



The National Charitable  
Foundation of the USTA

## USTA SERVES SPECIAL REPORT

# MORE THAN A SPORT:

Tennis, Education and Health

Full Report

February 2013

# LETTER FROM THE EXECUTIVE DIRECTOR

All of us who are involved in growing the sport of tennis are well aware of the wide range of benefits the sport can provide. Tennis has helped shape our lives, and our experiences in the sport motivate us to redouble our efforts to make tennis the sport of opportunity for all.

The United States Tennis Association (USTA), the national governing body for tennis in the United States, is committed to effectively promoting the sport as a means of healthful recreation and physical fitness; to establishing and maintaining good sportsmanship in tennis; and to encouraging the development of good health, outstanding character and responsible citizenship through involvement in the sport. USTA Serves, Incorporated, the national charitable foundation of the USTA, seeks to expand the reach of our sport and its myriad benefits to at-risk youth and people with disabilities through programs utilizing the powerful integration of tennis and education.

This [USTA Serves Special Report, More Than a Sport: Tennis, Education and Health](#), is the first nationwide study to analyze the educational, behavioral and health benefits for adolescents who participate in tennis. Using data from [Monitoring the Future](#) (MTF), a highly respected, federally funded survey, the researchers compared the education and health profiles of tennis players with other high school athletes, as well as with high school students who do not participate in sports. The results confirm USTA Serves' belief in tennis as a sport of opportunity and validate our mission to support programs that enhance the lives of children and families through the integration of tennis, health and education.

While most people may not be surprised to learn that the majority of adolescent tennis players score better than most other athletes (and all non-athletes) on education and social behavior, what is less known is that those benefits also cross all socioeconomic levels in varying degrees. This is particularly important information as we work not only to grow tennis, but also to increase our efforts to make the face of the sport more closely resemble the face of our country.

The MTF data and large sample size made it possible to create demographic profiles of U.S. tennis participants by gender, several racial and ethnic groups, family socioeconomic level and geographic region.

We believe you will find the information in this study to be both interesting and insightful, and feel strongly that the findings included here will be of use in our shared efforts to grow our sport and enhance lives through it.

Sincerely,  
Deborah Slaner Larkin  
Executive Director, USTA Serves

# FOREWORD AND ACKNOWLEDGEMENTS

The More Than a Sport: Tennis, Education and Health Full Report presents the major findings from a first-of-its-kind nationwide study that compares 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 do not participate in sports. The results confirm USTA Serves' belief in tennis as a sport of opportunity and validate our mission to support programs that enhance the lives of children and families through the integration of tennis, health and education. An executive summary is also available from [ustaserves.com](http://ustaserves.com).

## **About Those Involved**

USTA Serves, Inc., is the national charitable foundation of the USTA. Its mission is to support, monitor and promote programs that enhance the lives of at-risk youth and people with disabilities through the integration of tennis, education and health programs. USTA Serves encourages children to pursue their goals and highest dreams by succeeding in school, improving their health and nutrition, and becoming responsible citizens. USTA Serves has funded hundreds of programs in 172 cities and 47 states, providing more than 18 million hours of mentoring, tutoring, nutritional guidance and tennis instruction to more than 300,000 youths.

The USTA is the national governing body for the sport of tennis and the recognized leader in promoting and developing the sport's growth on every level in the United States, from local communities to the crown jewel of the professional game, the US Open. The USTA is a progressive and diverse not-for-profit organization whose volunteers, professional staff and financial resources support a single mission: to promote and develop the growth of tennis. The USTA is the largest tennis organization in the world, with 17 geographical sections, more than 770,000 individual members and more than 8,800 Organizational Members, thousands of volunteers and a professional staff dedicated to growing the game.

The study was conducted by the Women's Sports Foundation (WSF) on behalf of USTA Serves. The WSF, founded in 1974, is the leader in promoting sports, health and education for girls and women. With Billie Jean King as its founder and ongoing visionary, the Women's Sports Foundation continues to have a profound impact on female athletics, from its vigorous advocacy of Title IX legislation to providing grants, scholarships and grassroots programs for underserved girls and groundbreaking research.

The study was authored by Don Sabo, Ph.D., Center for Research on Physical Activity, Sports, and Health, D'Youville College; Phil Veliz, Ph.D., University of Michigan; and Lisa Rafalson, Ph.D., D'Youville College.

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## Acknowledgements

USTA Serves provided relevant evidence-based policy recommendations for future planning and action. We gratefully acknowledge the leadership and expertise of Deborah Slaner Larkin and Judie Eisenberg, president and founder of Proposal Pro, who authored the recommendations.

A very special thank you to Marjorie Snyder, Ph.D., and Don Sabo, Ph.D., who have been creating research surveys and analyzing findings to promote sports and physical activity for girls and women as well as boys and men for more than 30 years. They recognize the important role research findings play in effecting systemic change in our society. Their scholarly insights, professionalism, work ethic and sense of humor make life interesting—and considerably better.

USTA Serves is grateful for the consultative energy and scholarly insights of Michael Messner, Ph.D., as well as Sr. Denise Roche, Ph.D., president of D'Youville College, for her ongoing support of the Center for Research on Physical Activity, Sport & Health, and to Deana Monahan for her editorial and graphic design skills.

Special thanks to USTA Serves board member Thomas Chen for his careful review and edit of the text; the USTA Serves board of directors for its overall support; and USTA Serves staff members Karen Ford, Ginalysse Ingles and Jackie Materasso for their ongoing commitment to further the mission of USTA Serves.

A special shout out to the many USTA staff members who gave their time, energy, insight and commitment to bring these findings to all stakeholders: Dr. Brian Hainline, Chief Medical Officer; Dave Dellinger for his design expertise; Chris Widmaier, Tom LaDue and Trina Singian for their support publicizing the report; E.J. Crawford and Mark Preston for expert editing; and the cross-functional team of USTA staff led by Fred Alleman, which consisted of D.A. Abrams, Kirk Anderson, Jason Brown, Karin Buchholz, Ingrid Chen, Valerie Chin, April Croft, China Fanning, Karen Feldman, Barry Ford, Bill Leong, Bill Mountford, Don Roberts, David Schobel, David Slade, Renee Tirado and Michelle Wisch, whose enthusiasm and insights helped make this a stronger report.

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# INTRODUCTION

Youth interest and participation in tennis is growing in the United States, and tennis is among the top nine most popular school sports that girls and boys participate in at the high school level (NFHS, 2012). Tennis also engages both girls and boys, and often facilitates competition across generations. In order to expand interest and participation in tennis, USTA Serves seeks to provide at-risk children with athletic and life experiences that foster educational gains and favorable youth development. Community-based programs provided by the USTA/National Junior Tennis & Learning network and other USTA organization programs aim to enhance the academic achievement and health and wellness of youth tennis participants.

The “More Than a Sport” research initiative builds on two secondary analyses of national survey data sets in order to describe and analyze U.S. youth participation in tennis. This report is mainly based on an analysis of the Monitoring the Future (MTF) nationwide surveys, a federally funded longitudinal study of American secondary school students. About 50,000 students are surveyed every year (eighth-, 10th- and 12th-graders), and pertinent information is gathered pertaining to educational outcomes, health behaviors, social engagement and substance use. Of particular interest to USTA Serves, the MTF began gathering information about the specific sports that students participated in during the previous 12 months in 2006; i.e., baseball, basketball, cross country, field hockey, football, gymnastics, ice hockey, lacrosse, swimming, soccer, tennis, track, volleyball, weightlifting and other sports. The MTF data survey, therefore, offered USTA Serves an opportunity to systematically study a very large sample of U.S. youth tennis participants, as well as participants in other sports, such as football, swimming or

basketball. For instance, there were 395 eighth-graders, 384 10th-graders, and 147 12th-graders who participated in tennis during 2009.

The MTF’s large sample sizes enabled the researchers to generate detailed demographic profiles of adolescent tennis participants and, also, to test hypothesized relationships between tennis participation and various educational and developmental gains. Several key research questions guided the analysis.

- How does adolescent participation in tennis vary by gender, race/ethnicity, geographic region and family socioeconomic level?
- What do we know about how participation in tennis influences young people’s experiences in school—the hours they spend doing homework, their academic achievement or their aspirations to attend college?
- If participation in tennis is related to academic performance, does this influence hold for both genders and across racial/ethnic groups and family socioeconomic levels?

This report is intended to familiarize wider publics and the USTA leadership with some key research findings. A basic summary of the research design and methods appears below. Next the key results are presented and discussed.

# DESIGN, SAMPLES AND DATA ANALYSIS

In order to maximize sample sizes within a variety of sports (including tennis), the following sampling design was created. Five cross-sections of data from the Monitoring the Future survey were used to examine characteristics of tennis players in relation to other sports participants. Specifically, data from eighth- and 10th-graders in 2006 (n = 11,277), 2007 (11,023), 2008 (n = 10,600), 2009 (n = 10,650) and 2010 (n = 10,498) were combined in order to capture a large cross-section of adolescents who participated in various contact and non-contact sports in the latter half of the new millennium (n = 54,048). Of particular importance for the current

study, a total of 4,278 tennis participants were combined across the five cross-sections of data (2006, n = 952; 2007, n = 967; 2008, n = 841; 2009, n = 797; 2010, n = 721) in order to examine various academic, social and behavioral outcomes among tennis players in relation to adolescents who participated in contact sports (baseball, basketball, field hockey, football, ice hockey, lacrosse, soccer and wrestling) and non-contact sports (cross country, gymnastics, swimming, track and volleyball), as well as adolescents who did not participate in sports (non-sports participants).

## A DEMOGRAPHIC PROFILE OF ADOLESCENT TENNIS PLAYERS

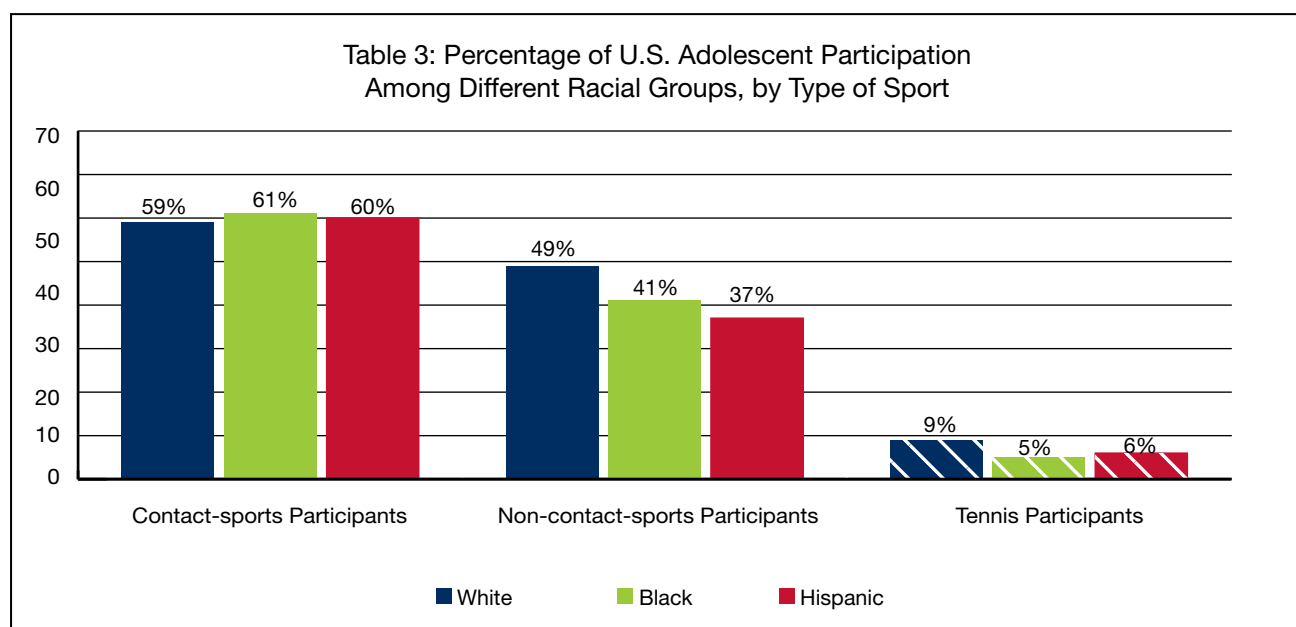
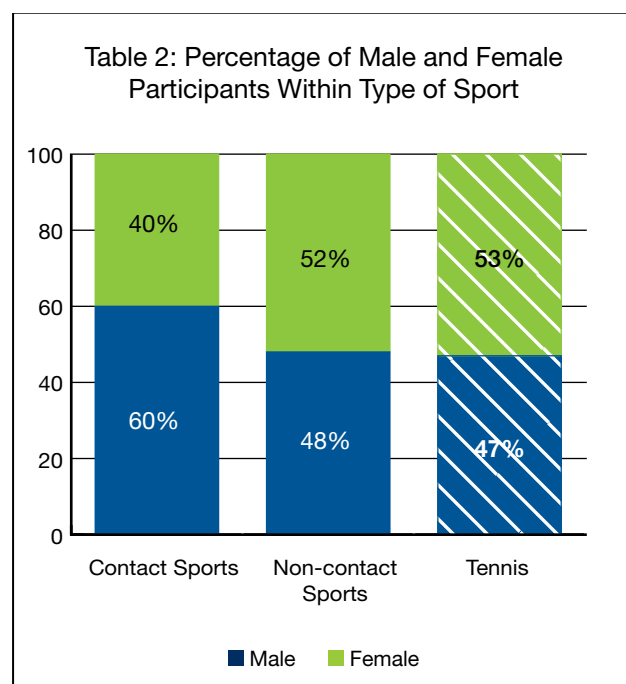
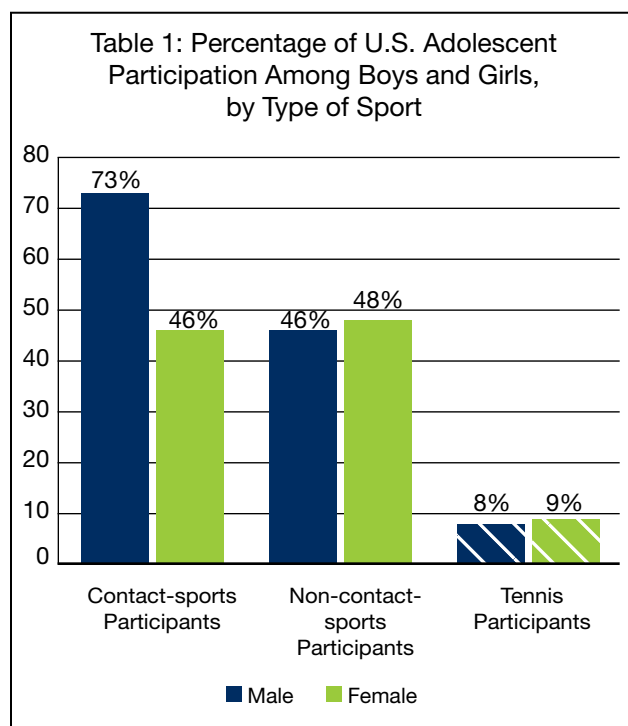
The Monitoring the Future database was tapped to create a profile of U.S. adolescent tennis participants. The researchers examined variations in tennis participation by gender, racial/ethnic groups, family socioeconomic levels and geographic region.

### GENDER AND RACE/ETHNICITY

Eight percent of all U.S. adolescent males and 9% of adolescent females participated in tennis during the last 12 months in their school or community. See Table 1 on following page. The coed cultural imprint of tennis is similar to participants in other non-contact sports in which 46% of males and 48% of females participated, yet different than contact sports (73% of males, 46% of females).<sup>1</sup>

More girls are involved with tennis than boys (53% and 47%, respectively). See Table 2 on following page. This is a gender difference of 5%, which is comparable to the 4% difference between boys and girls who participated in non-contact sports, and much smaller than the 20% difference among contact-sports participants. The findings suggest that tennis is a sport that attracts similar numbers of girls and boys.

Nine percent of U.S. White adolescents participated in tennis, and 5% and 6% of Blacks and Hispanics did so. See Table 3 on following page. Racial/ethnic minorities reported very similar rates of contact-sports participation; i.e., 59% of Whites, 61% of Blacks and 60% of Hispanics. And finally, racial/ethnic diversity among non-contact-sports

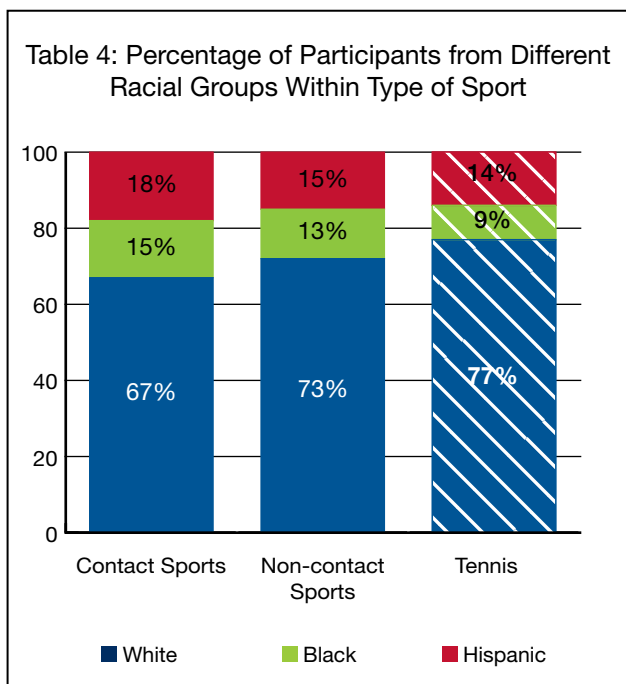


participants is more dispersed than in contact sports, as is the pattern among tennis participants.

When we examine the racial/ethnic composition of all U.S. adolescent tennis participants, Whites comprised 77%, Blacks were 9%, and Hispanics were 14% of the total. See Table 4 on following

page. Given that 72.4% of the U.S. population is White, 12.6% of the U.S. population is Black, and 16.3% of the U.S. population is Hispanic<sup>2</sup>, minorities appear to be underrepresented among tennis participants. In contrast, minorities tend to be overrepresented in contact sports with 15% of Blacks and 18% of Hispanics participating



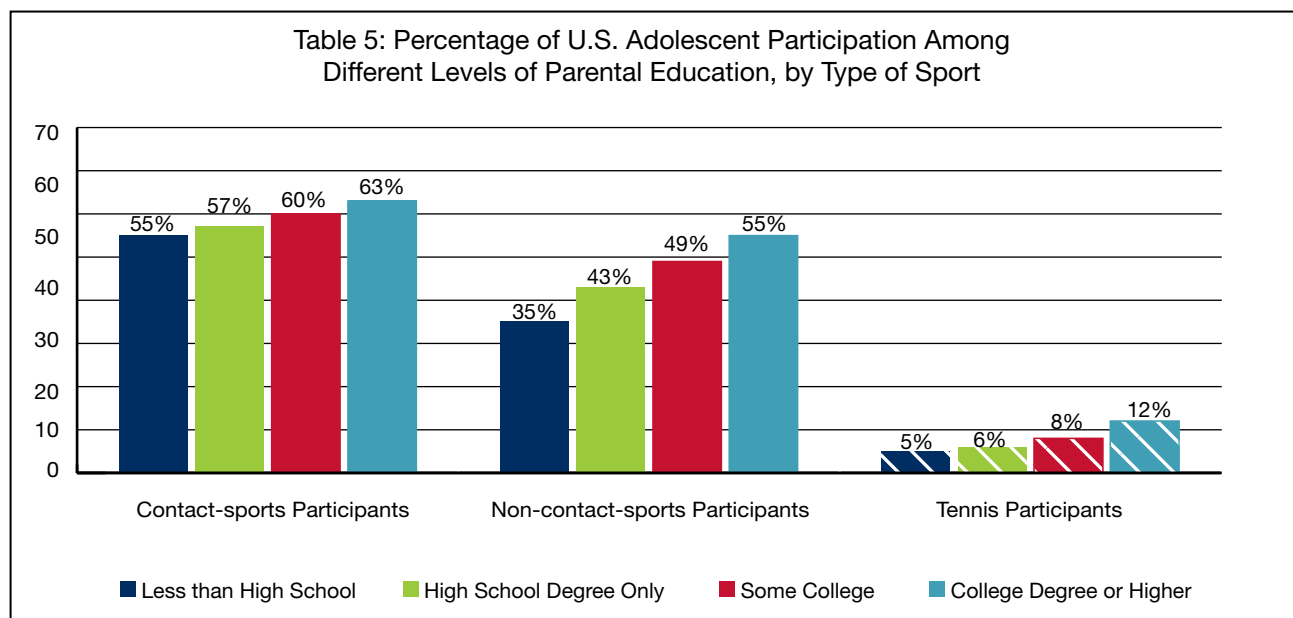


in contact sports, while Whites appear to be underrepresented within these sport categories. With regard to non-contact sports, Whites (73%), Blacks (13%) and Hispanics (15%) appear to have comparable representation in relation to the racial composition of the U.S. population.

## FAMILY SOCIOECONOMIC LEVEL

Young people's access to athletic opportunities is often influenced by family socioeconomic levels and financial resources. Economically disadvantaged schools and communities have fewer social and economic resources to invest in youth athletic programs than their more affluent counterparts. Families with higher disposable income can more easily afford "pay to play" athletic options for their children than lower- or middle-socioeconomic-level families. In this study the researchers followed common social scientific practice and used parents' level of education as a proxy measure of socioeconomic status in order to examine how socioeconomic status differences influence adolescent participation in tennis.

Table 5 shows that participation in tennis increased with family socioeconomic level. Just 5% of young people with parents with less than a high school education reported playing tennis during the past year, compared with 12% of those with college-educated parents. Socioeconomic differences in



participation rates for contact and non-contact sports are also evident. Interesting to note, however, is that the participation gaps across family socioeconomic levels appear to be more marked among tennis participants when compared to contact- and non-contact-sports participants (the percentage of tennis participants with the highest-educated parents are 2.4 times higher compared to tennis participants with the lowest-educated parents, while the percentage of contact- and non-contact-sport participants with the highest-educated parents are only 1.2 and 1.6 times higher when compared to participants in contact and non-contact sports with the lowest-educated parents, respectively).

Tennis has been tagged with a reputation as an “elitist” or “country club” sport. The findings do not entirely support this characterization. The results in Table 6 show that while half (50%) of all adolescent tennis players in the U.S. come from families with college-educated parents, the other 50% collectively have parents with some college, a high school degree only or less than high school education. Moreover, the parental education

level for tennis participants is somewhat similar to non-contact-sports participants in general. If the “elitist” tag fits tennis, then it would also seem to fit non-contact sports. Perhaps the elitist label may be coming outmoded given changes in the demographic composition of youth tennis participation during the past 20 years.

## TENNIS PARTICIPATION AND GEOGRAPHIC REGIONS

Adolescent participation in tennis varied across geographic regions. The findings are somewhat nuanced. First, Table 7 (on following page) shows the percentages of young people who reported participating in tennis and other sports in each geographic region. Nine percent of all U.S. adolescents participated in the Northeast, compared to 7% in the North Central states, 8% in the South and 9% in the West. A different demographic profile appears in Table 8 (on following page), which shows that one-third of all adolescent tennis participants in the U.S. live in the South, followed by 26% in the West, 20% in the North Central states and 20% in the Northeast. Indeed, the South is also home to the largest percentages of adolescent sports participants in contact and non-contact sports.

What does adolescent participation in tennis look like inside each geographic region? Table 9 (on page 8) depicts the percentages of White, Black and Hispanic tennis participants within each region of the country. Whites constitute the highest percentage of tennis participants in the North Central states—87% whites, compared with 83% in the Northeast, 71% in the South and 73% in the West. The highest percentage of Black tennis players is found in the South, while the largest

Table 6: Percentage of Participants from Different Levels of Parental Education Within Type of Sport

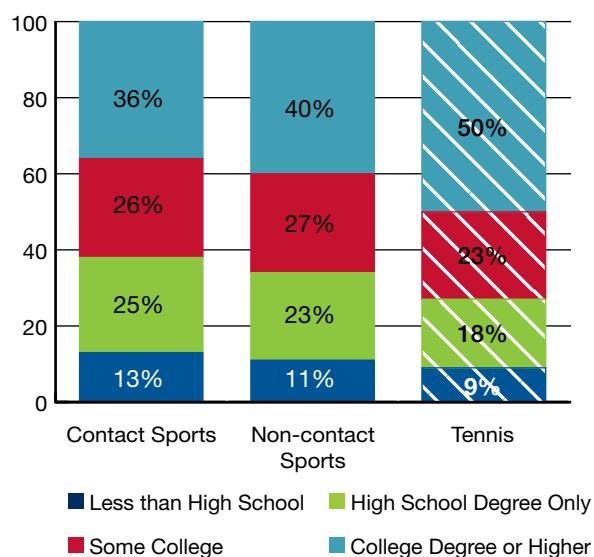


Table 7: Percentage of U.S. Adolescent Athletic Participation Among Different Geographic Regions, by Type of Sport

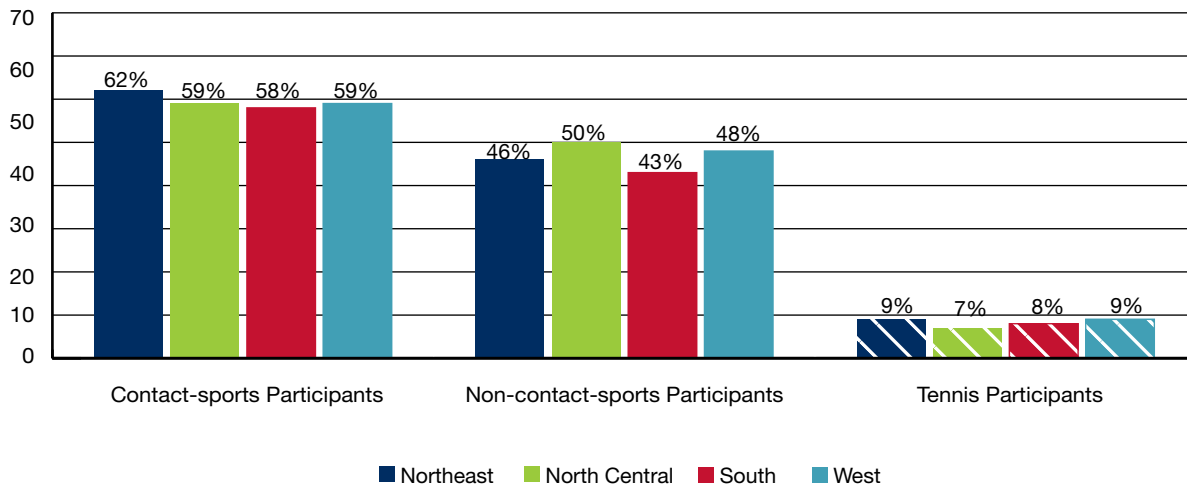
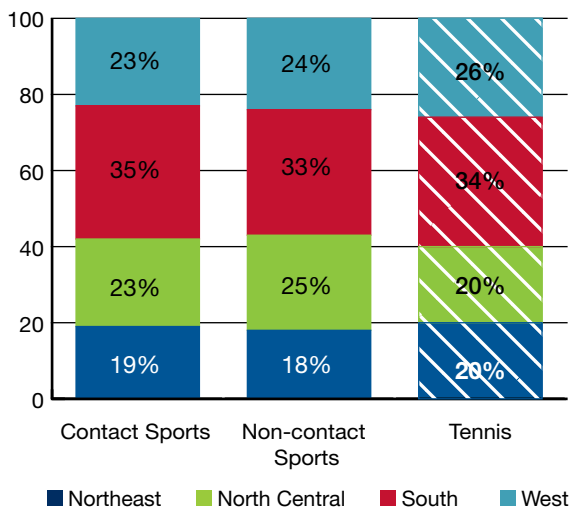
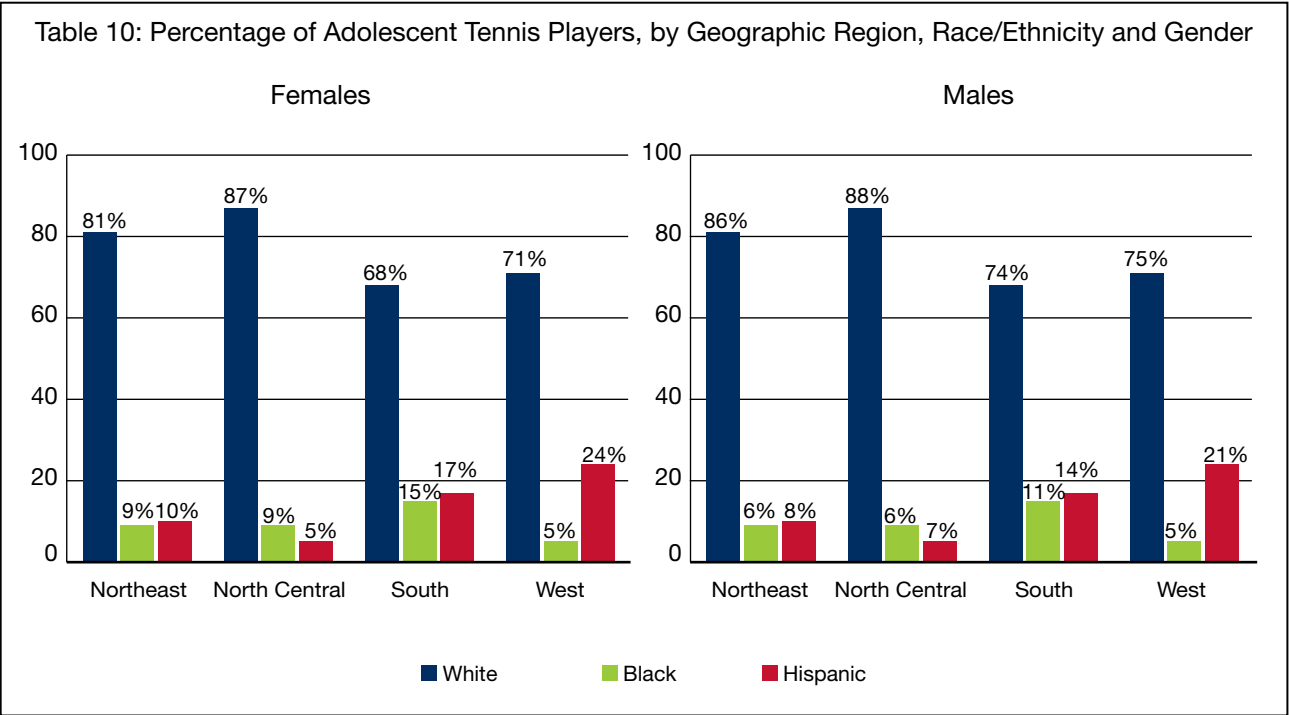
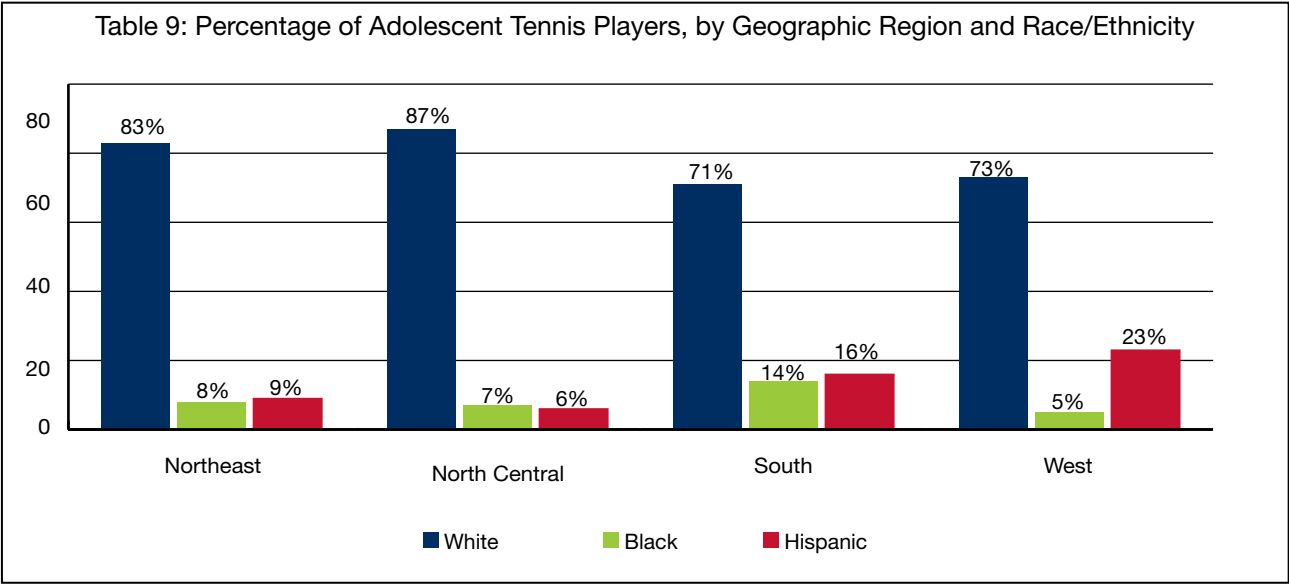


Table 8: Percentage of Participants From Different Geographic Regional Within Type of Sport



percentage of Hispanic tennis players (23%) was in the West.

Table 10 (on following page) breaks out the same information as above but within female and male populations. It appears that the most racial and ethnic diversity in adolescent tennis participation among males and females exists in the South. Higher levels of tennis participation are also evident among both Hispanic girls (24%) and boys (21%) in the West.



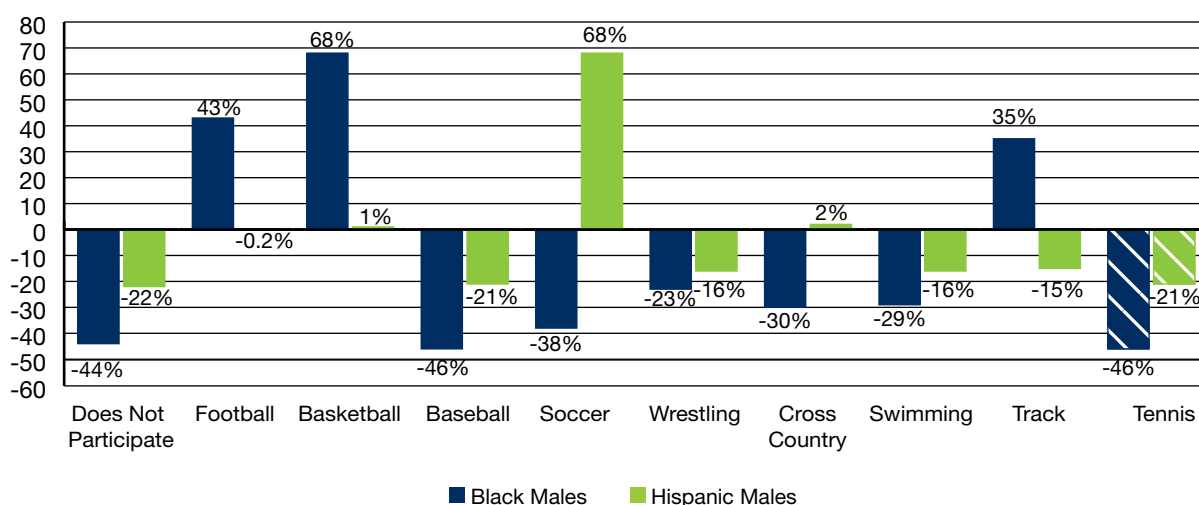
# MEASURING THE ODDS OF YOUTH PARTICIPATION ACROSS SPORTS

Many aspire, but few are chosen. Commentators and journalists frequently speculate about the odds of a young person ending up an Olympian or a professional athlete. In this study, we wondered about the odds of a young person in the U.S. participating in tennis. Indeed, what are the comparative odds of a young person participating in tennis, swimming, football, soccer or wrestling? Do the odds vary by gender and race/ethnicity?

Proponents of tennis have sought to more fully diversify participation across racial/ethnic groups. The large sample size of the MTF made it possible to calculate the odds of minority adolescents playing tennis and other sports in relation to their

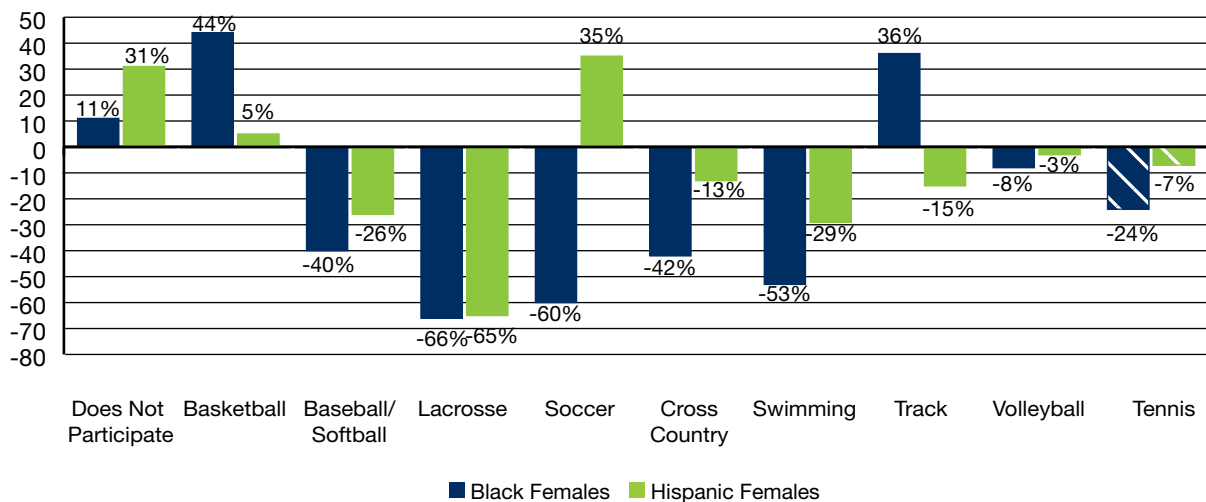
White counterparts. See Table 11 below and Table 12 on following page. The 0% line across the middle of the table represents equal odds that, across the United States, Black and Hispanic males participate in a specified sport at the same rate as White males. When percentages are expressed in positive numbers and above the line, it means that the minority males have greater odds of participating than White males. For example, the odds that a Hispanic adolescent male plays soccer are 68% greater than a White adolescent male. Stated another way, if you walked up to an adolescent Hispanic male standing next to an adolescent White male and guessed that the former played soccer compared to the latter, you would be right 68% of

Table 11: Odds of Black and Hispanic Adolescent Males Participating in Various Sports When Compared to White Males



Odds of Black and Hispanic males participating in various sports when compared to White males while controlling for family structure, highest level of education of father, age, performance in schools (average grades and suspension history), grade in school, year the adolescent participated in the MTF survey and place of residence (community type and region of United States).

Table 12: Odds of Black and Hispanic Adolescent Females Participating in Various Sports When Compared to White Females



Odds of Black and Hispanic females participating in various sports when compared to White females while controlling for family structure, highest level of education of father, age, performance in schools (average grades and suspension history), grade in school, year the adolescent participated in the MTF survey and place of residence (community type and region of United States).

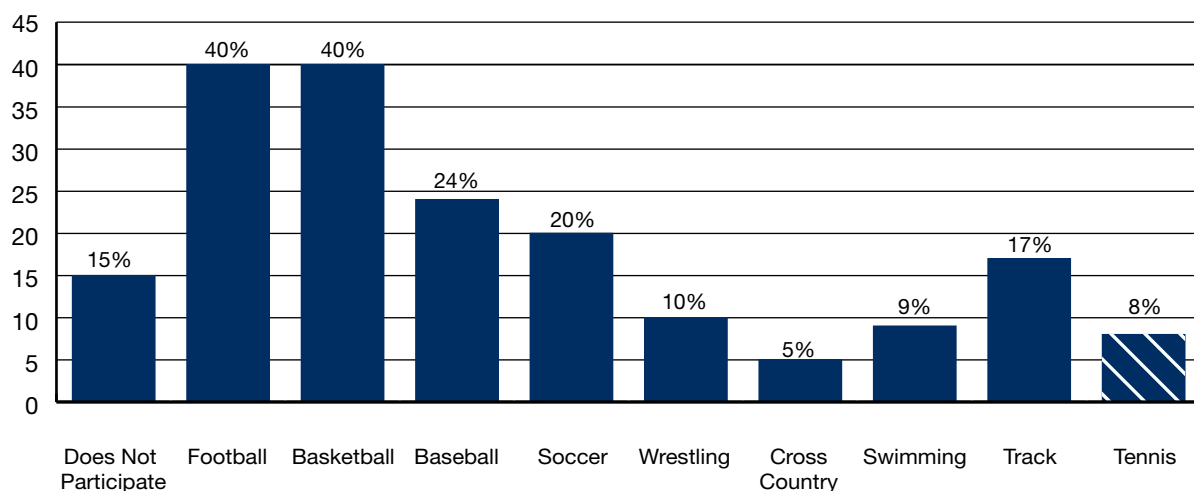
the time (i.e., the odds are in the Hispanic male's favor to participate in soccer, compared to the White male).

The results also show that the odds of Black male adolescents playing tennis are 46% lower when compared with their White counterparts. The findings in Table 12, however, show that Black females are 24% less likely than White females to participate in tennis. Compared to White females, Hispanic females are 35% more likely to play soccer and 7% less likely to participate in tennis. Examination of both Tables 11 and 12 show lower probabilities for minority girls and boys in most of the sports listed compared with Whites. Put simply, the odds of participation favor Whites more than Blacks and Hispanics.

## PARTICIPATION RATES ACROSS THE NINE MOST POPULAR U.S. YOUTH SPORTS

In the "old days" of school athletic programs, the key sports for boys were football, basketball, baseball, wrestling and track and field. The passage of Title IX enabled and encouraged greater female participation in sports during the 1970s and '80s. The array of interscholastic and community sports options for young people expanded during the past 20 years for both boys and girls. This trend coincided with the growth of youth involvement in community-based sports programs. The participation rates for the nine most popular sports among U.S. boys appear in Table 13 on following page. Whereas football and basketball remain most popular (with 40% of adolescent boys participating), soccer (20%), tennis (8%) and swimming (9%) have

Table 13: Percentage of Adolescent Males Participating in the Nine Most Popular Sports Among U.S. Boys



entered the top nine most popular sports. See Table 13. Football and basketball are especially popular among Black males, whereas soccer attracts a higher percentage of Hispanic males. See Table 14. Nine percent of White male adolescents played tennis, along with 4% of Black and 6% of Hispanic males.

Earlier we showed that 53% of all adolescent tennis participants are female, while 47% are male. (See Table 2 on page 4.) Among the nine most popular sports for girls, basketball and volleyball had the highest participation rates (26% and 23%, respectively). Compare the results in Tables 15 and 16 on following page. About 8.5% of girls reported involvement with tennis, with lacrosse

Table 14: Percentage of Adolescent Males Participating in the Nine Most Popular Sports in the U.S., by Race/Ethnicity

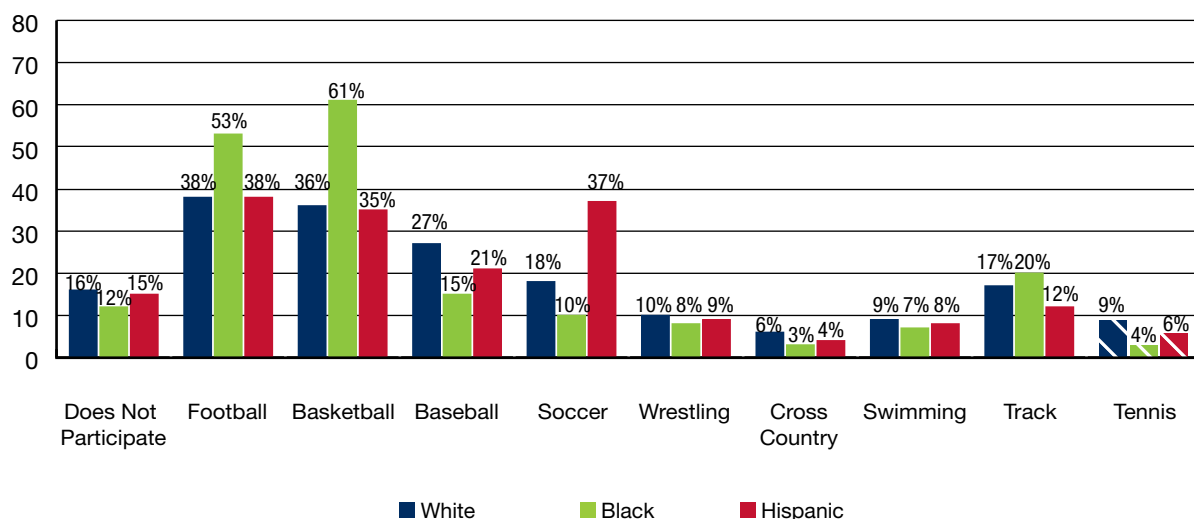


Table 15: Percentage of Adolescent Females Participating in the Nine Most Popular Sports Among U.S. Girls

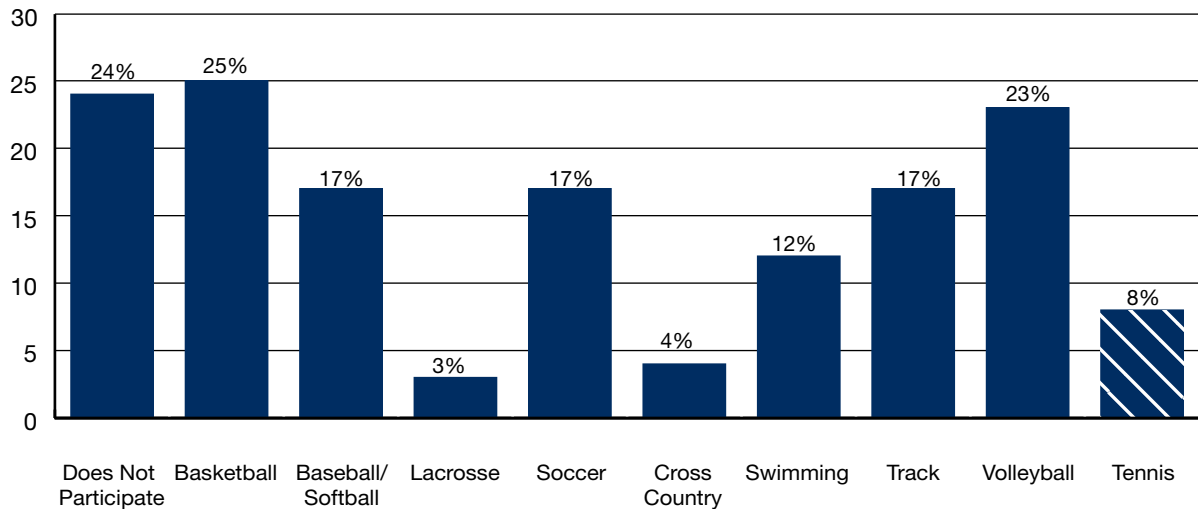
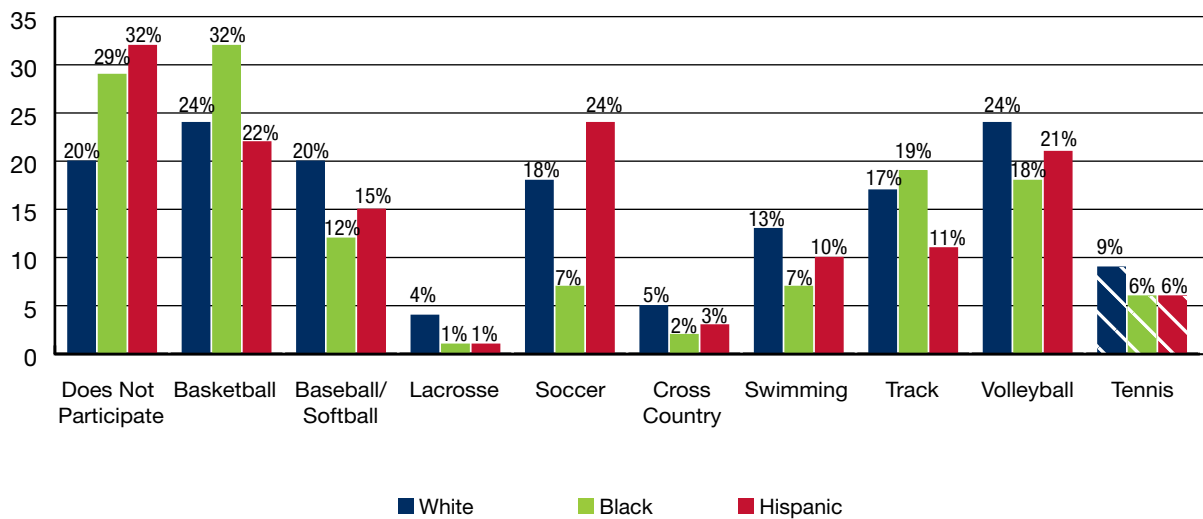


Table 16: Percentage of Adolescent Females Participating in the Nine Most Popular Sports Among Girls in The U.S.



(2.8%) and cross country (4.4%) showing lower rates of participation. Basketball had the highest participation rate among Black girls (32%), while

basketball and volleyball did so among White girls (both 24%). Soccer showed the highest rate of participation among Hispanic girls (24%).



# TENNIS: A CATALYST FOR EDUCATIONAL ADVANTAGE

Much previous research shows that school sports are associated with educational gains for many young people.<sup>3</sup> However, researchers basically do not know if this relationship stretches across all sports or, in contrast, whether some sports are more closely linked with educational advantage than other sports. The large sample sizes and information within the MTF study make it possible for researchers to examine whether participation across all sports or within specific sports is related to young people's educational achievement. Three basic research questions guided the statistical analyses. First, is there evidence that tennis participation is associated with favorable educational assets? Second, if involvement with tennis is linked with some educational advantages, is its academic influence the same or different from other school and community sports, such as football, wrestling, volleyball, swimming, soccer or baseball? And finally, to what extent are the educational benefits associated with tennis shared by boys and girls, or young people with families from different socioeconomic backgrounds or racial/ethnic groups?

To answer these questions, the researchers tested for associations between participation in tennis and hours spent doing homework, grade point average, aspirations to attend college and whether a student was suspended or expelled from school. Would tennis participants fare better than, worse than or the same as their contact-sport, non-contact-sport or non-sport participant counterparts? To what extent did participation in tennis appear to be a touchstone for educational attainment among

adolescents? Would the educational correlates of tennis participation be evident across family socioeconomic levels or be limited to well-to-do families? We analyzed several measures of academic achievement in order to answer these questions.

## ACADEMIC ACHIEVEMENT

A larger percentage of tennis participants reported earning an average grade of "A" in school when compared with participants in contact sports and other non-contact sports. The percentage of tennis participants who reported an average grade of "A" was almost twice as high as non-sports participants, 48% and 25%, respectively. See Tables 17 and 18 on following page.

Among males, tennis players and cross-country runners also reported higher average grades (B+) than participants in other sports such as basketball, wrestling, baseball or swimming. See Table 19 on page 15. When race/ethnicity are woven into the analysis, boys involved with tennis, cross country, swimming and track (non-contact sports) reported higher average grades than their counterparts in contact sports. See Table 20 on page 15. A similar overall pattern emerged among girls and girls of color, but across the racial/ethnic spectrum, female tennis participants also reported higher grade point averages than their male counterparts. Compare Tables 21 and 22 on page 16.

Table 17: Percentage of U.S. Adolescents Indicating an Average Grade in School, by Type of Sport

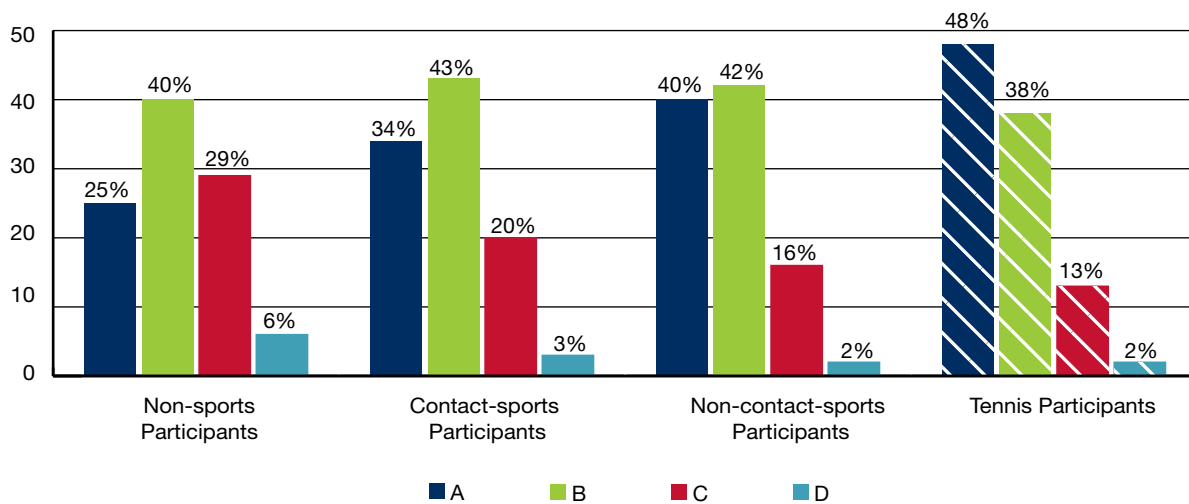
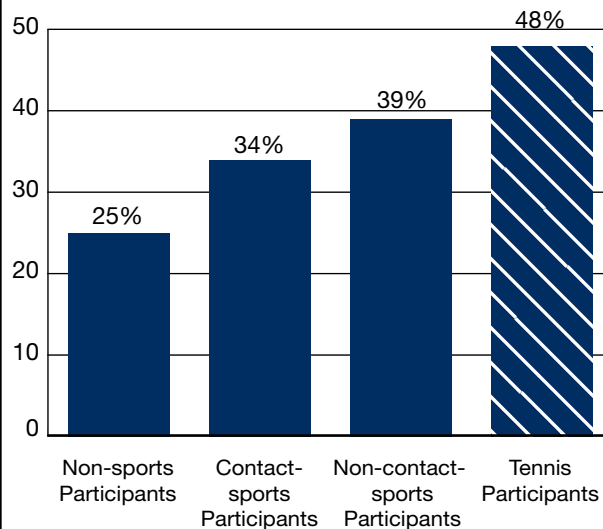


Table 18: Percentage of U.S. Adolescents Indicating an Average Grade of A in School, by Type of Sport



## EDUCATIONAL ASPIRATIONS

Sport subcultures can promote or erode values like hard work, fair play, aggression, or the pursuit of academic excellence and educational mobility. Regrettably, researchers know virtually nothing about how the norms within sports vary, let alone whether sport-specific values exert some influence on adolescent identity and behavior. Each sport subculture constitutes a unique intersection between the physical and subjective experiences of athletes and the objective world of the school and community in which the sport is structured and sustained. It makes sense that sport-specific subcultures vary in the extent to which they foment positive or negative educational beliefs and practices.<sup>4</sup> The MTF data offer researchers a rare opportunity to describe and compare whether educational aspirations varied across types of sports.

The findings showed that most high school athletes believe that they “definitely will” go to college. Eighty-one percent of tennis participants expressed this expectation, compared to 78% of non-contact-sports participants, 71% of contact-sports

Table 19: Average Grade in School Among Adolescent Males, by Type of Sport

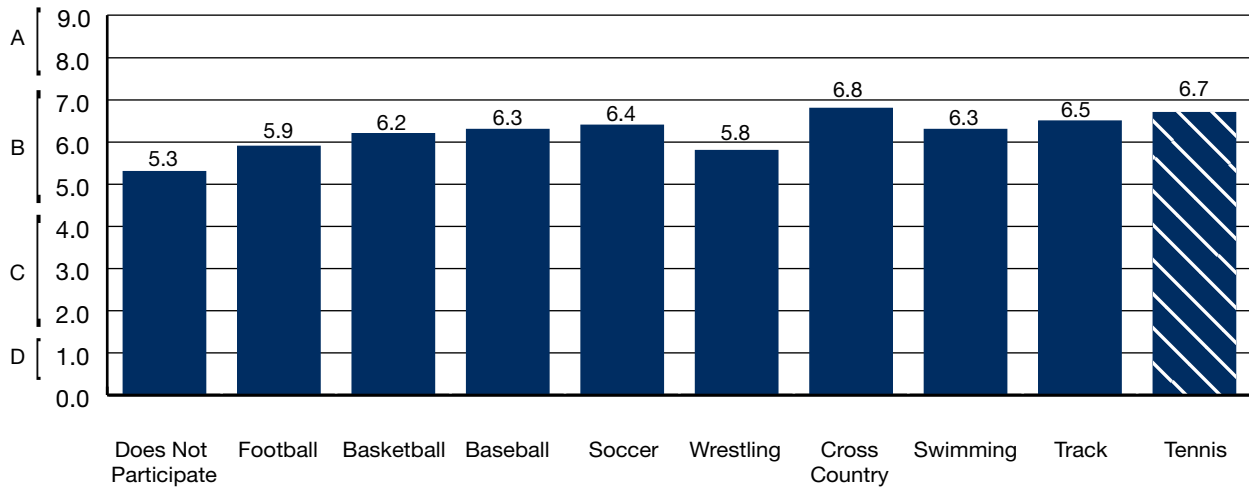
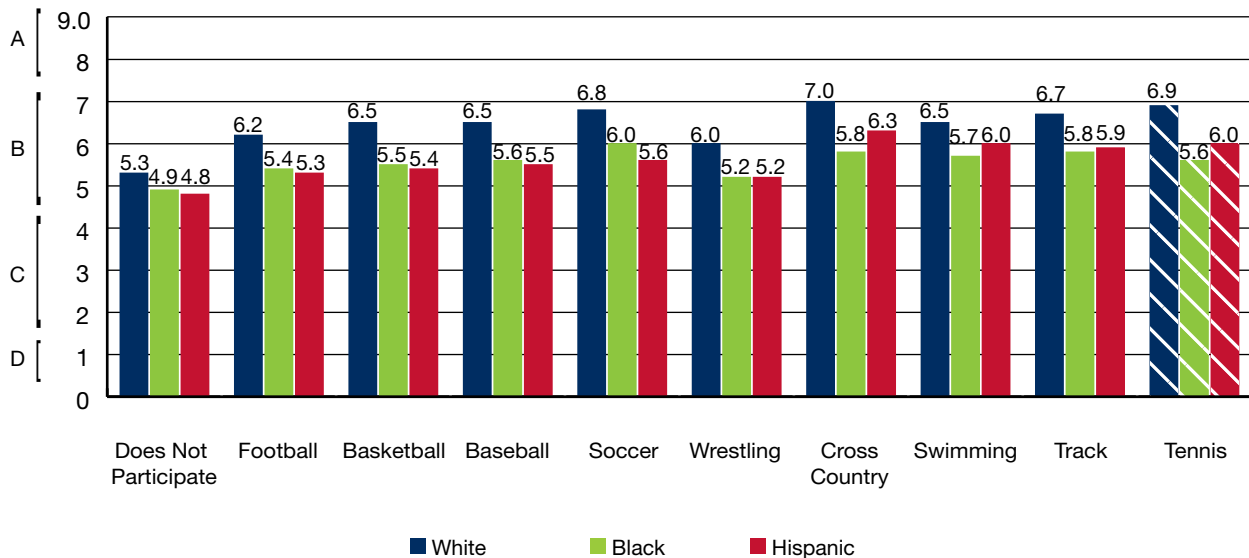


Table 20: Average Grade in School Among Adolescent Males, by Race/Ethnicity and Type of Sport



participants and 57% of non-sports participants. See Table 23 on page 17. Tennis participants also logged the highest percentage of respondents to indicate they “definitely will” graduate from college. Seventy-five percent of tennis participants said

they would “graduate from a four-year university” compared with 65% of contact-sports participants, 69% of non-contact-sports participants and 51% of the non-sports participants. See Tables 23 and 24 on page 17.

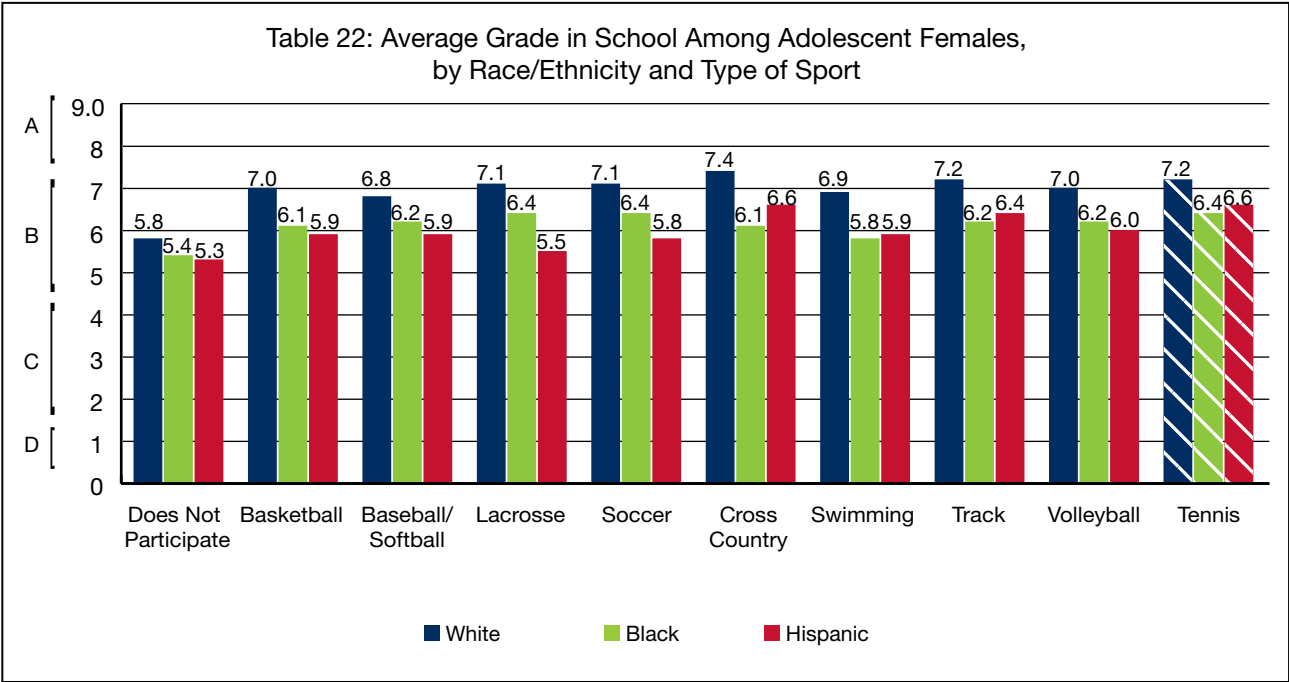
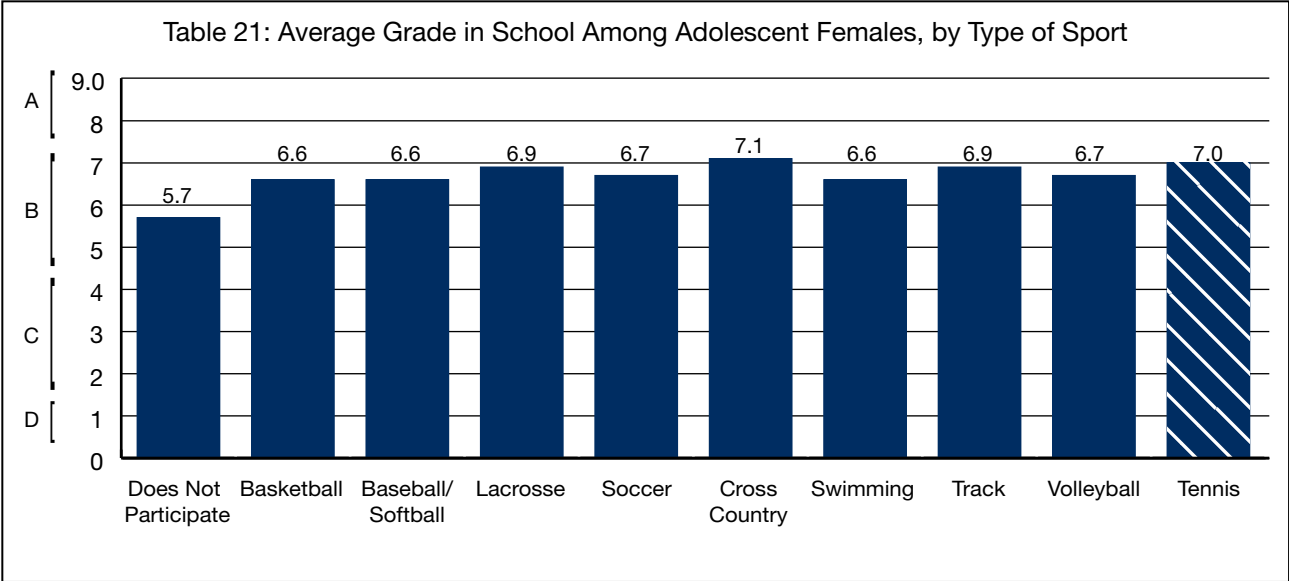


Table 23: Percentage of U.S. Adolescents Who Said They Definitely Will Go To College, by Type of Sport

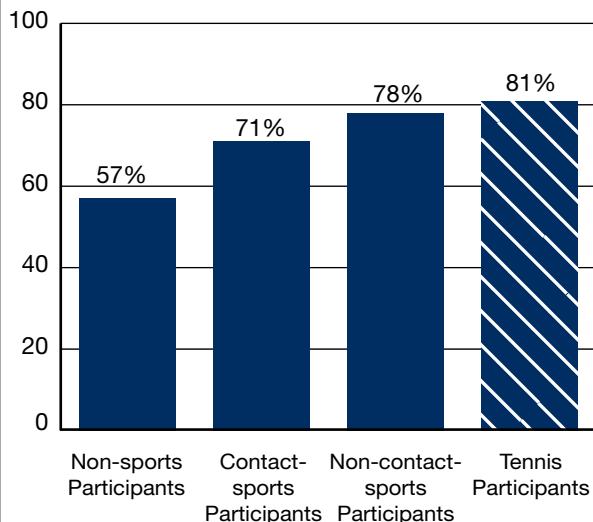
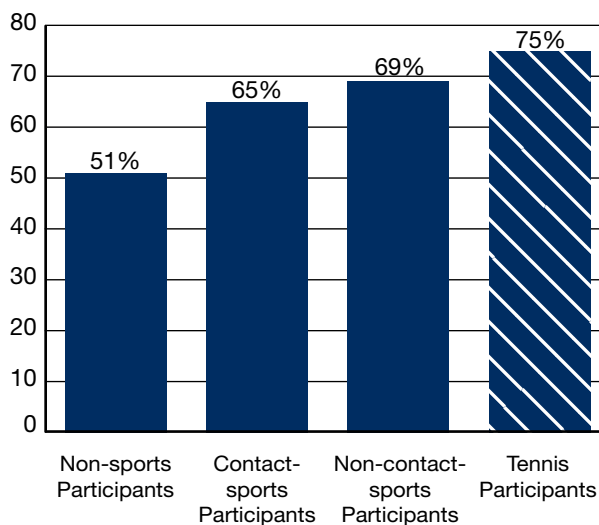


Table 24: Percentage of U.S. Adolescents Who Said They Will Definitely Graduate from a Four-Year University after High School, by Type of Sport

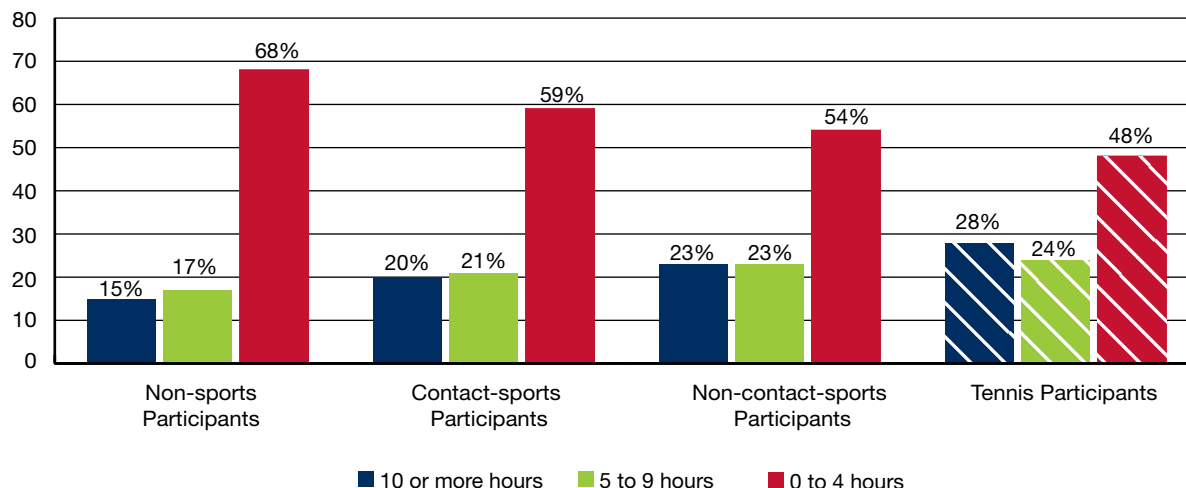


## HOURS SPENT DOING HOMEWORK PER WEEK

Student-athletes can aspire to attend and graduate from universities, but without investing time and energy into studying, a successful college

experience is unlikely. Tennis participants were significantly more apt to report studying 10 or more hours per week than non-athletes, other non-contact-sport participants and contact-sports participants. See Table 25.

Table 25: Number of Hours Spent Doing Homework Throughout the Week, by Type of Athletic Involvement

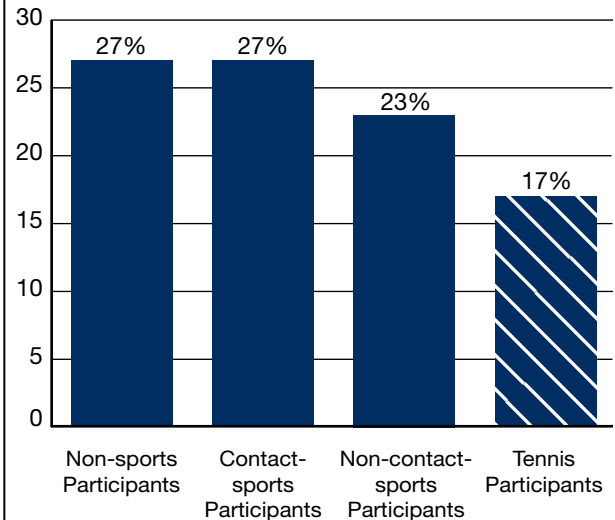


# SUSPENSION AND EXPULSION

Tennis participants reported lower percentages of suspension than their contact- and non-contact-sports counterparts. Seventeen percent of tennis participants reported being suspended during the past school year, compared with 27% of participants in contact sports, 23% of those in non-contact sports, and 27% of non-athletes. See Table 26. Overall, tennis participants had the lowest percentages for school suspensions.

Male adolescents who participated in tennis and cross country, both non-contact sports, showed the lowest percentage of being suspended “at least once during the past year” when compared with other sports. See Table 27. Wrestlers and football players had the highest percentages of suspension, followed by non-athletes. The results showed that the rate of suspension varied by race/ethnicity within and across sports. See Table 28 on following page. Black male wrestlers logged the highest percentage of suspensions of every sport, but the percentages among Black males were lowest among tennis players (46%) and soccer players (45%).

Table 26: Percentage of U.S. Adolescents Suspended at Least Once During the Past School Year, by Type of Sport



Suspension also varied a great deal among females athletes across sports. Again, a lower percentage of female tennis and cross-country participants (12.5% and 12.4%) reported being suspended when compared to most other sports only to be outdone by lacrosse players (10%). See Table 29 on following page and Table 30 on page 20. Larger percentages of girls of color experienced suspension than their White counterparts.

Table 27: Percentage of Adolescent Males Suspended at Least Once, by Type of Sport

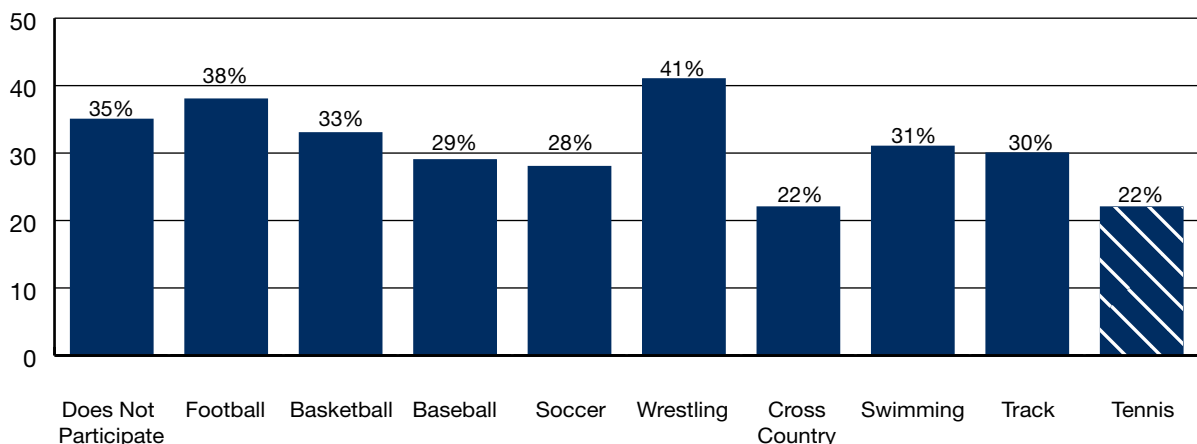


Table 28: Percentage of Adolescent Males Suspended, by Type of Sport and Race/Ethnicity

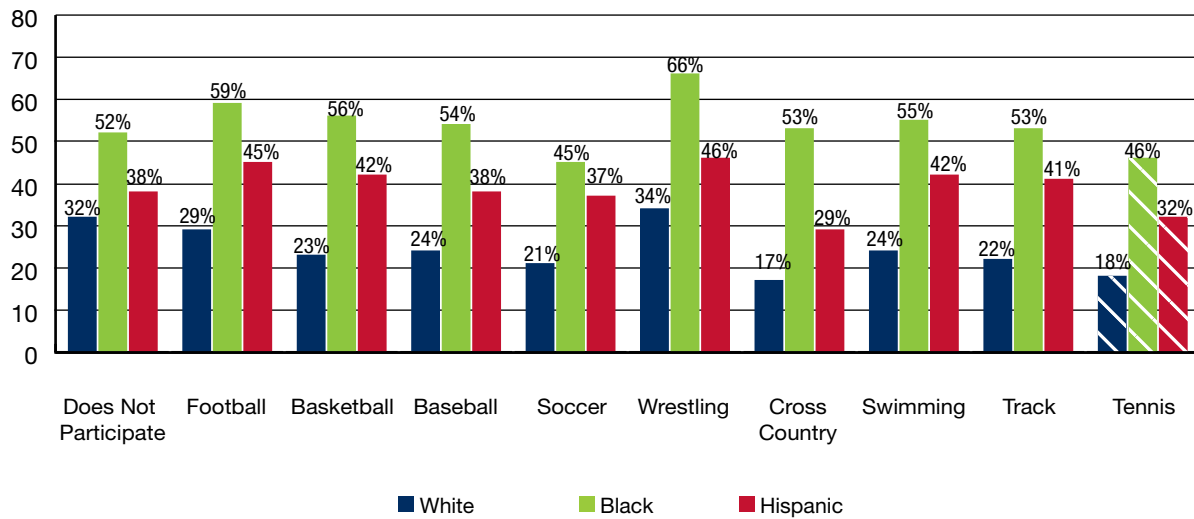


Table 29: Percentage of Adolescent Females Suspended, by Type of Sport

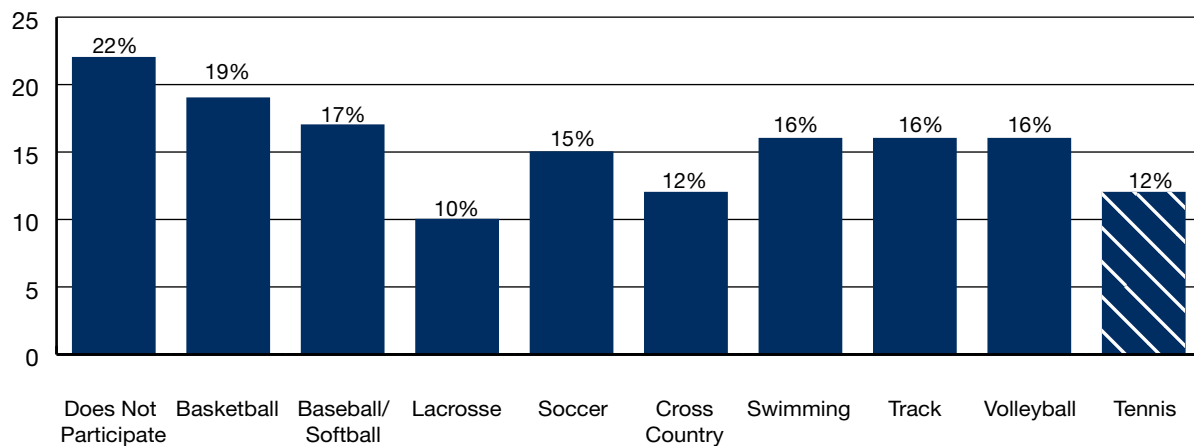
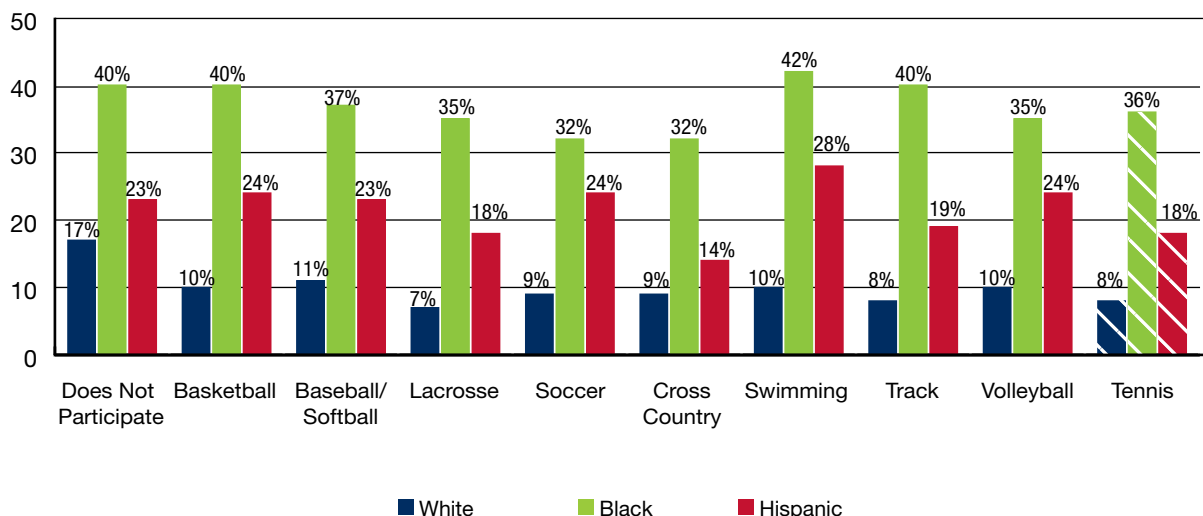


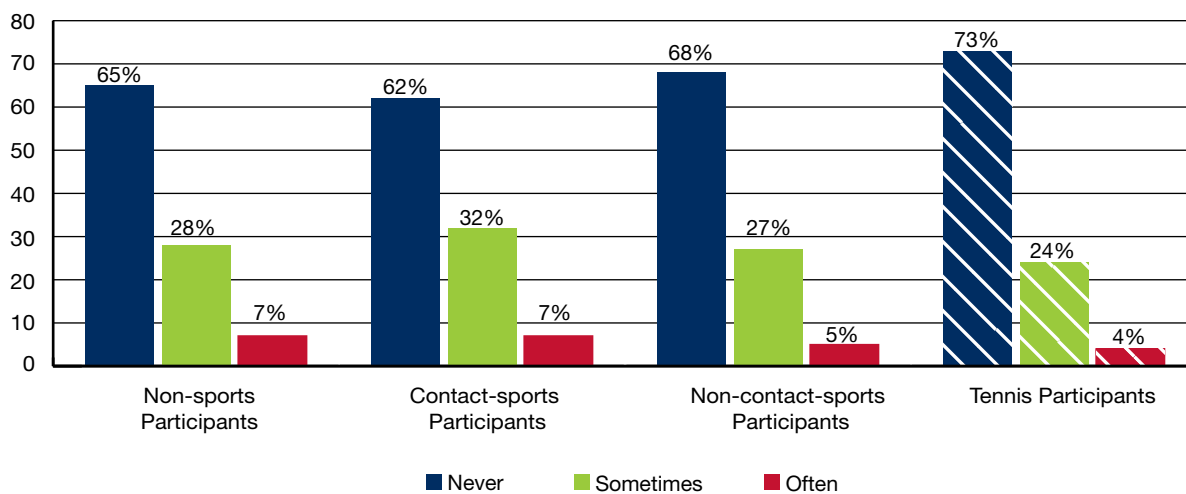
Table 30: Percentage of Adolescent Females Suspended, by Type of Sport and Race/Ethnicity



Black girls recorded the highest percentages of suspension across all sports—including tennis. A comparison across all the tables clearly documents that suspension was more common among male athletes than female athletes.

Tennis participants were less likely to be sent to the office for misbehavior than non-athletes, contact-sports participants and other non-contact-sports participants. See Table 31. Seventy-three percent of tennis participants indicated they had never been sent to the office for disciplinary reasons.

Table 31: Percentage of Students Who Were Sent To The Office Because of Misbehavior, by Type of Sport



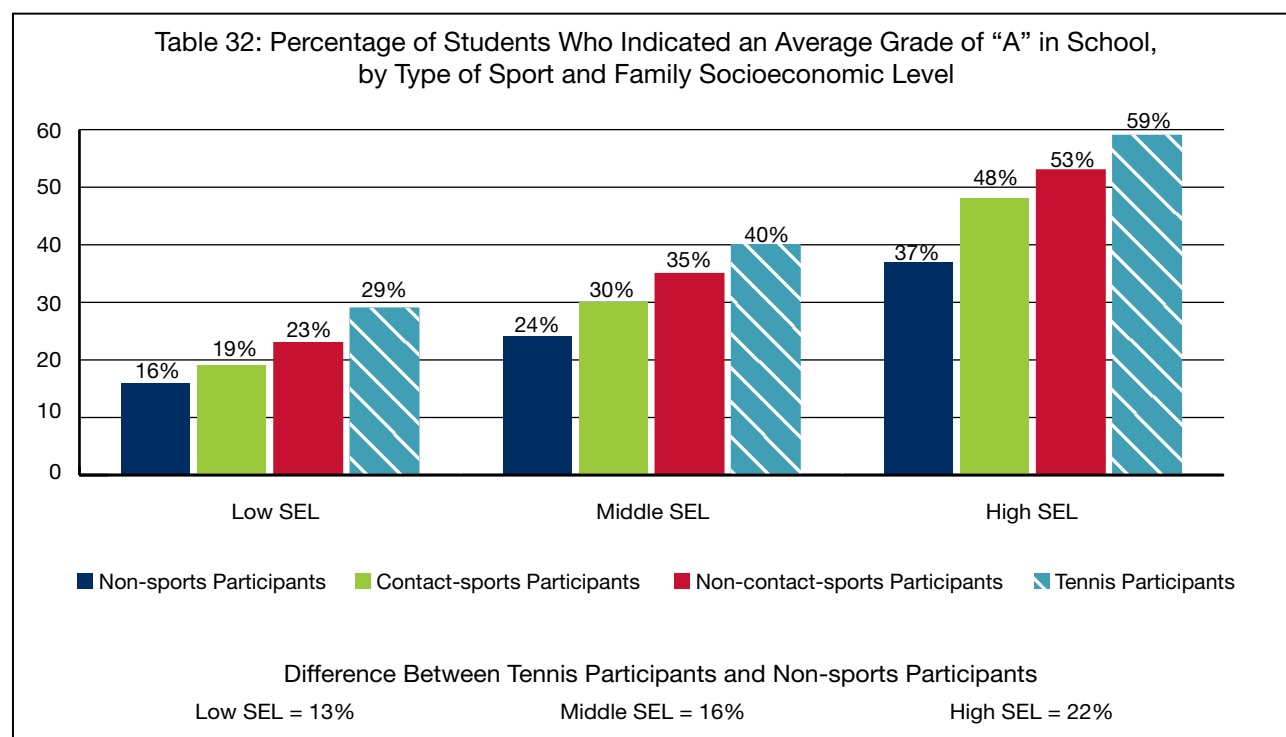


# THE INFLUENCE OF FAMILY SOCIOECONOMIC DIFFERENCES

The findings presented above raise more questions than answers about how or why tennis participation has a unique “educational reach” among adolescents. Because youth athletic participation in the U.S. is generally greater among more affluent and predominantly White populations, the discovery of positive outcomes attributed to sport participation are often later found to be owed to socioeconomic differences or racial/ethnic differences. What are initially considered the “benefits” of youth sports participation are often more fundamentally owed to larger social forces that flow through sports rather than the primary influence of sports. For this reason, the association between athletic participation and educational outcomes was examined both within and across differences in socioeconomic level.<sup>5</sup>

The results below are based on the following operational definition of family socioeconomic level. In “low-SEL (socioeconomic level)” families neither parent has a high school degree, whereas “middle-SEL” families have parents with either a high school degree or some college. In “high-SEL” families, both parents have a college degree or higher.

The positive relationships between tennis participation and academic performance were evident across family socioeconomic levels. Scrutiny of Table 32 reveals that tennis participants registered the highest percentage of students to report an “average grade of A” within each of the three family socioeconomic categories. Tennis players from the high family socioeconomic level generated the largest percentage (59%) of students to report an average grade of “A,” as well as showing the greatest difference with non-sports participants (22%). However, note that the difference between tennis participants and non-athletes narrowed but remained in place across the middle and low family socioeconomic levels (16% and 13%, respectively).



These results suggest that while the links between tennis participation and academic achievement are the most salient in high-socioeconomic-level families, there is a similar (yet not as powerful) relationship in middle- and low-socioeconomic-level families.

A similar pattern of findings emerged with regard to educational aspirations. Compared with non-athletes and participants in contact sports, the participants in tennis and non-contacts sports more frequently indicated that they would definitely go to college and graduate from college. See Table 33 below and Table 34 on following page. Readers should note two consistencies across the three socioeconomic groups. Tennis players showed the highest percentages across the three family socioeconomic levels and statistically significant differences with non-sports participants within each family subgroup.

Socioeconomic differences and similarities also occurred in relation to the number of hours students spent doing homework each week.

Across the spectrum of family socioeconomic levels, lower percentages of middle- and low-level counterparts reported spending 10 or more hours doing homework than their high-level counterparts. But here again, within each of the subgroups, tennis participants and other non-contact-sports participants did so more than non-sports participants and contact-sports participants. See Table 35 on following page.

Finally, a similar overarching pattern of associations emerged among family socioeconomic level, type of athletic participation, and suspension or expulsion from school. The suspension and expulsion rates for boys and girls across sport subgroups are depicted in Tables 36 and 37 on page 24. For both boys and girls within each family socioeconomic-level, the lowest suspension and expulsion rates were found among the tennis players and other non-contact-sports participants. Compared with their lower-socioeconomic-level counterparts, both girls and boys from high-socioeconomic-level families reported the lowest rates of suspension and expulsion.

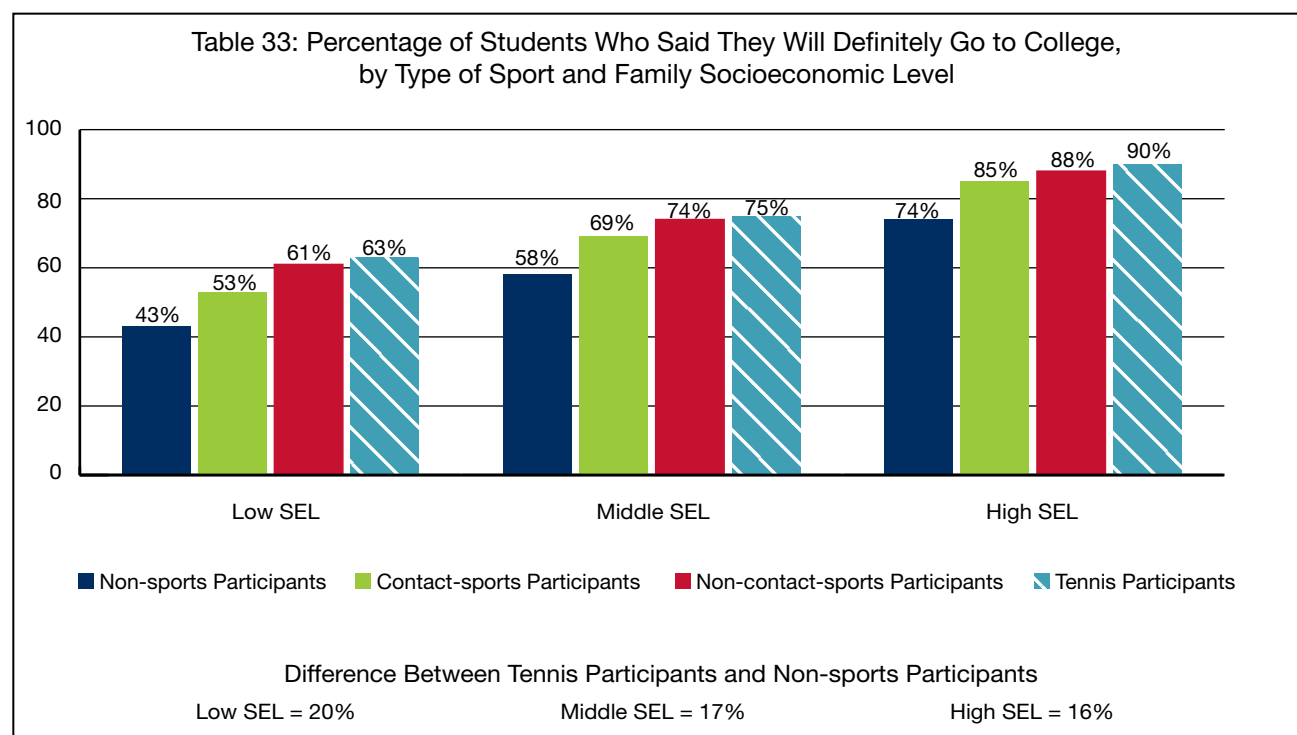


Table 34: Percentage of Students Who Said They Will Definitely Graduate from College, by Type of Sport and Family Socioeconomic Level

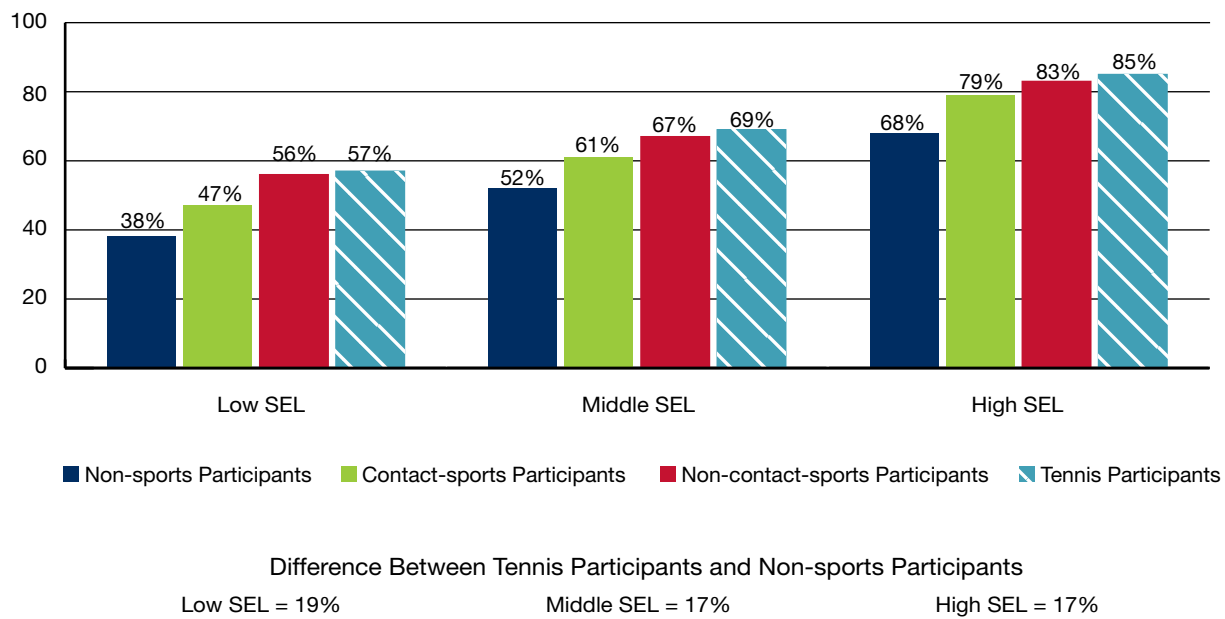
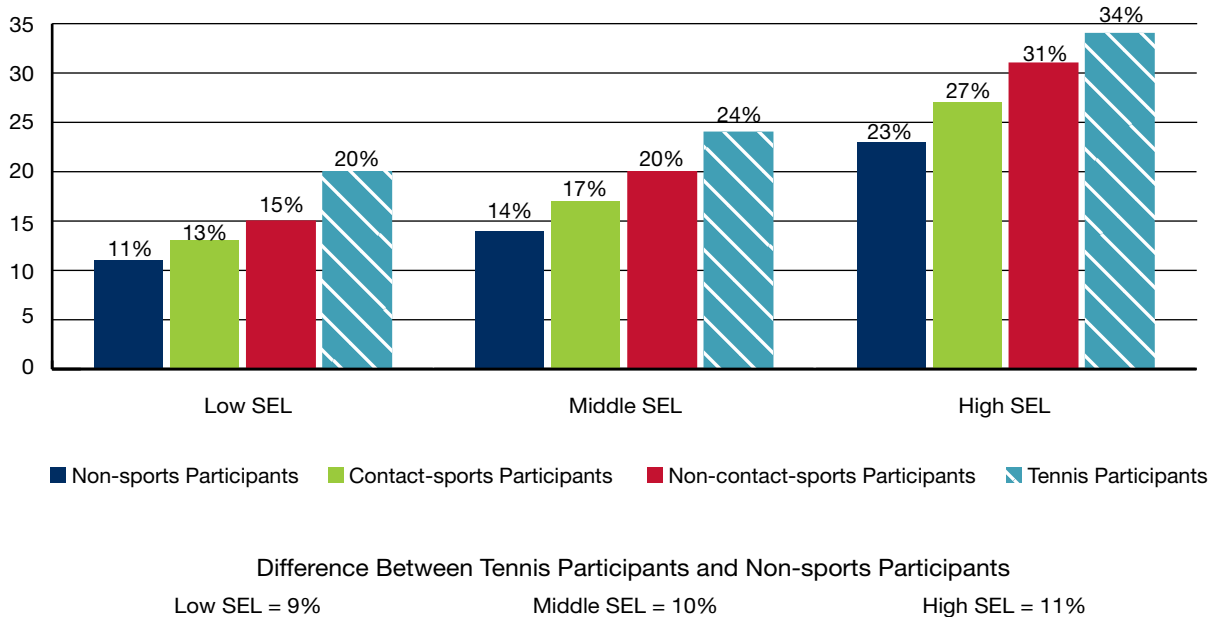
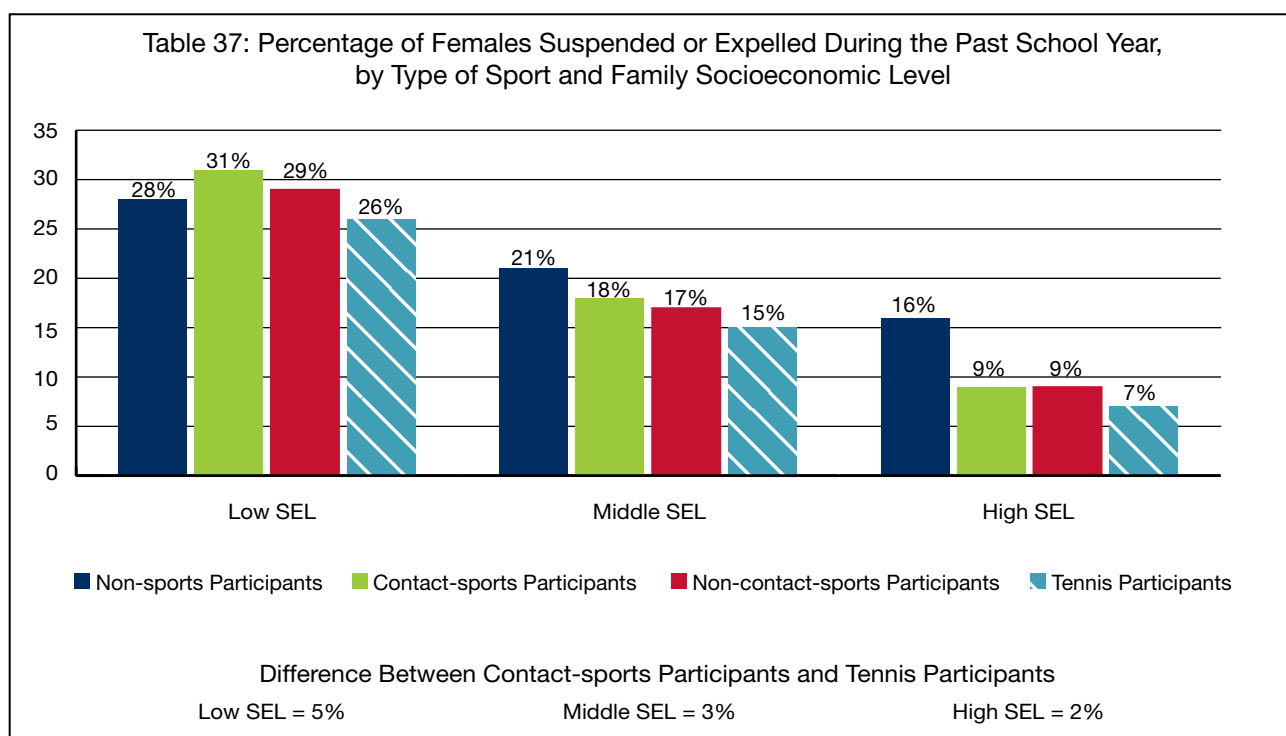
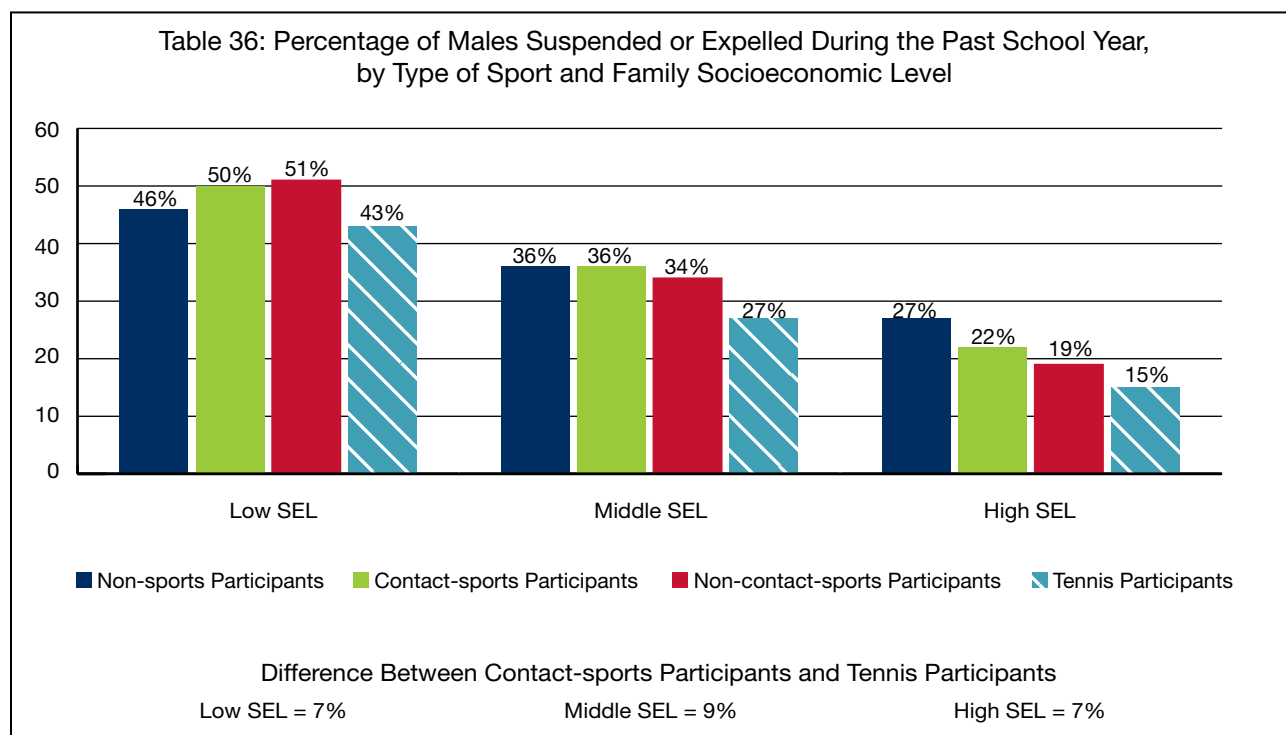


Table 35: Percentage of Students Reporting 10 or More Hours Spent Doing Homework Throughout the Week, by Type of Sport and Family Socioeconomic Level



These latter findings raise questions that may help to understand how tennis participation weaves its way through the educational experiences of adolescents. Why do tennis participants show a

more positive profile than their athletic and non-athletic counterparts, and furthermore, in ways that seem to stretch across family socioeconomic-levels? This “causal” question cannot be answered



in this study because it is limited to cross-sectional data. At the same time, while it may be that the educational advantages linked to tennis participation are most likely to accrue among

participants from high socioeconomic-level families, less marked benefits may issue among adolescents from middle- and low-socioeconomic-level families.

# DECODING THE CATALYST: TENNIS, SCHOOL AND COMMUNITY

This research study is unique in that its main purpose is to describe and analyze how participation in a specific sport—tennis—can foster educational opportunity, social engagement and health among adolescents. The findings reported above strongly suggest that, when compared to non-athletes and participants in many other sports, young people who participate in tennis get better grades, devote more hours to studying, think about the future, aspire to attend and graduate from university, and are less likely to report being suspended or expelled from school.

We suggest that youth participation in tennis be viewed as a catalyst for educational gains. The word “catalyst” derives from “catalysis,” which is defined as “an action between two or more persons or forces, initiated by an agent that itself remains unaffected by the action.”<sup>6</sup> Tennis participation is a kind of social catalysis. Tennis is neither a cause nor an effect in relation to educational advancement, but rather, the sport unfolds at an intersection among family, school, community, youth peer groups, coaches and teachers, and cultural beliefs that—when activated and sewn into a young person’s identity and development—can foster favorable educational and behavioral outcomes.

The following findings situate the analysis of adolescent tennis participants within a wider social matrix of youth peer groups, school and community. First, adolescent tennis players are likely to participate in multiple sports. Across family socioeconomic levels, boys engaged in four or five sports in their school or community during the past year, and girls participated in three to four

sports. See Table 38. In short, tennis participants tend to be athletically active adolescents. At the same time, however, other findings showed that a smaller percentage of the tennis players (58%) “participated in school-based athletics during the past year” compared to 64% of other non-contact-sports participants and 61% of contact-sports participants. See Table 39 on following page. This latter difference suggests that tennis may orient adolescents into the social orbits of both school and wider communities, which in turn, can enhance social engagement and personal development.

Tennis participants also reported high rates of involvement with extracurricular activities in their school and communities. Compared to non-athletes and participants in contact sports, larger

Table 38: Number of Sports that Tennis Players Indicated Participating in During the Past Year

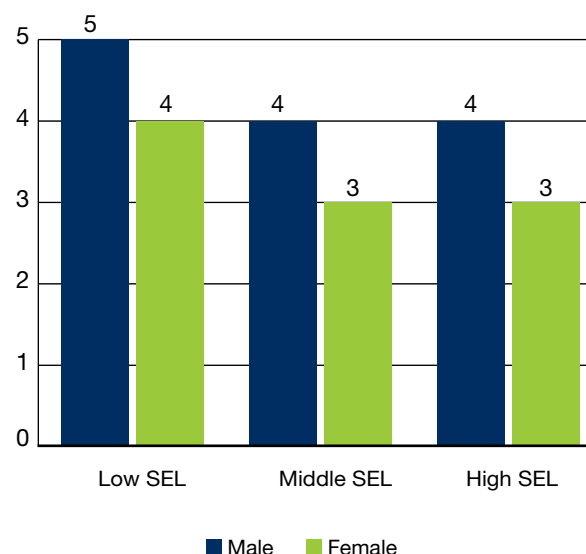
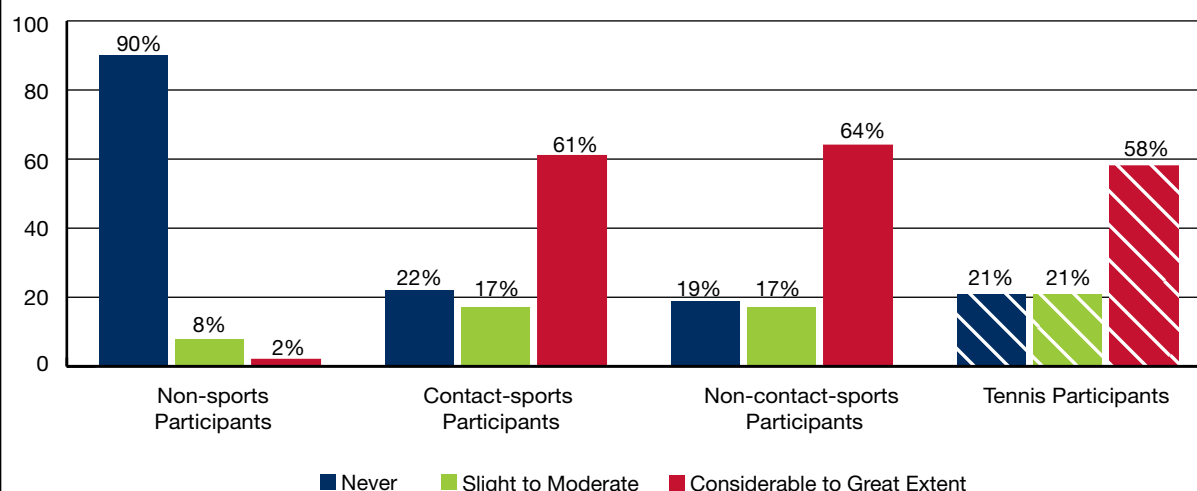


Table 39: To What Extent Have You Participated in School-Based Athletics During the Past Year?



percentages of tennis participants reported being involved with music or other performing arts, the school yearbook or newspaper, and participating or volunteering in community affairs. See Tables 40-

42 below and on following page. The percentages of tennis participants engaged in these activities were also slightly higher than non-contact-sports participants in general.

Table 40: Extent of Participation in School-Based Music or Other Performing Arts During the Previous Year, by Type of Sport

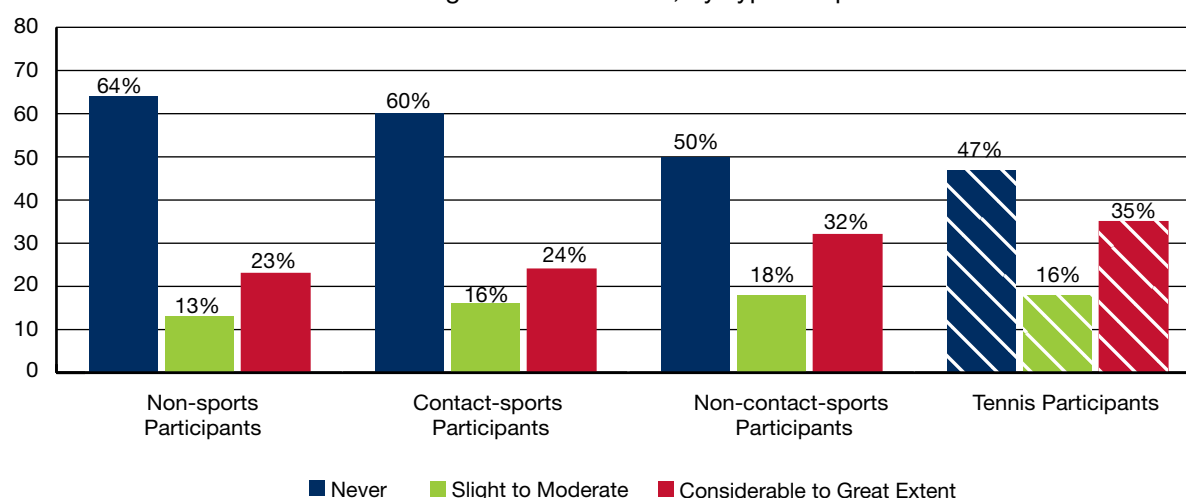


Table 41: Extent of Participation in the School Newspaper or Yearbook During the Previous Year, by Type of Sport

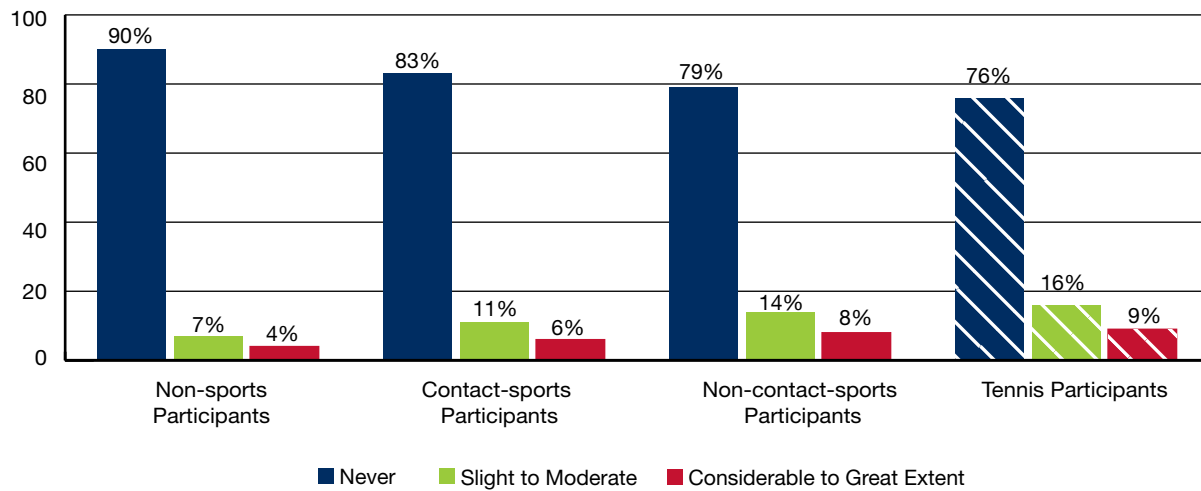
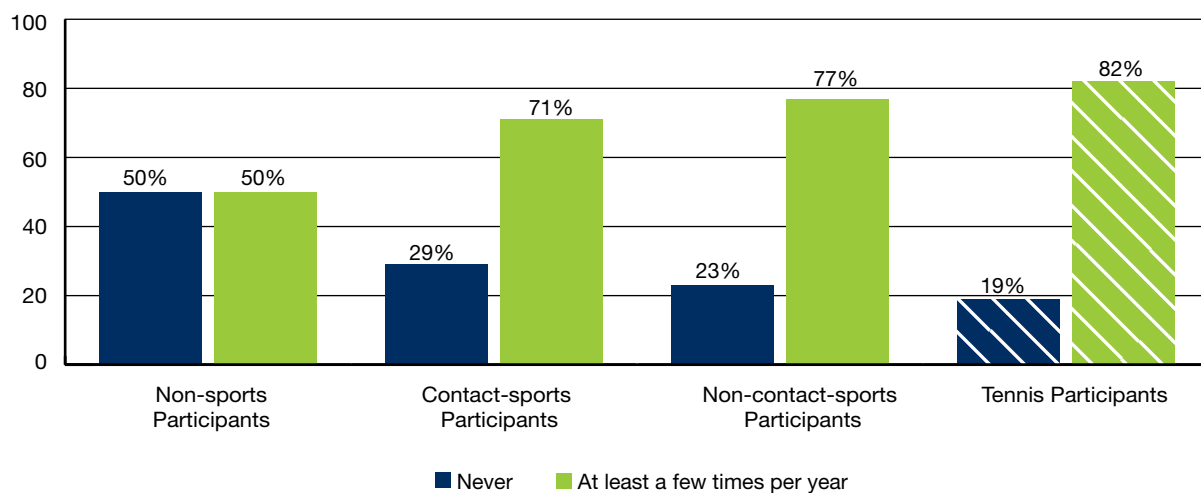


Table 42: Extent of Participation in Community Affairs or Volunteer Work, by Type of Sport

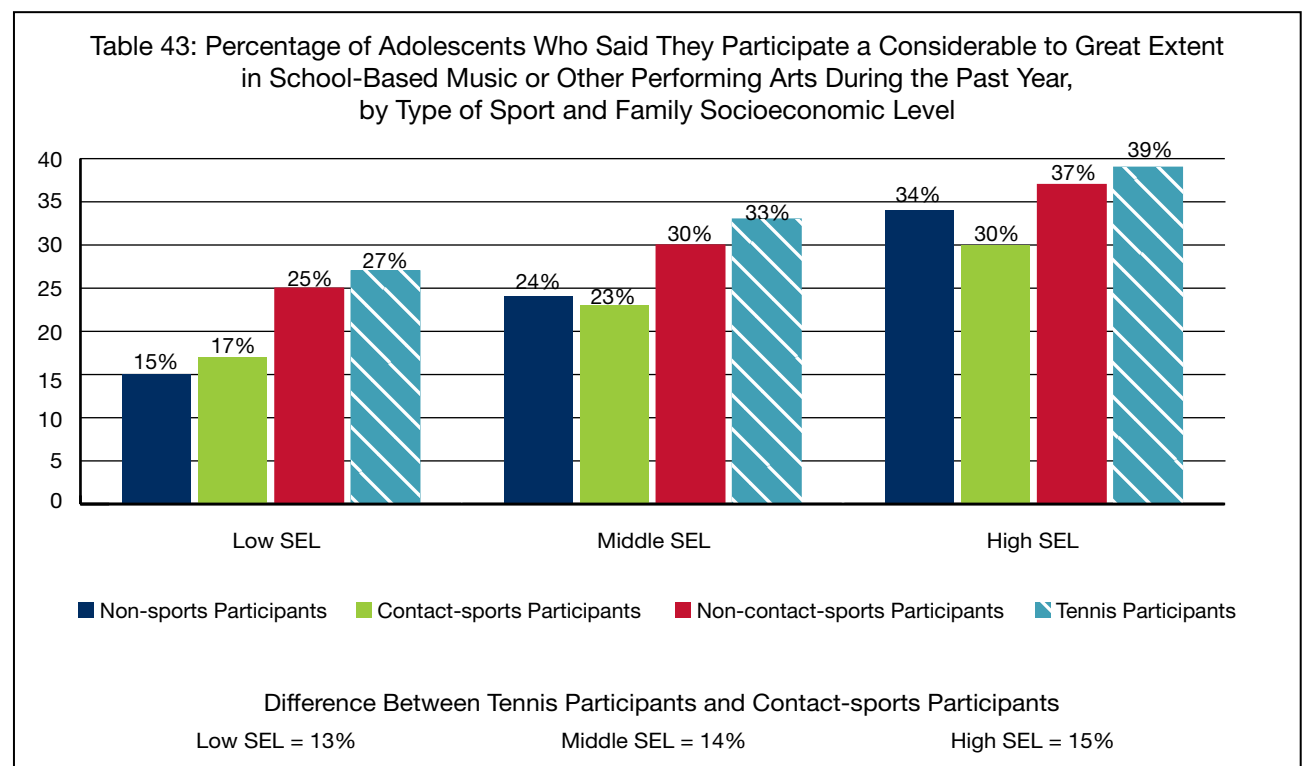


# THE INFLUENCE OF FAMILY SOCIOECONOMIC LEVEL

Did the association between tennis participation and extracurricular involvement hold up across family socioeconomic levels? Earlier in this report we examined the question whether the educational gains associated with tennis participation were limited to economically privileged families or, in contrast, if they were also evident among adolescents from middle and low family socioeconomic levels. The findings in Tables 43 through 45 (below and on following pages) help disentangle a similar web of association but with reference to adolescent involvement with school and community.

Generally, tennis participants and non-contact-sports participants from higher- socioeconomic-

level families had the highest rates of involvement with school-based music and performing arts programs (39% and 37%, respectively). See Table 43. The same pattern emerged within the middle- and low-socioeconomic-level subgroups, but with lower percentages of involvement. In the high-socioeconomic-level families, however, tennis participants and non-athletes had similar rates of involvement with music and the performing arts (39% and 34%, respectively). The researchers wondered if there was more of a crossover between the tennis and theater subcultures. Concomitantly, across all three family socioeconomic levels, contact-sports participants (e.g., football players, wrestlers) showed low rates of involvement with music and theater. These findings suggest that, whereas participation in tennis and other non-contact sports may encourage wider social engagement music and the arts in schools, involvement with football or wrestling (i.e., contact sports) may narrow involvement with some forms of extracurricular activity.<sup>7</sup> Might the more coed athletic subculture of tennis open more social-





psychological “doors” to adolescents than traditional contact sports, thereby helping them to be more receptive to music and the arts? These questions merit attention from future researchers.

In contrast, relatively few adolescents were involved with their school yearbook or newspaper. Here the rates of involvement across sports and family socioeconomic levels were nearly identical. Tennis players and other non-contact-sports participants registered the highest percentage of involvement and, on the opposite end of the sport-type spectrum, non-athletes and contact-sports participants were less involved. See Table 44.

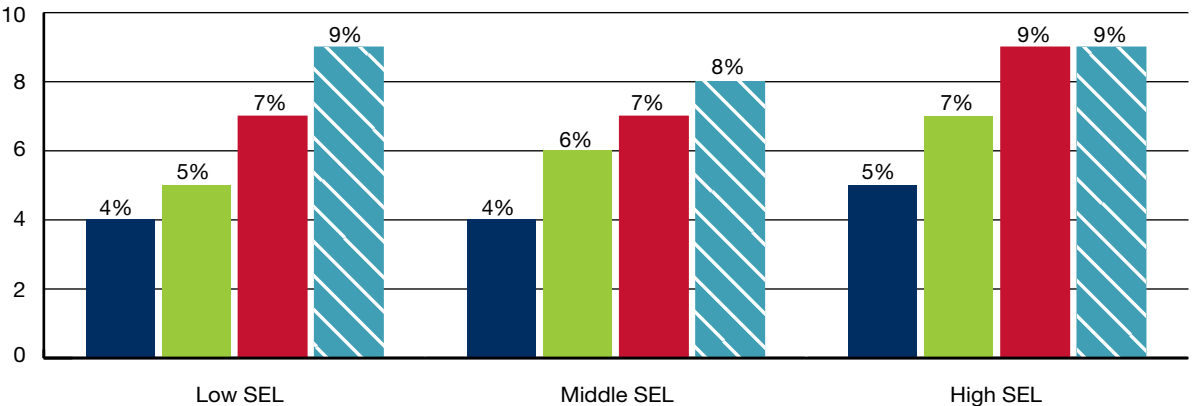
Across all three family socioeconomic levels, most adolescents said they were involved with their community or volunteering. See Table 45 on following page. Adolescents from the high-level families registered the highest rates of involvement. Athletes within each socioeconomic level had higher rates of community involvement than the non-

sports participants. Differences between the athlete subgroups, however, were not that marked.

The findings support two conclusions. First, tennis participants and participants in non-contact sports within each family socioeconomic level exhibited the highest percentages of adolescents involved with music and performing arts, the school yearbook or newspaper, or community affairs and volunteer work. Second, overall, extracurricular involvement became less frequent as family socioeconomic level decreased. These findings suggest that tennis participation is associated with greater youth engagement in extracurricular activities within each family SEL, even though the extent of involvement becomes less frequent as family socioeconomic level decreases.

These findings add brushstrokes to the “student-athlete” portrait of adolescent tennis players. Generally, when compared with non-athletes or other types of athletes, tennis players devoted

Table 44: Percentage of Adolescents Who Said They Participate a Considerable to Great Extent in the School Yearbook or Newspaper During the Previous Year, by Type of Sport and Family Socioeconomic Level



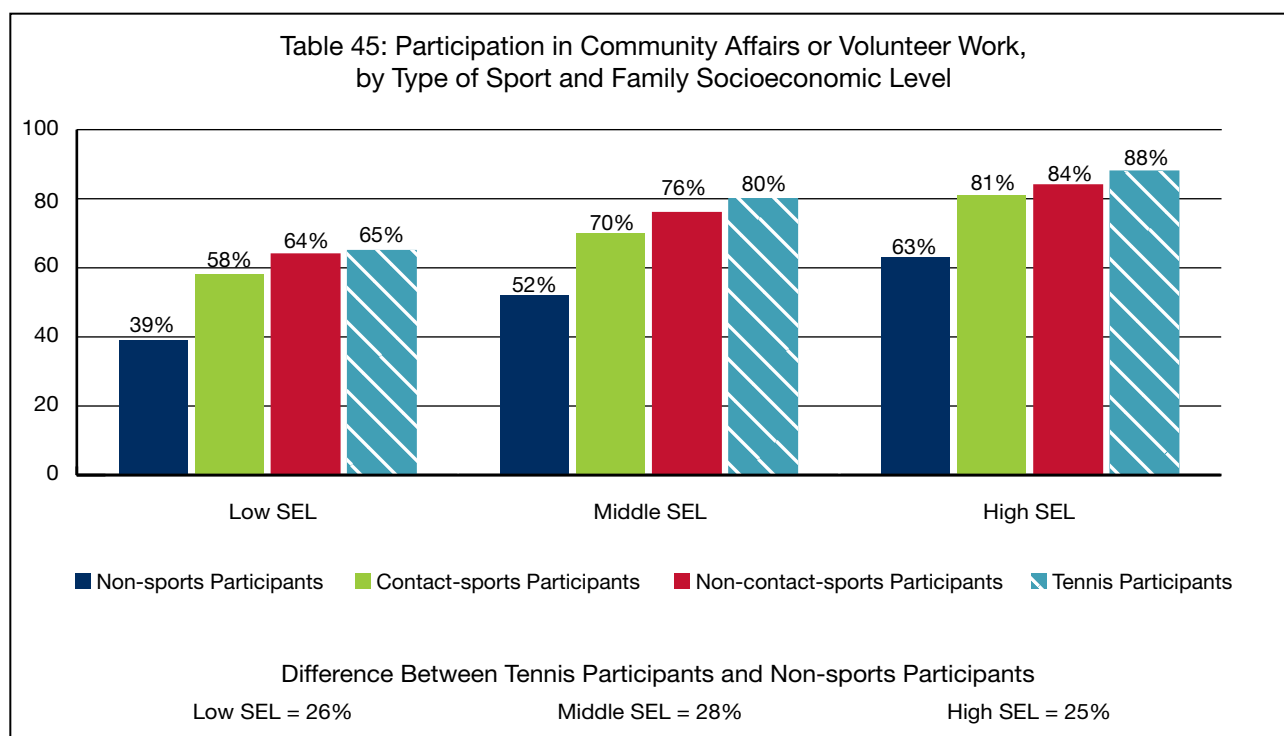
■ Non-sports Participants ■ Contact-sports Participants ■ Non-contact-sports Participants ■ Tennis Participants

Difference Between Tennis Participants and Non-sports Participants

Low SEL = 5%

Middle SEL = 4%

High SEL = 4%



more time to studying, reported high grades and aspired to attend university upon graduation. They participated in multiple sports, and tennis competition often happened in both school and community environments. Socially, they seem to be generally well-rounded and involved with extracurricular activities in their schools and

communities. Their lower rates of suspension and expulsion suggest that they are more fully integrated into school life than non-athletes or participants in contact sports.<sup>8</sup> Involvement with tennis seems to foster greater social involvement, which in turn, may broaden adolescent social networks.

# ADOLESCENT HEALTH AND TENNIS PARTICIPATION

To what extent is tennis participation associated with adolescent health? Since about 1990 social scientists have assessed “if and how” high school athletic participation influences a variety of teen health risks such as cigarette smoking, alcohol use, illicit drug use, seatbelt nonuse<sup>9</sup>, suicide, unintended pregnancy, depression and pathogenic weight-loss behavior.<sup>10</sup> While much of this research confirms favorable ties between athletic participation and reduced health risks among teenagers, the public health contributions of interscholastic sports also differ across socioeconomic levels, between genders, and among racial and ethnic groups.

This study is unique in that it examines variations in the health-risk behaviors within specific sports and across types of sports. The MTF survey includes data on some key adolescent health risks, including alcohol use, marijuana use and cigarette smoking. We break out the results by gender because previous research shows girls and boys

often exhibit different rates of health-risk behaviors. Further, as epidemiological and other public health studies conclusively document the influence of economic disparities on health processes and outcomes, we examined the links between teen health risks and athletic participation across family socioeconomic levels.

## BINGE DRINKING

Male contact-sports participants reported the highest rate (17%) of binge drinking during the previous two weeks. See Table 46. Male tennis players (13%) and non-contact-sports participants (15%) were less likely to binge drink than contact-sports participants (17%). Among female adolescents, the rates of binge drinking among female athletes and non-athletes were basically the same (13-14%) across the four subgroups. Tables 47 and 48 (on following page) also show greater percentages of binge drinking among male athletes

Table 46: Percentage of Adolescents Who Indicated Binge Drinking During the Past Two Weeks, by Gender and Type of Sport

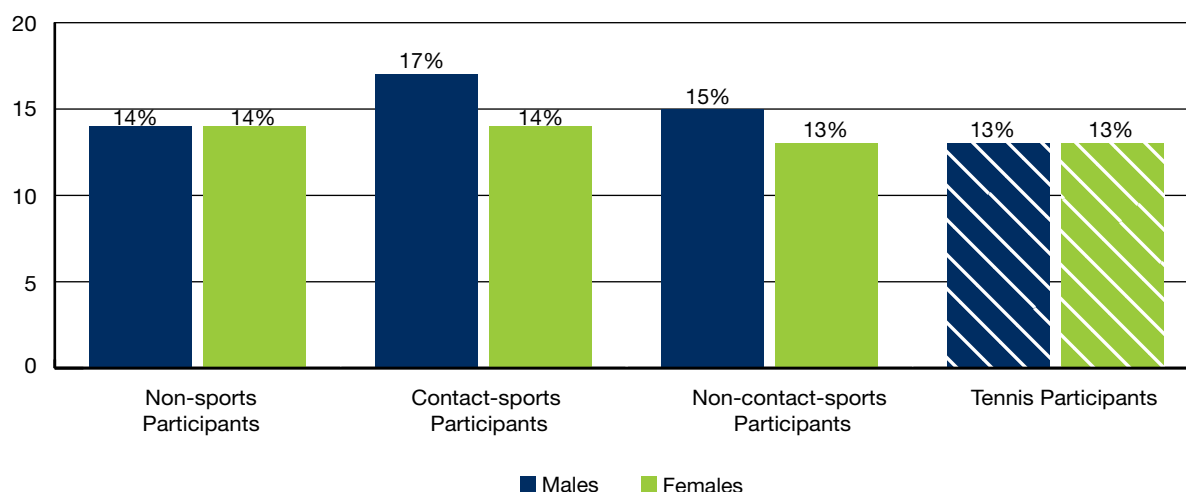


Table 47: Percentage of Adolescent Males Who Indicated Binge Drinking During the Past Two Weeks, by Type of Sport and Family Economic Level

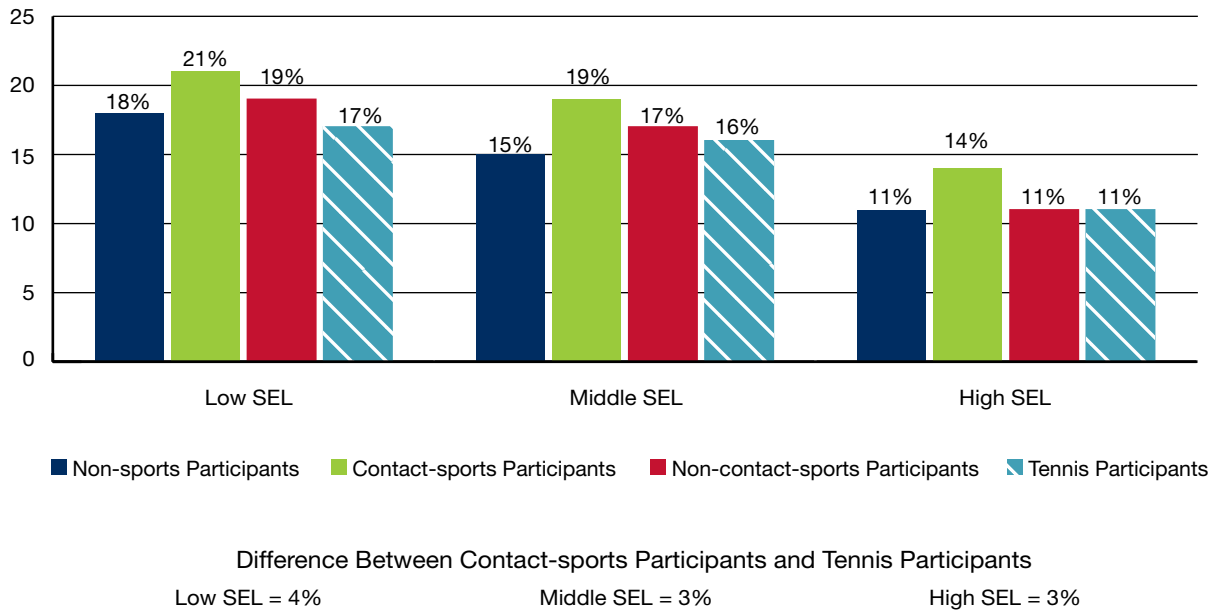
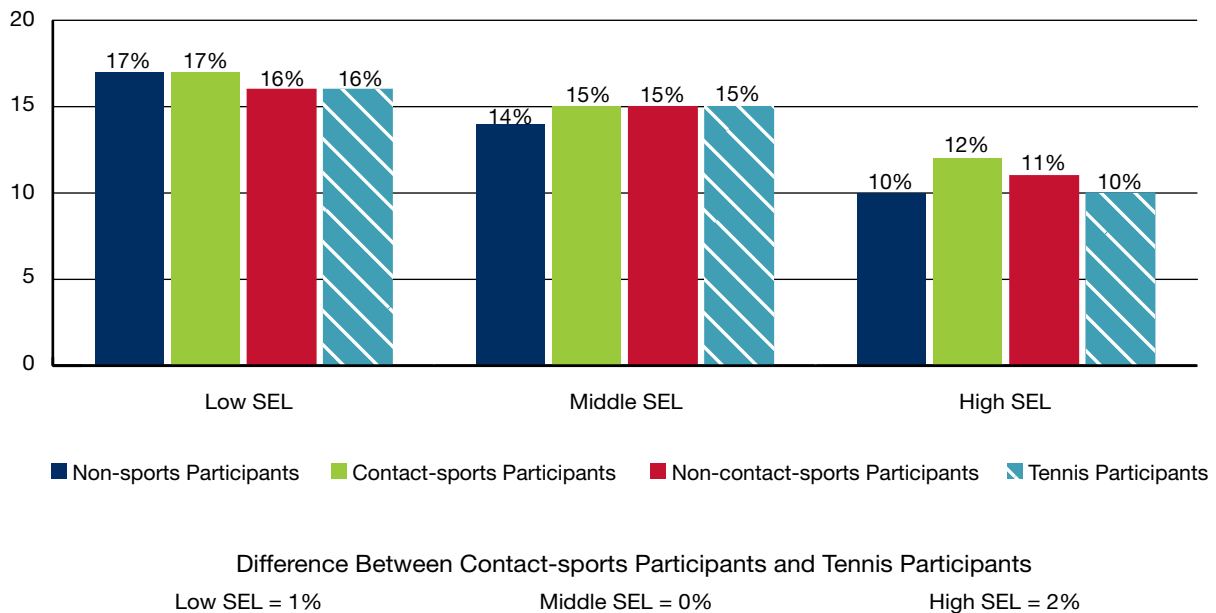


Table 48: Percentage of Adolescent Females Who Indicated Binge Drinking During the Past Two Weeks, by Type of Sport and Family Economic Level



in contact sports, and the highest rates of binge drinking among male athletes occurred at the low family socioeconomic level. Compared with boys, not as many girls reported binge drinking across all sport subgroups. No substantial differences

in the rate of girls' binge drinking were found between the types of sports. Finally, girls from the low family socioeconomic level reported higher rates of binge drinking than their middle- and high-socioeconomic counterparts.

# MARIJUANA USE

Lower percentages of girls than boys reported smoking marijuana. Male non-athletes (15%) and female non-athletes (13%) had the highest marijuana usage rates. See Table 49. Male contact-sports participants logged the highest rate of use (14%), while female tennis players and non-contact-sports participants had the lowest rates—both at 8%.

For males, marijuana use was inversely related to family socioeconomic levels—the lowest rates occurred in the high-socioeconomic-level families, while the largest percentages were in the low-socioeconomic-level subgroup. See Table 50 on following page. Tennis players from middle-socioeconomic-level families (13%) were less likely to have smoked marijuana than non-athletes (16%), contact-sports participants (15%), and non-contact-sports participants (17%). No differences in marijuana use occurred across the sport and non-sport participant subgroups within the low and high family socioeconomic levels. Generally,

tennis participants tipped toward the lower end of usage rates, with increasing use as the family socioeconomic level decreased.

Among females, once again higher rates of marijuana use issued as family socioeconomic level declined. Females showed lower rates of use than their male counterparts. See Table 51 on following page. At all three family socioeconomic levels, the tennis players had lower rates of marijuana use than the non-athletes.

# CIGARETTE SMOKING

Cigarette smoking is disdained in most athletic subcultures. Smoking is often simply “not cool” among athletes, and the equation of cigarettes with cancer risk contradicts the pro-health ethic of many sports. Smoking can also erode athletic performance and outcome, and it is subject to detection and discipline from coaches. For these and other reasons, the researchers expected to find

Table 49: Percentage of Adolescents Who Smoked Marijuana During the Past Month, by Gender and Type of Sport

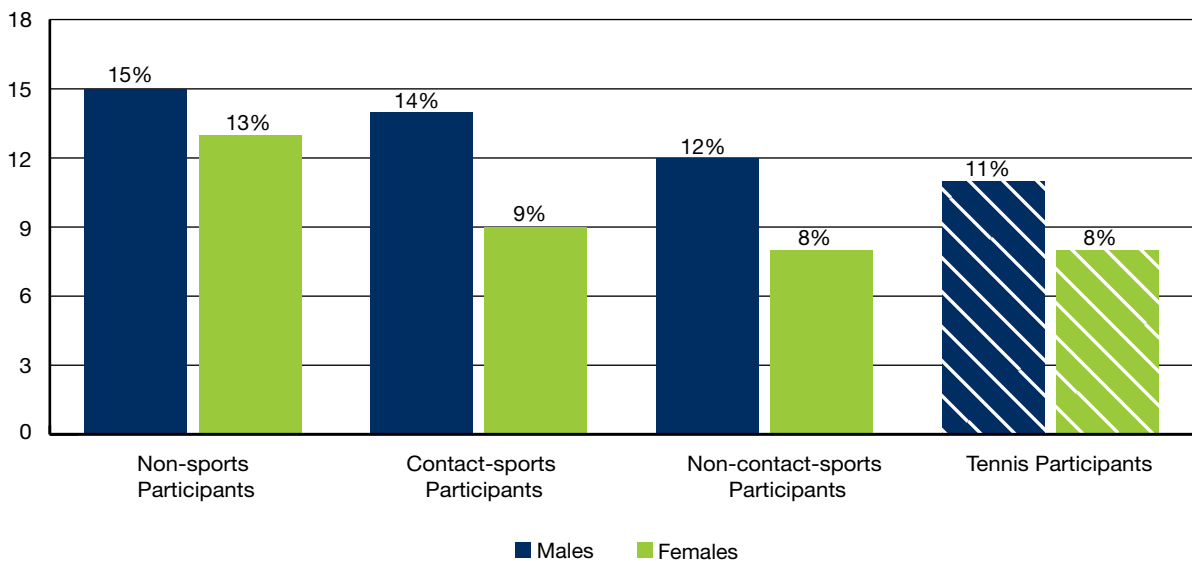


Table 50: Percentage of Adolescent Males Who Smoked Marijuana During the Past Month, by Type of Sport and Family Socioeconomic Level

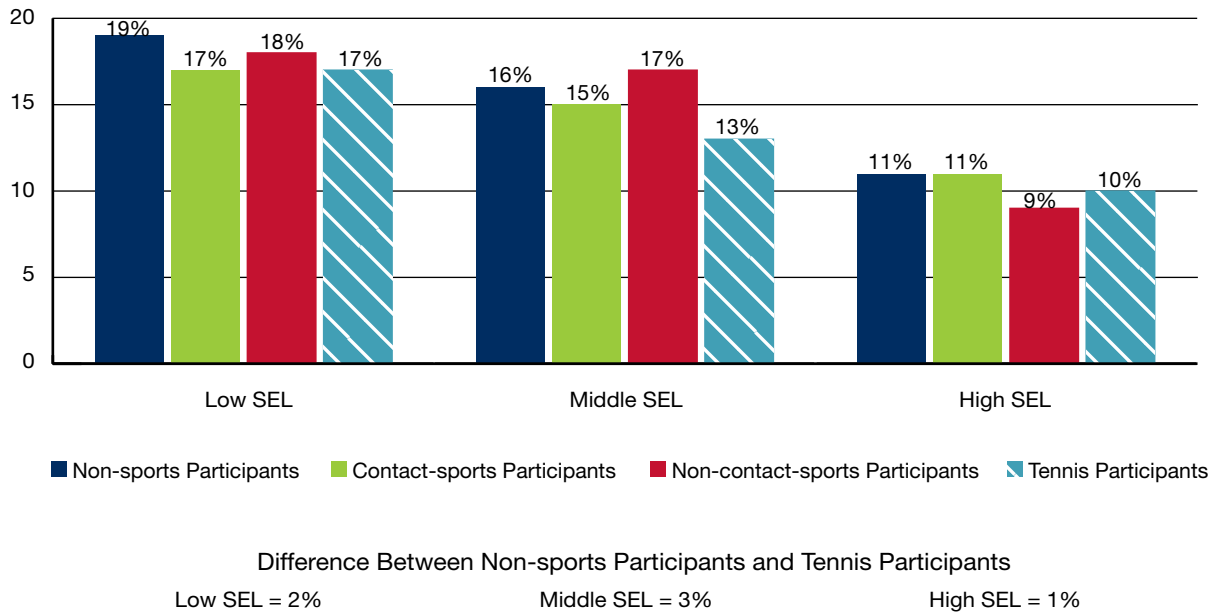
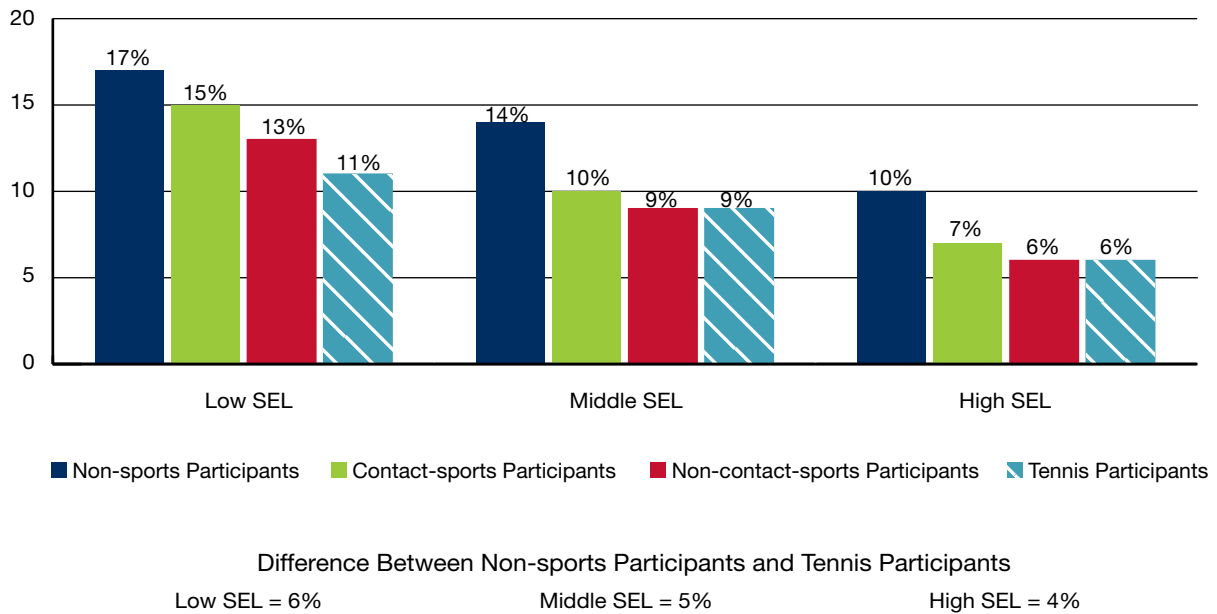


Table 51: Percentage of Adolescent Females Who Smoked Marijuana During the Past Month, by Type of Sport and Family Socioeconomic Level



lower rates of smoking cigarettes among athletes when compared with non-sports participants.

The findings showed this to be true among both male and female athletes. See Table 52. The respective rates of smoking among tennis players and non-contact-sports participants were basically similar for boys (10% and 9%) and girls (9% and 8%); however, these rates were also different from their non-athletic counterparts (16%). Among the athlete subgroups, once again, the male contact-sports participants exhibited the highest rate of cigarette use (11%). Cigarette smoking was highest among both the male and female non-sports participants within each of the family socioeconomic levels studied. See Table 53 and 54 on following page.

# OVERWEIGHT AND RISK OF BEING OVERWEIGHT

Obesity among children and adolescents is an important indicator of health risk. Because the Monitoring the Future study does not include

measurement of body mass index (a widely accepted measure of obesity risk), the researchers used the Go Out & Play: Youth Sports in America data in order to describe and analyze links between tennis participation and obesity risk.<sup>11</sup> A nationwide subsample of eighth- through 12th-graders was pulled from the larger study in order to examine the relationship between types of athletic participation and “risk for overweight” and “overweight”.<sup>12</sup>

Comparatively lower percentages of tennis participants reported being overweight or at risk for overweight than non-athletes and participants in contact and other non-contact sports. See Table 55 on page 37. Furthermore, the inferred lowered risk for obesity among the tennis players held for both boys and girls. Table 56 (on page 37) shows the average percentage of adolescents who are overweight or at risk of being overweight within 14 sports and for non-athletes.

In summary, the general hypothesis that tennis participation is associated with adolescent health held up well under the above empirical scrutiny. Compared to non-athletes and contact-sports participants, tennis players reported lower rates

Table 52: Percentage of Adolescents Who Smoked Cigarettes During the Past Month, by Gender and Type of Sport

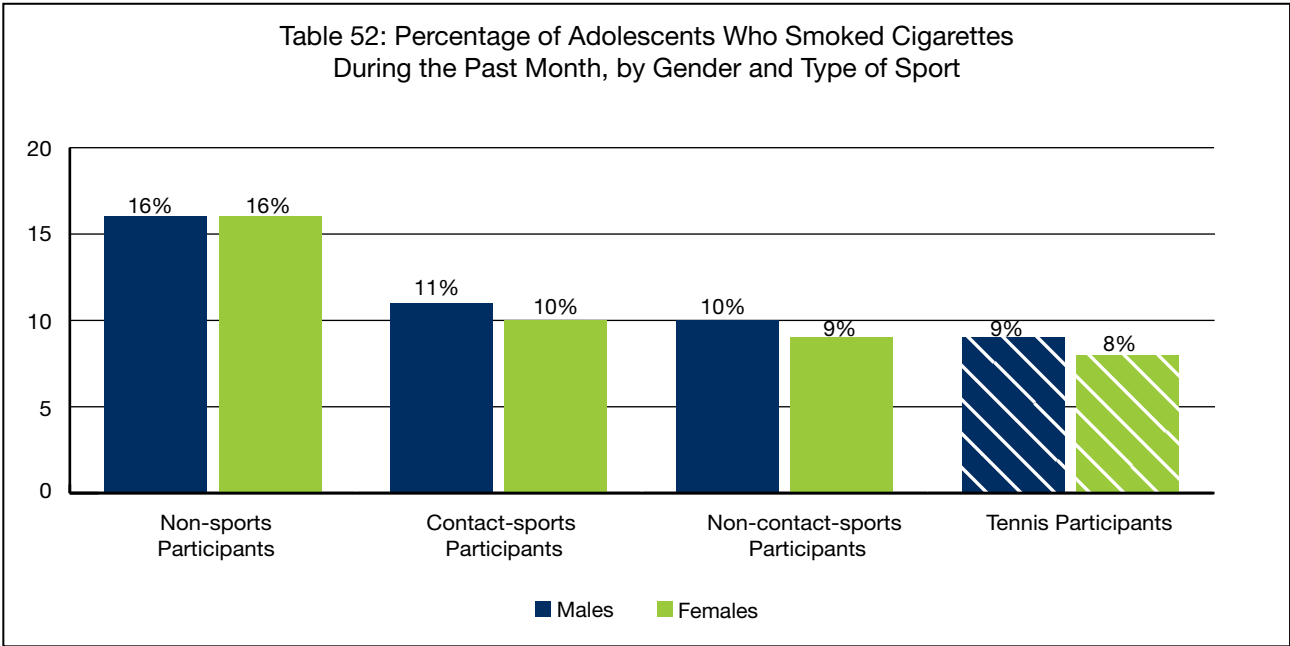


Table 53: Percentage of Adolescent Males Who Smoked Cigarettes During the Past Month, by Type of Sport and Family Socioeconomic Level

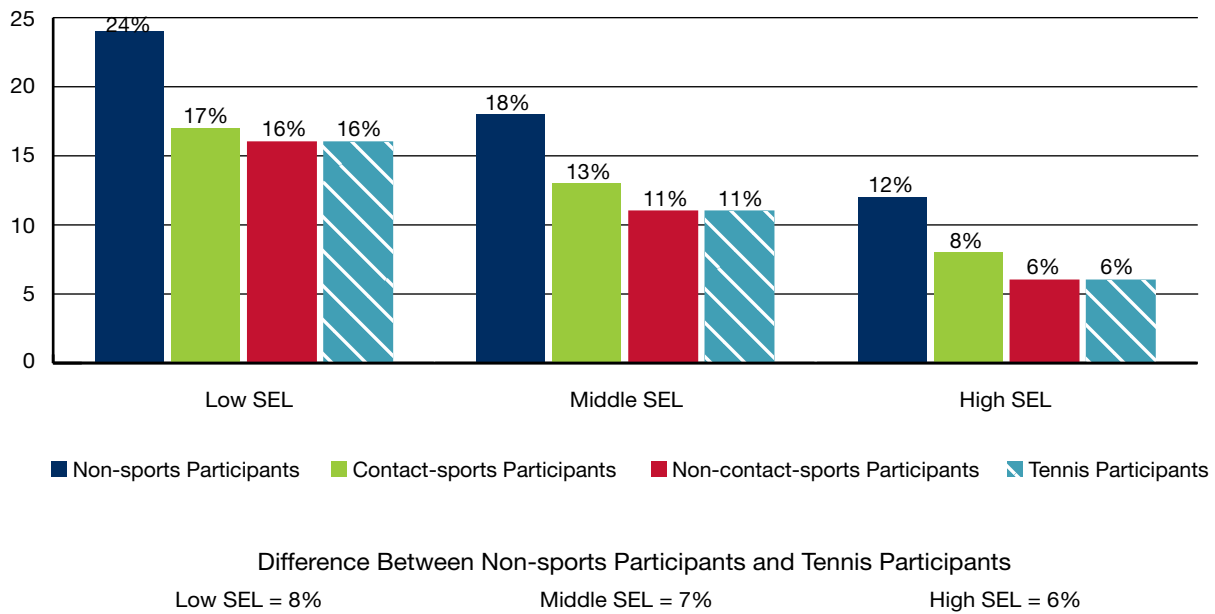
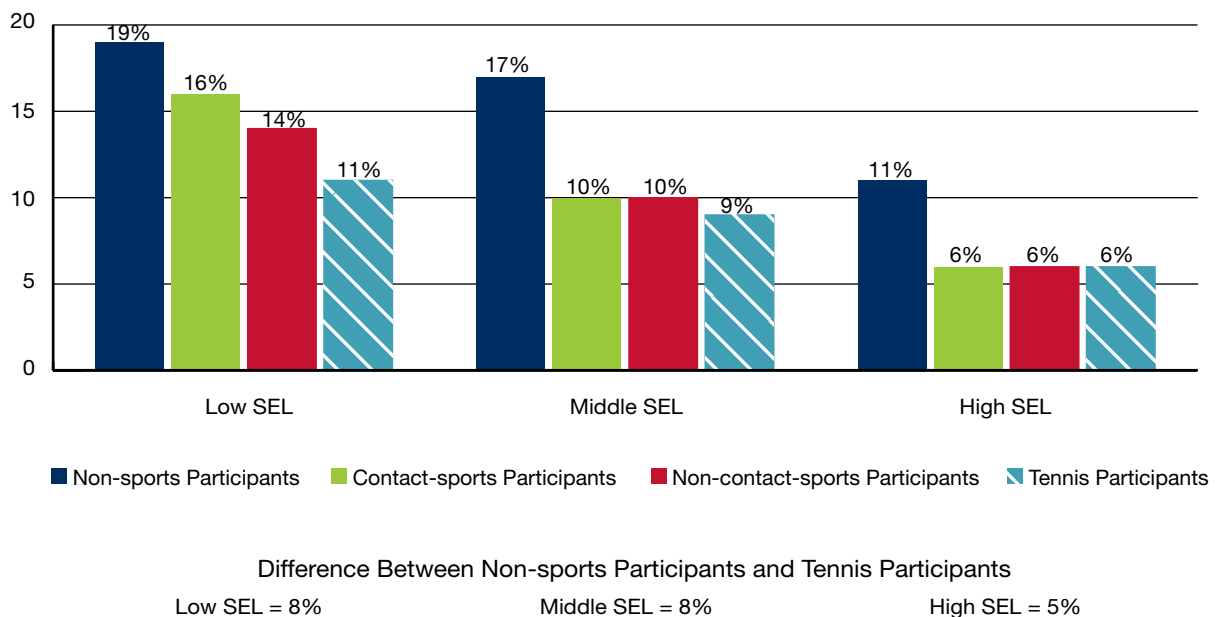


Table 54: Percentage of Adolescent Females Who Smoked Cigarettes During the Past Month, by Type of Sport and Family Socioeconomic Level



of binge drinking, marijuana use and cigarette smoking. The positive links between participation in tennis and other non-contact sports and risk reduction was particularly evident among girls. The positive associations between participation

in tennis and other non-contact sports and the adolescent health behaviors found here were mediated by family socioeconomic level—with less favorable influence at lower family socioeconomic levels. In the final analysis, the researchers contend



Table 55: Percentage of Adolescents Who Are Overweight and at Risk of Being Overweight, by Gender and Type of Sport

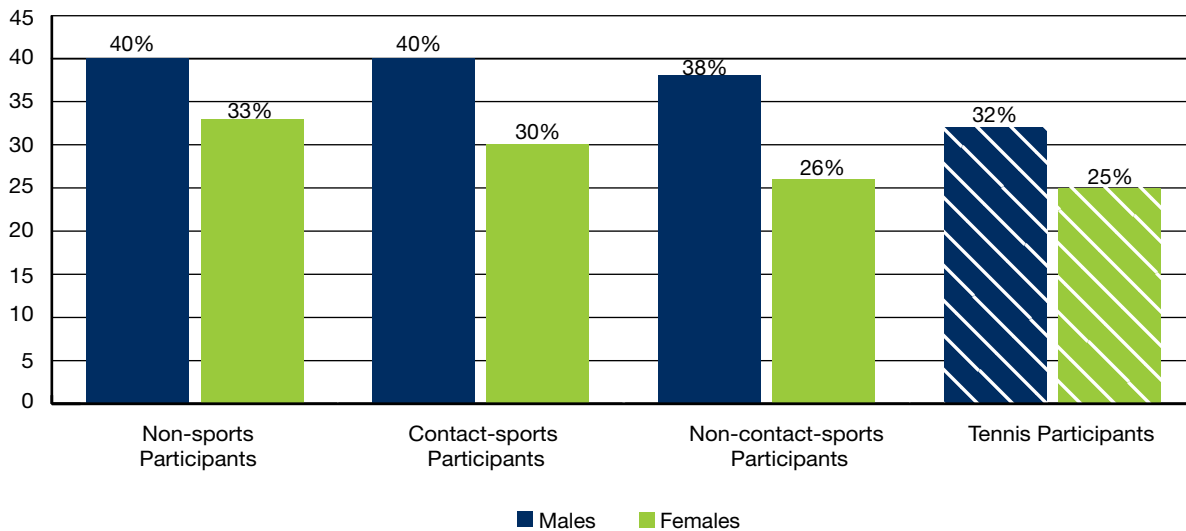
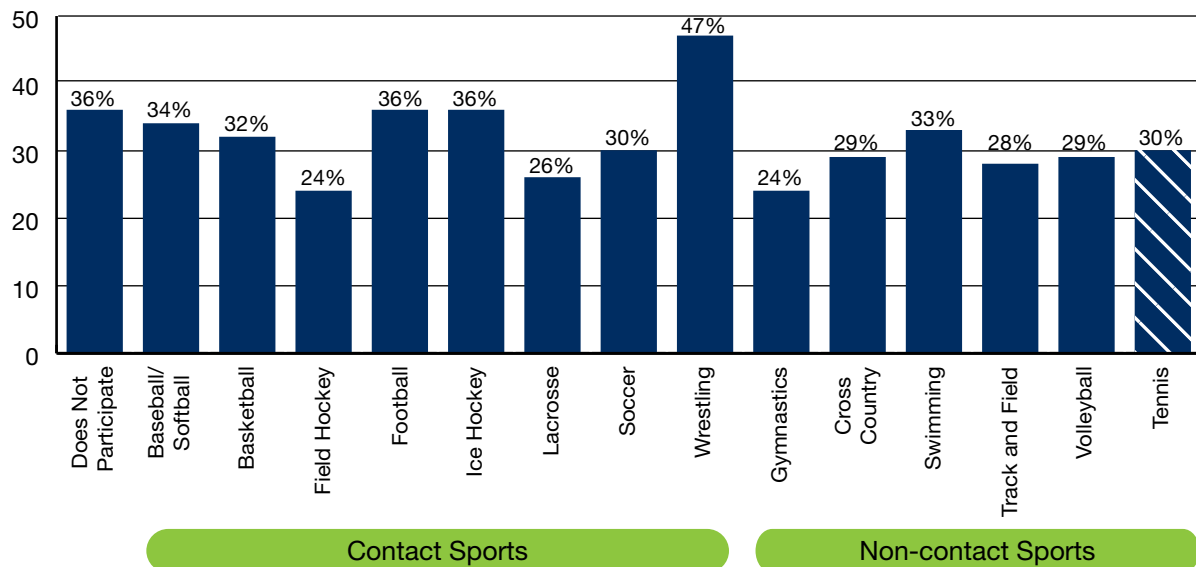


Table 56: Percentage of Adolescents Who Are Overweight and at Risk of Being Overweight, Within Various Sports



that these correlations should be welcomed by adolescent health advocates.

The many findings that show higher rates of health-risk behaviors among male contact-sports participants are disturbing from a public health perspective. Specific sports appear to set into

motion a unique set of health behaviors, which, in turn, intersect with socioeconomic disparities in complex ways that will require more research to explain. This study is a starting point for understanding how tennis participation affects teen health behaviors.

# CONCLUSION

How does a child end up with a tennis racquet in hand? What kinds of shifts in self-image and expectations are set in motion? Who else in the family, school or community recognizes and pulls a novice into the orbit of play? How do the social networks around the game unfold in ways that engage, inform and inspire young persons? To what does the game lead? What cultural values and life lessons are learned on the court and across the net, and how do they mesh with the development of a young person's identity, friendship networks and educational aspirations?

Many of the results discussed in this report provide evidence that tennis participation positively influences the lives of U.S. adolescents. While tennis remains a predominantly White sport, gender representation is equitable, and there is some

evidence that youth participation is expanding in middle- and lower-socioeconomic levels. The data paint a portrait of tennis players as well-rounded, basically 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 contact sports participants.

Some—but not all—types of sport do an effective job at recruiting and retaining young participants, as well as helping them to develop friendships, excel on the academic front, and adopt healthy behaviors. 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 IMPLICATIONS

Finally, the results of this study suggest several policy implications.

1. Given the educational, social and health benefits derived from tennis and the comparatively lower rates of tennis participation among all adolescents across the nation and geographic regions, the opportunities for participation should be increased. (See Table 3 on page 4 and Table 9 on page 8.)
2. Nationally, fewer than one-quarter of adolescent tennis participants are Black or Hispanic. Targeted recruitment and retention programs
- that increase participation among racial and ethnic minorities should be encouraged. See Table 9 on page 8.
3. Nationwide, there is evidence that fewer youth from economically disadvantaged families attend or persist through all four years of college. Yet, across family socioeconomic levels, higher percentages of tennis players aspire to attend and graduate from university. See Tables 33 and 34 on pages 22-23. Funders should be encouraged to continue to support more tennis scholarships that reach students from economically disadvantaged families.

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## ENDNOTES

1 Contact sports included were baseball, basketball, field hockey, football, ice hockey, lacrosse, soccer, and wrestling. The non-contact sports included were cross country, gymnastics, swimming, track and field, and volleyball.

2 Data provided by the U.S. Census Bureau. Data can be accessed at: <http://2010.census.gov/2010census/data/>

3 A good deal of previous research shows that adolescent participation in school-sponsored sports favorably influences youth development (Feldman and Matjasko, 2005.) Sports participation has been found to elevate adolescents' grades (Fejgin, 1994; Eccles & Barber, 1999; Lipscomb, 2007; Fox, Barr-Anderson, Neumark-Sztainer & Wall, 2010), enrollment in AP courses (Pearson, Crissey & Riegle-Crumb, 2009), commitment to graduating

high school (i.e., not dropping out) (McNeal, 1995), educational aspirations and educational attainment (Otto & Alwin, 1977; Fejgin, 1994), attending college (Sabo, Melnick & Vanfossen, 1993; Eccles & Barber, 1999) and graduation from college (Spreitzer, 1994). Adolescent athletic participation among adolescents can also deter delinquency (Schafer, 1969; Landers & Landers, 1978; Hastad et. al., 1984; Holland & Andre, 1987; Fejgin, 1994; Baumert, Henderson & Thompson, 1998; Hartmann & Massoglia, 2007). Previous research also shows that socioeconomic differences, gender and race/ethnicity influence the synergies between sports and educational outcomes (Sabo, Melnick & Vanfossen, 1989; Sabo, Melnick & Vansfossen, 1992; Sabo, Melnick & Vanfossen, 1993; Sabo & Veliz 2008; Veliz, 2012).

- 4 This general description of the dynamic interaction between an adolescent athlete's identity and physical development that flow from everyday experiences within the social world of sport derives from the sociological concept of "habitus." A variety of social theorists have used the concept of habitus to describe how the intersections between individual consciousness and embodied experience are mediated by social structure and culture. This report is not a practical vehicle to engage in intricate philosophical and social theory; however, we do want to note its potential relevance to this research. See Bourdieu, P. Wacquant, L. (1992). *An Invitation to Reflexive Sociology*, University of Chicago Press; MacLeod, J. (1995) *Ain't No Makin' It*. Colorado: Westview Press.
- 5 Note that the statistical strength and consistency of the relationship between tennis participation and the education variables discussed here were tested within a multifactorial regression model that controlled for the effects of gender, race/ethnicity and socioeconomic status. Many results remained statistically significant after controls were instituted, suggesting that tennis participation is independently associated with some educational outcomes among adolescents across socioeconomic status. Readers can contact Dr. Veliz for details on the modeling and outcomes.
- 6 The Random House Dictionary of the English Language (1967). New York: Random House, p. 231.
- 7 Some evidence in a previous study found that boys who participated in more than three sports during the year had significantly lower rates of involvement with extracurricular activities in their school and community. It may be that some boys who overly identify with sports are not as involved or "well-rounded" in the larger contexts of their lives. See Sabo, D. & Veliz, P. (2008). *Go Out and Play: Youth Sports in America*. East Meadow, NY: Women's Sports Foundation.
- 8 The hypothesized links between tennis participation and reduced rates of suspension and expulsion were tested using a multiple regression model that controlled for race (White, non-White), gender (male, female), grade (eighth, 10th), two-parent household (mother and father live in the same household), education of both parents, large Metropolitan Statistical Area, year survey was conducted, place where respondent lives (farm, country, city/town). For tennis participants  $B = -.287$ ,  $p < .001$ . Contact the researchers for information about regression models and results.
- 9 See Melnick, M., Miller, M., Sabo, D. Barnes, G. & Farrell, M. (2010). Athletic participation and seatbelt omission among U.S. high school students: A national study. *Health Education & Behavior*, 37(1): 23-36.
- 10 Some useful summaries of research on athletic participation and adolescent health include Staurowsky, E., et al. (2009). *Her Life Depends on It II: Sport, Physical Activity, and the Health of American Girls and Women*. East Meadow, NY: Women's Sports Foundation; and Miller, K., et al. (2000). *Health Risks and the Teen Athlete*, East Meadow, NY: Women's Sports Foundation.

11 See Sabo, D. & Veliz (2008). *Go Out and Play: Youth Sports in America*. East Meadow, NY: Women's Sports Foundation.

12 The terms “underweight,” “healthy weight,” “at risk of overweight” and “overweight” are used by the Centers for Disease Control (CDC) when describing children. The operational definition of overweight used in this study is as follows. Overweight is defined as above the 95th percentile for the sex/age-appropriate scale. At risk of overweight is defined as the 85th percentile to less than the 95th percentile. Age and sex are considered for boys and girls because the amount of body fat changes with age and the amount of body fat differs between girls and boys. The BMI calculations here are estimates—both because the children

in the Go Out and Play study self-reported their height and weight and because the age-by-sex cut-offs used to define the categories (at risk of overweight, etc.) are approximate rather than specific measures. Because this study also describes and compares risk of overweight and overweight across different sports, an additional caution needs to be stated. Interpretation of overweight data is complicated when comparing outcomes between different sports. Wrestlers can be used as an example. BMI is a surrogate measure of obesity, but it is not sensitive to muscularity—meaning that it is not always a good reflection of overweight. Wrestlers are quite muscular, and muscle weighs more than fat. So measurement of BMI among wrestlers is subject to generating skewed results.





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