powerful catalyst for education and health among U.S. adolescents.

# POLICY RECOMMENDATIONS

## Further Research Needed

This research does an excellent job of identifying the health, academic, and psychosocial benefits that accrue to youth who play tennis. The next step is the "why" — why does playing tennis produce these outcomes? What are the basic ingredients that lead to positive experiences for youth? Understanding why tennis produces such positive outcomes could help other sports develop in ways that maximize the benefits of participation. Research is needed to help us answer the "why."

## Increase Tennis Participation

While tennis is one of the 10 most popular sports for both boys and girls, only about 6% of youth participate in tennis. There is plenty of room for growth among both sexes, attracting different ethnic groups and participants of other sports. The industry needs to develop a plan targeted to key influencers (i.e., NGBs, parents, NJTLs, health-driven and policy-making organizations, schools, etc.) so the research data becomes well-known, especially since the positive benefits of tennis can potentially attract new participants who are seeking new activities.

## Increase the Diversity of Tennis Players

This report demonstrates that tennis is moving in the right direction in terms of diversifying participants. However, more progress is needed, especially concerning girls of color and both boys and girls from lower socioeconomic status. Greater efforts to recruit and retain these participants is needed, along with a greater effort to make this activity accessible year-round.

## Improve the Health Behaviors of Tennis Players

While there are many benefits attributed to tennis participation, there are a few areas in which tennis players report below-average ratings. Getting more physical activity and seven or more hours of sleep daily are two important areas for improvement. In addition, less than half of all tennis-playing youth eat breakfast daily. Tennis organizations should integrate education about these topics to help improve the health behaviors of youth.

## Play More Than Just Tennis

The findings in this report show that the benefits gained from sports participation increase when youth play more than one sport. About a quarter of youth tennis players only participate in one sport. We recommend that program leaders facilitate opportunities for tennis players to play other sports and, conversely, since tennis has so many great benefits, athletes from other sports should consider adding tennis as an additional activity or as a sport to participate in during their off-season. This will not only increase tennis participation, but also extend the benefits tennis players receive to other youth.

# APPENDIX A: SAMPLE SIZE INDEX

**Section 1: Trends in Tennis Participation between 2006 and 2016**

Sample sizes from the Monitoring the Future

Total sample size for eighth-, 10th-, and 12th-graders (n = 141,429)

Total sample size for eighth-graders (n = 58,624)

Total sample size for 10th-graders (n = 56,372)

Total sample size for 12th-graders (n = 25,953)

Total sample size for boys (n = 67,090)

Total sample size for girls (n = 69,240)

Total sample size for tennis participants (n = 9,283; boys = 4,342; girls = 4,728)

**Section 2, Part 1: Assessing Participation, Academic, Extracurricular Activities, Community Service and Substance Abuse**

Sample sizes from the Monitoring the Future

The sample sizes for key groups are provided below:

Total sample size for eighth- and 10th-graders (n = 114,996)

Total sample size for eighth-graders (n = 58,624)

Total sample size for 10th-graders (n = 56,372)

Total sample size for boys (n = 54,704)

Total sample size for girls (n = 56,594)

Total sample size for tennis participants (n = 7,892; boys = 3,611; girls = 4,101)

**Section 2, Part 2: Assessing Healthy Behavior, Physical Activity, and Psychological Outcomes**

Sample sizes from the Monitoring the Future

The sample sizes for key groups are provided below:

Total sample size for 12th-graders (n = 14,049)

Total sample size for boys (n = 5,557)

Total sample size for girls (n = 5,838)

Total sample size for tennis participants (n = 701; boys = 365; girls = 320)

**Section 3: What Sports Tend to Have the Healthiest (Physically, Psychologically, and Socially) and Highest Achieving Students?**

Sample sizes from the Monitoring the Future

The sample sizes for key groups are provided below:

Total sample size for 12th-graders (n = 14,049)

Total sample size for boys (n = 5,557)

Total sample size for girls (n = 5,838)

Total sample size for tennis participants (n = 701; boys = 365; girls = 320)

# APPENDIX B: MEASURES INDEX

## Measures for Sport Participation

(1) Different types of sport participation
(2) Number of sports that the adolescent indicated participation in during the past year

**Question:** In which competitive sports (if any) did you participate during the LAST 12 MONTHS? Include school, community, and other organized sports. (Mark all that apply.)

(1) Baseball/Softball
(2) Basketball
(3) Cheerleading
(4) Cross Country
(5) Football
(6) Golf
(7) Lacrosse
(8) Soccer
(9) Swimming and Diving
(10) Tennis
(11) Track and Field
(12) Volleyball
(13) Wrestling
(14) Crew
(15) Equestrian
(16) Field Hockey
(17) Gymnastics
(18) Ice Hockey
(19) Water Polo
(20) Weightlifting
(21) Other Sport

**Participates in at least one sport:** if a respondent marked at least 1 of the 21 sports listed.

**Number of sports:** if a respondent only marked one of the 21 sports (participates in only one sport); if a respondent marked two or more of the 21 sports (participates in two or more sports).

## Sociodemographic Measures

### Sex

**Question:** What is your sex?

**Response options:** 1="Male", 2="Female"

### Race

**Question:** How do you describe yourself? (Select one or more responses.) Black or African American; Mexican American or Chicano; Cuban American; Puerto Rican; Other Hispanic or Latino; Asian American; White (Caucasian); American Indian or Alaska Native; Native Hawaiian or Other Pacific Islander.

**Response options:** [Recoded in this data set so that 1="Black or African American", 2="White (Caucasian)", 3=Hispanic ("Mexican..." or "Cuban..." or "Puerto Rican" or "Other Hispanic..."). All other responses (e.g., Asian), including those of respondents who feel into more than one of the three were coded as "Other Race."]

## Socioeconomic Status

**Question:** If you have both a stepfather and a natural father, answer for the one that was the most important in raising you. What is the highest level of schooling your father completed?

**Question:** What is the highest level of schooling your mother completed?

**Response options:** 1="Completed grade school or less", 2="Some high school", 3="Completed high school", 4="Some college", 5="Completed college", 6="Graduate or professional school after college", 7="Don't know, or does not apply" – RECODED [Both parents have less than high school = 1, at least one parent has a high school degree (but not higher) = 2, at least one parent has some college (but not higher) = 3, at least one parent has a college degree or higher = 4]

## Region

**Question:** Region of the country, based on Census categories, in which respondent's school is located.

**Response options:** 1=Northeast, 2=North Central, 3=South, 4=West

## Urbanicity

**Question:** Component variable, along with V17, for a standardized three-category measure of population density. Population density is largest ("Large MSA") when V16 is coded 1 and V17 is coded 1, medium-sized ("Other MSA") when V16 is 0 and V17 1, and smallest ("Non-MSA") when both V16 and V17 are coded 0.

**Response options:** 0="Else", 1="Large MSA"

**Question – MSA:** Metropolitan Statistical Area as defined for the U.S. Census, a county or group of contiguous counties (or, in New England, Consolidated Metropolitan Areas) that contain at least one city of 50,000 inhabitants or more. (Formerly referred to as "Standard Metropolitan Statistical Area")

**Response options:** 0=Not MSA, 1=MSA – RECODED [taking the composite of both questions give use the following: 0 = Rural, 1 = Suburban, 2 = Urban]

# Measures for Healthy Behaviors

**Question:** How often do you...

(1) Eat breakfast?
(2) Eat at least some green vegetables?
(3) Eat at least some fruit?
(4) Get at least seven hours of sleep?

**Response options:** Never, Seldom, Most Days, Nearly Every Day, Every Day – RECODED [Never, Seldom, Most Days = 0; Nearly Every Day, Every Day = 1]

# Measures for Driving Safety

## Received a driving ticket in the last year

**Question:** Within the LAST 12 MONTHS, how many times, if any, have you received a ticket (OR been stopped and warned) for moving violations, such as speeding, running a stop light, or improper passing?

**Response options:** 0="None–GO TO QUESTION 30", 1="Once", 2="Twice", 3="Three times", 4="Four or more times" – RECODED [None = 0; Once, Twice, Three times, Four or more times = 1]

## In an accident

**Question:** We are interested in any accidents which occurred while you were driving a car, truck, or motorcycle. ("Accidents" means a collision involving property damage or personal injury—not bumps or scratches in parking lots.) During the LAST 12 MONTHS, how many accidents have you had while you were driving (whether or not you were responsible)?

**Response options:** 0="None–GO TO QUESTION 30", 1="Once", 2="Twice", 3="Three times", 4="Four or more times" – RECODED [None = 0; Once, Twice, Three times, Four or more times = 1]

# Measures for Physical Activity and Rest

**Question:** How often do you...

(1) Exercise vigorously (jogging, swimming, calisthenics, or any other active sports)?
(2) Get less sleep than you think you should?

**Response options:** Never, Seldom, Most Days, Nearly Every Day, Every Day – RECODED [Never, Seldom, Most Days = 0; Nearly Every Day, Every Day = 1]

## Exercise 7 days a week

**Question:** During the LAST 7 DAYS, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you get out of breath some of the time.)

**Response options:** 0="0 days", 1="1 day", 2="2 days", 3="3 days", 4="4 days", 5="5 days", 6="6 days", 7="7 days" – RECODED [0 days = 0; 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, 7 days = 1]

# Measures for Substance Use

## Cigarette use

**Question:** How frequently have you smoked cigarettes during the past 30 days?

**Response options:** 1="Not at all", 2="Less than one cigarette per day", 3="One to five cigarettes per day", 4="About one-half pack per day", 5="About one pack per day", 6="About one and one-half packs per day", 7="Two packs or more per day" – RECODED [Not at all = 0; Less than one cigarette per day, One to five cigarettes per day, About one-half pack per day, About one pack per day, About one and one-half packs per day, Two packs or more per day = 1]

## Binge drinking

**Question:** Think back over the LAST TWO WEEKS. How many times have you had five or more drinks in a row? (A "drink" is a glass of wine, a bottle of beer, a shot glass of liquor, a mixed drink, etc.)

**Response options:** 1="None", 2="Once", 3="Twice", 4="3 to 5 times", 5="6 to 9 times", 6="10 or more times" – RECODED [None = 0; Once, Twice, 3 to 5 times, 6 to 9 times, 10 or more times = 1]

## Marijuana use

**Question:** On how many occasions (if any) have you used marijuana (weed, pot) or hashish (hash, hash oil)...

**Response options:** 1="0 Occasions", 2="1-2 Occasions", 3="3-5 Occasions", 4="6-9 Occasions", 5="10-19 Occasions", 6="20-39 Occasions", 7="40 or More" – RECODED [0 Occasions = 0; 1-2 Occasions, 3-5 Occasions, 6-9 Occasions, 10-19 Occasions, 20-39 Occasions, 40 or More = 1]

# Measures for Academic Achievement

## Self-rated school ability is above average

**Question:** Compared with others your age throughout the country, how do you rate yourself on school ability?

**Response options:** 1="Far Below Average", 2="Below Average", 3="Slightly Below Average", 4="Average", 5="Slightly Above Average", 6="Above Average", 7="Far Above Average" – RECODED [Far Below Average, Below Average, Slightly Below Average, Average, Slightly Above Average = 0; Above Average, Far Above Average = 1]

## Self-rated intelligence is above average

**Question:** How intelligent do you think you are compared with others your age?

**Response options:** 1="Far Below Average", 2="Below Average", 3="Slightly Below Average", 4="Average", 5="Slightly Above Average", 6="Above Average", 7="Far Above Average" – RECODED [Far Below Average, Below Average, Slightly Below Average, Average, Slightly Above Average = 0; Above Average, Far Above Average = 1]

## Skipped school/class

**Question:** During the LAST FOUR WEEKS, how many whole days of school have you missed...

(1) Because you skipped or "cut"?
(2) Because of illness?
**Response options:** 1="None", 2="1 Day", 3="2 Days", 4="3 Days", 5="4-5 Days", 6="6-10 Days", 7="11 or More" – RECODED [None = 0; 1 Day, 2 Days, 3 Days, 4-5 Days, 6-10 Days, 11 or More = 1]

**Question:** During the LAST FOUR WEEKS, how often have you gone to school, but skipped a class when you weren't supposed to?

**Response options:** 1="Not at all", 2="1 or 2 times", 3="3-5 times", 4="6-10 times", 5="11-20 times", 6="More than 20 times" – RECODED [Not at all = 0; 1 or 2 times, 3-5 times, 6-10 times, 11-20 times, More than 20 times = 1]

## Suspended at least once

**Question:** Have you ever been suspended or expelled from school?

**Response options:** 1="No", 2="Yes, one time", 3="Yes, two or more times" – RECODED [No = 0; Yes, one time, Yes, two or more times = 1]

## Sent to the office because of misbehavior

**Question:** Now thinking back over the past year in school, how often did you ... get sent to the office, or have to stay after school, because you misbehaved?

**Response options:** 1="Never", 2="Seldom", 3="Sometimes", 4="Often", 5="Almost always" – RECODED [Never = 0; Seldom, Sometimes, Often, Almost always = 1]

## Grades

(1) Average grade in school
(2) Average grade of A in school

**Question:** Which of the following best describes your average grade so far in high school?

**Response options:** 9="A (93-100)", 8="A- (90-92)" 7="B+ (87-89)", 6="B (83-86)", 5="B- (80-82)", 4="C+ (77-79)", 3="C (73-76)", 2="C- (70-72)", 1="D (69 or below)" – RECODED [B+ (87-89), B (83-86), B- (80-82), C+ (77-79) , C (73-76), C- (70-72), D (69 or below) = 0; A (93-100), A- (90-92) = 1]

### 10 or more hours doing homework throughout the week

**Question:** About how many hours do you spend in an average week on all of your homework including both in school and out of school?

**Response options:** 1="0 hours", 2="1-4 hours", 3="5-9 hours", 4="10-14 hours", 5="15-19 hours", 6="20-24 hours", 7="25 or more hours" – RECODED [0 hours, 1-4 hours, 5-9 hours = 0; 10-14 hours, 15-19 hours, 20-24 hours, 25 or more hours = 1]

### Aspirations after high school

**Question:** How likely is it that you will do each of the following things after high school?

(1) Graduate from a two-year college program
(2) Attend college (four-year program)
(3) Graduate from college (four-year program)
(4) Attend graduate or professional school after college

**Response options:** 1="Definitely Won't", 2="Probably Won't", 3="Probably Will", 4="Definitely Will" – RECODED [Definitely Won't, Probably Won't, Probably Will = 0; Definitely Will = 1]

## Measures for Extracurricular Involvement

**Question:** To what extent have you participated in the following school activities during this school year?

(1) School newspaper or yearbook
(2) Music or other performing arts
(3) Athletic teams

**Response options:** 1="Not At All", 2="Slight", 3="Moderate", 4="Considerable", 5="Great" – RECODED [Not At All, Slight, Moderate = 0; Considerable, Great = 1]

### Participates in community affairs/volunteer work

**Question:** How often do you do participate in community affairs or volunteer work?

**Response options:** 5="Almost every day", 4="At least once a week", 3="Once or twice a month", 2="A few times a year", 1="Never" – RECODED [Never = 0; Almost every day, At least once a week, Once or twice a month, A few times a year = 1]

# Measures for Psychological Health

**SELF-ESTEEM Question:** Do you agree or disagree with each of the following? [NOTE: the combined construct of the four items has an alpha of .831]

(1) On the whole, I'm satisfied with myself

(2) I take a positive attitude toward myself

(3) I feel I am a person of worth, on an equal plane with others

(4) I am able to do things as well as most other people

**Response options:** 1="Disagree", 2="Mostly Disagree", 3="Neither", 4="Mostly Agree", 5="Agree" – RECODED [Disagree, Mostly Disagree, Neither = 0; Mostly Agree, Agree = 1]

**FATALISM Question:** Do you agree or disagree with each of the following? [NOTE: the combined construct of the two items has an alpha of .571]

(1) Every time I try to get ahead, something or somebody stops me

(2) People like me don't have much of a chance to be successful in life

**Response options:** 1="Disagree", 2="Mostly Disagree", 3="Neither", 4="Mostly Agree", 5="Agree" – RECODED [Disagree, Mostly Disagree, Neither = 0; Mostly Agree, Agree = 1]

**SELF-EFFICACY Question:** Do you agree or disagree with each of the following? [NOTE: the combined construct of the three items has an alpha of .566]

(1) Planning only makes a person unhappy since plans hardly ever work out anyway

(2) When I make plans, I am almost certain that I can make them work

(3) Planning ahead makes things turn out better

**Response options:** 1="Disagree", 2="Mostly Disagree", 3="Neither", 4="Mostly Agree", 5="Agree" – RECODED [Disagree, Mostly Disagree, Neither = 0; Mostly Agree, Agree = 1]

**LONELINESS Question:** Do you agree or disagree with each of the following? [NOTE: the combined construct of the three items has an alpha of .748]

(1) A lot of times I feel lonely

(2) I often feel left out of things

(3) I often wish I had more good friends

**Response options:** 1="Disagree", 2="Mostly Disagree", 3="Neither", 4="Mostly Agree", 5="Agree" – RECODED [Disagree, Mostly Disagree, Neither = 0; Mostly Agree, Agree = 1]

**SELF-DEROGATION Question:** Do you agree or disagree with each of the following? [NOTE: the combined construct of the four items has an alpha of .871]

(1) Sometimes I think that I am no good at all

(2) I feel I do not have much to be proud of

(3) I feel that I can't do anything right

(4) I feel that my life is not very useful

**Response options:** 1="Disagree", 2="Mostly Disagree", 3="Neither", 4="Mostly Agree", 5="Agree" – RECODED [Disagree, Mostly Disagree, Neither = 0; Mostly Agree, Agree = 1]

**SOCIAL SUPPORT Question:** Do you agree or disagree with each of the following? [NOTE: the combined construct of the three items has an alpha of .759]

(1) There is always someone I can turn to if I need help

(2) There is usually someone I can talk to if I need to

(3) I usually have a few friends around that I can get together with

**Response options:** 1="Disagree", 2="Mostly Disagree", 3="Neither", 4="Mostly Agree", 5="Agree" – RECODED [Disagree, Mostly Disagree, Neither = 0; Mostly Agree, Agree = 1]

# APPENDIX C: DETAILS ON LATENT CLASS ANALYSIS

LCA was used to create groups based on measures assessing diet and nutrition, physical activity, substance use, academic achievement, and psychological health (Please refer to Appendix B – Measures Index for details on the items used in the report). The exploratory LCA (with no covariates) was conducted using Mplus (version 8.0) assessing model fit across different class solutions (e.g., two-class model, three-class model). Based on the exploratory LCA, the identified subgroups were defined, then descriptive statistics were used to assess which sports had the highest percentage of participants who fell into the highest achieving/healthiest group of students. It should be noted that the 12th-grade sample that was used in Section 2 – Part 2 was used for this arm of the study.

The results from the latent class analysis assessing model fit using both the BIC and entropy scores found that a five-class solution for the 28 items (see Table 29 on page 41) was identified as the best-fitting model and was used to assess differences based on different types of sport participation (see Supplemental Table 1). The five-class solution had the lowest BIC value (BIC = 408577.488 – best fit based on evaluation between two-class and five-class solutions) and had an adequate entropy score (entropy = .750), indicating a good separation of latent classes (the five-class model was selected based on the non-significant VLMR/LRT score for the six-class solution – please refer to Supplemental Table 1 for more technical details). Based on the probabilities of the 28 items within each estimated latent class, the five groups were defined in the following manner: (1) "Healthy High Achievers," (2) "Healthy Low Achievers," (3) "High-Risk, Low-Health, Low Achievers," (4) "Low-Health High Achievers," and (5) "Low-Risk, Low-Health Low Achievers."

**Supplemental Table 1. Estimated Latent Class Analysis Probabilities and Prevalence of Sources Based on Five Latent Classes (Fit Indices)**

| Classes | Entropy | BIC | AIC | VLMR[1] | Sig. | LRT[2] | Sig. |
|---|---|---|---|---|---|---|---|
| 1 | – | 439601.698 | 439479.519 | – | – | – | – |
| 2 | 0.723 | 422287.501 | 422038.780 | 17498.739 | p<.001 | 17435.726 | p<.001 |
| 3 | 0.733 | 415443.081 | 415067.817 | 7028.963 | p<.001 | 7003.651 | p<.001 |
| 4 | 0.756 | 411265.610 | 410398.344 | 4727.473 | p<.001 | 4710.449 | p<.001 |
| 5 | 0.750 | 408577.488 | 407949.139 | 2507.205 | p<.001 | 2498.176 | p<.001 |
| 6 | 0.751 | 406071.287 | 405316.396 | 2491.457 | p=.275 | 2482.486 | p=.277 |

Data Source: Monitoring the Future study, 2011-2015 cohorts. Notes: [1]Vuong-Lo-Mendell Ruben Likelihhod Ratio Test. [2]Lo Mendell Rubin Adjusted LRT Test.

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