



Mapping Attrition among U.S. Adolescents in Competitive, Organized School and Community Sports

**Under the direction of The Center for Research on Physical Activity Sports &
Health (CRPASH) at D' Youville College**

Don Sabo, Ph.D., CRPASH, D'Youville College
Phil Veliz, Ph.D., University of Michigan

APRIL 21, 2014

Acknowledgments

The authors cherish the rewards and challenges of collaboration. A huge debt is owed to Deborah Slaner Larkin for the intellectual and policy vision she brought to all phases of the project, as well as the continued support of The Margaret Fund. We thank our stalwart project coordinator, Marjorie Snyder, Ph.D., for her substantive insights into the findings, and for navigating the collaboration forward to completion. We are grateful for the astute insights and useful guidance of Aspen Project Play leaders, Tom Farrey and Andrea Cernich. They helped us cut through mountains of data in order to uncover essential findings. We are grateful to D'Youville College's continuing support of the Center for Research on Physical Activity, Sport & Health (CRPASH), especially President Denise Roche, GNSH, Ph.D., and CRPASH co-director Renee Cadzow, Ph.D. Special thanks to the outside reviewers of earlier versions of this report—Ketra Armstrong, Ph.D., University of Michigan; Jay Coakley, Ph.D., University of Colorado at Colorado Springs; and Nicole Lavoie, Ph.D., University of Minnesota. Finally, kudos to Deana Monahan for her editorial expertise.

About the Center for Physical Activity, Sport & Health at D'Youville College

The **CRPASH** mission is to function as a collaborative hub that brings researchers and organizations together in order to conduct relevant social scientific research and policy initiatives. CRPASH also provides program evaluation research skills and services to help both national and community-based organizations and educational institutions to understand and enhance the effectiveness of their programs.



Preferred citation: Sabo, D. & Veliz, P. (2014). Mapping Attrition among U.S. Adolescents in Competitive, Organized School and Community Sports. Aspen, CO: The Aspen Project Play.

NOTE: Do not issue, share, or replicate without the permission of the principal investigator, Don Sabo, Ph.D., Co-Director, Center for Research on Physical Activity, Sport & Health, D'Youville College.

INTRODUCTION

American adolescents now participate in competitive, organized school and community sports in unprecedented numbers. Sport is the most popular extracurricular activity among U.S. high school students. Mounting social scientific research confirms positive links between adolescent sports participation and developmental assets such as educational achievement, lower rates of expulsion and suspension from school, seatbelt use, and reduced risk for teen pregnancy. When effectively organized and delivered, sports provide American youth with opportunities to have fun and forge friendships, develop social skills, learn the fundamentals of teamwork and competition, further educational achievement, be physically active, and develop healthy lifestyles. Sport is the primary source of physical activity in millions of kids' lives, which makes it a key institutional asset in the policy battle against childhood obesity and its related health risks.

The Aspen Institute's ***Project Play*** seeks to “reimagine youth sports in America” and to build “Sport for All, Play for Life” communities across the nation. Its leadership recognizes the real and potential contributions that sports can bring to young people, but also the reality that access and opportunities in youth sports are not distributed evenly across society. The purpose of this study is to describe and analyze the shifting flow of U.S. adolescents into and out of competitive, organized school and community sports across the high school years. We compared sport participation and attrition rates among a representative nationwide sample of more than 47,000 eighth-graders and 12th-graders. Dictionary definitions of “attrition” refer to “becoming fewer in number” or “decreasing in size”. In this report attrition rates are expressed as negative percentages in order to show decreases in the proportion of teens involved with sports between the eighth grade and 12th grade. Our goal is to provide nonprofit and sport leaders, policymakers, and educators with an evidence-based map of athletic participation and attrition patterns across adolescence. The report does not attempt to explain why or how attrition occurs across U.S. sports or within specific sports.

While market research and basic surveys confirm that youth participation in sports increased during the past few decades, little is known about how participation rates vary across adolescence and, by the time students reach 12th grade, just who ends up under or outside the “big tent” of youth sports in America. Researchers have documented that athletic participation rates are lower among many historically underserved American youth—girls, racial and ethnic minorities, and kids from poor or working-class families.ⁱ But it still remains unclear how specific youth sports differ in their capacity to recruit and maintain participation levels across the high school years. For example, do basketball, cross country, football, volleyball, or wrestling show consistent participation rates between eighth grade and 12th grade? And finally, do participation and attrition vary by gender, race and ethnicity, and social class?

For this study the researchers retrieved and analyzed Monitoring the Future (MTF) datasets in order to track adolescent participation and attrition in U.S. sports. This study uses a cohort designⁱⁱ that combines multiple nationwide samples of U.S. adolescents who participated in MTF surveys between 2006 and 2012. The MTF is a large, federally funded, longitudinal study of American secondary school students.

About 13,000 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. The primary question posed to respondents was as follows: “In which competitive sports (if any) did you participate in during the LAST 12 MONTHS? Include school, community, and other organized sports. (Mark all that apply).” The large sample sizes and information by the MTF surveys made it possible for the researchers to examine participation and attrition among eighth-grade to 12th-grade students across all sports as well as within 14 different sports. In 2006 the MTF began gathering information about the specific sports that respondents reported participating in during the previous 12 months in their school or community, including baseball/softball, basketball, cross country, field hockey, football, gymnastics, ice hockey, lacrosse, swimming, soccer, tennis, track, volleyball, wrestling, and other.ⁱⁱⁱ The “other sports” includes organized, competitive sports that were not specified in the preceding list; e.g., double-dutch, flag football, netball, climbing, martial arts, skiing, cheer, weightlifting, bowling, or equestrian competition. (A summary of the research design and data analysis procedures appears in Appendix B.)

The analysis of the MTF’s large storehouse of nationwide data across the 2006-2012 time frame enabled the researchers to:

1. Describe and compare the extent that 14 U.S. sports provide participation opportunities to boys and girls from different racial and ethnic groups, family socioeconomic levels, metropolitan areas, and geographic regions.
2. Track and assess if athletic participation rates increased, decreased, or remained stable between eighth grade and 12th grade—across all sports and within each of the 14 sports as well as “other sports.”
3. Examine whether shifts in athletic participation and attrition across the high school years were influenced by race and ethnicity, family socioeconomic level, metropolitan status, gender, or geographic region.

Several key findings are documented.

1. Big Leaks in the Sport Pipeline. While today more teens than ever flow through the pipeline of American sports, participation rates in most sports plunge between eighth grade and 12th grade. The average attrition rate across all sports is 32%. This means that 32 out of every 100 athletes drop out of sport between eighth grade and 12th grade.^{iv}
2. Attrition among Girls Is Significantly Higher than among Boys. The attrition rates for girls between eighth grade and 12th grade in all sports are two to three times higher than among boys. In basketball, for example, the attrition rates are -64% for girls and -36% for boys. The respective rates in lacrosse are -42% and -13%, or for soccer -53% and -31%.
3. Race and Ethnicity Matter. White teens show higher overall rates of athletic participation than for blacks and Hispanics, but the rates varied by sport. Blacks and Hispanics had high participation rates in general. However, those sports with a larger percentage of minorities also

showed high rates of attrition between eighth and 12th grades. Statistical analyses showed that sports with a higher percentage of white participants had lower overall rates of attrition between eighth grade and 12th grade. Specifically, for each 1% increase in the percentage of white participants in a given sport, there was a corresponding 1.5% decrease in the sport's attrition rate. Conversely, as the percentage of blacks and Hispanics increased within a given sport, the overall attrition rate within that sport increased.

4. More Teens Find Sports "Off the Grid". Many adolescents leave traditional sports to explore the growing array of "other sports" that may include activities such as martial arts, double-dutch, Ultimate Frisbee, climbing, or skateboarding. Overall participation in "other sports" ranked second-highest (27%) across all eighth- to 12th-graders, third among boys (24%), and first (31%) among girls. And yet, "other sports" were not as much of a refuge from attrition among girls as boys. While boys' rate of participation in "other sports" increased by 9% between eighth grade and 12th grade, girls' percentage decreased by 12%.
5. Attrition Occurs across Family Socioeconomic Differences. In eighth-grade adolescents from upper—socioeconomic-level families have higher rates of participation than adolescents from middle-level and lower-level families, but by 12th grade, these disparities are not as marked.
6. Shifts in "Big City" Participation. High attrition rates across eighth grade and 12th grade occurred in the 28 largest U.S. metropolitan areas in traditional sports such as baseball/softball. (-43%), basketball (-56%), cross country (-16%), football (-48%), gymnastics (-67%), soccer (-46%), tennis (-47%), track and field -47%), and volleyball (-58%). Yet participation in "other sports" increased by 4%, suggesting that some "big-city" adolescents who leave the traditional sports get involved with other kinds of sports and activities.

PARTICIPATION ACROSS SPORTS

The sports that survey respondents were able to specifically select included baseball/softball, basketball, cross country, field hockey, football, gymnastics, ice hockey, lacrosse, soccer, swimming, tennis, track and field, volleyball, weightlifting, wrestling, and "other" sports. Most of these sports—such as basketball, baseball/softball, football, track, soccer, swimming, tennis, or wrestling—are long-standing options in school sports. Today the widening array of organized, community-based sports includes Ultimate Frisbee, cycling, double-dutch, martial arts, badminton, squash, downhill skiing, skateboarding, surfboarding, or rock climbing. The MTF survey only indirectly captured participation data for these latter sports by asking students to check the "other sport" option.

Gone are the “old days” when boys’ football, baseball/softball, basketball, and wrestling monopolized the available options for teens. A wider array of athletic options is illustrated in Tables 1-3, which break out the participation rates of U.S. eighth- through 12th-grade students during the 2011-2012 school year.

Participation in three traditional sports ranked among the top four—basketball (30%), football (22%) and baseball/softball (20%). “Other sports” ranked second in participation (27%), and two relatively newer sports were among the top seven—soccer (18%) and volleyball (14%).

Table 2 reveals that, among boys, football (39%) and basketball (38%) garnered the highest participation rates, followed by other sports (24%), baseball/softball (23%), and soccer (19%). Finally, the highest participation rate among girls occurred in “other sports” (31%), followed by basketball (23%), volleyball (21%), baseball/softball (16%), and soccer (16%). See Table 3 on next page.

Table 1. The Percentage of All High School Students Who Participated in Each Sport, 2011

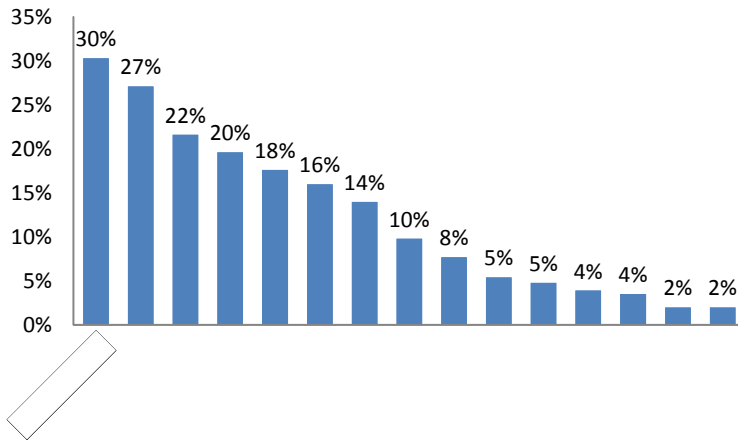
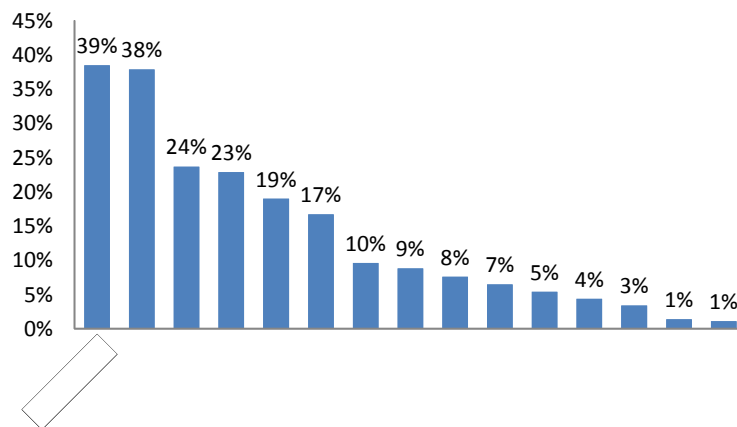


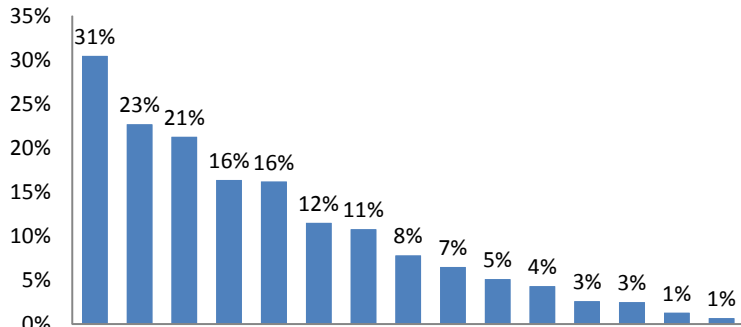
Table 2. The Percentage of High School Boys Who Participated in Each Sport, 2011



Three general observations can be distilled from the tables. First, basketball, football, and baseball/softball remain popular among American adolescents, but sports like soccer, swimming, and volleyball garner appreciable involvement among teens. Second, while participation rates among boys

are higher than girls in football, basketball, and baseball, similar participation rates occurred for tennis, cross country, and lacrosse. Finally, “other sports” ranked first among girls (31%) and third among boys (24%), which may mean that many teens search for a niche in sports outside the available school-based athletic offerings.

Table 3. The Percentage of High School Girls Who Participated in Each Sport, 2011



In summary, the results show that the flow of athletic participation through the pipeline of U.S.

youth sport has diversified. While participation in traditional sports remains high among boys, involvement now spreads across a wider variety of sports such as ice hockey, field hockey, volleyball, and lacrosse. Girls’ involvement also spills across a wide array of sports, but with relatively lower rates than boys in most sports—especially the more traditional sports like basketball, baseball/softball, track, and wrestling.

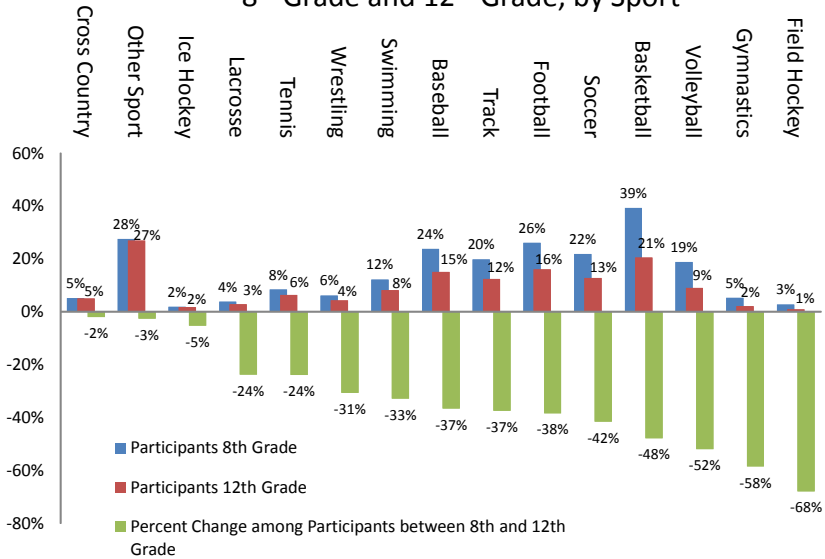
RUPTURES IN THE SPORT PIPELINE

Previous attempts to monitor athletic participation in the U.S. have been highly useful but basically linear. Each year the National Federation of State High School Associations (NFHS), for example, relies on voluntary surveys from schools and monitors general participation among boys and girls across all grade levels. Almost predictably participation rates go up year-to-year as the overall volume of participants in the pipeline of youth sports increases. The NFHS also counts “participants” more than once; i.e., the same boy who participated in three different sports is counted as three “participants”—which inflates the number of teens actually involved in sports. The conclusion and “news” is positive year after year; i.e., the growth streak continues.^v But amid this linear trajectory, there is little identification of declining numbers of adolescents in various sports, whether participation slumped or accelerated among racial/ethnic minorities, how the growth rates varied between cities or rural areas, or if participation increases were the same among teens from working-class, middle-class, or well-to-do families. And perhaps most importantly for advocates of youth sports and policymakers, the statistical clumping together of all “participants” does not provide insights into how participation rates fluctuate across adolescence or between eighth and 12th grades. The use of the MTF survey data in this study, however, made it possible to overcome these limitations.

This study clearly documents the substantial drainage of athletic participants between the eighth grade and 12th grade in almost all sports. Table 4 shows that the percentage of attrition among participants across the high school years ranged between lows of -2% in cross country to -68% in field hockey. The empirical excavation of the sport pipeline shows that almost all sports—except cross country, ice hockey, and “other sports”—had declining participation rates. Please note that in the text and tables below, a negative attrition rate means that a particular sport showed a lower percentage of participants among the 12th-graders compared to the percentage among eighth-graders. For instance, an attrition rate of -33% means that a sport had one-third fewer participants among 12th-graders than eighth-graders. In contrast, an attrition rate of 33% in a sport indicates that the percentage of its 12th-grade participants was one-third higher than the percentage among 8th-graders.

Our research unearthed large leaks in the youth sport pipeline across the high school years. Many eighth-graders opt for the mainstays of traditional high school sports like baseball/softball, football, basketball, and wrestling, but then appear to vote with their feet and either pursue athletic options elsewhere or not at all. Their exit or migration is also evident in sports like lacrosse, volleyball, gymnastics, and field hockey, where attrition

Table 4. Percent Change among Participants between 8th Grade and 12th Grade, by Sport



rates range between -24% and -68%. (See Table 4.) The findings raise important questions about why teens decide to leave one sport for another or to quit sports entirely. On one hand, “voting with their feet” implies individual choice, exploring new options, or choosing to leave sport altogether. One set of explanations for attrition resides in sport programs themselves. The hierarchy of competition built into the sport may involve cutting players at the junior varsity level who do not have the skills to perform at the varsity level. Young people who anticipate being cut or relegated to the sidelines decide not to “go out for” teams. School administrators and athletic administrators may provide ample funds to some sports but toss fiscal crumbs to what are considered lesser-status sports, thereby setting the stage for devaluation and departure. One program may emphasize performance and winning-at-all-costs rather than play and social engagement, which can nudge some adolescents toward the “exit door.”

And finally, social scientists have long documented how large institutional and cultural forces can influence individual options, behavior and choices in education, the work place, and sport. As pay-for-play levies are made in some school sports or the expense of community-based sports increases, for example, parents and teens in lower-income or middle-income families may find fees or transportation costs beyond their means. In the body of this report, we document how some of these larger social, cultural, and economic factors are related to athletic participation and attrition.

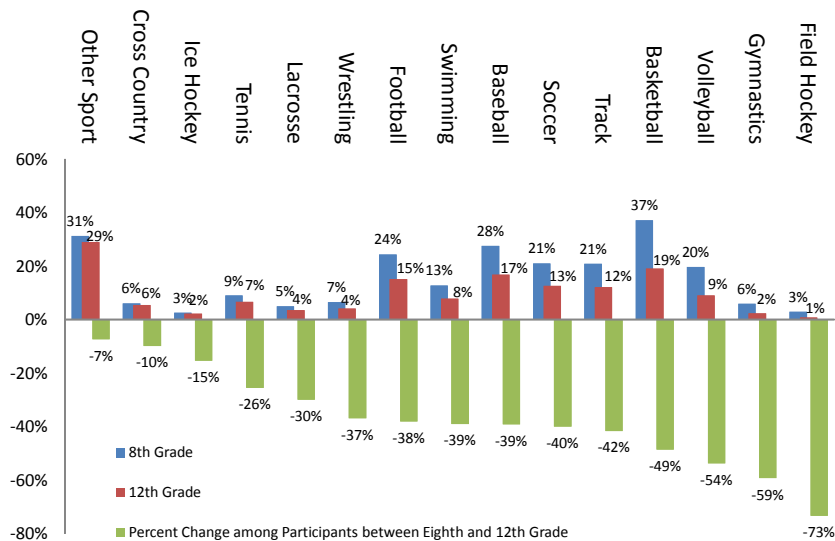
ATHLETIC PARTICIPATION AND ATTRITION

The opportunity streams in youth sport flow at different rates and speeds. Indeed, athletic interest and participation do not simply “add up” or accumulate across high school, but rather, athletes come and go, enter and leave sports in great numbers. We suspected that some of the same social and cultural factors that shape involvement and achievement in education and the work place also influence shifts in athletic participation—race and ethnicity, family socioeconomic background, type of community, and gender. Young people’s curiosity and participation can be fed or thwarted by cultural expectations, the size of budgetary support for some sports but not others, parental income level, and the level of community economic resources. Below we examine how some of these broader social, economic, and cultural forces are related to participation and attrition in sports.

Race and Ethnicity

Basketball is the most popular sport among whites and blacks, while soccer shows the highest participation rate among Hispanics. Scrutiny of Tables 5-7 shows 37% of eighth-grade whites played basketball, along with 51% of their black and 35% of their Hispanic counterparts. By 12th grade, however,

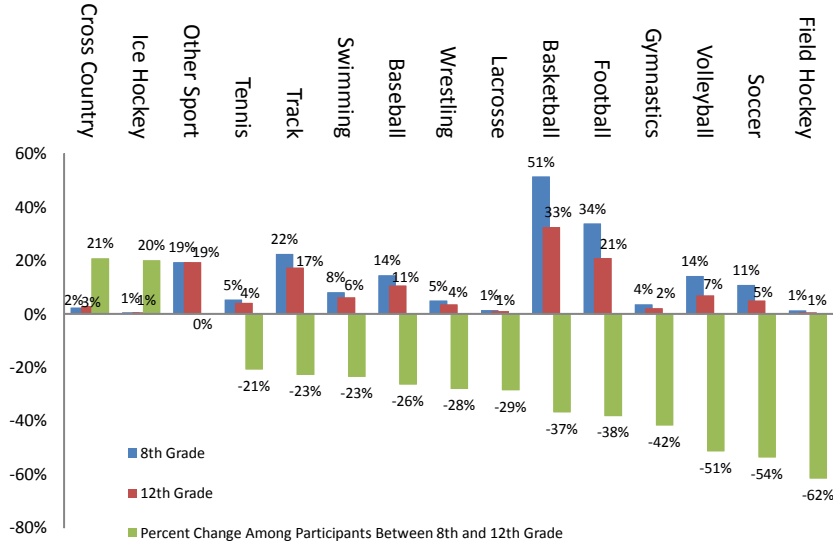
Table 5. White Participation Rates by Sport and Grade



just 16% of Hispanics played basketball, along with 33% of blacks and 19% of whites. Black participation is highest in traditional sports like basketball, football, and track, with soccer rising in popularity by 12th grade. The highest 12th-grade participation rates were among whites involved with “other sports” (29%), compared to 33% of blacks in basketball, and 20% of Hispanics in soccer.

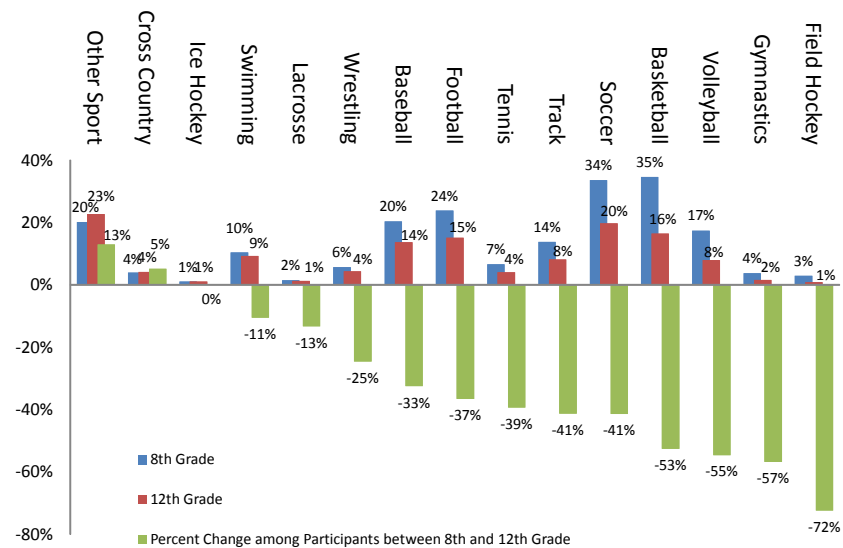
The results clearly show differences in the attrition between eighth grade and 12th grade across sports. (See the green bars.) On one end of the “attrition continuum” among whites, for example, the participation rates are lowest in “other sports” (-7%), cross country (-10%) and ice hockey (-15%), and highest in volleyball (-54%), gymnastics (-59%), and field hockey (-73%).

Table 6. Black Participation Rates by Sport and Grade



Among blacks, participation rates increase or remain the same between eighth grade and 12th grade in cross country (21%), ice hockey (20%), and “other sports” (0%), while attrition occurs between -38% and -62% in football, gymnastics, volleyball, soccer, and field hockey. While participation rates increased among

Table 7. Hispanic Participation Rates by Sport and Grade



Hispanics across the high school years in “other sports” (13%) and cross country (5%), attrition was evident in soccer, basketball, volleyball, gymnastics, and field hockey (with attrition rates ranging between -41% and -72%).

It is notable that participation rates in “other sports” among Hispanics increased by 13% between eighth grade and 12th grade, remained the same among blacks, and generated the lowest attrition rate (-7%) among whites. Indeed, “other sports” ranked first in participation among white and Hispanic 12th-graders.

Finally, Table 8 depicts the sports with the highest and lowest participation rates by sport across racial and ethnic groups. Table 9 breaks out attrition rates across sports by race and ethnicity. Some of these results suggest that attrition is lowest in sports that can be done alone or in small groups like tennis, cross country and swimming.

Family Socioeconomic Level

Social inequality influences many aspects of life, including the provision of educational opportunity as well as athletic opportunities. As children bob and weave through the latticework of school and community sports, parents incur costs. Program fees, equipment purchases, donations,

Table 8. Highest and Lowest Participation Rates by Sport and Race/Ethnicity

	Top Three Participation Rates	Bottom Three Participation Rates
Whites		
8 th grade	1. basketball 37% 2. other sports 31% 3. baseball/softball 28%	3. cross country, gymnastics 6% 2. lacrosse 5% 1. field hockey, ice hockey 3%
12 th grade	1. other sports 29% 2. basketball 19% 3. baseball 17%	3. lacrosse, wrestling 4% 2. gymnastics, ice hockey 2% 1. field hockey 1%
Blacks		
8 th grade	1. basketball 51% 2. football 34% 3. track and field 22%	3. gymnastics 4% 2. cross country 2% 1. field hockey, ice hockey, lacrosse .5%
12 th grade	1. basketball 35% 2. soccer 34% 3. football 24%	3. tennis, wrestling 4% 2. gymnastics, cross-country 2% 1. field hockey, ice hockey, lacrosse .5%
Hispanics		
8 th grade	1. basketball 35% 2. soccer 34% 3. football 24%	3. field hockey 3% 2. lacrosse 2% 1. ice hockey .5%
12 th grade	1. other sports 23% 2. soccer 20% 3. basketball 16%	3. cross country, tennis, wrestling 4% 2. gymnastics 2% 1. field hockey, ice hockey, lacrosse 1%

Table 9: Summary of Lowest & Highest Attrition Rates by Sport and Race/Ethnicity

	Lowest Four Attrition Rates	Highest Four Attrition Rates
Whites	1. other sports -7% 2. cross country -10% 3. ice hockey -15% 4. tennis -26%	4. basketball -49% 3. volleyball -54% 2. gymnastics -59% 1. field hockey -73%
Blacks	1. cross country 21% 2. ice hockey 20% 3. other 0% 4. tennis -21%	4. gymnastics -42% 3. volleyball -55% 2. soccer -54% 1. field hockey -62%
Hispanics	1. other 13% 2. cross country 5% 3. ice hockey 0% 4. swimming -11%	4. basketball -53% 3. volleyball -55% 2. gymnastics -72% 1. field hockey -72%

transportation costs, uniform purchases, consultant fees, medical bills, and special school taxes add up. School-based programs in wealthier communities typically have greater assets to expend on organized sports than programs located in working-class or impoverished communities. Dual-parent families or those with more disposable income find it easier to support a child’s athletic involvement than single-parent or low-income families. Consistent with this framework, we examined the relationship between social inequality and attrition in sport. Parents’ level of education was used as a proxy measure of socioeconomic status, and respondents were divided into upper, middle, and lower family socioeconomic levels.

The results belied theoretical expectations. A comparison of Tables 10, 11, and 12 shows that attrition rates are lowest among teens from middle-class families and generally higher among upper-class teens. Results also show that teens from lower-class families showed attrition rates above -40% in five sports (i.e., soccer, gymnastics, basketball, volleyball, and field hockey), their middle-class and upper-class counterparts did so in six and seven sports, respectively. And it was students from middle-class families who experienced the lowest attrition rates in ice hockey and cross country, as well as increased participation rate in “other sports.” Similarly, and across all family socioeconomic levels, the sports of field hockey, gymnastics, volleyball, basketball, soccer, and track generated similar

Table 10. Low Family Socioeconomic Level and Participation Rates by Sport and Grade

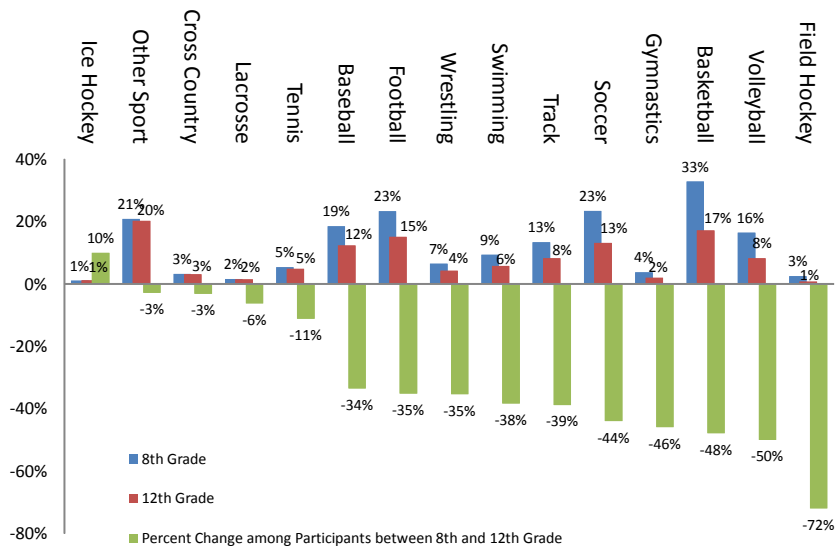
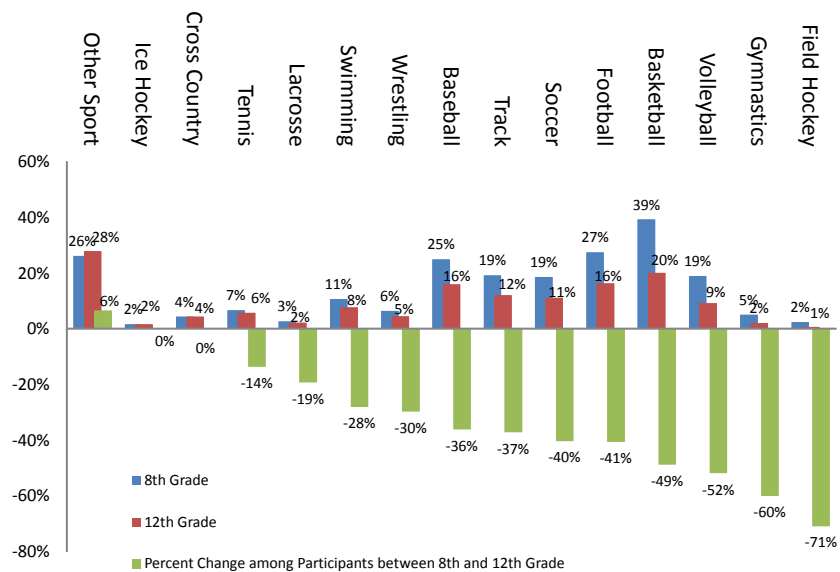


Table 11. Middle Family Socioeconomic Level and Participation Rates by Sport and Grade



rates of attrition, ranging from -37% to -72%.

Finally, the participation rankings across family socio-economic levels show that, despite declining participation rates across time, the traditional sports of basketball and football ranked among the top-three sports in both eighth grade and 12th grade. See Table 12. And by 12th grade and across all three family socioeconomic levels, “other sports” registered the highest participation rates. Finally, Table 13 shows the highest and lowest participation rates, while Table 14 (on next page) summarizes the lowest and highest attrition rates for eight sports.

These results point to the complexity that informs teenagers’ choices and movements into and out of specific sports or, among many, out of sport altogether. Whereas some teens from well-to-do families may leave one sport in order to explore

another, or choose to exit traditional school-based sports and tap the “other sport” options in their communities, the shifting interests of adolescents from middle-income and poorer families may take

Table 12. High Family Socioeconomic Level and Participation Rates by Sport and Grade

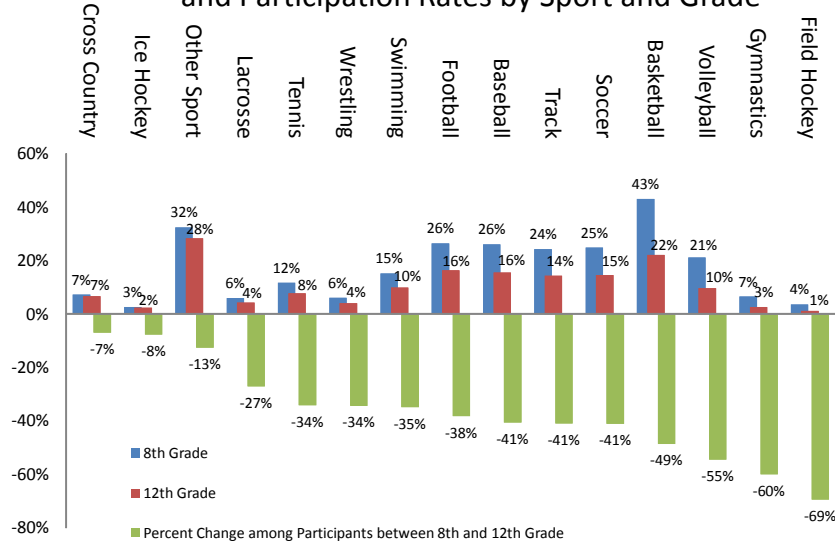


Table 13. Highest and Lowest Participation Rates by Sport and Family Socioeconomic Level

Grade	Top Three Participation Rates	Bottom Three Participation Rates
Low 8 th grade	Top Three Participation Rates 1. basketball 33% 2. soccer 23% 3. football 23%	Bottom Three Participation Rates 3. gymnastics 1% 2. lacrosse 1% 1. field hockey 1%
	12 th grade	3. gymnastics 2% 2. ice hockey 2% 1. field hockey 1%
Middle 8 th grade	Top Three Participation Rates 1. basketball 39% 2. football 27% 3. other sports 26%	Bottom Three Participation Rates 3. lacrosse 3% 2. gymnastics 2% 1. ice hockey 2%
	12 th grade	3. lacrosse 1% 2. field hockey 1% 1. ice hockey .5%
Upper 8 th grade	Top Three Participation Rates 1. basketball 43% 2. other sports 32% 3. football 26%	Bottom Three Participation Rates 3. gymnastics 3% 2. ice hockey 2% 1. field hockey 1%
	12 th grade	3. gymnastics 3% 2. ice hockey 2% 1. field hockey 1%

different routes to other sports or out of sport. The findings might also be owed to differences in the extent that schools financially support some sports at the expense of others. Clearly sport leaders and national governing bodies need to learn more about these movements and choices.

Metropolitan Status

Policymakers and youth sport advocates recognize that availability of athletic programs

can vary across urban, rural, and suburban communities. While the majority of U.S. citizens now live in or near large urban settings, other communities are located in geographic areas with sparser population density. The term “metropolitan statistical areas”^{vi} or “MSA” generally refers to three basic categories. First, “large MSA” refers to the 28 largest metropolitan statistical areas; i.e., New York NY-NJ, Los Angeles, Chicago, Philadelphia, Detroit, Washington DC, Dallas-Fort Worth, Boston, Houston, Atlanta, Seattle, Minneapolis, St. Louis, San Diego, Baltimore, Tampa-St Pete, Riverside-San Bernardino, Nassau-Suffolk, Anaheim-Santa Anna, Pittsburgh, Phoenix, Oakland, Cleveland, Miami, Newark, Denver, San Francisco, Kansas City.

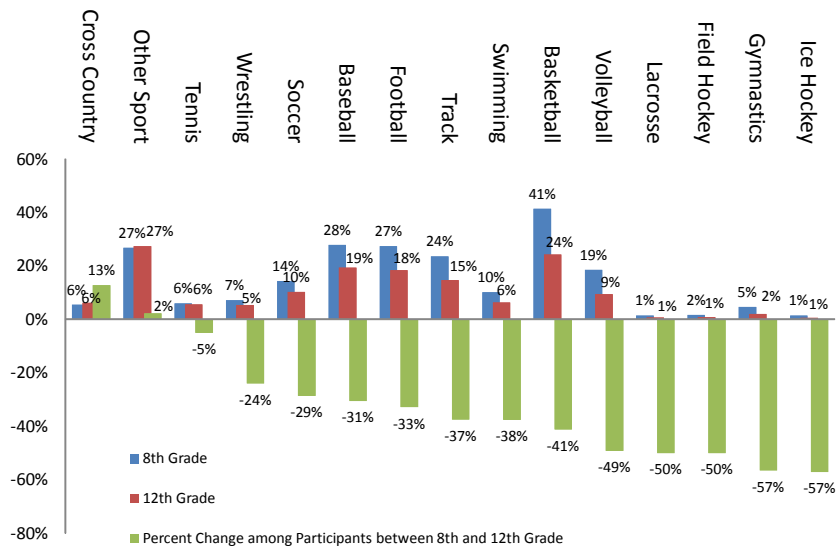
Second, “Other MSA” includes all metropolitan statistical areas or urban areas other than the 28 largest cities. Finally, “non-MSA” status refers to all areas not designated as MSAs and roughly includes towns and rural communities that are not adjacent to an urban area.

In this subsection attrition rates for each sport are broken out by grade level and MSA. See Tables 15-17. Generally, the results are

Table 14. Summary of the Lowest and Highest Attrition Rates by Sport and Family Socioeconomic Level

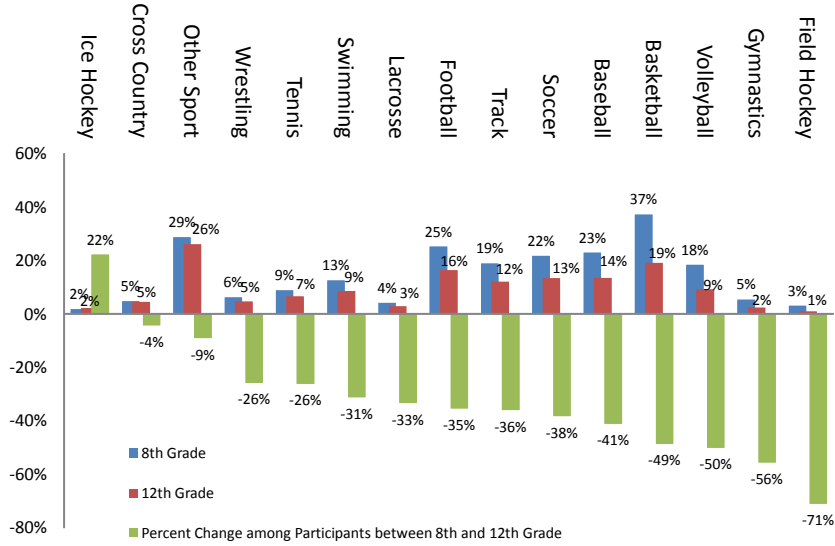
Socioeconomic Level	Lowest Four Attrition Rates	Highest Four Attrition Rates
Low	1. ice hockey 10% 2. other sports, cross country 3% 3. lacrosse 6 % 4. tennis 11%	4. gymnastics -46% 3. basketball -48% 2. volleyball -50% 1. field hockey -72%
Middle	1. other sports 6% 2. ice hockey 2% 3. cross country 0% 4. tennis -14%	4. basketball -49% 3. volleyball -52% 2. gymnastics -60% 1. field hockey -71%
Upper	1. cross country -7% 2. ice hockey -8% 3. other sports -13% 4. lacrosse -27%	4. basketball -49% 3. volleyball -58% 2. gymnastics -60% 1. field hockey -69%

Table 15. Non-MSA Participation Rates by Sport and Grade



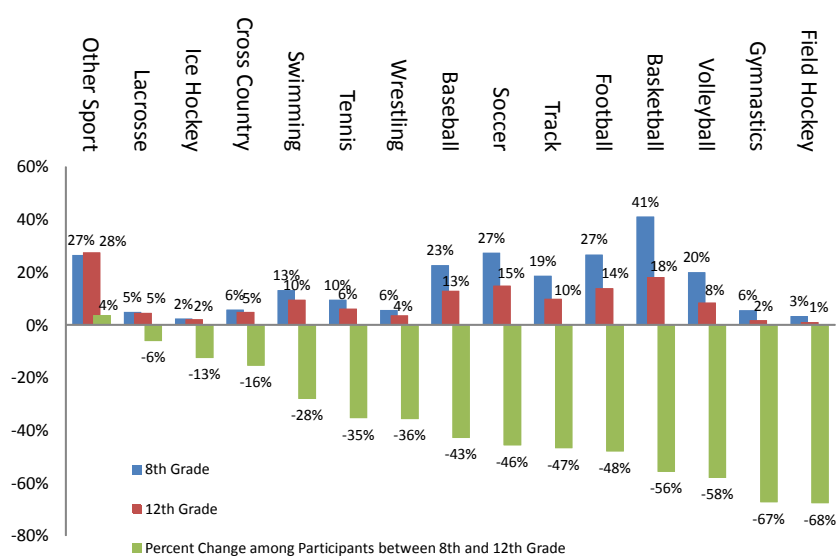
mixed, and finding a discernible pattern is difficult. The attrition rates in large MSA communities are highest in eight sports: basketball (-56%), volleyball (-58%), football (-48%), cross country (-16%), tennis (-35%), wrestling (-36%), soccer (-46%), and “other sports” (4%). Non-MSA communities, in contrast, registered

Table 16. MSA Participation Rates by Sport and Grade



the lowest attrition rates in 10 sports (from a 13% gain in cross country and a 2% gain in “other sports” to a -57% in ice hockey and gymnastics). It may be that larger urban schools offer fewer participation opportunities per capita than smaller rural or suburban schools.

Table 17. Large MSA Participation Rates by Sport and Grade



Tables 18 and 19 (on next page) show variation in

participation and attrition rates by sport. Among the eighth-graders, it is traditional sports like football, baseball/softball, and basketball that garner the highest participation rates across all three community types. But also note that by 12th grade, “other sports” ranks highest in participation for all three community environments, whereas basketball participation is next highest across all three environments.

Table 18. Highest and Lowest Participation Rates by Metropolitan Status

Non-City	Top Three Participation Rates	Bottom Three Participation Rates
8 th grade	1. basketball 41% 2. baseball/softball 28% 3. other sports 27%	3. field hockey 2% 2. lacrosse 1% 1. ice hockey 1%
12 th grade	1. other sports 27% 2. basketball 24% 3. baseball/softball 19%	3. gymnastics 1% 2. ice hockey 1% 1. field hockey 1%
Mid-City	Top Three Participation Rates	Bottom Three Participation Rates
8 th grade	1. basketball 37% 2. other sports 29% 3. football 25%	3. lacrosse, 4% 2. field hockey 3% 1. Gymnastics, ice hockey 2%
12 th grade	1. other sports 26% 2. basketball 19% 3. football 16%	3. lacrosse 3% 2. ice hockey, gymnastics 2% 1. field hockey 1%
Big City	Top Three Participation Rates	Bottom Three Participation Rates
8 th grade	1. basketball 41% 2. football, other sports, soccer 27% 3. baseball/softball 23%	3. lacrosse 5% 2. field hockey 3% 1. ice hockey 2%
12 th grade	1. other sports 28% 2. basketball 18% 3. soccer 15%	3. ice hockey 2% 2. gymnastics 2% 1. field hockey 1%

Table 19. Summary of Lowest and Highest Attrition Rates by Metropolitan Status

Non-City	Lowest Four Attrition Rates	Highest Four Attrition Rates
	1. cross country 13% 2. other sports 2% 3. tennis -5% 4. wrestling -24%	4. basketball -41% 3. volleyball, -49% 2. field hockey, lacrosse -50% 1. ice hockey, gymnastics -57%
Mid-City	Lowest Four Attrition Rates	Highest Four Attrition Rates
	1. ice hockey 22% 2. cross country -4% 3. other sports -9% 4. wrestling -26%	4. basketball -49% 3. volleyball -50% 2. gymnastics -56% 1. field hockey -71%
Big City	Lowest Four Attrition Rates	Highest Four Attrition Rates
	1. other sports 4% 2. lacrosse -6% 3. ice hockey -13% 4. cross country -16%	4. field hockey -68% 3. gymnastics -67% 2. volleyball -58% 1. basketball -56%

Gender

Several trends have been documented regarding U.S. boys' and girls' participation in competitive, organized school and community sports. First, Sabo & Veliz (2012) found that sports involvement grew for both genders between 2000 and 2010. Second, boys' participation increased faster than girls' participation across the decade, and during the 2009-2010 school year, 53 athletic opportunities were provided for every 100 boys compared to 41 opportunities for every 100 girls. In short, gender equity was not achieved. And finally, the number of high schools that reported they did not offer interscholastic sports programs increased from 8.2% to 15% across the historical time frame—and schools with disproportionately higher female enrollments were more likely to have dropped sports.^{vii}

A comparison of Tables 20 and 21 shows that the attrition rates between 8th-grade and 12th-grade girls in all sports are two to three times higher than the concomitant rates among boys. In tennis, for example, boys' attrition rate was -10% compared to -36% among girls. Other respective rates include -31% and -53% in soccer, -21% and -63% in gymnastics, and -36% and -64% in basketball. Boys' 12th-grade participation rate exceeded its 8th-grade level in cross country (26%), ice hockey (10%), and "other sports" (9%), whereas the rates among girls in these same sports were -35%, -50% and -12%, respectively.

Table 20. Percent Change among Participants between 8th-Grade and 12th-Grade Boys, by Sport

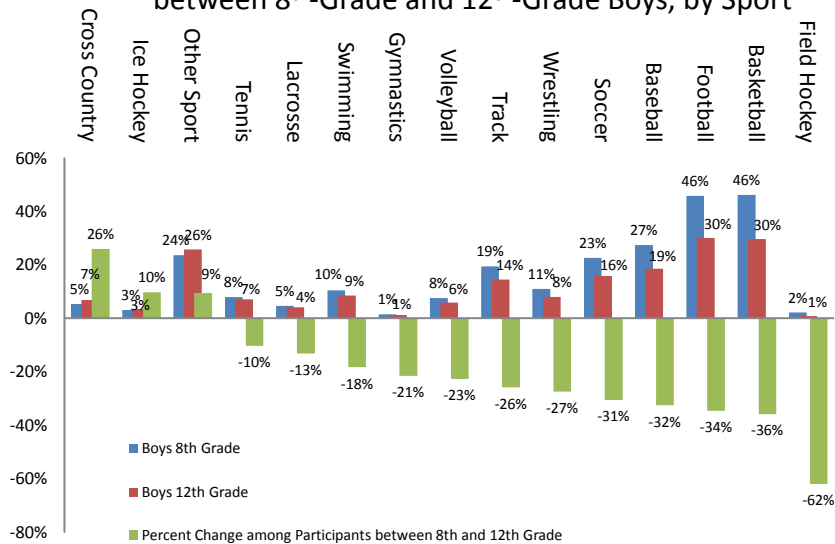
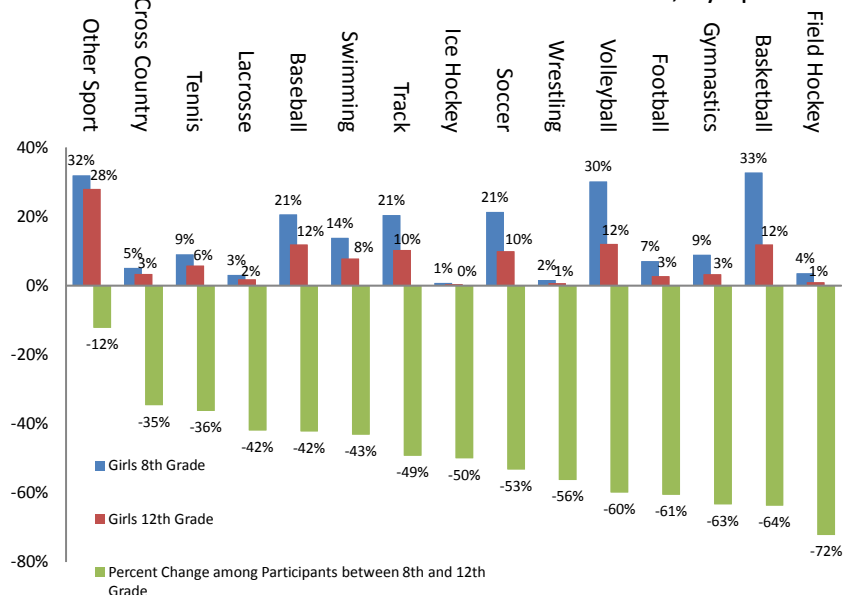


Table 21. Percent Change among Participants between 8th-Grade and 12th-Grade Girls, by Sport



Finally, a comparison of boys' and girls' top-ranked and bottom-ranked participation rates appears in Table 22.

Boys' participation base in traditional sports like basketball, football, and baseball is consistent across the high school years. Among girls, basketball and volleyball remain in the top-ranked sports among eighth-graders, but are joined by baseball/softball and basketball by the 12th grade. Finally, "other sports" remain highly ranked across grade levels and for both boys and girls. However, as Table 23 shows, boys' participation in "other sports" increased by 9% across the high school years, whereas girls' involvement decreased (-12%) across the time frame.

Table 22. Highest and Lowest Participation Rates by Gender

Boys	Top Three Participation Rates	Bottom Three Participation Rates
8 th grade	1. basketball, football 46% 2. baseball 27% 3. other 24%	3. ice hockey 3% 2. field hockey 2% 1. gymnastics 1%
12 th grade	1. basketball, football 30% 2. other sports 26% 3. baseball 19%	3. lacrosse 4% 2. ice hockey 3% 1. field hockey, gymnastics 1%
Girls	Top Three Participation Rates	Bottom Three Participation Rates
8 th grade	1. basketball 33% 2. other sports 32% 3. volleyball 30%	3. lacrosse 3% 2. wrestling 2% 1. ice hockey 1%
12 th grade	1. other sports 28% 2. baseball/softball, basketball, volleyball 12% 3. track, soccer 10%	3. cross-country, football, gymnastics 3% 2. lacrosse 2% 1. ice hockey, field hockey, wrestling 1%

Table 23. Highest and Lowest Attrition Rates by Gender

Boys	Lowest Four Attrition Rates	Highest Four Attrition Rates
	1. cross country 26% 2. ice hockey 10% 3. other sports 9% 4. tennis -10%	4. field hockey -62% 3. basketball -36% 2. football -34% 1. baseball/softball -32%
Girls	Lowest Four Attrition Rates	Highest Four Attrition Rates
	1. other sports -12% 2. cross country -35% 3. tennis -36% 4. lacrosse -42%	4. field hockey -72% 3. basketball -64% 2. gymnastics -63% 1. football -61%

Gender is a powerful predictor of attrition within sport across adolescence. Girls are leaving their sports at higher rates than boys. Part of the explanation is likely owed to their historical "late entry" into the institutional theater of school and community sports, spurred by the passage of Title IX in 1972. Our data suggest that their upward battle for equal access, institutional support, and a culturally sensitive home in sport has not been won. "Other sports" may offer some girls a new niche in athletics, but sadly, the greater attrition among girls in sport across the high school years parallels girls' larger decline in physical activity.^{viii}

Geographic Region

How do athletic participation and attrition within sports vary by geographic region? Parents, educators, and national governing body leaders may find the information in this section useful. Tables 24-27 below

depict eighth-grade and 12th-grade participation rates for each sport within four geographic regions. The rates of attrition are also provided.

Sports across all geographic regions show marked declines in participation across the high school years, with the highest attrition rates occurring in the West. One way to gauge the differences is to simply compare the number of sports in each region for which the attrition rates were above 40%; i.e., Northeast = 6, North Central = 7, South = 5, and West = 8. Readers can assess variation within each sport. Participation in basketball, for example, is consistent across geographic region—about 38-40% in eighth grade and 20-21% by 12th grade. Football participation rates range from 23%-27% in eighth grade and dip to 15-17% in 12th grades.

Table 24. Northeast Participation Rates by Sport and Grade

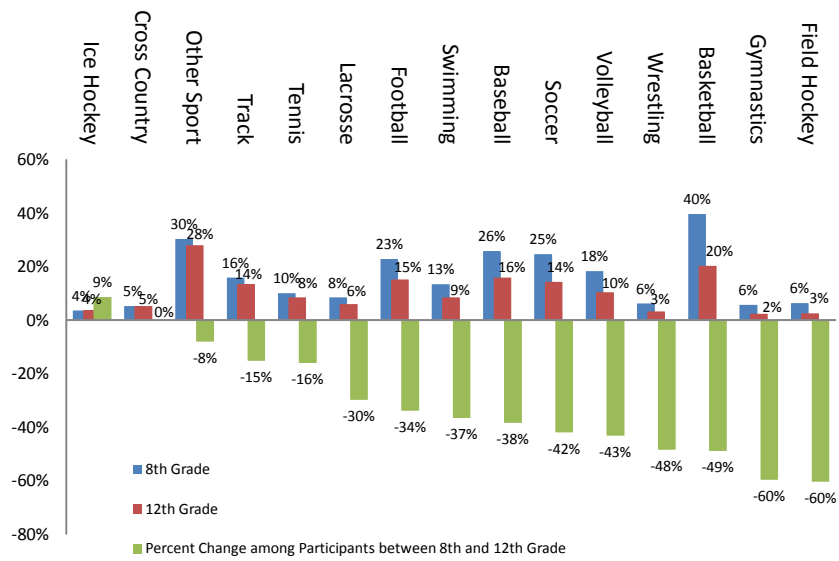
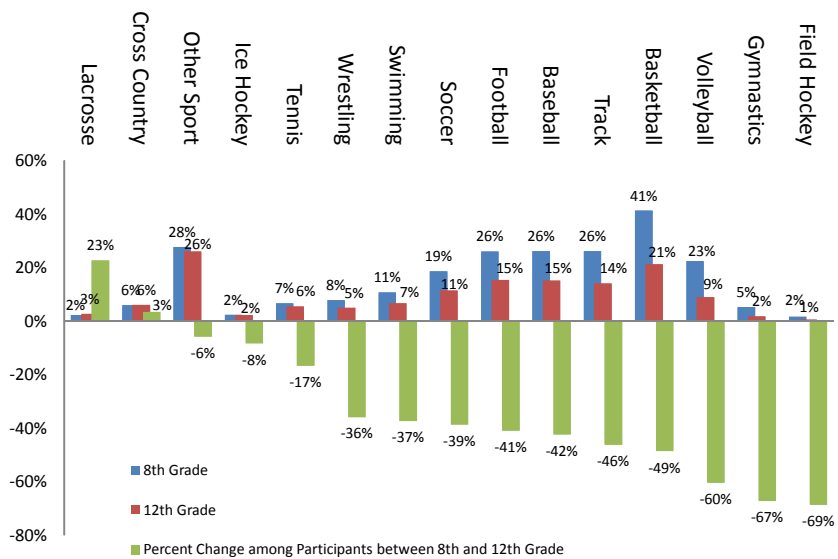


Table 25. North Central Participation Rates by Sport and Grade



Participation in “other sports” earned “top three” rankings in all four geographic regions. In addition, whereas attrition occurred for almost all sports from eighth grade to 12th grade, participation in “other sports” actually increased in the South (11%) while decreasing slightly in other regions. This suggests that some teens who quit traditional sports in the South may opt for athletic opportunities elsewhere.

Table 26. South Participation Rates by Sport and Grade

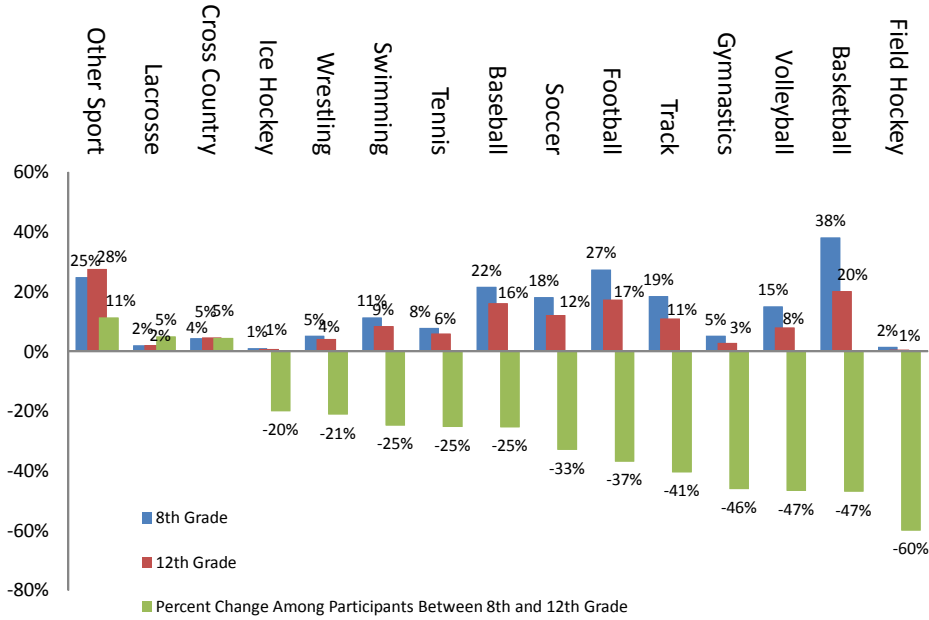


Table 27. West Participation Rates by Sport and Grade

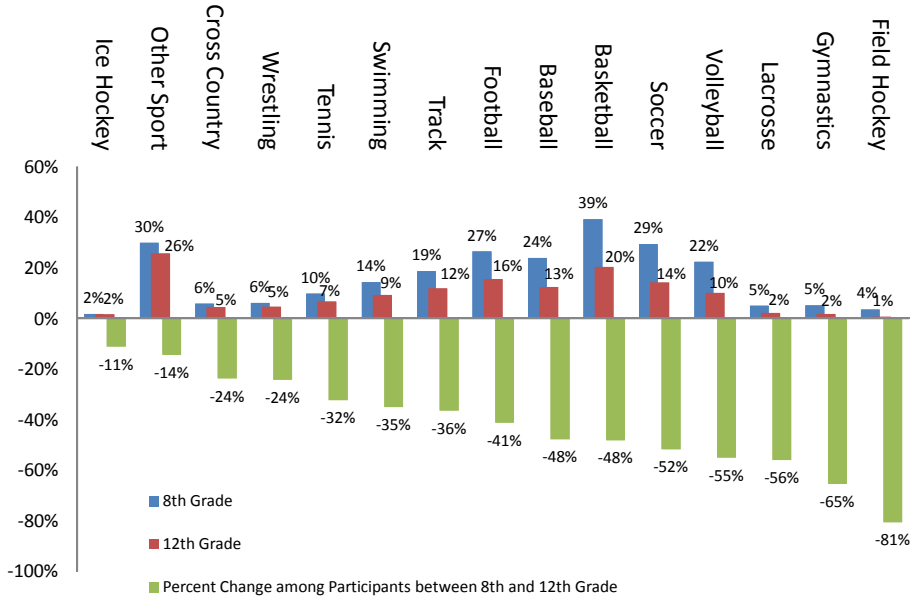


Table 28. Highest and Lowest Participation Rates by Geographic Region

Northeast 8 th grade	Top Three Participation Rates	Bottom Three Participation Rates
	1. basketball 40% 2. other sports 30% 3. baseball/softball 26%	3. field hockey, gymnastics, wrestling 6% 2. cross country 5% 1. ice hockey 4%
12 th grade	1. other sports 28% 2. basketball 20% 3. baseball/softball 19%	3. cross country 5% 2. field hockey, wrestling 3% 1. gymnastics 2%
North Central 8 th grade	Top Three Participation Rates	Bottom Three Participation Rates
	1. basketball 41% 2. other sports 28% 3. baseball/softball, football, track 26%	3. cross country 6% 2. gymnastics 5% 1. ice hockey, lacrosse, field hockey 2%
12 th grade	1. other sports 26% 2. basketball 21% 3. baseball/softball, football 15%	3. lacrosse 3% 2. gymnastics, ice hockey 2% 1. field hockey 1%
South 8 th grade	Top Three Participation Rates	Bottom Three Participation Rates
	1. basketball 38% 2. football 27% 3. other sports 25%	3. cross country 4% 2. field hockey, lacrosse 2% 1. ice hockey 1%
12 th grade	1. other sports 28% 2. basketball 20% 3. football 17%	3. gymnastics 3% 2. lacrosse 2% 1. field hockey, ice hockey 1%
West 8 th grade	Top Three Participation Rates	Bottom Three Participation Rates
	1. basketball 39% 2. other sports, 30% 3. baseball/softball 23%	3. gymnastics, lacrosse 5% 2. field hockey 4% 1. ice hockey 2%
12 th grade	1. other sports 28% 2. basketball 18% 3. soccer 29%	3. cross country, wrestling 5% 2. gymnastics, ice hockey, lacrosse 2% 1. field hockey 1%

Table 28 depicts the top and bottom three participation rates by geographic region and grade level, while Table 29 (on the following page) shows the highest and lowest attrition rates by region.

Table 29. Lowest and Highest Attrition Rates by Geographic Region

Northeast	Lowest Four Attrition Rates	Highest Four Attrition Rates
	<ol style="list-style-type: none"> 1. ice hockey 9% 2. cross country 0% 3. other sports -8% 4. track and field -15% 	<ol style="list-style-type: none"> 4. field hockey, gymnastics 60% 3. basketball 49% 2. wrestling 48% 1. volleyball 43%
North Central	Lowest Four Attrition Rates	Highest Four Attrition Rates
	<ol style="list-style-type: none"> 1. lacrosse 23% 2. cross country 3% 3. other sports -6% 4. ice hockey -8% 	<ol style="list-style-type: none"> 4. field hockey -69% 3. gymnastics -67% 2. volleyball -60% 1. basketball -49%
South	Lowest Four Attrition Rates	Highest Four Attrition Rates
	<ol style="list-style-type: none"> 1. other sports 11% 2. lacrosse, cross country 5% 3. ice hockey -20% 4. wrestling -21% 	<ol style="list-style-type: none"> 4. field hockey 60% 3. basketball, volleyball -47% 2. gymnastics -46% 1. track and field -41%
West	Lowest Four Attrition Rates	Highest Four Attrition Rates
	<ol style="list-style-type: none"> 1. ice hockey -11% 2. other sports -14%% 3. cross country, wrestling -24% 4. tennis, -32% 	<ol style="list-style-type: none"> 4. field hockey -81% 3. gymnastics -65% 2. lacrosse -56% 1. volleyball 55%

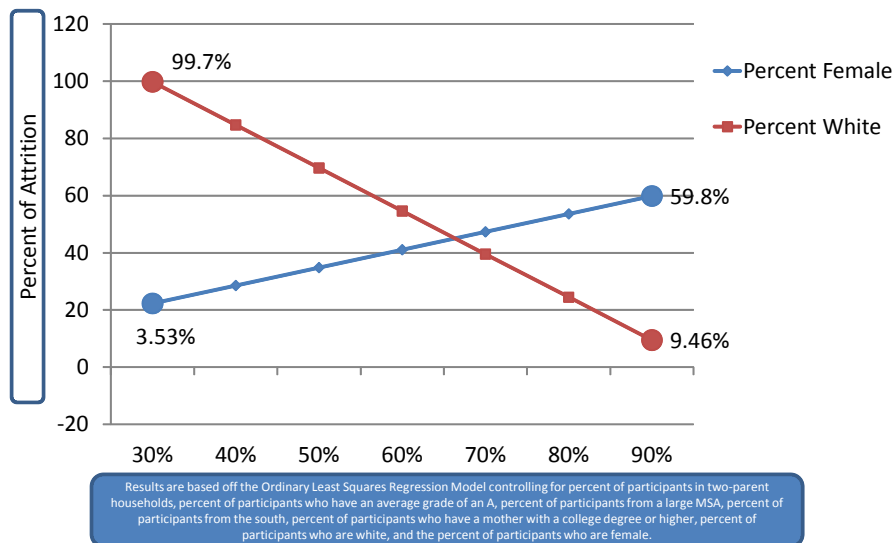
WHEN A DIFFERENCE MAKES A DIFFERENCE

Ralph Waldo Emerson observed that, “A difference, to be a difference, has to make a difference.” Several findings reported above suggest that drops in athletic participation during the high school years are owed to race and ethnicity, gender, family socioeconomic level, metropolitan status, or geographic region. While the descriptive data show that attrition is real, extensive, and evident in most sports, further statistical analysis was needed to assess the extent that attrition rates in school and community sport were significantly related to race and ethnicity, gender, family socioeconomic level, metropolitan status, or geographic region. In order to do so, “multifactorial analyses” were done to test the extent that each of the key factors measured in this study influenced changes in attrition at a statistically significant level. It is possible, for example, that because blacks and Hispanics are overrepresented among U.S. poor and working-class families, that differences in attrition might be more closely related to socioeconomic forces rather than race or ethnicity. Here is another example. Researchers sometimes assume that athletic participation contributes directly to the self-esteem of high school athletes, but it may actually be the case for many athletes that other factors are more directly responsible; i.e., the fact that most of the young people who participate in U.S. high school sports came from middle-class and higher socioeconomic backgrounds more directly explains their psychological well-being than sports involvement. (See Appendix B for details on the multifactorial statistical analysis.)

The cohort design and large samples used for this study allowed the researchers to test and compare whether or not attrition between eighth grade and 12th grade is significantly associated with race and ethnicity, gender, family socioeconomic level, metropolitan status, and geographic region.^{ix} Only the statistically significant results are reported below.

The line graph in Figure 1 shows that as the percentage of whites across all sports increases, the rate of attrition declines. Specifically, for each 1% increase in the percentage of whites involved with all sports, there is a 1.5% decrease in the rate of attrition. Figure 1 also illustrates that the attrition rates for girls between eighth grade and 12th grade in all sports are two to three times higher than among boys. For every 1% increase in the percentage of girls across all sports, there is a .63% increase in the attrition rate.^x Stated simply, the more girls involved with a sport, the higher the attrition rate. Conversely, the more boys in a sport, the lower the attrition rate.

Figure 1: Predicting Attrition Rates as a Function of the Percent of Female Participants and the Percent of White Participants within Competitive Sports (Holding Other Factors Constant)



These findings showed that attrition across the high school years is more significantly owed to gender and race/ethnicity than family socioeconomic level, metropolitan status, or geographic region. This does not mean that many teens from poor families do not decide to drop out of sports because their parents cannot afford to pay fees or purchase equipment, or that urban teens do not encounter unique transportation obstacles that make it tough to stay involved with the sport of their choice. Rather it suggests that the attrition rates across sports may be a function of the structural components embedded within sport. For instance, because field hockey tends to have a higher percentage of female participants, this may limit the amount of funding the sport receives and could restrict the number of participants who can participate in this sport. Finally, sports are not magic kingdoms, apart from the larger social and historical patterns of inequality. Fundamentally, youth sports are institutional resources and, as such, enmeshed by larger social and economic inequalities that disproportionately influence girls and women as well as racial and ethnic minorities.

CONCLUSION

This study provides information and analysis for social scientists, sport leaders, and policymakers affiliated with the Aspen Institute Project Play. We also included a profile for each sport in the MTF database so that athletic administrators, coaches, educators, health planners, and parents could assess participation within and across youth sports. Ironically, the United States probably has the largest percentage of youth involved with organized school and community sports in the world, but there is little social scientific research to inform our assessment of young people's passage through the gateway of sports. The ongoing national surveys funded by the U.S. Department of Education offer scholars an excellent resource to evaluate sports participation and its links to physical activity, health behaviors, and educational gains.^{xi}

This study focused on how athletic participation patterns change across the high school years, and whether involvement significantly differs by race and ethnicity, gender, family socioeconomic level, metropolitan status, and geographic region. The results confirm that mainly girls and racial and ethnic minorities exhibit the highest attrition rates in U.S. high school and community sports. Our findings do not explain how or why so many teens leave sports between eighth grade and 12th grade. Previous research suggests that young people drop out of a sport for lots of reasons. Some leading personal reasons include "lack of interest," "sports are not fun," "wanting to focus more on studying and grades," and injury or health issues. Parents and adolescents also point to institutional factors that can either pull young people on board sport or jettison them, such as "the school did not offer sports I like" or "no programs in the school or community."^{xii} The finding that more girls than boys choose to explore "other sports" during adolescence may indicate that traditional sports may not be as engaging for girls and that they need other programming.

Social or organizational factors may also influence attrition. Eighth-graders are old enough that for the first time they can opt for a sport that grabs their interest as opposed to simply having their parents or guardians sign them up. But many find their chosen sport does not meet their interest, or when the entry-level junior varsity or freshman team disappears, they discover that their skill level no longer "cuts it" in varsity sports where competition is increasingly consolidated among the very best. In many school districts both "tradition" and the existing leadership hierarchy allocates more resources to traditional boys' sports (e.g., football, basketball, baseball/softball) at the expense of girls' sports in general and lesser-status boys' sports (e.g., cross country, tennis, volleyball). Lesser-funded sports are left to wither on the organizational and cultural vines.

It is adolescent girls who comprise the greatest outflow from the opportunity pipeline of U.S. school and community sports. Individual-level, blame-the-quitter arguments and highlighting "lack of interest" or "not fun" explanations cannot account for the volume of girls' disaffection for existing sport organizations across adolescence. If educators, thought leaders, health planners, and policymakers are going to stop the hemorrhage and maximize athletic participation and physical activity among American youth, the disproportionately higher attrition among girls needs to be recognized and tackled. Jay

Coakley^{xiii} observes that whereas sports remain largely sex-segregated experiences for adolescents, most forms of sport and physical activity among adults occur in mixed-gender settings. Current school sports experiences are thus failing to prepare teens—and especially girls—to be active adults. Similarly, a greater sensitivity and organizational commitment to racial and ethnic diversity within all youth sports may encourage wider opportunity and pluralism in schools and communities. The sport experience among high school students is basically not meeting the needs and interests of many girls and minorities. The policy “elephant in the room” of youth sport reform is what to do about it.

The fact that so many adolescents gravitate toward “other sports” or leave sports entirely needs policy attention. Some younger adolescents may not have the knowledge or physical skills to meet coaches’ expectations during the early high school years, so they get left behind. Put another way, lots of young people may seek other athletic options because they do not find a niche or enough adult or programmatic support in the mainstay sports. The second-class status and limited institutional resources may also nudge girls toward the exit doors of their lesser-status sports. Clearly more evaluation is needed to assess not just the experiences and motivations of athletes within specific sports, but a systematic review of institutional investment and cultural support across sports and teams also makes sense.^{xiv} In this context, despite the fact that so many teens opt to participate in “other sports,” the overall attrition rates across adolescence remain high. Some teens may exit traditional sports because their interests and abilities are not being met.

This report does not explain how or why “other sports” attract so many teens, but it does document low attrition rates among participants across many sports. Given the high rates of attrition in traditional sports, the emerging popularity of “other sports” can be positively viewed as a new growth sector for athletic participation and physical activity. Many contemporary teens are used to acting on consumer options—if bored or your needs are not being met, then switch channels or click to another website. Since so many teens find “other sports” attractive, accessible, or socially engaging, this expanding locus for adolescent physical activity merits more attention and assessment. How can youth sport advocates, public health promoters, educators, and entrepreneurs better understand and capitalize on the emerging “other sport” sector?

While racial and ethnic minorities are few in number in many school and community sports, diversity is evident in sports like basketball, football, soccer, tennis, and track and field. Such sports may bring young people from diverse racial and ethnic backgrounds together, and retain their diversity during the high school years. Regretfully, very little is known about changing race relations in U.S. high school sports, which hampers reform and policy efforts.

Finally, the most glaring and evidence-based finding documented by this study is that marked attrition rates occur within most of the sports included in the sample. The Aspen Institute’s Sports & Society program (Project Play) aims “to get and keep more children of diverse backgrounds involved in sports, with a focus on addressing the epidemic of physical inactivity, health and education needs of communities.” Perhaps the greatest policy challenge flowing from this report is that reforms are

needed within each sport and across U.S. youth sports that stem the tide of attrition and keep adolescents engaged and physically active. Reform is necessary to create a “sport for all” sustainable system of athletic practices that maximize participation and retention.

Next Steps

The Aspen Institute Project Play seeks to promulgate constructive assessment and positive change in youth sports. Key findings in this report suggest areas for policy debate, future research, and critical reflection. The ideas for further discussion below are distilled from the findings in this report.

1. We now know what attrition looks like in competitive, organized school and community sports, and we can describe participation and attrition rates across the high school years. But we do not understand how and why attrition occurs. To what extent is attrition considered the “norm” by coaches, athletic administrators, and NGB leaders? How can policymakers be sensitive to and better understand how the unique histories and subcultures within each sport may either foster or guard against attrition? What factors (both positive and negative) influence attrition in each sport? How can leaders within specific sports rethink and reform administrative and coaching practice, as well as the ways their sports are organized, in order to maximize participation across adolescence?
2. What do we know about teen life after attrition? What happens when teenagers leave sport? Why do some leave one sport for another and, in effect, stay involved? How many leave sport entirely? How does the flow of teens in and out of competitive, organized school and community sports influence their relationships with peers and family, teachers and school officials? How do shifts in and out of competitive, organized school and community sports shape overall involvement in physical activity, educational achievement, and health behaviors? Is leaving sport bad? When is leaving a sport a good decision for teens?
3. How can social scientists and public health advocates better measure and assess linkages among youth sports participation, physical activity, obesity rates, and adolescent health outcomes? How do adolescent health behaviors and risks vary across sports and within specific sports? Which sports do the best job at facilitating health behaviors among athletes? There is a wealth of data within a variety of government-funded national surveys that can be analyzed in order to untangle these associations, thereby infusing current efforts to reimagine and reform youth sports with evidence-based analysis.
4. If so many teens are getting involved with “other sports,” what’s the attraction? Just what are the “other sports” that so many teens are gravitating to? Where can we find reliable information about teen participation in non-traditional sports? Why is attrition lower in “other sports” than most of the traditional competitive, organized school or community sports? How does the “other-sport” option get more teens to stick with sport as they move through adolescence?
5. Are “other sports” the new growth sector in competitive, organized school or community sports for teens? What are teens and parents finding in “other sports” that either complements or

substitutes for traditional competitive, organized school or community sports? What kinds of “other sports” are girls participating in? What perks boys’ interest and participation in “other sports?” To what extent do “other sports” provide same-sex or coed subcultures? Does the growth of “other sports” look different in metropolitan, smaller-city, or rural environments?

6. What do race relations look like in competitive, organized school and community sports? How does athletic participation foster friendship and pluralism among teens from diverse racial and ethnic backgrounds? Why is it that some sports show higher or lower rates of participation among racial and ethnic minorities?
7. Why are so many girls leaving the traditional competitive, organized school or community sports? What’s going on with girls? Why do traditional sports seem to be missing the mark for engaging girls’ spirits and physical energy? How do the gateways and exit ramps for girls vary by metropolitan status, family socioeconomic level, and geographic region?

APPENDIX A: PARTICIPATION PROFILES OF EACH SPORT

This report takes a first step toward describing and analyzing the extent that athletic opportunities in 14 sports are provided across socioeconomic levels, racial and ethnic groups, gender, geographic region, and metropolitan status. This appendix contains profiles for each of the 15 sports in this study. Each profile includes 10 tables, which break out participation and attrition rates across grade levels, race and ethnicity, family socio-economic level, metropolitan status, and gender. Please contact the authors with questions. See final PowerPoint slides.

Contact the authors for these tables.

APPENDIX B: DESIGN AND DATA ANALYSIS

Participants

The data analyzed here were collected as a part of the Monitoring the Future study of American secondary school students, which is an annual cross-sectional survey conducted by the University of Michigan's Institute for Social Research (Johnston et al., 2012). The MTF study surveys eighth-grade, 10th-grade, and 12th-grade students on a range of different topics like substance use, academic performance, and competitive sports participation. For the purposes of this study, MTF data collected from eighth-grade and 12th-grade students between 2006 and 2011 were merged. Given that the MTF survey instrument began asking adolescents about the different types of competitive sports they participated in during the past 12 months during the 2006 survey year, this year was chosen as the initial starting point for this study. Merging the data for all the years results in a total unweighted sample size of 47,255 adolescents (eighth-graders $n = 32,442$, 12th-graders $n = 14,813$) and a total weighted sample size of 47,268 adolescents (eighth-graders $n = 32,425$, 12th-graders $n = 14,843$).

Dependent Measures – Attrition Rates

Of particular importance for this study, the MTF survey asked students about different types of competitive sports participation. The primary question provided to respondents was as follows: "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)." The competitive sports that respondents could select included (but were not limited to^{xv}): baseball/softball, basketball, cross country, field hockey, football, gymnastics, ice hockey, lacrosse, soccer, swimming, tennis, track and field, volleyball, wrestling, and "Other sport." This series of questions that included 15 different sports were used to create participation rates for each sport among eighth-graders and 12th-graders across all survey years (participation rates combining all the data between 2006 and 2011) and within each survey year (i.e., participation rates for 2006, 2007, 2008, 2009, 2010, and 2011).

Accordingly, attrition rates (expressed as percentages) for each sport were constructed by dividing the participation rate among 12th-graders by the participation rate among eighth-graders (e.g., 12th-grade participation rate in baseball/softball [15%] divided by the eighth-grade participation rate in baseball/softball [24%]: $15\%/24\% = .625$). Once this value was obtained from dividing the 12th-grade participation rate by the eighth-grade participation rate (i.e., the retention rate), this value was then subtracted by 1 and multiplied by 100 in order to obtain the attrition rate as a percentage for each sport (e.g., $(1 - .625) * 100$ [note that .625 is the retention rate for baseball/softball]). The resulting percentage was then given a negative (minus) sign to indicate the loss in participation. Please note that if participations rates increased, this would result in a double negative, i.e., a positive percentage, to show a gain in participation. The equation below provides how attrition rates were constructed for each sport.

Step 1: $(12^{\text{th}}\text{-grade participation rate}) / (\text{eighth-grade participation rate}) = \text{Retention rate}$

Step 2: $(1 - \text{retention rate}) * 100 = \text{Attrition rate as a percentage}$

Step 3: Add negative sign to percentage to indicate a decline in participation rates

For the analysis, attrition rates were constructed for each sport across all survey years to provide a descriptive snapshot of which sports had the highest and the lowest attrition rates between eighth grade and 12th grade (attrition rates for 15 sports, $n = 15$). Moreover, attrition rates were also constructed for each sport within each survey year in order to examine some of the sport-level characteristics that can account for the variation in attrition rates across these 15 sports (attrition rates for 15 sports measured during six consecutive years [$15 * 6$], $n = 90$).

Independent Measures – Sport-Level Characteristics

Seven sport-level characteristics were created within each survey year in order to develop independent measures to help account for the variation in attrition rates across the 15 sports. The characteristics used were chosen based on certain factors like gender, race, socioeconomic status, selection effects, and geographic location being found to influence adolescent opportunities to participate in organized sports. Accordingly, these sport-level measures were constructed by using the percentage of participants within each sport who were female (i.e., gender), the percentage of participants who were white (i.e., race), the percentage of participants who indicated having a mother with a college degree or higher (i.e., socioeconomic status), the percentage of students indicating living in a two-parent household (i.e., socioeconomic status), the percentage of participants who indicated having an average grade of an A (i.e., selection effects), the percentage of participants who lived in the south (i.e., geographic location), and the percentage of participants who live in a large metropolitan area^{xvi} (i.e., geographic location).

Analytic Strategy

First, a descriptive presentation of the attrition rates among the 15 sports across all survey years was provided in order to examine which sports have the highest and lowest attrition rates between eighth and 12th grade. Second, we explored some of the descriptive statistics in relation to the sports-level characteristics to assess the structure of participants within the 15 different sports. Finally, an Ordinary Least Squares (OLS) regression analysis was used to examine which sport-level characteristics were associated with higher or lower attrition rates across the 15 sports. It should also be noted that the regression analysis used robust standard errors in order to take into account that the observations within each sport across the six consecutive survey years are non-independent. Given that a specific sport may produce similar estimates across each survey year, robust standard errors used in the analysis take into account that the observations within the same sport across the different survey years are correlated (i.e., the robust standard errors help provide unbiased estimates).

SOME RELATED REFERENCES

Baumert, P. W. and Thompson N.J. (1998). Health Risk Behaviors of Adolescent Participants in Organized Sports. *Journal of Adolescent Health*, Vol. 22, pp. 460-465.

Crosnoe, R. (2002). Academic and health-related trajectories in adolescence: The intersection of gender and athletics. *Journal of Health and Social Behavior*, Vol. 43, pp. 317-336.

Fejgin, N. (1994). Participation in High School Competitive Sports: A subversion of school mission or contribution to academic goals? *Sociology of Sport Journal*, Vol. 11, pp. 211-230.

Eccles, J. S., and Barber, B. L. (1999). Student Council, Volunteering, Basketball, or Marching Band: What kind of extracurricular involvement matters? *Journal of Adolescent Research*, Vol. 14, pp. 10-43.

Feldman, A., and Matjasko, J. (2005). The Role of School-Based Extracurricular Activities in Adolescent Development: A comprehensive review and future directions. *Review of Educational Research*, Vol. 75, pp. 159-210.

Fox, C.K., Barr-Anderson, D., Neumark-Sztainer, D., and Wall, D. (2010). Physical Activity and Sports Team Participation: Association with academic outcomes in middle school and high school students. *Journal of School Health*, Vol. 80, pp. 31-37.

Hastad, D. N., Segrave J.O., Pangrazi R., and Petersen G. (1984). Youth Sport Participation and Deviant Behavior. *Sociology of Sport Journal*. Vol. 1, pp. 366-373.

Hartmann, D. and Massoglia M. (2007). Reassessing the Relationship between High School Sports Participation and Deviance: Evidence of Enduring, Bifurcated Effects. *The Sociological Quarterly*, Vol. 48, pp. 485-505.

Holland, A., and Andre, T. (1987). Participation in Extracurricular Activities in Secondary School: What is known, what needs to be known? *Review of Educational Research*, Vol. 57, pp. 437-466.

Landers, D. M. and Landers, D. M. (1978). Socialization via Interscholastic Athletics: Its Effects on Delinquency. *Sociology of Education*, Vol. 51, pp. 299-303.

Lipscomb, S. (2007). Secondary School Extracurricular involvement and academic achievement: a fixed effects approach. *Economic of Education Review*, Vol. 26, pp. 463-472.

Pearson, J., Crissey, S.R., and Riegler-Crumb, C. (2009). Gendered Fields: Sports and advanced course taking in high school. *Sex Roles*, Vol. 61, pp. 519-535.

McNeal, R.B., Jr. (1995). Extracurricular Activities and High School Dropouts. *Sociology of Education*, Vol. 68, pp. 62-81.

Otto, L.B., and Alwin, D.F. (1977). Athletics, Aspirations, and Attainments. *Sociology of Education*, Vol. 50, pp. 102-113.

Pearson, J., Crissey, S.R., and Riegle-Crumb, C. (2009). Gendered Fields: Sports and advanced course taking in high school. *Sex Roles*, Vol. 61, pp. 519-535.

Sabo, D., Melnick, M. & Vanfossen, B. (1989). *The Women's Sports Foundation Report: Minorities in Sport*. New York: The Women's Sports Foundation. (Principal Investigator, Project Director.)

Sabo, D.F., Melnick, M.J., and Vanfossen, B.E. (1993). High School Athletic Participation and Post-Secondary Educational and Occupational Mobility: A focus on race and gender. *Sociology of Sport Journal*, Vol. 10, pp. 44-56.

Sabo, D., Melnick, M. & Vanfossen, B. (1992). Educational effects of interscholastic athletic participation on African-American and Hispanic youth. *Journal of Adolescence*, Vol. 27, Issue 106, pp. 295-308.

Sabo, D., Melnick, M. & Vanfossen, B. (1992). Effects of interscholastic athletic participation on the social, educational, and career mobility of Hispanic boys and girls. *International Review of Sport Sociology*, Vol. 27, Issue 1, pp. 57-75.

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

Schafer, W. E. (1969). Participation in Interscholastic Athletics and Delinquency: A Preliminary Study. *Social Problems*, Vol. 17, pp. 40-47.

Snyder, E.E. and Spreitzer, E. (1989). *Social Aspects of Sport*, 3rd ed. Englewood Cliffs: Prentice-Hall.

Sokol-Katz, J., Kelley M.S., Basinger-Fleischman L., and Braddock J.H. (2006). Re-Examining the Relationship between Interscholastic Sport Participation and Delinquency: Type of Sport Matters. *Sociological Focus*, Vol. 39, pp. 173-192.

Spreitzer, E. (1994). Does participation in interscholastic athletics affect adult development? : A longitudinal analysis of an 18-24 age cohort. *Youth & Society*, Vol. 25, pp. 368-387.

Spreitzer, E. and Pugh, M. (1973). Interscholastic Athletics and Educational Expectations. *Sociology of Education*, Vol. 46, pp. 171-182.

Veliz, P. (2012). The Role of Interscholastic Sport in Public High Schools: A Zero-Sum Game or a Bridge to Success? A dissertation, Faculty of the Graduate School of the University at Buffalo, State University of New York.

ⁱ Sabo, D. & Veliz, P. (2008). Go Out and Play: Youth Sports in America. East Meadow, NY: Women's Sports Foundation. Sabo, D. & Veliz, P. (October, 2012). The Decade of Decline: Gender Equity in High School Sports. Available at www.womenssportsfoundation.org. Sabo, Don & Veliz, Phillip (2008). Go Out and Play: Youth Sports in America. East Meadow, NY: Women's Sports Foundation. October 2008. Available at <http://www.womenssportsfoundation.org/home/research/articles-and-reports/mental-and-physical-health/go-out-and-play>. Sabo, D. & Veliz, P. (October, 2011). Progress without Equity: Gender the Provision of Athletic Opportunities in U.S. High Schools, 1993-94 through 2005-06. Released online through the Women's Sports Foundation. Link: <http://www.womenssportsfoundation.org/home/research/articles-and-reports/school-and-colleges/the-provision-of-hs-athletic-opportunity-in-the-us-by-gender-1993-94-through-2005-06>. Sabo, D. & Veliz, P. (2013). More Than a Sport: Tennis, Education & Health. White Plains, NY: USTA Serves. For overview of disadvantaged youth in sport, see M. Segas & G. B. Cunningham (January 2014), Sport Participation Rates among Underserved American Youth: Research Brief. Available at www.AspenProjectPlay.org.

ⁱⁱ A cohort design follows the same type of group across time. For example, a nationwide representative sample of middle-aged voters would be surveyed during 2010 and then another nationally representative sample (or cross-sectional slice) of middle-aged voters would be sampled during 2012. Please note that this is not a longitudinal "panel" design—which follows the same sample across time; e.g., a nationwide sample of middle-aged voters would be sampled during 2010 and the same sample would be surveyed again during 2012. A cohort design is considered a "solid" research design that produces more reliable results than simple cross-sectional or "one-time" survey data. While panel designs are the strongest for generating statistically reliable results, cohort designs are not as strong but are more advanced than simple cross-sectional surveys.

ⁱⁱⁱ The unweighted sample sizes for each sport for eighth-graders and 12th-graders only are: Baseball/softball (n = 9329), Basketball (n = 14,564), Cross Country (n = 2,272), Field Hockey (n = 1,012), Football (n = 10,282), Gymnastics (n = 1,985), Ice Hockey (n = 927), Lacrosse (n = 1,694), Swimming (n = 4,965), Soccer (n = 8,482), Tennis (n = 3,437), Track (n = 7,528), Volleyball (n = 6,617), Wrestling (n = 2,561), "Other Sport" (n = 12,038).

^{iv} Participation and attrition rates in this study were defined and measured as percentages. For example, if the participation rate for baseball/softball among eighth-graders was 10% (10 baseball/softball participants in the eighth grade divided by 100 students in the eighth grade) and the participation rate

among 12th-graders was 5% (five baseball/softball participants in the 12th grade divided by 100 12th-graders), then the attrition rate between eighth and 12th grade would be -50%. In short, the participation rate in 12th grade is half the size as the participation rate in eighth grade. See Appendix B for a detailed explanation regarding how the attrition rates was calculated across each sport).

^v An exception occurred during 2011 when the NFHS sounded an alarm that male participation in sports decreased by 3,000 males “for the first time in history.” Not only is this a very small number given the large number of participants in U.S. interscholastic sports, but the assessment did not account for the demographic dip in percentage of adolescent males in the wider American population. In other words, increases detected by the NFHS may be simply due to increases in the population, not general interest among these students to participate.

^{vi} For example, a metropolitan county is one that contains an urbanized area, or one that has a 25% commuter rate to an urbanized area regardless of population. Under the Core Based Statistical Areas used by the Office of Management and Budget (commonly referred to as “CBSA Codes”),^[6] a metropolitan county, or [Metropolitan Statistical Area](#), consists of (1) central counties with one or more urbanized areas (as defined by the [Census Bureau](#)) and (2) outlying counties that are economically tied to the core counties as measured by worker commuting data (i.e., if 25% of workers living there commute to the core counties, or if 25% of the employment in the county consists of workers coming from the central counties). Non-metro counties are outside the boundaries of metro areas and are further subdivided into [Micropolitan Statistical Areas](#) centered on urban clusters of 10,000-50,000 residents, and all remaining non-core counties.

^{vii} Sabo, D. & Veliz, P. (2012). *The Decade of Decline: Gender Equity in High School Sports*. Ann Arbor, MI: SHARP Center for Women and Girls.

^{viii} See Healthy People 2020 report, *Physical Activity Levels of High School Students—United States, 2010*. *Morbidity and Mortality Report*, June 17, 2011/60(23): 773-77.

^{ix} For details about the sampling design and procedures, contact the authors.

^x For readers who are uncomfortable with decimals, this statistic can be stated as: For every 10% increase in the percentage of girls across all sports there is a 6.3% increase in the attrition rate.

^{xi} Several ongoing government-funded nationwide surveys provide a gateway for researchers to conduct secondary analyses of how sports influence the lives of U.S. adolescents. These include the Add Health Survey, the Monitoring the Future Survey, the National Health and Nutrition Examination Survey, and the Youth Risk Behavior Survey.

^{xii} Sabo, D. & Veliz, P. (2008). *Go Out and Play: Youth Sports in America*. East Meadow, NY: Women’s Sports Foundation.

^{xiii} Jay Coakley, Ph.D., a leading sport sociologist and expert on youth sports, was one of the reviewers for this report.

^{xiv} For nuanced discussion of these issues see Tom Farrey (2008) *Game On: The All-American Race to Make Champions of Our Children*. New York: ESPN Books; and Michael Messner (2009). *It's All for the Kids: Gender, Families and Youth Sports*. Berkeley, CA: University of California Press.

^{xv} The MTF survey added five additional sports during the 2010 survey year. These sports were cheerleading, crew, equestrian, golf, and water polo. Given that these sports were not provided in the earlier versions of the MTF, they were recoded and included in the "other sport" category. Moreover, the MTF also included weightlifting as a competitive sport that adolescents could participate in during the past year. Although weightlifting is a competitive sport that both girls and boys can participate in, it is typically not commonly provided at the interscholastic level (NFHS 2013). As a result, weightlifting was recoded and included in the "other sport" category for the analysis.

^{xvi} The respondents were identified as residing in a large MSA if they were sampled from the 28 largest metropolitan statistical areas: New York NY-NJ, LA, Chicago, Philadelphia, Detroit, DC, Dallas-Ft Worth, Boston, Houston, Atlanta, Seattle, Minneapolis, St. Louis, San Diego, Baltimore, Tampa-St Pete, Riverside-San Bernardino, Nassau-Suffolk, Anaheim-Santa Ana, Pittsburgh, Phoenix, Oakland, Cleveland, Miami, Newark, Denver, San Francisco, and Kansas City.