

University of Richmond

UR Scholarship Repository

Honors Theses

Student Research

4-24-2023

The Effect of Youth Sports Participation on Health Outcomes for Immigrants in the United States

Emma Kennedy

University of Richmond, emma.kennedy@richmond.edu

Follow this and additional works at: <https://scholarship.richmond.edu/honors-theses>



Part of the [Civic and Community Engagement Commons](#), [Leadership Studies Commons](#), and the [Social Justice Commons](#)

Recommended Citation

Kennedy, Emma, "The Effect of Youth Sports Participation on Health Outcomes for Immigrants in the United States" (2023). *Honors Theses*. 1700.

<https://scholarship.richmond.edu/honors-theses/1700>

This Thesis is brought to you for free and open access by the Student Research at UR Scholarship Repository. It has been accepted for inclusion in Honors Theses by an authorized administrator of UR Scholarship Repository. For more information, please contact scholarshiprepository@richmond.edu.

Signature Page for Leadership Studies Honors Thesis

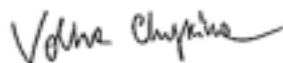
The Effect of Youth Sports Participation on Health Outcomes for Immigrants in the United States

Thesis Presented by

Emma Kennedy

This page certifies that this thesis prepared by Emma Kennedy has been approved by the thesis committee as satisfactory completion of the thesis requirement to earn honors in leadership studies.

Approved as to style and content by:



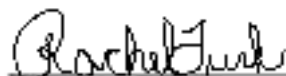
Dr. Volha Chykina, *Chair*



Dr. Chris von Rueden, *Member*



Dr. Thad Williamson, *Member*



Dr. Rachel Turk, *Member*



Dr. Kristin M. S. Bezio
Associate Dean for Academic Affairs
Jepson School of Leadership Studies

**THE EFFECT OF YOUTH SPORTS PARTICIPATION ON HEALTH
OUTCOMES FOR IMMIGRANTS IN THE UNITED STATES**

by

Emma Kennedy

Honors Thesis

Submitted to:

Jepson School of Leadership Studies
University of Richmond
Richmond, VA

April 24, 2023

Advisor: Dr. Volha Chykina

Committee members:

Volha Chykina

Assistant Professor of Leadership Studies

Thesis Adviser

Chair of Committee

Thad Williamson

Associate Professor of Leadership Studies and Philosophy, Politics, Economics and Law

Chris von Rueden

Associate Professor of Leadership Studies

Rachel Turk

Staff Psychologist (Athletics), Counseling and Psychological Services

CHAPTER OUTLINE

ABSTRACT.....	3
CHAPTER 1. INTRODUCTION.....	4
CHAPTER 2. THEORY AND HYPOTHESES.....	7
2.1 Health outcomes and disparities in the United States.....	7
2.2 Immigrant challenges in the United States.....	8
2.3 Role of sports in the United States.....	12
2.4 Hypotheses.....	15
CHAPTER 3. RESEARCH METHODS AND DATA ANALYSIS.....	20
3.1 Description of data used.....	20
3.2 Estimation strategy.....	20
3.3 Independent variables.....	21
3.4 Dependent variables.....	21
3.5 Control variables.....	24
3.6 Modeling strategy.....	27
CHAPTER 4. RESULTS.....	30
4.1 Primary results: general health.....	30
4.2 Secondary results: alcohol and gym use.....	37
4.3 Additional results: BMI.....	40
4.4 Additional results: diagnosed disorders and sickness.....	43
4.5 Additional results: mental health and depression.....	46
4.6 Additional results: alcohol use and fast food.....	49
4.7 Additional results: marijuana use and smoking.....	52
4.8 Limitations.....	55
CHAPTER 5. DISCUSSION, CONCLUSIONS, AND IMPLICATIONS.....	56
5.1 General health.....	56
5.2 Alcohol use.....	58
5.3 Policy recommendations.....	61
5.4 Conclusion.....	63
REFERENCES.....	64

ABSTRACT.

My study investigates the relationship between youth sports participation and health outcomes for immigrants using a quantitative statistical analysis of secondary data. Given the theory behind the relationships between physical activity level, sense of community, and health outcomes, I test the hypothesis that immigrants are positively impacted by youth sports participation on a significantly higher level compared to non-immigrants. Using Stata as my statistical analysis software tool, I measure the associations between immigrant status, sports participation, and various indicators of health such as BMI and reports of chronic illness. I found that sports participation is associated with improved general health overall, but the effect is significantly stronger only for adolescent immigrants and when they participate in sports three or more times per week. The key findings of this study support the argument that increasing opportunities for sports participation, specifically programs that involve physical activity at least several times per week for adolescents, should be a focus for policy makers and could be a practical way to improve some health disparities among immigrants in the U.S.

CHAPTER 1. INTRODUCTION

In the United States, our public health vision is healthy people in healthy communities. We want to promote equity in physical and mental health and prevent disease, injury, and disability for all people (U.S. Department of Health and Human Services, 2023). Understanding health disparities in the immigrant population in particular is crucial to this research and working towards these national health equity goals. Immigrants and their children are one of the fastest-growing demographic groups in the United States. In 2019, 44.9 million immigrants (foreign-born individuals) comprised fourteen percent of the national population, and twelve percent of native-born Americans had at least one immigrant parent (American Immigration Council, 2021). As such, the immigrant population is becoming more and more significant in considering the success and well-being of the American population as a whole. Healthier, happier immigrants are more likely to attain stable jobs, contribute to the economy and add value to communities. It also means less dependence on public assistance and less stress on the American healthcare system. Research shows that there tends to be considerable disparity across the domains of physical, mental, and social well-being between immigrants and non-immigrants. More specifically, health outcomes¹ of foreign-born individuals tend to deteriorate the longer they reside in America (Constant, 2015). Therefore, it is more imperative than ever to be aware of immigrant health overall, isolate factors that aid and inhibit positive outcomes, and develop concrete strategies aimed at improving the lives of immigrant children.

¹ “Health outcomes” includes presence of specific chronic health conditions (i.e., cardiovascular disease, asthma, cancer, obesity, diabetes), presence of mental health disorders, and level of physical activity.

One factor that has consistently shown to have an impact on public health outcomes for any general population is sports participation². Researchers have found that youth sports participation has multiple positive impacts on individuals, including educational and career success, economic and community impact, mental, emotional, and social health, as well as *physical health* (Andersen et al., 2019; Delgado et al., 2011; Johnson et al., 2016; PCSFN Science Board, 2020; Vedøy et al., 2020). We would expect that immigrants and their children also benefit from sports participation, but the extent of such benefits is not immediately clear. Immigrants are typically affected by certain factors, experiences, changes, and policies on a greater level than native-born people due to lower average socioeconomic status and accessibility to resources (Orrenius, 2009). This raises the question, does the factor of youth sports participation positively impact immigrants on a significantly higher level compared to non-immigrants in terms of health outcomes?

No research has been conducted to explicitly examine the potential difference in the impact level of sports participation on immigrants versus non-immigrants. The limited research conducted on understanding the association between sports participation and immigrant health outcomes has either focused on short-term effects on children alone or focused more on the social rather than physical effects, such as sense of community (Alfieri et al., 2019; Corvino et al., 2022). Furthermore, while some studies have been conducted to investigate the relationship between sports participation and health outcomes for humans in general (Anderson et al., 2019; Bailey, 2006; Hills et al., 2014), or differences in health outcomes between immigrants and non-immigrants (Constant, 2015; Frisco et al., 2019), or sports participation and immigrants

² "Sports participation" entails involvement in sports club versus high school level, frequency of sports participation, performance of individual versus team sports, and performance of indoor versus outdoor sports.

(Grimaldi-Puyana et al., 2018; Johnston et al., 2007; Kimbro, 2016), almost no research has been conducted to understand the complex relationship of all three, let alone for long-term health over decades. Therefore, in this thesis, I propose to fill this gap in knowledge. I explore the association between sports participation and specific dimensions in the physical and psychological domains of immigrant health and well-being for specific immigrant populations in the United States, and whether they differ from those of non-immigrants. Through an analysis of secondary data from The National Longitudinal Study of Adolescent to Adult Health (Add Health), a national longitudinal study, I expect to show that immigrants, specifically first-generation immigrants, will experience a more significant positive effect from youth sports participation on overall and long-term health outcomes. For example, it is expected that a twelve-year-old immigrant who participated in soccer throughout high school would exhibit a greater positive difference in overall health later in her mid-thirty's compared to the non-immigrant participant.

In Chapter 2, I explore the theory and issues of health disparities between immigrants and U.S. native-born residents as well as theories for the causes of these disparities, and I discuss the potential benefits and role of sports concerning these issues. From this background research on the theory and research gaps, I define my research thesis and variables. In Chapters 3 and 4, I discuss the research methodology design and results from the analyses. Lastly, I discuss the conclusions, implications, and next research steps in Chapter 5.

CHAPTER 2. THEORY AND HYPOTHESES

2.1 Health outcomes and disparities in the United States

According to the Center for Disease Control and Prevention (2020), health equity is achieved when “every person has the opportunity to attain his or her full health potential and no one is disadvantaged from achieving this potential because of social position or other socially determined circumstances. Health disparities or inequities are types of unfair health differences closely linked with social, economic or environmental disadvantages that adversely affect groups of people” (Ramirez et al., 2008, p. 6). There have been decades of surveillance and research in the United States documenting health disparities in numerous categories. Disparity among racial and ethnic minority groups and individuals from lower socioeconomic status has been a focus in recent years. It is estimated that from 2003 to 2006, “the combined costs of health inequities and premature deaths in the United States totaled \$1.24 trillion and that elimination of health disparities among racial/ethnic minorities would have reduced these costs, including direct medical care, by \$229.4 billion” (American Public Health Association, 2018, para. 10). Despite resulting initiatives, goals, and objectives by major organizations such as Healthy People, the Center for Disease Control, Robert Wood Johnson Foundation, and the American Public Health Association, significant disparities persist. Therefore, it is imperative that we employ more intentional and comprehensive strategies to help achieve health equity in America, starting with solutions to bridge the gap for immigrants, one of the most impacted groups by disparities and health-equity opportunities.

2.2 Immigrant challenges in the United States

We cannot begin to research, understand, and improve public health and disparities in the United States without considering the large and growing immigrant population. The United States has seen a rapid increase in the immigrant numbers over the most recent decades. In a survey study by Singh et al. (2013), it was found that the “health, social, and behavioral profiles of immigrants vary substantially from those of the US-born population” (Singh et al., 2013, para. 7), showing that immigrant health and life trends cannot be dismissed or simply lumped in with the more-researched native-born population. Immigrants now account for 14% of the total United States population, and nearly a quarter of U.S. children in 2011 had at least one foreign parent (Larsen, 2003; US Census Bureau, 2012).

Both first-generation immigrants and their children face numerous unique challenges in the first ten years of life in America (the “establishment phase”) that may contribute to health disparities. First, education services are more limited for new, non-English-speaking residents (Barran, 2018). Unequal educational opportunities are followed by lower high school graduation rates and postsecondary attainment for immigrant youth. Immigrant students also must navigate new systems, family responsibilities, along with financial pressures (Manspile et al., 2021). The COVID-19 pandemic has also disproportionately affected immigrants and low-income populations in the United States, accentuating the existing barriers for many immigrant students (e.g., technology access and language barriers) (Đoàn et al., 2021). There are economic issues including lack of secure jobs and obtaining low-paying jobs resulting in poor or crowded housing environments, isolation in immigrant communities and isolation from services enjoyed by native citizens. Finally, prejudice and discrimination as well as cultural differences that often deter immigrants from seeking and receiving job offers and other services (Baran, 2018).

All these factors inevitably affect health outcomes for immigrants, both directly and indirectly, short term and long term. Research by Chang et al. (2019) highlights how immigrants in America consistently receive suboptimal care when it comes to obtaining preventive health care services, managing their chronic health conditions, and accessing mental health services. With stigma, marginalization, and negative acculturation as contributing factors, poverty, food and housing insecurity, lack of educational attainment, and challenges with healthcare access remain the most significantly harmful social determinants of health that are impacting immigrants today. Yet despite these facts, there are some surprising trends for immigrant health in America, confirming that immigrants are truly disadvantaged far beyond the establishment phase in terms of health outcomes.

Singh et al. (2004) conducted an extensive statistical study to examine how health outcomes differ between foreign-born individuals and native-born individuals in the U.S. New male and female immigrants had, respectively, 3.4 and 2.5 years longer life expectancy than the US-born group. The results, however, showed that with time of acculturation taken into account, the immigrants' risks of disability and chronic disease morbidity increased with increasing length of residence. Another more recent study by Singh et al. (2013) further confirmed this trend. The 2007 National Survey of Children's Health was used to estimate health differentials (23 indicators) among 10 ethnic-nativity groups. Overall, findings suggested that immigrant children of most races and ethnicities were healthier than non-immigrant children, with lower prevalence of conditions such as asthma, developmental delay, learning disability, speech, hearing, and sleep problems. However, it was found that health risks increased significantly in relation to the parents' duration of residence in the United States. Furthermore, it was found that immigrant Hispanic children were at an increased risk of obesity and sedentary behaviors as adults. Poor

health outcomes typically carry on to the next generation. One major outcome that Frisco et al. (2019) found in their comparative study was the fact that Hispanic children of immigrants gained significantly more weight than White and Hispanic children with U.S.-native parents during the kindergarten, first, and second grade school years, contributing to major weight disparities between Hispanic children of immigrants and any children with U.S.-native parents.

Immigrants are not simply naturally “unhealthier” than native-born U.S. residents, in fact Singh et al. (2004) show the opposite, at least close to the time of immigrants’ arrival. Extensive research has gone into identifying and analyzing a phenomenon called the healthy immigrant effect (HIE). This refers to when immigrants arrive in the host country healthier than comparable native populations, but their health status may deteriorate with additional years in the country (Constant, 2015).

There are several explanations for why immigrants have an initial health advantage over native populations. One is the theory of positive self-selection of immigrants, that only the “healthiest and most motivated individuals choose to undergo the traumatic experience of migration to a new country; people who are sicker stay behind” (Neuman, 2014, p. 3). Another explanation for deterioration of health outcomes for immigrants as they reside in the United States longer is underuse of healthcare services. Low health insurance rates and hesitancy to obtain a primary care physician is a significant trend for immigrants in America (Derose, 2007). A 2003 survey conducted in the United States found that immigrants’ medical expenses were just half those of their U.S.-born counterparts (Ku, 2009). Even if it appears that there is not significant health disparity initially, the healthcare access disparity enables a gap to grow as years pass. There are multiple proposed reasons for immigrants’ significant underuse of health care services, whether that be obtaining insurance or just visiting a doctor. The most glaring

challenge is the language barrier. According to a 2018 study by Pew Research, half of the immigrant population in America are not English proficient, making it difficult for them to navigate the bureaucracy of government institutions, access many services, and especially understand nuanced insurance policies and health care systems (Nguyen, 2020). Discrimination against immigrants in healthcare is another major factor that has been heavily researched. Structural racism and xenophobia are linked to greater health disparities, having a negative effect on individual's ability to access and receive quality healthcare services (Gee & Ford, 2021). This leads to avoidance of services altogether, a need that has been painfully exacerbated by the recent COVID-19 pandemic (Zalla et al., 2021). A recent study by Damle et al. (2022) further revealed that Latinx immigrant women in particular experience significant discriminatory health care experiences and tend to avoid seeking health care, a trend that has worsened since the pandemic.

Immigrants' deterioration in health the longer they reside in the U.S. may also be attributed to a phenomenon called negative acculturation. "Acculturation" describes conformity to and adoption of the host society's mainstream behaviors and practices (Riosmena et al., 2015). Factors of negative acculturation in the U.S. include negative nutrition practices, unhealthy weight gain, and higher smoking and alcohol consumption levels, which are risk factors for many chronic health conditions and may be contributors to immigrants' overall health deterioration as they reside in the U.S. The degree of acculturation and duration of stay for immigrants are associated with lower consumption of fruit, vegetables, and fiber, as well as adoption of other unfavorable dietary changes including increased consumption of fast food (Akresh 2007). Research has shown that degree of acculturation and duration of stay for immigrants are also associated with increased smoking frequency - for women in particular

(Bethel & Schenker, 2005) - and alcohol consumption (Abraído-Lanza et al., 2005; Kimbro, 2009).

2.3 Role of sports³ in the United States

Now that we have explored the issue of health disparities between immigrants, children of immigrants, and U.S. native-born residents as well as theories for the causes of these disparities, we will transition into the topic of sports, how youth participation in athletics connects to health and well-being, and why it could help prevent or reduce health disparities for immigrant youth in particular.

The relationship between physical activity and physiological health has been well-researched and documented. There is strong evidence demonstrating that physical inactivity is linked to a significantly increased risk for heart disease, hypertension, type-2 diabetes, cancer, obesity, and early mortality (World Health Organization, 2010; Nielsen et al., 2014). On the flip side, physical activity has been shown to be linked to improved quality of life, higher self-confidence, and improved control of symptoms of anxiety and depression (World Health Organization, 2010; Rosenbaum et al., 2015). Research has also shown that participation in physical activity is related to improved social development, social interaction, and integration for individuals (McAuley et al., 2000).

Worldwide, the platform of sport has been increasingly utilized for different health purposes and have gained attention from policy makers, interest organizations, and researchers, as it is a very promising setting for encouraging increased participation in physical activity and

³ “Sport” in this paper will refer to any organized form of sport (high school, club, community recreation leagues...etc.). Involves: 1) physical activity/movement, 2) community and collaboration with others, and 3) competition between individuals. Will further be defined as research continues.

promoting healthy life practices (Parnell et al, 2018; Eime et al., 2013; Geidne et al., 2013). Sports have strong social and cultural significance in the U.S. and worldwide, and sports participation could be an effective and economically viable strategy to alleviate both individual and broader public health challenges (Coalter, 2001; Long, 2001). Research supports the fact that sports participation - for both adults and children - promotes healthier lifestyles as well as contributes to other non-physical benefits. These include social connectedness, sense of community and feeling of belonging, inspiration, and motivation to improve, character development, as well as life and leadership skills (Eime et al., 2013). Sports participation not only leads to the primary positive effect of increasing physical activity, but also to secondary positive effects linked to health benefits such as psychosocial development and decreased alcohol consumption (Malm et al., 2019).

Sports can also be utilized as a platform for values education, building relationships, and breaking down social bias barriers (i.e., race, culture, language) (Delgado & Gómez, 2011; Johnson et al., 2016). Research shows that physical activity rates are correlated with academic success, better mental health, improved self-perception of athletic competence, and improved self-perception of social acceptance (Ingeborg et al., 2020). There is consistent evidence that participation in team sports is associated with improved social and psychological health independent of the type of team sport, age, or prior physical or mental health problems (Anderson, 2019). Team sports specifically could be more effective in promoting health and ensuring exercise participation and continuation than individual sports, emphasizing the significance of the “social” impacts of sports in addition to individual physical benefits.

Given the significant benefits of physical activity and sports participation in general, immigrant youth could especially benefit from athletics. The benefits of sports participation

would be expected to offset the negative acculturation effect discussed earlier in Section 2.2 through the encouragement of adoption of healthier habits such as regular exercise and more mindful nutrition. Sports participation could also aid immigrants' ability to build community and improve social connectedness. Unfortunately, sports participation and overall physical activity levels among immigrants and refugees to high income nations are significantly lower than those of non-immigrant populations (Gadd et al., 2005). This trend could be attributed to cultural barriers, as some cultures with which certain immigrants identify may place minimal value in sports participation. In certain cultures, sports are viewed as trivial commitments in relation to academics (Stella et al., 2003), and others simply do not promote leisure-time physical activity (Singh et al., 2008). Stemming from such cultural norms, gender norms and expectations also may pose a barrier to physical activity for women in particular (Walseth & Fasting, 2003). There are also socioeconomic barriers to physical activity for immigrants, including low literacy, low education, and poverty (Dawson et al., 2005). Another deterrent could simply be intimidation by the overly white-dominated establishment of sports organizations (Tirone et al., 2010).

Potential trade-offs of sports participation are also acknowledged. There is inherent risk of injury for youth athletes, as adolescents experiencing increased growth velocity and closure of growth-plates are naturally more vulnerable to a variety of traumatic and overuse injuries (Hedstrom et al., 2004). There is also risk of discrimination and bullying, travel safety risk, and emotional and physical stress due to over-competitiveness and inappropriate expectations to achieving scholarships or a professional career (Merkel, 2013). Some of these risks may be more pronounced for immigrant youth. Research has been conducted on the positive effects of sports participation on immigrants: Sports participation can strengthen ethnic identity, reduce stress, increase self-efficacy (Martinez Damia et al., 2020) and help immigrants to build a better life

routine and resilience when facing migration-related uncertainties (Hartley et al., 2017). Nonetheless, several studies report that sport activities entail a higher risk of discrimination and social marginalization for immigrants (Corvino et al., 2022). It should be acknowledged that the effects of sports participation are highly dependent on many organizational, policy-driven, and structural aspects of sport programs (Anderson et al., 2019). Although sports usually occur within supportive settings that can sustain immigrants' inclusion, there is equal potential for exclusivity, discrimination, and overall development of negative environments for immigrants. This is one of the many reasons why more research needs to be conducted in these fields so that we can develop comprehensive solutions to combat every level of disparity.

2.4 Hypotheses

My study aims to find specific trends for youth sports participation and health outcomes for immigrants using a quantitative statistical analysis of secondary data. Given the theory behind the relationship between sports participation, physical activity level, sense of belonging, and health outcomes, I expect to find a positive correlation for youth sports participation and positive health outcomes (namely general health, body mass index, mental health, diagnosed disorders, and health practices). Furthermore, I expect that immigrants will be positively impacted by youth sports participation on a significantly higher level than non-immigrants, potentially due to sports increasing a sense of belonging more for immigrants and offsetting the effects of negative acculturation

I outline my hypotheses below:

General health hypotheses:

H1a: Sports participation will be positively associated with general health.

H1b: Being an immigrant will be positively associated with general health.

H1c: The positive association between sports participation and general health will be stronger for immigrants than non-immigrants.

Alcohol use (excess drinking) hypotheses:

H2a: Sports participation will be negatively associated with alcohol use (excess drinking).

H2b: Being an immigrant will be negatively associated with alcohol use (excess drinking).

H2c: The negative association between sports participation and alcohol use (excess drinking) will be stronger for immigrants than non-immigrants.

Gymnasium (gym)⁴ use hypotheses:

H3a: Sports participation will be positively associated with gym use.

H3b: Being an immigrant will be positively associated with gym use.

H3c: The positive association between sports participation and gym use will be stronger for immigrants than non-immigrants.

Body mass index (BMI) hypotheses:

H4a: Sports participation will be negatively associated with BMI.

H4b: Being an immigrant will be negatively associated with BMI.

⁴ “Gym” in this paper will refer to any designated facility, space or property with specific equipment for the purpose of exercising, engaging in sports, or engaging in other types of physical activity.

H4c: The negative association between sports participation and BMI will be stronger for immigrants than non-immigrants.

H4d: Sports participation will be negatively associated with *change* in BMI.

H4e: Being an immigrant will be negatively associated with *change* in BMI.

H4f: The negative association between sports participation and *change* in BMI will be stronger for immigrants than non-immigrants.

Diagnosed disorders hypotheses:

H5a: Sports participation will be negatively associated with (frequency of) diagnosed disorders.

H5b: Being an immigrant will be negatively associated with (frequency of) diagnosed disorders.

H5c: The negative association between sports participation and (frequency of) diagnosed disorders will be stronger for immigrants than non-immigrants.

Sickness frequency hypotheses:

H6a: Sports participation will be negatively associated with sickness frequency.

H6b: Being an immigrant will be negatively associated with sickness frequency.

H6c: The negative association between sports participation and sickness frequency will be stronger for immigrants than non-immigrants.

Mental health hypotheses:

H7a: Sports participation will be negatively associated with (poor) mental health.

H7b: Being an immigrant will be negatively associated with (poor) mental health.

H7c: The negative association between sports participation and (poor) mental health will be stronger for immigrants than non-immigrants.

Depression hypotheses:

H8a: Sports participation will be negatively associated with depression frequency.

H8b: Being an immigrant will be negatively associated with depression frequency.

H8c: The negative association between sports participation and depression frequency will be stronger for immigrants than non-immigrants.

Alcohol use (days drunk) hypotheses:

H9a: Sports participation will be negatively associated with high alcohol use (days drunk).

H9b: Being an immigrant will be negatively associated with high alcohol use (days drunk).

H9c: The negative association between sports participation and high alcohol use (days drunk) will be stronger for immigrants than non-immigrants.

Fast food consumption hypotheses:

H10a: Sports participation will be negatively associated with high fast-food consumption.

H10b: Being an immigrant will be negatively associated with high fast-food consumption.

H10c: The negative association between sports participation and fast-food consumption will be stronger for immigrants than non-immigrants.

Marijuana use hypotheses:

H11a: Sports participation will be negatively associated with marijuana use.

H11b: Being an immigrant will be negatively associated with marijuana use.

H11c: The negative association between sports participation and marijuana use will be stronger for immigrants than non-immigrants.

Smoking hypotheses:

H12a: Sports participation will be negatively associated with smoking.

H12b: Being an immigrant will be negatively associated with smoking.

H12c: The negative association between sports participation and smoking will be stronger for immigrants than non-immigrants

CHAPTER 3. RESEARCH METHODS AND DATA ANALYSIS

3.1 Description of data used

The primary aim of this research is to analyze the relationships between the multiple variables that describe sports participation, immigrant status, and physical and mental health outcomes. I use secondary data, which allows me to obtain a representative sample and wider range of data to work with. Using Stata as my statistical analysis software tool, I perform multiple regression analyses for several variables pulled from Add Health, which is a longitudinal study of a nationally representative sample of over 20,000 adolescents who were in grades 7 through 12 during the 1994-95 school year, and have been followed for five waves to date, most recently in 2016-18 (Add Health, 2022). The entire survey data file contains approximately 8,629 variables, with the data, codebooks, and guides spread across the five different waves. I identified all variables of possible interest and merged them into one condensed dataset in preparation for analysis using Stata.

3.2 Estimation strategy

I utilize a series of random effects models to test my hypothesis. The data that I use are clustered and collected from respondents with unequal probability of selection (Harris & Udry, n.d.). The structure of my data is “nested,” meaning that it describes students within schools within specific regions or neighborhoods of the United States. To obtain unbiased estimates, it is important to consider the sampling structure by using analytical methods that are designed to deal with such clustered data. To account for unobserved heterogeneity across units, I include random intercepts at the level suggested in the Add Health User Guide (Raudenbush and Bryk, 2002). The Add Health User Guide suggests using the “Cluster2” variable as the clustering variable to account

for design effects. This strategy allows me to obtain unbiased estimates of population parameters.

3.3 Independent variables

I use two primary independent variables: *sports participation* and *immigrant* status. Data for independent variables come from the responses to several questions asked during Wave I of the survey, which was conducted in 1994-95. The questions in Wave I focus on the “forces that may influence adolescents' health and risk behaviors, including personal traits, families, friendships, romantic relationships, peer groups, schools, neighborhoods, and communities” (Add Health, 2011, para. 2).

First, my *sports participation* variable is based on data from the following question: “During the past week, how many times did you play an active sport, such as baseball, softball, basketball, soccer, swimming, or football?” The possible responses ranged from (0) “Not at all,” to (3) “5 or more times.” Secondly, the *immigrant* status is based on data from the following question: “Were you born in the United States?” Respondents answered yes, coded as 0, or no, coded as 1. This way, 1 means that the respondent is a first-generation immigrant, and 0 means that the respondent is native-born (non-immigrant).

3.4 Dependent variables

Data for my dependent variables come from the responses to a variety of health outcome questions asked during either Wave I or Wave IV of the survey. Wave IV interviews were completed in 2008, when the sample was aged 24-32. The focus of this wave is on social, environmental, behavioral, and biological data to track the emergence of chronic disease as the cohort moves through their second and third decades of life. The goal is to better understand how experiences and behaviors are related to decisions, behavior, and health outcomes in the

transition to adulthood (Add Health, 2011). My dependent variables of interest describe both the health conditions of the respondent as an adolescent and young adult, and specific health practices of the respondent as a young adult. *All* variables are re-coded to change any “refused,” “legitimate skip,” or “not applicable” responses into missing values.

My *general health* variables are derived from the following question: “In general, how is your health?” The five possible responses are “Excellent”, “Very good”, “Good”, “Fair”, and “Poor”. This question was asked during both Wave I (when participants were adolescents) as well as Wave IV (when participants were young adults). I analyze both as dependent variables in my study. The *BMI* variable is derived from the question asked during Wave IV: “What is your BMI (Body mass index)?” This is a continuous variable containing values ranging from 14.4 to 70.3. The *change in BMI* variable is derived from two questions and a manual calculation. I use the *BMI (Wave IV)* variable and then the *BMI (Wave I)* variable, which are derived from the same survey question, just asked during different waves. On Stata, I generate a new variable describing the difference between the values reported in the two variables for each participant (BMI Wave IV - BMI Wave I).

Variables in the *diagnosed disorders* category are categorical, derived from questions asked during Wave IV about whether the respondent has ever been diagnosed with a specific health condition, giving a “yes” or “no” option (coded 1 or 0 respectively). The health conditions that respondents are asked about are: *high blood pressure, heart disease, diabetes, asthma, hepatitis, and chronic migraines*. The data from these six questions are summed to create the single *diagnosed disorder* variable.

My *sickness frequency* variable is derived from the following question: “How often have you felt sick in the past month?” The five possible responses are “Everyday”, “Often”,

“Occasionally”, “Rarely”, and “Never” (coded 0 to 4 respectively). This question was asked during Wave I when participants were adolescents.

Variables in the *mental health* category are also categorical, derived from questions asked during Wave IV about whether the respondent has ever been diagnosed with a specific mental health condition, giving a “yes” or “no” option (coded 1 or 0 respectively). The mental health conditions asked about are *depression*, *anxiety*, and *ADD/ADHD*. The data from these three questions are summed to create the single *mental health* variable.

My *depression* variable is derived from the following question: “How often have you felt depressed in the past month?” The five possible responses are “Everyday”, “Often”, “Occasionally”, “Rarely”, and “Never” (coded 0 to 4 respectively). This question was asked during Wave I when participants were adolescents.

I chose variables describing these specific diagnosed mental and physical health conditions because research has shown that immigrants in America consistently receive suboptimal care when it comes to obtaining preventive health care services, managing their chronic health conditions, and accessing mental health services (Chang, 2019). Furthermore, immigrants are at greater risk for conditions including obesity and diabetes the longer they reside in America, which is why I use data from Wave IV, when the respondents are adults. I also analyze health practices to further understand factors that contribute to the deterioration of health upon establishing in America. Suspected factors of such deterioration of health include adoption of unhealthy habits more prevalent in America, including smoking, alcohol consumption, overeating, and lack of physical exercise (Jasso et al., 2004).

My health practices-related variables are derived from several questions. To measure *smoking* behavior, participants were asked, “How many cigarettes a day do you smoke?” I

reverse code this variable so that it is a measure of “good health” (high values represent “healthier” and lower values represent “unhealthier”). If a respondent enters 1 [10 or fewer cigarettes], I code them as 4; if a respondent enters 2 [11 to 20 cigarettes], I code them as 3, and so on. To measure *marijuana* usage, participants were asked, “What is the number of days you used marijuana in the past year?” I reverse code this variable like I do with the *smoking* variable so that it is also measure of “good health.” To measure *fast food*, participants were asked, “How many times in the past seven days did you eat food from a fast-food restaurant, such as McDonald's, Burger King, Wendy's, Arby's, Pizza Hut, Taco Bell, or Kentucky Fried Chicken or a local fast-food restaurant?” I also reverse code this variable like I do with the *smoking* variable so that it is a measure of “good health.” To measure *gym use*, participants are asked the following question: “On the average, how many times per week do you use a physical fitness or recreation center in your neighborhood?” I do not reverse code this variable since high values already represent the “healthier” end of the spectrum (high gym usage).

Further, two alcohol consumption variables are derived from data from the following two questions: *excess drinking*: “Have you often had more to drink or kept drinking for a longer period of time than you intended?” and *days drunk*: “During the past 12 months, on how many days did you drink {5 or more/4 or more} drinks in a row?” I reverse code both variables so that they are measures of “good health” (high values represent “healthier” and lower values represent “unhealthier”). If a respondent enters 1 [1 or 2 days in past 12 months], I code them as 5; if a respondent enters 2 [once a month or less], I code them as 4, and so on.

3.5 Control variables

To ensure that my results would accurately reflect the association of interest and not the result of any confounding variables, I include additional measures in the model: income, sex, grade in school, school achievement, ethnicity, and race. These factors might impact the overall experiences and health outcomes of immigrant and native-born individuals in different ways (Entorf & Lauk, 2006; Nguyen, 2020; Orrenius, 2009). As such, I include these variables as controls. The *income* variable describes how much total income, before taxes, the respondent's family received in 1994 (including their own income, the income of everyone else in their household, and income from welfare benefits, dividends, and all other sources). *Female* describes the respondent's biological sex, with "female" coded as 1 and "male" as 0. *Grade in school* describes the respondent's current grade at their respective school, with values ranging from 7th grade to 12th grade. I code *school achievement* as a mean of the values that correspond to the letter grade a student receives in the three categories of English, math, and science. *Hispanic* describes whether the respondent is of Hispanic origin. Several race variables are included as well. Race variables were re-coded so that the only categories that respondents fall into are: *White*, *Black*, *Asian*, *Other* (which is re-coded to include "other race," "American Indian," and "multiracial" [more than 1 race selected]). Each variable was re-coded to change any "refused," "legitimate skip," or "not applicable" responses into missing values.

Table 1. Descriptive Statistics.

Variable	M	SD	Minimum	Maximum
Sports participation	1.381	1.145	0	3
Immigrant	0.061	0.240	0	1
Income	47.70	56.35	0	999
Female	0.516	0.500	0	1
Grade in school	9.539	1.668	7	12
School achievement	1.824	0.800	0	3
Hispanic	0.115	0.319	0	1
White	0.624	0.484	0	1
Black	0.230	0.421	0	1
Asian	0.033	0.179	0	1
Other race	0.114	0.318	0	1
BMI (Wave I)	22.47	4.412	11.21	56.38
BMI (Wave IV)	29.14	7.488	14.40	70.30
Change in BMI (IV-I)	6.468	5.359	-11.90	39.87
General health (Wave I)	2.912	0.931	0	4
General health (Wave IV)	3.660	0.917	1	5
Diagnosed disorders	0.485	0.767	0	5
Mental health	0.341	0.670	0	3
Smoking	4.724	0.689	1	5
Excess drinking	1.312	0.861	0	2
Days drunk	5.133	1.796	0	7
Marijuana use	5.829	1.972	0	7
Fast food	23.67	2.746	1	26
Gym use	1.956	1.696	0	8
Depression (Wave I)	2.803	1.191	0	4
Sickness (Wave I)	2.838	0.950	0	4

3.6 Modeling strategy

I utilize a random effects model strategy to test each of my hypotheses for each dependent variable of interest.

Variable: Wave I general health

$$\text{Wave I general health} = \text{sports participation} + \text{immigrant status} + \text{controls}$$

$$\text{Wave I general health} = \text{sports participation} + \text{immigrant status} + \text{sports participation} \times \text{immigrant status} + \text{controls}$$

Variable: Wave IV general health

$$\text{Wave IV general health} = \text{sports participation} + \text{immigrant status} + \text{controls}$$

$$\text{Wave IV general health} = \text{sports participation} + \text{immigrant status} + \text{sports participation} \times \text{immigrant status} + \text{controls}$$

Variable: Alcohol use (excess drinking)

$$\text{Excess drinking} = \text{sports participation} + \text{immigrant status} + \text{controls}$$

$$\text{Excess drinking} = \text{sports participation} + \text{immigrant status} + \text{sports participation} \times \text{immigrant status} + \text{controls}$$

Variable: Gym use

$$\text{Gym use} = \text{sports participation} + \text{immigrant status} + \text{controls}$$

$$\text{Gym use} = \text{sports participation} + \text{immigrant status} + \text{sports participation} \times \text{immigrant status} + \text{controls}$$

Variable: Body mass index

$$\text{BMI} = \text{sports participation} + \text{immigrant status} + \text{controls}$$

BMI = sports participation + immigrant status + sports participation x immigrant status
+ controls

Variable: Change in body mass index

Change in BMI = sports participation + immigrant status + controls

Change in BMI = sports participation + immigrant status + sports participation x
immigrant status + controls

Variable: Diagnosed disorders

Diagnosed disorders = sports participation + immigrant status + controls

Diagnosed disorders = sports participation + immigrant status + sports participation x
immigrant status + controls

Variable: Sickness frequency

Sickness frequency = sports participation + immigrant status + controls

Sickness frequency = sports participation + immigrant status + sports participation x
immigrant status + controls

Variable: Mental health

Mental health = sports participation + immigrant status + controls

Mental health = sports participation + immigrant status + sports participation x
immigrant status + controls

Variable: Depression

Depression = sports participation + immigrant status + controls

Depression = sports participation + immigrant status + sports participation x immigrant
status + controls

Variable: Alcohol use (days drunk)

Days drunk = sports participation + immigrant status + controls

Days drunk = sports participation + immigrant status + sports participation x immigrant status + controls

Variable: Fast food consumption

Fast food = sports participation + immigrant status + controls

Fast food = sports participation + immigrant status + sports participation x immigrant status + controls

Variable: Marijuana use

Marijuana use = sports participation + immigrant status + controls

Marijuana use = sports participation + immigrant status + sports participation x immigrant status + controls

Variable: Smoking

Smoking = sports participation + immigrant status + controls

Smoking = sports participation + immigrant status + sports participation x immigrant status + controls

CHAPTER 4. RESULTS

4.1 Primary results: general health

In Model 1 in Table 2, I first test the relationship between *sports participation* and *Wave I general health*. My results show that the relationship between these two variables is positive and statistically significant. Holding other factors constant, participating in youth sports is associated with better overall Wave I general health, that is, when participants are still in grades 7-12 ($p=0.000$). Being an immigrant is not independently associated with general health by conventional statistical standards. In other words, I do not have enough evidence to suggest that being an immigrant is associated with better health outcomes, when health outcomes are measured in the first wave of data collection. However, it is worth noting that the p-value on this coefficient is 0.064, thus meeting the $\alpha=0.1$ threshold. Furthermore, I test the conditional part of my *General Health Hypothesis* (H1c) in Model 2 using the interaction term *Immigrant X Sports Participation*. The results show this interaction term to be statistically significant ($p=0.034$), supporting the claim that the positive effect of sports participation on general health is significantly stronger for immigrants compared to non-immigrant adolescent youth. These results partially support my *General Health Hypothesis*. Even though there is not enough evidence to suggest that immigrants independently have better general health outcomes overall, sports participation does matter more for immigrants' general health than for non-immigrants in terms of their health outcomes. The positive and statistically significant interaction term supports this part of my hypothesis. Furthermore, this model allows us to visualize the marginal effects of immigrant status across various levels of sports participation. As shown in Figure 1, immigrant status only becomes statistically significant when sports participation reaches values of two and three (playing an active sport three or more times per week). The results show a 0.28 increase,

which is about one-third of a standard deviation change, and 0.43 increase, respectively, which is a one-half of a standard deviation change. Overall, this is a substantively large effect.

Table 2. The estimated relationship between *Immigrant*, *Sports participation*, and *Wave I general health*.

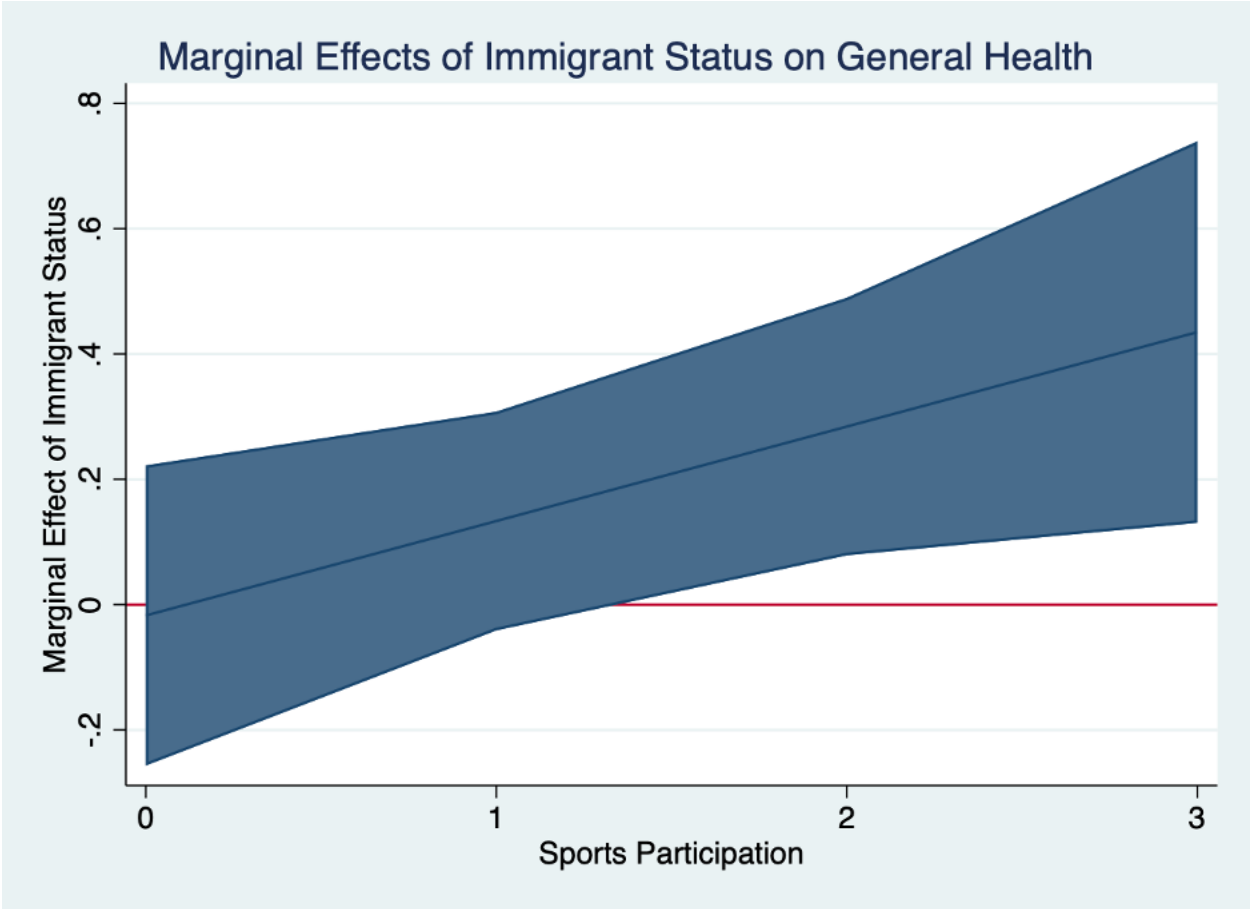
Dependent Variable: Wave I General Health	Model 1	Model 2
Sports participation	0.121*** (0.0150)	0.115*** (0.0153)
Immigrant	0.163 (0.0880)	-0.0173 (0.122)
Income	0.000685* (0.000278)	0.000702* (0.000278)
Female	-0.191*** (0.0341)	-0.191*** (0.0341)
Eighth grade	-0.0948 (0.0587)	-0.0956 (0.0586)
Ninth grade	-0.171** (0.0587)	-0.174** (0.0587)
Tenth grade	-0.155** (0.0586)	-0.156** (0.0586)
Eleventh grade	-0.0926 (0.0601)	-0.0922 (0.0601)
Twelfth grade	-0.105 (0.0637)	-0.106 (0.0637)
School achievement	0.173*** (0.0210)	0.174*** (0.0210)

Hispanic	-0.0835 (0.0686)	-0.0893 (0.0686)
White	-0.0202 (0.0607)	-0.0231 (0.0606)
Black	0.130 (0.0692)	0.127 (0.0691)
Asian	-0.0529 (0.117)	-0.0610 (0.117)
Immigrant X Sports Participation		0.151* (0.0709)
Constant	2.592*** (0.0877)	2.603*** (0.0878)
Number of students	3,036	3,036
Number of schools	123	123

Standard errors in parentheses

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Figure 1. A marginal effects plot that shows how the association between immigrant status and adolescent general health outcomes changes under different levels of sports participation.



While my theory does not focus on the relationships between my dependent variables and the control variables that I include in my models, it is worth noting that being a female has a negative effect on Wave I general health, while having higher school achievement scores as well as income both have a positive effect on Wave I general health.

Another question of interest is whether these effects are relevant across time in the participants' lives. To test this, I conducted additional analyses, using Wave IV general health as my dependent variable. This was to test the association between youth sports participation and general health of participants when they were at the more mature ages 24-32. Model 1 in Table 3 tested the relationship between *sports participation*, *immigrant status*, and *Wave IV general health (Wave IV)*. My results show that the coefficient for the relationship between sports participation and Wave IV general health is positive and statistically significant ($p=0.001$). Holding other factors constant, participating in youth sports is associated with better overall Wave IV general health, that is, when participants are 24-32 years of age. The relationship between being an immigrant and Wave IV general health is not statistically significant ($p=0.820$). I use Model 2 to test the interaction term *Immigrant X Sports Participation (Wave IV)*. The results show that the interaction term is not statistically significant ($p=0.889$), suggesting that the positive effect of sports participation on general health is not stronger for immigrants compared to non-immigrant participants.

Furthermore, while my theory does not focus on the relationships between Wave IV general health, sports participation, and the control variables that I include in my models, it is worth noting that being a female has a negative effect on Wave IV general health. Having higher school achievement scores as well as a higher income both have a positive effect on Wave IV general health, paralleling the trend observed for Wave I.

In sum, my hypothesis about the positive association between sports participation and general health being stronger for immigrants is partially supported. Wave I data capture the more immediate effects of sports participation on individuals whereas the dependent variable data of Wave IV are temporally further removed from the independent variable measure and may not be as accurate in capturing correlations of interest. The associations between sports participation and general health are statistically significant for individuals both when they are adolescents and middle-aged adults, but the effect is stronger for immigrants only when they are adolescents. This could suggest that the positive effect of sports participation on health dissipates by the time people are young adults (24-32 years of age).

Table 3. The estimated relationship between *Immigrant*, *Sports participation*, and *Wave IV general health*.

Dependent Variable: Wave IV General Health	Model 1	Model 2
Sports participation	0.0546*** (0.0159)	0.0542*** (0.0162)
Immigrant	0.0218 (0.0961)	0.00861 (0.135)
Income	0.000719* (0.000307)	0.000721* (0.000307)
Female	-0.101** (0.0361)	-0.101** (0.0361)
Eighth grade	-0.0517 (0.0608)	-0.0518 (0.0608)
Ninth grade	0.0363 (0.0612)	0.0359 (0.0613)
Tenth grade	-0.0737 (0.0616)	-0.0739 (0.0616)
Eleventh grade	-0.00873 (0.0632)	-0.00874 (0.0632)
Twelfth grade	-0.0445 (0.0673)	-0.0446 (0.0674)
School achievement	0.177*** (0.0221)	0.177*** (0.0221)
Hispanic	0.0385 (0.0754)	0.0381 (0.0755)

White	0.127 (0.0658)	0.127 (0.0658)
Black	0.0872 (0.0744)	0.0869 (0.0745)
Asian	-0.112 (0.125)	-0.112 (0.125)
Immigrant X Sports Participation		0.0112 (0.0805)
Constant		3.250*** (0.0929)
Observations	2,581	2,581
Number of groups	123	123

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

So far, I have discussed the primary findings and established that youth sports participation is positively associated with general health outcomes for individuals both as adolescents and adults, but this positive correlation is significantly stronger for immigrants only when they are adolescents. Now I will unpack the results even more to analyze what effects that sports participation has on various health outcomes persist into adulthood while others do not. I discuss both the positive and negative trends found in the analyses between sports participation and additional Wave IV variables.

4.2 Secondary results: alcohol and gym use

In Model 1 in Table 4a, I test the relationship between *sports participation* and *excess drinking behavior*. Findings show that youth sports participation is associated with worse overall excess drinking behavior as a young adult ($p=0.007$). The immigrant coefficient is not statistically significant, meaning that being an immigrant is not independently associated with better drinking behavior. I test whether immigrants might benefit more from sports activities than non-immigrants in Model 2 by examining the interaction term *Immigrant X Sports Participation*. The results show this interaction term to be negative and statistically significant. This indicates that the negative effect that sports participation may have on drinking behavior is stronger if the participant is an immigrant.

In Model 3 in Table 4a, I test the relationship between *sports participation* and *gym use*. Findings show that youth sports participation does have an independent positive effect on gym use for young adults ($p=0.000$). Being an immigrant has no independent effect. I test whether immigrants still might benefit more from sports activities than non-immigrants in Model 4 by examining the interaction term *Immigrant X Sports Participation*. The results show this interaction term as not statistically significant, meaning that the positive effect that sports participation has on gym use is not any larger for immigrants compared to non-immigrants.

Table 4a. The estimated relationships between *Immigrant*, *Sports participation*, and additional *Wave IV variables*.

Dependent Variables:	Excess drinking (Model 1)	Excess drinking (Model 2)	Gym use (Model 3)	Gym use (Model 4)
Sports Participation	-0.0413** (0.0154)	-0.0338* (0.0156)	0.157*** (0.0321)	0.157*** (0.0326)
Immigrant	0.129 (0.0927)	0.379** (0.130)	-0.00644 (0.192)	0.0258 (0.271)
Income	-0.000845** (0.000296)	-0.000872** (0.000296)	0.000870 (0.000610)	0.000867 (0.000610)
Female	0.175*** (0.0349)	0.173*** (0.0348)	-0.0783 (0.0726)	-0.0784 (0.0726)
Eighth grade	-0.00324 (0.0588)	-0.00175 (0.0587)	-0.0831 (0.122)	-0.0829 (0.122)
Ninth grade	-0.00427 (0.0592)	0.00403 (0.0592)	0.108 (0.121)	0.109 (0.121)
Tenth grade	0.00412 (0.0595)	0.00711 (0.0595)	0.0576 (0.122)	0.0579 (0.122)
Eleventh grade	0.0791 (0.0611)	0.0794 (0.0611)	0.133 (0.125)	0.133 (0.125)
Twelfth grade	0.101 (0.0651)	0.103 (0.0650)	-0.0849 (0.134)	-0.0847 (0.134)

School Achievement	0.00246 (0.0213)	0.00130 (0.0213)	0.237*** (0.0443)	0.237*** (0.0443)
Hispanic	0.176* (0.0728)	0.183* (0.0728)	0.158 (0.151)	0.159 (0.151)
White	0.00979 (0.0635)	0.0149 (0.0635)	-0.119 (0.132)	-0.119 (0.132)
Black	0.444*** (0.0719)	0.449*** (0.0718)	0.0274 (0.149)	0.0280 (0.149)
Asian	-0.0390 (0.121)	-0.0230 (0.121)	0.267 (0.249)	0.269 (0.249)
Immigrant X Sports Participation		-0.213** (0.0775)		-0.0273 (0.162)
Constant	1.161*** (0.0896)	1.146*** (0.0896)	1.409*** (0.185)	1.407*** (0.186)
Observations	2,579	2,579	2,579	2,579
Number of groups	123	123	123	123

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

After analyzing all Wave IV variables of interest, *excess drinking* appears to be the only variable in which the interaction term is statistically significant. While there are independent associations between the variables and sports participation or immigrant status, *excess drinking* is the only variable where the effects of sports participation are greater for immigrants compared to non-immigrants, even though the effect was in the opposite direction than expected. Nonetheless, it is worth discussing the remaining variables and the independent associations found.

4.3 Additional results: BMI

In Model 1 in Table 4b, I test the relationship between *sports participation* and *BMI*. Findings show that there is no independent correlation between *sports participation* and *BMI*, but there are independent correlations that are negative and statistically significant between *BMI* and *immigrant*, *income*, *school achievement*, *White*, and *Asian*. These results suggest those who are an immigrant, report higher household income, higher school achievement, or are White or Asian are more likely to report a lower BMI as young adults. The relationship between *immigrant* and *BMI* in particular is consistent with the healthy immigrant paradox and the idea that first-generation immigrants tend to be healthier (including lower rates of obesity) compared to second and third-generation immigrants (Marks et al., 2014). My results show that first-generation immigrants tend to have lower BMI as young adults, but it would be interesting to further investigate BMI as when those participants are older adults and for the next generation. In Model 3 in Table 4b, I test the relationship between *sports participation* and *change in BMI*. Findings show that there is no independent correlation between *sports participation* and *change in BMI*, but there are independent correlations that are negative and statistically significant between

change in BMI and *income, ninth grade, tenth grade, eleventh grade, twelfth grade, and school achievement*. There is also a significant positive effect between *change in BMI* and *female*.

These results suggest that those who report a higher household income and higher school achievement are more likely to report a negative BMI change (weight loss), while females are more likely to report a positive BMI change (weight gain) as young adults.

Table 4b. The estimated relationships between *Immigrant*, *Sports participation*, and additional *Wave IV variables (cont.)*.

Dependent Variables:	BMI (Model 1)	BMI (Model 2)	Change in BMI (Model 3)	Change in BMI (Model 4)
Sports Participation	-0.143 (0.132)	-0.138 (0.134)	0.0588 (0.0958)	0.0807 (0.0973)
Immigrant	-1.631* (0.794)	-1.465 (1.115)	-0.743 (0.576)	-0.000765 (0.818)
Income	-0.00797** (0.00254)	-0.00798** (0.00254)	-0.00457* (0.00181)	-0.00465* (0.00181)
Female	0.302 (0.300)	0.301 (0.300)	0.575** (0.218)	0.571** (0.217)
Eighth grade	0.0600 (0.505)	0.0610 (0.505)	-0.429 (0.369)	-0.424 (0.369)
Ninth grade	0.486 (0.509)	0.492 (0.510)	-1.147** (0.366)	-1.123** (0.366)
Tenth grade	0.658 (0.512)	0.659 (0.512)	-1.245*** (0.368)	-1.235*** (0.368)
Eleventh grade	0.720 (0.525)	0.721 (0.525)	-1.339*** (0.375)	-1.338*** (0.375)
Twelfth grade	0.238 (0.561)	0.239 (0.561)	-1.750*** (0.402)	-1.747*** (0.402)
School Achievement	-0.831***	-0.832***	-0.287*	-0.290*

	(0.184)	(0.184)	(0.134)	(0.134)
Hispanic	0.0677	0.0723	0.495	0.518
	(0.631)	(0.632)	(0.454)	(0.454)
White	-1.181*	-1.178*	-0.248	-0.231
	(0.547)	(0.548)	(0.398)	(0.398)
Black	0.442	0.445	0.493	0.509
	(0.619)	(0.620)	(0.449)	(0.450)
Asian	-2.408*	-2.397*	-0.956	-0.899
	(1.035)	(1.036)	(0.751)	(0.752)
Immigrant X Sports Participation		-0.140		-0.618
		(0.664)		(0.483)
Constant	31.39***	31.38***	7.869***	7.823***
	(0.772)	(0.773)	(0.558)	(0.559)
Observations	2,546	2,546	2,486	2,486
Number of groups	123	123	123	123

Standard errors in parentheses

*** p<0.001, ** p<0.01, *p<0.05

4.4 Additional results: diagnosed disorders and sickness

In Model 1 in Table 4c, I test the relationship between *sports participation* and *diagnosed disorders*. Findings show that there is no independent correlation between *sports participation* and *diagnosed disorders*, but there is an independent correlation that is positive and statistically significant between *diagnosed disorders* and *female*. There are also independent correlations that are negative and statistically significant between *diagnosed disorders* and *White, Black, and Asian*. These results suggest that being a female is associated with having less prevalence of chronic health conditions such as heart disease, diabetes, and asthma, but being White, Black, or Asian is independently associated with a higher prevalence of chronic health conditions.

In Model 3 in Table 4c, I test the relationship between *sports participation* and *sickness frequency*. Findings show that there is no independent correlation between *sports participation* and *sickness frequency*, but there is an independent negative correlation between *sickness frequency* and *female*. There is also an independent positive correlation between *sickness frequency* and *school achievement*. These results suggest that being a female is associated with higher frequency of short-term sickness (or sick days), while having higher school achievement scores is independently associated with lower frequency of sickness.

Table 4c. The estimated relationships between *Immigrant*, *Sports participation*, and additional *Wave IV variables (cont.)*.

Dependent Variables:	Diagnosed Disorders (Model 1)	Diagnosed Disorders (Model 2)	Sickness Frequency (Model 3)	Sickness Frequency (Model 4)
Sports Participation	0.00621 (0.0136)	0.00558 (0.0138)	0.0189 (0.0155)	0.0195 (0.0158)
Immigrant	-0.0404 (0.0810)	-0.0611 (0.114)	0.101 (0.0906)	0.119 (0.127)
Income	0.000128 (0.000253)	0.000130 (0.000253)	0.000508 (0.000275)	0.000506 (0.000276)
Female	0.177*** (0.0307)	0.177*** (0.0307)	-0.367*** (0.0353)	-0.367*** (0.0353)
Eighth grade	0.00788 (0.0517)	0.00774 (0.0517)	-0.00163 (0.0608)	-0.00146 (0.0608)
Ninth grade	-0.0205 (0.0502)	-0.0212 (0.0502)	-0.0675 (0.0585)	-0.0672 (0.0586)
Tenth grade	-0.0309 (0.0504)	-0.0312 (0.0504)	0.0222 (0.0583)	0.0222 (0.0583)
Eleventh grade	0.0148 (0.0517)	0.0147 (0.0517)	-0.0422 (0.0599)	-0.0422 (0.0599)
Twelfth grade	0.0569 (0.0555)	0.0568 (0.0555)	0.00592 (0.0638)	0.00601 (0.0638)

School Achievement	-0.0324 (0.0186)	-0.0323 (0.0186)	0.123*** (0.0215)	0.123*** (0.0215)
Hispanic	-0.0417 (0.0632)	-0.0423 (0.0633)	0.0710 (0.0701)	0.0717 (0.0702)
White	-0.182** (0.0555)	-0.182** (0.0555)	-0.0287 (0.0619)	-0.0285 (0.0619)
Black	-0.145* (0.0622)	-0.146* (0.0622)	-0.00538 (0.0699)	-0.00518 (0.0699)
Asian	-0.356*** (0.104)	-0.358*** (0.104)	-0.117 (0.117)	-0.116 (0.117)
Immigrant X Sports Participation		0.0175 (0.0686)		-0.0152 (0.0738)
Constant	0.589*** (0.0776)	0.590*** (0.0777)	2.802*** (0.0893)	2.802*** (0.0894)
Observations	2,581	2,581	2,992	2,992
Number of groups	123	123	123	123

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

4.5 Additional results: mental health and depression

In Model I in Table 4d, I test the relationship between *sports participation* and *mental health*. Findings show that there is no independent correlation between *sports participation* and *mental health*, but there are independent correlations that are positive and statistically significant between *mental health* and *female* and *eighth grade*. There are also independent correlations that are negative and statistically significant between *mental health* and *school achievement* and *Hispanic*. These results suggest that being a female or being an eighth grader is associated with having overall better mental health conditions, while having high school achievement or being Hispanic is associated with having poorer mental health.

In Model 3 in Table 4d, I test the relationship between *sports participation* and *depression*. Findings show that there is an independent correlation that is positive and statistically significant between *sports participation* and *depression*, suggesting that youth sports participation may have a significantly positive impact on improving youth depression rates. There are also independent correlations that are positive and statistically significant between *depression* and *school achievement*, *Hispanic*, and *Black*. This suggests that having high school achievement, being Hispanic, or being Black is associated with lower frequency of depression. It is intriguing that higher school achievement is associated with lower depression frequency, but it is also associated with worse overall mental health scores. However, the *depression* variable is measured from Wave I while the *mental health* variable is drawn from Wave IV and includes measures of both depression and anxiety. These results could suggest that having high school achievement helps in a more immediate effect while it is associated with individuals obtaining certain careers or life circumstances that are associated with higher levels of depression and anxiety later in life. There are independent correlations that are negative and statistically

significant between *depression* and *female* and *eighth grade*, *ninth grade*, *tenth grade*, *eleventh grade*, and *twelfth grade*. These results suggest that being a female or being in any grade included in this study, basically by being an adolescent, is associated with having an overall higher frequency of depression. Similar to the trend of the school achievement variable, it is intriguing that being a female is associated with lower depression frequency, but it is also associated with worse overall mental health scores. These results suggest that adolescent females may tend to have higher rates of depression which tend to improve as they reach adulthood.

Table 4d. The estimated relationships between *Immigrant*, *Sports participation*, and additional *Wave IV variables (cont.)*.

Dependent Variables:	Mental Health (Model 1)	Mental Health (Model 2)	Depression (Model 3)	Depression (Model 4)
Sports Participation	-0.0198 (0.0118)	-0.0221 (0.0120)	0.0763*** (0.0195)	0.0762*** (0.0198)
Immigrant	-0.127 (0.0706)	-0.206* (0.0997)	0.0911 (0.116)	0.0879 (0.162)
Income	0.000304 (0.000221)	0.000312 (0.000221)	0.000325 (0.000351)	0.000325 (0.000352)
Female	0.184*** (0.0268)	0.185*** (0.0268)	-0.439*** (0.0444)	-0.439*** (0.0444)
Eighth grade	0.111* (0.0451)	0.110* (0.0451)	-0.215** (0.0768)	-0.215** (0.0768)
Ninth grade	-0.0316 (0.0439)	-0.0343 (0.0440)	-0.312*** (0.0750)	-0.312*** (0.0750)
Tenth grade	0.0320 (0.0441)	0.0310 (0.0441)	-0.386*** (0.0748)	-0.386*** (0.0748)
Eleventh grade	0.0124 (0.0453)	0.0122 (0.0453)	-0.542*** (0.0768)	-0.542*** (0.0768)
Twelfth grade	-0.0487 (0.0485)	-0.0493 (0.0485)	-0.429*** (0.0814)	-0.429*** (0.0814)
School Achievement	-0.0743***	-0.0740***	0.0843**	0.0843**

	(0.0162)	(0.0162)	(0.0271)	(0.0271)
Hispanic	-0.128*	-0.131*	0.271**	0.271**
	(0.0552)	(0.0552)	(0.0888)	(0.0889)
White	0.0709	0.0691	0.139	0.139
	(0.0484)	(0.0484)	(0.0782)	(0.0782)
Black	-0.166**	-0.168**	0.412***	0.412***
	(0.0543)	(0.0543)	(0.0887)	(0.0888)
Asian	-0.114	-0.118	0.165	0.164
	(0.0905)	(0.0907)	(0.150)	(0.150)
Immigrant X Sports Participation		0.0669		0.00261
		(0.0598)		(0.0928)
Constant	0.373***	0.377***	2.871***	2.872***
	(0.0677)	(0.0679)	(0.113)	(0.113)
Observations	2,581	2,581	2,967	2,967
Number of groups	123	123	123	123

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

4.6 Additional results: alcohol use and fast food

In Model I in Table 4e, I test the relationship between *sports participation* and *days drunk*.

Findings show that there is no independent correlation between *sports participation* and *days drunk*, but there are independent correlations that are positive and statistically significant between *alcohol use* and *immigrant*, *female*, and *ninth grade*, *twelfth grade*, and *Black*. There are also independent correlations that are negative and statistically significant between *days drunk* and *income*. These results suggest that being an immigrant or being female or Black is associated with having overall better alcohol use habits as adults, that is less days recalled being drunk in the past month, while having higher income is associated with overall worse alcohol use habits, or more days drunk.

In Model 3 in Table 4e, I test the relationship between *sports participation* and *fast food*. Findings show that there is no independent correlation between *sports participation* and *fast food*, but there are independent correlations that are positive and statistically significant between *fast food* and *immigrant*, *female*, and *school achievement*. There are also independent correlations that are negative and statistically significant between *alcohol use* and *eighth grade*, *Hispanic*, and *Black*. These results suggest that being an immigrant, being female, or having higher school achievement is associated with better fast-food habits, that is lower frequency of going out to eat fast food per week. These results also suggest that being an eighth grader, being Hispanic or being Black is associated with having overall worse fast-food habits, that is higher frequency of eating fast food per week.

Table 4e. The estimated relationships between *Immigrant*, *Sports participation*, and additional *Wave IV variables (cont.)*.

Dependent Variables:	Days Drunk (Model 1)	Days Drunk (Model 2)	Fast Food (Model 3)	Fast Food (Model 4)
Sports Participation	-0.0528 (0.0313)	-0.0446 (0.0318)	0.0333 (0.0464)	0.0452 (0.0471)
Immigrant	0.425* (0.189)	0.696** (0.265)	0.441 (0.280)	0.837* (0.392)
Income	-0.00168** (0.000603)	-0.00171** (0.000603)	0.00133 (0.000900)	0.00128 (0.000900)
Female	0.599*** (0.0709)	0.598*** (0.0709)	0.631*** (0.105)	0.628*** (0.105)
Eighth grade	0.106 (0.120)	0.108 (0.120)	-0.351* (0.177)	-0.349* (0.177)
Ninth grade	0.247* (0.121)	0.257* (0.121)	0.178 (0.183)	0.191 (0.183)
Tenth grade	0.220 (0.122)	0.224 (0.122)	0.257 (0.184)	0.262 (0.184)
Eleventh grade	0.191 (0.125)	0.192 (0.125)	0.114 (0.189)	0.115 (0.189)
Twelfth grade	0.457*** (0.133)	0.459*** (0.133)	0.0417 (0.200)	0.0439 (0.200)

School Achievement	-0.0174 (0.0434)	-0.0186 (0.0434)	0.315*** (0.0648)	0.313*** (0.0648)
Hispanic	-0.0731 (0.148)	-0.0656 (0.149)	-0.574** (0.221)	-0.563* (0.221)
White	-0.0942 (0.130)	-0.0888 (0.130)	0.0841 (0.192)	0.0921 (0.192)
Black	0.571*** (0.147)	0.576*** (0.147)	-0.719** (0.219)	-0.711** (0.219)
Asian	0.151 (0.246)	0.169 (0.246)	0.157 (0.368)	0.181 (0.368)
Immigrant X Sports Participation		-0.230 (0.158)		-0.335 (0.233)
Constant	4.691*** (0.183)	4.674*** (0.183)	22.77*** (0.273)	22.75*** (0.274)
Observations	2,574	2,574	2,566	2,566
Number of groups	123	123	123	123

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

4.7 Additional results: marijuana use and smoking

In Model 1 in Table 4f, I test the relationship between *sports participation* and *marijuana use*.

Findings show that there is no independent correlation between *sports participation* and *marijuana use*, but there are independent correlations that are positive and statistically significant between *marijuana use* and *female*, *eighth grade*, *twelfth grade*, *school achievement*. These results suggest that being female, being in eighth or twelfth grade, or having higher school achievement is associated with lower use of marijuana.

In Model 3 in Table 4f, I test the relationship between *sports participation* and *smoking*. Findings show that there is an independent correlation between *sports participation* and *smoking*, suggesting that youth sports participation is associated with lower frequency of smoking as a young adult. There are also independent correlations that are positive and statistically significant between *smoking* and *female*, *twelfth grade*, and *school achievement*. These results suggest that being female, being in twelfth grade, or having higher school achievement is also associated with better smoking habits as young adults. The only statistically significant negative correlation found was between *smoking* and *White*, suggesting that being White is independently associated with worse smoking behavior, that is higher frequency, as a young adult.

Table 4f. The estimated relationships between *Immigrant, Sports participation*, and additional *Wave IV variables (cont.)*.

Dependent Variables:	Marijuana Use (Model 1)	Marijuana Use (Model 2)	Smoking (Model 3)	Smoking (Model 4)
Sports Participation	0.0321 (0.0351)	0.0265 (0.0357)	0.0275* (0.0123)	0.0262* (0.0125)
Immigrant	0.270 (0.211)	0.0842 (0.297)	0.100 (0.0743)	0.0584 (0.104)
Income	-0.000366 (0.000671)	-0.000345 (0.000672)	0.000423 (0.000237)	0.000427 (0.000237)
Female	0.590*** (0.0796)	0.591*** (0.0796)	0.128*** (0.0278)	0.129*** (0.0278)
Eighth grade	0.0510 (0.134)	0.0498 (0.134)	-0.00537 (0.0468)	-0.00565 (0.0468)
Ninth grade	0.179 (0.134)	0.173 (0.134)	0.0605 (0.0477)	0.0592 (0.0477)
Tenth grade	0.202 (0.134)	0.200 (0.134)	0.0930 (0.0480)	0.0925 (0.0480)
Eleventh grade	0.457*** (0.138)	0.457*** (0.138)	0.0376 (0.0492)	0.0376 (0.0493)
Twelfth grade	0.477** (0.147)	0.476** (0.147)	0.187*** (0.0523)	0.187*** (0.0523)
School Achievement	0.233***	0.234***	0.139***	0.140***

	(0.0486)	(0.0486)	(0.0170)	(0.0170)
Hispanic	0.154	0.149	0.0712	0.0701
	(0.166)	(0.166)	(0.0583)	(0.0583)
White	0.113	0.109	-0.138**	-0.139**
	(0.145)	(0.145)	(0.0507)	(0.0508)
Black	0.218	0.214	-0.0296	-0.0303
	(0.163)	(0.163)	(0.0575)	(0.0575)
Asian	0.361	0.349	0.000535	-0.00209
	(0.274)	(0.274)	(0.0967)	(0.0969)
Immigrant X Sports Participation		0.157		0.0355
		(0.177)		(0.0619)
Constant	4.692***	4.703***	4.362***	4.365***
	(0.203)	(0.204)	(0.0717)	(0.0718)
Observations	2,579	2,579	2,576	2,576
Number of groups	123	123	123	123

Standard errors in parentheses

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

4.8 Limitations

This study has limitations. I use a longitudinal secondary dataset, a type that can suffer from attrition. Individuals may drop out of the study, and those who remain in the study may not end up being representative of the starting sample. Another limitation is that this study is not experimental, as I did not physically assign treatment. Therefore, it is harder to establish a causal effect. Because this study deals with associations rather than causal effects, there is always the possibility of missing confounding variables. Another limitation to consider is the timing of data collection. There is continuity over many years, and some of my outcomes and dependent variables are far removed from the independent variables. In other words, Wave I data capture the more immediate effects of sports participation on individuals whereas the dependent variable data of Wave IV are temporally further removed from the independent variable measure and may not be as accurate in capturing correlations of interest. Because the data was collected starting several decades ago, we cannot be entirely confident that the same trends would apply in today's time. I also have limited controls for environmental factors, cultural differences, and major influential societal events that occur over time. Finally, my analysis of immigrant and acculturation patterns is limited because I lacked data on variables such as the length of immigration, citizenship, naturalization, and legal status.

CHAPTER 5. DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

This study aimed to capture the degree of health-related benefits of youth sports participation for immigrants in the United States. Investigating this relationship is important, as immigrants are a large and significant demographic to consider if we hope to improve the overall health and well-being in the United States. Healthier immigrants bring exponential value to the nation as a whole in various aspects. It is also established that physical activity is directly linked to improved health outcomes. Given these facts and the major health disparities between immigrants and native-born individuals, it is imperative that such relationships and potential solutions become targets for more focused research and policy implementations. Currently, no research has been conducted to explicitly examine the potential differences in the impact level of sports participation on immigrants versus non-immigrants. As such, this study broadens our understanding of the intersection between youth sports participation, immigrant status, and health outcomes.

5.1 General health

A key finding of this study is that sports participation is associated with improved general health overall, but this effect is significantly stronger for immigrants only when they are adolescents. Nonetheless, from these results, one could argue that the positive effect of sports participation on general health dissipates by the time people are young adults, more drastically for immigrants than non-immigrants. Additionally, the results show that this positive effect of youth sports participation for immigrant adolescents only became significantly larger than that of non-immigrants when sport was played three or more times per week.

Taken as a whole, these findings correspond well with previous reviews concluding that physical activity interventions can be effective in contributing to overall improved health

outcomes. For example, regular physical activity as simple as walking daily is associated with lower risk of cardiovascular disease, decreased clinical disease frequency, and lower all-cause mortality in healthy individuals (Hamer & Chida, 2008). Interventions that focus on promoting physical activity and exercise referral programs based in primary care are effective strategies to increase physical activity to achieve these outcomes (Orrow et al., 2012).

My results add to this existing knowledge about physical activity as intervention work, specifically in the context of immigrant populations in the United States and the timing of such focused intervention work. My results also highlight the important yet often overlooked phenomenon of negative acculturation, where immigrant health declines with longer residence in the United States because of poorer health behaviors and health risks that reflect Americanized lifestyles. The observed higher level of impact that sports participation has for adolescent immigrants may suggest that the positive health benefits of physical activity decline more noticeably for immigrants compared to non-immigrants as they transition into young adulthood, reflecting the trend of negative acculturation. More research, however, is needed in this topic. These results do not mean that immigrants' general health simply declines as they age. They show that the difference in the magnitude of impact of sports participation for immigrants versus non-immigrants seems to "level out" as individuals reach young adulthood. While immigrants are still positively impacted by sports as adults, that positive impact is no longer significantly larger compared to non-immigrants.

This suggests that many negative acculturation factors are still stronger than the many positive effects that youth sports participation may add for immigrants early in their lives. Mediating factors for this trend might include certain acculturation practices more associated with the age period between adolescence and young adulthood when individuals begin to

practice more independence. Such factors may include lower quality food diets and habits (Akresh 2007) and higher levels and smoking and alcohol use (Abraído-Lanza et al., 2005; Kimbro, 2009).

As my results shed light on how the timing and nature of sports participation interventions could impact general health, we isolate important insights into how we could battle the early stages of negative acculturation for young immigrants. First, my results suggest that we should implement initiatives promoting sports participation for young immigrant children *and* adults. We expect that such initiatives will have a more significant immediate positive effect on adolescent general health, but we should continue such efforts as individuals age and reach adulthood to counter negative acculturation effects. Second, the fact that the effect of interest is only significant when the individual participated in sports three or more times per week suggests that these efforts ideally should promote more frequent and consistent participation rather than short-term programs or condensed camp events.

5.2 Alcohol use

Another finding of interest from this study is that youth sports participation has a negative effect on individuals' alcohol use as adults (higher use), and this negative effect is significantly stronger for immigrants. Given the specific nature of the individual relationships between sports and alcohol use and immigrant status and alcohol use, there are several explanations behind why immigrants might experience this negative effect more noticeably compared to non-immigrants. While there have been previous studies emphasizing sports participation as a protective factor against excess alcohol and substance use (Lorente et al., 2004; Watten, 2002), there has also been research showing that sports participation, and particularly team sports participation, is associated with increased rates of alcohol use (Andes et al., 2012). Most of this research,

however, emphasizes that sports participation alone is unlikely to increase alcohol use. Rather, specific social norms and identities attached to sports give rise to certain values and practices (Sønderlund et al., 2014).

There are two main theories behind why sports participation is associated with higher alcohol use: (i) alcohol being used as a coping strategy by athletes dealing with high levels of pressure from their sport (Valentine & Daub, 1999) and (ii) alcohol being part of the social component and cultural norm that the “athlete identity” entails. Active participation in sports facilitates the construction of a sports-specific identity (Miller, 2009), and the maintenance of this social identity may be a primary influencer for increased alcohol consumption. For example, drinking is perceived to be important for team cohesion (Zhou et al., 2014), and athletes often describe the culture of consumption to celebrate wins or commiserate losses (Collins & Vamplew, 2002).

Several studies have linked team sport athletes (i.e., football, soccer, and basketball), with higher levels of excess drinking compared to individual sports athletes (i.e., track and field, swimming, and golf) (Brenner et al., 2007), which highlights the significance of social identity, potential peer pressure, and cohesion involved in sports participation. Furthermore, these results underscoring the connection between sports participation and alcohol use were found specifically for college students attending universities in the United States, which happen to be environments where social belonging and group identity is especially central. One other potential explanation for sports participation being associated with excess drinking is overestimation of alcohol tolerance. We expect that individuals who participate in sports have overall better general health than those who do not participate in sports. These individuals may assume that because they are “healthier” than the average person, they can afford to consume a higher level of alcohol.

Potential explanations for why being an immigrant is independently associated with excess drinking include increased levels of social stress, lower levels of social support and family cohesion, and more barriers to proper education and awareness about safe substance use. Stressors associated with immigration significantly increase the risk of unhealthy alcohol use and related consequences for immigrants (Sirin et al., 2022). Higher family cohesion directly associated with lower alcohol use and abuse in the general population, and immigrants, especially immigrant women, are more likely to have lower levels of social support and less stable family living situations compared to non-immigrants (Sword et al., 2006). Therefore, the intersection of sports and excess alcohol use is likely to have a greater impact on immigrants due to their increased vulnerability to social pressures of sports team and society in general, as well as the desire to strengthen social identity in their host country.

There tends to be strong associations between sports and alcohol use, with many athletes and fans using alcohol as a way to celebrate victories or cope with losses (Collins & Vamplew, 2002). Immigrants may feel a heightened sense of pressure to assimilate into their new cultural environment, including adopting the norms and behaviors associated with sports fandom and participation. Furthermore, the immigrant experience can be isolating, and the sense of belonging that comes with being a part of a sports team may be particularly appealing. However, this desire to fit in can lead to increased alcohol consumption seen as a way to bond with others and demonstrate loyalty to a particular team or sport. Immigrants may face additional challenges related to alcohol use, such as language barriers and lack of access to culturally appropriate support services. Ultimately, these factors, combined with the increased likelihood of social isolation and limited access to resources that immigrants may experience, can make them more susceptible to the negative effects of sports-related alcohol use.

5.3 Policy recommendations

There are several policies and initiatives that could be implemented to promote sports participation among immigrants centered around three themes: (i) increased outreach for immigrants, (ii) incorporation of more education and awareness in sports environments, and (iii) more cultivation of inclusivity in such environments.

To encourage sports participation among immigrants, policies should focus on *increased outreach efforts* aimed at both adolescent, college-aged, and young adult immigrants. There is also a need for more sport programs that aim to break down access barriers for immigrant groups that may be isolated. More youth sports programs should be initiated particularly in immigrant-dense locations and communities. Such initiatives could include outreach programs to schools, community centers, and workplaces, as open access to sport is critical. These efforts should involve frequent sports participation (three or more times per week) to battle negative acculturation more effectively. Programs could be tailored to specific cultural groups and should focus on promoting the benefits of sports participation, building social networks, and creating a sense of belonging. Other educational initiatives could be centered on healthy diets including alcohol use and long-term physical activity habits and benefits.

To create long-term impact and awareness, policies should focus on creating *educational initiatives* among immigrants within the platform of athletics. Initiatives could be targeted at schools, community centers, and workplaces, and could include training programs, workshops, and seminars. These programs could promote the benefits of sports participation, highlight the importance of physical activity, and educate immigrants on how to access sports programs and resources.

Policies could focus on cultivating *inclusive environments* that cater to the needs of immigrants. This could involve creating sports programs that are accessible and culturally sensitive. Programs that provide language support, cultural events, and community outreach programs could be used to specifically promote sports participation among immigrants. Additionally, sports clubs and teams could implement policies that promote diversity and inclusion, such as anti-discrimination policies and diversity training for coaches and athletes. By creating inclusive environments that are tailored to specific cultural groups and consider relevant barriers, immigrants may feel more comfortable and more likely to participate in sports programs without being negatively affected by the social acculturation pressures such as increased alcohol use, which could ultimately improve their physical health and well-being for the short and long-term.

In practical terms, the policy recommendations these implications apply to include increasing funding for existing programs aimed at providing sports opportunities for immigrant youth, more funding towards club sports scholarships for immigrant youth specifically, federal health programs increasing funding for sports programs (both school-based and community-based) to significantly expand sports program opportunities beyond school P.E. classes, as well as funding for more research on the intersection of these topics.

5.4 Conclusion

In conclusion, the results of this study underscore the crucial role of sports participation as a means of improving the general health of immigrants, while also considering the unique challenges and experiences that can affect their vulnerability to factors associated with negative acculturation such as increased alcohol use. Addressing these challenges requires a multifaceted approach that integrates culturally responsive and evidence-based interventions. By understanding the intersection of sports, health, and immigrant status, policymakers, healthcare professionals, and sports program leaders can develop more tailored interventions to promote physical activity among immigrants and better mitigate the negative effects of acculturation. Future research could expand on the findings of this study by investigating the effectiveness of such interventions, examining the impact of community-based programs, the role of social support in promoting physical activity among immigrants, exploring the cultural factors and beliefs that influence the attitudes of immigrants towards physical activity, and further investigating the complex interplay between physical activity and other social determinants of health among immigrants. Ultimately, by addressing these gaps in knowledge, we can continue to build a better understanding of the potential benefits of sports participation for immigrant health, moving towards positive acculturation, and long-term well-being.

REFERENCES

- Abraído-Lanza, A. F., Chao, M. T., & Flórez, K. R. (2005). Do healthy behaviors decline with greater acculturation? Implications for the Latino mortality paradox. *Social Science & Medicine*, *61*(6), 1243–1255. <https://doi.org/10.1016/j.socscimed.2005.01.016>
- Add Health Wave IV Public Use Data Released. (2011, 06 May 6). *Add Health*.
<https://addhealth.cpc.unc.edu/news/news-about-wave-iv-data-release/#:~:text=The%20Wave%20IV%20interviews%20were,peer%20groups%2C%20and%20romantic%20relationships>
- Akresh I. R. (2007). Dietary assimilation and health among hispanic immigrants to the United States. *Journal of health and social behavior*, *48*(4), 404–417.
<https://doi.org/10.1177/002214650704800405>
- Alfieri, S., Marzana, D., D'Angelo, C., Corvino, C., Gozzoli C. & Marta E. (2019). Engagement of young immigrants: The impact of prosocial and recreational activities. *Journal of Prevention & Intervention in the Community*, *50*(4), 344-360,
<https://doi.org/10.1080/10852352.2021.1935199>
- American Immigration Council. (2021, September 21). *Fact Sheet: Immigrants in the United States*. American Immigration Council.
<https://www.americanimmigrationcouncil.org/research/immigrants-in-the-united-states>
- American Public Health Association (2018). *Achieving Health Equity in the United States*.
<https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2019/01/29/achieving-health-equity>
- Anderson, M. A., Oshiro, K. F., Wicker, P., Cunningham, G. B., & Heere, B. (2019). Managerial perceptions of factors affecting the design and delivery of sport for health programs for

- refugee populations. *Sport Management Review*, 22, 80–95.
<https://doi.org/10.1016/j.smr.2018.06.015>
- Andersen, Ottesen, L., & Thing, L. F. (2019). The social and psychological health outcomes of team sport participation in adults: An integrative review of research. *Scandinavian Journal of Public Health*, 47(8), 832–850. <https://doi.org/10.1177/1403494818791405>
- Andes, S., Poet, K., & McWilliams, S. (2012). The culture of high-risk alcohol use among club and intramural athletes. *Journal of American College Health*, 60, 556–561.
doi:10.1080/07448481.2012.719559.
- Bailey (2006). Physical Education and Sport in Schools: A Review of Benefits and Outcomes. *The Journal of School Health*, 76(8), 397–401. <https://doi.org/10.1111/j.1746-1561.2006.00132.x>
- Baran, B. E., Valcea, S., Porter, T. H., & Gallagher, V. C. (2018). Survival, expectations, and employment: An inquiry of refugees and immigrants to the United States. *Journal of Vocational Behavior*, 105, 102–115. <https://doi.org/10.1016/j.jvb.2017.10.011>
- Bethel, J. W., & Schenker, M. B. (2005). Acculturation and smoking patterns among Hispanics: a review. *American Journal of Preventive Medicine*, 29(2), 143–148.
<https://doi.org/10.1016/j.amepre.2005.04.014>
- Brenner, J., & Swanik, K. (2007). High-risk drinking characteristics in collegiate athletes. *Journal of American College Health*, 56(3), 267-272.
- Center for Disease Control and Prevention. (2020). *Promoting Health Equity: A Resource to Help Communities Address Social Determinants of Health*. CDC.
<https://www.cdc.gov/nccdphp/dch/programs/healthycommunitiesprogram/tools/pdf/SDO-H-workbook.pdf>

- Chang, C. D. (2019). Social Determinants of Health and Health Disparities Among Immigrants and their Children. *Current Problems in Pediatric and Adolescent Health Care*, 49(1), 23–30. <https://doi.org/10.1016/j.cppeds.2018.11.009>
- Coalter, F. (2001). *Realizing the Potential of Cultural Services: The Case for Sport*. Local Government Association.
- Collins, T., & Vamplew, W. (2002). *Mud, sweat and beers: A cultural history of sport and alcohol*. Berg Publishers.
- Constant, A. F. (2015, September). A "healthy immigrant effect" or a "sick immigrant effect"? selection and policies matter. IZA. <https://www.iza.org/publications/dp/9338/a-healthy-immigrant-effect-or-a-sick-immigrant-effect-selection-and-policies-matter#:~:text=An%20extensive%20body%20of%20research,additional%20years%20in%20the%20country.>
- Corvino, C., Martinez-Damia, S., Belluzzi, M., Marzana, D., & D'angelo, C. (2022). “Even though we have different colors, we are all equal here”: Immigrants building a sense of community and well-being through sport participation. *Journal of Community Psychology*, 1– 18. <https://doi.org/10.1002/jcop.22897>
- Damle, M., Wurtz, H., & Samari, G. (2022). Racism and health care: Experiences of Latinx immigrant women in NYC during COVID-19. *SSM-Qualitative Research in Health*, (2)100094. <https://doi.org/10.1016/j.ssmqr.2022.100094>
- Dawson, A. J., Sundquist, J., & Johansson, S. E. (2005). The influence of ethnicity and length of time since immigration on physical activity. *Ethnicity and Health*, 10(4), 293-309. <https://doi.org/10.1080/13557850500159965>

- Delgado, A. A., & Gómez, E. A. (2011). Sport as a platform for values education. *Journal of Human Sport and Exercise*, 6(4), 573–584. <https://doi.org/10.4100/jhse.2011.64.01>
- Derose, K. P. et al. (2007). Immigrants And Health Care: Sources of Vulnerability. *Health Affairs*, 26(5), 1258-1268. <https://www.healthaffairs.org/doi/10.1377/hlthaff.26.5.1258>
- Đoàn, L. N., Chong, S. K., Misra, S., Kwon, S. C., & Yi, S. S. (2021). Immigrant Communities and COVID-19: Strengthening the Public Health Response. *American Journal of Public Health*, 111(3), 224–231. <https://doi.org/10.2105/AJPH.2021.306433>
- Eime, Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. *The International Journal of Behavioral Nutrition and Physical Activity*, 10(1), 98–98. <https://doi.org/10.1186/1479-5868-10-98>
- Entorf, H., & Lauk, M. (2008). Peer effects, social multipliers and migrants at school: An international comparison. *Journal of Ethnic and Migration Studies*, 34(4), 633-654. <https://doi.org/10.1080/13691830801961639>
- Frisco, M. L., Baumgartner, E., & Van Hook, J. (2019). The weight of school entry: Weight gain among Hispanic children of immigrants during the early elementary school years. *Demographic Research*, 40, 95–120. <https://www.jstor.org/stable/26726994>
- Gadd, M., Sundquist, J., Johansson, S. E., & Wändell, P. (2005). Do immigrants have an increased prevalence of unhealthy behaviors and risk factors for coronary heart disease? *European journal of cardiovascular prevention and rehabilitation: official journal of the European Society of Cardiology, Working Groups on Epidemiology & Prevention and*

- Cardiac Rehabilitation and Exercise Physiology*, 12(6), 535–541.
<https://doi.org/10.1097/01.hjr.0000174829.25388.ed>
- Gee, G. C., & Ford, C. L. (2021). Structural Racism and Health Inequities: Old Issues, New Directions. *Du Bois Review: Social Science Research on Race*, 8(1), 115–132.
<https://doi.org/10.1017/S1742058X11000130>
- Geidne, S., Quennerstedt, M., & Eriksson, C. (2013). The youth sports club as a health-promoting setting: An integrative review of research. *Scandinavian Journal of Public Health*, 41(3), 269-283. <https://doi.org/10.1177/1403494812473204>
- Grimaldi-Puyana, Moises & Fernandez, Jesus & Sanchez-Oliver, Antonio & García-Fernández, Jerónimo (2018). Management of new forms of sports habits in an immigrant population during the acculturation process. *Journal of Physical Education and Sport*, 18(1), 33-40.
<https://doi.org/10.7752/jpes.2018.01005>
- Harris, K. M., & Udry, J. R. (n.d.). *National Longitudinal Study of Adolescent to Adult Health (Add Health), 1994-2018 [Public Use]*. User Guide.
<https://www.icpsr.umich.edu/web/pages/DSDR/add-health-data-guide.html>
- Hartley, L., Fleay, C., & Tye, M. E. (2017). Exploring physical activity engagement and barriers for asylum seekers in Australia coping with prolonged uncertainty and no right to work. *Health & Social Care in the Community*, 25(3), 1190-1198.
<https://doi.org/10.1111/hsc.12419>
- Hedstrom, R., & Gould, D. (2004). Research in youth sports: Critical issues status. *Michigan: Michigan State University*, 1(42).
<http://www.educ.msu.edu/ysi/project/CriticalIssuesYouthSports.pdf>

- Hills, Dengel, D. R., & Lubans, D. R. (2014). Supporting Public Health Priorities: Recommendations for Physical Education and Physical Activity Promotion in Schools. *Progress in Cardiovascular Diseases, 57*(4), 368–374.
<https://doi.org/10.1016/j.pcad.2014.09.010>
- Jasso, G. et al. (2007). Immigrant health-selectivity and acculturation. *Critical Perspectives on Racial and Ethnic Differences in Health in Late Life, 227–266*.
https://www.ncbi.nlm.nih.gov/books/NBK25533/?report=reader#_NBK25533_pubdet_
- Johnston, Delva, J., & O'Malley, P. M. (2007). Sports participation and physical education in American secondary schools: current levels and racial/ethnic and socioeconomic disparities. *American Journal of Preventive Medicine, 33*(4), 195–208.
<https://doi.org/10.1016/j.amepre.2007.07.015>
- Johnson, Garing, J. H., Oliphant, J. A., & Roberts, D. K. (2016). Promoting positive youth development through sport: continuing education opportunities for coaches and future directions for health promotion of athletes. *Journal of Adolescent Health, 58*(2), 86–87.
<https://doi.org/10.1016/j.jadohealth.2015.10.185>
- Kimbro, R. T. (2009). Acculturation in context: Gender, age at migration, neighborhood ethnicity, and health behaviors. *Social Science Quarterly, 90*(5), 1145-1166.
<https://doi.org/10.1016/j.socscimed.2014.02.002>
- Kimbro, R.T., Kaul, B. (2016). Physical activity disparities between US-born and Immigrant Children by Maternal Region of Origin. *Immigrant Minority Health, 18*, 308–317.
<https://doi.org/10.1007/s10903-015-0180-6>

- Ku, L. (2009). Health insurance coverage and medical expenditures of immigrants and native-born citizens in the United States. *American Journal of Public Health* 99(7) 1322–1328.
<https://doi.org/10.2105/AJPH.2008.144733>
- Larsen, L.J. (2003). *The foreign-born population in the United States*. Current Population Reports. 20- 551.
<https://www.census.gov/content/dam/Census/library/publications/2004/demo/p20-551>
- Long, J. S. I. (2001). The social benefits of sport: where’s the proof? *Sport in the City: The Role of Sport in Economic and Social Regeneration*. 187-203.
- Lorente, F. O., Souville, M., Griffet, J., & Grélot, L. (2004). Participation in sports and alcohol consumption among French adolescents. *Addictive Behaviors*, 29(5), 941-946.
<https://doi.org/10.1016/j.addbeh.2004.02.039>
- Malm, C., Jakobsson, J., & Isaksson, A. (2019). Physical activity and sports-real health benefits: a review with insight into the public health of Sweden. *Sports (Basel, Switzerland)*, 7(5), 127. <https://doi.org/10.3390/sports7050127>
- Manspile, E., Atwell, M., & Bridgeland, J. (2021). Immigrant Students and English Learners: Challenges Faced in High School and Postsecondary Education. *Civic*.
<https://files.eric.ed.gov/fulltext/ED614148.pdf>
- Marks, A., Coll, C. (2014). Understanding the U.S. immigrant paradox in childhood and adolescence. *Child Development Perspectives*, 8, 59-64.
<https://doi.org/10.1111/cdep.12071>.
- Marzana, D., Martinez-Damia, S., Atallah, D., & Loreto Martinez, M. (2020). The resilience of Peruvian immigrants through participation in community-based organizations in urban

- Chile. *Journal of Community Psychology*, 48(5), 1327–1346.
<https://doi.org/10.1002/jcop.22284>
- McAuley, E., Blissmer, B., Marquez, D. X., Jerome, G. J., Kramer, A. F., & Katula, J. (2000). Social relations, physical activity, and well-being in older adults. *Preventive Medicine*, 31(5), 608-617. <https://doi.org/10.1006/pmed.2000.0740>
- Merkel D. L. (2013). Youth sport: positive and negative impact on young athletes. *Open Access Journal of Sports Medicine*, 4, 151–160. <https://doi.org/10.2147/OAJSM.S33556>
- Miller, K. E. (2009). Sport-related identities and the “toxic jock.” *Journal of Sport Behavior*, 32, 69–91. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3107047/>
- Neuman, S. (2014). Are immigrants healthier than native residents? *IZA*, 108.
<https://doi.org/10.15185/izawol.108>
- Nguyen, T. (2020). *Health equity and immigrant populations: a literature review*. Symposium of Student Scholars. Kennesaw State University.
<https://digitalcommons.kennesaw.edu/undergradsymposiumksu/fall2020>
- Nielsen, G., Wikman, J. M., Jensen, C. J., Schmidt, J. F., Gliemann, L., & Andersen, T. R. (2014). Health promotion: the impact of beliefs of health benefits, social relations and enjoyment on exercise continuation. *Scandinavian Journal of Medicine & Science in Sports*, 24, 66-75. <https://doi.org/10.1111/sms.12275>
- Orrenius, P. M., & Zavodny, M. (2009). Do immigrants work in riskier jobs? *Demography*, 46(3), 535–551. <https://doi.org/10.1353/dem.0.0064>
- Orow, G., Kinmonth, A. L., Sanderson, S., & Sutton, S. (2012). Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of

- randomized controlled trials. *BMJ (Clinical research ed.)*, 344(1389).
<https://doi.org/10.1136/bmj.e1389>
- Parnell, D., Cope, E., Bailey, R., Krstrup, P., & Curran, K. (2018). Retracted article: Football and physical health: what do we know? *Sports in Society*.
<https://www.semanticscholar.org/paper/Retracted-article%3A-Football-and-physical-health%3A-do-Parnell-Cope/7e4fb9368a8ec633f02e13f14862e91a13842376>
- President's Council on Sports, Fitness & Nutrition Science Board (PCSFN) (2020). PCSFN Science Board Report on Youth Sports. *Proceedings from the 2020 Annual Meeting of the President's Council on Sports, Fitness & Nutrition*. www.health.gov/our-work/pcsfn/about-pcsfn/science-board.
- Ramirez, L.K., Baker, E.A., & Metzler, M.M. (2008). Promoting health equity; a resource to help communities address social determinants of health.
<https://stacks.cdc.gov/view/cdc/11130>
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models. Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Riosmena, F., Everett, B. G., Rogers, R. G., & Dennis, J. A. (2015). Negative Acculturation and Nothing More? Cumulative Disadvantage and Mortality during the Immigrant Adaptation Process among Latinos in the United States. *The International Migration Review*, 49(2), 443–478. <https://doi.org/10.1111/imre.12102>
- Rosenbaum, S., Tiedemann, A., Ward, P. B., Curtis, J., & Sherrington, C. (2015). Physical activity interventions: an essential component in recovery from mental illness. *British Journal of Sports Medicine*, 49(24), 1544-1545.

- Singh, G.K., Miller, B.A. (2004). Health, Life Expectancy, and Mortality Patterns Among Immigrant Populations in the United States. *Can J Public Health* 95, 14–121.
<https://doi.org/10.1007/BF03403660>
- Singh, G. K., Rodriguez-Lainz, A., & Kogan, M. D. (2013). Immigrant health inequalities in the United States: use of eight major national data systems. *The Scientific World Journal*, 512313. <https://doi.org/10.1155/2013/512313>
- Singh, G. K., Yu, S. M., & Kogan, M. D. (2013). Health, chronic conditions, and behavioral risk disparities among U.S. immigrant children and adolescents. *Public Health Reports*, 128(6), 463–479. <https://doi.org/10.1177/003335491312800606>
- Singh, G. K., Yu, S. M., Siahpush, M., & Kogan, M. D. (2008). High levels of physical inactivity and sedentary behaviors among US immigrant children and adolescents. *Archives of Pediatrics & Adolescent Medicine*, 162(8), 756–763.
<https://doi.org/10.1001/archpedi.162.8.756>
- Sirin, S. R., Choi, E., & Sin, E. J. (2022). Meta-analysis on the relation between acculturation and alcohol use among immigrant youth. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 70(3), 361–377.
<https://doi.org/10.1016/j.jadohealth.2021.09.021>
- Sønderlund, A. L., O'Brien, K., Kremer, P., Rowland, B., De Groot, F., Staiger, P., Zinkiewicz, L., & Miller, P. G. (2014). The association between sports participation, alcohol use and aggression and violence: a systematic review. *Journal of Science and Medicine in Sport*, 17(1), 2–7. <https://doi.org/10.1016/j.jsams.2013.03.011>

- Stella, M. Y., Huang, Z. J., Schwalberg, R. H., Overpeck, M., & Kogan, M. D. (2003). Acculturation and the health and well-being of US immigrant adolescents. *Journal of Adolescent Health, 33*(6), 479-488.
- Sword, W., Watt, S., & Krueger, P. (2006). Postpartum health, service needs, and access to care experiences of immigrant and Canadian-born women. *Journal of Obstetric, Gynecologic, and Neonatal Nursing (JOGNN), 35*(6), 717–727. <https://doi.org/10.1111/j.1552-6909.2006.00092.x>
- Tirone, S., Livingston, L., A., Miller, A.J., & Smith, E.L. (2010). Including immigrants in elite and recreational sports: The experiences of athletes, sports providers and immigrants. *Leisure, 34*(4), 403-420.
- The National Longitudinal Study of Adolescent to Adult Health (Add Health). (n.d.). *Home*. Add Health. <https://addhealth.cpc.unc.edu/>
- U.S. Census Bureau (2012). *The 2011 American Community Survey*. US Census Bureau. <http://www.census.gov/acs/www/>.
- U.S. Department of Health and Human Services. (2023). *Healthy People 2020*. Health.gov. <https://health.gov/our-work/national-health-initiatives/healthy-people/healthy-people-2020>
- Valentine, J. J., & Taub, D. J. (1999). Responding to the developmental needs of student athletes. *Journal of College Counseling, 2*, 164–179. doi:10.1002/j.2161-1882.1999.tb00153.x.
- Vedøy, I. B., Anderssen, S. A., Tjomsland, H. E., Skulberg, K. R., Thurston, M. (2020). Physical activity, mental health and academic achievement: A cross-sectional study of Norwegian adolescents, *Mental Health and Physical Activity, 18*(1). <https://doi.org/10.1016/j.mhpa.2020.100322>

- Walseth, K., & Fasting, K. (2003). Islam's view on physical activity and sport: Egyptian women interpreting Islam. *International Review for the Sociology of Sport*, 38(1), 45-60.
- Watten, G. R., Foxcroft, R. D., Ingebrigtsen, E. J., & Relling, G. (2002). Teenage alcohol and intoxication: The impact of family socialization factors, living area and participation in organized sports. *Alcohol & Alcoholism*, 37(1), 74-80.
- World Health Organization. (n.d.). *WHOQOL - Measuring Quality of Life*. World Health Organization. <https://www.who.int/tools/whoqol>
- World Health Organization, T. (2010). *Global recommendations on physical activity for health*. World Health Organization.
- Zalla, L. C., Martin, C. L., Edwards, J. K., Gartner, D. R., & Noppert, G. A. (2021). A Geography of Risk: Structural Racism and Coronavirus Disease: Mortality in the United States. *American Journal of Epidemiology*, 190(8), 1439–1446. <https://doi.org/10.1093/aje/kwab059>
- Zhang, Lee, J., Chu, T. L. A., Chen, C., & Gu, X. (2020). Accessing Physical Activity and Health Disparities among Underserved Hispanic Children: The Role of Actual and Perceived Motor Competence. *International Journal of Environmental Research and Public Health*, 17(9), 3013–. <https://doi.org/10.3390/ijerph17093013>
- Zhou, J., O'Brien, K. S., & Heim, D. (2014). Alcohol consumption in sportspeople: The role of social cohesion, identity and happiness. *International Review for the Sociology of Sport*, 49(3-4), 278-293.