ADOLESCENT PHYSICAL ACTIVITY LEVELS:

THE INFLUENCE OF HIGH SCHOOL PHYSICAL EDUCATION PARTICIPATION

A Thesis

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MASTER OF PUBLIC POLICY AND ADMINISTRATION

by

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Department of Public Policy and Administration

Abstract

of

ADOLESCENT PHYSICAL ACTIVITY LEVELS:

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Health policy experts recommend that adolescents engage in at least 60 minutes of physical activity per day. In California, fewer adolescents are reaching these guidelines, with declining activity levels as age increases. A higher prevalence of inactivity in addition to rising obesity rates prompts policy concern because of the increased risk of developing chronic health conditions such as Type 2 diabetes and cardiovascular disease, which affect long-term health. There is a national policy debate occurring about the declining emphasis on physical education within schools, given evidence that it has the potential to improve exercise habits.

From a California standpoint, my research explores whether more physical education participation causes increases in adolescent exercise behaviors, to determine why is there a declining emphasis on physical education, and to identify the primary policy and practical barriers to increasing time for high school students to spend in physical education. Using 2,799 adolescent observations from the 2011-2012 California Health Interview Survey, I conduct a regression analysis to quantify the influence of high school physical education participation on overall activity levels. Since many factors influence activity behaviors, which I cannot fully capture in a quantitative analysis, I also conduct nine interviews across state and local education entities to explore the policy and practical barriers to investing time into physical education.

My regression results show that physical education participation does not influence the choice to exercise, but among adolescents who are at least somewhat active, it does influence the amount that they choose to engage in each day. Combined with my interview results, I confirm prior literature that the following socio-demographic and environmental factors influence adolescent activity levels: gender, age, income, neighborhood safety, access to activity opportunities after school, and education support of quality physical education. My results add to prior research, showing that having an athletic role model positively influences activity behaviors.

Based on my findings, I recommend investing in an educational culture that values physical education as an instructional priority and in community partnerships to create more opportunities for adolescent activity outside of school hours. Ensuring that physical education is an instructional priority requires investing in both the quality and quantity of the program, creating more professional development opportunities, ensuring that facilities are adequate and physical education teachers hold the proper credentials to teach the standards-based curriculum. Based on findings that resource discrepancies pose greater barriers for schools serving a large proportion of low-income students, districts can effectively collaborate with community members to promote activity at the broader local level through use of required Local Control and Accountability Plans (LCAP) to ensure that their spending matches state priorities for students.

_____, Committee Chair
Robert Wassmer, Ph.D.

_____
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Chapter 1

INTRODUCTION

Health policy experts recommend that adolescents engage in at least 60 minutes of physical activity per day (American Cancer Society Cancer Action Network (ACS CAN), American Diabetes Association (ADA), & American Heart Association (AHA), 2012; Centers for Disease Control and Prevention (CDC), 2010; California Department of Public Health (CDPH), 2014; White House Task Force on Childhood Obesity, 2010). Regular physical activity for youth has health benefits including improved bone and muscle strength; improved self-esteem and concentration; weight control; improved mood; and improved cardiovascular health (Centers for Disease Control and Prevention (CDC), 2006). Inactivity is a particular concern for adolescents for a couple of reasons. First, rising obesity trends are a growing public health problem because of negative long-term health effects on current and future generations (Centers for Disease Control, 2013; White House Task Force on Childhood Obesity, 2010). Nationwide, one in three children, ages 2-19 is overweight or obese (White House Task Force on Childhood Obesity), which puts them at increased risk of developing chronic health conditions such as Type 2 diabetes, heart disease, certain cancers, and mental health conditions (CDPH, 2014; CDC, 2013; Lynn, 2007; White House Task Force on Childhood Obesity). Second, particularly for adolescents, the exercise habits that they set now affect the likelihood that they will be active adults (Steele, 2011, p. 72).

Although inactivity is not the sole cause of obesity, it is an important contributing factor, due to increased sedentary behaviors that come with increased use of technologies such as computers, television, and video games (American Academy of Pediatrics, 2006). When adolescents understand the importance of adopting and maintaining a physically active lifestyle, their overall health benefits, which is the reason why national policies recommend that schools

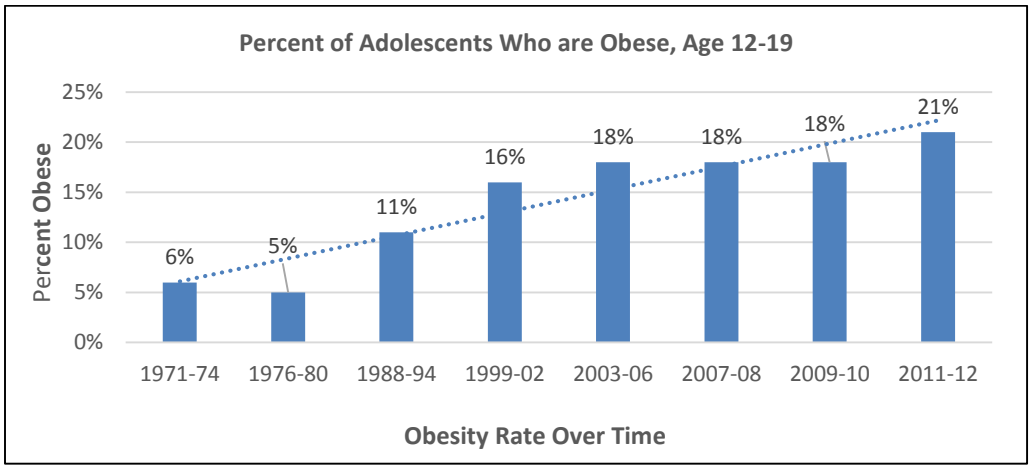
provide high quality, daily physical education (Centers for Disease Control and Prevention (CDC), 2006; Steele, 2011, p. 72). Former U.S. Surgeon General, David Satcher stated, "I think we've made a serious error by not requiring physical education. We are paying a tremendous price for the physical inactivity epidemic affecting our country. People are paying with pain and suffering and society pays with money and lost productivity. Physical education should be mandatory in kindergarten through 12th grade" (Payne & Morrow, 2009, p. 1).

Despite national policies recommending that adolescents engage in at least 60 minutes of daily physical activity and participate in daily physical education, activity levels are declining. Nationwide, only 56 percent of high school students participate in physical education, with even less participation in higher grades (Lynn, 2007, p. 18). Participation in daily physical education declined from 42 percent in 1991 to 28 percent in 2003 (p. 18). Since adolescents spend a significant portion of their awake weekday time in school, there is an opportunity for policy to invest in quality physical education programs. Although physical activity should also be promoted at home and in the community, schools offer the most integrated approach for all youth to benefit (American Academy of Pediatrics, 2006; CDC, 2013).

California Adolescents are not Meeting Public Health Standards of Physical Activity

Although rising adolescent obesity and declining physical activity trends are a nation-wide issue, the thesis research I offer here focuses on California adolescents in particular. Findings derived from a recent California Department of Public Health (2014) report indicate that only 16.1 percent of adolescents meet standards of 60 minutes or more of daily physical activity, with declining activity levels as age increases (p. 3). Figure 1 shows the upward trend in obesity rates since the 1970s.

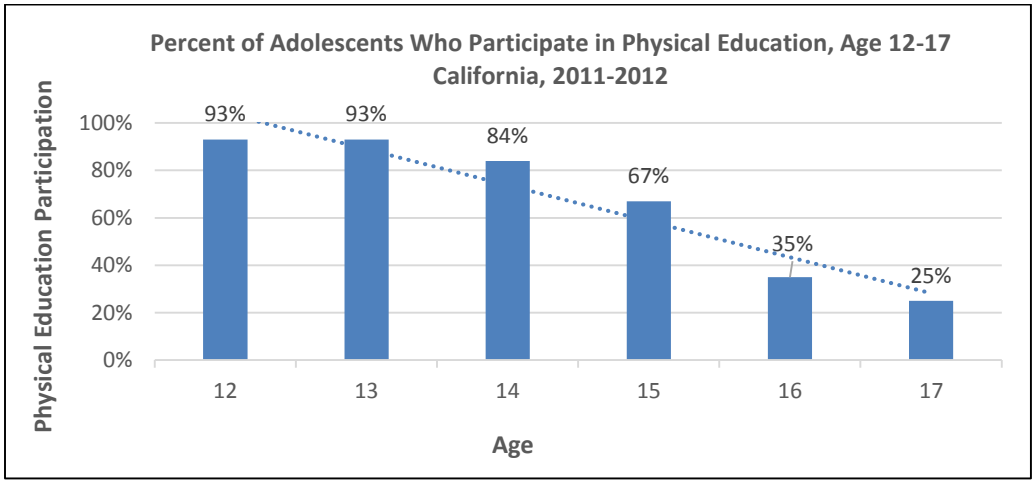
Figure 1: Upward Trend in Adolescent Obesity



Source: Child Trends Data Bank. Overweight children and youth. Retrieved from http://www.childtrends.org/?indicators=overweight-children-and-youth

Also similar to national trends, physical education participation declines with age, as shown below in Figure 2. California Health Interview Survey data (2011-12) shows that participation in physical education drops from 95% at age 12 to only 23% at age 17.

Figure 2: Physical Education Participation Declines with Age



Source: California Health Interview Survey (2011-12).

Declining participation among older students is often because policy allows high school juniors and seniors exemptions from physical education (Diamant, Babey, & Wolstein, 2011, p.

2), yet other barriers to increasing emphasis on physical education occur within local education agencies. Budget constraints, lack of credentialed staff, and competing academic priorities influence the amount of time and resources invested into physical education (White House Task Force on Childhood Obesity, 2010). Although the decline in physical education participation is not a direct cause of rising adolescent obesity rates, many researchers point to it as an important contributing factor. In this thesis, I seek to answer three questions:

1) Does greater high school physical education participation among California adolescents cause increases in their non-physical education-related physical activity levels?
2) Why is there a decreased emphasis on physical education in California's high schools?
3) What are the primary policy and practical barriers to increasing the amount of time that high school students spend in physical education?

The remainder of this introduction provides more context into several state policy issues and local education agency barriers regarding physical education. First, the benefits of physical education (to both the individual and society) and the reasons why the growing number of adolescents who are physically inactive presents a public health policy concern. Second, although written state policy supports quality physical education, in practice, physical education participation is still declining. Finally, some of the policy and practical barriers to providing more physical education include budget cuts, lack of administrator support, and the prioritization of academic test scores.

Physical Education is an Important Health and Education Policy Priority

Quality physical education is an important education policy priority because it helps students "develop the knowledge, attitudes, skills, behavior, and motivation needed to be physically active for life (EC Section 33350 [c])." Adolescents that are more active are healthier both physically and mentally, which positively influences their academic performance (ACA

CAN, ADA, & AHA, 2012; Cox & Chamberlain, 2010; Steele, 2011). According to Charles Bucher, who wrote about the foundations of physical education, "if a nation is to remain strong physically, mentally, spiritually, and socially, there must be education for fitness (1968, p. 456)." *Physical education* is fundamentally different from *physical activity*. Physical activity is simply the act of expending energy through bodily movement, where the amount and frequency varies by personal choice (Caspersen, Powell, & Christenson, 1985, p. 126-127). A quality physical education curriculum is designed to create a structured environment, where students are exposed to a variety of activities, learn certain skills, demonstrate knowledge of various fitness concepts and principles, in order to apply what they learn in their daily lives (CDE, 2010). The provision of a quality physical education program directly benefits the individual by teaching the value of making healthy and physically active lifestyle choices, which also translates into a broader social benefit.

Inactivity is a major contributing factor to rising youth obesity rates, which leads to the more chronic illnesses, which ultimately increases health care costs, most of which are preventable (Steele, 2011, p. 73). It is appropriate for state policymakers to intervene in order to prioritize physical activity because of the negative externality (Munger, 2000) that obesity and inactivity imposes on society in the forms of health care and lost productivity costs (Public Health Advocacy report, 2009). Investing in preventative measures to ensure that young people understand the importance of being physically active, helps them to make healthier lifestyle decisions as they enter adulthood.

California spends the most in the nation on health care costs to treat obesity-related conditions, at $15.2 billion annually with 41.5 percent of these costs paid for through Medicare and Medi-Cal (CDPH, 2014, p. 4). A report conducted for the California Center for Public Health Advocacy (2009), quantifies the economic impacts from adults that are overweight, obese,

and physically inactive. In 2006, these conditions cost society a total of $41 billion dollars per year in health care and lost productivity (p. 3), which is a cost equivalent to over a third of the state's budget, which has doubled in the past six years (p. 1). The statewide impacts for physical inactivity alone total $7.9 billion in health care costs and $12.2 billion in lost productivity (p. 4). In a five-year period, if physical activity levels improved by just five percent, obesity-related costs would be $12 billion less (p. 2). These potential cost savings are a good incentive for government to invest in policies that promote the importance of being physically active and making healthy lifestyle choices.

State policy also has a role to intervene for equity reasons. Low-income, African American, and Latino adolescents are more likely to suffer the health consequences of physical inactivity and generally have less access to safe neighborhood environments to exercise outside of school (CDPH, 2014; White House Task Force on Childhood Obesity, 2010). Data from the 2011-12 California Health Interview Survey shows that African American and Latino adolescents have the highest obesity prevalence at 28.6 percent and 19.7 percent, compared to only 9.4 percent of White adolescents (CDPH, 2014, p. 16). The same data also shows that adolescents below the Federal Poverty Level are 50 percent more likely to be obese than those living above 300 percent of the poverty level, at rates of 20.7 percent compared to 10.9 percent (p. 19). Those who live close to a neighborhood park are generally more physically active (Babey, Wolstein, Krunholz, Robertson, & Diamant, 2013), but if that park is not safe, the likelihood decreases. Sixteen percent of low-income adolescents perceive their neighboring park to be unsafe compared to only 5.8 percent of higher-income adolescents, which may help explain why only 34.5 percent are active at least 60 minutes per day compared to 40 percent (p. 2). Whether high or low income, adequate levels of physical activity are lacking, but lower income teens face an unfair disadvantage if not given sufficient access to or opportunities to meet recommended levels of

activity. The school environment is likely a more effective way to mitigate against these disparities.

A recent lawsuit about the physical activity issue are another reason for state policy to care about issues surrounding the provision of quality physical education. In October 2013, a lawsuit by a physical education advocacy organization named Cal200, sued thirty-seven California school districts claiming that they are failing to provide state mandated amounts of exercise to students (Hayden, 2014). While the court order specifically targets physical education at the elementary school level, it shows evidence of disconnect between policy emphasis on physical education and actual implementation.

Evidence of Policy Support for Physical Education

Although there is much evidence that state policy has room to be more involved to promote physical activity, many argue that it already does enough. In California for example, written education policy clearly supports the importance and provision of quality physical education. At the state level, the California Department of Education already has the following written mandates and recommended standards in place supporting the priority of high school physical education:

- *California Education Code, Section 51225.3* requires that high school students, grades nine through twelve, take two courses in physical education in order to receive a graduation diploma, unless they are exempt for reasons acceptable in the code (EC Sections 51241-51246).
- *California Education Code, Section 51222* requires students, grades seven through twelve, to participate in at least 400 minutes of physical education every 10 schooldays.
- *California Code of Regulations, Title 5, Education, Section 10060* lists a required course of study for quality high school physical education instruction. These eight requirements

include: 1) effects of physical activity upon dynamic health; 2) mechanics of body movement; 3) aquatics; 4) gymnastics and tumbling; 5) individual and dual sports; 6) rhythms and dance; 7) team sports; 8) combatives.

- *California Education Code, Section 60605.2* required the State Board of Education to adopt model content standards for physical education, by December 1, 2004. Today the *Physical Education Model Content Standards* provide a framework and guidance for local education agencies to develop quality physical education programs (CDE, 2010), which are not mandatory, but highly recommended.
- *California Education Code, Section 60800* requires all school districts to administer a physical performance test to grades 5, 7, and 9 in the spring semester. They must submit FITNESSGRAM results to the state at least once every two years and report aggregate results in the annual school accountability report card (CDE, 2009).
- The *Physical Education Framework for California Public Schools* is a resource for district and school administrators, teachers, community members and parents to develop quality, comprehensive physical education programs, and is a tool to align community efforts to support student commitments to health and physical activity (CDE, 2009).

Even though written state policies indicate that physical education is an instructional priority, because it teaches children to understand the importance of a lifelong commitment to health and physical activity (CDE; 2009; CDE, 2010), barriers at local education agency levels affect its provision. The most common barriers to the value that districts and schools place on quality physical education include increased emphasis on academic standards and test scores, lack of administration support, and budgetary constraints (Cox & Chamberlain, 2010). Since the provision of physical education varies according to district discretion (Payne & Morrow, 2009), it

is difficult to tell whether it is administered according to physical education curriculum standards, and if not, whether there are any implications for failure to meet mandated requirements (California Endowment, 2008; Payne & Morrow, 2009). Below I summarize some of the state mandates and recommendations for quality physical education, and note some of the problems that arise in the actual implementation phase.

Time requirements: Students in grades seven through twelve are required to participate in 400 minutes of physical education every 10 days (EC Section 51222), which if placed in a daily perspective, means that if a school offers physical education five days per week, the class must allow at least 40 minutes for students to be physically active. If only offered three days per week, the amount of time physically active needs to be over 60 minutes. According to the Office of Disease Prevention and Health Promotion (2015), students should engage in moderate to vigorous physical activity for at least 50 percent of physical education class time, which is also supported by other policy organizations (California Endowment, 2008; White House Task Force on Childhood Obesity, 2010). In addition to minute requirements, students are required to take physical education in grade nine plus an additional year to receive a high school graduation diploma (EC Section 51225.3). Since 1978, high school students are no longer required to enroll in all four years of physical education (EC Section 51241), which poses a challenge for how to determine if high school 11th and 12th graders are physically active enough. Since high school students can obtain a two year exemption from physical education if they simply pass the FITNESSGRAM in grade 9 (California Endowment, 2008, p.7), this written policy may take away from the perceived importance of daily physical education.

Content Standards: The California Code of Regulations sets standards for the content that students must be evaluated on in physical education programs (CCR, Title 5, Section 10060). The California Department of Education leaves it up to local school boards to determine the

course curriculums that meet their districts' graduation requirements (ED Section 51225.3), so it is difficult to ensure that individual schools are meeting standards. For example, many schools that use block scheduling must meet specific waiver requirements, by specifying how students are getting enough physical activity during the rest of the school year. Although block schedules may create greater opportunities for students to take more classes over the course of their high school careers, a policy report by the California State Board of Education (1999) recommends that schools choose alternate day block scheduling over term blocks to ensure that students do not miss an entire term of physical education. In practice, it is difficult to know how much of the quality standards of physical education are truly emphasized, without visiting each individual school and looking at each teacher's lesson plans.

Credentialing standards: The California Department of Education also stresses the need for physical education teachers to hold proper credentials in the subject. Only a teacher with a single subject physical education credential may design the core curriculum and lead the department (EC Sections 45340-45349). While a teacher with a multiple subject credential may teach a physical education class, the school should be aware that there might be liability issues if the teacher leads movement activities and does not hold the full 58 units required for a full single subject credential. A recent provision now allows high school military instructors to receive special authorization to teach physical education, which devalues holding a full single subject credential in physical education, since these instructors are not required to have a Bachelor's degree (Adams, 2014). Under the Common Core State Standards, it is unlikely that districts and schools would allow non-credentialed teachers to teach the subject matter for any other course (Adams, 2014).

Declining Emphasis on Physical Education in California

California policy has specific written guidelines for the provision of high school physical education, but these guidelines still below national recommended time standards. Although national standards recommend that adolescents participate in 225 minutes of weekly physical education, California only requires 200 minutes every five days, with less than 50 percent of districts even meeting these mandates (California Center for Public Health Advocacy, 2009). The emphasis on physical education varies by district and even by school, so it is difficult to pinpoint individual implementation challenges, but broader physical education research points to several major barriers that explain why its implementation often fails to meet physical activity recommendations. The primary barriers to an effective high school physical education program are budgetary issues, a lack of administrator support, and more time devoted to academic testing in place of physical education (Public Health Institute, 2010, p.6). I will discuss each barrier more thoroughly in the qualitative methods portion of my thesis.

Budgetary constraints: Districts often do not have budgetary flexibility to accommodate new policy requirements, which might make a new provision for daily physical education unfeasible without making cuts to other important curriculum standards (Lynn, 2007). Many lower income schools lack adequate facilities and equipment, but even in wealthier districts, any new policy guidelines require additional needs and tradeoffs. Without the ability to build a good case for the value of physical education in terms of the measurable benefits it has on student academic performance and health, it is difficult to acquire additional funding from policymakers.

A lack of administrator support is often evident in the level of expectations placed on physical education teachers (Rhea, 2009). For one, class sizes are generally too large, which takes away from the ability of students to engage in adequate amounts of physical activity. Often there are budget constraints to hiring more teachers, but very large class sizes significantly take

away from the quality of physical education and make it more about behavior management than teaching the necessary skills. Another issue is evident in the credentials of the physical education teachers themselves (Rhea, 2009). An administrator that does not value physical education may hire an existing teacher or coach to teach the class, without requiring that they have a full 58-unit single subject credential. A final way to know if the administrator is supportive is whether or not he or she is communicative to all teachers of the amount of district funds for physical education were received, whether grant money is available, and how the funds were allocated (Public Health Institute, 2010). If the administrator does not buy in to the value of physical education, then it is unlikely that a quality physical education program exists in their school.

Competing academic priorities: The No Child Left Behind (NCLB) Act increased pressure on schools to improve academic test scores, by linking federal funding to student improvements in reading and math, which caused a disconnect with physical education, through fear that it would take away from time to invest in core academic subjects (Lynn, 2007; Trost & van der Mars, 2009). Since this act does not include physical education as an academic priority, it reduces the perceived value of the subject, despite its ability to improve both the health and academic performance of children (California Endowment, 2008; McKenzie & Lounsbery, 2009). Newly enacted California State Common Core Standards pose a similar challenge because they were adopted to "ensure that all students are literate and college and career ready no later than the end of high school" (California State Board of Education (CSBE), 2013). Standards are set for grades Kindergarten through 12th grade to be academically proficient in reading, writing, speaking and listening, and language, with measures in place for the subjects of English, Language Arts, History/Social Studies, Science, and Technical Subjects (CSBE, 2013). The standards are based on the premise that students need these skills to be successful in their future careers, but do not include physical education.

Thesis Framework

This thesis uses a mixed-methods approach with quantitative and qualitative components, to understand the influence of high school physical education on adolescent physical activity habits, the reasons why there is a decreased emphasis on physical education in California high schools, and to identify the main educational policy and practical barriers to increasing time for students to spend in physical education. Chapter 2 of my thesis provides a comprehensive review of existing physical education literature, setting a framework for what my own research might add, as well as determining where policy investment can have the most impact. Several important themes include specific socio-demographic, environmental, and behavioral determinants of adolescent physical activity levels, and policy and academic barriers to high school physical education.

Chapter 3 builds upon existing literature by adding my own research on the topic. I use a mixed-methods approach, using quantitative and qualitative data to show the influence of physical education participation, and to understand how a policy emphasis on promoting physical activity poses both benefits and challenges. Through regression analysis, I use a two-part model to quantify the influence of high school physical education participation on overall adolescent physical activity levels. I include an exploratory qualitative component by conducting interviews with state, district, and school education experts to understand some of the policy and practice barriers at the local education agency levels to increasing the amount of time that adolescents can opt to take physical education.

Chapter 4 summarizes the results of my regression analysis and interviews. My regression analysis quantifies the effects of thirty-nine explanatory variables on overall adolescent physical activity behavior, with particular interest in the influence of physical education participation. I also summarize the results of my interviews with nine education

experts representing the state, district, and school levels to understand the policy and practical barriers to increasing time for adolescents to spend in physical education. Interviews with four district experts and four school experts are conducted in-person, and one state expert interview conducted through online written correspondence. Finally, Chapter 5 synthesizes all of the information and offers some offer some suggestions for how policy can positively influence adolescent physical activity levels.

Chapter 2

LITERATURE REVIEW

The previous chapter highlighted the importance of adolescent physical activity. For many high school students, high school physical education may the most comprehensive option to ensure that they engage in daily exercise and learn to value living a healthy and active lifestyle. With a rising obesity epidemic that leads to the onset of other chronic conditions that are costly in terms of both individual and public health, it is necessary to determine where policy investment can have the most impact on motivating youth to be more active. Since physical activity levels correlate with many factors, one policy change in itself will not directly lead to across the board improvements in student health and reduce obesity rates. Since adolescents spend the majority of their awake time in school, it makes sense to look at the influence of physical education programs in particular.

In this chapter, I will first review literature on the most significant correlates of adolescent physical activity levels. I group the factors into three themes: socio-demographic correlates, environmental correlates, and behavioral correlates. Socio-demographic variables describe individual characteristics of the studied population, environmental variables provide context for external barriers and opportunities to be physically active, and behavioral variables are individual attitudes and perceptions on being active that may complicate policy efforts. A fourth theme includes research on the policy and academic barriers to high school physical education. This final theme provides identifies the primary barriers to emphasizing its value at the federal, state, and local levels of government.

Socio-demographic Correlates

Age and Gender

A majority of the literature researches the effects of age and gender on adolescent physical activity levels. The most significant findings show that as K-12 students age, they are less likely to be physically active (Allison, Dwyer, & Makin, 1999; Butcher, Sallis, Mayer, & Woodruff, 2008; Durant, Harris, Doyle, Person, Saelens, Kerr, Norman, & Sallis, 2009; Gordon-Larsen, McMurray, & Popkin, 2000; Haug, Torsheim, & Samdal, 2009; Lee et al, 2007; Madsen, Gosliner, Woodward-Lopez, & Crawford, 2009; O'Malley, Johnston, Delva, & Terry-McElrath, 2009; Pate, Davis, Robinson, Stone, McKenzie, & Young, 2006). Even though California health policy recommends that adolescents participate in 400 minutes of physical education every 10 days to reach physical activity targets (Diamant, Babey, & Wolstein, 2011, p. 2), actual participation declines with age, likely because 11th and 12th graders are no longer required to take physical education. Hobin, Leatherdale, Manske, Burkhalter, and Woodruff (2010) conducted a survey sampling 23, 817 students, grades 9 through 12, across 73 public high schools in Ontario, and confirm this by using odds ratios to compare student characteristics with the likelihood of enrolling in physical education. They found that compared to 9th graders, 10th graders are 31% less likely to enroll in physical education, 11th grader are 41% less likely, and 12th graders 56% less likely (p. 449). While enrollment declines with age, so does actual likelihood to be physically active during physical education class (Allison, et al., 1999). Activity levels during class likely change as adolescents grow older, due to increased academic and social demands (Allison et al., 1999). This age effect becomes more significant for females (Butcher, et al., 2008; Cawley, et al., 2005).

Females are generally less likely to be physically active compared to males and yield more direct benefits from physical education programs (Butcher, et al., 2008; Durant, et al., 2009;

Cawley, et al., 2005; Gordon-Larsen, et al., 2000; Nakamura, Teixeira, Papini, de Lemos, Nazario, & Kokubun, 2012). An important finding of policy relevance in the Nakamura, et al. study (2012) is that different factors influence physical activity levels in males and females. They interviewed 467 adolescents through a random selection of public and private high schools in Rio Claro, São Paulo, and used logistic regression to determine how in-school physical education and after school sports participation correlate with overall physical activity levels. While both genders tended to be less physically active overall when they did not participate in physical education or sports in school, these results were only significant for boys. These results match other findings that females tend to be more inactive outside of school (Cawley, et al., 2005), and even with added exercise time during physical education, they tend to offset the direct benefits by being more inactive in non-curricular hours (p. 19). Some of the reasons why females tend to be less physically active than males are behavioral (Allison et al., 1999; Carroll & Loumidis, 2001), which make policy intervention strategies more complicated.

The first study to examine the generalizability of age and gender physical activity factors is that of Sallis, Prochaska, Taylor, & Hill (1999). Since adolescent behaviors are so complex, their purpose was to show where interventions should target to make the most impact on physical activity levels. Although they used self-reported survey data, their precise data collection methods along with a large sample of 1,504 children grades 4-12 and parents across the nation, validate the generalizability of their findings. They find that as students grow older, enjoyment of physical education and family support becomes especially significant for female physical activity levels. Across all age groups, the use of afternoon time positively correlates with physical activity. While this illustrates where intervention efforts may be most effective, it also begins to show the major complexities within just the age and gender correlates and why deeper examinations are so critical to prompt policy decisions.

Race/Ethnicity, Income, and Education

Race/ethnicity, parent education, and income levels find mixed results regarding their independent influence on physical activity, which could be due to the variety of sampling methods and modeling procedures across studies, which make it difficult to generalize findings.

Race/ethnicity/parent education: Sallis et al.'s (1999) nation-wide sample found insignificant race effects, yet the authors' site other research of theirs that find White students to be more active than other racial groups. Gordon-Larsen et al.'s (2000) national sample of 17,766 middle school and high school students across White, Hispanic, Black, and Asian ethnicities, found inactivity to be most significant among Filipino, African American, and Puerto Rican adolescents, but in general, findings related to parent education level do not offer much insight into adolescent physical activity patterns. If socio-economic effects do not provide enough concrete support for how policy can improve physical activity levels, looking into environmental effects may be more insightful (Gordon-Larsen et al, 2000).

Income: Research on income effects also bring mixed results. Madsen et al. (2009) conducted research specific to the effects of low-income on physical activity levels of California adolescents and found a significant negative correlation. Their study was a part of the Healthy Eating Active Communities Program through the California Endowment that emphasized healthy eating and physical activity promotion among low-income adolescents. Their findings support the importance of policy investment in physical education, particularly for low-income adolescents. On the other hand, Hobin, et al.'s (2010) ecological research approach into student and school characteristics on physical education enrollment in Ontario, Canada public schools found different results. They found that students living in neighborhoods with a household income higher than the median are 37 percent less likely to enroll in physical education. The

authors' findings may indicate that these students are able to participate in extracurricular sporting activities that may take the place of physical education.

Environmental Correlates

Environmental determinants entail school, neighborhood, and after school access factors that policies can modify to promote higher levels of physical activity (Gordon-Larsen, et al., 2000). Since individual correlates cannot explain everything, ecological research approaches are becoming more common in order to include environmental correlates in the mix and how they interact with other variables to determine particular outcomes (Gyurcsik, Spink, Bray, Chad, & Kwan, 2006; Haug et al., 2009; Hobin et al., 2010; Madsen et al., 2012). These methods are particularly beneficial in determining particular environmental barriers to physical activity, but since they look at group interactions, findings are not always generalizable to the individual level (Madsen et al., 2012).

School Environment

Since adolescents spend a majority of their weekdays in school, physical education programs are an ideal setting to promote physical activity and highly relevant to public policy (Gordon-Larsen, et al., 2000; Hobin, et al., 2010; Nakamura, et al., 2013; Pate et al., 2006). Several studies look into how required time in physical education increases overall physical activity levels outside of school (Durant, et al., 2009; Gordon-Larsen, et al., 2000; O'Malley, et al., 2009), but the research by Gordon-Larsen, et al, (2000) offers some key important insight to future research. Using logistic regression methods, they determined that environmental factors are more determinant of physical activity levels than socio-demographic factors, which are more indicative of inactivity levels. By measuring high, medium, and low levels of physical activity in a 17,766 sample of seventh through twelfth grade students from the 1996 National Longitudinal Study of Adolescent Health, they found that having physical education class five or more days

per week increases the odds that a child will fall under the highest level of physical activity by 121 percent. This amount is comparable to only a 44 percent in odds of being highly physically active with physical education one to four times per week.

School physical activity policies themselves also affect student physical activity levels (Haug, et al., 2009; O'Malley, et al., 2009). Haug, et al. (2009) use a unique ecological approach showing the importance of environmental factors on physical activity levels. While their research specifically looks at recess physical activity among 1,347 Norwegian 8th graders across 68 schools, their use of hierarchical block-wise modeling to show how policies interact with individual and school characteristics, provides evidence that the implementation physical activity policies have a positive influence on physical activity levels. The research by O'Malley, et al. (2009) confirm these findings, but their results show higher levels of significance among younger students. They compiled 2004-2007 nation-wide data from a Monitoring the Future (MTF) sample of 70,000 8th, 10th and 12th grade students from public and private schools and a Youth, Education, and Society (YES) survey of 693 school administrators to examine the relationship between the school environment and adolescent physical activity levels. They found that school policies requiring more time spent in physical education was only significant among eighth graders, most likely because it is not until high school that physical education class becomes optional.

Hobin et al. (2010) delve further into the importance of school characteristics by being the first to evaluate the relationship between high schools that offer daily physical education and student enrollment. They found that adolescents attending high schools that offer physical education five days per week are 19% more likely to enroll in the course. Although making curriculum shifts to accommodate daily physical education is not usually a viable option due to budget constraints and limited staff, the authors found that increasing physical education class

sizes for this purpose would actually improve enrollment. This however does not consider the quality of individual classes, which may pose an issue for larger class sizes to meet core physical education standards.

Physical Activity Opportunities Outside of School Hours and the Neighborhood Environment

Access to physical activity in non-curricular school hours (Durant, et al., 2009; Madsen et al., 2012) and the neighborhood environment (Butcher, et al., 2008; Cawley, et al., 2005; Gordon-Larsen, et al., 2000) are other important determinants of overall adolescent physical activity. The study by Durant, et al. (2009) provides important insight on the importance of access to after school recreational facilities. They add to available research by looking into adolescent perceptions of their ability to use recreational equipment and facilities. From a sample of 165 adolescents aged 12-18 in the cities of Cincinnati, Boston, and San Diego, they found that although students under age 14 reported more days per week in physical education class, the students aged 15 and older had a greater perception of the ability to access after school physical activity equipment. They specifically sampled from neighborhoods in Cincinnati and San Diego based on low to high income and the walkability of the area. From Boston, they gathered samples from lower income neighborhoods to represent more racial/ethnic groups. They found that recreational facilities open to the public mediate the relationship between access to after school facilities and overall physical activity levels (p. 156). This means that opportunities to be active outside of school are important policy interventions to consider aside from school level policies that promote physical activity.

The neighborhood environment is another important determinant to physical activity levels (Cawley, et al., 2005; Gordon-Larsen, et al., 2000; Gyurcsik et al., 2006). Gordon-Larsen, et al.'s (2000) national study also looked at neighborhood safety impacts and found that high crime rates decrease the likelihood of being highly physically active by 23 percent (p. 4). Their

regression methods tested for the interaction effects of race and gender, finding that for Black and Hispanic teens the negative impact of living in a high crime area is most significantly associated with lower physical activity levels. For females, the impact is only significant for levels of inactivity. Neighborhood region is a determinant of physical activity minimally assessed in the research. Cawley, et al. (2005) combined 1999, 2001, and 2003 data from the national Youth Risk Behavior Surveillance System and merged it with the 2001 Shape of the Nation Report's minimum state physical education requirements. They found that living in an urban area is negatively associated with high physical activity levels, but they do not thoroughly explore this data. In many of the studies that sample larger cities, there is not much consideration of regional differences (Butcher, et al., 2008).

Behavioral Correlates

The behavioral piece is complex, because even if greater investment in physical education directly benefits adolescent physical activity levels, it does not necessarily mean that all students will maintain an active lifestyle or be interested in daily physical education class (Hobin et al., 2010; Nahas, Goldfine, & Collins, 2003). Without a general understanding of how individual behaviors affect physical activity levels, policy efforts may risk wasting valuable time and resources targeting the wrong thing. If the overall goal is to encourage youth to adopt a lifetime of physical activity, a base understanding of the behavioral components that are most applicable to physical activity levels and able to be modified are important for effective interventions (Sallis et al., 1999). These behavioral correlates include self-efficacy and enjoyment of physical education. In order to be modifiable through policy, interventions should target not only the quantity of physical education, but the quality as well (Sallis et al., 1999).

Self-efficacy

Adolescents who have higher perceived competence in their physical capabilities are more likely to engage in physical activity outside of school hours (Allison et al., 1999; Carroll et al., 2001). The concept of self-efficacy originally came from Arthur Bandura's social-cognitive theory, which emphasizes that a person's feelings of competence determine behavior change (Nahas et al., 2003). This significantly relates to physical activity levels because whether or not an adolescent is particularly skilled in certain physical education activities, if students perceive themselves to have the abilities to learn them, they will be more likely to show interest and continue into daily physical activity (Nahas et al., 2003).

Allison et al. (1999) was the first study to look at the correlation between self-efficacy in adolescents and their physical activity levels. They surveyed 1,041 9th and 11th graders from a random sample of schools and classrooms in Toronto, and conducted a factor analysis to compare self-efficacy levels with internal and external barriers to physical activity participation. In support of social cognitive theory, they found that higher self-efficacy positively affects physical education participation, but only if the perceived barriers are external. Although perceived competence is generally lower in females (Allison et al., 1999; Carroll et al., 2002), adolescents of low socio-economic status (Allison et al., 1999) and of older age (Allison et al., 1999; Gyurcsik et al., 2006), the results indicate that if primary perceived barriers to physical activity are external, then policy intervention to improve physical education programs can be effective.

Gyurcsik et al.'s (2006) unique research on life transitions among adolescents and the particular barriers they face as they age, finds that the most cited physical activity barriers among adolescents are behavioral, dealing with perceived lack of skills and poor motivation. They conducted open-ended surveys of 291 adolescents aged 12 to 19 years in public schools across urban cities in the Midwestern region of the United States. Although their findings offer useful

insight into the various physical activity barriers faced by students grades 7 through first year university, since the survey data was self-reported and cross sectional, it has limited generalizability to real policy barriers that adolescents may not realize exist.

E*njoyment of physical education*

The enjoyment of physical education is an important correlate for policy to consider because it makes it more likely that students will translate what they gain from the class to their daily lives outside of school (Portman, 2003; Sallis et al., 1999). The enjoyment of physical education correlates with higher physical activity levels (Madsen et al., 2012; Sallis et al., 1999), and it enhances the motivational factors that encourage adolescents to maintain an active lifestyle outside of school (Carroll & Loumidis, 2001). Most students understand the health benefits of physical education, but if the curriculum is not relevant to their daily lives, lacks variety, or is too competitive, many of those that were initially interested in physical education may be discouraged from participating (Couturier, Chepko, & Coughlin, 2005).

Portman (2003) was the first to actually survey high school students to find out how much they enjoyed physical education, and whether it prompted them to carry over more physical activity behaviors into their daily lives. She interviewed 46 ninth graders in their final required semester of physical education. The sample of students was across three different Indiana high schools in seven different physical education classes, with a mix of skills levels. One of the main themes was lack of enjoyment in the subject, influenced by various factors that differed among higher and lower skilled students. Self-efficacy was a factor for both groups, as higher skilled students did not feel challenged enough, while lower skilled students lacked confidence in their abilities. Both groups mentioned that curriculum offerings were not fun or interesting. Higher skilled students already participated in physical activity outside of school without physical

education, but lower skilled students were less likely to want to participate in physical activity if they did not enjoy physical education (Portman, 2003).

Policy and Academic Barriers to High School Physical Education

The first three themes covered a variety of correlates to adolescent physical activity levels in order to provide a context for where policy efforts can best target improving long-term physical activity outcomes. This final theme focuses on actual policy practices that general research sights as key barriers to high school physical education at the federal, state, and local levels.

Federal legislation effects on physical education

One of the most important dilemmas that state policymakers face is that despite health recommendations to improve physical activity levels, there is really no federal law that specifically requires physical education or incentive to develop new policies to improve accountability and quality physical education implementation (Eyler, Brownson, Aytur, Cradock, Doescher, Evenson, Kerr, Maddock, Pluto, Steinman, Tompkins, Troped, & Schmid, 2010; Story, Nanney, & Schwartz, 2009). This section describes a timeline of federal laws and initiatives that have a particular impact on the quantity and quality of physical education implementation.

No Child Left Behind Act (2001): California high schools are no exception to those across the nation who face strict repercussions for failing to meet core academic standards imposed after the passage of the federal No Child Left Behind Act (which is the reauthorization of 1965's Elementary and Secondary Education Act). This law is cited by several studies as a major reason why high school physical education is being pushed out, since it is not considered one of the core academic subjects for which schools are held accountable to produce test results (Pate et al., 2006; Story et al., 2009). Despite the general consensus in the research showing that more time being physically active actually helps rather than hinders academic performance (Pate et al.,

2006), physical education is still being cut. A Center on Education Policy report found that due to heightened academic requirements couples with budget constraints, 46 percent of districts nationwide reported more time spent on Math and English, with concurrent declines in weekly physical education by 25 to as many as 49 minutes (Eyler et al., 2010, p. 327). Although the reduced emphasis on physical education is more frequent, since it occurs at the school level, it is difficult to determine in which schools this occurs the most, without firm accountability mechanisms in place.

The Carol M. White Physical Education Program (PEP) (2001): Formerly known as the Physical Education for Progress Program, this Congressional physical education initiative gave the U.S. Departments of Education the authority to offer grants to local education agencies, including schools and community organizations, to expand physical education opportunities for grades K-12 (Lee et al., 2007). Funds must go either towards developing a new program, or to expand an existing one, in order to meet physical education standards and to teach students the importance of living an active and healthy lifestyle (U.S. Department of Education, 2014, April). Local education agencies may qualify for funds ranging from $100,000 to $750,000 and the SPARK program is one of the top implemented programs to qualify for funding for physical education and after school physical activity (SPARK, 2015, April). If grant money is awarded at the local education agency level, it is unclear who decides its allocation and ultimate use, how much of the funding typically goes to high schools, and how informed physical education directors are of additional funds available to enhance their programs.

The Child Reauthorization Act of 2004 prompted a renewed national interest in physical education policy, as it required all school districts to participate in a federal school lunch program and to develop individual school wellness policies by the start of the 2006-07 school year. With more pressure on districts to develop concrete nutrition and physical activity goals (Cox, Berends,

Sallis, St. John, Gonzalez, & Agron, 2011; Eyler et al., 2010; Evenson, Ballard, Lee, & Ammerman, 2009), an influx of physical education policy legislation across states occurred in 2005 (Cawley et al., 2007; Eyler et al., 2010).

The *Healthy People* program through the U.S. Department of Health and Human Services sets 10-year national goals to improve public health. Most of the literature cites Healthy People 2010, although currently new Healthy People 2020 goals are already underway. Objectives most relevant to the importance of physical education include the following: increase the number of high schools requiring daily physical education, increase the percentage of adolescents enrolled in daily physical education, and increase the percentage of adolescents who spend at least 50 percent of physical education class engaging in vigorous physical activity (Eyler et al., 2010; Lee et al., 2007). Healthy People objectives for 2020 remain the same (Office of Disease Prevention and Health Promotion, 2015) and of particular relevance to this study is the national emphasis on daily physical education.

Role of California's policymakers: Lack of accountability and oversight

While national rules and standards set the framework for the implementation of physical education programs, this thesis narrows the focus on California. State policy has the potential to improve adolescent physical activity levels (Eyler et al., 2010), but efforts to invest in physical education programs are complicated without cost effectiveness measures and proven long-term benefits (Cawley et al., 2007). Although there is not extensive physical education policy literature that is solely California-focused, the few studies that are offer valuable information in terms of the particular opportunities and challenges the state faces (Brown, Barnes, & Reyes, 2004; Cox et al., 2011). Nationally sampled studies also offer insight applicable to the state level (Cawley et al., 2005; Cawley et al., 2007; Eyler et al., 2010; Lee et al., 2007)

Lack of Accountability and Oversight: Even though physical education is mandated, is it unclear who is actually enforcing the requirements. Physical education policy research emphasizes the importance of the need to not only increase the *quantity* of high school physical education, but the *quality* as well (Madsen et al., 2012; O'Malley et al., 2009; Sallis et al., 1999). Without accountability systems to monitor the effectiveness of programs and incentive mechanisms to promote compliance with physical education curriculum standards, any major investment could be useless. For example, Madsen et al (2010) surveyed 5,357 low-income seventh and ninth graders across 19 California public schools and found that even though all were required to take physical education, in several schools only 60 percent of this age group were enrolled. In addition, this research found that almost 50 percent of the students surveyed spent less than 20 minutes of physical education class time being physically active. These findings are particularly significant because of failure to follow the state physical education mandate, and classes themselves are not offering students sufficient opportunities to be active.

California Education Code, Section 33352 does place accountability on districts by requiring the California Department of Education to mechanism in place that requires the State Superintendent of Public Instruction (Superintendent) to "exercise general supervision" over physical education implementation at the elementary and secondary school levels. Chaptered law, Assembly Bill 1793 (Migden, 2002) on physical education, requires the Superintendent to randomly select 10 percent of districts each year to ensure that they are meeting standards, but high schools are exempt from this requirement. At the high school level, lack of accountability mechanisms in place could be problematic if schools do not abide by mandated physical education minutes and curriculum requirements. Title 5 of the California Code of Regulations outlines the eight instructional requirements that districts and schools must use to evaluate students in physical education, which include: 1) effects of physical activity upon dynamic health;

2) mechanics of body movement; 3) aquatics; 4) gymnastics and tumbling; 5) individual and dual sports; 6) rhythms and dance; 7) team sports; and 8) combatives (EC Section 10060[a]). These curriculum components purposefully reinforce the value of physical education as an important component of student education and health (CDE, 2009).

Another problem across various states is that the policy languages in laws regarding physical education are generally not strong enough. Research looking into policy implications of current laws show that most state physical education policies are not binding (Cawley et al., 2007; Madsen et al., 2012). The studies that look into the effectiveness of policies on improving adolescent physical activity levels are generally nationally focused (Cawley et al., 2007; Eyler et al., 2010; Lee et al., 2007) and some not specific to the high school level (Evenson, Ballard, Lee, & Ammerman, 2009), yet offer useful insight for how California lawmakers can analyze the effectiveness of current policies. Later work by Cawley et al. (2007) was unique in looking at the impact of state policy requirements on youth physical activity levels. By comparing national Youth Risk Behavior Surveillance System (YRBSS) data with physical education policies in different states, they found that binding physical education requirements increase the likelihood that both male and female students participate in physical education (p. 514). Despite the importance of a binding requirement, this does not necessarily take into consideration the actual quality of the physical education programs themselves, as they found a binding requirement actually led to boys spending less time being active in physical education class. Since this research is national, it leaves an opportunity for more research on the potential effects of California-specific policies. Although state policies cannot directly cause changes in physical activity levels (Cawley et al., 2007), understanding the various impacts of the current mechanisms in place can offer useful insight into what can be improved.

Local Education Agencies

Factors within local education agencies may also create barriers to effective physical education interventions (Kahn et al., 2002). Even with state mandates for physical education, there is no accountability for individual districts and high schools to meet guidelines, which makes it difficult to pinpoint where the exact problem stems from. Local school governance leaders provide some of the most useful insight for policymakers for practical application and support of physical education policies (Brown et al., 2004; Cox et al., 2011). Research by Brown et al. (2004) and Cox et al. (2011) reported on perspectives and decision-making influences of California school board members. Both studies included partnerships between California Project LEAN and the California School Boards Association, but offer unique perspectives that provide deeper insight into decisions made in regards to physical education, as well as key barriers, opportunities and perceptions of increasing school-based physical activity policies. Brown et al. (2004) randomly selected 807 California board members from the 404 school districts in the state with high schools. They mailed an 84-question survey on the factors that influence decision-making in regards to physical activity and nutrition policies, which yielded a final response from 210 board members, a 26 percent rate. The following are the most significant results related to physical activity policy: 75 percent of respondents believe policies requiring daily physical activity will reduce the prevalence of obese students; 31 percent of respondents have a physical activity policy in their district; and 26 percent believe their district is doing enough to improve student health and physical activity behaviors (p, 6).

Cox et al.'s (2011) survey totaled 2,669 respondents representing 13 percent of board members across 49 participating counties, which is a small sample, but the findings are very useful. Their research focused on board member perceptions of the amount of physical education in schools, barriers and opportunities to emphasize school-based physical activity, and current

readiness to adopt a new physical education-related policy. Over 90 percent of respondents believed that physical activity positively affects student health, academic performance and the likelihood that physical activity behaviors would carry over to lifetime behavior. The top three barriers that board members cited to increasing physical education were budget constraints, limited time during the school day, and competing district priorities. Barriers were greater for low-income districts, particularly because of less social support and resources to implement and monitor policies (p. 2). This shows that even if most board members believe in the value of physical education, real barriers exist that prevent placing physical education higher on the agenda. The same group cited the following as the most useful ways to address physical education policies, which include developing case studies of other school districts that have successful physical education policies, conducting a cost-benefit analysis of policies and practices, and sharing more research that shows the positive effect that physical education has on academic performance.

Conclusion

Based on my review of the literature, I find that each theme offers distinct takeaway points that I must account for in my own research. There are also gaps that I hope to address by taking a California-specific approach. Socio-demographic correlates of physical activity show that activity levels decline with age and are typically lower among female and lower-income adolescents. Since each correlate is complex in itself, cross sectional studies alone are not generalizable enough to formulate effective policy interventions. Environmental correlates of physical activity show that external characteristics of school policies and the surrounding neighborhood environment affect access to opportunities for adolescents to be active both during and after school. These correlates are more straightforward for policy intervention, but still

unclear whether policies changes to enhance access to physical activity opportunities are effective when considering individual behaviors.

Behavioral correlates of physical activity significantly complicate policy efforts because even if stronger mandates require physical education participation, it does not necessarily consider mean that adolescents will automatically become physically active for life. A quality physical education program is more likely to consider individual differences and promote greater enjoyment of being active, but it there is no enforcement mechanism to determine this. Policy and academic barriers to physical education participation among adolescents are a final piece of the puzzle, where a better understanding should generate more effective policy solutions. Unfortunately, it is unclear the amount of responsibility that federal, state, and local entities should and are willing to take on in regards to improving adolescent physical activity levels.

To address some of the gaps in the literature, my thesis looks deeper into whether more days in high school physical education has a positive effect on overall daily physical activity, by focusing on California adolescents in particular. To determine the effects, I ran a regression analysis using California Health Interview Survey data. To mitigate the inherent flaw in using a cross-sectional approach that cannot prove causation, I conducted in-person interviews with district and high school education experts in order to gain contextual information as to their thoughts on the barriers to increasing physical education standards. By combining qualitative and quantitative data, I can offer some insight into broader trends and why certain physical education policy efforts are not effective in promoting sufficient levels of physical activity (Durant, et al., 2009). My hope is that my research can offer a California specific piece of the puzzle and to help policymakers better understand some of the primary challenges and opportunities to successfully improve student physical activity levels using physical education as the primary policy tool.

Chapter 3

METHODOLOGY

I use a mixed-methods approach to understand the role of high school physical education in supporting adolescent physical activity habits. The first part of my analysis is a quantitative regression method, to capture the overall effects of physical education participation across the adolescent population in California. The second part of my analysis is qualitative, based on interviews with state and local education experts. The purpose of the interviews is to explore education experts' perceptions about adolescent's opportunities to be active outside of school, as well as the policy and practical barriers that they face with increasing time for physical education. The first section of this chapter explains my methods for conducting the quantitative analysis portion, using a two-part regression model. The second section describes my methods for conducting the qualitative analysis portion, using in-person interviews.

Quantitative Regression Analysis

I use a two-part regression model to quantify the influence of high school physical education participation on overall adolescent physical activity levels. This portion of my analysis answers my first research question: "Does more high school physical education participation among California adolescents cause increases in their non-physical education-related physical activity levels?"

Regression Framework

The dependent variable that I examine is the number of days in a typical week that an adolescent self-reports being physically active for 60 minutes or more. I chose this variable because it aligns with health policy recommendations for youth physical activity levels. I group the explanatory variables that I expect to cause variation in the dependent variable into nine broad causal categories. Each causal factor is further broken into the specific variables that represent

these broad causes and have the most influence on the likelihood of being physically active. I use data from the 2011-2012 Adolescent portion of the California Health Interview Survey (CHIS), which sampled 2,799 youth ages 12 through 17. To ensure that my observations accurately represent the adolescent population in California, STATA-based statistical calculations use the appropriate weighting measures included with the survey protocol. [1]

My model below represents the framework for my regression to show how I am grouping the explanatory variables in my study. I further break down each category to explain the variables I selected, and why they are important measures to include in and analysis of physical activity.

Days per week physically active 60 minutes or more= *f*(Adolescent Demographics, Adolescent Race/Ethnicity, Parent Education, Family Characteristics, Household Income, School Environment, Neighborhood Environment, Health Care Access, Role Models)

Adolescent Demographics= *f(age, female, U.S. citizen, lived in U.S. less than five years)*

The literature indicates a negative association between age and physical activity, as well as between the female gender and physical activity. I also include a variable to account for immigrant status, since California students make up a growing proportion of the ethnic minority population. I am unsure how being classified as a U.S. citizen or living in the U.S. less than five years will affect physical activity, but I suspect that a minority student with less time as a California resident may be less active if they are also from a lower-income household.

Adolescent Race/Ethnicity= *f(White (omitted), Latino, African American, Asian, Asian considers self Filipino, Native American, Pacific Islander/other race, two or more race)*

The literature indicates mixed results among race/ethnicity effects, but there are some minor indications that being Filipino (Gordon-Larsen et al., 2000) and Latino are negatively

[1] See http://healthpolicy.ucla.edu/chis/analyze/Pages/weighting.aspx for detailed information from the CHIS website on the weighting process and how to use it.

associated with meeting recommended physical activity levels. I omit White ethnicity from the analysis to serve as a base comparison factor in the regression.

Parent education= *ƒ(less than high school (omitted), high school, some college, vocational school, associate's degree, bachelor's degree, less than master's degree, master's degree or higher)*

The literature indicates that the influence of parent education holds a heavier weight on factors that influence adolescent inactivity levels as opposed to activity levels. Tassitano et al. (2010) find that teens with a mother who has at least a high school education are 26 percent more likely to take two or more physical education classes per week (p. 129). Since the act of taking a physical education class does not necessarily cause high levels of physical activity, I am unsure what the particular results of my own analysis will be, but I assume that a student from a more educated household will engage in higher levels of physical activity. I omit less than high school education to serve as a base comparison variable.

Family characteristics= *ƒ(parents married, household size, father U.S. citizen, mother U.S. citizen)*

Parent marriage status, household size, and parent immigration status are generally more prevalent in literature that focuses on the child rather than adolescent unit of analysis, but I still feel that they are important to include, since most high school students do not live on their own.

Household income= *ƒ(more than three times poverty line (omitted), poverty line to three times poverty line, below poverty line)*

The literature generally shows that adolescents from lower-income households tend to be less physically active, which is often the result of attending poorer schools that had to cut back on physical activity programs and facilities, living in neighborhoods that are unsafe and more urbanized, among other factors. I omit the lowest income variable to use as a reference category.

School environment= *ƒ(take PE, days PE 60 minutes or more)*

In the school environment, I am particularly interested in the effects of physical education enrollment on physical activity levels and the effects of more time spent in physical education class. Based on literature findings, I expect more time in physical education to have a positive effect on adolescent physical activity levels (Durant et al., 2009, Gordon-Larsen et al., 2000, O'Malley et al., 2009).

Neighborhood environment= *ƒ*(*rural residence (omitted), suburban residence, second city residence, urban residence, neighborhood definitely safe, nearest park safe during the day, nearest park walking distance)*

The literature shows that environmental factors affect physical activity. Safe neighborhoods with more sidewalk space and access to recreational facilities are positively associated with physical activity. I am unsure of whether a park that is walking distance from home will significantly influence the dependent variable, because it does not mean that the neighborhood is safe. I omit rural residence to use as my comparison variable to other residential areas.

Health care access= *ƒ(physical exam within past year, talked with doctor about physical activity)*

Although much of the literature that I have read does not account for health care access factors, I believe they are important to include for health policy purposes. I think that it is important to understand the impacts of having a yearly physical exam and talking to a doctor about physical activity levels on an adolescent's health and motivation to be active.

Role models= *ƒ*(*admires an athlete)*

The literature does not account for role models, but I think that having someone to look up to influences behavior. I think that an adolescent that holds another athlete in high esteem will

increase their likelihood of being physically active, due to increased motivation to emulate the athlete's behaviors.

Interaction Effects

Since the regression coefficient on the physical education explanatory variables only indicates an average effect across all adolescents, an interaction will check whether the affect is different for different types of individuals. I do this in addition to calculating the average effects to test if physical education participation is more significant for some groups. I interact physical education with the following variables to determine the effects on my dependent variable: female, age 16 or more, urban, below poverty line, African American, Latino, Asian, and Asian considers oneself Filipino.

Data

I used data from the 2011-12 California Health Interview Survey (CHIS) Adolescent sample. This is a telephone survey given every two years that includes sample weights that create a representative sample of the entire California adolescent population. The survey questioned 2,799 adolescents aged 12-17. These data are ideal for my research because it offers the most comprehensive information on adolescent socio-demographics, physical environment, and physical activity behaviors. My dataset includes thirty-nine explanatory variables, with four dummy variables excluded to serve as a base comparison for others in a similar category. The descriptive statistics provide the mean, standard deviation, and minimum and maximum values of each observation. I put careful thought into each variable that I chose to ensure that my analysis only incorporates factors exogenous to the adolescent. This is important so that my findings represent something that policy can do something about and to reduce sources of multicollinearity bias in my model.

Regression Model

My dependent variable is continuous, representing the number of days per week an adolescent is active 60 minutes or more. To set up my model, I run a two-part regression based on the premise that physical activity represents a two-part decision-making process: 1) the choice to be active or not and 2) if active at all, the choice in how much physical activity to engage in.

Model 1 uses a Logistic functional form, in which I am able to turn my continuous dependent variable into a dichotomous variable, in order to determine the factors that impact the decision to be active or not. In this framework, 0 represents no days per week of physical activity and 1 represents at least one to seven days per week of activity for 60 minutes. By turning my results into odds ratios, I can determine how each explanatory variable affects an adolescent's decision to be active or not, through percentage likelihood. Model 2 takes from the sample of adolescents that are active at least one to seven days per week, and uses a linear ordinary least squares (OLS) regression to determine what variables influence an adolescent's choice to engage in more or less physical activity each day.

Model 1 (Logistic Regression):

In the logistic portion of my analysis, my total sample captures all adolescents attending a public school with the option to take a physical education class. Of these students, 1846 responded "yes" when asked if they take physical education. Table 1 lists all descriptive statistics for this model.

Table 1: Logistic Variables and Descriptive Statistics (2,799 Observations)

Variable Name	Description (Derived from 2011-12 CHIS Adolescent Public Use Data)	Number Obs.	Mean	Standard Deviation	Min	Max
Dependent Variable						
Physically Active 60 Minutes	Teen is physically active 1-7 days per week for	2799	0.914	0.28	0	1
	60 min or more, outside of school (TE49)					
Explanatory Variables						
Adolescent Demographics						
Age	Adolescent age (SRAGE_P)	2799	14.534	1.685	12	17
Female	Adolescent self-reported gender (SRSEX)	2799	0.511	0.5	0	1
U.S. Citizen	Adolescent citizenship status (CITIZEN2)	2799	0.911	0.284	0	1
Lived in U.S. Less Than Five Years	For adolescents born outside U.S.:	2799	0.024	0.152	0	1
	years lived in U.S. (YRUS)					
Adolescent Race/Ethnicity						
Latino	CA Department of Finance	2799	0.436	0.496	0	1
	Classification (RACEDO_P)					
African American	CA Department of Finance	2799	0.032	0.175	0	1
	Classification Non-Latino (RACEDO_P)					
Asian	Same as above	2799	0.087	0.283	0	1
Asian Considers Self Filipino	Asian and identified self as Filipino subtype (ASIAN8)	2799	0.016	0.127	0	1
Native American	CA Department of Finance	2799	0.01	0.101	0	1
	Classification Non-Latino (RACEDO_P)					
Pacific Islander/Other Race	Same as above	2799	0.002	0.042	0	1
Two or More Race	Same as above	2799	0.045	0.207	0	1
Parent Education						
High School	Adult Educational Attainment (AHEDUC)	2799	0.171	0.376	0	1
Some College	Adult Educational Attainment (AHEDUC)	2799	0.117	0.322	0	1
Vocational School	Adult Educational Attainment (AHEDUC)	2799	0.038	0.193	0	1
Associate's Degree	Adult Educational Attainment (AHEDUC)	2799	0.071	0.256	0	1
Bachelor's Degree	Adult Educational Attainment (AHEDUC)	2799	0.213	0.409	0	1
Less Than Master's Degree	Adult Educational Attainment (AHEDUC)	2799	0.013	0.111	0	1
Master's Degree or Higher	Adult Educational Attainment (AHEDUC)	2799	0.155	0.362	0	1
Family Characteristics						
Married	Family Type (FAMT4)	2799	0.784	0.411	0	1
Household Size	Household Size (HHSIZE_P)	2799	4.305	1.249	2	7
Father U.S. Citizen	Citizenship and immigration status of father (CITIZ2_F)	2799	0.726	0.446	0	1
Mother U.S. Citizen	Citizenship and immigration status of mother (CITIZ2_M)	2799	0.723	0.447	0	1
Household Income						
Poverty Line to Three Times Poverty Line	Federal poverty line used (POVLL)	2799	0.352	0.478	0	1
Below Poverty Line	Federal poverty line used (POVLL)	2799	0.204	0.403	0	1
School Environment						
Take PE	Currently taking PE at school (TE57)	2762	0.668	0.471	0	1
Days PE 60 Minutes or More	Number of days per week PE for 60 minutes or more	2799	1.155	1.903	0	5
	(TE58 x TD26_P)					
Neighborhood Environment						
Suburban Residence	Census definition based on Census Tract (UR_TRACT)	2799	0.209	0.407	0	1
Second City Residence	Same as above	2799	0.220	0.414	0	1
Urban Residence	Same as above	2799	0.361	0.48	0	1
Neighborhood Definitely Safe	Feel safe in neighborhood (TE64)	2799	0.532	0.499	0	1
Nearest Park Safe During the Day	Nearby park safe during the day (TC25)	2799	0.93	0.256	0	1
Nearest Park Walking Distance	Park walking distance from home (TC42)	2799	0.864	0.343	0	1
Health Care Access						
Physical Exam Within Past Year	Last time saw doctor for routine physical exam (TF5)	2799	0.865	0.342	0	1
Talked With Doctor About Physical Activity	For teens that had physical exam within 2 years:	2799	0.584	0.493	0	1
	spoke with doctor about physical activity (TF8H)					
Role Models						
Admires an Athlete	For Adolescents who admire someone:	2799	0.142	0.349	0	1
	Admired person's category (TH23)					

Model 2 (OLS Regression):

The linear OLS regression captures 2,559 adolescents who attend a public school and are physically active at least one to seven days per week at 60 minutes or more per day. Of those that engage in some form of physical activity, 410 take physical education the maximum five days per week for at least 60 minutes per class. Table 2 lists all descriptive statistics for this model.

Table 2: OLS Variables and Descriptive Statistics (2,559 Observations)

Variable Name	Description (Derived from 2011-12 CHIS Adolescent Public Use Data)	Number Obs.	Mean	Standard Deviation	Min	Max
Dependent Variable						
Physically Active 60 Minutes	Teen is physically active 1-7 days per week for	2559	4.191	1.892	1	7
	60 min or more, outside of school (TE49)					
Explanatory Variables						
Adolescent Demographics						
Age	Adolescent age (SRAGE_P)	2559	14.515	1.683	12	17
Female	Adolescent self-reported gender (SRSEX)	2559	0.499	0.5	0	1
U.S. Citizen	Adolescent citizenship status (CITIZEN2)	2559	0.919	0.272	0	1
Lived in U.S. Less Than Five Years	For adolescents born outside U.S.:	2559	0.02	0.141	0	1
	years lived in U.S. (YRUS)					
Adolescent Race/Ethnicity						
Latino	CA Department of Finance	2559	0.421	0.494	0	1
	Classification (RACEDO_P)					
African American	CA Department of Finance	2559	0.033	0.179	0	1
	Classification Non-Latino (RACEDO_P)					
Asian	Same as above	2559	0.084	0.277	0	1
Asian Considers Self Filipino	Asian and identified self as Filipino subtype (ASIAN8)	2559	0.016	0.124	0	1
Native American	CA Department of Finance	2559	0.011	0.106	0	1
	Classification Non-Latino (RACEDO_P)					
Pacific Islander/Other Race	Same as above	2559	0.002	0.04	0	1
Two or More Race	Same as above	2559	0.045	0.208	0	1
Parent Education						
High School	Adult Educational Attainment (AHEDUC)	2559	0.172	0.377	0	1
Some College	Adult Educational Attainment (AHEDUC)	2559	0.118	0.323	0	1
Vocational School	Adult Educational Attainment (AHEDUC)	2559	0.039	0.193	0	1
Associate's Degree	Adult Educational Attainment (AHEDUC)	2559	0.070	0.256	0	1
Bachelor's Degree	Adult Educational Attainment (AHEDUC)	2559	0.216	0.411	0	1
Less Than Master's Degree	Adult Educational Attainment (AHEDUC)	2559	0.013	0.115	0	1
Master's Degree or Higher	Adult Educational Attainment (AHEDUC)	2559	0.162	0.369	0	1
Family Characteristics						
Parents Married	Family Type (FAMT4)	2559	0.787	0.41	0	1
Household Size	Household Size (HHSIZE_P)	2559	4.291	1.249	2	7
Father U.S. Citizen	Citizenship and immigration status of father (CITIZ2_F)	2559	0.742	0.438	0	1
Mother U.S. Citizen	Citizenship and immigration status of mother (CITIZ2_M)	2559	0.737	0.253	0	1
Household Income						
Poverty Line to Three Times Poverty Line	Federal poverty line used (POVLL)	2559	0.349	0.477	0	1
Below Poverty Line	Federal poverty line used (POVLL)	2559	0.191	0.393	0	1
School Environment						
Take PE	Currently taking PE at school (TE57)	2525	0.669	0.471	0	1
Days PE 60 Minutes or More	Number of days per week PE for 60 minutes or more	2559	1.148	1.899	0	5
	(TE58 x TD26_P)					
Neighborhood Environment						
Suburban Residence	Census definition based on Census Tract (UR_TRACT)	2559	0.215	0.411	0	1
Second City Residence	Same as above	2559	0.217	0.412	0	1
Urban Residence	Same as above	2559	0.352	0.478	0	1
Neighborhood Definitely Safe	Feel safe in neighborhood (TE64)	2559	0.534	0.499	0	1
Nearest Park Safe During the Day	Nearby park safe during the day (TC25)	2559	0.931	0.253	0	1
Nearest Park Walking Distance	Park walking distance from home (TC42)	2559	0.866	0.341	0	1
Health Care Access						
Physical Exam Within Past Year	Last time saw doctor for routine physical exam (TF5)	2559	0.866	0.341	0	1
Talked With Doctor About Physical Activity	For teens that had physical exam within 2 years:	2559	0.589	0.492	0	1
	spoke with doctor about physical activity (TF8H)					
Role Models						
Admires an Athlete	For Adolescents who admire someone:	2559	0.151	0.358	0	1
	Admired person's category (TH23)					

Data Limitations

I used a wide range of variables to reduce omitted variable bias and tested for robust standard limitations to my analysis. First, there is only so much that a cross-sectional quantitative analysis can capture, because the data is drawn from one point in time. Second, since so many factors influence physical activity levels, the magnitude of my findings are likely to be small. Finally, this survey data uses adolescent self-reporting measures, which reduces some of the accuracy in the analysis for two reasons. First, adolescents may have a tendency to over-report true physical activity levels. Second, adolescents may not actually pay much attention to how much activity they are getting per day. Based on these limitations, the second part of my thesis adds a qualitative component to address some of these gaps. By conducting interviews with state and local education entities, I seek to understand some of the policy and practice barriers to increasing time that adolescents can actually spend in physical education.

Qualitative Analysis

The first portion of my methodology focuses on the individual adolescent unit of analysis to determine if more physical education participation leads to increases in their non-physical education-related physical activity levels outside of school. To close some of the gaps in policy context that a cross-sectional study cannot fully capture, this portion of my analysis seeks to explore some of the policy and practice barriers at the state and local education levels to increasing the amount of time that adolescents can opt to take physical education. By conducting in-person interviews with state, district, and school education experts, I can answer my final two research questions:

1) Why is there a decreased emphasis on physical education in California's high schools?

2) What are the primary policy and practical barriers to increasing the amount of time that high school students spend in physical education?

Interview Participants and Questions

I conducted in-person interviews with administrative staff from four high school districts and four high schools across the greater Sacramento area, representing a range of student population sizes, income levels, and performance on test scores. I also conducted one state level interview with a national physical education expert. This respondent advises states, districts, and schools on advice related to physical education, and is a prominent writer on physical education curriculum, instruction, and assessment. I completed this interview through online correspondence, since the respondent does not reside in the nearby vicinity. I included state, district and school levels to compare and contrast the various challenges they face in terms of increasing time for physical education in high schools. I selected participants based on their leadership roles in the field of education and familiarity with high school physical education. Given my sampling criteria and time constraints, my interviews were limited to respondents who had an interest in issues surrounding student activity and my research on physical education.

The districts in my sample have student population sizes between 7,330 and 31,553, a range of Academic Performance Index scores from 725 and 891, and represent a span of 19.1 to 87.6 percent of students who qualify for the free and reduced price meal program (California Department of Education (CDE) Dataquest, 2013). Of the four districts in my sample, one of them is low-income, which I define based on local control finance guidelines, where districts with over 55 percent of students qualifying for free and reduced price meals are eligible for additional concentration grants (EdSource, 2015). One district is particularly well-off, with less than 25 percent of students qualifying for the free meal program. The high schools in my sample have student population sizes between 531 and 1,319, a range of school Academic Performance Index scores from 582 and 855, and represent a span of 15.9 to 91.1 percent of students who qualify for the free and reduced price meal program (CDE, 2013). Of the four high schools in my sample,

two are low-income and one is well-off, based on the same income parameters as in the district sample.

I designed my interview questions to provide information on the roles and responsibilities of each level concerning physical education requirements, to understand their priorities for high school students, as well as some of the opportunities and challenges they face in regards to increasing time for students to participate in more physical activity. Many of the questions were of similar content to allow for a parallel comparison across each level, but since each level also faces unique challenges and responsibilities, other questions sought to capture the differences. I carefully designed my questions to minimize response bias and to solicit the most relevant information to accompany my regression findings. I provide a complete list of all interview questions and the script that guided my field research in Appendix A.

Data Collection

I invited participants to participate via telephone or email and offered no incentive to participate. For those interested in participating, I emailed a consent form in advance to provide more context into the purpose of my research and my data collection procedures (see attached Appendix B). I made sure to obtain the signed consent form before conducting the interviews. My research design and questions passed a thorough Human Subjects Review process through the university. To mitigate potential confidentiality risks to participants, I did not include any of their names or titles. Interviews were conducted in-person and lasted between 30 to 45 minutes. I audio recorded them so that I could pay full attention to the conversation and accurately transcribe the information to written form. All interview recordings and transcripts were destroyed by May 8, 2015, upon completion of my thesis.

The outreach process to obtain interview consent from education experts at the state, district, and school levels, took a significant amount of effort, particularly at the state and district

levels. At the state level, my original intent was to speak with someone from the California Department of Education to represent its perspective on physical education, but since the agency is dealing with lawsuits against over thirty-seven elementary districts in the state for failing to meet mandated minute requirements, no one I contacted would agree to participate. Instead, my state-level interview is with a physical education consultant, who advises states, districts, and schools nationwide for advice related to physical education curriculum, instruction, and assessment, who also was also an author of key state documents that guide the provision of a quality physical education curriculum. Since my interview questions had already gone through the Human Subjects approval process for what I intended to ask staff in the California Department of Education, I was unable to significantly change my questions to align with the perspective of a physical education consultant. Despite this challenge, the respondent was significantly qualified to answer all questions pertaining to statewide challenges regarding physical education at the high school level.

Since district staff is very busy and there is no person specifically hired to represent physical education, it was very challenging to secure district-level interviews. I was able to obtain four total district respondents. Each respondent was sufficiently qualified to answer questions regarding policy and practical barriers to physical education, because of their roles within the agency and involvement with the broader educational curriculum.

Data Analysis

The interview protocol for each participant (state, district, school) included six open-ended questions to identify common themes to compare and contrast across the state, district and school levels. My methods were semi-structured, which allowed for an accurate comparison of responses to similar questions, but also gave enough leeway to ask additional probing questions to gather more context into the particular demographic makeup of the student population and

neighborhood environment. To properly organize and analyze all data, I created a matrix and coded responses across several themes that pertained to each role type. These themes were: 1) roles and responsibilities regarding physical education; 2) top priorities for students and potential conflicts with physical education; 3) factors aside from physical education participation that influence exercise habits outside of school; 4) options to improve students' exercise behaviors outside of school.

Since respondents represented a blend of perspectives from the state, districts, and schools, I also included additional themes more specific to each level. For example, specific to the district level, I wanted to know what percentage of students are typically exempt from required physical education classes and the most common allowable exemptions. In addition, the kinds of opportunities and limitations for students to be active outside of school. Specific to high schools, I also wanted to understand the opportunities for students to be active outside of school, as well as whether there are typical demographic differences in the students that opt to take elective physical education versus not.

I faced a couple of challenges in the data analysis process, due to the slight variation in the expertise of each respondent. Although I spent a great deal of time perfecting my questions to ensure I was not asking anything too sensitive or outside of the expertise of the respondents, the depth of the answers varied depending on the respondent's role with the particular education level and knowledge of the physical education curriculum. Another challenge I faced was that even though I went into my interview with a plan for how I would organize all of the data, many of the in-person responses to my questions touched on multiple themes, which created greater risk for measurement error. I purposely designed my questions to be open-ended, so that respondents would give answers in accordance to their true thoughts on the issue, but some of the flexibility created varying interpretations of certain questions, which sometimes needed clarification. For

example, when I asked districts and schools to identify opportunities and limitations for students to be physically active outside of school, some of the responses were similar to the ones I gathered when I asked them to identify factors aside from physical education participation that influence exercise habits. To reduce measurement error, I did not blend similar responses from different questions.

Chapter 4 summarizes the findings of my quantitative and qualitative analyses as identified in my methodology. The first part provides the results of my two-part regression analysis. The second part of the chapter organizes my interview results starting with the state level, followed by the district and school education levels.

Chapter 4

RESULTS

This chapter provides the results of my mixed-methods data collection and analysis. I first explain all findings from my regression analysis, followed by the exploratory information that I gathered through nine interviews.

Regression Results

Using a two-part regression model, I estimated the effects of thirty-nine explanatory variables on overall adolescent physically activity behavior. Specifically, this model represents a two-part decision-making process, where an adolescent first decides to be active or not, and then if he or she decides to be active, how much activity will he or she engage in? As I stated in the previous chapter, my quantitative analysis seeks to determine whether more high school physical education participation among California adolescents causes increases in their non-physical education-related physical activity levels.

I first explain the significant influence of all other explanatory variables on the decision to be active or not (Logistic regression). The next segment of results only focuses on the adolescents who are active at least 1 to 7 days per week, omitting adolescents that are active zero days. Here I will explain the variables that significantly affect the amount of activity that a student engages in each day (Ordinary Least Squares (OLS) regression). Since my key interest in this research is to understand the particular effects of physical education participation on the decisions to be more or less physically active, I will highlight these findings at the beginning of each section. Finally, I will explain any interaction results that determine whether physical education affects certain population groups more than others. Table 3 shows the results of all Logistic and OLS regression estimations.

Table 3: Logistic and OLS Regression Results

Explanatory Variable	Pt 1: Logistic Active or Not	Pt 2: OLS Activity Amount
Adolescent Demographics		
Female	**-.445***** (.003)	**-.172***** (.000)
Age	**-.121**** (.017)	.001 (.918)
U.S. Citizen	.251 (.294)	.010 (.851)
Lived in U.S. Less than 5 Yrs.	-.547 (.141)	-.132 (.110)
Adolescent Race/Ethnicity		
Latino	**-.553***** (.011)	**-.065**** (.045)
African American	.249 (.655)	-.001 (.988)
Asian	**-.834***** (.002)	-.058 (.172)
Asian Considers Self Filipino	-.350 (.490)	-.054 (.522)
Native American	n/a	.021 (.855)
Pacific Islander/Other Race	-1.23 (.198)	-.003 (.988)
Two or More Race	-.505 (.185)	-.013 (.805)
Parent Education		
High School	.287 (.195)	-.053 (.175)
Some College	.149 (.586)	.008 (.860)
Vocational School	-.077 (.834)	-.067 (.306)
Associate's Degree	-.027 (.930)	-.024 (.647)
Bachelor's Degree	.001 (.995)	-.030 (.492)
Less than Master's Degree	.654 (.528)	-.071 (.427)
Master's Degree or Higher	.413 (.207)	.024 (.603)

Statistical significance: *p<.10, **p<.05, ***p<.01

Explanatory Variable	Pt 1: Logistic Active or Not	Pt 2: OLS Activity Amount
Family Characteristics		
Parents Married	.054 (.767)	**.056*** (.070)
Household Size	.014 (.814)	-.007 (.509)
Father U.S. Citizen	.159 (.431)	**.070*** (.058)
Mother U.S. Citizen	-.074 (.710)	.051 (.161)
Household Income		
Poverty Line to Three Times Poverty Line	**-.341*** (.092)	-.017 (.583)
Below Poverty Line	**-.534**** (.027)	.006 (.882)
Health Care Access		
Physical Exam within past year	.025 (.905)	**.066*** (.061)
Talked with doctor about physical activity	.180 (.219)	**.048**** (.035)
Role Models		
Admires an Athlete	**1.108***** (.001)	**.138***** (.000)
Neighborhood Environment		
Suburban Residence	-.062 (.806)	-.054 (.110)
Second City Residence	**-.375*** (.094)	**-.059*** (.077)
Urban Residence	**-.396*** (.059)	**-.075**** (.017)
Neighborhood Definitely Safe	-.119 (.416)	**.048**** (.031)
Nearest Park Safe During the Day	.099 (.702)	**.098**** (.051)
Nearest Park Walking Distance	.207 (.298)	.043 (.203)
School Environment		
Take PE	-.157 (.446)	-.015 (.618)
Days PE 60 min plus	-.011 (.783)	**-.011*** (.080)
Pseudo r squared	.0768	
R squared		.0824

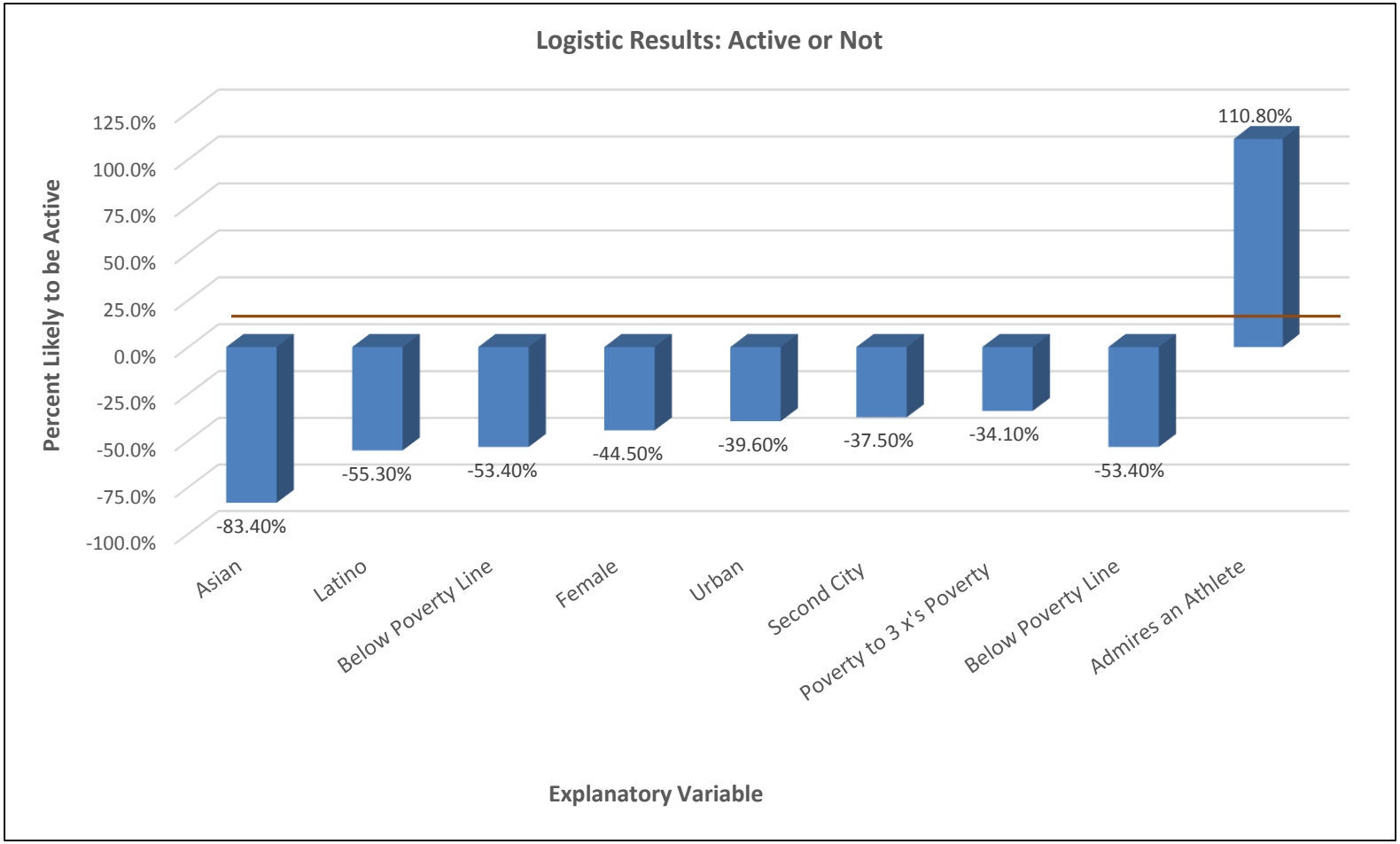
Logistic Regression Results (Active or not)

My logistic results show that physical education participation does not significantly influence an adolescent's decision to be active or not. Although my key explanatory variables are not influential in this model, I gather interesting findings from other variables. My logistic results confirm findings from the literature that socio-demographic and neighborhood factors significantly influence one's initial decision to be active at all. Holding all other explanatory variables constant, adolescents that are female, of Asian or Latino descent, reside in an urban environment, and low income household are less likely to be active. I also find that having an athletic role model has a positive influence on the decision to have any exercise habit. Figure 3 on the following page shows these influences from largest negative to largest positive magnitude. The bars in the figure represent the percentage change in the likelihood of being active after changing the respective explanatory variable by one unit, holding all other factors constant.

The results specifically indicate that a female is 44.5 percent less likely to be active, compared to a male, holding all other explanatory variables constant. Other socio-demographic variables show compared to the base category of White adolescents, Asians and Latinos are 83.4 percent and 55.3 percent less likely to be active at all. My model also shows significant income effects on the likelihood to be active. Compared to adolescents living in a household with income over three times the federal poverty line, those living in the range of poverty to three times poverty are 34.1 percent less likely to be active at all. Those in households where income falls below the poverty line are 53.4 percent less likely to be active.

Neighborhood effects are also significant. Compared to adolescents living in a rural neighborhood, those living in second city and urban environments are 37.5 and 39.6 percent less likely to be active at all. A positive influence on exercise behavior is the presence of an athletic role model, which leads to a 111 percent increased likelihood of being active.

Figure 3: Logistic Regression Results



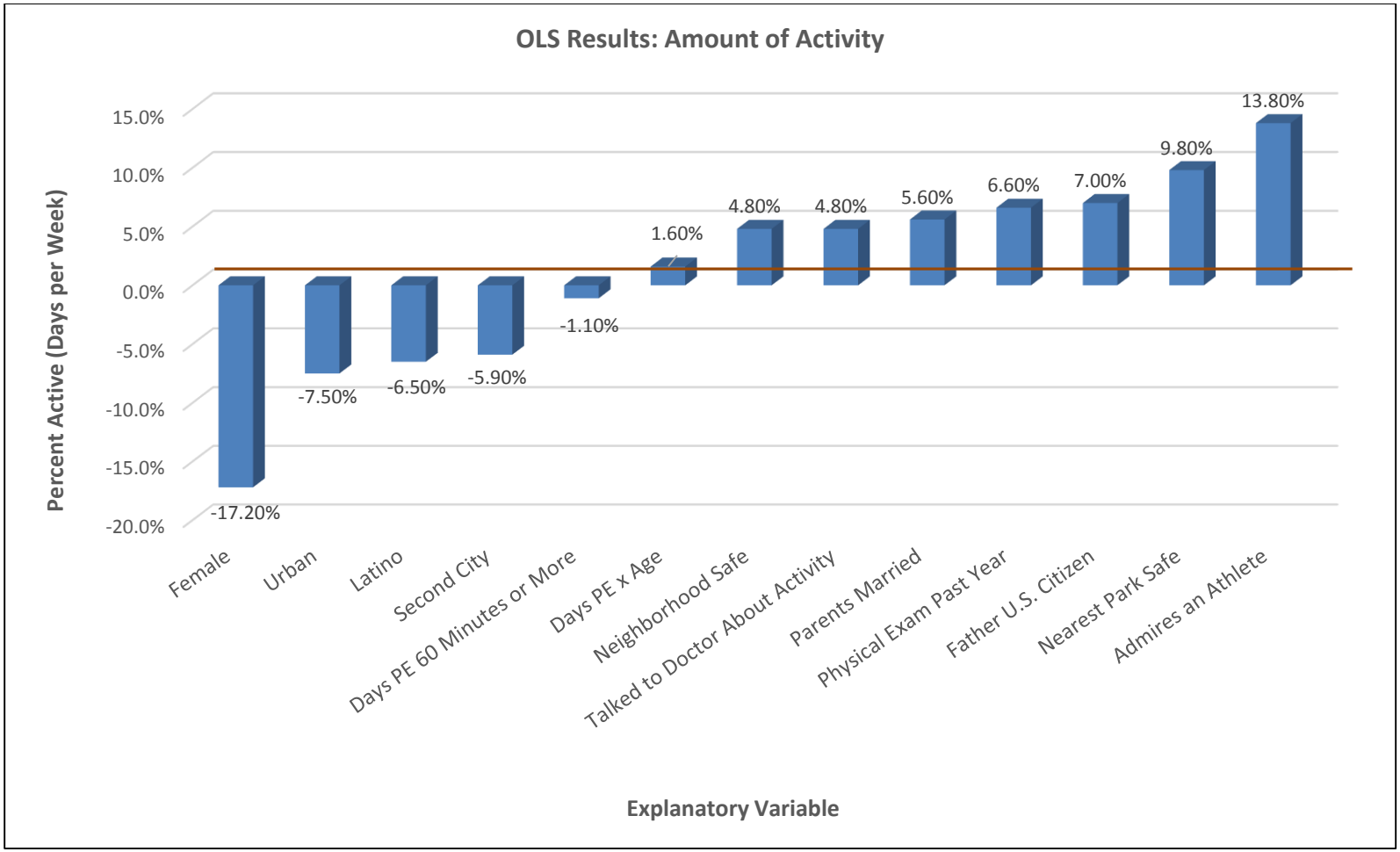
Ordinary Least Squares (OLS) Results

My second model uses a log-linear OLS regression that analyzes the sample of adolescents that reported being physically active for 60 minutes or more from one to seven days per week. I seek to determine the variables that influence the number of days per week that an adolescent decides to engage in at least 60 minutes of physical activity. All adolescents captured in my dataset are active on average 4.2 days per week for 60 minutes or more. To determine the isolated effects of each explanatory variable, using the log-linear model I multiply each variable by 100 to calculate the percentage change in comparison to the mean amount of weekly activity.

Figure 4 on the following page shows that more factors influence activity amount compared to the decision to be active or not. Most important to my research, is that physical education is significant, but the effects are negative. My results show that each day per week of physical education participation for at least 60 minutes, decreases an adolescent's overall physical activity by 1.1 percent less days per week. In comparison to the mean amount of 4.2 days per week of activity, this is a minimal effect, but an important finding because it means that physical education is a substitute for daily activity. This may be positive or negative depending on the quality of the individual physical education program.

Females are also significant in this model, with results showing that they are likely to be active 17.3 percent less days per week than the average adolescent. The only significant ethnic effect is being Latino. My results show that adolescents who are Latino are likely to be active 6.5 percent fewer days per week. Family environment also plays a role in activity amount. Adolescents with married parents are active 5.6 percent more days per week and with Fathers who are U.S. Citizens are active 7 percent more.

Figure 4: OLS Regression Results



Neighborhood effects play an important role in terms of activity amount. Those living in urban and second city environments with higher population densities exercise 7.5 and 5.9 percent less days per week. Adolescents that feel personally or physically unthreatened in their neighboring environment, or safe, are more likely to engage in regular physical activity. For example, living in a safe neighborhood increases weekly exercise amount by 5 percent and living in walking distance of a safe park increases weekly exercise amount by 10 percent.

Once again having an athletic role model shows the highest positive influence on the amount of physical activity that an adolescent engages in each week. Specifically, those with an athletic role model are likely to be active 14 percent more days per week. I also find significance in a couple of other factors, not frequently discussed in the physical activity literature, but that are relevant to public health policy. Adolescent who talk to their doctor about physical activity and who have had a physical exams within the past year are likely to be active 4.8 percent and 6.6 percent more days per week.

Interaction Effects

Since my primary interest in this study is the influence of physical education on adolescent physical activity levels, I also test whether physical education participation matters more for certain groups. Using both the Logistic and OLS models, I created interactions between my physical education variables and the following explanatory variables: female, age 16 or more, urban, below poverty line, African American, Latino, Asian, and Asian considers oneself Filipino. My results show significant physical education effects for one group in each model. I list all interaction results in Table 4 on the following page.

Table 4: Interaction Results

Interaction Effects with Take PE:

Pt. 1: Logistic results	**Female**	**Urban**	**Below Poverty Line**	**Age 16+**	**African American**	**Latino**	**Asian**	**Considers Self Filipino**
Take PE	-.447 (.122)	-.013 (.958)	-.093 (.682)	-.320 (.222)	-.170 (.409)	-.008 (.976)	-.089 (.679)	-.109 (.596)
Take PE x interaction	.468 (.133)	-.346 (.257)	-.228 (.500)	.359 (.257)	.748 (.491)	-.271 (.371)	-.513 (.273)	**-13.62***** (.000)
Pt. 2: OLS results								
Take PE	.012 (.735)	.011 (.757)	-.005 (.872)	-.043 (.226)	-.014 (.638)	.100 (.783)	-.030 (.341)	-.015 (.630)
Take PE x interaction	-.057 (.220)	-.075 (.124)	-.055 (.374)	.069 (.137)	-.033 (.829)	-.061 (.198)	**.147*** (.075)	-.029 (.856)

Interaction Effects with More Time Spent in PE (Days PE 60 minutes or more):

Pt. 1: Logistic results	**Female**	**Urban**	**Below Poverty Line**	**Age 16+**	**African American**	**Latino**	**Asian**	**Considers Self Filipino**
Days PE 60 Plus	-.089 (.132)	**.098*** (.078)	-.018 (.707)	-.033 (.425)	-.017 (.681)	-.010 (.873)	.015 (.720)	-.0003 (.994)
Days PE 60 Plus x interaction	**.127*** (.078)	**-.221***** (.003)	.020 (.800)	.145 (.123)	**.556**** (.042)	-.003 (.973)	**-.174*** (.086)	**-.396*** (.070)
Pt. 2: OLS results								
Days PE 60 Plus	.003 (.729)	-.011 (.161)	**-.013*** (.074)	**-.017**** (.017)	**-.012*** (.082)	-.011 (.147)	**-.011*** (.095)	**-.012*** (.074)
Days PE 60 Plus x interaction	**-.028**** (.018)	-.001 (.907)	.006 (.695)	**.033***** (.010)	.002 (.943)	-.0001 (.988)	-.002 (.940)	.022 (.559)

In the Logistic model, which tests the effects on an adolescent's decision to be active or not, I find that adolescents who live in an urban environment and spend more time in physical education each week, are 12.3 percent less likely to be active outside of school. This finding illustrates the importance of a quality physical education program, particularly if students do not live in neighborhood communities with safe places to exercise after school hours. In the OLS model, which tests the factors that influence the amount of activity an adolescent engages in, I find that more time spent in physical education each week is significant for teens aged 16 and 17. Specifically, for each day that a 16 and 17 year old spends in physical education for 60 minutes or more, there is an expected 2 percent increase in their weekly physical activity. Although the magnitude of this effect is relatively small, it matches findings in the literature showing that physical activity behaviors tend to decline with age. High school juniors and seniors are generally in this 16 to 17 year old age range, and not required to take physical education, so based on this finding, more time invested in activity for this age group might be useful.

From the quantitative research, I learned that physical education participation does not influence an adolescent's choice to be physically active or not outside of school, but it does have a substitute effect on the amount of weekly activity they engage in. This finding is important, because for many adolescents, their only daily activity occurs in physical education class. Therefore, if the quality of the program is insufficient, then there is no guarantee that adolescents are truly engaging in 60 minutes of physical activity per day. This is especially significant for adolescents living in urban neighborhoods, who have fewer opportunities to exercise in a safe space outside of school. Socio-demographic and environmental factors play a large role in an adolescent's decision to engage in physical activity at all, as well as the decision in how much activity to engage in. Overall, adolescents that are female, Latino, and live in urban neighborhoods are less likely to be active at all, and if they are active, they tend to exercise less.

Household income and the safety of the neighborhood environment are also important influences on physical activity. In addition, having an athletic role model positively and significantly increases physical activity behaviors among adolescents.

Although I believe that my findings are important for policy, there is only so much that a cross-sectional quantitative analysis can capture, since the data is drawn from one point in time. Another limitation to the data is that since so many factors influence physical activity levels, the magnitude of my findings are relatively small. Finally, the survey data uses adolescent self-reporting measures, which reduces some of the accuracy in the analysis as there may be a tendency to over-report or to understand true activity levels. Although it is difficult to pinpoint one particular cause of inactivity, it only means that it is important to look at this issue with a qualitative component to add context to the regression component. By combining qualitative data to understand broader trends within schools, and why certain policy efforts are not effective in promoting higher levels of physical activity, I can improve the relevance of my research. Consequently, I conducted nine interviews across the state and local education entities to understand some of the policy and practical barriers to increasing time that adolescents can actually spend in physical education.

Interview Results

As mentioned in the previous chapter, I interviewed nine respondents to represent state, district, and high school education agency perspectives. I organize my interview findings into three broad themes that cover the perspective of each level and provide greater context into the role of high school physical education in supporting adolescent exercise habits: (1) roles and responsibilities concerning physical education requirements and standards; (2) policy barriers to increasing time in physical education; (3) practical barriers to increasing time in physical education. My findings seek to answer my final two research questions, which are:

1) Why is there a decreased emphasis on physical education in California high schools?
2) What are the primary policy and practical barriers to increasing the amount of time that high school students spend in physical education?

I provide a summary of all interview responses in Table 5 at the end of the chapter.

Roles and responsibilities concerning physical education requirements and standards

The roles and responsibilities of districts and high schools concerning physical education requirements and state framework standards provide insight into why fewer adolescents are participating in physical education. Since I was unable to access a representative from the California Department of Education, I did not include the state education perspective for this question. All district and school respondents indicated that they strictly abide by the California Education Code's two-year physical education course requirement for high school students to graduate. This includes a requirement that students take 400 instructional minutes of physical education every ten days. To provide further context on why there is still a broad decline in physical education participation among adolescents despite adherence to state mandated requirements, participants explained their responsibilities regarding physical education and further insight into the two-year requirements at their levels.

One district goes beyond the state standards by requiring that students complete three years of physical education instead of only two. This district believes that a focus on the health and wellbeing of students is a necessary component to their overall lifestyle balance and academic achievement (March 25, 2015). Although only 19 percent of students in this district are on free and reduced priced lunches (CDE Dataquest, 2013-14), the district still faced its own challenges during the recession, which led to discussions about dropping the physical education requirement down to the state minimum of two years. Through a strong organizational culture,

with values supporting the importance of physical activity, the district was able to work with the teachers unions and make some concessions to maintain the three-year requirement.

Although each district abides by state physical education minute requirements, a couple of districts use block scheduling in some of their high schools, which requires adjusting the amount of time appropriately. With a block schedule, students enroll in eight courses per year, or four per semester, as opposed to only six in a traditional high school schedule. This could pose a potential problem for students' physical activity levels if they only taking the course one semester per year in a block schedule, and engage in no other activity during the day. On the other hand, the district and school participants that use block scheduling emphasized the plethora of opportunities available to students because of the ability to enroll in and choose among more courses per year. One of the districts that does not use block scheduling mentioned that the biggest hurdle to satisfying physical education requirements is the impacted schedules of students, who often do not have enough periods during the day to take physical education (March 18, 2015). It is somewhat unclear if the difference in opportunities across block versus traditional schedules are due to greater course availability, or if the districts using block schedules serve students in less disadvantaged communities.

Exemptions and elective physical education

Since the physical education literature discusses some of the issues surrounding unwarranted exemptions from mandated physical education, I asked districts to indicate the approximate percentage of students who receive exemptions from the two-year physical education requirement to graduate, as well as the most common allowable exemptions. At the school level, I asked school respondents to indicate whether there is a particular demographic of students that typically opt to take elective physical education, to gauge differences among students that might not enjoy or feel motivated to be physically active.

In terms of allowable exemptions, every district respondent explained that they are minimal, since approving them has to go through the State Board of Education. Of all district responses, the only allowable exemptions mentioned were temporary exemptions to accommodate an unexpected major injury or life tragedy, a partial exemption for a physical disability, and a two-year exemption. It should be noted that the district that referenced the two-year exemption serves a very low-income demographic, so the challenges are different. The respondent stated that only one to two percent of the total student population in the district is allowed an exemption from physical education, but the district is actually pushing for more two-year exemptions to create more opportunities for students (March 12, 2015). The reasoning behind this is that the district wants to build out so that students in the tenth grade have the option to take more classes that are academic. The goal is not to completely take away physical education, but to make the junior and senior years more interesting by creating more options for physical education than are currently available (March 12, 2015).

School interview respondents indicated that the students who most often opt to take elective physical education, beyond the two-year requirement are the athletes and the students whose schedules are not impacted. Three of the four respondents stated that students that usually take an elective physical education class are already involved in a sport on campus, so they take a course such as weight training, basketball, football, volleyball, or other options that are most conducive to improving their sport-related strength and skills. One school respondent stated that their success in interscholastic sports results from having strong physical education elective opportunities (March 9, 2015). Two respondents indicated that depending on the course, boys are more likely to take elective physical education than girls are, but generally, participation seems to be among athletes in general.

Academics also play a role among the students that choose to take elective physical education. Two of the respondents indicated that depending on when physical education class offered, it might conflict with other necessary academic coursework and available teachers. One school respondent said that it is mainly the students who are "middle of the road academically that are most likely to take elective physical education, since they are not bound by academic AP course requirements (March 16, 2015)." In contrast, a separate school that uses block scheduling rather than the traditional six period course day, is able to mitigate against this problem, since a larger number of courses to choose from creates more opportunities for students to take AP classes and still fit physical education into their schedules (March 24, 2015). I was surprised to learn about the benefits of block schedules in creating more opportunities for students to take physical education, based on a California Board of Education (1999) policy paper warning against the potential negative effects of terms block scheduling on physical activity levels for students who may not enroll in the course for an entire term. The school that serves students on the lowest end of the income spectrum, said the a big part of the problem is students failing their freshman and sophomore year courses, so they have to catch up academically in order earn enough credits to graduate (March 9, 2015). Scheduling affects can create opportunities or barriers, making it most important for district and school administration to be on the same page in terms of how to align physical education curriculum to their other priorities.

Policy barriers to more time spent in physical education

I asked each participant about their top three priorities for high school students, to be able to compare and contrast across the state, district, and school levels, and to determine whether physical education conflicts with any of these priorities. Across each level, the main priorities for high school students include academic achievement related to Common Core, student support, and an organizational culture dedicated to student success. None of the nine participants thinks

that these priorities pose a real barrier to physical education, so this section primarily describes best practices that each level uses to mitigate against potential policy barriers.

Common Core implementation and "college and career readiness"

All respondents pinpointed Common Core implementation and "college and career readiness" as top educational priorities. The goal is to ensure that all high school students complete their university eligible course requirements and obtain the necessary knowledge and skills to be successful in whatever career and higher education path they desire once they graduate. One of the school respondents said that a key component of Common Core goes deeper than academic test scores, since the end goal is to teach students "how" to do their work and to become successful (March 9, 2015). The respondent further explained that physical education is the only subject left out of Common Core curriculum standards, despite the fact that the goal setting and planning components of physical education work well under the standards (March 9, 2015). No participants believe that the emphasis on academic achievement is a barrier to physical education, although the state level respondent indicated that the latest conflict stems from recent decisions by the State Board of Education to allow some non-physical education courses to count as physical education credit (March 17, 2015), which takes away from its perceived importance.

Student supports

All participants indicated that student supports are a top priority. Mechanisms of support include personalized learning, interventions and support services, and communication in multiple languages if needed. The overarching goal is to do what is in the best interest of each student, so that they may be successful, which requires being in tune with the respective student population and their changing needs. All participants think that physical education supports the positive character and academic development of students. One district respondent explained, students who move on to college still have to be physically fit, because "the more physically healthy, the

more mentally healthy and more balanced student (March 25, 2015)." Another district respondent indicated that "physical education is one of the only subjects that works on the social aspects of people…..math doesn't do that (March 18, 2015)." The importance of student health and wellbeing can always fit into the overall goals of the education system.

Organizational culture dedicated to student success

Since the primary goal across the education system is to develop successful students, necessary organizational mechanisms must be in place to provide the proper supports according to the needs of the student population. The staff development aspect is a critical component of meeting student needs, according to a district respondent, because "it takes a concerted effort to change instructional practices of teachers (March, 11, 2015)." When all levels of staff are on the same page, the more likely to develop a culture that clearly supports student success.

Another district respondent mentioned that there are actually not many professional development opportunities offered to physical education teachers (March 18, 2015), which leaves it up to the individual teacher to follow the physical education framework and provide quality education to their students. Aside from the requirement to publicly report ninth grade students' FITNESSGRAM scores that test overall physical fitness, there is no firm accountability measure for quality instruction of physical education (March 18, 2015). A district and school culture that supports incorporating physical activity into the curriculum is a key component of a quality physical education program, likely because staff serve as positive role models that promote the benefits of living a balanced and healthy lifestyle.

Although all respondents believe that physical education supports each of these priorities, a couple of participants indicated that one of the primary conflicts with physical education participation has to do with the impacted academic schedules of some students, where they may have to make a tradeoff between taking physical education or an AP class. With a limited amount

of time in the school day and a limited amount of credits to take, students must choose between what they need to be successful in terms of academic preparedness versus being well rounded and choosing an elective course.

Practical barriers to more time spent in physical education

Since many factors affect an adolescent physical activity levels, I also asked respondents a couple of questions concerning student opportunities and limitations to be active outside of school, as well as some of the factors other than physical education participation that influence their exercise habits.

Opportunities and limitations to be active outside of school hours

I only asked districts and schools to indicate the after school opportunities and limitations of their respective student populations, in order to determine any particular neighborhood and income effects. Although there are common themes among responses, there is a clear difference in terms of opportunities to be more or less active based on economic resources and neighborhood safety.

Opportunities available to adolescents to be physically active outside of school include campus-based sports participation and clubs, as well as community-based gyms, recreation leagues, and partnerships with community organizations. All district and school respondents highlighted the opportunity for students to participate in after school sports and three school respondents described the club offerings on campus, which offer a variety of indoor and outdoor activity options. A school respondent that serves a large percentage of low-income and minority students, indicated that the "kids that participate in team sports and athletics have a higher chance of graduating because they are more engaged and participation promotes engagement in basic school culture and teaches collaboration (March 9, 2015)."

Community partnerships are important for creating more opportunities for adolescents to be active. Three district and three school respondents referenced this practice, although it is particularly critical among those serving lower income students in underserved neighborhoods. Even in the upper echelon neighborhoods, investing in positive community relationships serve as an additional motivator for adolescents to enjoy being active. For example, one district has a positive relationship with the local park district and school insurance group, who also believe in the value of investing in students' physical wellbeing. The respondent described how the city goal is to build a park in each neighborhood and how the school insurance group goal is to invest in student and staff health by creating walking trails with mile markers around school campuses (March 25, 2015). Although costly in the short-term, in the long-term it will save money, because of healthier students and staff (March 25, 2015).

Two of the districts mentioned access to gyms and community recreation leagues as opportunities, but these districts serve students in more advantaged communities. In the lower-income neighborhoods, lack of income and unsafe areas to walk and bike outdoors limit these potential opportunities. Other limitations to after school physical activity are influenced by the quality of available facilities and potentially conflicting adolescent priorities. One school respondent that educates students in a low income community, described the importance of suitable facilities in terms of "form meets function: when the facility is in shape, then participants that use the facility are in shape; but when it is not adequate, then they can't use and benefit from what it is supposed to accomplish (March 9, 2015)." Schools lacking financial resources to fix broken central heating and air in a gym, to replace lost or stolen equipment, or to build a swimming pool to teach the required swimming component of the state physical education framework face greater limitations. Despite greater barriers, the respondents that I spoke with demonstrate that income does not have to be an ultimate limitation.

Competing adolescent priorities are another limitation to after school physical activity. An adolescent's activity habits often depend on their individual lifestyles, which can provide opportunities or limitations. For example, one district and one school described how some students work after school or need to rush home to take care of a sibling, which leaves them little time to spend active.

Factors aside from physical education participation that influence activity outside of school

Across the state, district, and school levels, the primary indicated factors aside from physical education participation that respondents believe influence exercise habits outside of school are: sports participation, social aspects, family support/income, and neighborhood factors. All nine participants cited sports participation as influential. Three district and four school respondents cited income level and neighborhood environment as important factors. The state respondent as well as the majority of district and school respondents cited social aspects and family support of physical activity behaviors.

Social factors can lead to positive or negative motivations to be physically active, depending on the lifestyles and interests of individual adolescents. A district respondent described how society places increased pressure on males and females to be physically fit, which is heightened by social media and the influence of marketing ads for sports products (March 25, 2015). Although in some cases, social factors create healthier attitudes and more motivation to be physically active, in some cases they do not. Adolescents who are accustomed to being sedentary in their daily lifestyles or whose group of friends are inactive may be more inclined to prefer playing video games at home.

This social component also affects quality physical exertion in physical education class, for some adolescents that feel uncomfortable getting sweaty, changing in the locker room, or showering after class. A school respondent described that there is an expectation of physical

exertion, but in their school, there is no requirement to shower after physical education, which does not prepare students from the back end if they have a second period class and smell the rest of the school day (March 9, 2015). The respondent indicated that factors such as this are more challenging for schools that do not necessarily have the capacity to support what is truly expected from a physical education program (March 9, 2015).

The influence of the family also contributes to adolescent motivation to be physically active. In the home environment, students set their habits, often by modeling their parents or other close relatives. Whether a positive or negative influence, these behaviors carry over to what the schools and districts deal with. A district respondent from a more established neighborhood explained that "it starts with the family and where the family sets the priority, but believes socioeconomic plays a role (March 25, 2015)." One school respondent confirmed this by describing how impoverished the students at their school are, where they lack of stable and quality meals and at home. These students are often too tired and lack energy to spend being active (March 9, 2015).

Those living in urban areas may be disadvantaged because there are fewer safe places to exercise. In the lowest income communities, it is generally unsafe to play, walk or go for runs outside. One school respondent described how gang shootings are common occurrences in the neighborhood, so fences around the school are locked at the end of the day to prevent crime from entering the campus and to keep the students safe (March 9, 2015). Although safety is a more pressing issue for the urban communities, even in upscale neighborhoods, safety can be an issue. A school respondent from a very safe community explained that even in their neighborhood where it is safe to walk at 11:00 p.m., parents still drive their children to school because there are no sidewalks to safely bike on the rural roads (March 24, 2015).

I asked all respondents whether they thought that these factors play a larger role in high school students' physical activity behaviors than by simply participating in physical education class during school. The state respondent, three districts and three schools believe that each these factors hold an equal weight on physical activity behaviors compared to physical education participation. The school respondent serving a more rural community believes that physical education is the most important because students view their physical education teachers as role models (March 24, 2015). The respondent went on to say that, "there is a huge jump from eighth to ninth grade in terms of expectations to run a mile time once a week and to do push-ups and sit-ups every day. It is all about goal setting, because even if [students] don't reach a certain level, it's about seeing improvement. Students don't necessarily get goal setting from their parents, which is why physical education is a big factor in what keeps kids motivated (March 24, 2015)."

One district confirmed this reasoning by stating that a big factor has to do with the level of exposure that kids have to PE at younger grade levels. If the only exposure that a child has to physical education during grades K though 8 is the equivalent to recess, then by the time they reach the high school level, they are less likely to be able to follow simple instructions and understand the importance of the subject. There is a systemic issue at the elementary level because there is not enough funding for physical education specialists to teach organized sport or skill development. By the time students reach ninth grade, they view physical education as a requirement with little deemed importance (March 12, 2015).

Should more be done to improve physical activity levels outside of school?

I asked each participant whether more should be done at their level to improve adolescent physical activity levels outside of school. The California Physical Education Framework is a required guideline for school physical education programs to abide by, so the state level participant believes that there is nothing more to do at the state level. The state expert said that

the problem lies within the individual physical education teachers and the curriculum taught to the students, since not all high schools follow the standards (March 17, 2015). Since all districts and schools that consented to an interview have overarching organizational cultures in support of physical education, I did not detect any problems with the teachers or curriculum, but I gathered other important insight in terms of economic and neighborhood factors.

At the district level, respondents stated that they promote the benefits of active lifestyles and the importance of healthy students. Students with less poverty and safer neighborhood environments face fewer barriers to being active that do not need to be mitigated by the district. Although the respondents from districts with more resources said that there is always room to do more, at some point, it goes beyond the graduation requirement and comes down to the individual student and the importance that he or she places on living a healthy lifestyle (March 11, 2015).

In the lower income districts, where barriers are more apparent, there are fewer educational and neighborhood resources to support physical activity. The district that serves the largest proportion of low-income students stressed the importance of bringing physical activity and physical education into the whole curriculum to narrow the achievement gap, because "even adults can't sit in professional development for six hours a day" (March 12, 2015). This district faces additional challenges from the number of federal, state, and county partnerships that it relies on for income support. The respondent explained that while the partnerships are necessary and beneficial, with so many temporary pilot programs going on in individual schools, it is hard to gauge how students actually benefit from them (March 12, 2015). Although resources are necessary, the respondent thought that it would be better to be more purposeful in terms of whom to collaborate with, in order to measure the benefits of the programs more accurately.

Another helpful practice at the district level is to continue administrative support and to develop staff as a team in support of overall student wellbeing, both academically and in terms of

health. One district interviewee mentioned that more professional development would be useful to educate staff on the barriers to physical activity and how to overcome them (March 18, 2015). For example, despite the requirement for ninth graders to pass the FITNESSGRAM assessment, over the past thirteen years aerobic scores have flat-lined, which shows the need for more motivation for fitness (March 18, 2015). The district respondent also indicated the need for more emphasis on recognizing the problem of students not participating in physical education and activities outside of school and finding ways to be more accountable for these outcomes.

At the school level, ideas included continuing community partnerships, on-campus club and after-school sport offerings, creating safer streets, parent education, and reinstating a four-year physical education requirement. Strong relationships with the community are a common practice with each school that I interviewed, which occurs across the income spectrum, but the importance seems most prevalent for the schools serving the lowest income student populations. Partnerships with community centers and local fitness businesses takes strategy, but in the long run it creates new opportunities for adolescents to be active that were not otherwise available.

One school respondent mentioned that, "it would be nice to see a four-year physical education requirement reinstated, because it would at least guarantee that over four years, students would be more likely to build a habit of being physically active" (March 16, 2015). The respondent mentioned that there is more research showing that kids who are more active do better academically. The connection between more activity and better academic performance is confirmed through policy reports conducted by agencies such as the California Endowment (2008), citing studies that find similar results. For example, greater amounts of aerobic activity increase blood flow to the brain, making it easier for students to concentrate in class and to improve memory functioning (p. 4). Although reinstating a daily physical education requirement might be more challenging for students on a rigorous academic track, the respondent stated,

"Nothing is being done aside from stopping sales of soda on campuses, which treats only treats one side of the issue and not the other in terms of getting kids more active. Such a requirement would send a clear message of the importance of physical activity, especially since this is the time in the students' lives that they are building their habits into adulthood" (March 16, 2015).

Conclusion

In conclusion, my regression results indicate that physical education participation does not influence an adolescent's choice to be physically active or not outside of school, but it does have a substitute effect on the amount of daily activity in which they engage. Based on the results of my interviews, I conclude that the decline in physical education at the high school level is attributed to factors that include the impacted academic schedules of students and a lack of administrative buy-in to the benefits of a quality physical education program. Since all of my interviews were with education experts who strongly support investing in quality physical education, my results cannot attest to other districts and schools that do not.

Policy barriers to physical education appear to be minimal since the state has specific requirements for districts and schools to abide by, but often structural and resource constraints affect proper program implementation across all levels. The perceived importance of physical education often determines willingness to create more innovative strategies to overcome these barriers. Even if state education agencies can do nothing more at the high school level in terms of creating more requirements, they should realize that buy-in to investing in quality physical education at the lower levels is often contingent on the resources and support that they provide.

Practical barriers are generally issues that districts and schools cannot fully control, which include the neighborhood environment, socioeconomic status of students, social aspect and family support. District and school respondents who believe in the benefits of quality physical education appear to be able to mitigate against some of these barriers.

Table 5: Summary of Interview Responses

	State	Districts				Schools			
Issue	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Abide by State Physical Education Requirements and Standards	N/A	Yes	Yes	Yes	Yes. Requires 3 years physical education instead of state required 2 years.	Yes. Strategic efforts to cater physical education program to unique needs of very low-income students.	Yes	Yes	Yes
Exemptions – Most common allowable (Districts)	N/A	Minimal allowances. Only temporary exemptions for emergency situations.	Only 1-2% allowance. 2-year exemption is most common, to create more academic opportunities for 10th graders.	Minimal allowances. All must pass board approval, but more debate on this because of impacted academic schedules.	Minimal allowances. Only for physical disabilities, but students are still expected to do what they are capable of doing.	N/A	N/A	N/A	N/A
Elective physical education – types of students that generally opt to enroll (Schools)	N/A	N/A	N/A	N/A	N/A	Mainly males. Most students do not have opportunities to take elective physical education, since they may fail academic courses in 9th and 10th grade and have to catch up.	Mostly athletes	Athletes, "middle of the road" students academically, and males.	Athletes (male and female).

	State	Districts				Schools			
Top Priorities for high school students	1) Academic achievement related to Common Core 2)Personalize Learning 3) Including online learning	1) Common Core/ college and career readiness 2) Student support services 3) Staff development to support students	1) 100% graduation with diploma or certificate 2) Common Core 3) Build district learning organization	1) Communicate across schools to recognize overall district goals	1) Safe schools 2) College and career readiness 3) Everything in students' best interest	1) Teach students to be respectful, responsible, kind and safe 2) College and career ready/ student advocacy 3) Teach grit and perseverance	1) Common Core 2) Ensure A-G course eligibility; maintain strong communication in multiple languages to keep parents and students engaged. 3) Safe environment.	1) College and career readiness 2) Student development and positive school culture	1) College and career readiness, complete A-G requirements. 2) Safe and supportive environment. 3) School culture with strong traditions, leadership and after school activities.
Do any priorities conflict with physical education?	No. All support it.	No. All support it. Block schedules provide greater opportunities	No conflict, but Common Core creates perceived challenges among teachers due to the shift in how to teach courses. Also, most resources are allocated for academic materials instead of updating facilities and equipment	No conflict. Daily physical activity works into the district's mission. The challenge is that there is nobody is in charge of physical education at the district level to integrate physical activity and academic priorities.	No conflict. Physical activity is important to balance students' lives, in terms of both physical and mental aspects. Block schedules provide greater opportunities.	No conflict. Physical education teaches grit and social aspects, which are Common Core components. Physical education is not in the standards, but a strong school culture to support a quality program helps.	No. All support it.	No, but a couple of conflicts include: 1) Impacted academic schedules; 2) Parent push in the district to exempt athletes from physical education, which takes away from its curricular foundation to promote lifelong activity.	No. All support it. Block schedule creates more choices and student opportunities.

	State	Districts				Schools			
Opportunities for student physical activity outside of school	N/A	Gyms, recreation leagues, tracks to run and walk on, safe neighborhood	Intercollegiate sports, partnerships with community organizations, high school campuses are open after school hours	Intercollegiate and club sports, nearby parks, partnerships with community park districts and local fitness businesses	After school sports, clubs, community/ local business partnerships, city park renovations, walking paths around school campuses, healthy community, safe neighborhood	Community partnerships with the local park district and Sheriff department	Intercollegiate sports, clubs, health and sports academy on campus, community sports organizations	Intercollegiate sports, clubs, community sports organizations, community parks, partnership with local Crossfit business	Intercollegiate sports, clubs, safe and supportive community environment
Limitations to student physical activity outside of school	N/A	No limitations. Depends on the individual lifestyle of the student.	Urban living, unsafe community, poverty, students work/care for family, "fat" American culture	Many after school sports are fee-based, which makes it more difficult for lower income students to participate.	No limitations. Many after school opportunities are fee-based, but many parks and safe areas to be active that are no cost.	Student poverty; unsafe neighborhood	Inadequate facilities; low socio-economic, urban environment	Work or have to care for family after school	Rural roads with no sidewalks make it unsafe to walk or bike to school.
Factors that influence activity outside of school (aside from physical education participation)	(-/+): friend/family behaviors regarding physical activity (+): Sports participation	(-/+): Social factors. Depends on individual student attitudes. (+): Overall, healthy attitude in the district and surrounding community	(-): No emphasis on physical education in elementary schools affects perceived importance of exercise as students age. Urban living, culture/ethnic factors. (+): None mentioned	(-): Work obligations, technology (-/+): ability to pay for outside activities, community safety, parent support.	(-/+): Social influence/pressure to be fit, family influence, individual behaviors.	(-): Lack of stable meals at home influence energy levels; poor quality food; unsafe neighborhood (+): Partnering with local park district; sports participation	(-): Social challenges and expectations; lower socio-economic, urban environment (+): Sports; partnering with local park district and community centers	(-): Behaviors of students that don't enjoy being active; sedentary generation; (-/+): home environment (+): Partner with local Crossfit; staff emphasis on health	(-): None mentioned. (+):Safe community; school sports/clubs; physical education plays a major role, since teachers set high expectations and act as positive role models

	State	Districts				Schools			
Should more be done at your level to improve student physical activity levels?	Not at the state level. It's the role of individual physical education teachers. The problem is not all high schools follow the California Physical Education Framework and Standards.	Always want to do more, but with plentiful opportunities, at some point it comes down to the value that the individual student places on living a healthy lifestyle.	Yes. 1) To narrow the achievement gap, physical education is an important component of the curriculum to benefit the "whole child." 2) The district serves a very low-income population, so it is important to be more purposeful in selecting pilot programs to fund schools.	Yes. 1) More professional development to learn how to overcome barriers. 2) More emphasis on recognizing the problem with declining physical education and after school physical activity participation.	Can always do more, but in a district with already high participation in physical education and after school activity, it's hard to create added supports for obese students without discriminating.	Yes. 1) The district is hoping to fund an on-campus facility for students to exercise safely and affordably, since they do not have access to commercial gyms. 2) Continue community partnerships and school administrative support.	Yes. 1) More programs and community resources to promote health and physical activity. Takes a "strategic mind." 2) Maintain strong relations with park districts/community centers. Important to have different agencies working together with the same vision for kids.	Yes, but unsure how to accomplish it. A return to the 4-year physical education requirement would be ideal, to send the message that it is just as important as other academic subjects.	Yes, but it's more of a sidewalk issue than community or school issue. 1) Create safer ways for kids to transport themselves to school via bike or walking. 2) Continue making clubs available.

Chapter 5

CONCLUSION

My regression and interview results confirm prior literature that the following socio-demographic and environmental factors significantly influence adolescent physical activity levels: gender, age, income, neighborhood safety, access to activity opportunities after school, and education support of quality physical education. My results also add to prior research, by showing that access to health care and the presence of an athletic role model positively influence physical activity behaviors. Since my qualitative findings are exploratory, they are not sufficient on their own to warrant formal policy recommendations, but by synthesizing them with my regression results, in addition to evidence in prior research, in this final chapter of my thesis, I offer some suggestions for the State Board of Education to consider. I think investing in quality physical education programs through educational system and community support can positively influence adolescent physical activity behaviors.

Create an Education Culture that Values Physical Education

Investing in an educational culture that values physical education as an instructional priority sets the tone for the quality of the program. This starts at the state level and filters down to the districts, schools, and students. All of the interview respondents in my study value physical education as an instructional priority, and believe that it supports their top educational priorities to meet Common Core State Standards, provide student supports, and to invest in staff development.

Although there are many districts and schools across California that value quality physical education and creating more opportunities for adolescents to be active, there are many who do not share the same priorities. My evidence for this is based on the statewide lawsuit by physical education advocacy organization Cal200 against thirty-seven districts for failure to

provide mandated instructional minutes of physical education to students (Hayden, 2014, Los Angeles Times).

Importance of a quality physical education program

The quality of high school physical education is an important part of an adolescents' comprehensive learning experience (ACS CAN, ADA, & AHA, 2012; CDE, 2009; CDC, 2006; CDC, 2013; Cox & Chamberlain, 2010; Madsen, et al., 2012; O'Malley, et al., 2009; Sallis, et al., 1999), because it helps them develop the skills, knowledge and confidence to live a healthy and active lifestyle (CDC, 2006; CDE, 2009; CDC, 2013). Physical education is an important instructional tool that helps students understand why daily physical activity is important, which in turn increases their motivation to translate exercise behaviors to their daily lives (Madsen, et al. 2012; Portman, 2003; Sallis, et al., 1999). A high quality physical education program should ensure that students engage in moderate to vigorous physical activity at least 50 percent of class time, that physical education teachers hold proper credentials, and that facilities and equipment are sufficient to support mandatory curriculum requirements (ACS CAN, ADA, & AHA, 2012).

I base my recommendations on the top priorities for high school students as cited by the state, district, and school respondents in my field research. For each recommendation, I will explain how investment in increasing time for students to be physically active, professional development, and a safe and supportive environment supports a quality physical education program as well as district and school educational priorities. Since improving adolescent physical activity behaviors is also a family and community responsibility, I also provide a couple of recommendations for how community efforts can create more opportunities for adolescents to be active both in and out of school.

Increasing time for students to be physically active

Many health organizations recommend providing daily physical education in schools (American Academy of Pediatrics, 2009; CDE, 2009; CDC, 2006), but even if daily physical education is provided, it does not mean that students are sufficiently active during the allotted time frame or that physical education teachers are teaching the appropriate curriculum. According to my regression results, across the entire representative sample of California adolescents that are already active at least one or more days per week, more time spent in physical class slightly reduces their out of school activity behaviors. Although the reduction in overall activity is a minimal effect, it indicates that physical education may be used as a substitute towards daily activity, which makes the quality of instruction particularly important for students that are not habitually active. This is why the State Board of Education adopted Model Content Standards for physical education is an important instructional tool for physical educators to abide by. The content has academic purpose, which thoroughly lays out skill and knowledge standards that every student should know, in order that they successfully transition out of high school, making conscious individual choices to engage in daily physical activity as adults (CDE, 2010).

The quality of physical education instruction supports educational priorities for students as evidenced in research linking physical activity to improved academic performance (ACS CAN, ADA, & AHA, 2012; Cox & Chamberlain, 2010). Unfortunately, since physical education standards are left to district and school discretion to apply, local education agencies with increased pressure to ensure that their students academically measure up to Common Core and academic test standards, may choose to neglect physical education in order to ensure that academic test scores are up to par. Despite any perceived conflict, the Physical Education Model Content Standards actually provide a specific academic framework that flows well with student achievement goals. For example, students are not only required to demonstrate and perform

particular movement skills, but are also required to demonstrate knowledge of fitness concepts, develop their own personal fitness plans and set personal goals, learn to work as a team, and even understand and explain the role of physical activity in preventing chronic disease (CDE, 2010). All of these standards plus more are mapped out in the Physical Education Model Content Standards and connect to curriculum content in other academic areas (CDE, 2010), as mandated in the new mandated Common Core State Standards.

It is interesting that even though the California Department of Education sets physical education as a curricular priority (CDE, 2010), it is one of the only subjects not mentioned in the new Common Core State Standards. Being prepared for life after high school also includes health literacy, which the introduction section of the Standards notes as a disclaimer (CSBE, 2013, p. 5). Physical education is one of the most comprehensive courses to teach students the value of health and exercise and to allow them to apply these skills in a team environment. Since physical education is not specifically mentioned in the Common Core State Standards, and since teachers integrate these standards into curriculums based on their discretion (p. 5), some districts and schools may view it as easier to neglect physical education citing conflict with academic priorities for students.

The academic priorities set by Common Core may make it difficult for some districts and schools to understand how to integrate physical education, even with an understanding of the Physical Education Model Content Standards. To assist educators and community members even further, the California State Board of Education adopted Physical Education Framework for California Public Schools thoroughly guides administrators and teachers through model curriculum standards and instructions on how to create a quality program despite various challenges (CDE, 2009). Based on research stating that that many physical education policies are not taken seriously enough (Cawley, et al., 2007; Madsen, et al., 2012), I think that specifically

mentioning physical education in the Common Core State Standards could be a cost effective way to improve the perceived value of the course. Since Model Content Standards and the Physical Education Framework for California Public Schools already serve as best practice models to creating a quality physical education program, nothing in the administration or content of Common Core needs to change except drawing awareness to the fact that these documents are important educational priorities as well.

Improving professional development for physical educators

Professional development is an important organizational mechanism for districts and schools to include in their practices, in order to develop successful students. An education culture that supports quality physical education is important to the priority of student success, because for students to be ultimately successful in the real world, they not only need a base academic competence, but also an understanding of the importance of health and physical activity. Developing staff in such a way to serve as role models to students in terms of valuing a healthy and active lifestyle necessitates more leaders at the state and district levels to offer guidance and support, as well as integrated staff training at the district and school levels.

One recommendation is to hire a person at the state or district level in charge of physical education coordination (ACS CAN, ADA, & AHA, 2012; CDE, 2009). Someone specifically hired as a qualified physical education expert, can be a valuable support to schools in terms of understanding on how to integrate academic standards with physical activity topics, how to develop the curriculum based on unique student needs, and to educate district and school staff on how physical education supports academic learning (CDE, 2009). This type of coordinator can also assist schools where the structure of the school day impacts opportunities for many students to take physical education (Kahn, et al, 2002), due to increased academic demands. This coordinator will also serve as a positive role model to the rest of the district, which also trickles

down to school administrators, teaching staff, and students. Based on my interviews, I gathered no indication that it is common practice to hire such a position at the district level in charge of physical education coordination. I did not specifically ask this question, as I thought it might be too sensitive, but one of the four district respondents specifically stated that there is no such position at the district level (March 18, 2015).

Based on my research, I assume that either districts do not have sufficient funding to create such a position, or that they have the funding but choose to allocate it to other academic subjects. At the state level, there is a person in charge of answering physical education questions, but since I was unable to obtain interview consent, it is unclear what this role entails and whether it is solely focused on physical education or combined with other job responsibilities. Although the state already has policies and documents in place that clearly support the provision of quality physical education, it could be helpful to further incentivize districts and schools to implement physical education programs according to the recommended Model Content Standards. Investment in leaders with thorough content knowledge of physical education, professional connections to health and physical education organizations, an understanding of how to evaluate instructional resources and practices (CDE, 2009), and knowledge of how to integrate their expertise with other academic priorities for students, could help create a greater perceived value in physical education.

A second recommendation to is to implement staff wellness programs at the district and school levels, which can effectively promote health and physical activity among staff. These programs will not only contribute to morale and teambuilding in the professional environment, but set positive examples for students to follow (CDC, 2013). Such programs are a positive way to include staff of subjects in curriculum discussions to build a culture where physical education teachers are just as important to school priorities as english and math teachers. The more that

administrators and teachers can come together to share ideas and resources, the better the ability to adjust teaching methods to student needs and support one another.

Ensuring a safe and supportive physical education environment for all students

Student wellbeing as a top educational priority includes ensuring a safe and supportive school environment. Setting accountability mechanisms to monitor quality physical education is important (Cox & Chamberlain, 2010) in this regard, since a safe and supportive environment depends on having adequate facilities and teachers holding the proper credentials (CDE, 2009).

For districts and schools that serve students in lower income areas, adequate funding supports to maintain facilities and to ensure that proper equipment is available is more challenging. For example, if a school does not have enough money to maintain a swimming pool, then it cannot teach the required swim component of the physical education curriculum unless it can collaborate with a local park district to share the pool facilities. Many lower income districts and schools rely on various grant programs where funding only offers temporary solutions to an ongoing problem. The provision of quality physical education is often more challenging for low income schools that lack resources, which makes it even more important for the state and districts to communicate and to be purposeful about where to allocate funding.

A safe environment also means that physical education teachers hold the proper credentials to teach the required curriculum and are a trained in safety (CDE, 2009) in case a student becomes injured. The better trained the physical educators, the more likely they will serve as positive role models to students in terms of the value placed on living a healthy and active lifestyle.

Community and Parent Involvement

Although it is not the direct role of a district or high school to create external opportunities for adolescents to be active, several interview respondents collaborate with

community organizations to do so. My regression results and field research indicate that adolescents live in households with income levels below the Federal poverty line, and unsafe urban areas are less likely to be active outside of school compared to adolescents that live in affluent areas that are safe. Family factors also influence activity levels, so it is important to create educational campaigns targeted at parents and the broader community.

Creating community partnerships

Particularly in lower income communities, where students have fewer opportunities to be active outside of school, partnerships with local park districts, community centers, fitness businesses, and other organizations willing to contribute can be effective. Most of my interview respondents across income levels mentioned the effectiveness of partnerships as a mechanism to improve adolescent opportunities to be active. The California Physical Education Framework (CDE, 2009) also confirms the benefits, and adds that partnerships create a greater sense of community integration and support for school efforts to improve student health and wellbeing.

Through my field research observations alone, the differences in student opportunities were strikingly evident, which provide confirmation of prior literature that access to after school activity opportunities (Durant, et al., 2009; Madsen et al., 2012) and neighborhood safety (Cawley, et al., 2005; Gordon-Larsen, et al.; Gyurcsik et al., 2006) are important determinants of overall physical activity. I witnessed major differences in the neighborhood environments and subsequent opportunities or lack thereof. In the more affluent communities, I noticed people biking on nicely paved bike lanes, running on sidewalks and nearby park trails, various gyms located in nearby areas, and a mostly White demographic. Campus parking lots filled with nice cars that students drove, and surrounding neighborhoods safe enough to walk to school. In the very low-income communities, people walked but it appeared to be a mode of transportation rather than for exercise purposes. Many streets and buildings appeared in need of repair and I

noticed a mix of race and ethnic backgrounds, but little to no White students. Campus parking lots had fewer cars that belonged to staff rather than students, and safety precautions on certain campuses were more evident with gates surrounding the perimeter to lock after hours.

An opportunity to reduce some of the disadvantages that lower income districts have in funding quality physical education can be mitigated through California's Local Control Funding Formula (LCFF), which Governor Brown signed into law in 2013 (EdSource, 2013). The purpose of the new change in education funding is to provide local districts more control over how they would like to spend their money, with accountability mechanisms in place to ensure that they are obtaining positive results (EdSource, 2013). All districts in the state receive a base grant according to student attendance rates and grade level, but districts serving a larger percentage of higher needs students in terms of low-income, English Language Learner, or in foster care (EdSource, 2013) receive supplemental grants to reduce the funding disadvantage. In districts where over 55 percent of the student population are high-needs, the district will receive additional concentration grants for each student in this population.

Although districts can spend base grant money in any way they choose, the supplemental and concentration grants must be used to enhance opportunities for high needs students. Since many districts in the state to serve a both high- and low-income schools, it is their ultimate responsibility to allocate the funding according to student needs, but the new law sets an accountability mechanism in place to publicly disclose how funds are spent. This provides more opportunities and incentive for communities and parents to get involved in the funding decisions that are made for students, which is described in the following section.

Enhancing parent and community involvement

Parent and community involvement in district and school practices surrounding physical education are important, because no matter how academically prepared adolescents are after they

graduate from high school, it is important that they understand the importance of health and physical activity, to maintain an overall healthy lifestyle balance. Adolescents learn their physical activity habits in their home environment, where they model parent behaviors. If parents do not understand and promote the value of adequate nutrition and daily exercise at home, then their children will also be more likely to be inactive (CDE, 2009, p. 237). This not only increases the importance of school physical education to teach students the importance of living a healthy and active lifestyle, but also increases the importance of regular communication with parents and the community to promote activity at the broader community level.

Under the Local Control Funding Formula, districts are required to reach out to schools, parents, and the community to solicit ideas for how funding is spent. Suggestions are integrated into a Local Control and Accountability Plan (LCAP) to ensure that district spending matches state priorities for students. There are eight priorities that include: preparing students to be college and career ready, implementing Common Core standards, creating more resources for high-needs students, ensuring that teachers are fully credentialed, measurable student outcomes in physical education and the arts, parent involvement in school decisions, student engagement, and improving school climate (EdSource, 2015). This plan is an opportunity for community members and parents who support creating more opportunities for students to be physically active, to guide local decision-making processes in this direction. This type of civic engagement is also recommended by the Center for Disease Control (CDC) (2013), citing the formation of school health councils (SCH) comprised of community members, parents, and teachers, as an effective way to coordinate and guide the formation of physical activity policies within schools, create community wellness programs, and provide community health education.

Study Limitations and Suggestions for Future Research

My research results are limited by the fact that the adolescent survey data that I used in my regression are self-reported, which when factoring in physical activity behaviors, are likely to be over-reported or adolescents may not actually pay much attention to how much activity they are getting each day. In my qualitative research, it is important to note that each respondent openly supports quality physical education programs, so I did not capture districts and schools that fail to abide by standards. In addition, the interviews were exploratory, which limits my ability to make formal policy recommendations based on the small sample size.

For future research, I suggest conducting more structured and generalizable qualitative research to gain a deeper understanding of the barriers to physical education. Although this method likely only captures the opinions of experts that already value physical education and abide by standards, their insight is helpful in terms of what the challenges are and how they are able to or attempt to mitigate against them. It is important to understand the barriers within districts and schools in regards to the provision of quality physical education to develop lasting solutions. I also suggest further research on how school system structures influence opportunities for students to enroll in elective physical education and their overall activity behaviors. Neighborhood and income determinants on adolescent physical activity levels also warrant further research in order to models for developing safer environments and collaborations between schools and community centers.

APPENDIX A

THESIS INTERVIEW PROTOCOL AND QUESTIONS

Research Question(s):

There is a national policy debate occurring about the declining emphasis on physical education within schools, given evidence that physical education has the potential to improve the exercise habits of adolescents. Given that context, this thesis seeks to understand three main issues:

1) Does more high school physical education participation among California adolescents cause increases in their non-physical education-related physical activity levels?

2) Why is there a decreased emphasis on physical education in California's high schools?

3) What are the primary policy and practice barriers to increasing the amount of time that high school students spend in physical education?

Explanation of my research and its purpose to interviewees:

I am a student in the Public Policy and Administration Master's program at Sac State and I am writing my thesis on declining physical activity among California adolescents and the role of physical education in supporting exercise habits. I am interested in the recent policy debate over increasing emphasis on physical education in schools as a means to improve exercise habits among youth, but since many factors affect adolescent exercise behaviors, the issue is complex. I understand that there are policy and practice barriers at the state and local education levels to increasing time spent in physical education, so I am conducting interviews to understand those barriers.

I will be recording this conversation so that I can transcribe everything later. That way, I can pay close attention to the conversation since I do not have to take notes while we talk. I want

to make sure you know that I will not use your name or title in the thesis. Do you have any questions about my research before we begin?

Interview Questions:

State Level:

1) What are your roles and responsibilities with regard to physical education?
2) In general, what currently are the state's top three priorities for high schools?
    - Do they conflict with physical education? If so, in what way?
3) Among high school students in the state, do you think that factors aside from physical education participation influence their exercise habits outside of school? What are they?
    - What level of influence do you think they have on physical activity levels compared to physical education participation?
4) Do you think the state should do anything more to try to increase/improve high school students' exercise behaviors outside of school? If so, what do you think the state should do?

District Level:

1) Please describe your district's role with regard to physical education requirements and standards.
2) In general, what currently are your district's top three priorities for high schools?
    - Do they conflict with physical education? If so, in what way?
3) Approximately what percentage of high schools students in your district are allowed exemptions from the two-course physical education requirement to graduate? What are the most common allowable exemptions in your district?
4) Could you characterize the kinds of opportunities for students that are available for high school students in the district to be active outside of school hours? If so, could you please describe what those opportunities are? Are there any limitations?

5) Among high school students in your district, do you think that any factors aside from physical education participation influence their exercise habits outside of school? What are they? How much influence do you think they have on physical activity levels compared to physical education participation?
6) Do you think your district should do anything more to try to increase/improve high school students' exercise behaviors outside of school? If so, what do you think your district should do?

School Level:

1) Please describe your district's role with regard to physical education requirements and standards.
2) In general, what currently are your school's top three priorities?
    - Do they conflict with physical education? If so, in what way?
3) In your school, of the students who have already met their 2-year physical education requirement to graduate, are there differences in the demographics of those that choose to take additional elective physical education credit versus those who no longer wish to take physical education?
4) Could you characterize the kinds of opportunities for students that are available students in the school to be active outside of school hours? If so, could you please describe what those opportunities are? Are there any limitations?
5) Among the students in your school, do you think that factors aside from physical education participation influence their exercise habits outside of school? What are they? How much influence do you think they have on physical activity levels compared to physical education participation?

6) Do you think your school should do anything more to try to increase/improve high school students' exercise behaviors outside of school? If so, what do you think your school should do?

APPENDIX B

INFORMED CONSENT FORM

Adolescent Physical Activity Levels and the Influence of High School Physical Education Participation

You are invited to participate in a research study which will involve understanding the influence of high school physical education participation on adolescent exercise habits along with other correlating factors. My name is Yovana Gojnic and I am a Master's student at California State University, Sacramento, Department of Public Policy and Administration. You were selected as a possible participant in this study because of your expertise in the field of education and familiarity with high school PE.

The purpose of this research is to gain further insight into the national policy debate occurring about the declining emphasis on physical education within high schools, given evidence that physical education has the potential to improve the exercise habits of adolescents. If you decide to participate, you will be asked to answer several open ended questions about the primary policy and practice barriers to increasing the amount of time that high school students spend in physical education, as well as some thoughts on other factors that might influence adolescent exercise habits. Your participation in this study will last 30 to 45 minutes.

There are some possible risks involved for participants. The risks involve ensuring confidentiality and privacy. There are some benefits to this research, particularly that it will contribute to positive social change by offering new insight into what policymakers can do to improve growing public health concerns surrounding growing obesity and declining physical activity levels among California adolescents. This research in unique in that it is California-specific and incorporates exploratory data from experts at the state, district, and school levels with quanititative regression data.

If you have any questions about the research at any time, please call me at (xxx) xxx-xxxx, or my Advisor, Robert Wassmer at (xxx) xxx-xxxx. If you have any questions about your rights as a participant in a research project please call the Office of Research Affairs, California State University, Sacramento, (xxx) xxx-xxxx, or email irb@csus.edu.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Measures to insure your confidentiality are that I will be the only person with access to the data and no names or titles will be used in the collection or reporting process. The data obtained will be maintained in a safe, locked location and will be destroyed by May 8, 2015 after the study is completed.

Your participation is entirely voluntary and your decision whether or not to participate will involve no penalty or loss of benefits to which you are otherwise entitled. If you decide to participate, you are free to discontinue participation at any time with out penalty or loss of benefits to which you are otherwise entitled.

Your signature below indicates that you have read and understand the information provided above, that you willingly agree to participate, that you may withdraw your consent at any time

and discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled, that you will receive a copy of this form, and that you are not waiving any legal claims, rights or remedies.

You will be offered a copy of this signed form to keep.

Signature _____ Date _____

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