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Leveraging Schools to Promote Health: A Mixed Methods Study of Early Adolescent Health Behaviors and the Middle School Health Environment

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Leveraging Schools to Promote Health:

A Mixed Methods Study of Early Adolescent Health Behaviors and the Middle School Health Environment

A dissertation submitted in partial satisfaction of the

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in Community Health Sciences

by

Monique Gill

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ABSTRACT OF THE DISSERTATION

Leveraging Schools to Promote Health:

A Mixed Methods Study of Early Adolescent Health Behaviors

and the Middle School Health Environment

by

Monique Gill

Doctor of Philosophy in Community Health Sciences

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Professor Michael L. Prelip, Chair

The prevention and control of chronic diseases remains an important public health issue due to their contribution to worldwide morbidity and mortality and the considerable social and economic costs associated with these conditions. Early adolescence is a critical period for fostering healthy habits associated with chronic disease prevention, including physical activity and eating a healthy diet. Physical activity and diet are frequent targets of school-based public health programs because early adolescents spend a large portion of their time in the school setting and are shaped by processes in this social context. However, current trends in public education have resulted in the de-prioritization of issues not directly related to school accountability and academic achievement. As such, health promotion efforts are often cobbled

together in non-institutionalized ways and there is incomplete understanding of the influence of the broader school health environment on early adolescents' health behaviors.

Using a mixed methods approach, three separate but related studies were conducted in order to understand the relationship between the school health environment and early adolescent health behaviors related to long-term chronic disease prevention. The research was guided by the Biopsychosocial Model of Adolescent development, Ecological Systems Theory, and the life course perspective, focusing on both individual and contextual factors that shape behavior.

The first study examined changes in and determinants of early adolescents' physical activity and dietary behaviors during middle school. This study used quantitative, longitudinal data (i.e., surveys conducted during students' 7th and 8th grade years) from Project SHAPE, a school-based intervention study. In general, this study found that participation in daily physical activity and consumption of fruits and vegetables was low in both seventh and eighth grade. In addition to the low rates themselves, declines in physical activity and diet quality during this period were also a cause for concern. This study found, on average, a 7.2% decline in the number of days of 60 minutes of physical activity among girls, a 5.3% decline in the number of days of muscle-strengthening physical activity among boys, and a 17% decline in the number of days of muscle-strengthening physical activity among girls. Individual- and school-level factors helped to explain the changes in physical activity and dietary behaviors from seventh to eighth grade found in this study.

Using the same Project SHAPE data from 8th grade only, the second study examined the relationship between the perceived school health environment and early adolescents' physical

activity and dietary behaviors. This study found that few eighth grade students met recommendations for daily or muscle-strengthening physical activity, that intake of fruits and vegetables was also below recommendations, and that intake of unhealthy food items (i.e., soda, diet soda, sugar-sweetened beverages, salty snacks, sweets, and fast food) was high relative to healthy food intake. Differences in these behaviors were observed by individual- and school-level factors. On average, students' perceptions of the school health environment were quite low (3.9 out of 9), suggesting that they did not find the environment to be supportive of healthy behaviors. No individual factors were found to be associated with these perceptions in this study. More positive perceptions of the school health environment were associated with a higher likelihood of meeting the muscle-strengthening physical activity recommendation and marginally associated with a higher likelihood of meeting the daily physical activity recommendation. Depending on the level of meal program participation at the school, more positive perceptions of the school health environment were also associated with higher intake of fruit and vegetables, but were not associated with intake of unhealthy food items.

The third study investigated educators' perspectives on the ways in which schools influence the health of early adolescents. This study used additional qualitative data collected from staff and administrators from the same Project SHAPE study schools. Several of the findings of this study were related to the perception that students today are growing up in a "different world" than the one interviewees themselves had experienced in childhood and adolescence, and these perceptions factored into the ways in which interviewees conceptualized health and safety at school. For example, interviewees described observing high levels of stress, anxiety, and trauma among their student populations. Interviewees described

an increase in conversation or action around mental health and social emotional learning in their schools; however, there were also several examples of ways in which health promotion was de-prioritized at the school, even for administrators who strongly believed it was important. Physical education (PE) and provision of food at school were by and large viewed as the two main sources of health promotion in the school. However, interviewees also brought up a plethora of issues associated with PE and school meals, such as having class time taken away from PE or students not liking the food provided. Overall, interviewees felt that in an ideal world, health promotion would be naturally and implicitly woven in to the culture and mission of the school.

Findings of the three studies contribute to our understanding of the school health environment, including the ways in which both physical and social aspects of the environment are associated with early adolescents' health behaviors.

The dissertation of Monique Gill is approved.

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Roth, S.E., **Gill, M.**, Chan-Golston, A.M., Rice, L.N., Crespi, C.M., Koniak-Griffin, D., Prelip, M.L. The effects of a two-year middle school physical education program on physical activity and its determinants. *Journal of Physical Activity and Health.* (Accepted for Publication)

Gill, M., Roth, S.E., Rice, L.N., Prelip, M.L., & Koniak-Griffin, D. "You only teach PE and it doesn't really matter": Middle school PE teachers' perspectives on intervention efforts to increase physical activity. *Journal of School Nursing.* (Published Online August 29, 2018). https://doi.org/10.1177/1059840518795039

Roth, S.E., **Gill, M.**, Chan-Golston, A.M., Rice, L.N., Crespi, C.M., Koniak-Griffin, D., Cole, B.L., Upchurch, D.M., & Prelip, M.L. Physical activity correlates in middle school adolescents: Perceived benefits and barriers and their determinants. *Journal of School Nursing.* (Published Online June 12, 2018). https://doi.org/10.1177/1059840518780300

Roth, S.E., **Gill, M.**, Puri, S.S., Chan-Golston, A.M., Crespi, C.M., Albert, S.L., Rice, L.N., Prelip, M.L. (2018). Nutrition campaign knowledge and dietary behavior in middle school students. *California Journal of Health Promotion*, 16(2), 1-10.

Upchurch, D., **Gill, M.**, Jiang, L., Prelip, M., Slusser, W. (2018). Use of mind-body therapies among young adults 18-24. *Journal of Adolescent Health,* 63(2), 227-232. https://doi.org/10.1016/j.jadohealth.2018.03.014

Gill, M., Koleilat, M., & Whaley, S.E. (2018). The impact of food insecurity on the home environment among low-income mothers of young children. *Maternal and Child Health*, 22(8), 1146-1153. https://doi.org/10.1177/1090198117714826

Gill, M., Chan-Golston, A.M., Rice, L.N., Roth, S.E., Crespi, C.M., Cole, B.L., Koniak-Griffin, D., & Prelip, M.L. (2018). Correlates of social support and its association with physical activity among young adolescents. *Health Education & Behavior*, 45(2), 207-216. https://doi.org/10.1177/1090198117714826

Gill, M., Chan-Golston, A.M., Rice, L.N., Cole, B.L., Koniak-Griffin, D., & Prelip, M.L. (2016). Consistency of moderate to vigorous physical activity in middle school physical education. *Family and Community Health*, 39(4), 283-292. https://doi.org/10.1097/FCH.0000000000000115

Introduction

Given their contribution to worldwide morbidity and mortality and the immense social and economic costs associated with chronic diseases (U. E. Bauer, Briss, Goodman, & Bowman, 2014; Centers for Disease Control and Prevention [CDC], 2016a; Gerteis et al., 2014; World Health Organization [WHO], 2014), the prevention of these conditions is a crucial public health issue. Early adolescence is a critical period for establishing many health behaviors, including those that may protect against the development of chronic diseases, such as regular physical activity and a healthy diet (Salam, Das, Lassi, & Bhutta, 2016; Sawyer et al., 2012). Public health programs frequently target these behaviors in adolescents, and many of these efforts are school-based (Basch, 2011; Story, Nanney, & Schwartz, 2009). Despite a long history of health promotion in the school setting (Bradley & Greene, 2013), programs are rarely institutionalized, policies are weak, and there remains incomplete understanding of the impact of the broader school health environment on early adolescents' health behaviors (Basch, 2011; Horn, Freeland, & Butler, 2015). Further research is needed to understand the potential to leverage the school setting in more strategic ways to promote healthy development.

The goal of the three studies in this dissertation was to contribute to the body of literature on school health. Through an embedded mixed methods research design, the overall aim was to understand the relationship between the school health environment (i.e., resources, culture, climate and norms) and early adolescent health behaviors, specifically their level of physical activity and quality of their diets, both of which are crucial to long-term chronic disease prevention. I used quantitative data obtained from middle schools and middle school students in Los Angeles from 2014-2016 in order to:

Aim 1: Examine changes in early adolescents' physical activity and dietary behaviors during middle school, as well as the individual and school-level factors associated with these changes; and

Aim 2: Examine the relationship between students' perceptions of the school health environment and their physical activity and eating behaviors.

In addition, I used qualitative data that obtained from middle school teachers and administrators in order to:

Aim 3: Understand educators' perspectives on the ways in which schools influence the health of early adolescents.

The quantitative middle school data are maintained by Project SHAPE, a physical education (PE) intervention study, and were collected with support from the National Institute of Nursing Research. These data include 3,524 student survey respondents at two points in time (baseline: 4,773/6,201 [77.0%] and follow up: 4,885/6,061 [80.6%]) from 16 low-income, urban middle schools in Los Angeles County. Participant records have been linked to FITNESSGRAM (i.e., standardized testing used in PE) data providing students' height and weight, as well as to publicly available school-level data (e.g., enrollment, school socioeconomic composition) and school characteristics assessed using the School Physical Activity Opportunities Report Card (SPARC) Audit Tool (e.g., amount of space available for leisure-time physical activity). The qualitative data was collected from a sample of teachers and administrators drawn from the same 16 middle schools in Los Angeles. These data provide a unique opportunity to investigate the school health environment and school health promotion efforts from multiple perspectives.

A mixed methods approach was selected to address the above research aims for several reasons. First, mixed methods provided an opportunity to examine overlapping and different facets of phenomena, as well as added breadth and scope to the research. In addition, the different methods raised the possibility of discovering contradictions and new perspectives. Finally, a great deal of research and public health interventions have sought to understand and change health behaviors in youth with limited success. With growing recognition of contextual and environmental influences on behavior, this dissertation combines quantitative and qualitative data in order to foster a more complete understanding of the school health environment and the ways in which it facilitates and constrains healthy behaviors among early adolescents.

The first chapter provides a review of the literature on school health promotion, early adolescence, and physical activity and dietary behaviors. Chapter two describes the theories motivating this study and the conceptual framework for investigating the relationship between the school health environment and early adolescent health behaviors. Chapter three provides an overview of the research aims, questions, and hypotheses for the three studies. Chapter four describes the data and methods for each study. This is followed by the presentation and discussion of results for each of the three studies in chapters five, six, and seven. Finally, chapter eight concludes with integrated findings, strengths and limitations, and recommendations for future research.

CHAPTER 1: BACKGROUND AND SIGNIFICANCE

The Burden of Chronic Disease

Whereas early public health efforts focused largely on communicable diseases, a primary challenge of the current generation of public health researchers and practitioners has been the prevention and control of chronic diseases, including cancer, cardiovascular disease, and diabetes (U. E. Bauer et al., 2014; World Health Organization [WHO], 2014). These conditions are among the leading causes of death and disability worldwide (U. E. Bauer et al., 2014; WHO, 2014). In the United States, approximately seven in ten deaths per year are attributable to chronic diseases, and 86% of the nation's $2.7 trillion annual healthcare costs are spent on the treatment of these diseases (Centers for Disease Control and Prevention [CDC], 2016a; Gerteis et al., 2014). Further, geographic, racial/ethnic, and socioeconomic disparities exist such that socially disadvantaged populations are disproportionately affected by chronic diseases (U. E. Bauer et al., 2014; CDC, 2013).

While chronic diseases are common and costly, they are also preventable (CDC, 2016a). Poor diet and physical inactivity are among the most prevalent modifiable risk factors for chronic disease (U. E. Bauer et al., 2014). Considerable public health efforts and resources focus on chronic disease prevention through the promotion of healthy lifestyles, which include healthy diet and regular physical activity (U. E. Bauer et al., 2014; CDC, 2016a). However, substantial challenges remain to sustain and accelerate these efforts, particularly in the most vulnerable communities where disease burden is driven by social determinants of health like poverty and education (Braveman et al., 2011). Collaboration across different sectors, including those not directly responsible for health, is necessary to strategically and more effectively

address risk factors for chronic disease and build healthier communities (U. E. Bauer et al., 2014; Giles-Corti et al., 2015).

Why Focus on Early Adolescents?

While chronic disease prevention efforts can target multiple ages and life stages, those focused on youth are particularly important. Chronic diseases tend to emerge later in life; however, behaviors established at younger ages contribute in significant ways to the development of these conditions (Viner et al., 2012). Indeed, research suggests that the majority of premature deaths in adulthood are related to experiences or behaviors developed in youth (WHO, 2001). Moreover, as a critical period for human development more generally, early adolescence represents an optimal window for intervention to support a healthy developmental trajectory (Salam et al., 2016; Sawyer et al., 2012).

In addition to long term effects that manifest in adulthood, chronic disease risk factors such as physical inactivity and poor diet also have more immediate effects on adolescents. These behaviors are associated with overweight and obesity (Hallal, Victora, Azevedo, & Wells, 2006; Lobstein et al., 2015; Strong et al., 2005), adverse mental health outcomes (Biddle & Asare, 2011; O'Neil et al., 2014; Strong et al., 2005), unhealthy physical and social development (Biddle & Asare, 2011; Strong et al., 2005; U.S. Department of Health and Human Services, 1996), and poor academic outcomes (Florence, Asbridge, & Veugelers, 2008; Singh, Uijtdewilligen, Twisk, van Mechelen, & Chinapaw, 2012; Strong et al., 2005). The impact of these conditions on the length and quality of life further underscores the importance of preventative interventions during early adolescence.

Why Study School Health Promotion?

Health and education are inextricably linked – in order to derive the maximum benefit from education, it is necessary to be healthy, and level of educational attainment predicts long-term health outcomes (Bradley & Greene, 2013; Chiang, Meagher, & Slade, 2015; Story et al., 2009; Zimmerman, Woolf, & Haley, 2015). Health affects motivation and learning ability through its connection with absenteeism from school, but also by its association with cognition (e.g., executive functioning of the brain) and perceptions (e.g., feeling safe and cared for by the school community) (Basch, 2011; Zimmerman et al., 2015). In addition, education drives health outcomes by enhancing cognitive and non-cognitive skills and access to economic and social resources, thereby impacting an individual's health behaviors, ability to avoid risks, and capacity to manage the consequences of disease (Link & Phelan, 1995; Zimmerman et al., 2015). For example, access to healthy foods and green space (e.g., parks) where residents can be active tends to be higher in neighborhoods with higher levels of educational attainment (CDC, 2013; Powell, Slater, Chaloupka, & Harper, 2006; Zimmerman et al., 2015). Moreover, the quality of public schools, which are largely funded by local property taxes, differs among communities and is generally lower in neighborhoods with lower educational attainment (Zimmerman et al., 2015).

Health promotion in schools has a long history, from helping manage outbreaks of communicable diseases to responding to inadequate child nutrition and addressing sexual and mental health issues (Bradley & Greene, 2013; Institute of Medicine [IOM], 1997). Many health-risk behavior prevention efforts take the form of a school-based program or policy because young people spend a large portion of their daily lives in the school setting and are likely

shaped by this social context (Basch, 2011). However, health promotion efforts are not viewed by all as central to the mission of schools and public education (Basch, 2011; Lucarelli et al., 2014; Smith, Steckler, McCormick, & McLeroy, 1995). In most cases, non-academic supports, such as health programs, are outsourced or cobbled together in non-institutionalized ways, lack financial investment, and are seen as outside of the primary responsibilities of the school (Basch, 2011; Horn et al., 2015; Lucarelli et al., 2014; Smith et al., 1995). Furthermore, school health programming and services are not distributed equitably; schools serving minority and low-income youth, who are disproportionately affected by both educational and health disparities, encounter particularly challenging contexts for implementing and sustaining health promotion efforts (Basch, 2011).

Given the history of public health efforts in public schools and the close link between education and health outcomes, there is a need to understand the potential to leverage the school setting in more strategic ways to influence health behaviors and outcomes; understanding this potential would thereby positively affect educational trajectories as well. More research is needed to understand the most effective and feasible ways in which to intervene in the school setting. A great deal of school health research has been conducted either in elementary schools, with a primary focus on nutrition, or in high schools, with a primary focus on risky health behaviors (e.g., sexual behaviors, violence, and substance use) (Langford et al., 2017). This creates two critical gaps in the school health literature: (1) the middle school years, which include the particularly salient period of early adolescence, and (2) physical activity research, which is closely connected to chronic disease prevention.

Further, while the school health environment, defined as social and physical factors within the school that influence health behaviors (Kontak, McIsaac, Penney, Kuhle, & Kirk, 2017; Wechsler, Devereaux, Davis, & Collins, 2000), has been examined to some extent (K. W. Bauer, Yang, & Austin, 2004; Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009; Durant et al., 2009; Kontak et al., 2017), more research is needed regarding the specific aspects of the school environment that contribute to health behaviors and outcomes. In addition, there is a gap in understanding students' perceptions of the environment. Lastly, while public health and education share similar goals of positively impacting young people's life trajectories, more research is needed to understand the perspective of educators when it comes to health efforts in schools (Lewallen, Hunt, Potts-Datema, Zaza, & Giles, 2015). Integration of these perspectives would contribute to more effective intervention design and sustainable programming and policies in schools with the goal of preventing chronic disease.

Development in Early Adolescence

As described above, public health programs and policies frequently target school-aged youth to promote healthy behaviors and prevent adverse health outcomes (Bradley & Greene, 2013; Salam et al., 2016; Sawyer et al., 2012). Early adolescence is widely viewed as a critical period of human development. Typically defined as the period between the ages of 10 and 14 years, young people in this stage of life experience rapid and dramatic physical, cognitive, and social changes (Blum, Astone, Decker, & Mouli, 2014; Roeser, Eccles, & Sameroff, 2000; Sawyer et al., 2012). These changes expose youth to opportunities and stressors that are unique and distinct from those experienced in childhood and later adolescence. This more nuanced understanding of early adolescent development moves away from its earlier characterization as

a period of “storm and stress” (Roeser et al., 2000). Rather, early adolescence is viewed as a time for developing the capacity to manage the evolving circumstances of one’s life, while still acknowledging the salience of this stage of development and the challenges it may include (Roeser et al., 2000).

Physical Development

Physical development during early adolescence is related to the onset of puberty and includes structural changes in the brain, changes to body size and symmetry, and hormonal changes within the body (Alberga, Sigal, Goldfield, Prud’ homme, & Kenny, 2012; Steinberg, 2005; Urdan & Klein, 1998). Early adolescent females tend to begin these physical changes before early adolescent males (Hills & Byrne, 2010), but both groups experience a growth spurt and development of sexual characteristics. Increased production of certain hormones is responsible for this growth, and hormonal changes can also affect concentration and energy levels (Urdan & Klein, 1998). In addition, the quantity and location of body fat changes during this period (Alberga et al., 2012). Adipocytes (i.e., fat cells) increase in size and number, and early adolescents show increases in fat-free mass as well (Malina, Bouchard, & Bar-Or, 2004). Notably, changes to body composition differ for males and females. During maturation, females accumulate a greater percentage of fat and less fat-free mass than males (Pietrobelli, Boner, & Tatò, 2005), thus the total percentage of body fat decreases for males and increases for females (Malina et al., 2004). Early adolescent males tend to deposit more fat beneath the skin and between organs, while early adolescent females tend to distribute fat peripherally and mainly in the hips (Alberga et al., 2012; de Ridder et al., 1992; Pietrobelli et al., 2005). As a result of these differences, early adolescent girls are at increased risk for excess weight gain compared

with early adolescent boys (Alberga et al., 2012; Armoni, Rafaeloff, Barzilai, Eitan, & Karnieli, 1987; Chumlea, Knittle, Roche, Siervogel, & Webb, 1981; Sjöström, Smith, Krotkiewski, & Björntorp, 1972). However, in the absence of physical activity and balanced diets, both early adolescent males and females are at risk for retaining excess pre-pubertal and pubertal body fat (Todd, Street, Ziviani, Byrne, & Hills, 2015).

Cognitive Development

Cognitive development is directly related to some of the physical changes occurring within the body during early adolescence. Maturation of the prefrontal cortex of the brain, as well as expanding linkages within the entire brain, results in improved reasoning and information processing (Steinberg, 2005; Urdan & Klein, 1998). Most notably, early adolescents demonstrate increased ability for abstract and hypothetical thinking (Christie & Viner, 2005; Steinberg, 2005; Urdan & Klein, 1998). Other changes to brain structure and function occur during this life stage in regions of the brain that are associated with emotion regulation, calibration of risks and rewards, and response inhibition (Steinberg, 2005). Overall, these cognitive changes result in a more fully conscious, self-directed, and self-regulating mind (Steinberg, 2005). A consequence of the development of these new cognitive skills is that early adolescents begin to create a clearer sense of their personal identity. According to Goodenow (1993), this stage is key for reflecting on "who [young people] are and wish to be, with whom they belong, and where they intend to invest their energies" (Vieno, Santinello, Pastore, & Perkins, 2007, p. 180).

Social Development

Social development during early adolescence is also closely tied to the physical and cognitive changes occurring during this stage. However, while physical and cognitive changes are largely biologically determined, social development is much more influenced by environmental and sociocultural factors (Blum et al., 2014; Christie & Viner, 2005; Smetana, Campione-Barr, & Metzger, 2006; WHO, 2001). As youth begin exploring their personal and social identities, they also begin to exert independence and autonomy (Christie & Viner, 2005; Smetana et al., 2006). Much of their identity exploration occurs separate from parents and family, and parental control over behaviors and decision-making is reduced (Christie & Viner, 2005; Erikson, 1994; Vieno et al., 2007). Early adolescents develop more intimate relationships with peers and significant adult figures outside of the family, and peer norms and actions become a prominent influence on behavior patterns—more so than in any other time during the course of development (Erikson, 1994; Nickerson & Nagle, 2005; Roeser et al., 2000; Smetana et al., 2006).

Because more time is spent outside of the home, contextual factors are also increasingly relevant to development. Outside of the home, the primary social context to which early adolescents are exposed is the school (Basch, 2011; K. W. Bauer et al., 2004; Blum et al., 2014), and schools play a large role in facilitating or inhibiting successful development during this life stage. Early adolescents rely on external support for validation of emotions and for tangible assistance with decision-making and task completion (Vieno et al., 2007). Thus, their perception of the supportiveness of the school environment and adults within that environment greatly influences self-efficacy and motivation (Vieno et al., 2007). Adolescents who perceive their

school environment to be supportive and caring demonstrate more adaptive patterns of cognition, affect, and behavior (Battistich, Solomon, Kim, Watson, & Schaps, 1995; Eccles et al., 1993; Galliher, Rostosky, & Hughes, 2004; Osterman, 2000; Vieno et al., 2007). According to Erikson, developmental success lies in both the early adolescent's ability to negotiate the multiple, simultaneous developmental changes occurring in his or her life, but also in the quality of opportunities afforded by adults in families, schools, and communities for cultivating prosocial behaviors and cognition (1994).

In addition to the complex physical, cognitive, and social changes that accompany the transition from childhood to adolescence, early adolescents also experience another major transition—moving from primary to secondary school (Blum et al., 2014; McLaughlin & Clarke, 2010). Not only does this shift profoundly change social networks, but middle schools are also generally very different from elementary schools in size, organization, and other structural factors. Rather than spending an entire day with one non-familial adult, early adolescents in middle school spend about an hour a day with several different adults, each of whom interacts with 100-150 other students each day. This difference can have important implications on development because of the desire for deeper personal relationships during early adolescence. While youth are exposed to a larger number of social connections, this stage is sometimes described as being alienating rather than facilitating social connection (Urdan & Klein, 1998).

What Gaps Remain in Understanding Early Adolescence?

While adolescence has been studied to a great extent, many unanswered questions remain about development during this stage of the life cycle. The impact of all the physical, cognitive, and social changes on development is not thoroughly understood, particularly when

it comes to behavioral development (Blum et al., 2014; Steinberg, 2005; Urdan & Klein, 1998). In addition, early adolescence is "among the most neglected periods of life" with regard to health research, particularly when compared to research focused on middle or late adolescence (Blum et al., 2014, p. 321). Further, more research is needed on the aspects of development and identity exploration that are influenced by gender and racial/ethnic identity (Blum et al., 2014). Little research has examined the ways in which structures or instructional practices in middle schools affect social processes and behavior. For example, more research is needed to examine the fit between early adolescents' developmental level and the programs and practices implemented in middle schools in order to understand which strategies foster and match their cognitive and social development (K. W. Bauer et al., 2004; Blum et al., 2014; Sawyer et al., 2012; Urdan & Klein, 1998).

Given that early adolescence is characterized by such a challenging array of changes and complex interplay between individual and collective factors, it is certainly an important age group to study in the context of health promotion and chronic disease prevention efforts. Decisions and experiences during this time period have great influence on subsequent life outcomes, and many behaviors established in early adolescence track into adulthood and affect long-term behavioral patterns (Viner et al., 2012). Thus, early adolescence is viewed by many as the optimal time to target behaviors in order to maximize impact on enhancing health in the years ahead (Blum et al., 2014; Gore et al., 2011; Salam et al., 2016; Sawyer et al., 2012).

Physical Activity and Dietary Behaviors in Early Adolescence

Two behaviors that are particularly important for chronic disease prevention during early adolescence are physical activity and eating a healthy diet. Along with sedentary behavior,

physical activity and dietary behaviors cluster in young adolescents in both healthy and unhealthy ways (D. A. Cohen et al., 2014; Hills, Byrne, Lindstrom, & Hill, 2013; Leech, McNaughton, & Timperio, 2014). In addition, because youth spend more time in the school setting than any other context outside of the home, schools are seen as a key site for public health intervention to address activity levels and diet quality among early adolescents (Story et al., 2009).

Physical Activity

Physical activity is defined as bodily movement requiring energy expenditure, and intensity of activity ranges from light to vigorous, with moderate to vigorous activity being the most beneficial (U.S. Department of Health and Human Services, 2018). The U.S. Department of Health and Human Services recommends that adolescents engage in a minimum of 60 minutes of moderate to vigorous physical activity per day and at least three days per week of exercise to strengthen or tone muscles (2018). As adolescents spend a large portion of their waking hours in schools, physical activity is often measured as in-school, out-of-school, and overall physical activity (Dale, Corbin, & Dale, 2000; Gidlow, Cochrane, Davey, & Smith, 2008; Mallam, Metcalf, Kirkby, Voss, & Wilkin, 2003).

Regular physical activity supports the healthy physical, cognitive, and social development of adolescents (Biddle & Asare, 2011; Strong et al., 2005), and inactivity is an established risk factor for mortality and burden of disease (U. E. Bauer et al., 2014; Lee, Blair, & Jackson, 1999; WHO, 2009). Physical activity declines as much as 7% per year during adolescence, a finding that is consistent across 32 countries (Borraccino et al., 2009; Dumith, Gigante, Domingues, & Kohl, 2011), and sedentary behavior (e.g., watching TV, using mobile

devices or computers, playing console games) also increases during this time period (Sisson et al., 2009). Given this decline in physical activity, as well as physical changes to the body that put youth at risk for excess weight gain (Todd et al., 2015) and the fact that activity habits established in early adolescence are linked to adult lifestyle choices (Trudeau, Laurencelle, & Shephard, 2004; U.S. Department of Health and Human Services, 1996), early adolescence is a particularly important stage for chronic disease prevention through the promotion of physical activity.

Few youth participate in sufficient amounts of physical activity. Nationally, less than one quarter of adolescents (24.8%) report meeting the guideline of 60 minutes per day (Fakhouri et al., 2014). In California, only 15.4% of adolescents report meeting the same guideline (UCLA Center for Health Policy Research, 2013). Further, less than a quarter of adolescents (20.4%) report engaging in physical activity outside of school (CDC & National Center for Health Statistics [NCHS], 2013). In addition to low overall levels of physical activity among adolescents, important disparities persist among vulnerable groups. Rooted in parenting and socialization of men and women, middle school girls report lower levels of physical activity than their male counterparts (Gill et al., 2017; Leech et al., 2014; Prochaska, Rodgers, & Sallis, 2002; Sterdt, Liersch, & Walter, 2014). Non-Hispanic White youth have higher levels of physical activity than Latino and non-Latino Black youth (Carlson, Densmore, Fulton, Yore, & Kohl III, 2009; CDC, 2005; Sterdt et al., 2014; UCLA Center for Health Policy Research, 2013). In addition, physical activity has been found to be significantly associated with socioeconomic status (SES) such that lower SES youth reported less physical activity (Leech et al., 2014; Sterdt et al., 2014). This is compounded by findings suggesting that screen time (e.g., watching TV, using mobile devices),

one of the most common sedentary behaviors, is amplified for low SES youth (Hanson & Chen, 2007b; Mielke, Brown, Nunes, Silva, & Hallal, 2017). Lastly, evidence also suggests that the decline in physical activity during adolescence is greater in girls and low SES adolescents (Dumith et al., 2011).

Correlates of Physical Activity

Understanding correlates of physical activity in early adolescents is essential for informing effective interventions. At the intra- and interpersonal levels, social support for physical activity, perceived competence and intention to be active have been found to be consistently positively associated with participation in physical activity (Duncan, Duncan, & Strycker, 2005; Gill et al., 2017; Prochaska et al., 2002; Sallis, Prochaska, & Taylor, 2000; Sterdt et al., 2014). Conversely, perceived benefits of physical activity, self-efficacy, body image, attitudes toward physical activity, physical activity knowledge, and enjoyment of physical activity are inconsistently related to physical activity (Sallis et al., 2000; Sterdt et al., 2014).

Environmental factors have also been explored as inhibitors or promoters of physical activity among this age group, focusing on three environments that are relevant to early adolescents: the home, the neighborhood, and the school. In general, minority and low income youth have fewer opportunities to engage in physical activity due to limited access to safe spaces for out-of-school recreation at home or in their neighborhoods (Gordon-Larsen, 2006; Richmond, 2006; Whitt-Glover et al., 2009). Those with higher perceived access to physical activity equipment or spaces are more likely to be active (Garcia et al., 1995; Gill et al., 2017), and social support from family has been found to be even more important for being active for students with low perceived access (Gill et al., 2017).

Physical activity intervention research with early adolescents suggests that school-based interventions are more effective at increasing physical activity than family- or community-based programming (Pearson, Braithwaite, & Biddle, 2015; Salmon, Booth, Phongsavan, Murphy, & Timperio, 2007; van Sluijs, McMinn, & Griffin, 2007). School-based physical activity interventions generally focus on increasing knowledge about physical activity via health education or implementing curricula or programming to increase time spent engaging in physical activity while at school (Morton, Atkin, Corder, Suhrcke, & van Sluijs, 2016). Nonetheless, the success of school-based physical activity interventions for adolescents has been limited (Dobbins, DeCorby, Robeson, Husson, & Tirilis, 2009; Morton et al., 2016; Owen, Curry, Kerner, Newson, & Fairclough, 2017), and many programs are criticized for failing to consider physical, social, and institutional factors in the wider school environment that may promote or inhibit physical activity (Doak, Visscher, Renders, & Seidell, 2006; Morton et al., 2016).

Issues with School-Based Physical Activity Programs and Policies

Within the school, physical education (PE) has been framed by public heath researchers and practitioners as an opportunity for all youth to be active and an ideal site for intervention (Hills, Dengel, & Lubans, 2015; Sallis et al., 2012; Whitt-Glover et al., 2009). Disparities in PE quantity and quality exist across schools. The National Association for Sport and Physical Education (NASPE) recommends 225 minutes of PE per week for middle and high school students, with at least 50% of class time spent in moderate to vigorous physical activity (National Association for Sport and Physical Education [NASPE], 2004; Pate, 2006). However, not all states require schools to provide a minimum amount of PE, and of those that do, most

require amounts below NASPE recommendations (NASPE & American Heart Association [AHA], 2012). For students living in low-resource communities with environmental barriers to physical activity, inadequate physical activity in PE also contributes to disparities in PA levels by SES (Gordon-Larsen, 2006; McKenzie & Lounsbery, 2009; Sallis et al., 2012). Furthermore, shortening or cancelling PE classes is a common practice, further reducing opportunities for physical activity and sending students the message that schools do not value PE (Gill et al., 2016; D. R. Young et al., 2007).

In addition, PE has been criticized for having a "muddled mission" because of shifting priorities and a broad range of goals, including motor skills, cognitive, social, and emotional development of students (McKenzie & Lounsbery, 2009; Pate & Hohn, 1994). PE curricula vary greatly from school to school (CDC, 2016c; Story et al., 2009), and while PE is seen as an opportunity for students to be active, rates of physical activity in PE are much lower than the recommended 50% of class time (Gill et al., 2016; Lafleur et al., 2013; UCLA Center to Eliminate Health Disparities & Samules & Associates, 2007). It is also important to note that the push to increase physical activity levels in PE is led primarily by public health entities. For example, the largest report on PE quality across the country was written in part by the American Heart Association (NASPE & AHA, 2012) and funding for coordinated school health programs that promote physical activity is provided by the CDC (CDC, 2016c; Story et al., 2009). Until recently, PE was left out of federal policy for school accountability (American School Health Association, 2016). While addressing low levels of physical activity among early adolescents is not the responsibility of schools alone, it will require collaborative efforts across different sectors and

settings, including stronger and better supported school-based physical activity programs and policies (U. E. Bauer et al., 2014; Giles-Corti et al., 2015; Story et al., 2009).

Dietary Behaviors

Dietary behaviors are also critical to chronic disease prevention. Nutrition and dietary behaviors refer to the intake of food and nutrients in relation to the body's dietary needs (WHO, 2018). Dietary behaviors evolve throughout the formative years of life – young people learn what, when, and how much to eat through direct experiences with food and by observing others (Birch, Savage, & Ventura, 2007). The federal government provides dietary guidelines to increase nutrition knowledge and shape the public's diet (Haack & Byker, 2014; Kennedy, Meyers, & Layden, 1996), and nutrition education campaigns such as "MyPlate" help to make these recommendations more accessible (U.S. Department of Agriculture, 2012).

The quality of an early adolescent's diet has important implications for risk factors for chronic disease, such as obesity, metabolic syndrome, and other co-morbidities (Alberga et al., 2012; Todd et al., 2015). Similar to physical activity, early adolescence is a key period for establishing healthy dietary habits for chronic disease prevention. Fruit, vegetable, and sugar-sweetened beverage consumption are often used as indicators of diet quality. Diet quality tends to worsen in adolescence, and dietary behaviors track over time (Alberga et al., 2012; Demory-Luce et al., 2004; Todd et al., 2015). In particular, early adolescents tend to consume excessive amounts of fat and saturated fat, sugar, and salt, and inadequate amounts of fruits and vegetables, whole grains, calcium-containing foods, and iron (Gu & Tucker, 2017; Hoelscher, Evans, Parcel, & Kelder, 2002; Lien, Lytle, & Klepp, 2001). Only a small percentage (22.7%) of young adolescents aged 12-14 in California reported eating five or more servings of

fruits and vegetables a day as recommended by nutrition guidelines (UCLA Center for Health Policy Research, 2017). In addition, nearly one third of 12-14-year-olds in California reported drinking soda during the previous day (UCLA Center for Health Policy Research, 2017).

Correlates of Dietary Behaviors

Whereas parents largely determine dietary intake early in life, early adolescents begin to take greater responsibility for dietary choices (Todd et al., 2015) and experience shifts in food preferences driven by biological, social, and environmental influences (Neumark-Sztainer, Story, Perry, & Casey, 1999). For example, early adolescent diets are impacted by changes in sleep patterns (Taheri, Lin, Austin, Young, & Mignot, 2004) and hormonal changes, which may foster a preference for salty, sweet, or high fat foods (Coldwell, Oswald, & Reed, 2009; McNeil, Cameron, Finlayson, Blundell, & Doucet, 2013). Peers and advertisements also influence dietary habits (A. Gustafson et al., 2014; Utter, Scragg, & Schaaf, 2006). In addition, access and availability of food is important for determining the quality of early adolescent diets (Thornton et al., 2013; Trivedi, Burton, & Oden, 2014).

Decreased diet quality in adolescence is frequently attributed to increased food consumption away from the home, including both meals and snacking (Gillman et al., 2000; Larson, Neumark-Sztainer, Hannan, & Story, 2007; Nielsen, 2002). Meals eaten outside the home are associated with increased empty calories, increased fat and saturated fat consumption, and increased sodium intake (Gillman et al., 2000; Larson et al., 2007; St-Onge, Keller, & Heymsfield, 2003). In addition, adolescents from low SES backgrounds report greater consumption of unhealthy foods and less consumption of healthy foods than their higher SES counterparts (Hanson & Chen, 2007a).

Given that dietary behaviors are closely related to home availability of fruits and vegetables, family support, and taste preferences (Neumark-Sztainer, Wall, Perry, & Story, 2003), interventions that are part of coordinated efforts tend to be more successful at impacting adolescent diets (Hoelscher et al., 2002). Those with a behavioral focus do have positive effects, but additional components targeting motivators and skills necessary to engage in healthy eating behaviors increase effectiveness (Hoelscher et al., 2002; Sharma, 2006). Moreover, changes in the food environment, particularly in school, have demonstrated promising results. For instance, limiting the availability of and access to unhealthy food items in vending machines or school stores is associated with lower consumption of sugar-sweetened beverages and energy dense (i.e., unhealthy) foods and with healthier weight status among students (Briefel et al., 2009; Fox, Dodd, Wilson, & Gleason, 2009; Kubik, Lytle, & Story, 2005; Minaker et al., 2011).

Issues with School Nutrition Programs and Policies

Schools have the organizational structure to promote improved dietary behaviors, and as such, many food-related programs take place in the school setting (Katz et al., 2005; Pate, 2006; Story, Kaphingst, & French, 2006). One approach to promoting healthy dietary behaviors is to include nutrition education in the existing curriculum; however, teachers frequently cite a lack of instructional time as a barrier to teaching nutrition (Jones & Zidenberg-Cherr, 2015). Some research suggests that the median number of hours of nutrition education taught to middle school students is five hours per year (Story et al., 2009). As mentioned previously, the school food environment plays a large role in determining adolescents' diets because as much as half of their total daily calories are consumed at school (Story et al., 2009). The school food

environment includes both food served as part of the federal school lunch and breakfast programs, and “competitive foods”, which are cafeteria à la carte items and foods available in vending machines, snack bars, school stores, and as part of fundraisers (Story et al., 2009).

Recent federal legislation requires stricter nutrition standards be applied to competitive foods sold during the school day (CDC, 2016c; U.S. Department of Agriculture, 2013), but schools are only responsible for adhering to local wellness policies, which vary greatly across districts (CDC, 2016c; Story et al., 2009). Notably, the number of school districts receiving incentives for soft drink sales decreased from 2006 to 2016 (CDC, 2016c). However, over 50% of school districts allow marketing for fast food restaurants and unhealthy foods and beverages on campus or on school buses, publications, or products distributed to students (CDC, 2016c). In addition, less than a third of districts prohibit the sale of unhealthy foods and beverages for fundraisers (CDC, 2016c). When thought about in combination with nutrition education curricula or marketing materials promoting the balanced, healthy “MyPlate” meals, the marketing of unhealthy foods and beverages sends mixed and confusing messages to students (CDC, 2016c). Similar to physical activity, promoting a healthy diet is not a responsibility solely placed on schools; however, school-based policies and programs must be part of collective efforts to improve dietary behaviors in order to make strides in addressing chronic disease (Story et al., 2009).

Schools and Health

The experiences and environments to which youth are exposed play a particularly influential role in shaping healthy behaviors. The home environment and family factors have an undeniable influence on young people’s health behaviors and outcomes (Barber, Stolz, Olsen,

Collins, & Burchinal, 2005; Bronfenbrenner, 1999; Resnick, 1997; Viner et al., 2012). Outside of the home, however, the primary social context to which the majority of youth are exposed is the school (Basch, 2011; K. W. Bauer et al., 2004; Blum et al., 2014). No other institution has as much continuous and close contact with adolescents than the school, and this is where a large portion of their waking hours is spent (Fox et al., 2009; Story et al., 2006).

The relationship between attending school and demonstrating improved educational outcomes has been well established for almost four decades (Rutter, Maughan, Mortimore, & Ouston, 1979). However, the school context and experiences in school also significantly influence development more broadly, including psychosocial factors and behaviors relevant to health (Chiang et al., 2015; McLaughlin & Clarke, 2010; Rutter, 1991). This happens in direct ways, such as through the provision of health education and services, but also in unintended ways, through the influence of the school environment, culture, and climate (Chiang et al., 2015; McLaughlin & Clarke, 2010; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013; Vieno et al., 2007).

Erikson (1994) has argued that successful and healthy development is an intergenerational issue—adults and institutions, namely schools, are collectively responsible for helping youth become full members of society. This view purports that schools have a responsibility beyond academics and pure cognitive development. On the other hand, schools also exist within a broader community system in which other partners, such as parents and families, community organizations, and health service providers, share in the duty to support healthy youth development. Given limited resources, many believe that placing additional responsibilities on the school would be an undue burden. Overall, the degree to which schools

can and should be involved in other processes of development is unclear, and this debate has existed since the origin of public schooling in the United States (IOM, 1997).

A Historical Perspective

Understanding the history of public schools and school health programs provides insight into the ways in which educational, political, and social issues have shaped their evolution. Public education in the United States emerged as a "necessary expression of democratic society" (Association for Supervision and Curriculum Development [ASCD], 1996). Since their origin, public schools and trends in education have been a reflection of broader societal debates. One core area of perpetual tension has been caused by efforts to reconcile the school's role in an individual's "pursuit of happiness" with a desire to promote "the common good" (ASCD, 1996).

During the colonial era, children were educated through disjointed institutions and arrangements, mainly church-supported schools and private tutoring, which resulted in inequities for those excluded from these systems (e.g., girls, African Americans, Native Americans, and poor White children, and children in rural communities) (Kaestle, 2001; Kober, 2007; Perlmann & Margo, 2001). In addition, curricula taught within these schools varied greatly by the religious groups or organizations sponsoring the school (Kober, 2007; Mendez, Yoo, & Rury, 2017). During the late 18th century, various laws were enacted in order to reserve funds for public schools, and Massachusetts, Vermont, and New Hampshire became the first to create tax-supported schools (Kober, 2007). Beginning in the 1830s, the notion of the "common school", or publicly funded, locally controlled schools offering a common curriculum to all students, gained support (Kober, 2007; Mendez et al., 2017). Early reformers, like Horace Mann

and other proponents of the common school, viewed public education as a means to address larger social problems, such as poverty, crime, and class and ethnic conflict (Kober, 2007), and reforms were also driven by growing concern over an increasingly diverse nation experiencing rapid industrialization (Mendez et al., 2017). The common school idea spread, and by the end of the 19th century, public elementary schools were available to all children, including girls and African American children, in nearly all parts of the country (Kober, 2007; Mendez et al., 2017). By 1918, all states had compulsory attendance laws for public elementary school, and public high schools began to emerge and become commonplace (Kober, 2007; Mendez et al., 2017). Also in the early 20th century, a new primary focus of schools arose as schools were called on to "Americanize" new immigrants to the U.S. (Kober, 2007), mirroring the ideology used during forced assimilation of Native American children in the previous decades (Mendez et al., 2017).

Around the same time that public education was becoming more common and accessible, a report published by the Sanitary Commission of Massachusetts in 1860 emphasized the importance of teaching young children about health in order to "preserve his own life" (IOM, 1997). Led by Lemuel Shattuck, a teacher, this report brought attention to the idea of using schools as a means to promote health and prevent disease. Influenced by this report, the earliest school health efforts focused primarily on "medical inspection" (Hastings, 1912; IOM, 1997). For example, a smallpox outbreak in New York City in the 1860s led to vaccine inspections in schools, and ultimately, vaccination became a prerequisite for school attendance (Colgrove, 2004; Duffy, 1974; IOM, 1997). In later decades, other states began to require vision examinations, routine inspections for contagious eye and skin diseases, and mandatory general medical inspections (IOM, 1997). These requirements were formalized

through legislation, which remains a primary method for enacting school health policies or programs (IOM, 1997).

Along with inspection, early school health efforts also involved nurses, who were charged with helping families seek out and follow through with treatment after inspection. School nurses at the turn of the 20th century treated students for minor issues at school, but also visited homes to educate parents and provide information (IOM, 1997; Regan, 1976). In addition to nurses, school-based medical and dental clinics were opened in some schools during the early 1900s. The extent of services provided at these clinics varied greatly, and some efforts were denounced by private physicians who felt they lost business through this "socialized medicine" (IOM, 1997).

In the early 20th century, philanthropic, community, and professional organizations also sponsored health-related programming in the school setting. For example, the National Tuberculosis Association began awarding students with "Modern Health Crusader" certificates in 1915, and these children were responsible for recording "health chores" such as washing their hands or looking both ways before crossing the street (Means, 1975; Scott, 1919). These types of organizations also served meals at school, provided transportation to or from school, taught special education classes, ran recreational programs after school, and attempted to link students with jobs (IOM, 1997). After World War I, issues related to poverty, such as malnutrition and poor physical conditions, came to the forefront of child health advocacy efforts (IOM, 1997; Means, 1975). The National Education Agency and American Medical Association joined forces to promote coordination between the fields of medicine and

education. This partnership was also among the first to contribute to the newly formed area of school health services research (IOM, 1997).

Informal school meal programs began in some areas of the U.S in the early 20th century as well (IOM, 1997). During the Great Depression, concerns over the learning abilities of malnourished and hungry children deepened across the country. At the same time, farmers were facing financial issues as crop prices collapsed. Schools were in a unique position to address both problems; the federal government began purchasing surplus crops and serving food to hungry students (Ralston, Newman, Clauson, Guthrie, & Buzby, 2008). This idea was formalized in 1946 with the passage of the National School Lunch Act (NSLA), motivated in part by nutritional deficiencies identified in WWII draftees (Martin, 2008; Story et al., 2009). The NSLA was described as "a measure of national security to safeguard the health and well-being of the Nation's children" (National School Lunch Act, 1946). This legislation provided permanent federal support for the provision of meals to children, and the program was eventually amended to create options for free and reduced price meals (IOM, 1997; Story et al., 2009). In 1966, the Child Nutrition Act consolidated the administration of different lunch programs and expanded meal assistance to include the School Breakfast Program and the Summer Food Service Program (Kennedy & Davis, 1998; Ralston et al., 2008). Despite being among the largest food and nutrition assistance programs in the country, there has historically been disagreement over whether the school actually has a responsibility in this area (Gunderson, 2003).

While physical education in various forms, mainly gymnastics, had been part of some schools since the mid-19th century, it was not until approximately 1921 that almost every state had enacted a law related to physical education for school children (Kort, 1984). This was

partially due to large numbers of WWI draftees failing physical examinations (IOM, 1997; Marble, 2013). By 1950, over 400 colleges and universities offered a physical education major to teachers, and programs such as the Presidential Fitness Test emerged to prepare youth for military service (SPARK, 2015). Commitment to physical education declined in later decades and was even dropped from some educational institutions (IOM, 1997).

During the mid-20th century, the focus of school health shifted from the delivery of health services in schools to the provision of health education, while still continuing to link students to community resources for health care (IOM, 1997; Regan, 1976). Health education curricula were more fully developed, and requirements for this subject were added in almost all states (IOM, 1997). With the introduction of Great Society programs in the 1960s, federal funding for health and social services in schools was expanded, including the previously mentioned Child Nutrition Act (IOM, 1997; Story et al., 2009). The Elementary and Secondary Education Act of 1965 also increased the number of school nurses, but disagreement over the extent of services that should be provided by these nurses continued (IOM, 1997; Regan, 1976).

School Health in the Current Context

From the 1980s until 2015, the federal government's role in education expanded immensely, resulting in policies and practices that continue to shape public education and school health today. The 1983 publication of *A Nation at Risk*, a report by the U.S. Secretary of Education's National Commission on Excellence in Education, described the public school system as being "in crisis and in need of major reform" (Mendez et al., 2017, p. 21). The report drew on international comparisons in which American students performed worse academically than other industrialized nations and also highlighted the increasingly global and technological

marketplace in which American students would need to compete for jobs (Mendez et al., 2017; National Commission on Excellence in Education, 1983). The report and the public dialogue that resulted from the report emphasized the importance of education, including more rigorous standards for student performance, as being key to the growth of the knowledge economy (Drucker, 1993; Mendez et al., 2017; National Commission on Excellence in Education, 1983; Spring, 2008).

The years after the publication of *A Nation at Risk* saw increasing federal legislation related to academic achievement and school accountability. In 2001, the No Child Left Behind (NCLB) Act tied school funding to standardized testing requirements, with schools expected to demonstrate "adequate yearly progress" in order to ensure they could stay open (Mendez et al., 2017; No Child Left Behind Act of 2001 [NCLB], 2002). This created a high-stakes testing environment in which schools narrowed their focus to subjects requiring standardized testing under NCLB (i.e., "core academic subjects") (Mendez et al., 2017; NCLB, 2002). One effect of this narrowed focus has been the de-funding or de-prioritization of programs outside of the primary academic scope, such as music, art, and health-related programming (Abril & Gault, 2006; NASPE & AHA, 2012).

As non-core academic subjects, PE and health were not evaluated for student achievement or required to have highly qualified teachers under NCLB (NASPE & AHA, 2012; Story et al., 2009). Data on allocation of instructional time and school resources in the wake of NCLB are scant and ambiguous (Ringwalt et al., 2011); however, there is some evidence that after the enactment of NCLB, instructional time was cut from PE, health, and other subjects in order to increase the amount of time devoted to reading and math (Abril & Gault, 2006;

Jennings & Rentner, 2006; McMurrer & Kober, 2007; NASPE & AHA, 2012; Valli & Buese, 2007). These changes were more common in schools identified as low-performing, which generally serve a student body that is low-income and majority minority (McMurrer & Kober, 2007; Stullich, Eisner, McCrary, & Roney, 2006).

In December 2015, the Every Student Succeeds Act (ESSA) replaced NCLB, and it listed physical education and health as part of a "well-rounded education" (American School Health Association, 2016; Rentner, Kober, & Frizzell, 2017; Russo, 2016). The enactment of ESSA shifted power toward the states and away from the federal government; the language of standardized testing, school and teacher accountability, and student achievement continues to put pressure on schools to perform, but it is simply up to each state, rather than the federal government, to decide how to measure school progress (Rentner et al., 2017). One year after the enactment of ESSA, a few school districts have reported taking steps toward reducing the amount of time spent on standardized testing (Rentner et al., 2017). It remains unclear as of yet whether additional time and resources have been redistributed to PE and health as a result of being included in the definition of a "well-rounded education."

School health promotion efforts outside of PE and health classes have also continued in recent decades. Whereas school health efforts of the past prioritized controlling and preventing infectious diseases, such as smallpox and tuberculosis (IOM, 1997), the defining school health challenges of today are related to chronic diseases and problems based in behavior and lifestyle choices (e.g. inadequate physical activity and unhealthy dietary patterns) (U. E. Bauer et al., 2014; CDC, 2016a). These behaviors can theoretically be prevented or changed, but the

solutions are not as straightforward as simpler school health efforts, such as one time immunizations or medical inspection for school attendance.

New federal and local school health policies have emerged to reflect this shifted focus on chronic disease prevention, particularly targeting the school food environment. The 2004 Women, Infants and Children (WIC) reauthorization act required school districts to create a wellness policy as a requirement to receive federal funding for meals (Ralston et al., 2008; Story et al., 2009). However, the legislation did not specify minimum standards for these policies, resulting in considerable variability in the scope and strength of school wellness policies across districts (Meendering, Kranz, Shafrath, & McCormack, 2016; Story et al., 2009). In addition, while school food programs have always included nutrition guidelines of some sort, in 2009, the Healthy Hunger-Free Kids Act added stricter standards for nutrition content (Snelling, 2012).

These policies reflect a broader understanding of the wide-ranging influences on health in schools beyond health services and health education, which historically have focused on individual changes. Terms such as “healthful school environment” have been used since the 1950s, but in the early 1980s, “comprehensive school health” (also referred to as coordinated school health) became commonly used terminology to collectively describe health instruction, school health services, and a healthy school environment (Allensworth & Kolbe, 1987; Lewallen et al., 2015; I. Young, 2005). The comprehensive school health (CSH) framework outlined eight elements essential to health promotion and disease prevention: health education, physical education, health services, nutrition services, counseling and psychological services, staff wellness, parent and community involvement, and a healthy and safe school environment

(Allensworth & Kolbe, 1987; IOM, 1997; Lewallen et al., 2015; Rasberry, Slade, Lohrmann, & Valois, 2015).

The CSH framework was adopted by the CDC's Division of Adolescent and School Health and widely disseminated to inform school health programming and research (Lohrmann, 2010). While public health practitioners viewed the CSH framework as essential to addressing health promotion in schools, the education sector did not identify as strongly with this model (Lewallen et al., 2015; Rasberry et al., 2015). In 2013, the CDC convened a group of school health and education leaders and developed the Whole School, Whole Community, Whole Child (WSCC) model to bridge the efforts of the public health and education sectors (Lewallen et al., 2015). The WSCC model draws on the eight components of the CSH approach but also acknowledges the connection to the larger community and calls for greater collaboration across the community, school, health, and education sectors (ASCD & CDC, 2014). While the WSCC model provides guidance for understanding the link between health and schooling, much of the literature on WSCC focuses on implementation and theoretical implications (ASCD & CDC, 2014; Lewallen et al., 2015; Murray, Hurley, & Ahmed, 2015; Rasberry et al., 2015), with little actual evaluation of its effects or assessment of its use (Chiang et al., 2015).

The School Health Environment: What We Know

In comparison to school health services and health education, relatively few studies have addressed the influence of the broader school health environment on students' health behaviors and outcomes. The school health environment is defined as any external factor that influences the health or health behaviors of students (Wechsler et al., 2000) and encompasses both the social (e.g., the school climate) and physical (e.g., availability of facilities and services)

(Kontak et al., 2017). The school social and physical environments directly and indirectly influence health behaviors; schools provide and introduce students to new foods and physical activities, but behaviors are also learned and reinforced through visual cues, social norms, and access to resources (Kontak et al., 2017).

Research related to the school health environment often focuses on the food environment and most commonly operationalizes the environment as the availability or absence of various practices (e.g., serving a la carte food or access to physical activity spaces after school) (Briefel et al., 2009; Durant et al., 2009; Fox et al., 2009; Kubik et al., 2005; Minaker et al., 2011; Naiman, Leatherdale, Gotay, & Mâsse, 2015; Ward et al., 2015). Study findings suggest the relationship between the food environment (i.e., food practices) and healthy food consumption is inconsistent (Briefel et al., 2009; Minaker et al., 2011). Some research suggests that higher numbers of unhealthy food practices within a school, such as having unhealthy food items in vending machines available to students, is associated with higher prevalence of overweight and obesity (Fox et al., 2009; Kubik et al., 2005; Minaker et al., 2011). Similarly, access to more facilities or equipment for physical activity, both during and outside of school hours, has been found to be associated with higher levels of physical activity in some studies (Naiman et al., 2015), but not in others (Durant et al., 2009; Ward et al., 2015).

Perceptions of school are also particularly important for adolescents. According to Reddy et al. (2003) and others (Assor & Connell, 1992; Schunk & Meece, 1992), actual levels of support or actual environmental factors are less powerful predictors of adolescent health and academic outcomes than perceptions. For example, perceived teacher support among youth is associated with positive mental health outcomes and self-esteem, as well as serves a protective

role when it comes to initiating or escalating risky health behaviors (Reddy et al., 2003; Roeser et al., 2000). In addition, feeling connected to school and cared for by adults at school also protects against health-risk behaviors, supports educational achievement, and is associated with a higher degree of well-being (Resnick, 1997). Other research findings also suggest that students' cognitively constructed perceptions of their environment direct learning behavior and academic outcomes (Marchant, Paulson, & Rothlisberg, 2001). Together, these findings suggest that students' perceptions of the school health environment, such as the norms and values they perceive to be emphasized by the school, may also influence their health behaviors and outcomes.

Gaps and Issues in School Health Research

As described above, the goals of schooling are wide in scope and not universally agreed upon. Health promotion and chronic disease prevention remain low priorities within the school (Basch, 2011; Lucarelli et al., 2014; Smith et al., 1995). One way in which this has manifested is a disconnect between concepts that are taught through health education and the ways in which the school environment (i.e., resources, culture, climate and norms) constrains healthy choices. For example, nutrition education focused on avoiding consumption of sugar-sweetened beverages (SSBs) conflicts with advertisements for soda companies on campus and the consumption of SSBs by adults at school.

In addition, while recent legislation has attempted to bring additional attention to school health issues through the requirement of local wellness policies, creation of a policy does not ensure full implementation (Budd, Schwarz, Yount, & Haire-Joshu, 2012; McKinnon et al., 2009). Implementation of school wellness policies is generally inconsistent or nonexistent

(Hager et al., 2016; Sánchez et al., 2014) due to lack of support and resources (Agron, Berends, Ellis, & Gonzalez, 2010; Sánchez et al., 2014; Schuler et al., 2018). This is particularly true in schools and districts serving large proportions of minority and/or low-income students (Hager et al., 2016; Schuler et al., 2018).

Further, the school health environment is still not well defined or understood, nor is its connection to students' health and health behaviors. The use of inconsistent definitions and conceptualizations of the school health environment contributes to this issue and results in an unclear idea of what specific factors may facilitate or undermine efforts to promote healthful behaviors. In order to measure the school health environment, most studies take the approach of having an administrator (e.g., principal) or health personnel (e.g., school nurse), describe the school environment in an "objective" way using a checklist of healthy or unhealthy practices (Briefel et al., 2009; Durant et al., 2009; Fox et al., 2009; Kubik et al., 2005; Minaker et al., 2011; Naiman et al., 2015; Prelip, Slusser, Lange, Vecchiarielli, & Neumann, 2010; Ward et al., 2015). Not only does this method ignore the perspectives of students, teachers, and parents, it may also miss important contextual information. For example, a checklist might show that a middle school offers a lunch menu that meets nutrition guidelines, but it would fail to capture that students do not purchase school meals because they do not like the taste. In other words, a checklist approach is incomplete, as it focuses almost exclusively on concrete (i.e., physical) aspects of the environment, while ignoring social aspects (e.g., climate). A deeper understanding of the ways in which diverse stakeholders (e.g., administrators, school health personnel, teachers, parents, and students) conceptualize the role of schools in health

promotion is needed to inform more strategic ways to leverage resources within the environment to support health promotion.

School health research must also consider differences in school health environments across schools in low and high-income communities. Evidence suggests that students in low-income schools report more health problems and unhealthy behaviors (Hanson & Chen, 2007a; IOM, 1997; Leech et al., 2014; Sterdt et al., 2014) compared to their higher-income peers. Many studies of the school health environment were conducted in high resource settings (K. W. Bauer et al., 2004; Durant et al., 2009; Kubik et al., 2005; Naiman et al., 2015); it is less clear whether, how, and the extent to which the school health environment affects students in low income or majority minority schools. In some cases, the school buildings themselves in low-income communities are structurally inferior (Alexander & Lewis, 2014; IOM, 1997), which can also be harmful for health. Moreover, the physical state of schools and the priority placed on health and wellness sends students a message about their own self-worth and the importance of education and health. For these reasons, it is important to extend our understanding of the school health environment to more diverse settings.

The perspective of school administrators and staff is also necessary given the fact that most school health efforts today are driven by public health researchers and practitioners without full commitment from the field of public education (ASCD & CDC, 2014; Basch, 2011; Lewallen et al., 2015; Rasberry et al., 2015). Most discussion, research, and resources related to Comprehensive School Health and the CDC's Whole School, Whole Community, Whole Child (WSCC) approach, occurs in public health spaces rather than in the education sector (Lewallen et al., 2015; Rasberry et al., 2015). Given distinct accountability measures and pressure to

demonstrate short term academic gains, it can be challenging for schools to prioritize issues that are not within the core academic areas. The result is health programs and policies that are fragmented and ineffective (Spradlin, Gard, Huang, Kopp, & Malik, 2012). Moreover, rather than collaboration between the two fields in working towards a shared vision of healthy and successful development, the school ends up viewed as simply a convenient setting for health intervention (Koplan, Liverman, & Kraak, 2005). In order to move away from fragmented programs and unenforced policies and toward sustainable and institutionalized efforts, it is necessary to understand the perspective of those in the education field with regard to school health. While this is true at all levels of public education, the middle school stage stands out for being both understudied and a critical period of human development (Blum et al., 2014; Gore et al., 2011; Salam et al., 2016; Sawyer et al., 2012).

Summary

The prevention and control of chronic diseases remains a salient public health issue given their contribution to worldwide morbidity and mortality and the enormous social and economic costs associated with these conditions (U. E. Bauer et al., 2014; CDC, 2016a; Gerteis et al., 2014; WHO, 2014). While many stages of the life course are important to the development or prevention of chronic disease, early adolescence is a critical period for fostering healthy habits associated with both short- and long-term health (Salam et al., 2016; Sawyer et al., 2012). Physical activity and a healthy diet are both important for chronic disease prevention during early adolescence, and these behaviors are frequent targets of school-based public health programs because early adolescents spend a large portion of their time in the

school setting and are shaped by processes in this social context (Basch, 2011; Story et al., 2009).

While health promotion in the school setting has a long history (Bradley & Greene, 2013; IOM, 1997), current trends in public education have resulted in the de-prioritization of issues not directly related to school accountability and academic achievement (Abril & Gault, 2006; Jennings & Rentner, 2006; McMurrer & Kober, 2007; NASPE & AHA, 2012; Ringwalt et al., 2011). As such, health promotion efforts are often cobbled together in non-institutionalized ways and there is incomplete understanding of the influence of the broader school health environment on early adolescents' health behaviors (Basch, 2011; Horn et al., 2015). There is a need to understand the potential to leverage the school setting in more strategic ways to influence both health and educational outcomes. Ultimately, understanding the factors that support early adolescents' health as well as their academic success will also make strides in the effort to prevent chronic disease.

CHAPTER 2: THEORY

This dissertation explores the relationship between the school context, namely social and physical aspects of the school health environment, and early adolescent health behaviors related to diet and physical activity. As discussed in the previous chapter, early adolescent development is greatly affected by contextual factors, including those in the home, neighborhood, and school. The theories presented here were selected because they emphasize both the individual and the environment in thinking about healthy development. In this chapter, I will begin by discussing a biopsychosocial theory of adolescent development from the field of health psychology. I will then discuss two theories used often in the field of public health to examine individual and contextual factors that influence health: Bronfenbrenner's Ecological Systems Theory and the Life Course Perspective. I will finish by discussing how the conceptual framework brings these theories together in an integrated model that will be applied to examine the relationship between the school context and early adolescent health behaviors.

Biopsychosocial Model of Adolescent Development

Within the fields of psychiatry and health psychology, biopsychosocial models have been the major conceptual framework for researchers and practitioners for nearly half a century (Engel, 1977; Suls & Rothman, 2004). In general, these models put forth the idea that biological, psychological, and social processes are integrated in their influence on health and illness (Suls & Rothman, 2004). Over the past several decades, these models have inspired innovation in the planning and implementation of health promotion interventions (Suls & Rothman, 2004). One specific version of this model, the Biopsychosocial Model of Adolescent

Development, originated in the need to theoretically ground adolescent healthy psychology research in a developmental framework (Williams, Holmbeck, & Greenley, 2002). Arguing that adolescence is characterized by challenges that are distinct from those of childhood and adulthood, this model has been used to inform primary, secondary, and tertiary prevention programs targeting adolescent health behaviors (Williams et al., 2002).

Adolescence is critical for health and wellbeing in both the short and long-term due to the physical, cognitive and psychological, and social role changes occurring during this period. These changes impact both positive health behaviors (e.g., healthy diet and physical activity) and risky health behaviors (e.g., substance use and unsafe sexual behavior), with particular influence on the etiology of these behaviors and their promotion or prevention. For example, though dietary and exercise habits first emerge in childhood, it is during adolescence that these behaviors are more permanently established (R. Y. Cohen, Brownell, & Felix, 1990; Viner et al., 2012). In addition, while developmental changes also happen in other phases of life, transitions during adolescence are more prominent and numerous than any other stage excluding infancy (Williams et al., 2002). Moreover, adolescence encompasses both the transition from childhood to early adolescence and the transition to adulthood from late adolescence (Steinberg, 1996), both of which hold significance for long-term health and social outcomes (Steinberg, 1996; Williams et al., 2002).

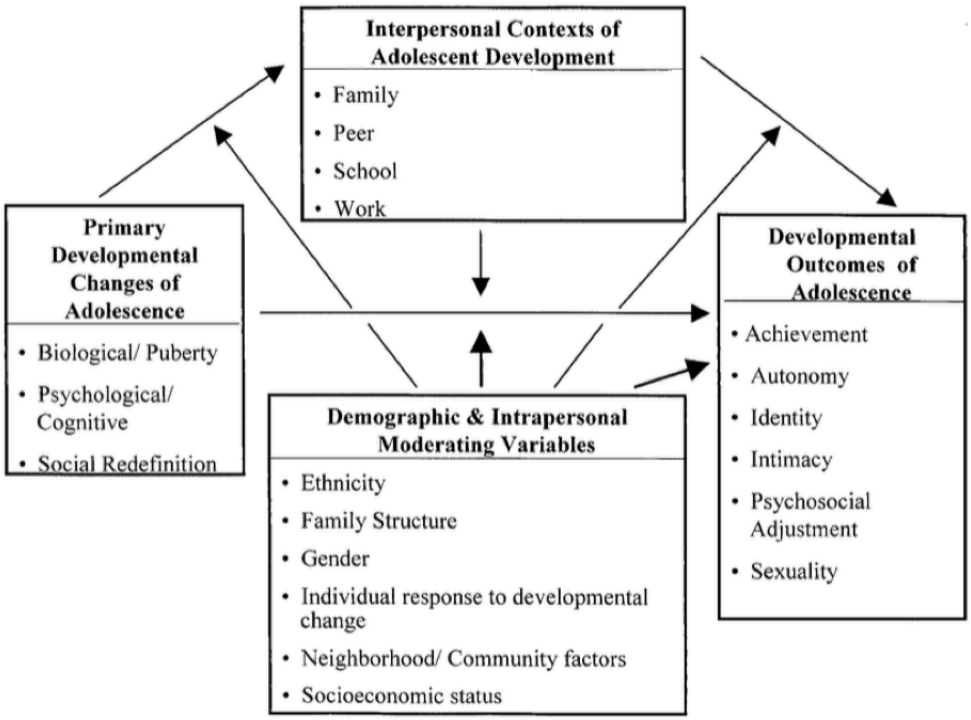

Figure 2.1. Biopsychosocial Model of Adolescent Development
Source: Holmbeck & Shapera, 1999

As shown in Figure 2.1, adolescent development is a complex process that involves demographic, intrapersonal, interpersonal, and other influences. The primary developmental changes of adolescence, which include biological, psychological/cognitive, and social changes, have a direct influence on development of adolescents (Holmbeck, 2002; Holmbeck & Shapera, 1999). These changes also affect developmental outcomes through the interpersonal contexts, which include family, peer, school, and work contexts (Holmbeck, 2002; Holmbeck & Shapera, 1999). In other words, primary developmental changes may impact interactions with the various contexts of development, which then influences how adolescents navigate the major milestones of this period, including achievement, autonomy, identity, intimacy, psychosocial adjustment, and sexuality (Holmbeck, 2002; Holmbeck & Shapera, 1999). In addition to a mediating role, interpersonal contexts can also moderate the association between

developmental changes and outcomes (Holmbeck & Shapera, 1999). For example, the association between early puberty and early initiation of sexual behaviors may be moderated by the interpersonal context of the home. The strength of the association may vary by the extent to which families increase supervision or restrictiveness, for example (Holmbeck & Shapera, 1999). Demographic variables, such as gender, are also hypothesized to play a moderating role in the relationship between developmental changes and outcomes (Holmbeck, 2002; Holmbeck & Shapera, 1999).

The primary developmental changes highlighted by this model include biological, cognitive, and social role changes (Holmbeck, 2002; Holmbeck & Shapera, 1999). Biological changes include the process of puberty and physical changes to the body (Holmbeck, 2002; Holmbeck & Shapera, 1999). Key psychological or cognitive changes of this period include developing the ability to think more complexly and abstractly, explore several possibilities when making decisions, and understand significant others and their behaviors (Holmbeck, 2002; Holmbeck & Shapera, 1999). Social role changes generally refer to changes in the youth's social status (Holmbeck, 2002; Holmbeck & Shapera, 1999).

Primary developmental changes, particularly perceptions of self and cognitive developmental level, are related to health knowledge, attitudes, and behavior (Williams et al., 2002). Risk perception and autonomy are also under development during this stage and can influence decision making around health behaviors (Williams et al., 2002). Because primary developmental changes differ by gender, this construct is viewed as a "potent moderator" of morbidity among adolescents (Williams et al., 2002, p. 833). In fact, gender differences in physical and mental health outcomes first emerge during adolescence (Williams et al., 2002),

supporting the notion that early adolescence is a crucial time for health behavior interventions for all youth.

Ecological Systems Theory

Also referred to as the Social Ecological Model, Bronfenbrenner's Ecological Systems Theory originated as a theory of human development during the 1970s (Rosa & Tudge, 2013). Moving away from the predominant paradigm of the time concentrating on the individual, the earliest version of Bronfenbrenner's theory focused largely on the impact of context (Bronfenbrenner, 1977; Rosa & Tudge, 2013). Further development of the theory brought in an emphasis on the individual, larger social forces, time, and the reciprocal relationships between all these factors (Rosa & Tudge, 2013). The central idea of Ecological Systems Theory is that the context in which a child develops is an important component for understanding the child's development (Bronfenbrenner, 1994). The Ecological Systems Theory provides a framework for understanding how the middle school context and environment is related to early adolescent health and health behaviors.

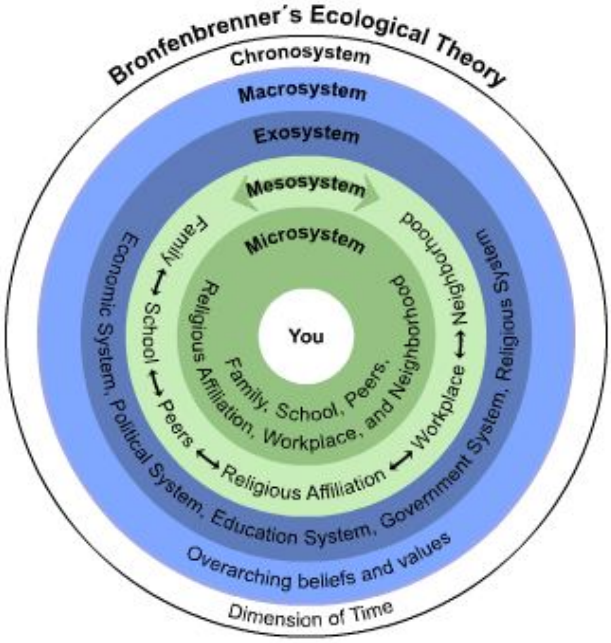

Figure 2.2. Ecological Systems Theory

Source: http://seansturm.wordpress.com/2009/06/21/the-writing-zone-according-to-ecological-systems-theory/

As shown in Figure 2.2, the theory posits that children develop within a set of nested subsystems: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Interactions occur between factors within the subsystems, as well as between adjacent subsystems. The microsystem includes the interactions between the child and his or her immediate environment, including the home and school (Bronfenbrenner, 1977, 1994). Interactions with the microsystem include social roles, patterns of activities, and interpersonal relationships (Bronfenbrenner, 1994), and these interactions can produce, facilitate, and constrain behavior (Bronfenbrenner, 1977, 1994).

The mesosystem consists of the interrelations between two or more settings, or microsystems containing the developing child (Bronfenbrenner, 1977, 1994). The exosystem refers to formal and informal social structures that exert an indirect influence on the child, such

as governmental programs and policies or the mass media (Bronfenbrenner, 1977). The macrosystem consists of the larger culture and institutional patterns (e.g., economic, social, and political systems) that implicitly and explicitly shape the micro-, meso-, and exosystems (Bronfenbrenner, 1977). Of particular importance are belief systems, resources, customs, and opportunity structures embedded in these overarching systems (Bronfenbrenner, 1994). The last component, the chronosystem, was added to the model later in order to incorporate the aging of the child and the influence of historical events and timing (Bronfenbrenner, 1994).

In addition, the concept of "proximal processes" in Ecological Systems Theory provides a mechanism for understanding how various subsystems influence the developing child. This concept reflects the idea that the relationships between an individual and his or her environment, as well as the relationships between the micro-, meso-, exo-, and macro-systems, are reciprocal. Human development is described as taking place through "progressively more complex reciprocal interaction[s]" between individuals and the persons, objects, and symbols in their environments, resulting in enduring forms of interaction between the person and the context (Bronfenbrenner, 1999, p. 5). It is through proximal processes that the multiple levels of the environment influence behavior by reinforcing belief systems, opportunity structures, and norms (Bronfenbrenner, 1999). For example, Bronfenbrenner (1999) examined the influence of parental monitoring on children's grades in order to get at the process of parent-child interaction. Proximal processes also encompass more complex interactions at higher levels, such as the influence of historical context on behavioral norms.

Life Course Perspective

The life course perspective was developed in response to a need for better understanding of how people lived their lives in changing times and across various contexts (Elder, 1998; Elder, Johnson, & Crosnoe, 2003). According to this framework, the life course consists of "age-graded patterns that are embedded in social institutions and history" (Elder et al., 2003, p. 4). This theoretical perspective provides insight into the social organization of lives, as well as how historical time and individual biography influence development (Elder, 1998; Elder et al., 2003).

According to the life course perspective, development is a life-long process (Elder et al., 2003). The core concepts of this perspective, which include transition, duration, turning points, trajectories, and social pathways, reflect the dynamic and temporal nature of lives situated in a biographical and historical context (Elder et al., 2003). This theory also encompasses the concepts of critical and sensitive periods, or important developmental windows during which exposures can have irreversible or reversible effects, respectively, which can be either adverse or protective (Ben-Shlomo & Kuh, 2002). Together these concepts acknowledge that historical time shapes individual's lives, events have differing effects depending on the timing in an individual's life, and individuals are embedded within a larger social system that influences behaviors and constrains choices (Elder et al., 2003).

The life course perspective encompasses multiple levels of study, as both macro and micro-level processes are acknowledged. The principle of agency in this framework emphasizes the role of individual choices and compromises made within available options and constraints (Elder, 1998; Elder et al., 2003). Individuals are not passively acted upon by social forces that

shape their lives, but instead, they make choices that have important consequences for future trajectories. In addition, the principle of linked lives underscores the importance of considering the inter-dependence of lives and the way in which social change impacts individuals through their relationships (Elder, 1998; Elder et al., 2003). Larger social processes often influence individuals through their effect on interpersonal contexts, like schools or families (Elder et al., 2003).

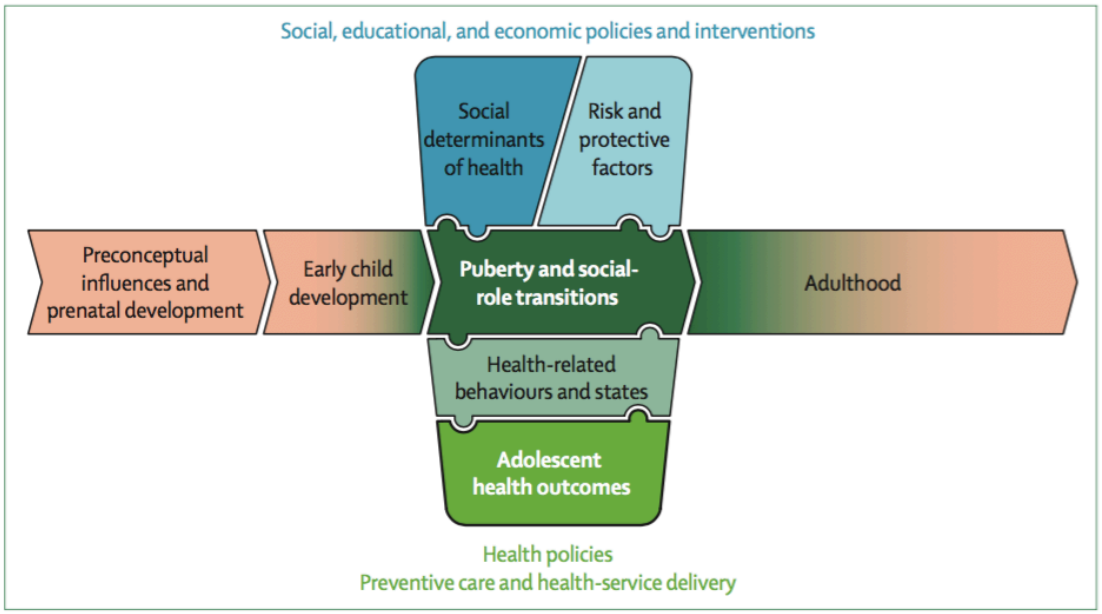

Figure 2.3. Adolescent Health and Development Using a Life Course Perspective
Source: Sawyer et al., 2012

Sawyer and colleagues (2012) developed a conceptual framework for understanding adolescent health and development using a life course perspective. As shown in Figure 2.3, the unique experiences of adolescence, such as puberty and social role transitions, combine with early influences to affect health and development during adolescence and beyond (Sawyer et al., 2012). The vertical axis also incorporates the influence of larger social forces, such as social, educational, economic, and health policies and services (Sawyer et al., 2012). The framework as

a whole underscores the temporal component of prevention because many health outcomes in adults arise from risk or protective processes that begin in or are more deeply established in adolescence.

Conceptual Framework

The three theories outlined above complement each other in important ways that lend themselves to application in this dissertation. All three theories acknowledge the influence of individual and contextual factors to varying degrees. Whereas the Biopsychosocial Model of Adolescent Development is primary focused on individual developmental processes and interpersonal interactions, Ecological Systems Theory emphasizes the effect of the broader social context (i.e., beyond individual and interpersonal factors) on development. In addition, while Ecological Systems Theory recognizes the influence of timing through the added component of the chronosystem, the life course perspective more explicitly connects the influence of historical time and timing in one's life to health and behavior outcomes through concepts like critical and sensitive periods.

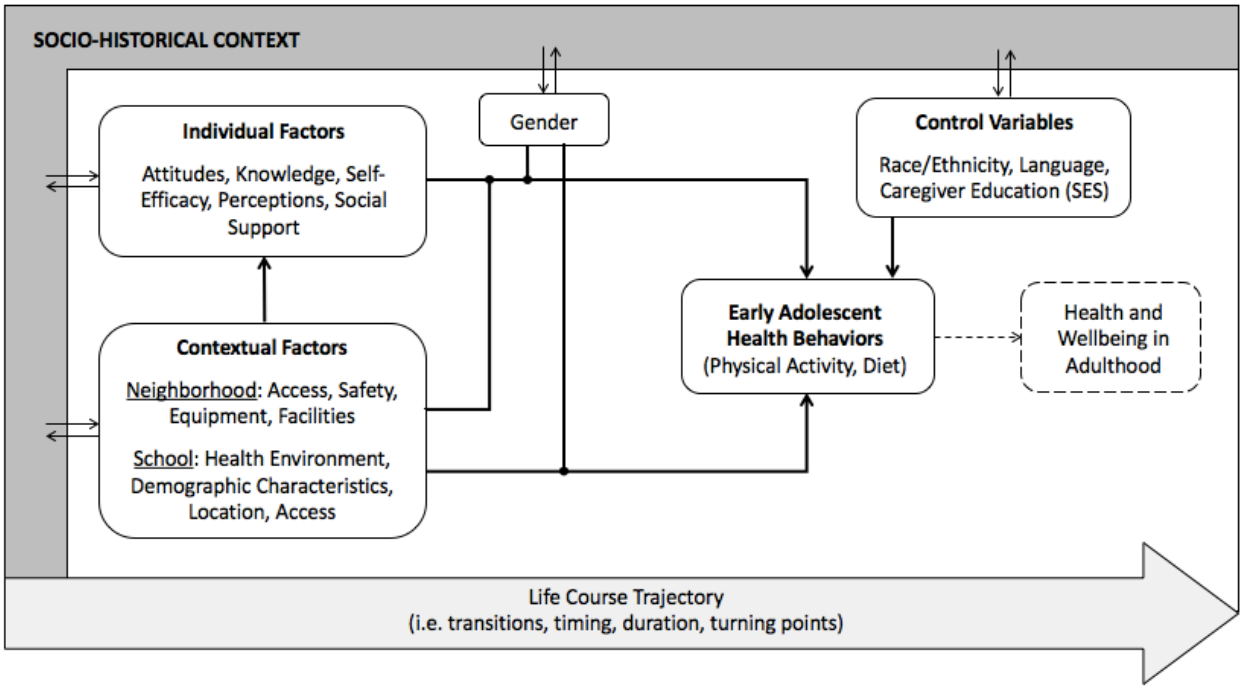

Figure 2.4. Conceptual Framework of Context and Early Adolescent Health

Building off of the Biopsychosocial Model of Adolescent Development, Ecological Systems Theory, and the life course perspective, the integrated framework presented in this section explains the different ways in which individual and contextual factors influence early adolescent health behaviors. As shown in Figure 2.4, early adolescent health behaviors like physical activity and healthy diet are affected by individual factors, such as attitudes, knowledge, and self-efficacy. Individual factors are also related to factors in the immediate context, such as the neighborhood or school. In addition, the framework acknowledges the direct influence of these contextual factors on early adolescent health behaviors. Health behaviors, individual factors, and contextual factors are also affected by the larger socio-historical context, such as norms, culture, and policies. The arrow across the bottom of the model emphasizes the importance of timing; experiences during critical periods such as early adolescence have particular salience for development across the life course. This is also

represented by the arrow between early adolescent health behaviors and health and wellbeing in adulthood. This relationship is depicted with dotted lines because it will not be tested in this dissertation.

Drawing on the Biopsychosocial Model of Adolescent Development, the integrated conceptual framework proposes that gender moderates the relationships between individual factors and early adolescent health behaviors and between contextual factors and early adolescent health behaviors. Gender differences in health outcomes emerge during adolescence (Williams et al., 2002), in part because this developmental period is important for gender identity development (Steinberg, 2005). In addition, behaviors such as physical activity and diet, which are the focus of the current study, are affected by gender norms. For example, physical activity and sport are often viewed as behaviors associated with masculinity (Wellard, 2009). The influence of societal norms is represented in the framework by the bidirectional arrows between gender and the socio-historical context.

The influence of contextual factors on early adolescent health behaviors is based on the Ecological Systems Theory. While this theory acknowledges that individuals develop in a set of nested subsystems (Bronfenbrenner, 1977, 1994), the integrated framework presented here more explicitly shows the relationship between macro- and microsystems and individual behavior. The framework also proposes that individual factors may influence behavior in different ways depending on contextual factors. In other words, contextual factors may moderate the relationship between individual factors and early adolescent health behaviors.

Drawing on the life course perspective, all of the relationships in the framework are understood to be happening within a life course trajectory. The current study focuses on the

critical period of early adolescence and explores changes in early adolescent health behaviors as youth move through middle school. In addition, the conceptual framework suggests that the socio-historical context largely influences the school policy environment and culture, which in turn affects the ways in which middle schools implement health programming and policies, as well as affects educators' perspectives on health in schools.

Study One of the dissertation examines changes in and determinants of early adolescents' physical activity and dietary behaviors moving from seventh to eighth grade. The research questions within Study One were motivated by the assumption that early adolescence is a critical period for chronic disease prevention, depicted in the model by the arrow of the life course trajectory. Understanding factors associated with increased and decreased healthy behaviors may provide important information for preventative intervention. This study also explores the moderating role of gender in the relationship between contextual factors (i.e., school-level characteristics), and changes in physical activity and dietary behaviors, as described above.

Study Two of the dissertation focuses on one specific individual factor—students' perceptions of the school health environment, or their views of the extent to which the school supports or constrains healthy choices. As shown in the integrated framework and motivated by the Biopsychosocial Model of Adolescent Development (Holmbeck & Shapera, 1999), contextual factors may moderate the relationship between individual factors and health behaviors. As such, the research questions within this study explored the moderating role of school characteristics on the relationship between student perceptions and their health behaviors.

Study Three of the dissertation examines perspectives of educators in order to understand how health promotion occurs in the school setting, including how efforts are actualized and sustained. This also includes an exploration of barriers and facilitators to health promotion efforts. It is hypothesized that the socio-historical context, which includes larger social processes such as trends in education policy, norms, and culture, shape educators' perspectives regarding the role schools play in promoting health. As shown in the integrated framework, the socio-historical context also influences contextual and individual factors associated with early adolescent health behaviors. Following an embedded mixed methods research design, this influence was interrogated further by integrating the qualitative findings of Study Three with the quantitative findings of Studies One and Two.

Overall, the integrated conceptual framework is well-suited to guide the achievement of the study aims. The three studies presented in this dissertation aim to add to our understanding of the school context and how it is related to early adolescents' health and health behaviors. By acknowledging the influence of both individual and contextual factors, as well as larger social processes, this framework provides a basis for the three study aims and related research questions presented in the next chapter.

CHAPTER 3: RESEARCH AIMS

This chapter provides an overview of the aims of the three studies, including research questions and hypotheses. Sources of data, details about variables, and analytic methods will be discussed in Chapter 4.

Primary Research Question: How does the school context, including social and physical aspects of the school health environment, influence early adolescents' health and health behaviors? Across the three studies, the school context was examined from different viewpoints, including objective characteristics, student perceptions, and educator perspectives. The health behaviors examined in Studies One and Two were physical activity and diet. Study Three considered physical activity and diet, as well as health and wellness more broadly defined.

Study One

Study Aim: To examine the changes in and determinants of early adolescents' physical activity and dietary behaviors during middle school. To address this study aim, I identified the following research questions:

> **Question 1.1:** To what extent do early adolescents' physical activity and dietary behaviors change from seventh to eighth grade?
>
> **Question 1.2:** To what extent do individual and school level factors explain the change in early adolescents' physical activity and dietary behaviors from seventh to eighth grade?
>
> **Question 1.3:** Is the relationship between school level factors and the change in early adolescents' physical activity and dietary behaviors moderated by gender?

I addressed the first study aim by testing the following research hypotheses:

Hypothesis 1: Physical activity, measured as self-reported frequency of participating in daily physical activity and weekly muscle-strengthening physical activity, and healthy dietary behaviors, measured as self-reported fruit and vegetable consumption, will decrease from seventh to eighth grade.

Hypothesis 2: Individual and school level variables will explain changes in physical activity and dietary behaviors from seventh to eighth grade. Individual level factors include attitudes, perceptions, and knowledge. School level factors include socioeconomic status, size, school type, and environmental characteristics.

Hypothesis 3: Gender will moderate the relationship between school level factors and changes in physical activity and dietary behaviors. The effect of school characteristics on decreases in physical activity and healthy dietary behaviors will be greater for girls.

Support for hypotheses: The conceptual framework draws from the life course perspective and emphasizes adolescence as a critical period for developing protective health behaviors (Ben-Shlomo & Kuh, 2002; Sawyer et al., 2012). This is because physical activity levels and diet quality both tend to decline during early adolescence (Alberga et al., 2012; Borraccino et al., 2009; Dumith et al., 2011; Todd et al., 2015). Drawing from Ecological Systems Theory, the conceptual framework also suggests that interpersonal contexts, such as the school or neighborhood, as well as the larger social context influences behavior in direct and indirect ways (Bronfenbrenner, 1994). As such, the researcher hypothesized that accounting for school level characteristics will help to explain the decline in healthy behaviors during this time period. Lastly, as highlighted by the Biopsychosocial Model of Adolescent Development, which informs the conceptual framework of this study, gender is a “potent moderator” of the relationship

between individual factors and developmental outcomes (Steinberg, 2005; Williams et al., 2002). The researcher hypothesized that this assertion also applies to the relationship between contextual factors (i.e., school level factors) and health behaviors.

Study Two

Study Aim: To examine the relationship between the perceived school health environment and early adolescents' physical activity and dietary behaviors. To address this study aim, I identified the following research questions:

Question 2.1: Which individual level factors affect early adolescents' perceptions of the school health environment?

Question 2.2: Is the perception of the school health environment associated with early adolescents' physical activity behaviors?

Question 2.2a: Is this relationship moderated by school level factors?

Question 2.3: Is the perception of the school health environment associated with early adolescents' dietary behaviors?

Question 2.3a: Is this relationship moderated by school level factors?

I addressed the second study aim by testing the following research hypotheses:

Hypothesis 1: Individual factors, such as gender, ethnicity, and socioeconomic status will be associated with early adolescents' perceptions of the school health environment.

Hypothesis 2: Perceptions of the school health environment will be associated with self-reported physical activity behaviors. School-level indicators will moderate the association between perceptions and behavior.

Hypothesis 3: Perceptions of the school health environment will be associated with self-reported healthy and dietary behaviors. School-level indicators will moderate the association between perceptions and behavior.

Support for hypotheses: Previous research has documented the important ways in which perceptions influence early adolescents, and in some examples, perceptions are even stronger predictors of behavior than the reality (Reddy et al., 2003). The researcher hypothesized that perceptions are informed by a variety of factors and are associated with both physical activity and dietary behaviors. The conceptual framework suggests that actual contextual factors may moderate the association between perceptions and early adolescent health behaviors. This notion is drawn from the Biopsychosocial Model of Adolescent Development, which asserts that interpersonal contexts may play both a mediating and moderating role in the relationship between individual level factors and developmental outcomes (Williams et al., 2002). The extent to which this applies to school level factors was tested in this study.

Study Three

Study Aim: To understand educators' perspectives on the ways in which schools influence the health of early adolescents. To address this study aim, I identified the following research questions:

Question 3.1: How are physical activity and healthy eating promoted in middle schools?

Question 3.1a: What are the barriers and facilitators?

Question 3.2: How are school health promotion efforts actualized and sustained?

Question 3.3: How do educators view health promotion in middle schools?

Study Three used in-depth interviews with teachers and administrators to answer the research questions described above. As shown in the conceptual framework, early adolescents' health behaviors and outcomes are associated with factors at both the individual and school levels. However, it must also be noted that these connections are happening within and are deeply influenced by the larger socio-historical context. Study Three considered the local school context from a different perspective, that of teachers and administrators, but also aimed to understand the connections between these daily experiences and macro-level forces that shape values and priorities of public institutions and thereby create a "school health climate."

Full details regarding the data and methods for all three studies are presented in the next chapter.

CHAPTER 4: METHODS

This chapter describes the sources of data and analytic approaches used for the dissertation. In an embedded mixed methods research design, the collection and analysis of quantitative and qualitative data is combined within a traditional quantitative or qualitative research design (Creswell & Plano Clark, 2011). In some embedded designs, as is the case in this dissertation, one type of data provides a supportive, secondary role in the study in order to answer a different, related research question for which a single data set is not sufficient (Creswell & Plano Clark, 2011). I will begin this chapter by describing the quantitative methods for Studies One and Two, followed by the qualitative methods for Study Three. I will conclude the chapter with my approach for bringing the quantitative and qualitative findings together.

Quantitative Methods

Studies One and Two used quantitative data collected during Project SHAPE, a school-engaged physical education (PE) intervention study targeting middle school PE teachers in Los Angeles, CA.

Overview of Project SHAPE

The purpose of Project SHAPE was to reduce health disparities in early adolescents' physical activity and related health outcomes in urban schools serving low-income student populations by increasing the school's capacity for providing high-quality PE. Middle schools in the Los Angeles Unified School District (LAUSD), a large, urban school district in Los Angeles, were eligible to participate in Project SHAPE based on the proportion of students enrolled in the National School Breakfast and Lunch programs. The project identified 48 schools that met the inclusion criteria and invited them to participate. Twenty-four schools initially expressed

interest, and 17 were recruited for participation. One school dropped after baseline classroom observations, resulting in a final sample size of 16 middle schools (eight control and eight intervention) and 51 PE teachers. A table of school characteristics is presented in Chapter 5.

Teachers at intervention schools (n = 23) were invited to attend 12 hours of professional development training and provided with SPARK PE for Middle Schools (a PE curriculum), $2500 in vouchers for PE equipment, and a $200 stipend for completing training. Five types of data were collected: (1) PE class observation data using a modified version of the System for Observing Fitness Instruction Time (SOFIT), a validated measure of the level of physical activity in PE classes (Lafleur et al., 2013; McKenzie, Sallis, & Nader, 1991); (2) student surveys at two time points (beginning of seventh-grade and end of eighth-grade), which included measures of attitudes, knowledge, perceptions, and self-reported behaviors; (3) student fitness scores, height, and weight using FITNESSGRAM (Meredith, Welk, & Cooper Institute, 2010), a standardized test used in PE; (4) assessment of physical activity spaces at the schools using the School Physical Activity Opportunities Report Card (SPARC) Audit Tool (Cole, Tan, Fielding, & Yancey, 2011); and (5) teacher experiences with the SPARK curriculum and training using in-depth individual interviews.

Studies One and Two of the dissertation used multiple data sources (student survey data, student FITNESSGRAM data, SPARC assessments of physical activity spaces, and school-level characteristics reported by the California Department of Education), all of which are discussed in more detail below. Study approval was obtained through the UCLA Institutional Review Board and LAUSD. Principals and PE teachers from each school agreed to participate as demonstrated through the establishment of memoranda of understanding.

Data Source 1: Student Survey

The Project SHAPE student survey instruments included items developed by the research team and items adapted and adopted from existing youth surveys (CDC, 2016b; Freedman & Bell, 2009; *Hearts N' Parks Community Mobilization Guide*, 2001; Neumark-Sztainer et al., 2012; Ortega et al., 2015; Prelip, Slusser, Thai, Kinsler, & Erausquin, 2011; Prelip, Thai, Toller Erausquin, & Slusser, 2011; Reynolds, Yaroch, Franklin, & Maloy, 2002; Sallis, 2002; Sallis, Grossman, Pinski, Patterson, & Nader, 1987; UCLA Center for Health Policy Research, 2015). A detailed description of the sources of survey items is provided in Table 4.1. The full baseline and follow up student surveys are provided in Appendices A1 and A2.

Table 4.1. Sources of Project SHAPE Survey Items

Construct	Baseline Item #	Follow up Item #	Source/Reference	Will be used?
Nutrition knowledge – servings of fruits and vegetables	1		Adopted from Proyecto MercadoFRESCO Community Survey[1]	
Nutrition knowledge – general	2-6	1-3	Adopted from Proyecto MercadoFRESCO Community Survey[1]	
Nutrition campaign (MyPlate) knowledge	7-9		Adopted from Proyecto MercadoFRESCO Community Survey[1]	✓
Nutrition facts label use	10		Adopted from Proyecto MercadoFRESCO Community Survey[1]	
Fruit juice consumption	11	4	Adopted from High School Youth Risk Behavior Survey (YRBS) 2013[2]	
Fruit consumption	12	5	Adopted from High School YRBS 2013[2]	✓
Vegetable consumption	13	6	Adopted from High School YRBS 2013[2]	✓
Soda/diet soda consumption	14		Adapted from High School YRBS 2013[2]	

Soda consumption		7	Adopted from High School YRBS 2013[2]	✓
Diet soda consumption		8	Adapted from High School YRBS 2013[2]	✓
Breakfast consumption	15		Adopted from Middle School YRBS 2013[2]	
Sugar-sweetened beverage consumption		9	Adapted from California Health Interview Survey (CHIS) 2013-2014[3] and High School YRBS 2013[2]	✓
Sweets consumption		10	Adapted from CHIS 2013-2014[3] and High School YRBS 2013[2]	✓
Salty snack consumption		11	Adapted from CHIS 2013-2014[3] and High School YRBS 2013[2]	✓
Fast food consumption		12	Adapted from CHIS 2013-2014[3] and High School YRBS 2013[2]	✓
Self-rated diet	16-18	13-15	Adopted from Network-LAUSD/Nutrition-Friendly Schools and Communities Study[4]	
Nutrition knowledge - general	19-23		Adopted from High 5 Study[5]	
Self-rated eating habits		16	Adopted from Proyecto MercadoFRESCO Community Survey[1]	
Perceptions of friends' eating habits		17	Adapted from Project EAT[6]	
PE perceptions	24-25	18-19	Adopted from Amherst Health & Activity Study[7]	
PE frequency	26	20	Adopted from Middle School YRBS 2013[2]	
Daily PA	27	21	Adopted from Middle School YRBS 2013[2]	✓
Sports team participation	28	22	Adopted from Middle School YRBS 2013[2]	
Weekly (Muscle-strengthening) PA	29	23	Adopted from Middle School YRBS 2013[2]	✓
PA Attitudes	30-33	24-27	Adopted from Hearts N' Parks Study[8]	✓
Self-rated PA	34	28	Adopted from Network-LAUSD/Nutrition-Friendly	

			Schools and Communities Study[4]	
Sallis Social Support for Exercise Scales	35-36	29-30	Adopted from Social Support for Exercise Survey[9]	✓
PA Barriers	37	31	Adapted from Amherst Health & Activity Study[7]	
PA Benefits	38	32	Adapted from Amherst Health & Activity Study[7]	
Perceived access to PA space and equipment	39a-b	33a-b	Adopted from Amherst Health & Activity Study[7]	✓
Perceived safety	39c-d	33c-d	Adopted from Amherst Health & Activity Study[7]	✓
Perceived weight status	40	34	Adopted from Middle School YRBS 2013[2]	✓
Weight intentions	41	35	Adopted from Middle School YRBS 2013[2]	✓
Race/Ethnicity	42	36	Adopted from Proyecto MercadoFRESCO Community Survey[1]	✓
Language	43-44	37-38	Adopted from Proyecto MercadoFRESCO Community Survey[1]	✓
Caregiver education		39-40	Adapted from Project EAT[6]	✓
Media use	45-48		Adapted from Project EAT[6]	
Perceptions of school health environment		41-44	Developed by research team	✓
Perceived access to healthy food		45	Adapted from Perceived Access to Food in Neighborhoods and Communities scale[10]	
Sleep habits		46-50	Adapted from Project EAT[6]	
Advertisements		51-53	Adapted from CHIS 2013-2014[3]	
Time spent using media		54	Adapted from Project EAT[6]	

[1] Ortega et al., 2015
[2] CDC, 2016b
[3] UCLA Center for Health Policy Research, 2015
[4] Prelip et al., 2011a; Prelip et al., 2011b
[5] Reynolds et al., 2002
[6] Neumark-Sztainer et al., 2012
[7] Sallis, 2002
[8] "Hearts N' Parks Community Mobilization Guide," 2001
[9] Sallis et al., 1987

[10] Freedman & Bell, 2009

Prior to the initiation of data collection, the baseline survey instrument was pre-tested with 18 sixth- and seventh-grade students, followed by revisions to ensure appropriate reading level. The revised baseline instrument was again pre-tested with nine additional seventh-grade students. As shown in Table 4.1, the follow up survey instrument was modified between survey administrations to remove some items and add new items. The new follow up survey items were pre-tested with nine eighth-grade students to ensure appropriate reading level. Studies One and Two use a subset of variables from these survey items, as noted in Table 4.1 and described later in this chapter.

Students at all 16 Project SHAPE study schools were offered the opportunity to participate in the student survey during their physical education classes. The baseline survey was offered to seventh-grade students during the fall of 2014, and the follow up survey was offered to eighth-grade students during the spring of 2016. Prior to data collection, parents were informed of the study through an information sheet distributed to students in physical education classes by the research team. Parents were able to opt their children out of the survey, and students provided verbal assent to participate. Prior to survey administration, the research team explained the study to students again and informed them that completion of the survey was voluntary and had no effect on academic grades. The research team remained in the room to answer questions during survey administration.

At baseline, of the 6,201 seventh-grade students at all 16 schools, 4,773 (77.0%) students completed the survey. At follow up, of the 6,061 eighth grade students at all 16 schools, 4,885 (80.6%) students completed the survey. The number of students surveyed at

both time points was 3,524. A table of student participant characteristics is presented in Chapter 5.

Data Source 2: FITNESSGRAM

Height and weight data for Studies One and Two were obtained during regular FITNESSGRAM testing conducted by PE teachers during the same time periods as baseline and follow up survey data collection. FITNESSGRAM refers to a widely used fitness assessment and reporting system. The battery of fitness tests, which include aerobic capacity, body composition, strength and endurance, flexibility, abdominal strength, and trunk strength, are scored using age and gender specific criterion-referenced standards (Meredith et al., 2010).

In California, FITNESSGRAM is used as the state's official physical fitness test for school children, similar to standardized testing in other school subjects. FITNESSGRAM testing is required in grades five, seven, and nine, but takes place regularly in other grades as well in order to provide students with opportunities to track their fitness progress and conduct self-assessments (California Department of Education, 2009; Meredith et al., 2010). Baseline FITNESSGRAM data for the dissertation was collected by physical education teachers during regularly scheduled administration of the tests in seventh grade. Follow up FITNESSGRAM data for the dissertation was collected using the same protocol during a special administration of the tests in eighth grade, and this special administration was required as a component of Project SHAPE study participation. Teachers are trained in FITNESSGRAM test administration procedures, described in detail in Appendix A3, prior to conducting the assessments.

Project SHAPE received FITNESSGRAM data for 3,863 students at baseline (62.3%), 3,410 students at follow up (56.3%), and 2,223 students at both time points. Student FITNESSGRAM

data were matched to survey data at both time points by name and date of birth. FITNESSGRAM response rates were lower than those of the student survey for a few reasons: (1) students who had been surveyed may have been absent or no longer enrolled at the school at the time of FITNESSGRAM testing, (2) while it was considered a requirement for study participation, FITNESSGRAM testing is not required in eighth grade and teachers could not be compelled to collect this data, nor could they be compelled to submit this data to Project SHAPE at either time point, and (3) some data were poor quality (e.g., illegible or incomplete).

Data Source 3: School Physical Activity Opportunities Report Card (SPARC)

Assessments of the schools' physical activity spaces were completed using the School Physical Activity Opportunities Report Card (SPARC) Audit Tool during the 2015-2016 school year. An example of the tool is provided in Appendix A4. SPARC is a tool for systematically observing and recording where, when, and how many students are present and active during different parts of the school day. Prior to recording activity levels, the quantity and quality of space and facilities are recorded (i.e., the "Pre-Audit"). Once the Pre-Audit is complete, each space or facility is scanned by the observer at different times of day, such as before school, during lunch, and after school (i.e., the "Activity Audit"). The observer records an estimate of the number of students who are sedentary, lightly or moderately active, and very active in each area during each designated time (Cole et al., 2011).

Project SHAPE implemented only the Pre-Audit portion of the SPARC tool to collect information about the quantity and quality of space and equipment. Any potential areas for leisure-time (e.g., lunch, before school, after school, nutrition break) physical activity at each school were identified by the research team in collaboration with PE teachers on site at the 16

study schools. These areas were measured using a laser rangefinder to record the dimensions and the following characteristics of each area were recorded by trained observers: types of equipment present (e.g., basketball hoops, soccer goal, demarcations), surface (e.g., grass, blacktop, wood), quality of the space (i.e., no deficiency, deficiency, extreme deficiency), and uses (e.g., lunch, physical education).

Data Source 4: California Department of Education Public Databases

School-level data were also obtained from the California Department of Education's publicly available database, DataQuest (California Department of Education, 2015). Dataquest provides annual information about school enrollment, rates of participation in National School Breakfast and Lunch Programs, and other school information (e.g., grades served, type of school). School types include magnet schools (i.e., a school that focuses on a special area of study, such as science or performing arts), charter schools (i.e., a publicly funded school that is governed by a group or organization under a legislative contract [charter] with the state or district), or regular schools (California Department of Education, 2015). School characteristics were matched to all 16 Project SHAPE study schools by school name.

Study One - Overview

Using data from the sources described above, Study One aimed to **examine the changes in and determinants of early adolescents' physical activity and dietary behaviors during middle school** by answering the following research questions:

Question 1.1: To what extent do early adolescents' physical activity and dietary behaviors change from seventh to eighth grade?

Question 1.2: To what extent do individual and school level factors explain the change in early adolescents' physical activity and dietary behaviors from seventh to eighth grade?

Question 1.3: Is the relationship between school level factors and the change in early adolescents' physical activity and dietary behaviors moderated by gender?

Study One - Variables

The variables used in Study One are described below. For reference, a table of the variables with items, response options, and coding is provided in Appendix A5. For variables that are based on student survey items, sources of survey items are provided in Table 4.1.

Dependent Variables

Daily Physical Activity (PA): This is a ratio variable and is defined as the number of days the participant reported doing 60 minutes or more of PA in the previous seven days (range 0 to 7). Adolescents are recommended to engage in a minimum of 60 minutes of moderate to vigorous physical activity per day (U.S. Department of Health and Human Services, 2018). This variable represents the students' self-reported frequency of achieving this recommendation in the previous week.

Daily PA Change Score: This is a continuous variable. Change in daily PA from seventh to eighth grade was calculated by subtracting the number of days active for 60 minutes or more at baseline from the number at the follow up survey (range -7 to 7).

Muscle-Strengthening PA: This is a ratio variable and is defined as the number of days the participant reported muscle-strengthening PA in the previous seven days (range 0 to 7). Adolescents are recommended to engage in at least three days per week of exercise to strengthen or tone muscles (U.S. Department of Health and Human Services, 2018). This

variable represents the students' self-reported frequency of completing this behavior in the previous week.

Muscle-Strengthening PA Change Score: This is a continuous variable. Change in weekly muscle-strengthening PA from seventh to eighth grade was calculated by subtracting the number of days of muscle-strengthening activity at baseline from the number at the follow up survey (range -7 to 7).

Fruit Consumption: This is a quasi-continuous variable and is defined as the self-reported frequency of fruit consumption during the previous seven days. It was calculated by converting the categorical responses (0 times during the past 7 days, 1-3 times during the past 7 days, 4-6 times during the past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day) into continuous responses (0, 2, 5, 7, 14, 21, 28 times in the past 7 days, respectively).

Fruit Consumption Change Score: This is a continuous variable. Change in fruit consumption was calculated by subtracting frequency of fruit consumption at baseline from that at follow up (range -28 to 28).

Vegetable Consumption: This is a quasi-continuous variable and is defined as the self-reported frequency of vegetable consumption during the previous seven days. It was calculated by converting the categorical responses (0 times during the past 7 days, 1-3 times during the past 7 days, 4-6 times during the past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day) into continuous responses (0, 2, 5, 7, 14, 21, 28 times in the past 7 days, respectively).

Vegetable Consumption Change Score: This is a continuous variable. Change in vegetable consumption was calculated by subtracting frequency of fruit consumption at baseline from that at follow up (range -28 to 28).

Independent Variables (individual-level)

Grade: This is a binary indicator variable of survey time point (baseline/seventh grade vs. follow up/eighth grade).

PA Attitudes: This is a binary variable which represents having positive or negative attitudes towards PA. It was created by scoring and summing the responses to four items regarding PA attitudes (e.g., "I would rather watch TV than play sports or be active"). The summed scale score was dichotomized to reflect positive and negative attitudes toward PA in accordance with the original source of the scale (*Hearts N' Parks Community Mobilization Guide*, 2001).

Perceived Safety: This is a binary variable and is defined as perceiving that it is safe to participate in PA in the participant's neighborhood (unsafe vs. safe). It was assessed using two items (e.g., "It is safe to walk or jog alone in my neighborhood during the day"). Likert scale responses were scored, summed, and dichotomized to reflect agreement (safe) and disagreement (unsafe) with survey items.

Perceived Access: This is a binary variable and is defined as perceiving access to supplies, equipment, and spaces for PA (low vs. high). It was assessed using two items (e.g., "There are playgrounds, parks, or gyms close to my home or that I can get to easily"). Likert scale responses were scored, summed, and dichotomized to reflect agreement (high access) and disagreement (low access) with survey items.

Friend Support for PA: This is a binary variable created from the Sallis Support for Exercise scales (Sallis et al., 1987). Responses to 10 items were scored and summed to create a scale score, which was then dichotomized into low friend support and high friend support (Leslie et al., 1999).

Family Support for PA: This is a binary variable created from the Sallis Support for Exercise scales (Sallis et al., 1987). Responses to 10 items were scored and summed to create a scale score, which was then dichotomized into low family support and high family support (Leslie et al., 1999).

Nutrition Campaign Knowledge: This is a binary variable and is defined as answering three questions regarding MyPlate nutrition guidelines correctly (all correct vs. not all correct). Each item was scored as correct or incorrect based on MyPlate dietary recommendations (U.S. Department of Agriculture, 2012).

Perceived Weight Status: This is a categorical variable and is defined as the participant's perception of his or her own weight status (underweight vs. right weight vs. overweight vs. very overweight). It was assessed using one item: "How do you describe your weight?"

Weight Intentions: This is a binary variable and is defined as the participant's intentions to change his or her weight (lose weight vs. not lose weight). It was assessed using one item: "which of the following are you trying to do about your weight," and responses were dichotomized into students who reported they were trying to "lose weight" and those who reported they were trying to "gain weight", "stay the same weight", and "I am not trying to do anything about my weight."

Actual Weight Status: This is an ordinal variable and is created using FITNESSGRAM height and weight data. Body mass index (BMI) and gender- and age-specific BMI percentiles were calculated using the 2000 CDC Growth Charts for ages 2 to <20 years. The variable was then defined as underweight for percentiles <5, healthy weight for percentiles ≥5 and <85, overweight for percentiles ≥85 and <95, and obese for percentiles ≥95 (Kuczmarski et al., 2000).

Independent Variables (school-level)

School Socioeconomic Status (SES): This is a continuous variable and is defined as the percent of students at the school participating in the National School Breakfast and Lunch Programs (California Department of Education, 2015). School-level participation in these meal programs is an established proxy for individual-level poverty (Day et al., 2016) and thereby provides important descriptive information about the socioeconomic makeup of the school.

School Size: This is a continuous variable and is defined as the number of students enrolled in the school (California Department of Education, 2015).

School Type: This is a categorical variable and is defined as the type of public school (charter school vs. magnet school vs. regular). A magnet school is a school that focuses on a special area of study, such as science or performing arts, and a charter school is a publicly funded school that is governed by a group or organization under a legislative contract (i.e., charter) with the state or district (California Department of Education, 2015).

School PA Spaces: This is a continuous variable and is defined as the amount of space available at the school for leisure-time PA, measured in square yards. As described above, this information was recorded during the SPARC Pre-Audit by asking school staff to identify areas

open to students for play and physical activity before school, after school, and during lunch and nutrition (i.e., morning break), and measuring the dimensions of these areas.

Control Variables

Race/Ethnicity: This is a binary variable (Latino vs. Non-Latino). Students self-reported race/ethnicity on the survey, and the variable was dichotomized into Latino and Non-Latino responses due to the distribution of responses.

Language Spoken at Home: This is a categorical variable and is defined as the primary language spoken at home (English only vs. Spanish only vs. Both English and Spanish vs. Other).

Female Caregiver Education: This is an ordinal variable that indicates the highest level of education completed by the participant's female caregiver (parent or guardian). The categories were: less than high school, high school, some college, college, more than college.

Intervention Status: This is a binary variable (Intervention vs. Control).

Moderator variable

Gender: This is a binary variable (Female vs. Male).

Study One – Analysis Plan

Using descriptive statistics, I first examined the distributions of all variables using histograms, including means and standard deviations for the continuous variables and frequency distributions for the categorical variables. I also examined distributions of continuous variables for normality, and determined that transformations were not necessary. To check for multicollinearity of variables, I constructed a correlation matrix for continuous variables and used Cramer's V for categorical variables. Characteristics of the sample were summarized using descriptive statistics.

Analyses used hierarchical linear models in which students were nested within schools. By including school in the models as a random effect, as well as individuals in the case where observations were nested within students (Question 1.1), this modeling approach accounted for any additional variance due to the cluster-sampling design and the potential for observations obtained from students at the same school to be correlated (Raudenbush & Bryk, 2002). In addition, hierarchical modeling allowed school-level predictors to be accurately modeled as group-level covariates.

To address Question 1.1 (To what extent do early adolescents' physical activity and dietary behaviors change from seventh to eighth grade?), four outcome variables were used: (1) daily physical activity, (2) muscle-strengthening physical activity, (3) fruit consumption, and (4) vegetable consumption. Hierarchical linear regression models were used to determine the extent to which the four outcomes changed from seventh to eighth grade. The hierarchical models included two measurements (i.e., seventh and eighth grade) nested within students, who were nested within schools; as such, models included an individual-level random effect and a school-level random effect. First, simple hierarchical linear regression models were fit to assess the bivariate association between the outcome of interest and the grade indicator variable. Next, models were fit including control variables: gender, race/ethnicity, language spoken at home, female caregiver education, intervention status (i.e., treatment condition), and an interaction term between the grade indicator variable and gender.

To address Question 1.2 (To what extent do individual and school level factors explain the change in early adolescents' physical activity and dietary behaviors from seventh to eighth grade?), four outcome variables were used: (1) daily physical activity change score, (2) muscle-

strengthening physical activity change score, (3) fruit consumption change score, and (4) vegetable consumption change score. Hierarchical linear regression models were used to determine the extent to which individual and school-level factors explained changes in physical activity and diet. Models included a school-level random effect. First, simple hierarchical models were fit to assess the bivariate association between the outcome of interest and each independent variable (individual and school-level). Next, a hierarchical model was fit including all covariates and controlling for additional potential confounders: gender, race/ethnicity, language spoken at home, female caregiver education, intervention status (i.e., treatment condition), and baseline level of each outcome.

To address Question 1.3 (Is the relationship between school level factors and the change in early adolescents' physical activity and dietary behaviors moderated by gender?), I built on the hierarchical linear regression models from Question 1.2 by testing whether gender acted as a moderator. Interactions between school-level covariates and gender were tested and only included in final models if significant ($p<0.05$).

All analyses were performed using Stata version 15.1 (StataCorp, 2017).

Study Two – Overview

Using data from the sources described above, Study Two aimed to **examine the relationship between the perceived school health environment and early adolescents' physical activity and dietary behaviors** by answering the following research questions:

Question 2.1: Which individual level factors affect early adolescents' perceptions of the school health environment?

Question 2.2: Is the perception of the school health environment associated with early adolescents' physical activity behaviors?

Question 2.2a: Is this relationship moderated by school level factors?

Question 2.3: Is the perception of the school health environment associated with early adolescents' dietary behaviors?

Question 2.3a: Is this relationship moderated by school level factors?

Study Two - Variables

The variables used in Study Two are described below. For reference, a table of the variables with items, response options, and coding is provided in Appendix A5. For variables that are based on student survey items, sources of survey items are provided in Table 4.1.

Dependent Variables

Recommended Daily Physical Activity (PA): This is a binary variable and is defined as reporting meeting recommendations for 60 minutes or more of daily PA during the previous seven days (did not meet recommendations vs. met recommendations) (U.S. Department of Health and Human Services, 2018).

Recommended Muscle-Strengthening PA: This is a binary variable and is defined as reporting meeting recommendations for three or more days of muscle-strengthening PA in the previous seven days (did not meet recommendations vs. met recommendations) (U.S. Department of Health and Human Services, 2018).

Fruit Consumption: As described above.

Vegetable Consumption: As described above.

Unhealthy Dietary Behaviors: This is a quasi-continuous variable and is defined as the self-reported frequency of soda, diet soda, sugar-sweetened beverage, sweets, salty snack, and fast food consumption during the previous seven days. It was calculated by converting the categorical responses (0 times during the past 7 days, 1-3 times during the past 7 days, 4-6 times during the past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day) into continuous responses (0, 2, 5, 7, 14, 21, 28 times in the past 7 days, respectively) and then summing the reported frequency of soda, diet soda, sugar-sweetened beverage, sweets, salty snack, and fast food consumption.

Primary Independent Variable

Perceived school health environment: This is a continuous variable and is defined as the student's perceptions of the school's effort to support healthy behaviors, specifically with regard to eating. This variable was calculated by summing the responses to three items (range 0-9). The internal consistency for this scale was α=0.62.

Covariates

School Socioeconomic Status (SES): As described above.

School Size: As described above.

School Type: As described above.

School PA Spaces: As described above.

Aggregate Perceived School Health Environment: This is a continuous variable and is defined as the school-level aggregate of students' perceptions of the school's effort to support healthy behaviors, specifically with regard to eating. This variable was calculated by taking the mean of the school health environment perception "score" at each school (range 0-9).

Control Variables

Gender: As described above.

Race/Ethnicity: As described above.

Language Spoken at Home: As described above.

Female Caregiver Education: As described above.

Intervention Status: As described above.

Study Two – Analysis Plan

Using descriptive statistics, I first examined the distributions of all additional variables (i.e., those not already examined in Study One) using histograms, including means and standard deviations for the continuous variables and frequency distributions for the categorical variables. I also examined distributions of continuous variables for normality and determined that transformations were not necessary. To check for multicollinearity of variables, I constructed a correlation matrix for continuous variables and used Cramer's V for categorical variables. Characteristics of the sample were summarized using descriptive statistics.

Analyses for Study Two used hierarchical linear and logistic models in which students were nested within schools. By including school in the models as a random effect, this modeling approach accounted for any additional variance due to the cluster-sampling design and the potential for observations obtained from students at the same school to be correlated (Raudenbush & Bryk, 2002). In addition, hierarchical modeling allowed school-level predictors to be accurately modeled as group-level covariates.

To address Question 2.1 (Which individual level factors affect early adolescents' perceptions of the school health environment?), one outcome variable was used: perceived

school health environment. A hierarchical linear regression model was used to determine which individual-level covariates were associated with perceptions of the school health environment. The model included a school-level random effect. First, a simple hierarchical model was fit to assess the bivariate association between the outcome and each covariate. Next, a model was fit controlling for potential confounders: race/ethnicity, language spoken at home, female caregiver education, and intervention status (treatment condition), and gender.

To address Questions 2.2 (Is the perception of the school health environment associated with early adolescents' physical activity behaviors?) and 2.2a (Is this relationship moderated by school level factors?), two binary outcome variables were used: (1) recommended daily physical activity, and (2) recommended muscle-strengthening physical activity. Hierarchical logistic regression models were used to determine the association between perceptions of the school health environment and each outcome variable. Models included a school-level random effect. First, simple hierarchical models were fit to assess the bivariate association between the outcome of interest and the primary independent variable (perceived school health environment score). Next, a model was fit including additional covariates and controlling for potential confounders: race/ethnicity, language spoken at home, female caregiver education, and intervention status (treatment condition), and gender. Interactions between the school-level covariates and perceived school health environment were tested and only included in final models if significant ($p<0.05$).

To address Questions 2.3 (Is the perception of the school health environment associated with early adolescents' dietary behaviors?) and 2.3a (Is this relationship moderated by school level factors?), three quasi-continuous outcome variables were used: (1) fruit consumption, (2)

vegetable consumption, and (3) unhealthy dietary behaviors. Hierarchical linear regression models were used to determine the association between perceptions of the school health environment and each outcome variable. Models included a school-level random effect. First, simple hierarchical models were fit to assess the bivariate association between each outcome of interest and the primary independent variable (perceived school health environment). Next, a model was fit including additional covariates and controlling for potential confounders: race/ethnicity, language spoken at home, female caregiver education, and intervention status (treatment condition), and gender. Interactions between school-level covariates and perceived school health environment were tested and only included in final models if significant ($p<0.05$).

All analyses were performed using Stata version 15.1 (StataCorp, 2017).

Qualitative Methods

For Study Three, in-depth qualitative interview data were collected from teachers and administrators recruited from schools that participated in Project SHAPE. This study aimed to **understand educators' perspectives on the ways in which schools influence the health of early adolescents** by answering the following research questions:

Question 3.1: How are physical activity and healthy eating promoted in middle schools?

Question 3.1a: What are the barriers and facilitators?

Question 3.2: How are school health promotion efforts actualized and sustained?

Question 3.3: How do educators view health promotion in middle schools?

Study Three - Participants

Recruiting from the same schools that participated in Project SHAPE, this study aimed to conduct interviews with one to two administrators and one to two staff members at each of the

16 study middle schools. Through the Project SHAPE project manager's and principal investigator's existing relationships with the district and study schools, a school administrator (e.g., principal, assistant principal, dean of instruction) at each study school was contacted via email and provided information regarding the new study. School administrators who expressed interest in participating in the study were contacted by the researcher to schedule an interview. For schools where administrators did not respond to the initial email (n=15), follow-up occurred by email, by phone, and through contacting one of the PE teachers who had participated in Project SHAPE. Following a purposive snowball sampling strategy, administrators were also asked to provide contact details for one to two staff members at the school who worked in a health-related capacity (e.g., health teacher, school health coordinator). These individuals were also contacted and provided information about the study, and those who expressed willingness to participate were scheduled for an interview. In some cases, administrators declined to participate but did forward study information on to staff members who did participate.

Study Three - Data Collection Procedures

Interviews were scheduled at the availability of the administrators and staff members and took place in a quiet, private location on site at the school. Prior to beginning the interview, participants were asked to provide written consent to participate and were informed that they may end the interview at any time. All interviewees gave permission for the interviews to be digitally recorded. The researcher conducted the interview and took notes. Interviews lasted approximately one hour on average.

The interviews included a semi-structured component and a structured component. Participants were asked to complete a structured interview, consisting of 19 closed-ended

questions regarding physical and social aspects of the school health environment (see Appendix A7). These items were developed through and adapted from a review of qualitative research around health promotion in schools and of resources designed for school-level assessments, such as the Nutrition Friendly Schools and Communities framework (Prelip et al., 2010) and others (Briefel et al., 2009; Durant et al., 2009; Kubik et al., 2005). Examples of items include: "The school has a written wellness policy" with response options "yes", "no", and "I don't know"; and "School administration supports efforts to promote health among all school community stakeholders, including staff, students, and families" with response options "strongly agree", "agree", "disagree", "strongly disagree", and "I don't know".

The semi-structured nature of the second part of the interviews allowed for exploration of important information related to the research topic and probing of concepts that emerged during the discussion, as well as permit the interviewee to guide the discussion (Seidman, 2013). The semi-structured interview guide (see Appendix A6) was developed based on a review of the existing school health literature, as described in Chapter 1, and the researcher's experience working with the study schools. The semi-structured interview guide focuses on three research areas: (1) capturing the school's efforts to promote healthy eating and physical activity, including barriers and facilitators, (2) exploring the elements of the school that contribute to actualizing and sustaining health promotion efforts, and (3) understanding educators' views of the school's role in addressing health issues.

Demographic information for each participant was also collected at the end of each interview. This information included: gender, race/ethnicity, current title, number of years under current title, number of years at current school, number of years as an educator, other

titles held as an educator, and current certifications or credentials. These data were used to describe the sample. Following each interview, a short memo was written by the researcher to record any immediate reactions and note details that may have been relevant during analysis. These memos were read prior to coding.

The semi-structured and structured interview guides were pre-tested with five educators and individuals familiar with school health research (i.e., key informants). The purpose of pre-testing was to determine whether the questions were clear, to gauge the flow of the interview, and to estimate the length of time needed for each segment. Minor modifications were made to the wording and order of questions as a result of pre-testing.

Study Three - Analysis Plan

Interviews were transcribed verbatim from the digital recording, and each transcription was validated for accuracy. Transcription and validation was completed through a secure transcription service (Rev.com). Coding and analysis was performed by the researcher using Dedoose version 8.1.8 (*Dedoose web application*, 2019).

In an embedded mixed methods research design, the assumptions of the design are established by the primary approach (Creswell & Plano Clark, 2011). In the case of this dissertation, the qualitative study is embedded in the larger quantitative study, which uses a deductive approach. As such, Study Three used post-positivist assumptions as the overarching paradigm and used a qualitative descriptive approach. This study aimed to capture a type of "thick description," (Geertz, 1973) or a description of social realities from the perspective of those who are being studied (Hesse-Biber & Leavy, 2011).

Qualitative descriptive studies seek to comprehensively summarize an experience or phenomenon through description and exploration rather than explanation (Lambert & Lambert, 2012). A qualitative descriptive approach allowed the researcher to stay close to the data (e.g., use the participants' own words) with more description and less interpretation than grounded theory, phenomenology, or other theory-generating approaches (Colorafi & Evans, 2016; Kim, Sefcik, & Bradway, 2017; Lambert & Lambert, 2012). A qualitative descriptive approach was suitable to this study because the primary aim was to understand the perspective of educators with regard to health promotion in the school setting.

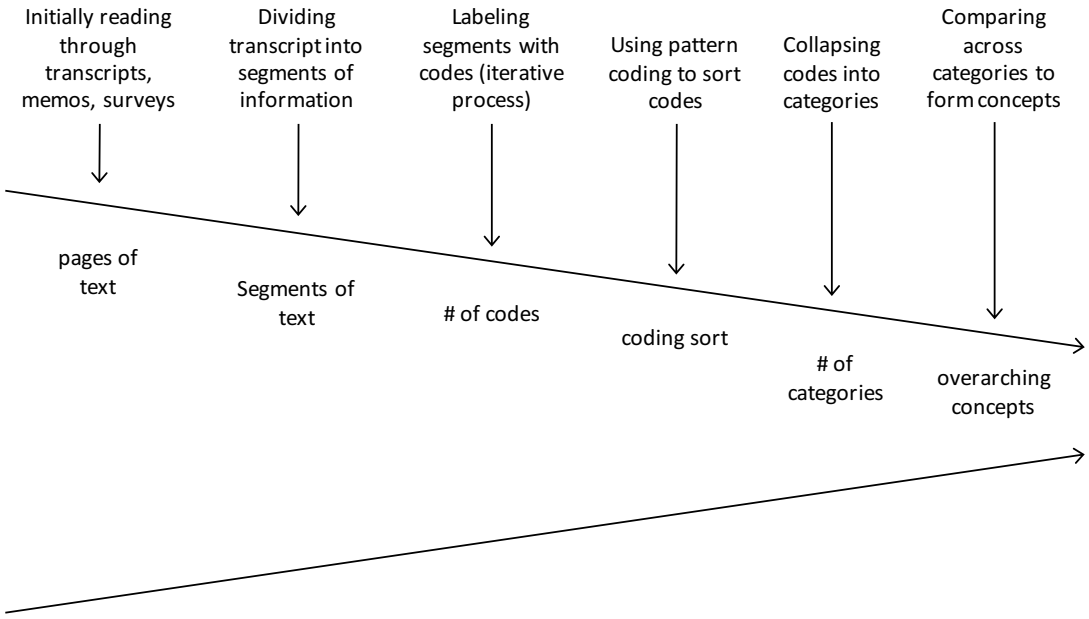

Figure 4.1. Visual Model of Qualitative Data Analysis
Source: Adapted from Creswell, 2012

Figure 4.1 provides a visual depiction of the data reduction strategy that was applied in the analysis of qualitative data (Creswell, 2012). Preliminary analysis through note-taking began before all interviews were completed, allowing for new understandings to be explored in subsequent interviews. After transcription of interviews, the transcripts were read for coding

purposes. Prior to coding each transcript, the corresponding memo and responses to the structured interview questions were read to re-orient the researcher to each interview.

An initial codebook was developed based on the semi-structured interview guide and was iteratively revised. The first cycle of coding used the initial coding structure, and codes were also inductively generated to systematically label passages of the transcript text. Various coding methods were applied, including in vivo, descriptive, process, and values coding (Miles, Huberman, & Saldaña, 2014).

The codebook generated after coding of the first transcript was used to code subsequent interviews. Emergent codes were added to the codebook, and the codebook was finalized after coding five interviews (one from each job title: principal, assistant principal, counselor, science teacher, and PE teacher). The revised codebook was used to analyze the transcripts a second time. Pattern coding was then used to group codes into a smaller number of categories, followed by identification of overarching concepts that brought together similar categories (Miles et al., 2014).

The demographic inventory was used to describe the sample. As with the researcher memos, responses to the structured interview were reviewed prior to coding of the interview transcript to provide a comprehensive picture of the participant's perspective.

Mixed Methods

As described previously, this dissertation employed an embedded mixed methods research design, in which the collection and analysis of quantitative data and interview data were combined within a traditional quantitative research design (Creswell & Plano Clark, 2011). Three principles motivated the mixed methods approach: (1) complementarity, or an

opportunity to examine overlapping and different facets of a phenomenon; (2) expansion, or adding breadth and scope to a project; and (3) initiation, or the possibility of discovering contradictions and new perspectives (Creswell & Plano Clark, 2011).

The quantitative survey data and qualitative interview data were "mixed" for several reasons. First, completeness refers to the idea that the two types of data provided a more comprehensive account of an area of research and allow for more complete understanding of the research questions (Bryman, 2006). In addition, this approach allowed for answering different research questions and providing context (Bryman, 2006). For example, the researcher was able to consider through the qualitative data collection and analysis anything that may have been missed by the quantitative data. Finally, integrating findings may increase their utility for application in the school setting (e.g., identifying things that have worked in some schools and disseminating this information to practitioners) (Bryman, 2006).

Integration of data and findings in this dissertation considered several factors. The researcher compared student responses to survey items regarding the school health environment to the teacher and administrator responses to related items. This allowed for assessment of whether students and adults within schools perceive the environment in similar or different ways—considering both comparison and triangulation. In addition, findings from the qualitative interviews were initially going to be used to inform post-hoc analysis of quantitative data. However, due to a smaller sample size than anticipated for Study Three, this analysis was not completed. Nonetheless, findings of all three studies were considered together in order to construct a more complete understanding of the ways in which the school context influences adolescent health and health behaviors.

CHAPTER 5: STUDY ONE – RESULTS AND DISCUSSION

Project SHAPE School Characteristics

Table 5.1 provides characteristics of Project SHAPE study schools. Study schools varied in size; across the 16 study schools, student enrollment during the baseline school year ranged from 411 to 2,532 students. Schools had an average enrollment of approximately 1,312 students (SD = 586.0). About three-quarters of the student body across all schools participated in the National School Breakfast and Lunch Programs. Schools also varied in the amount of space available on campus for physical activity, with 6,500 square yards as the minimum and over 41,000 yards at the maximum. On average, schools had approximately 29,000 square yards (SD = 12,900) of space available for physical activity, which is equivalent to approximately 6 acres. Of the 16 schools, eight were magnet schools (50%), one was a charter school (6.3%), and seven (43.7%) were regular schools.

Table 5.1. Characteristics of Project SHAPE Study Schools (N=16)

	N	% or Mean (SD)	Min	Max
Enrollment[1]	-	1,311.9 (586.0)	411	2,532
Meal Programs Participation[1,2]	15,500	73.8	49.9	94.2
Physical Activity Space (thousand square yards)	-	28.9 (12.9)	6.5	41.9
School Type				
Charter	1	6.3	-	-
Magnet	8	50.0	-	-
Regular	7	43.7	-	-

[1] 2014-2015 school year

[2] Number/percent of students enrolled in the National School Breakfast and Lunch programs

Source: California Department of Education (for enrollment, meal program participation, and school type); Author (for physical activity space)

Student Characteristics and Outcome Variables

Table 5.2 provides characteristics of the students who participated in the Project SHAPE student surveys at both time points (N=3,524). Approximately half of the sample (51.5%)

identified as female, and slightly more than two-thirds (72.2%) identified as Latino. At baseline, the mean age of respondents was 12.6 years, and the mean age of respondents at follow up was 14.1 years. The majority of students spoke both English and Spanish at home (59.9%), and approximately another quarter of students reported speaking English only at home (25.6%). Information on mothers' education levels was collected only at follow up but was matched to participants who completed both surveys. Approximately half of the sample reported that their female parent or guardian completed less than high school, high school, or some college, about a quarter reported that she completed college or more than college, and another quarter reported that they did not know.

Table 5.2. Characteristics of Project SHAPE Student Survey Participants – Study One (N=3,524)

	% or Mean (SD)
Female	51.5
Latino	72.2
Age at baseline	12.6 (0.5)
Age at follow up	14.1 (0.4)
Language Spoken at Home	
English	25.6
Spanish	8.0
English and Spanish	59.9
Other	6.5
Mother's Education	
Less than High School	17.5
High School	20.8
Some College	9.6
College	15.9
More than College	9.4
Don't know	26.9
Intervention	38.6

Note: Because of missing data, some summary statistics presented here were calculated with smaller sample sizes than reported in the table. Percentages may not sum to 100 due to rounding.

Table 5.3 provides a summary of Study One outcome variables and bivariate tests for changes in behavior between baseline and follow up. At baseline, students reported being active for at least 60 minutes for an average of 4.61 days during the previous week, and there was no significant change in this behavior at follow up found here. The mean change score from baseline to follow up was -0.10 days for daily PA. The average number of days students completed muscle-strengthening exercises was 3.35 at baseline, and this decreased to 2.92 at follow up ($p<0.001$). The mean change score for muscle-strengthening PA was -0.43 days.

Students reported consuming fruit an average of 8.65 times in the previous week, with no significant change from baseline to follow up. The mean change score for fruit consumption was -0.29. Vegetables were consumed 6.62 times in the previous week at baseline, and this significantly reduced to 6.25 times at follow up. The mean change score for vegetable consumption was -0.37.

Table 5.3. Summary of Study One Outcome Variables (N=3,524)

	Baseline Mean (SD)	Follow up Mean (SD)	Change Mean (SD)
Days of 60 minutes of PA[1]	4.61 (2.0)	4.51 (2.0)	-0.10 (2.4)
Days of muscle-strengthening PA[1]	3.35 (2.1)	2.92 (2.2)***	-0.43 (2.6)
Frequency of fruit consumption[2]	8.65 (8.3)	8.36 (7.8)	-0.29 (9.6)
Frequency of vegetable consumption[2]	6.62 (7.2)	6.25 (6.7)*	-0.37 (8.2)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Significant differences in study one behaviors between baseline and follow up were tested using Wald tests in hierarchical linear regression models.
Note: PA = Physical Activity. Because of missing data, some summary statistics presented here were calculated with smaller sample sizes than reported in the table.
[1]Number of days during the previous week
[2]Number of times during the previous week

Results

Study One aimed to examine the changes in and determinants of early adolescents' physical activity and dietary behaviors during middle school. Table 5.4 presents the results of

analyses for Question 1.1 (To what extent do early adolescents' physical activity and dietary behaviors change from seventh to eighth grade?), which are shown as hierarchical linear regression models predicting each of the four behaviors.

In the model predicting days of at least 60 minutes of PA, the significant negative interaction term for gender and follow up suggests that there was no change in daily PA for boys, but for girls, there was a significant decline in daily PA of an average of about a third of a day. Similarly, for muscle-strengthening PA, the interaction term was also significant. This suggests that there was a small decrease in muscle-strengthening PA among boys (-0.19 days), and a larger decrease among girls (-0.62 days). These relationships are depicted in Figures 5.1 and 5.2. When controlling for covariates and control variables, no significant change in fruit or vegetable consumption was observed; however, girls and Latino students reported consuming fewer vegetables than boys and non-Latino students, respectively.

Students who reported speaking Spanish or both English and Spanish at home had significantly more days of muscle-strengthening PA and significantly higher fruit consumption than those who reported speaking only English at home. Students who reported speaking another language at home had significantly higher vegetable consumption than English-only speakers. Higher education of the mother or female caregiver was associated with more days of 60 minutes of PA. This was also true for muscle-strengthening PA for students whose mother or female caregiver completed more than college compared to those who completed less than high school, as well as for fruit and vegetable consumption for students whose mother or female caregiver completed college or more than college.

Table 5.4. Hierarchical Linear Regression Models Predicting Physical Activity and Dietary Behaviors During Previous 7 Days

Coefficients	Days of at least 60 Minutes of PA B (SE(B)) N = 4,708	Days of Muscle Strengthening PA B (SE(B)) N = 4,708	Frequency of Fruit Consumption B (SE(B)) N = 4,710	Frequency of Vegetable Consumption B (SE(B)) N = 4,702
Fixed Effects				
Follow-up (8th grade)	0.02 (0.06)	-0.19 (0.06)**	-0.01 (0.16)	-0.18 (0.14)
Female	-0.31 (0.07)***	-0.30 (0.08)***	-0.35 (0.20)	-0.72 (0.17)***
Follow-up x Female	-0.33 (0.08)***	-0.43 (0.09)***	-	-
Latino	-0.11 (0.07)	-0.08 (0.07)	-0.50 (0.28)	-0.77 (0.24)**
Language at Home				
English (ref)				
Spanish	0.19 (0.10)	0.26 (0.11)*	1.39 (0.41)**	0.65 (0.35)
English and Spanish	0.12 (0.07)	0.19 (0.07)*	0.73 (0.28)*	0.19 (0.24)
Other	0.03 (0.10)	0.12 (0.10)	0.72 (0.40)	1.10 (0.34)**
Mother's Education				
Less than High School (ref)				
High School	0.20 (0.08)*	0.13 (0.09)	0.07 (0.34)	0.34 (0.29)
Some College	0.34 (0.10)**	0.12 (0.11)	0.44 (0.41)	0.49 (0.35)
College	0.31 (0.09)**	0.16 (0.10)	0.84 (0.37)*	1.03 (0.32)**
More than College	0.56 (0.10)***	0.52 (0.11)***	1.44 (0.43)**	1.78 (0.37)***
Don't know	0.07 (0.08)	-0.06 (0.08)	0.18 (0.32)	0.37 (0.27)
Intervention School	0.02 (0.19)	-0.48 (0.21)*	0.10 (0.38)	0.18 (0.28)
Intercept[1]	4.56 (0.16)***	3.57 (0.18)***	8.08 (0.45)***	6.59 (0.37)***
Random Effects				
School Level Error Variance[2]	0.12***	0.16***	0.37***	0.18***
Student Level Error Variance[2]	0.97***	1.10***	19.16***	32.8***

* p < 0.05, ** p < 0.01, *** p < 0.001. Note: PA = Physical Activity

[1]Intercept represents baseline level of this behavior (7th grade)

[2]Significance of school and student level error variance were tested using likelihood ratio tests.

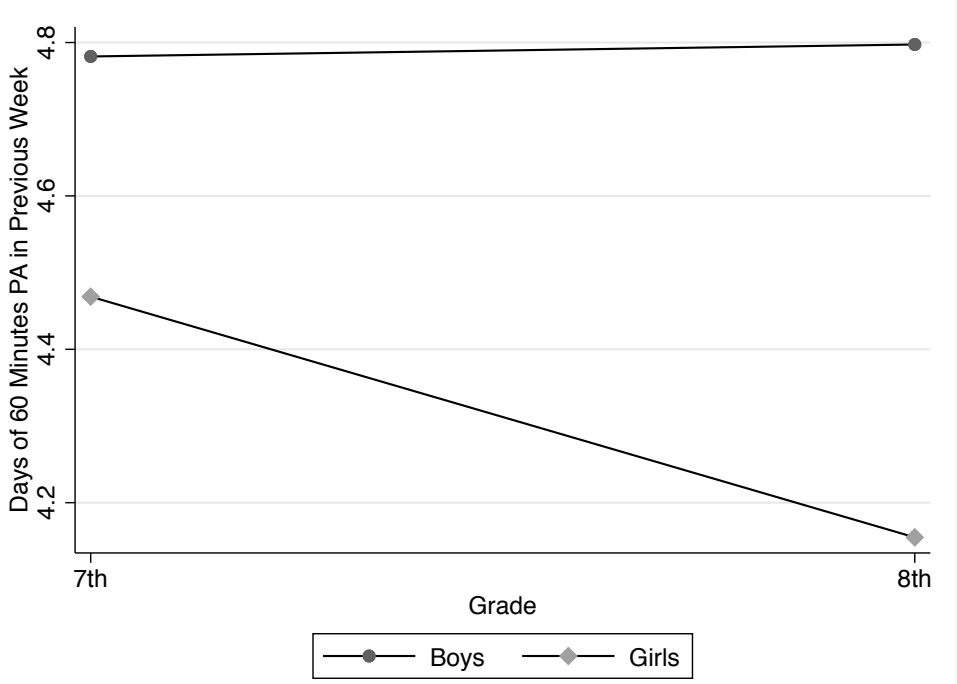

Figure 5.1. Relationship Between Grade and Daily Physical Activity by Gender

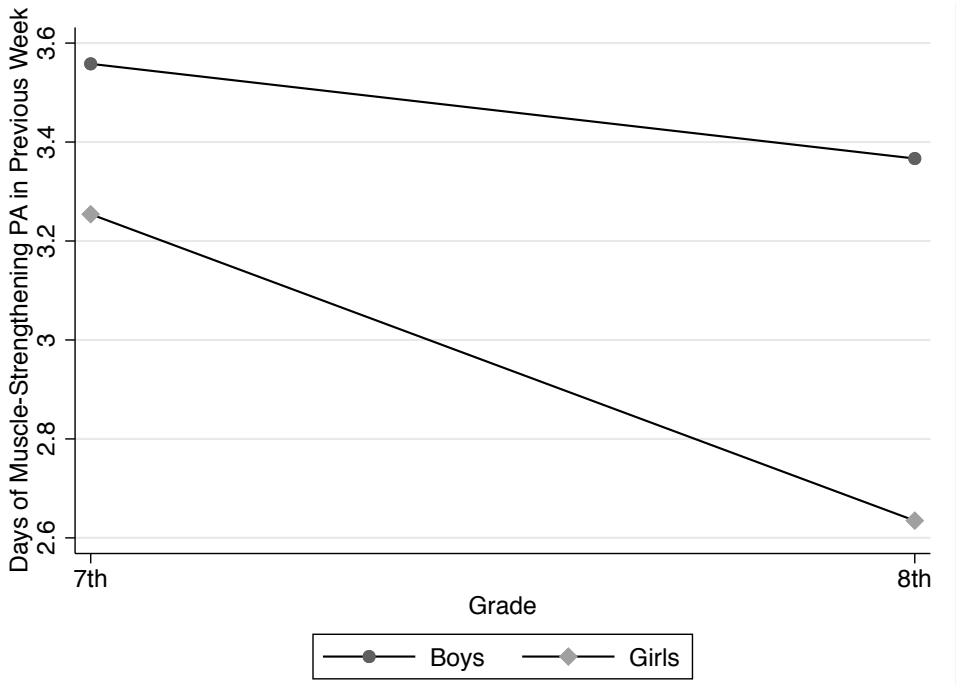

Figure 5.2. Relationship Between Grade and Muscle-Strengthening Physical Activity by Gender

Table 5.5 presents the hierarchical linear regression models predicting changes in physical activity and dietary behaviors to answer Question 1.2 (To what extent do individual and school level factors explain the change in early adolescents' physical activity and dietary behaviors from seventh to eighth grade?). Students who reported having high access to PA resources and space and those who reported high support for PA from friends showed positive changes in both PA behaviors during middle school compared to students with low access or support, respectively. Having a positive attitude towards PA was associated with a positive change in daily PA, fruit consumption, and vegetable consumption. In addition, perceiving oneself as overweight was associated with having a decline in muscle-strengthening PA relative to students who perceived themselves to be underweight. Compared to boys, girls showed declines in both PA behaviors, and compared to English-only speakers, those who reported speaking Spanish at home showed more positive changes in muscle-strengthening PA only. Students with high family support for PA were protected against declines in fruit and vegetable intake. In addition, those who reported speaking a language other than English or Spanish at home showed positive changes in fruit and vegetable intake from baseline to follow up. For all four behaviors, a higher level at baseline was associated with a decline in the behavior.

With regard to school level factors, the following results were observed. Students at schools with a higher percent of meal program participation had negative changes in days of 60 minutes of PA, and students at magnet schools showed positive changes in both PA outcomes compared to students at regular schools. Surprisingly, students at schools with more space available for PA had negative changes in both PA outcomes and in fruit intake.

Finally, Question 1.3 (Is the relationship between school level factors and the change in early adolescents' physical activity and dietary behaviors moderated by gender?) was assessed by testing for interactions between gender and each school level factor, and none of these interactions were significant (Appendix B1). As such, they are not included in Table 5.5.

Table 5.5. Hierarchical Linear Regression Models Predicting Changes in Physical Activity and Dietary Behaviors

Coefficients	Change in Number of Days of 60 Minutes of PA B (SE(B)) N = 2,158	Change in Number of Days of Muscle-Strengthening PA B (SE(B)) N = 2,161	Change in Frequency of Fruit Consumption B (SE(B)) N = 2,181	Change in Frequency of Vegetable Consumption B (SE(B)) N = 2,165
Fixed Effects				
Individual Level Factors				
Positive PA Attitude	0.40 (0.10)***	0.16 (0.11)	0.76 (0.38)*	0.79 (0.32)*
Safe Neighborhood	-0.06 (0.09)	-0.02 (0.10)	-0.03 (0.34)	-0.35 (0.28)
High Access to PA Resources	0.35 (0.09)***	0.30 (0.09)**	0.24 (0.33)	0.05 (0.27)
High Friend Support for PA	0.32 (0.11)**	0.34 (0.12)**	-0.33 (0.44)	-0.69 (0.36)
High Family Support for PA	0.11 (0.09)	0.19 (0.10)	0.98 (0.36)**	1.12 (0.30)***
Nutrition Campaign Knowledge	-0.21 (0.13)	-0.41 (0.15)**	-0.23 (0.52)	-0.11 (0.43)
Weight Perception				
Underweight (ref)				
Right Weight	0.15 (0.11)	0.00 (0.12)	0.12 (0.43)	-0.35 (0.36)
Overweight	-0.05 (0.14)	-0.32 (0.16)*	-0.15 (0.55)	-0.49 (0.47)
Very Overweight	0.17 (0.21)	-0.01 (0.23)	-0.37 (0.81)	-0.13 (0.69)
Trying to Lose Weight	0.15 (0.10)	0.18 (0.11)	-0.01 (0.39)	0.08 (0.32)
Weight Status				
Healthy (ref)				
Overweight	-0.02 (0.12)	-0.03 (0.13)	0.50 (0.45)	0.64 (0.38)
Obese	-0.03 (0.12)	-0.08 (0.13)	0.17 (0.47)	-0.13 (0.40)
Underweight	-0.21 (0.23)	-0.10 (0.25)	1.56 (0.89)	1.18 (0.75)
Control Variables				
Female	-0.50 (0.08)***	-0.62 (0.09)***	0.19 (0.32)	-0.30 (0.26)
Latino	-0.05 (0.11)	0.03 (0.13)	-0.30 (0.44)	-0.60 (0.37)
Language at Home				
English (ref)				
Spanish	0.22 (0.18)	0.42 (0.20)*	0.95 (0.69)	0.03 (0.58)

English and Spanish	0.01 (0.12)	0.10 (0.13)	0.66 (0.45)	0.03 (0.38)
Other	0.05 (0.16)	0.24 (0.17)	1.28 (0.61)*	1.03 (0.51)*
Mother's Education				
Less than High School (ref)				
High School	0.12 (0.13)	0.17 (0.15)	0.36 (0.51)	-0.30 (0.43)
Some College	0.24 (0.16)	0.21 (0.18)	0.49 (0.62)	0.69 (0.52)
College	0.27 (0.14)	0.17 (0.16)	1.03 (0.56)	0.78 (0.47)
More than College	0.32 (0.17)	0.28 (0.19)	0.95 (0.66)	0.59 (0.55)
Don't know	0.03 (0.12)	-0.01 (0.13)	0.75 (0.48)	0.38 (0.40)
Intervention School	-0.14 (0.13)	-0.42 (0.17)*	0.39 (0.51)	0.87 (0.43)*
Baseline Level of Behavior	-0.78 (0.02)***	-0.78 (0.02)***	-0.69 (0.02)***	-0.71 (0.02)***
School Level Factors				
% Meal Program Participation	-0.01 (0.00)*	-0.00 (0.00)	-0.01 (0.01)	-0.01 (0.01)
Enrollment	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
School Type				
Regular (ref)				
Magnet	0.50 (0.14)***	0.46 (0.18)*	0.19 (0.54)	0.06 (0.45)
Charter	0.45 (0.32)	0.77 (0.41)	0.41 (1.24)	-0.67 (1.04)
PA Space at School[2]	-0.02 (0.01)***	-0.02 (0.01)*	-0.06 (0.02)*	-0.01 (0.02)
Intercept	3.59 (0.38)***	2.66 (0.49)***	5.77 (1.45)***	3.75 (1.22)***
Random Effects				
School Level Error Variance[1]	0.00	0.01	0.00	0.00

* p < 0.05, ** p < 0.01, *** p < 0.001. Note: PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Discussion

In general, this study found that participation in daily physical activity was low in both seventh and eighth grade. On average, students in the current study reported being active for at least an hour on fewer than five days a week in seventh grade. This level of activity was even lower in eighth grade. It is recommended that early adolescents participate in physical activity for at least an hour every day of the week (U.S. Department of Health and Human Services, 2018); on average, this recommendation was not met in either grade in the current study. In seventh grade, students reported doing muscle-strengthening physical activity for an average of approximately three days a week, which is in accordance with physical activity recommendations (U.S. Department of Health and Human Services, 2018). However, muscle-strengthening physical activity declined to fewer than three days a week in eighth grade, suggesting that there may be a worrisome trend in this behavior as well. This study also found that consumption of fruits and vegetables was low in both seventh and eighth grade; students reported eating fruits and vegetables on average only approximately eight and six times per week, respectively, in seventh grade, with slightly lower rates of consumption in eighth grade as well. These levels of consumption are far below dietary guidelines for this age group, which recommend a minimum of five fruits or vegetables each day (Produce for Better Health Foundation, 2019).

Previous studies have found similarly low rates of physical activity and consumption of fruits and vegetables among this age group nationally and in California (Fakhouri et al., 2014; UCLA Center for Health Policy Research, 2013, 2017). Infrequent physical activity and low intake of fruits and vegetables among early adolescents is concerning for several reasons. Regular

physical activity supports healthy development, including physical, cognitive, and social domains of development (Biddle & Asare, 2011; Strong et al., 2005). Lack of regular activity is associated with higher body fat, weaker bones and muscles, lower cardiorespiratory fitness, and increased risk for mortality and burden of disease (U. E. Bauer et al., 2014; Lee et al., 1999; U.S. Department of Health and Human Services, 2018). Poor diet quality during adolescence is also associated with important risk factors for chronic disease, such as obesity and metabolic syndrome (Alberga et al., 2012; Todd et al., 2015).

In addition to the low rates themselves, declines in physical activity and diet quality during adolescence are also a cause for concern. Worsening diet quality during adolescence has been observed by previous studies (Alberga et al., 2012; Demory-Luce et al., 2004; Todd et al., 2015), particularly with regard to consuming inadequate quantities of fruits and vegetables (Gu & Tucker, 2017; Hoelscher et al., 2002; Lien et al., 2001). Previous research has also suggested that physical activity declines as much as 7% per year during adolescence (Borraccino et al., 2009; Dumith et al., 2011). The current study found very similar average declines from seventh to eighth grade: a 7.2% decline in the number of days of 60 minutes of physical activity among girls, a 5.3% decline in the number of days of muscle-strengthening physical activity among boys, and a 17% decline in the number of days of muscle-strengthening physical activity among girls.

A decline in physical activity and diet quality during early adolescence is particularly concerning for several reasons. Along with sedentary behavior (e.g., watching TV, using mobile devices, playing console games), physical activity and dietary behaviors tend to cluster in young adolescents in unhealthy ways (D. A. Cohen et al., 2014; Hills et al., 2013; Leech et al., 2014).

Research suggests that sedentary behavior increases during adolescence (Sisson et al., 2009). Taken together, a decline in physical activity and an increase in sedentary behavior puts youth at higher risk for poor health in the short and long term (U.S. Department of Health and Human Services, 2018). When combined with typical physical changes to the body that occur during early adolescence, these behavior changes put early adolescents at risk for excess weight gain and associated morbidities (Todd et al., 2015). Unhealthy dietary intake only compounds these issues. Moreover, physical activity and dietary habits developed in early adolescence are linked to adult lifestyle choices (Trudeau et al., 2004; U.S. Department of Health and Human Services, 1996). While these findings are concerning and warrant intervention to prevent declines in physical activity and diet quality, they are also not surprising given salient biological, social, and environmental influences (e.g., hormonal changes, peer influence, social norms). Public health efforts must consider this complex milieu of factors when planning interventions addressing adolescent health behaviors.

Looking in more depth at changes from seventh to eighth grade, it was observed that declines in physical activity were more pronounced for girls than for boys. In the regression models predicting changes in physical activity (Table 5.5), girls were also more likely to experience a decline in physical activity than were boys. Previous research has also found lower levels of physical activity and greater declines in physical activity among middle school girls compared to middle school boys (Dumith et al., 2011; Gill et al., 2017; Leech et al., 2014; Prochaska et al., 2002; Sterdt et al., 2014; Telford, Telford, Olive, Cochrane, & Davey, 2016). This gender disparity persists into later adolescence and young adulthood as well (Armstrong et al., 2018). As such, examining gender differences in physical activity at the point when this

disparity emerges is critical. Understanding factors underlying these differences has the potential to inform interventions, particularly those that are school-based and serve both boys and girls.

Previous research has suggested that lower rates of physical activity among girls may be related to less participation in organized sports or perceiving less support or enjoyment for physical activity and physical education (Telford et al., 2016). This disparity is also rooted in the socialization of girls and boys, which produces gender norms that discourage physical activity for girls. For example, reduced participation in extracurricular sports may actually be indicative of fewer opportunities for or less support of girls' athletics programs (Telford et al., 2016). Gender differences in physical activity also came up in qualitative interviews for Study Three, which will be discussed in more detail in Chapter 7. Interviewees described gender differences in middle school physical activity, particularly in later grades and in mixed gender physical education classes. Future research should continue to examine and identify factors that promote physical activity, with particular emphasis on making physical activity accessible and desirable for girls.

Beyond gender, several additional individual level factors helped to explain the changes in physical activity behaviors from seventh to eighth grade found in this study. For example, perceived access to physical activity resources and equipment, as well as support from friends were protective against declines in both types of physical activity behaviors. Other studies have also pointed to the importance of interpersonal relationships (Duncan et al., 2005; Gill, Chan-Golston, et al., 2018; Prochaska et al., 2002) and environmental factors, including access to equipment and space for physical activity (Babey, Hastert, Yu, & Brown, 2008; Ding, Sallis, Kerr,

Lee, & Rosenberg, 2011; Gill, Chan-Golston, et al., 2018), as facilitators of physical activity among early adolescents. Interestingly, family support for physical activity was not associated with changes in either physical activity behavior examined in this study. Previous studies have demonstrated the importance of family support for physical activity participation (Duncan et al., 2005; Gill, Chan-Golston, et al., 2018; Prochaska et al., 2002). However, this finding underscores the growing influence of peers during the early adolescent developmental period and the salience of social support from friends for preventing declines in physical activity. Youth physical activity interventions should include group activities and foster peer supportive behaviors in order to harness the potential of peer social support for physical activity.

Perceiving oneself to be overweight was also associated with reporting a decline in muscle-strengthening physical activity. Other than this relationship, neither perceived nor actual weight status, nor reporting trying to lose weight were associated with any changes in physical activity or diet. It is possible that students who perceived themselves to be overweight felt more self-conscious about being active, specifically with regard to muscle-strengthening activities. This phenomenon was also observed by PE teachers interviewed in Study Three. A growing body of literature is examining the relationship between physical activity outcomes, body size, and internalized stigma among early adolescents (Rukavina & Li, 2007). Obesity bias, or weight-related teasing and criticism, during physical activity has damaging psychological and emotional effects on youth, and creates resistance to physical activity among overweight or obese adolescents (Hayden-Wade et al., 2005; Maïano et al., 2018; Rukavina & Li, 2007). School- and community-based physical activity programming should emphasize inclusivity and

promotion of a safe and positive climate for physical activity so as not to deter youth of varying body sizes.

Some individual level factors also helped to explain the changes in fruit and vegetable consumption from seventh to eighth grade observed in this study. High family support for physical activity was associated with reporting an increase in fruit and vegetable intake over time. Because family support for healthy eating was not measured, it is possible that family support for physical activity served as a proxy for having family support for healthy behaviors in general. Previous research also suggests that dietary behaviors of early adolescents are closely related to home availability of fruits and vegetables and family support (Neumark-Sztainer et al., 2003). In addition, speaking a language other than Spanish or English at home was associated with an increase in fruit and vegetable intake. Language usage is frequently used as a proxy for acculturation to the U.S., and acculturation has been found to be a risk factor for unhealthy dietary behaviors among Latino and Asian-American adolescents (Unger et al., 2004). This finding should be examined further using a larger sample of non-English, non-Spanish speakers.

Lastly, several school level factors were associated with changes in both physical activity and dietary behaviors. Higher school-level participation in the National School Breakfast and Lunch programs was associated with a decline in daily physical activity. Participation in school meal programs is a commonly used proxy for school socioeconomic status (Day et al., 2016). Previous studies have also documented the relationship between socioeconomic status and unhealthy behaviors (Dumith et al., 2011; Hanson & Chen, 2007b, 2007a; Mielke et al., 2017). The finding that school socioeconomic status is also associated with a decline in physical activity

suggests that schools serving lower income youth may be less equipped to support physical activity in later grades, possibly because of added pressure for academic performance (McMurrer & Kober, 2007; Stullich et al., 2006; Tienken & Zhao, 2013). However, it is important to note that individual-level socioeconomic status, measured as mother's education, was not associated with a decline in physical activity. This finding suggests that school-level socioeconomic status is more salient in influencing physical activity among this age group. Further research is needed to examine the varying influence of individual- and school-level socioeconomic status on early adolescents' health behaviors.

Interestingly, being a student at a magnet school was protective against declines in physical activity behaviors. Magnet schools or schools with magnet programs are unique because they incorporate a focus on a special area of study, such as science or performing arts. Some evidence suggests that magnet schools concentrate race and class advantage (Davis, 2014; Saporito, 2003). There may be unobserved social characteristics at magnet schools (e.g., stronger or different school culture) that also contributed to protective effects on physical activity. Overall, the effects of magnet and charter schools on inequality are not yet fully understood (Riel, Parcel, Mickelson, & Smith, 2018). Findings related to magnet schools also emerged from the qualitative interviews in Study Three and will be discussed in more detail in Chapter 7.

Finally, this study found that being at a school with more space available for physical activity was actually associated with declines in both types of physical activity and a decline in fruit intake. This finding was counterintuitive; however, it must be noted that having space available for physical activity does not necessarily mean that students are using it. As many of

the other findings of this study suggest, physical activity and fruit and vegetable consumption are complex behaviors, particularly during the middle school period, and simply providing space is not enough to manifest protective behaviors. Moreover, students also spend a significant amount of time at home, where the availability of physical activity space or equipment may not be the same as it is at school. Interventions aiming to improve rates of physical activity among early adolescents must consider relevant factors at multiple levels (i.e., inter- and intrapersonal and environmental), particularly peer influence and support, gender norms, developmental changes, and access.

CHAPTER 6: STUDY TWO – RESULTS AND DISCUSSION

Student Characteristics and Outcome Variables

Table 6.1 provides characteristics of the students who participated in the Project SHAPE student survey at follow up (N=4,885). About half of the participants (49.3%) identified as female, and 70% identified as Latino. The mean age of this group of respondents was 14.1 years. Speaking both English and Spanish at home was most common (57.4%), followed by speaking English only at home (27.1%), speaking Spanish only at home (8.1%), and speaking another language (7.3%). Approximately half of the sample reported that their female parent or guardian completed less than high school, high school, or some college, about a quarter reported that she completed college or more than college, and another quarter reported that they did not know.

Table 6.1. Characteristics of Project SHAPE Student Survey Participants – Study Two (N=4,885)

	% or Mean (SD)
Female	49.3
Latino	70.0
Age	14.1 (0.4)
Language Spoken at Home	
English	27.1
Spanish	8.1
English and Spanish	57.4
Other	7.3
Mother's Education	
Less than High School	16.4
High School	20.4
Some College	10.2
College	16.4
More than College	9.8
Don't know	26.7
Intervention	41.2

Note: Because of missing data, some summary statistics presented here were calculated with smaller sample sizes than reported in the table. Percentages may not sum to 100 due to rounding.

Table 6.2 provides a summary of Study Two outcome variables. At follow up, less than one-quarter of students (23.2%) met the daily PA recommendation of 60 minutes of PA every day during the past 7 days. In addition, 55% of students reported meeting the muscle-strengthening PA recommendation of at least 3 days of muscle-strengthening PA during the previous 7 days.

At follow up, students reported consuming fruits 8.61 times during the previous week and vegetables 6.45 times during the previous week. Students also reported consuming unhealthy food items (soda, diet soda, SSBs, sweets, salty snacks, and fast food) an average of 21.6 times during the previous week. Lastly, students scored an average of 3.9 on the perceptions of the school health environment scale, which ranged from 0-9, with 0 being negative perceptions and 9 being the most positive perceptions.

Table 6.2. Summary of Study Two Outcome Variables (N=4,885)

	% or Mean (SD)
Met daily PA recommendation[1]	23.2
Met muscle-strengthening PA recommendation[2]	55.0
Frequency of fruit consumption	8.61 (8.0)
Frequency of vegetable consumption	6.45 (6.9)
Frequency of unhealthy item consumption	21.60 (21.5)
Perceived School Health Environment score (0-9)	3.9 (1.9)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Significant differences in study one behaviors between baseline and follow up were tested using Wald tests in hierarchical linear regression models. Note: Because of missing data, some summary statistics presented here were calculated with smaller sample sizes than reported in the table.
[1] Daily PA recommendation: at least 60 minutes of moderate to vigorous PA daily
[2] Muscle-strengthening PA recommendation: include muscle-strengthening physical activity on at least 3 days a week

Results

Study Two aimed to examine the relationship between the perceived school health environment and early adolescents' physical activity and dietary behaviors. Table 6.3 presents

the results of analyses for Question 2.1 (Which individual level factors affect early adolescents' perceptions of the school health environment?). Only one variable was associated with students' perception of the school health environment. Compared to students whose mother or female caregiver completed less than high school, those whose mother or female caregiver completed high school had more positive perceptions of the school health environment.

Table 6.3. Hierarchical Linear Regression Model Predicting Perceived School Health Environment Score

Coefficients	Perceived School Health Environment score B (SE(B)) N = 4,633
Fixed Effects	
Female	0.03 (0.06)
Latino	-0.03 (0.09)
Language at Home	
English (ref)	
Spanish	0.03 (0.12)
English and Spanish	0.12 (0.08)
Other	0.01 (0.12)
Mother's Education	
Less than High School (ref)	
High School	0.21 (0.09)*
Some College	0.19 (0.11)
College	0.17 (0.10)
More than College	0.02 (0.12)
Don't know	0.11 (0.09)
Intervention School	-0.08 (0.15)
Intercept	3.81 (0.14)***
Random Effects	
School Level Error Variance[1]	0.07***

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

[1]Significance of school level error variance was tested using likelihood ratio tests.

Table 6.4 presents the hierarchical logistic regression models predicting meeting recommendations for daily and muscle-strengthening PA to answer Question 2.2 (Is perception

of the school health environment associated with PA behaviors?). The primary variable of interest, perception of the school health environment, was significantly associated with meeting the muscle-strengthening PA recommendation (OR=1.09) and marginally significantly associated with meeting the daily PA recommendation (OR=1.04).

Girls were less likely to meet both recommendations than boys. In addition, there was a threshold college effect for daily PA: students whose mother or female caregiver completed some college or more were more likely to meet the daily PA recommendation than students whose mother or female caregiver completed less than high school. For muscle-strengthening PA, only more than college was associated with a higher likelihood of meeting the recommendation. Question 2.2a (Is this relationship moderated by school level factors) was assessed by testing for interactions between perception of the school health environment and each school level factor, and none of these interactions were significant (Appendix B2). As such, they are not included in Table 6.4.

Table 6.4. Hierarchical Logistic Regression Models Predicting Meeting Physical Activity Recommendations

Coefficients	Met Daily PA Recommendation OR (95% CI) N = 4,610	Met Muscle-Strengthening PA Recommendation OR (95% CI) N = 4,604
Fixed Effects		
Perception of SHE	1.04 (1.00, 1.08)†	1.09 (1.06, 1.13)***
% Meal Program Participation	0.99 (0.98, 1.00)	1.00 (0.99, 1.02)
Enrollment	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
School Type		
Regular (ref)		
Magnet	1.07 (0.75, 1.53)	1.32 (0.79, 2.20)
Charter	1.17 (0.63, 2.20)	2.38 (0.86, 6.63)
PA Space at School[2]	0.99 (0.98, 1.00)	0.99 (0.97, 1.01)
Average SHE	0.67 (0.47, 0.96)*	0.82 (0.47, 1.42)
Female	0.47 (0.41, 0.55)***	0.52 (0.46, 0.59)***
Latino	0.82 (0.66, 1.02)	0.93 (0.77, 1.12)
Language at Home		
English (ref)		
Spanish	1.21 (0.88, 1.66)	1.22 (0.93, 1.60)
English and Spanish	1.06 (0.85, 1.31)	1.19 (0.99, 1.43)
Other	1.16 (0.88, 1.53)	1.16 (0.90, 1.50)
Mother's Education		
Less than High School (ref)		
High School	1.22 (0.95, 1.57)	1.03 (0.84, 1.26)
Some College	1.46 (1.09, 1.96)*	1.14 (0.89, 1.45)
College	1.37 (1.05, 1.80)*	1.12 (0.89, 1.40)
More than College	1.66 (1.23, 2.25)**	1.32 (1.02, 1.72)*
Don't know	1.24 (0.97, 1.57)	0.91 (0.75, 1.10)
Intervention School	0.99 (0.78, 1.26)	0.52 (0.36, 0.75)***
Random Effects		
School Level Error Variance[1]	0.11	0.27***

* p < 0.05, ** p < 0.01, *** p < 0.001; † p < 0.10 (marginally significant)

Note: SHE = school health environment, PA = physical activity

[1]Significance of school level error variance was tested using likelihood ratio tests.

[2]Unit: thousand square yards

Table 6.5 presents the hierarchical linear regression models predicting dietary behaviors to answer Question 2.3 (Is perception of the school health environment associated with diet?)

and Question 2.3a (Is this relationship moderated by school level factors?). For the models predicting frequency of fruit and vegetable consumption, there was a significant interaction between school-level meal program participation and perceptions of the school health environment. At schools with higher meal program participation (i.e., high poverty schools), the effect of perceptions of the school health environment on fruit and vegetable consumption was more positive. In other words, the extent to which perceptions affected consumption depended on the school socioeconomic status (Figures 6.1 and 6.2). On the other hand, perception of the school health environment was not associated with reported intake of unhealthy items. Interactions between perception of the school health environment and other school level factors were also tested, and none of these interactions were significant (Appendix B3). Only significant interactions are included in the table.

The main effect for school meal program participation was also significantly associated with fruit and vegetable consumption. All else equal, students at schools with higher meal program participation had lower fruit and vegetable consumption and reported higher intake of unhealthy food items. Girls reported lower vegetable consumption than boys, but boys reported higher consumption of unhealthy food items. Students who identified as Latino reported lower unhealthy item intake than those who identified as non-Latino. In addition, language spoken at home was associated with fruit and vegetable intake, but not unhealthy food items intake. Compared to English-only speakers, speaking Spanish or both English and Spanish at home was associated with higher fruit intake, while speaking Spanish or another language at home was associated with higher vegetable intake. Students with a mother or female caregiver who completed college or more than college had higher intake of fruits and

vegetables than those whose mother or female caregiver completed less than high school. Students who did not know their mother or female caregiver's education level reported higher consumption of unhealthy food items than those with less than high school.

Table 6.5. Hierarchical Linear Regression Models Predicting Dietary Behaviors

Coefficients	Frequency of Fruit Consumption B (SE(B)) N = 4,620	Frequency of Vegetable Consumption B (SE(B)) N = 4,584	Frequency of Unhealthy Item Consumption B (SE(B)) N = 4,519
Fixed Effects			
Perception of SHE	-0.33 (0.28)	0.30 (0.24)	-0.07 (0.16)
% Meal Program Participation	-0.06 (0.02)**	-0.05 (0.02)**	0.17 (0.03)***
Perception of SHE * % Meal Program Participation	0.01 (0.00)*	0.01 (0.00)*	--
Enrollment	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
School Type			
Regular (ref)			
Magnet	0.26 (0.53)	0.64 (0.53)	-0.10 (1.30)
Charter	0.84 (0.95)	1.06 (0.98)	0.79 (2.23)
PA Space at School[2]	-0.00 (0.00)	-0.00 (0.00)	-0.06 (0.05)
Average SHE	-0.37 (0.55)	-0.52 (0.56)	-4.52 (1.28)***
Female	-0.40 (0.24)	-0.67 (0.20)**	-1.84 (0.61)**
Latino	-0.66 (0.37)	-0.59 (0.31)	-2.16 (0.96)*
Language at Home			
English (ref)			
Spanish	1.89 (0.53)***	0.89 (0.45)*	0.99 (1.39)
English and Spanish	0.90 (0.36)*	0.33 (0.31)	1.30 (0.94)
Other	0.69 (0.50)	1.74 (0.42)***	-1.32 (1.30)
Mother's Education			
Less than High School (ref)			
High School	0.52 (0.39)	0.42 (0.33)	1.30 (1.02)
Some College	0.65 (0.48)	0.65 (0.41)	0.25 (1.25)
College	1.17 (0.44)**	1.32 (0.37)***	0.79 (1.14)
More than College	1.28 (0.50)*	1.65 (0.43)***	0.99 (1.31)
Don't know	0.59 (0.37)	0.57 (0.32)	2.27 (0.97)*
Intervention School	0.19 (0.35)	0.14 (0.36)	-1.17 (0.85)
Intercept	14.5 (3.17)***	11.72 (3.19)***	27.7 (6.99)***
Random Effects			
School Level Error Variance[1]	0.05	0.14*	0.00

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school level error variance was tested using likelihood ratio tests.

[2]Unit: thousand square yards

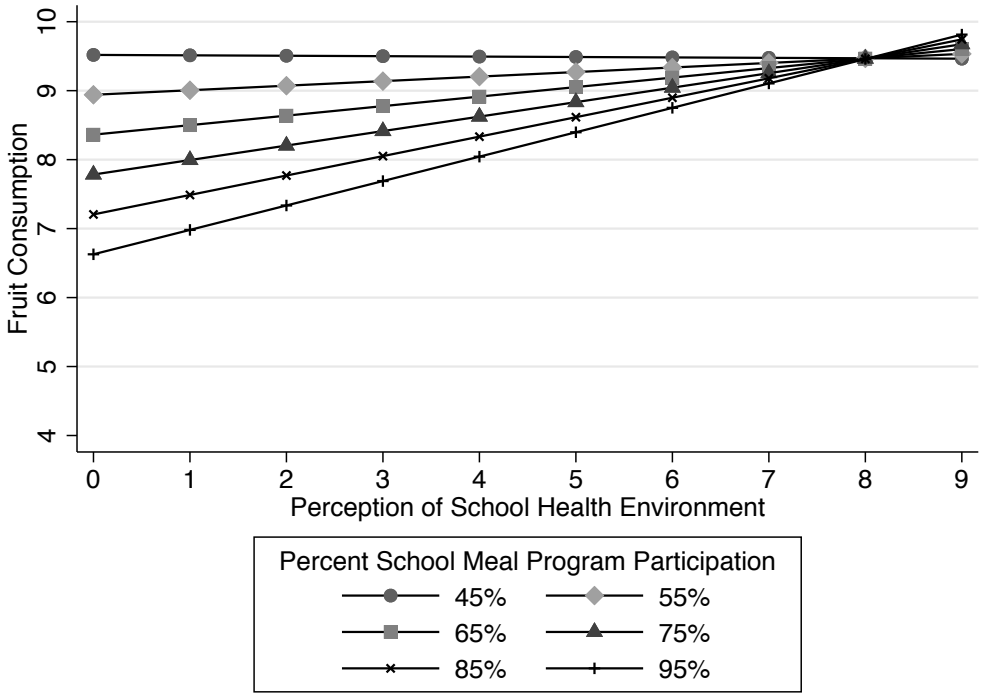

Figure 6.1. Relationship Between Fruit Consumption and Perception of School Health Environment by Level of School Meal Program Participation

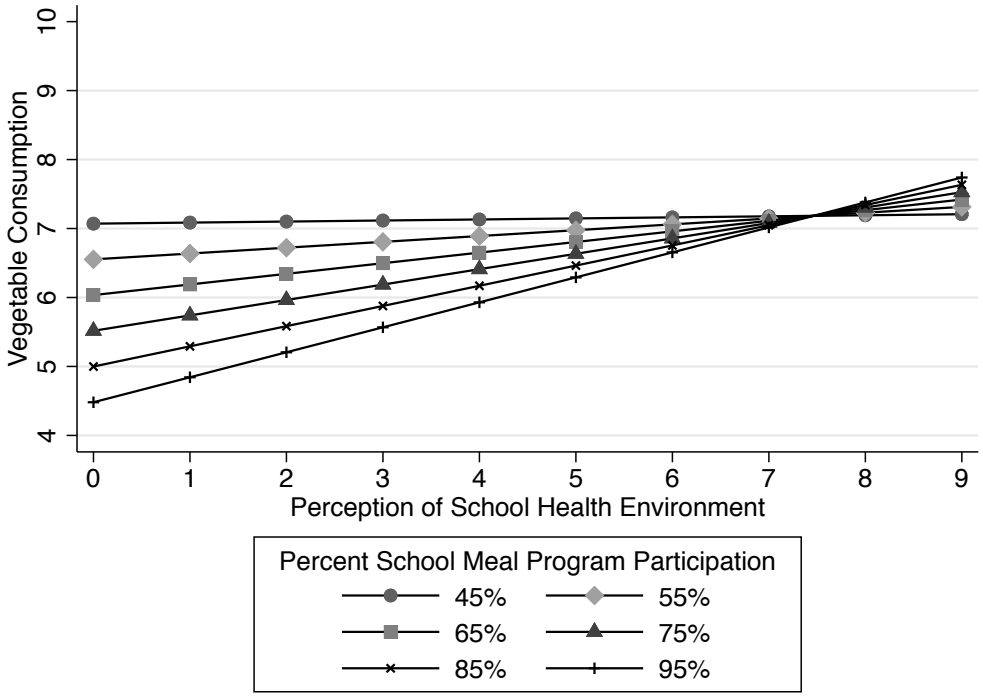

Figure 6.2. Relationship Between Vegetable Consumption and Perception of School Health Environment by Level of School Meal Program Participation

Discussion

In general, this study found that few eighth grade students met recommendations for daily or muscle-strengthening physical activity. National physical activity guidelines recommend that children and adolescents participate in at least 60 minutes of physical activity daily, as well as at least three days of muscle-strengthening physical activity (U.S. Department of Health and Human Services, 2018). Similar to previous research using national data (Fakhouri et al., 2014), less than a quarter of students in this study (23.2%) reported meeting the daily physical activity recommendation. This proportion was also similar to what was found by the Middle School Youth Risk Behavior Survey in Los Angeles in 2017 (29.2%) for eighth grade students (CDC, 2017b).

Compared to daily physical activity, a higher proportion of students reported meeting the muscle-strengthening physical activity recommendation (approximately 55%). While a similar measure was not available for eighth graders specifically, the California Health Interview Survey estimated that approximately 70.5% of 11-year-olds (i.e., sixth graders) statewide between 2014 and 2017 reported meeting this recommendation, and nationally, this proportion was 57.6% for ninth grade students in 2017 (CDC, 2017a). These rates support previously discussed findings regarding declines in physical activity during early adolescence and underscore the importance of promoting physical activity with middle school students.

Although a higher proportion of students reported meeting the muscle-strengthening physical activity recommendation compared to the daily physical activity recommendation, both findings are nonetheless concerning because of the important role that regular physical activity plays in healthy development. As discussed in Study One, regular physical activity

supports healthy physical, cognitive, and social development (Biddle & Asare, 2011; Strong et al., 2005) and is associated with lower body fat, stronger bones and muscles, higher cardiorespiratory fitness, and decreased risk for mortality and burden of disease (U. E. Bauer et al., 2014; Lee et al., 1999; U.S. Department of Health and Human Services, 2018). Moreover, early adolescence is a critical period for developing healthy physical activity habits that track into adulthood (Trudeau et al., 2004; U.S. Department of Health and Human Services, 1996). As such, addressing low rates of meeting physical activity recommendations is an urgent public health issue (U.S. Department of Health and Human Services, 2011)

Gender and mother's level of education were both associated with the likelihood of meeting physical activity recommendations. Compared to boys, girls had 53% lower odds of meeting the daily physical activity recommendation and 48% lower odds of meeting the muscle-strengthening recommendation. Gender differences in physical activity levels have been attributed to less participation by girls in extracurricular sports and lower perceived support for physical activity (Telford et al., 2016). Even in a case where girls were found to perceive higher support for physical activity from their families, this level of support did not translate into increased physical activity (Gill, Chan-Golston, et al., 2018). Together, these findings underscore the pervasiveness of gender norms and their influence on physical activity behaviors, particularly among young adolescent girls.

Unlike previous research, ethnicity was not associated with likelihood of meeting PA recommendations in the current study. Previous research has found that non-Hispanic White youth have higher levels of physical activity than Latino and non-Latino Black youth (Carlson et al., 2009; CDC, 2005; Sterdt et al., 2014; UCLA Center for Health Policy Research, 2013). In this

study, there were no differences in levels of physical activity by ethnicity or language spoken at home. However, higher mother's education was associated with higher odds of meeting recommendations for both types of physical activity, although the threshold was different for each. For daily physical activity, completing some college, college, and more than college were all associated with higher odds relative to students whose mother completed less than high school; for muscle-strengthening physical activity, only completing more than college was associated with higher odds. Previous research has also identified parental education as a correlate of physical activity among youth (U.S. Department of Health and Human Services, 2011; Van Der Horst, Paw, Twisk, & Van Mechelen, 2007). As mother's education level is an indicator of socioeconomic status, socioeconomic factors may be at play in this finding, specifically accessibility or availability of resources to support physical activity (S. L. Gustafson & Rhodes, 2006; Van Der Horst et al., 2007) and perceptions of neighborhood safety (Esteban-Cornejo et al., 2016).

This study also found that intake of fruits and vegetables was low and intake of unhealthy food items (i.e., soda, diet soda, sugar-sweetened beverages, salty snacks, sweets, and fast food) was high among early adolescents. Eighth grade students in this study consumed about eight fruits and six vegetables per week, or approximately two fruits or vegetables a day, far below the recommended minimum of five (Produce for Better Health Foundation, 2019; U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Eighth grade students in this study also reported consuming unhealthy food items approximately 20 times per week. Other surveys of youth health behaviors have found similarly low levels of healthy food intake and excessive unhealthy food intake (CDC, 2017a; UCLA Center

for Health Policy Research, 2017). However, this study was unique in its ability to report on consumption of six different types of unhealthy foods.

Infrequent fruit and vegetable consumption and frequent intake of soda, diet soda, sugar-sweetened beverages, salty snacks, sweets, and fast food is concerning for several reasons. Unhealthy dietary intake during early adolescence puts youth at increased risk for obesity and metabolic syndrome in the short-term, as well as chronic disease in the long-term (Alberga et al., 2012; Todd et al., 2015). Systematic reviews of diet-related studies have also identified that higher quality diet is associated with better mental health and academic performance among children and adolescents (Bradley & Greene, 2013; Burrows, Goldman, Pursey, & Lim, 2017; O'Neil et al., 2014).

Higher school-level participation in school meal programs (i.e., lower school socioeconomic status) was also associated with lower fruit and vegetable intake and higher intake of unhealthy items. This finding is somewhat ironic because school meals are required to adhere to federal nutrition standards (Snelling, 2012). In theory, students eating breakfast and lunch at school should receive approximately 12 servings of fruits and vegetables in a week at school alone (U.S. Department of Agriculture, 2019). Given that the majority of students across all Project SHAPE schools were eligible for school meals, it is concerning that consumption of fruits and vegetables was still low. In addition, many of the unhealthy items measured in the current study are not allowed or not sold in schools (U.S. Department of Agriculture, 2013). However, it is likely actual consumption of school meals is inhibited by stigma associated with school meals, perceptions of quality of school food, and preference for energy-dense, nutrient-poor snacks commonly purchased from off-campus locations (Bailey-Davis et al., 2013; Bhatia,

Jones, & Reicker, 2011). These phenomena were also observed by interviewees in Study Three and will be discussed in more detail in Chapter 7.

Differences by gender in vegetable and unhealthy item intake were also observed in this study. Girls consumed fewer vegetables than boys, but no difference was observed for fruit. This finding differed from previous studies, which found that girls eat more fruits and vegetables than boys during youth and adulthood (Cooke & Wardle, 2005; Emanuel, McCully, Gallagher, & Updegraff, 2012; Reynolds et al., 1999). This study also found that boys reported eating unhealthy items more frequently. Among adults, gender differences in diet are associated with beliefs about the importance of fruits and vegetables for health (Emanuel et al., 2012). Additional research is needed to better understand gender differences in adolescent diets and identify relevant points for intervention to improve diet quality for all genders.

This study also had interesting findings related to ethnicity and language. Students who identified as Latino reported lower intake of unhealthy items. While ethnicity was not associated with fruit or vegetable intake, speaking Spanish or an "other" language (i.e., a language other than English or Spanish) at home was associated with eating more fruits and vegetables. As discussed in the previous study, language usage is frequently used as a proxy for acculturation to the U.S., and acculturation has been found to be a risk factor for unhealthy dietary behaviors among Latino and Asian-American adolescents (Unger et al., 2004). Thus, speaking Spanish or an "other" language may have been an indicator of less acculturation, and thereby been protective for fruit and vegetable intake.

As with physical activity, mother's education was also associated with diet. Students whose mothers completed higher levels of education reported consuming more fruits and

vegetables per week. Previous findings regarding the relationship between parental education and fruit and vegetable intake have been mixed (Lytle et al., 2003; Pearson, Biddle, & Gorely, 2009). There is some evidence that adolescents from low socioeconomic backgrounds report greater consumption of unhealthy foods and less consumption of healthy foods than their higher socioeconomic status counterparts (Hanson & Chen, 2007a). Further research is needed to elucidate the influence of parental education or occupation, household income, and other family circumstances that may be related to socioeconomic status. Interestingly, students who reported that they did not know their mother or female caregiver's level of education reported higher intake of unhealthy food items. More research is also needed to understand what it means when an early adolescent does not know his or her mother's level of education. Not knowing may be related to increased eating outside of the home, which is associated with increased empty calories, increased fat and saturated fat consumption, and increased sodium intake (Gillman et al., 2000; Larson et al., 2007; St-Onge et al., 2003).

Students' perceptions of the school health environment were also examined in this study. The school health environment refers to both social (e.g., the school climate or culture) and physical (e.g., availability of facilities or services) factors (Kontak et al., 2017) within the school that influence the health or health behaviors of students (Wechsler et al., 2000). Student perceptions of this environment were measured using a scale that ranged from zero to nine, with nine being positive perceptions of the school health environment. On average, students' perceptions of the school health environment were quite low (3.9 out of 9), suggesting that they did not find the environment to be supportive of healthy behaviors. Although it was hypothesized that there may be gender differences in perceptions of the school health

environment, no individual factors were found to be associated with these perceptions in this study. There seemed to be a possible trend with mother's level of education which should be explored further in future research.

To some extent, perceptions of the school are more powerful predictors of adolescent health and academic outcomes than actual levels of support or actual environmental factors (Assor & Connell, 1992; Reddy et al., 2003; Schunk & Meece, 1992). For example, perceived teacher support among youth has been found to be associated with positive mental health outcomes and self-esteem, as well as serves a protective role when it comes to initiating or escalating risky health behaviors (Reddy et al., 2003; Roeser et al., 2000). In addition, feeling connected to school and cared for by adults at school also protects against health-risk behaviors, supports educational achievement, and is associated with a higher degree of well-being (Resnick, 1997). Other research findings also suggest that students' cognitively constructed perceptions of their environment direct learning behavior and academic outcomes (Marchant et al., 2001). Together, these findings suggest that students' perceptions of the school health environment, such as the norms and values they perceive to be emphasized by the school, are also important to consider with regard to health behaviors and outcomes.

More positive perceptions of the school health environment were associated with a higher likelihood of meeting the muscle-strengthening physical activity recommendation and marginally associated with a higher likelihood of meeting the daily physical activity recommendation. Depending on the level of meal program participation at the school, more positive perceptions of the school health environment were also associated with higher intake of fruit and vegetables, but were not associated with intake of unhealthy food items. These

findings are promising because it suggests that there is potential for intervention to increase healthy behaviors by influencing students' perceptions of the school health environment, particularly at high poverty schools. If students perceive physical activity and a healthy diet to be valued by their school, or to be normative behaviors, those beliefs are likely to influence their participation in that behavior. This finding also supports theoretical and empirical evidence underscoring the importance of social and environmental environments for facilitating healthy behaviors in general (Bronfenbrenner, 1977, 1994, 1999; Gordon-Larsen, 2006; Neumark-Sztainer et al., 1999; Richmond, 2006; Rosa & Tudge, 2013; Thornton et al., 2013; Trivedi et al., 2014; Whitt-Glover et al., 2009). The current study adds to that body of knowledge by emphasizing that social and environmental factors in the school, and students' perceptions of them, are particularly important factors to consider when trying to understand or change early adolescent health behaviors.

The school health environment construct was also examined by looking separately at each of the three items that made up this scale: (1) "How often do you learn about healthy eating in your classes at school?"; (2) "How often do you notice advertisements for healthy food or healthy eating in your classrooms, the cafeteria, or other places at your school?"; and (3) "How much effort has your school made to help students eat healthfully?" (Appendix B4). No individual factors were found to be associated with the frequency of learning about healthy eating or noticing advertisements for healthy food or healthy eating. Compared to students whose mothers completed less than high school, students whose mothers completed high school or completed college reported slightly higher perceptions of effort made by the school to help students eat healthfully. The effects of each variable on daily physical activity, muscle-

strengthening physical activity, fruit consumption, vegetable consumption, and unhealthy item consumption was mixed. Ultimately, it was determined that the scale (sum of the three individual items) provided a better measure of the perceived environment as a whole, rather than focusing on specifics like advertising or nutrition education. However, future research should examine this measure further, including testing its validity and reliability.

CHAPTER 7: STUDY THREE – RESULTS AND DISCUSSION

Staff and Administrator Characteristics

Table 7.1 provides characteristics of teachers and administrators who participated in qualitative interviews. Nine of the 12 interviewees were female. Five interview participants identified as Latino, three identified as Black or African-American, and four identified as White. Participants were evenly split in job category, with six administrators and six staff members participating. Of the six administrators, three were Principals and three were Assistant Principals. One Assistant Principal was specifically designated as the Assistant Principal for Secondary Counseling Services, meaning she was the head of the academic and social counseling department at her school. Of the six staff members, one was a Counselor, one was a Psychiatric Social Worker, three were PE Teachers, and one was a Science Teacher. Two of the three PE Teachers were also Department Chairs. On average, participants had been in their current role for over eight years, at their current school for 10 years, and in education for about 22 years.

Table 7.1. Characteristics of Study Three Interview Participants (N=12)

School ID	Gender	Ethnicity	Job Category	Job Title	Years in Current Role	Years at Current School	Total Years in Education
16	Male	White	Administrator	Principal	2	10	25
11	Female	Hispanic/Latina	Administrator	Asst. Principal	2	2	15
12	Female	Hispanic/Latina	Administrator	Principal	6	6	23
3	Female	Black/African American	Staff	Counselor	7	7	15
3	Male	White	Administrator	Principal	7	7	48
11	Female	Hispanic/Latina	Staff	PSW	4	4	4
5	Female	Black/African American	Staff	PE Teacher	37	43	43
9	Male	White	Administrator	Asst. Principal	3	3	11
12	Female	Black/African American	Staff	Science Teacher	1	1	18
2	Female	White	Staff	PE Teacher	17	17	20
1	Female	Hispanic/Latina	Administrator	Asst. Principal	7	7	24
4	Female	Hispanic/Latina	Staff	PE Teacher	13	13	15

Note: PSW = Psychiatric Social Worker

Results

Study Three aimed to understand educators' perspectives on the ways in which schools influence the health of early adolescents by exploring perceptions, processes, barriers, and facilitators related to health promotion in the school. Four primary themes (context, mindsets and priorities, perceived control, and challenges and facilitators) were identified during qualitative analysis and are described in detail below.

Context

Several concepts emerged from the data related to the theme of context, or the influence of broader contextual factors on schools' daily operations. All interviewed administrators and staff brought up the feeling that times have changed since they were in school, resulting in a "*different world*" for students and different challenges for schools:

> *"I do think in the younger generation, um, compared to when I was growing up especially, I mean when I was growing up we could take our bike all over the place. But these kids, we're very careful now because there's so many dangers that there weren't before."*

For example, interviewees mentioned that students today deal with a high amount of trauma and stress and suggested that these experiences are unique to the current social context in which we live. Across the interviews, there were several examples mentioned of middle school students experiencing depression, anxiety, cutting, and suicidal ideation.

> *"Our students are being exposed to so much more violence, crime, uh, discrimination, racism, uh, and I know those are…beyond, um, our control, to a point."*

> *"We've had a lot of issues where kids were trying to attempt suicide here... And you know it's the thing to do. I mean kids, you know, they get upset because they got their cell phone taken, so you know, kids are like, 'I wanna kill myself.'... But again we live in a different world… We're living in different times than when I was a kid growing up."*

Poverty and increasing violence in and out of school (i.e., local and national incidents) were cited as the main reasons for higher levels of student stress and trauma. For administrators in particular, these perceptions led them to be concerned about school safety and to place higher priority on social-emotional health than has been done in the past. Some of this emphasis was motivated by wanting to ensure that the school did not gain a reputation as a violent or unsafe school, which could result in decreasing enrollment and consequently, reduced funding:

> *"It's all these red flags, so they* [administrators] *have to do something, and it's mandated, because kids are dying. Kids are hurting people. And kids are killing people."*

> *"In 2008, the school went through this real traumatic episode because there was this huge kind of lockdown, kind of gang shoot-out over here… It kind of just…that was the bottom. So from that point on, the school just kind of just developed this reputation, nobody really wanted to come here."*

Both staff and administrators suggested that they had noticed a greater emphasis on social-emotional health from the district as well. This was seen primarily in the form of district-wide policies and deadlines associated with safety and preparedness, such as having safety plans and conducting drills:

> *"I do think the district and the mindset is more that social emotional learning, dealing with the trauma that kids have had in the past that are affecting their learning now. It's something we're starting to talk about that we didn't before. Especially at schools like mine where a high number of our kids are, um, 88% free and reduced lunch and kids with trauma, things that happened or family members shot, killed, stuff like that, how it affects them later on."*

All interviewees either explicitly or implicitly connected the growing focus on safety and social-emotional health, often referred to as focusing on the "*whole child*" or the "*whole student*", to an understanding that these factors are strongly related to academic performance:

"We know that if a student is not in a good place, the academics are just, they're going to fall by the wayside."

It was emphasized that preparing students for college and career remained the primary focus of the school. Two interviewees described the mission of each of their schools as:

"Basically it's just to make sure they're prepared to go off to high school and college and then beyond, and that they have the [academic] *tools that they need to be successful in those environments."*

"Through goal setting and high expectations, all students become college and career-ready."

Given this mission focusing on academic success, supporting the "*whole student*" was ultimately viewed as a means to success on standardized tests:

"It is important to have the scores, because as a principal that is our focus…as a district. But because we are working with human beings and each kid is different, we do understand that, at times, we're not going to get through. So we do work on the social emotional a lot."

One administrator mentioned that because academic performance is the ultimate goal, it can also be easy to lose sight of the focus on wellness:

"It's quite possible that ... you know, the hysteria around the way schools are…, sort of calibrated and evaluated, and teachers to some measure, is too…myopic that um, we forget that you know, if all, you know, the adults and the kids feel better, feel healthier, feel, uh, happier, that their performance will be better. So, is it a school's responsibility to do that? Yeah, I think it is the school's responsibility to do that."

In addition to the general broader social context in the U.S. as a whole, local neighborhood context was also brought up as very important in shaping school experiences with health promotion. One principal discussed the implications of having a charter school co-located on her campus. She suggested that her school lost enrollment and resources as a result, but specifically lost students whose parents tended to be more involved in volunteering and support activities:

> *"We always kind of relied upon the parents who had the time to kind of, not hold up the school, but... and I as a parent was not one of those ultra involved people, but I would do little things, but then there were parents who maybe weren't working, doing a lot. But a lot of my parents aren't able to do that, um, and so it makes it really hard. So now that I see I have a co-location on my campus and those parents are here all the time. And so it makes me feel that a real community means people that support all kids in that area. And it kind of equalizes the ... it equalizes it. So I think that now we don't have a lot of that because when one school on the same campus can raise $300,000 and I can't even have a PTA, it is a little sad…We have lost numbers. Um, the past couple of years I, I've held on but the kids that I'm getting… are some... I mean I'm seeing that the numbers in the issues are more intense* [higher-need students]*."*

An assistant principal at another school described a local shift in the opposite direction. His school had become a STEM (Science, Technology, Engineering, and Math) magnet school after the 2008 lockdown incident mentioned above, and this change attracted a new kind of "*clientele*" with the social capital to demand more from the school, including more and healthier food options and repairs to physical activity spaces and equipment:

> *"Since the school went magnet, we're actually, our, our population's becoming much more diverse. And, and not just in terms of, um, ethnicity. But in terms of socioeconomic background. And I think that, probably more than anything, defines a lot of it. So ... as the school started changing, expanding, the clientele started changing. So it wasn't just people from the community that, unfortunately were coming in with low expectations, we were now getting people that were coming in were like, "Oh, well you have a state championship robotics team, well we want more. We expect more."*

Mindsets and Priorities

Another theme that emerged from the data was related to mindsets and priorities. Mindsets, or the established set of attitudes (Fang, Kang, & Liu, 2004), of school administrators and staff affected how they viewed their own role at the school, as well as their expectations for others' roles and responsibilities. On both sides of the administrator-staff relationship, there was a desire to see the other half work harder to demonstrate that they cared more about student wellness. For example, one assistant principal described his "*servant mentality*"

approach (i.e., his willingness to go beyond the expectations of his job in order to best serve his students, parents, and teachers) and his desire to see the same from his staff:

> *"I'm a servant. I've been hired by the state of California to serve the people and to figure out what I can do to make their experience at our school as positive and impactful as possible… I wish I had another day in the week, I wish I had twelve more hours in the day, and a clone. Because it's just, no matter how you do it in education, right when you think you've achieved that ceiling of perfection do you realize there's this whole other world above it that you can tap into… it's never finished, and because of that, for me, it's hard to ever be satisfied with what we could have done. Because I know if we had more people who were just as passionate, we could do a little bit more… If I could have anything more, it's just finding more good people that just want to help humans be the best version of themselves."*

With one exception, staff interviewees also demonstrated willingness to engage beyond their primary duties (e.g., volunteering to lead student activities, taking on unpaid leadership roles) in the interest of doing what was best for students; however, they also expressed that these extra efforts were not always recognized or authentically supported by administrators. Just as administrators seemed to want more commitment from their staff, staff interviewees also expressed a disconnect between administrators' beliefs about health and their actions. Even when administrators seemed to genuinely understand the importance of health for students and staff, it was not always clear in their actions. Some examples of this included taking minutes away from physical activity in PE class in order to do a survey or for picture day, not allocating funds for hiring health personnel (e.g., nurses, counselors, psychiatric social workers, health coordinators), or providing superficial support for health promotion initiatives:

> *"I couldn't get people engaged. And it was a mystery to me…I had administrative support, but it was like, you do it! Go ahead!"*

One PE teacher described a time when she attempted to create a "*health and wellness committee*" that would focus on physical health because the school already had some activities

around safety and mental health. Though her principal was initially supportive and suggested including physical health under the existing umbrella of safety and wellness, her efforts were ultimately unsuccessful:

> *"Every time I went into the meeting, it was all about the safety things. And so I was getting a little bit frustrated. So the administrator that I, I talked to about doing it, I said, this is what's happening, and I'm a little frustrated in that they never come on the agenda. Um, can we make either make a separate group or can we make sure there's something on the agenda about this topic? And they said, this is priority, so. That, that ended. And it didn't get any farther. So I, I wasn't able to get that body of people to get something started."*

Ultimately, mindsets of school administrators informed their priorities and vision for the school, and were thereby very important in shaping decisions around allocation of resources, including both time and money:

> *"It helps to have a principal who values mental health… and the 'whole student' need because then we're able to fund these positions."*

Including health in the school's vision was seen as both essential and insufficient. One administrator stressed, "*if it doesn't start with a vision, it's not gonna happen. It's not gonna happen.*" At the same time, administrators who did see health as an essential part of their school's mission still struggled with decisions such as allocating time for teacher professional development related to health promotion, extending lunch periods so that all students had time to eat, paying for repairs to the blacktop or fitness equipment, or hiring health personnel:

> *"Well, uh, I mean do, uh, do we ... do we invest money in, uh, social-emotional health or do we invest money in academic… uh, resources? In other words, do I buy another counselor or do I buy an elective teacher, do I buy a psychiatric social worker or do I buy an extra math teacher? I mean those ... those aren't necessarily battles but they're certainly decisions that are difficult to make."*

An assistant principal in charge of counseling explained:

> *"We want to make sure kids are in a classroom where the teacher, and that's, that is, you know, first I guess, but, um, when, when districts have budget cuts, when they're looking for ways to save money, um, usually those additional* [counseling] *services are the first to, to be considered as far as being cut… I think now we compare ourselves so much to other states, other districts and how people are doing in terms of test scores and… health has to come second."*

Perceived Control

The next theme that emerged from the data was related to the tension between what interviewees felt was within their control as a school or as an individual administrator or staff and what was out of their control. To an extent, administrators have a large amount of control over what happens at their school. Principals in particular described that they oversaw all aspects of the school and were involved in all high-level decisions, such as developing the school's vision, budgeting, scheduling, hiring, and partnering with outside organizations:

> *"I'm in charge of every aspect of the facility, ranging from… instruction, to safety, uh, to parent engagement, to… community engagement… to staff relations, to, um, human resources. There's nothing at the school that I'm not responsible for.*"

> *"Well being the principal I do a little bit of everything, many different hats."*

However, interviewees also mentioned several factors related to student health that they felt were out of their control. First, interviewees viewed the home environment as critical for developing healthy habits, particularly those related to eating. Some interviewees suggested that parents provide unhealthy food at home because they do not "*know any better*" or have financial or physical barriers to accessing healthy food. In addition to coming to school with unhealthy habits that are already "*entrenched*" from home, interviewees also suggested that middle schoolers can be difficult due to their stage of development and inability to understand "*delayed gratification*," or long-term benefits of doing healthy practices now:

> *"I mean, it's not bad to, you know, to have the kids looking at it* [health] *at this young age either, but maybe you should start in elementary where then it's the norm. In elementary they'll do anything to please the teacher, you know… At a certain age they also want to, they're off. This is a great developmental stage to be pushing boundaries with adults in their lives, and they're going to do what they want to do or they're not going to listen… These kids can't think past four o'clock today. They're only looking right now trying to get to lunch at 12:00. To talk about, you know, long term obesity, or you need to stretch, you want to talk about osteoporosis? They're not, they're not there. Not at this age level… This age, 11 to 14, is an interesting one to manage, you know."*

> *"They just want to hang out with their friends… They don't want to mess up their hair* [by being physically active]*. And, you know, sometimes I guess they have a really great outfit on for the day, and they don't want to change* [for PE]. *And they don't want to go on the grass and mess up their kicks, you know… I think it'd be totally different for elementary… It's a little frustrating. It's not all of 'em, but… I think they'd rather just talk and not, like, get messed up. They* [administrators] *tell us, 'tell them the 'why'! Tell them it's good for them. They'll thank you later.' That doesn't really pay off either, because they don't see tomorrow. They don't see past today… So you're always trying to promote this lifelong thing. And they're not really thinking there."*

As described previously, another area where interviewees felt they lacked control was getting buy-in from colleagues. Administrators expressed wanting staff who demonstrated "*a willingness to volunteer outside the minimum requirement*," but could certainly not force teachers to do work beyond their required duties. Similarly, staff expressed a desire for genuine support from administrators when it came to health-related efforts, but at the same time they did not want to come across as "*difficult*" to work with if they asked for too much. A PE teacher described her thoughts about having to give up class time and bring students inside for a presentation:

> *"I could say no…but then that'll be a big rift, like, why? Principal's asking me to bring them in for a fundraiser. Do I tell him no? He's the boss. He can tell us to go in whenever he wants, you know? You say 'no', and then you're being difficult."*

Lastly, the district was mentioned in all interviews as an entity that felt largely inaccessible or beyond anyone's control, in part because of its size. The most common example

was related to the quality of food served at school, which was generally described to be low or perceived as low by students. However, interviewees suggested that the district controlled the choice of the food vendor, and therefore they had no control over the quality of school food:

> *"I don't have any question whatsoever, the kids have access to food. And you know, in some cases, the majority of food they eat might be here. Is the food, you know, attractive and delicious? No. Absolutely not. Sometimes, it's ... like it looks horrible. So… foods are available, but…sometimes… they don't eat all day."*

> *"The kids don't eat lunch. I notice, um, I actually had a tally going on* [for] *how many students eat their school lunch. And, um, I don't know what it is with our district that serves terrible food… It's been brought up so many times…I see the cafeteria, I see what they serve and…it's disturbing for me. And I don't know why we can't change that."*

> *"*[For breakfast in the classroom]… *They'll give them like, a bean and cheese burrito with like an apple… They don't always send enough. Today was some kind of pancake-something in a bag. Sometimes if they don't have fruit, they'll send enough juice to give them two juices or something like that. The only thing they eat is the coffee cake and the bean burritos, really. All the other stuff… most of the kids… they don't eat it. They drink the juice, if anything."*

> *"We're limited also in what we can offer, you know, and so I know that, you know, whatever vendor our, our students who are users, it's straight from the district. I think it, the, the way we resolve that is kind of beyond the school, you know, beyond just the school site you know, um, offering better choices through the vendors that we use that, that give us some of those items."*

Challenges and Facilitators

Several concepts emerged from the data related to the final theme: challenges and facilitators of school health promotion. A primary challenge, as mentioned previously, was allocating time and money towards promoting health. For example, a psychiatric social worker described her efforts to schedule a health education session and self-care training for staff:

> *"The challenge is me trying to get onto the calendar, the school calendar, to present on trauma. I'm supposed to present on trauma to middle school teachers. On what that looks like, what it means, and how it impedes academic learning. And trying to differentiate. Is it a learning disability? Is it trauma? Is it, um ... what's going on?... And, um, but again there's so many policies and things, deadlines, exams, or assessments that*

need to be done that the time for me to go in there and do a presentation is, is, it's hard. Because all these other stuff need to be done first."

According to interviewees, it was also challenging to allocate resources towards health because there is no "*structure*" or "*guidelines*" to follow, and even if a policy is written, "*there's no enforcer*." In addition, because resources are tight, interviewees described having to focus on health, whether physical or mental health, on a case-by-case basis rather than taking a public health approach:

"I think, I think our school prioritizes, um, that, that aspect of student health, student need. Um, can we do better? Yes. I feel that because of the size of our school, um, at times we're overwhelmed and we're consumed with our neediest cases. And so we neglect maybe doing this school wide kind of campaigns in school wide programs because we're, we're so consumed with, um, our highest need kiddos that we have here."

Some staff interviewees felt that administrators did not always fully understand the job of various health personnel, including counselors, psychiatric social workers, school psychologists, and PE teachers, and treated them as though they were interchangeable. Further, bad experiences with one employee could create an unfair or inaccurate reputation for that role. As a result, individuals in these roles felt they had to constantly advocate for themselves in order to fare well in case of budget cuts:

"Our positions are more of, if we have extra funds, then we'll purchase your position. We're not full time, but we'll get you three days or two days. So, if we have a principal… who understands our position, then they're gonna understand our role is important… So, if we're not promoting ourselves, then the school isn't, or the staff or whoever, they're not gonna know who we are."

Another challenge identified during interviews was supporting staff wellness. Working in education was described as a "*high stake type position*," and several interviewees talked about a high level of job stress. Stress and pressure "*trickle[d] down from the top*", and some

interviewees worried that when stress interfered with their own self-care (e.g., eating well, working out), it affected their ability to be a good role model for students:

> *"When you, when you have a job that maybe you're supposed to get off at four, but you're working until seven every night but they say, 'Try to fit in exercise time' and you're like, 'Well I would if I could finish my job.' It's like, yeah, that's easy for you to say. So likewise if some, there's a lot of stress. A lot of stress in this job. And so, yeah, we all talk about not wanting to be found at your desk like this one day, you know?... It's one thing saying it, it's another thing actually giving people the time to do it.*

Several challenges emerged from the data specifically related to diet and physical activity, such as stigma associated with school lunch, students bringing outside food to campus (e.g., snacks from the corner store), and certain groups of students (e.g., girls in eighth grade, girls in co-ed PE classes, overweight students) feeling less comfortable with sports or physical activity:

> *"A lot of the girls are just too embarrassed to really push themselves because of the boys. And then… we have to like, encourage them to, you know, it's your grade, so you need to try your best. Those like, non-athletes, um, they tend to sit back because they're embarrassed. But the boys, they're pretty consistent. It's almost like they don't really care about that stuff. But if they're overweight, then they do. They are self-conscious and won't tell you, but they, um, but I notice it does affect their participation."*

> *"As the girls get older they have a tendency to pull back. Unless they're hardcore, and then they're mixing it up with the boys. But teaching as long as I have, I've been teaching 43 years, um when we didn't have the co-ed situation, the girls achieved more. But with the boys in the class, they don't... Many of them are shy or embarrassed, and so then they don't perform as well."*

Another challenge was consistent messaging about health to students. Interviewees felt that when health-related activities or classes were de-prioritized, it was sending the wrong message to students:

> *"Like for example when they need to like, sell fundraisers they'll ask us to take our kids indoors and so somebody can come present the whole day. So our kids are sitting there, which- we're helping, we're glad to help, but what does that- what message is that sending to our students? That this is more important than being outside? Than getting*

our activity for the day? It's the culture of the school… Picture day in our PE classes. Cap and gown pictures, PE classes. Um. I mean, I think we're happy to do it, you know, we'll help them. But what- it's- your setting up that culture, like, everything but PE. Just like it's been for many years. And in many schools… It wouldn't happen during math class. It wouldn't happen during English. So what is that message you're sending? You know, fitness, it's not that important, right? Health is not that important."

Similarly, healthy food was often discussed as being antithetical to "student-friendly" food. One principal described his attempt to avoid promoting fast food to students:

"Some of our teachers wanted to… for rewards in their service, they wanted to give out McDonald's gift cards and I was very uh, uh, resistant to it 'cause I felt like it was sending the wrong message, but I ... at the end of the day, I was sort of, you know, I was sort of overruled because they kept saying, 'This is what the kids want. In this case, this is what they want.' It's a reward. It's not a, an opportunity for us to try to instill healthy eating. And so, I ... I ... I gave in."

There were also several facilitators of school health promotion, with the main facilitator being having a health champion at the campus. Health champions, whether administrators, staff, or parents, ensured that there was attention paid to health and led any efforts to create positive change. For example, parents at the previously described STEM magnet school played a critical role in repairing a turf field that had been unusable for physical activity for six years because "*the district didn't have revenues or resources to be able to fix them and replace them*." Across all interviews, it emerged that parents were also key to other types of changes, such as extending the lunch period to ensure all students had time to eat and bringing bullying to the attention of school staff, leading to a school-wide anti-bullying campaign. Administrators and staff also acted as health champions, often in volunteer roles (e.g., being the lead for Students Run LA, a marathon training club).

Another facilitator of health promotion in schools was continuity from earlier grades. Three of the interviewees worked at schools that served students from kindergarten to eighth

or twelfth grade, and these schools tended to have a greater amount of health-related policies, programming, or services than did the other schools. Interviewees suggested that students, as well as parents, were able to get used to rules and expectations because they had been seeing them since starting kindergarten. For example, one of these schools had a school-wide policy banning unhealthy snacks:

> *"Well we have our policy that, uh, we give out at the beginning of the school year, and it addresses specifically there, we want healthy snacks, um, and no sugary snacks, no, no sugary drinks, and at lunch time, and recess time when the little kids are out, we take a look to see what they're eating and what they bring for lunch, 'cause a lot of them tend to bring lunch from home, and we'll address it and we'll call home and let the parent know that, um, 'your child's been bringing, you know, unhealthy snacks, you know, this is what we want, it's in our parent pol- parent student policy at the beginning of the school year, so we'd like for you to adhere to it.' … the parents, for the most part, are on board. And you know, … because we are a K-8 school, the parents start to learn our, you know, our, our rules, and they, they, they oblige. So it's not too problematic."*

Finally, making health part of the implicit school culture was also suggested by several interviewees as a way to facilitate prioritizing health. However, interviewees struggled to describe how that could happen in the context of limited resources and buy in. One PE teacher described her frustration with administrators who acknowledged how important it was to promote health but could not translate that belief into actions:

> *"Isn't it amazing. They* [administrators] *know it! They do know it! And they believe it. I just don't think they understand how to kind of flip the table. I don't think anybody does."*

Discussion

Several of the findings of this study were related to the perception that students today are growing up in a "different world" than the one interviewees themselves had experienced in childhood and adolescence, and these perceptions factored into the ways in which interviewees conceptualized health and safety. In particular, interviewees described observing high levels of

stress, anxiety, and trauma among their student populations. There is some data to support these observations—rates of depression, anxiety, and trauma among school-aged youth have increased in the past several years (Whitaker et al., 2019). Rates of suicide among ages 10-17 increased by 70% from 2006 to 2016 (CDC, 2019; Whitaker et al., 2019), and the majority of youth (72%) experience at least one traumatic event before the age of 18 (Whitaker et al., 2019).

Many external factors could be contributing to interviewees perceptions of a "different world", and some interviewees connected this perception to the recent social and political climate in the country as a whole. According to the American Psychological Association, stress levels are high among all age groups, including Generation Z, and the future of the country was identified as a primary stressor (2018). For 72% of Generation Z youth, the possibility of a school shooting is a significant source of stress (American Psychological Association, 2018). In addition, Sondel, Baggett, and Dunn (2018) identified "political trauma" among school-age youth in the months leading up to and after the 2016 presidential election, and a national survey of public school teachers suggested that students were experiencing higher stress and anxiety because of the election than in previous school years (Rogers et al., 2017).

Despite these findings in the current study and in previous studies, rates of student victimization at school have actually declined every year since 1992, as has the percentage of schools recording one or more incidents of crime during a school year since 1999 (Musu-Gillette et al., 2018). Furthermore, school shootings are actually quite rare, though not in comparison to other countries, but high profile media coverage stimulates public fear and has prompted major changes in school safety policies and practices (B. W. Fisher, Nation, Nixon, & McIlroy,

2017; Whitaker et al., 2019). For example, after the Sandy Hook school shooting in 2012, President Barack Obama pledged $45 million dollars of funding for school resource officers (B. W. Fisher et al., 2017; Whitaker et al., 2019). There is currently no evidence of the effectiveness of resource officers in preventing school violence, nor has there been an increase in violent incidents at school (Whitaker et al., 2019). Nonetheless, interviewees of this study seemed to be describing a sort of "moral panic" (Burns & Crawford, 1999), or a heightened level of concern about violence and its perceived threat to the moral order of society and schools.

Given this contextual reality, it is not surprising that interviewees described an increase in conversation or action around mental health and social emotional learning in their schools. Since their origin, public schools and trends in education have been a reflection of broader societal debates and occurrences. For example, mid-19th century school reforms were driven by growing concern over an increasingly diverse nation experiencing rapid industrialization (Mendez et al., 2017), and early proponents of the "common school" in the same century viewed public education as a means to address rising rates of crime and class and ethnic conflict (Kober, 2007). Later, better understanding of the spread of infectious diseases led to schools requiring vaccination and routine medical inspections (Colgrove, 2004; Duffy, 1974; IOM, 1997). In the early 20th century, the National School Lunch Program addressed growing concerns over the learning abilities of malnourished children as well as a nationwide crop surplus (Ralston et al., 2008); the development of the Presidential Fitness test in physical education was motivated by national security concerns after large numbers of World War I draftees failed physical examinations (IOM, 1997; Marble, 2013). More recently, the 1983 publication of *A Nation at Risk*, a report by the U.S. Secretary of Education, sparked public

dialogue about increasing the rigor of public education in order to ensure American students could compete for jobs in an increasingly global and technological marketplace (Drucker, 1993; Mendez et al., 2017; National Commission on Excellence in Education, 1983; Spring, 2008). The resulting federal legislation (i.e., the Every Student Succeeds Act of 2015, and its predecessor, the No Child Left Behind Act of 2001) changed the landscape of public education in significant ways. All of these shifts in school priorities were connected to or informed by external forces, and this seems to be the case again in the current study.

Although interviewees described increased attention on mental and social emotional health from the schools and district, all interviewees explicitly or implicitly connected this focus to academic performance. In other words, student wellbeing was a concern because academic performance suffers when students are not well, and ultimately the interviewees believed that their job was to ensure that students are prepared for high school, college, and a career. Indeed, a primary consequence of federal education legislation and initiatives in the last two decades has been that schools are incentivized and punished based on students' academic performance on standardized exams (Jennings & Rentner, 2006). Previous research looking at moral and civic education in urban public schools also found that, similar to health promotion, emphasis on character development and citizenship education is both "temporally and organizationally secondary to the schools' primary institutional commitment: to get students into college, and, as such, into a comfortable position in the middle class" (Guhin, 2018, p. 25).

School choice is another recent issue that has had an enormous impact on public education and came up during some interviews. School choice refers to opportunities to enroll in public or private alternatives to traditional neighborhood public schools (Riel et al., 2018).

Charter and magnet schools have emerged over the last decade as a popular school choice; this trend has sparked debates over the ways in which charters and magnets affect traditional public schools with regard to academic achievement and racial or socioeconomic segregation (Riel et al., 2018). In the current study, one principal described the negative impacts of a co-located charter school on her traditional school. Several previous studies have suggested that charter schools divert public funds and general support away from traditional public schools (Blume, 2016; Frankenberg & Siegel-Hawley, 2013; Riel et al., 2018) fueling claims that charter schools increase segregation and exacerbate inequality (Riel et al., 2018). On the other hand, an assistant principal at another school in the current study felt his school was positively impacted by its transition to a magnet. Understanding of the ramifications of school choice is an area of future research, in terms of both educational and health outcomes.

During the course of the current study, there was a teacher strike at the district involved in the study. This is important to note because this occurrence may have an impact on data and results, but also because of the motivation for the strike. Along with smaller class sizes and higher pay, the union was asking for an increase in support staff—specifically nurses and counselors. The need for more staff was mentioned in interviews that took place both before and after the strike. Because of staff shortages, interviewees felt they had to focus on case management (i.e., reactive health service provision) rather than prevention (i.e., proactive health promotion). Recent national data also reports shortages in school health personnel; 90% of students across the U.S. attend schools that fail to meet minimum requirements for school counselors, nurses, social workers, and psychologists (Whitaker et al., 2019).

Another important finding of the current study was that mindsets and priorities of school leaders informed their priorities and vision for the school, thereby shaping decisions around allocation of resources. Including health in the school's vision was seen as both essential and insufficient, and there were several examples of ways in which health promotion was de-prioritized, even for administrators who strongly believed it was important.

Several concepts theorized by Pierre Bourdieu can be applied to understand how health promotion was considered in the study schools. According to Bourdieu (1989), the social world is organized into classifications or hierarchies, with each position given a relative amount of power based on its relationship to other positions. The power in this case is referred to as "capital," and can be categorized as social, economic, cultural, or symbolic (Bourdieu, 1985, 1989). This analysis of the organization of the social world can be extended to the school context, where subjects are classified into a hierarchy based on their symbolic capital, and thereby their perceived value to the mission of the school system. For example, interviewees in this study acknowledged that in the current education context, the focus is on high-stakes testing; as such, they felt that math, reading, and other "core" areas are prioritized over subjects, such as health, that are not assessed for accountability.

The school symbolic order is then maintained through symbolic violence, which are the mechanisms by which those with power impose certain beliefs and attitudes as valid, as well as judge the validity of all viewpoints (Bourdieu, 1989; Weininger, 2002). In this study, symbolic violence included things like failing to provide time or support for health promotion efforts, not funding full-time positions for school health personnel, or physically isolating PE teachers at the back of the school and away from the main campus. These mechanisms reinforce and

reproduce the status of health promotion and school health personnel. The effect of this status occurs primarily through the habitus, which is the "basis of strategies of reproduction that tend to maintain…relations of order(ing), hence concurring in practice (although not consciously or deliberately) in reproducing the entire system of differences constitutive of the social order" (Bourdieu, 1989, p. 3). The organizational habitus manifests through the school culture, where there may be an academic goal orientation that leaves out health and well-being, leading to administrative prioritization of traditional academic subjects. The individual habitus includes the internalization of this culture, whereby teachers themselves begin to de-value their position and contribution to the development of students.

The majority of students across the Project SHAPE study schools were low-income. The position of health promotion within the school social order becomes especially stark in schools that are under-resourced or in low-income communities. These types of schools often face greater pressure to raise standardized test scores relative to schools with fewer economically disadvantaged students (Tienken & Zhao, 2013). This pressure results in restrictions on students' opportunities to receive a well-balanced curriculum, with subjects such as reading and math prospering at the expense of social studies, science, the arts, and physical education (Tienken & Zhao, 2013). At the same time, individuals who are highly disadvantaged are especially reliant on "the organizations that structure their lives, the systems in which those organizations are embedded, and the institutions that regulate the operation of both" (Small, Allard, Allard, & Small, 2013, p. 8). For example, many studies have found low levels of physical activity outside of the school setting for students in underresourced communities, with perceptions of lack of safety and access to equipment or physical activity spaces cited as the

most common reasons (CDC & NCHS, 2013). Thus, students in these communities are particularly reliant on the school as an organization to provide opportunities to be physically active and eat nutritious food.

For this reason, the challenges associated with physical activity and diet that were noted by interviewees of this study are particularly concerning. Physical education (PE) and provision of food at school were by and large viewed as the two main sources of health promotion in the school. However, interviewees also brought up a plethora of issues associated with PE and school meals, such as having class time taken away from PE or students not liking the food provided. Moreover, previous research suggests that these two "programs" are not necessarily having expected effects on health. Levels of physical activity in PE classes have been found to be far below recommendations (Fairclough & Stratton, 2004; Gill et al., 2016, Forthcoming; NASPE, 2004). In addition, there is some misalignment between the public health view of PE's purpose as a site for health intervention (IOM & Food and Nutrition Board, 2013) and PE teachers' perceptions of the role of PE (Gill, Roth, Rice, Prelip, & Koniak-Griffin, 2018). Further, although policies exist to limit the availability of unhealthy foods in school, middle and high schoolers frequently bring food from off campus, often purchased from corner stores or fast food locations near campus (Bailey-Davis et al., 2013; Bhatia et al., 2011). Several studies, including this one, have also documented students' dislike for school food and stigma associated with school meals (Bailey-Davis et al., 2013; Bhatia et al., 2011).

Another commonly mentioned challenge in this study was scarcity of time and resources for health promotion. A growing body of literature conceptualizes time as a resource needed for good health, and thereby as a social determinant of health (Strazdins et al., 2011; Strazdins,

Welsh, Korda, Broom, & Paolucci, 2016). For example, people need time to engage in health-supporting behaviors (e.g., visiting the doctor), and lack of time is a frequently cited reason for not engaging in healthy behaviors (Gee, Hing, Mohammed, Tabor, & Williams, 2019; Jabs & Devine, 2006; Strazdins et al., 2011), especially physical activity and preparing healthy food (Strazdins et al., 2016). There is also a social dimension to time such that disadvantaged populations experience more time scarcity and have less free time (Roy, Tubbs, & Burton, 2004). For example, as discussed previously, schools serving low-income communities often face higher pressure to demonstrate academic rigor, resulting in lack of time for issues that are not part of "core" academic subjects (Tienken & Zhao, 2013). In this study, lack of time was another example of symbolic violence, which reinforced the existing symbolic order in which health was perceived to be de-prioritized. There is potential for interdisciplinary collaboration to better understand how time may be a resource or privilege in certain schools, and whether this is associated with disparities in health behaviors or outcomes.

As with the results of studies one and two, gender differences in physical activity were also a point of conversation during many of the interviews. In general, interviewees suggested that most girls would withdraw from physical activity as they moved from sixth to eighth grade. The interviewed PE teachers seemed to believe that having boys and girls in the same class were to explain for this decline, at least during PE. In the literature, there are mixed findings regarding students' activity levels in co-ed and single gender PE classes, as well as regarding students' preferences for each type of class (McKenzie, Prochaska, Sallis, & LaMaster, 2004; Zeng, Hipscher, & Leung, 2011). As emphasized in the previous two chapters, public health researchers and practitioners interested in addressing low rates of physical activity must further

examine gender differences in physical activity at the point when this disparity emerges. Understanding factors underlying these differences can inform interventions, particularly those that are school-based and serve both boys and girls. Future research should continue to examine and identify factors that promote physical activity, with particular emphasis on making physical activity accessible and desirable for girls.

Interviewees also discussed several facilitators of health promotion at each of their schools. The most common facilitator mentioned was the presence of a health "champion," or someone who was passionate about promoting health at the school and would take the lead in such efforts. Previous studies have also emphasized the importance of having a school health champion for carrying out health promotion activities (Lucarelli et al., 2014; Stolp, Wilkins, & Raine, 2015). However, reliance on a champion is not necessarily a sustainable model for school health promotion (Stolp et al., 2015); interviewees also described examples of instances where the champion left the school, and any initiatives he or she had begun were no longer carried out.

Another interesting finding was related to interviewees desire for health to be implicitly woven into the school culture, which a few interviewees believed was possible if there were standard guidelines related to health and some kind of enforcement. This was interesting because the district actually has a written wellness policy and corresponding guide available on their website. This document is described as a guide for schools to implement comprehensive health and wellness plans. However, none of the interviewees in the current study mentioned this document, suggesting that it may not be widely distributed or advertised. A substantial

body of literature has examined school wellness policies, but it is clear that additional work is needed to bridge the gap between adoption and implementation of school wellness policies.

Finally, buy-in for health promotion from all staff, as well as from students and families, was viewed as an ideal way to sustain health promotion efforts. Interviewees also felt that in an ideal world, health promotion would be naturally and implicitly woven in to the culture and mission of the school. Ultimately, interviewees seemed to agree that it is the responsibility of the school to ensure that students are physically and mentally well, but they were not clear on how to get around some of the current obstacles.

CHAPTER 8: CONCLUSION

Integrated Findings and Recommendations

This dissertation employed an embedded mixed methods research design, in which the collection and analysis of quantitative data and interview data was combined within a traditional quantitative research design (Creswell & Plano Clark, 2011). Using a mixed methods approach added breadth and scope to the studies, as well as provided an opportunity to examine different facets of the middle school experience with regard to health promotion. In addition, the data captured different perspectives, including some complementary and some contradictory findings. In general, "mixing" the quantitative survey data and qualitative interview data provided context for understanding student behaviors and presented a more comprehensive account of the school health environment and its impact.

Integration of data and findings in this dissertation considered several factors. The researcher compared student responses to survey items regarding the school health environment to the staff and administrator responses to the same items. Staff and administrator responses were not representative because of the small sample size, but in general, the perception of the school health environment among adults in the school tended to be more positive than that of students. There has been limited research examining congruence between student and teacher perceptions of the school environment (Mitchell, Bradshaw, & Leaf, 2010). It is possible that staff and administrators were more aware of health-related efforts happening at the school and thereby felt more positively about the school health environment; indeed, students and faculty share a common experience, but their differing roles likely inform incongruent perceptions (Mitchell et al., 2010). Adults in the school may have felt

more positively because they were in a position of power and had more control over daily activities, whereas students may have possessed less favorable perceptions due to their relative position in the hierarchy. Previous studies have also reported discrepancies in student, staff, and administrator perceptions of the school environment (Bosworth, Ford, & Hernandaz, 2011; D. L. Fisher & Fraser, 1983; Gase et al., 2017; Mitchell et al., 2010). Though not tested in the present study, it is also possible that staff and/or administrators' perceptions had some influence on students' perceptions of the school environment (Mitchell et al., 2010). Overall, this finding underscores the importance of examining student, staff, and administrator perceptions in order to have a more complete understanding of the school health environment, and of its influence on health behaviors.

Many of the findings related to physical activity and diet in the first two studies were supported by findings of the qualitative study. Analyses of the student surveys found low rates of physical activity, poor diet quality, and concerning declines in both types of behaviors among middle school-aged youth. Interviewees also frequently brought up concerns about students' levels of physical activity and diet quality, including a noticeable decline from the beginning of middle school to the end. Interestingly, staff and administrators generally reported that physical education classes and meals at school were the primary ways they felt they could have an effect on students' levels of physical activity or diet quality, despite highlighting several issues with both programs. Because staff and administrators view these programs as important for supporting student health, this finding suggests that there is potential to intervene in these settings to prevent declines in physical activity and promote better diet quality. In addition, the fact that staff and administrators expressed concern over current health behaviors and

frustration over their inability to overcome challenges to changing these behaviors also suggests that there is potential for authentic collaboration and community-engaged research with school leaders to address this issue. Staff and administrators also extensively discussed issues related to social-emotional and mental health, violence, and safety, which were not assessed on the student questionnaires. Future research should consider extending understanding of perceptions of the school health environment to include its relationship with other health-related behaviors or outcomes (e.g., coping skills, self-efficacy, self-reported health, violent behavior, victimization, mental health outcomes).

In all three studies, gender differences in physical activity were also emphasized. This is not a unique finding, but it is nonetheless important because it demonstrates that efforts up until this point have not been successful in reducing or eliminating gender disparities in physical activity. For children and adolescents, schools are often viewed as the ideal setting to promote physical activity, in physical education classes, but also during breaks and through extracurricular activities. Although staff and administrators suggested that some girls (i.e., athletes) participated in these activities at the same level as boys, previous research has indicated that girls and boys behave differently in physical education classes and during physical activity that happens during breaks (Cairney et al., 2012; Ridgers, Salmon, Parrish, Stanley, & Okely, 2012). Opportunities to be active during these times may be more accessible or desirable to boys (Telford et al., 2016). Ultimately, in order to reduce this gender disparity, more work is needed to understand how to make physical activity accessible and desirable to all genders and ages.

Interviewees did note that certain activities, such as dance, would attract more girls. Previous research has also suggested that being part of an extracurricular sports team has a sustained positive influence on physical activity among youth, although it is slightly less for girls (Telford et al., 2016). Nonetheless, efforts to increase and maintain sports team participation among all youth may be a promising strategy for preventing declines in physical activity. Interviewees who were physical education teachers also suggested that co-ed classes were not supportive of girls' physical activity. Because of gender differences in physical development, pre-pubescent girls of average weight carry slightly more body fat, have poorer eye-hand coordination, and have lower fitness than pre-pubescent boys of average weight (Telford et al., 2016). These differences should be considered when planning co-ed physical education classes, particularly ensuring that activities do not favor boys or compare performance of boys and girls. There is potential for future research to support teachers in identifying activities that promote sustained engagement and enjoyment of physical activity (Telford et al., 2016).

Strengths and Limitations

This dissertation addresses the important public health issue of chronic disease prevention through a unique opportunity to investigate the school health environment and school health promotion efforts from multiple perspectives. Moreover, the dissertation focuses on early adolescence, which is both understudied and a critical period for development. The multiple perspectives, which included those of students, school staff, and school administrators, were integrated through an embedded mixed methods research design, an approach which offers several benefits. The collection of additional qualitative data provided an opportunity to address different research questions and enhanced understanding of

quantitative results. In addition, the quantitative and qualitative methods complemented each other and allowed for more complete analysis and understanding of the school health environment.

Another strength of the dissertation was the use of multiple sources of data, which added to the breadth and scope of the study. The Project SHAPE baseline and follow up surveys had large sample sizes and high response rates. In addition, study schools provided student-level FITNESSGRAM data, which was matched to student surveys to provide information on weight status. The School Physical Activity Opportunities Report Card (SPARC) tool provided additional objective information about the school environment. Last, the qualitative data was collected from teachers and administrators at the same schools, thus providing additional context and integration of data and findings in meaningful ways.

The use of semi-structured interviews allowed for exploration of important information related to the research questions, but also left room for participants to bring up topics during the discussion. Participants were able to guide the conversation, allowing for the most salient concepts to emerge. The analysis of this data using a qualitative descriptive approach also allowed the participants' perspective to be prioritized over that of the researcher.

Whereas much of the school health environment research in the past has focused exclusively on concrete, physical components of school environments, the data and analyses in this dissertation addressed both physical and social aspects of the health environment. There is potential for future work to build off of the current studies to develop a validated measure of the "school *health* climate," focusing on the social aspects of the school context that are related to health outcomes and health behaviors.

Finally, findings of the dissertation provide information useful for school health program planning and implementation, school health policy development and implementation, and allocation of school health resources. The three studies contribute to research on the impact of the broader school health environment on early adolescent' health behaviors. In addition, the dissertation furthers understanding of the potential to leverage the school setting in more strategic ways to promote healthy development.

The current research is limited in some respects. The data was drawn from a sample in one geographical location and in one school district, limiting the generalizability of findings. Moreover, the third study used qualitative data, meaning findings are specific to the context of this research and not generalizable. In addition, the use of an embedded mixed methods research design brought challenges, namely issues with integrating findings.

There were also limitations with regard to the data. Some survey items were available only at one time point of the survey. For example, Study One does not include unhealthy dietary behaviors (e.g., consumption of soda and other sugar-sweetened beverages, sweets, salty snacks, and fast food) as an outcome because this information was not collected at baseline. In addition, Study Two uses a cross-sectional design because items related to the school health environment were asked only at the follow up survey. As such, this study was not able to make any causal claims. Survey data was self-reported by the students, and was thereby subject to both social desirability and recall bias. Some measures within the survey (e.g., perceptions of the school health environment) were not validated measures. In addition, the items related to dietary behaviors did not account for serving size, instead asking only about

frequency of consumption. Lastly, school-level covariates were limited to characteristics available from the California Department of Education's public databases.

While it was valuable to have survey responses from students in both their seventh and eighth grade school years, there was also some loss to follow up and some students missing baseline measurements. Also, FITNESSGRAM data was collected by teachers, so there was no certainty that recommended procedures were followed or validated instruments were used to measure height and weight. In addition, FITNESSGRAM response rates were relatively lower than survey response rates, resulting in a smaller sample size.

Staff and administrators interviewed for Study Three varied in terms of age, gender, years of experience, and job title, which strengthens the credibility and transferability of this study. Because all interviewees worked at Project SHAPE study schools, the researcher was able to develop rapport with participants, also contributing to the credibility of the study. Transferability of findings is questionable due to the small number of interviews, although interviews provided a variety of views. Selection criteria limited participation to staff or administrators who worked at schools involved in a research study, suggesting a risk of bias toward individuals or schools who have time or motivation to participate in these kinds of activities. Nonetheless, several findings were recurrent across the different interviews and thus may transfer to other schools, staff, and administrators. While interviewees were able to bring up unique topics during the interview, the use of a semi-structured interview guide provided consistency and increases the dependability of the study. The rigor of analyses was also a strength, increasing confidence in interpretation of data. Categories and themes were identified after multiple rounds of coding and thorough analysis, further strengthening the

credibility of the study. However, some categories and themes identified were related to concepts that were not covered in the quantitative studies, limiting the ability to integrate findings.

Conclusion

Behaviors established during early adolescence contribute in significant ways to health and quality of life across the life course (Viner et al., 2012). As such, early adolescence represents an optimal window for intervention to support a healthy developmental trajectory (Salam et al., 2016; Sawyer et al., 2012). Current health promotion efforts targeting this group primarily take place in the school setting; however, there is a gap in understanding how to most effectively leverage the school setting to influence health behaviors and outcomes. This dissertation begins to fill this gap by using a mixed methods approach to explore the ways in which the school environment contributes to health behaviors among middle school students. Findings highlight the importance of incorporating multiple stakeholder perspectives into school health research in order to move towards sustainable and institutionalized school health efforts.

While there has been some research on the school heath using objective measures (i.e., checklists) and from the perspective of school staff or administrators (K. W. Bauer et al., 2004; Briefel et al., 2009; Durant et al., 2009; Kontak et al., 2017), to the author's knowledge, this is the first study to examine middle school students' perceptions of the school health environment. Overall, students' perceptions of the school health environment were important predictors of physical activity and dietary behaviors. More positive perceptions of the school health environment were associated with a higher likelihood of meeting the muscle-

strengthening physical activity recommendation and marginally associated with a higher likelihood of meeting the daily physical activity recommendation. Depending on the level of meal program participation at the school, more positive perceptions of the school health environment were also associated with higher intake of fruits and vegetables.

This interaction between school socioeconomic status and perceptions of the school health environment is meaningful, as it suggests that students at the most vulnerable schools, who themselves often have worse health behaviors than their more affluent peers, have the most to gain from improvements to the school health environment. Lower school-level socioeconomic status was also associated with a decline in daily physical activity during middle school, lower fruit and vegetable intake, and higher intake of unhealthy food items. For these types of schools in particular, influencing students' perceptions of the school health environment is a promising strategy for improving healthy behaviors. While objective (i.e., concrete) components of the school health environment (e.g., presence or absence of certain policies or practices) certainly influence student perceptions, it is imperative to explicitly consider how students perceive these facets of the school environment as a key part of school improvement efforts.

The perspective of staff and administrators at the study schools provided additional context for understanding the school health environment, particularly social aspects that are missed when focusing solely on objective components. Overall, factors external to the school, such as the broader social climate in the country, played a large role in shaping things happening inside the school. Concerns about safety and student mental health led to increased conversation about social and emotional health and its relevance to academic performance.

Nonetheless, health as a whole was only prioritized in theory; actual practices and perceptions of school health personnel suggested that health promotion was a low priority activity within the broader mission of schools.

Recent federal policy changes listed health as part of a "well-rounded education" (American School Health Association, 2016; Rentner et al., 2017; Russo, 2016), and to some extent, schools in this study reported, at a minimum, increased conversation about health and wellbeing as a means to achieve more academically. Thus, it is an opportune moment for research on the school health environment in order to inform health promotion policies and practices in schools; the findings of this dissertation, as well as subsequent work building on these findings, are timely and significant to the promotion of a healthy lifestyle. Through further understanding of the school health environment in order to better promote healthy behaviors among young people, schools can also lay the foundation for academic success. Ultimately, understanding the factors that support healthy development and academic success of early adolescents will also contribute to the prevention chronic disease.

APPENDICES

Appendix A1 – Project SHAPE Baseline Survey

Project SHAPE

First Name:

Last Name:

Date of Birth: / /

M M D D Y Y Y Y

Gender: **M** **F** **(Please check one box)**

Grade Level: **6** **7** **8** **(Please circle one)**

Instructions:

Be sure to choose an answer that is the closest to what you think or feel.
Circle or check off one answer for each question.
If at any point, you have any questions, let the survey administrator know.
There is no right or wrong answers. We're interested in your opinions.

Please circle one answer for each question.

We are first going to ask you some questions about food.

1. How many servings of fruits and vegetables a day do you think teens are supposed to eat? One serving could be, for example, an apple or an ear of corn.

a) 0
b) 1-3
c) 4-6
d) 7-9
e) 10 or more
f) I don't know

Please mark if you AGREE or DISAGREE with each of the following statements:

2. Eating a serving of fruit is healthier than drinking a glass of 100% fruit juice.

a) Agree
b) Disagree
c) I don't know

3. Tampico and Sunny Delight are just as healthy as 100% fruit juice.

a) Agree
b) Disagree
c) I don't know

4. What you eat can make a difference in your chances of getting heart disease.

a) Agree
b) Disagree
c) I don't know

Processed foods, such as frozen pizzas, chips, etc are often high in sodium.

a) Agree
b) Disagree
c) I don't know

6. A way to prevent obesity is to eat smaller portion sizes.

a) Agree
b) Disagree
c) I don't know

According to My Plate, please answer these questions about what a typical plate of food should look like for someone with a healthy diet.

7. How much of the plate in a typical meal should be fruits and vegetables?
a) 1/8
b) 1/4
c) 1/2
d) The whole plate
e) I don't know

8. How much of the plate in a typical meal should be grains?
a) 1/8
b) 1/4
c) 1/2
d) The whole plate
e) I don't know

9. How much of the plate in a typical meal should be proteins such as meat, poultry, or seafood?
a) 1/8
b) 1/4
c) 1/2
d) The whole plate
e) I don't know

10. Do you look at the nutrition label of foods you may eat or drink?
a) No
b) Sometimes
c) Often
d) Always
e) I don't know

The next questions ask about food you ate or drank during the past 7 days.

11. During the past 7 days, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? Do not count punch, Kool-Aid®, sports drinks, and other fruit flavored drinks.

a) I did not drink 100% fruit juice during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day

g) 4 or more times per day

12. During the past 7 days, how many times did you eat fruit?
    a) I did not eat fruit during the past 7 days
    b) 1 to 3 times during the past 7 days
    c) 4 to 6 times during the past 7 days
    d) 1 time per day
    e) 2 times per day
    f) 3 times per day
    g) 4 or more times per day

13. During the past 7 days, how many times did you eat vegetables? Not including potatoes.
    a) I did not eat other vegetables during the past 7 days
    b) 1 to 3 times during the past 7 days
    c) 4 to 6 times during the past 7 days
    d) 1 time per day
    e) 2 times per day
    f) 3 times per day
    g) 4 or more times per day

14. During the past 7 days, how many times did you drink a can, bottle, or glass of soda, such as Coke®, Pepsi®, Sprite®, or any Diet Sodas?
    a) I did not drink soda during the past 7 days
    b) 1 to 3 times during the past 7 days
    c) 4 to 6 times during the past 7 days
    d) 1 time per day
    e) 2 times per day
    f) 3 times per day
    g) 4 or more times per day

15. During the past 7 days, on how many days did you eat breakfast?
    a) 0 days
    b) 1 day
    c) 2 days
    d) 3 days
    e) 4 days
    f) 5 days
    g) 6 days
    h) 7 days

The questions in this section are to find out what you think about the amount of food you eat each day.

16.The amount of fruit I eat each day is:

a) Too much
b) Just right
c) Too little

17. The amount of vegetables I eat each day is:
a) Too much
b) Just right
c) Too little

18. The amount of soda I drink each day is:
a) Too much
b) Just right
c) Too little

The next questions are about healthful eating.

19. People who are overweight are more likely to have health problems than people who are not overweight.
a) True
b) False
c) I don't know

20. Which of these would be the LOWEST fat sandwich choice?
a) Cheeseburger
b) Tuna salad sandwich with mayonnaise
c) Plain grilled chicken breast sandwich
d) I don't know

21. Which of these would be the best way to add a fruit or vegetable to your meal at a fast food restaurant?
a) Add a tomato slice to your hamburger
b) Order apple pie for dessert
c) Order a large serving of French fries
d) Order a side of salad
e) I don't know

22. Which of these is the HEALTHIEST way to eat potatoes?
a) Potato salad
b) French fries
c) Baked potato without toppings like butter
d) I don't know
23. Do you think the following foods and beverages are healthy or unhealthy?

Please check one box for each letter.

	Healthy	Unhealthy	I don't know
a) Regular soda (not diet, zero, light)	□	□	□
b) An apple	□	□	□
c) Sports drinks (e.g. Gatorade or Vitamin Water)	□	□	□
d) Baked Chips	□	□	□
e) Horchata	□	□	□
f) Sunny Delight	□	□	□
g) 100% Orange Juice	□	□	□
h) Regular Chips	□	□	□
i) Cheetos	□	□	□
j) Energy drinks (e.g. Red Bull or Monster)	□	□	□
k) Diet soda	□	□	□

The next questions ask about your Physical Education classes.

24. How much do you enjoy physical education (PE) classes at school?
a) PE is very un-enjoyable
b) PE is somewhat un-enjoyable
c) PE is neither, un-enjoyable or enjoyable
d) PE is somewhat enjoyable
e) PE is very enjoyable
f) Not enrolled in PE

25. During an average PE class, how many minutes or hours do you spend actually exercising or playing sports?
a) I do not take PE
b) Less than 10 minutes

c) 10 to 20 minutes
d) 21 to 30 minutes
e) 31 to 40 minutes
f) 41 to 50 minutes
g) 51 to 60 minutes
h) More than 60 minutes

26. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
a) 0 days
b) 1 day
c) 2 days
d) 3 days
e) 4 days
f) 5 days

27. During the past 7 days, on how many days were you physically active for 60 minutes or more per day? This includes all activities in and out of school.
a) 0 days
b) 1 day
c) 2 days
d) 3 days
e) 4 days
f) 5 days
g) 6 days
h) 7 days

28. During the past 12 months, on how many sports teams did you play? Count any teams run by your school or in your community like AYSO , Little League Baseball, etc.
a) 0 teams
b) 1 team
c) 2 teams
d) 3 or more teams

29. On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?
a) 0 days
b) 1 day
c) 2 days
d) 3 days
e) 4 days
f) 5 days
g) 6 days
h) 7 days

These next questions are about <u>how you feel</u> about exercise and physical activity.

30. I would rather watch TV than play sports or be active.
a) Yes
b) No
c) Sometimes

31. People who play sports or are active seem to have a lot of fun doing it.
a) Yes
b) No
c) Sometimes

32. How do you feel about your ability to run a long way without stopping?
a) Great
b) Okay
c) Not good

33. How do you feel about your ability to play many different games and sports?
a) Great
b) Okay
c) Not good

34. Would you say you get too much, too little or just the right amount of physical activity each day?
a) Too much
b) Just right
c) Too little

The next questions ask about your <u>physical activity</u>. Physical activity means doing exercise like playing sports, running, jogging, bike riding, swimming, dancing, skating or any other activity that makes you breathe fast.

Below is a list of things people might do or say to someone who is trying to exercise regularly. Please read and give an answer to every question. Please check one box for each letter.

35. During the <u>past three months,</u> my *family* or a member of my household:

	Never	Rarely	A few times	Often	Very Often
a) Exercised with me	☐	☐	☐	☐	☐

b) Offered to exercise with me	☐	☐	☐	☐	☐
c) Gave me helpful reminders to exercise	☐	☐	☐	☐	☐
d) Gave me encouragement to stick with my exercise program	☐	☐	☐	☐	☐
e) Changed their schedule so we could exercise together	☐	☐	☐	☐	☐
f) Discussed exercise with me	☐	☐	☐	☐	☐
g) Complained about the time I spend exercising	☐	☐	☐	☐	☐
h) Criticized me or made fun of me for exercising	☐	☐	☐	☐	☐
i) Gave me rewards for exercising (bought or gave me something)	☐	☐	☐	☐	☐
j) Planned for exercise or recreational outings	☐	☐	☐	☐	☐
k) Helped plan activities around my exercise	☐	☐	☐	☐	☐
l) Asked me for ideas on how they can get more exercise	☐	☐	☐	☐	☐
m) Talked about how much they like to exercise	☐	☐	☐	☐	☐

The next questions also ask about your <u>physical activity</u>.

Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question. Please check one box for each letter.

36. During the <u>past three months,</u> my *friends* or *classmates*:

	Never	Rarely	A few times	Often	Very Often
a) Exercised with me	☐	☐	☐	☐	☐
b) Offered to exercise with me	☐	☐	☐	☐	☐
c) Gave me helpful reminders to exercise	☐	☐	☐	☐	☐
d) Gave me encouragement to stick with my exercise program	☐	☐	☐	☐	☐
e) Changed their schedule so we could exercise together	☐	☐	☐	☐	☐
f) Discussed exercise with me	☐	☐	☐	☐	☐
g) Complained about the time I spend exercising	☐	☐	☐	☐	☐
h) Criticized me or made fun of me for exercising	☐	☐	☐	☐	☐
i) Gave me rewards for exercising (bought or gave me something)	☐	☐	☐	☐	☐
j) Planned for exercise or recreational outings	☐	☐	☐	☐	☐
k) Helped plan activities around my exercise	☐	☐	☐	☐	☐
l) Asked me for ideas on how they can get more exercise	☐	☐	☐	☐	☐
m) Talked about how much they like to exercise	☐	☐	☐	☐	☐

37. How often do the following stop you from getting exercise? Check one box for each letter.

	Never	Rarely	A few times	Often	Very Often
a) Self-conscious about my looks	☐	☐	☐	☐	☐

b) Lack of interest in physical activity	☐	☐	☐	☐	☐
c) Lack of self-discipline (will power)	☐	☐	☐	☐	☐
d) Lack of time	☐	☐	☐	☐	☐
e) Lack of energy	☐	☐	☐	☐	☐
f) I do not have anyone to do physical activity with me	☐	☐	☐	☐	☐
g) I do not enjoy physical activity	☐	☐	☐	☐	☐
h) Lack of equipment	☐	☐	☐	☐	☐
i) The weather is too bad	☐	☐	☐	☐	☐
j) Planned for exercise or recreational outings	☐	☐	☐	☐	☐
k) Lack of skills	☐	☐	☐	☐	☐
l) I am too tired to exercise	☐	☐	☐	☐	☐
m) Lack of knowledge on how to do physical activities	☐	☐	☐	☐	☐
n) Lack of a convenient place to do physical activity	☐	☐	☐	☐	☐
o) I am too overweight	☐	☐	☐	☐	☐
p) Physical activity is boring	☐	☐	☐	☐	☐
q) My friends don't like to exercise	☐	☐	☐	☐	☐
r) I don't like to sweat	☐	☐	☐	☐	☐
s) Physical activity messes up my appearance (hair, clothes, make-up)	☐	☐	☐	☐	☐
t) I don't want to get too strong or muscular	☐	☐	☐	☐	☐
u) Homework	☐	☐	☐	☐	☐

How much do you agree or disagree with the following statements. Please check one box for each letter.

38. If I participate in regular physical activity or sports, then:

	Strongly disagree	Somewhat disagree	Do not agree or disagree	Somewhat agree	Strongly agree
a) I will meet new people	☐	☐	☐	☐	☐
b) I will lose weight	☐	☐	☐	☐	☐
c) I will build up my muscular strength	☐	☐	☐	☐	☐
d) I will feel less tension and stress	☐	☐	☐	☐	☐
e) I will improve my health or reduce my risk of disease	☐	☐	☐	☐	☐
f) I will improve my heart and lung fitness	☐	☐	☐	☐	☐
g) I will feel better about my body	☐	☐	☐	☐	☐
h) I will increase my energy level	☐	☐	☐	☐	☐
i) My body will look better	☐	☐	☐	☐	☐

39. How much do you agree or disagree with the following statements. Please check one box for each letter.

	Strongly disagree	Somewhat disagree	Do not agree or disagree	Somewhat agree	Strongly agree
a) At home there are enough supplies and pieces of sports equipment (like balls, bicycles, skates) to use for physical activity	☐	☐	☐	☐	☐
b) There are playgrounds, parks, or gyms close to my home or that I can get to easily	☐	☐	☐	☐	☐
c) It is safe to walk or jog alone in my neighborhood during the day	☐	☐	☐	☐	☐
d) It is difficult to walk or jog in my neighborhood because of things like traffic, no sidewalks, dogs, gangs, and so on	☐	☐	☐	☐	☐

The next questions are about body weight.

40. How do you describe your weight?
    a) Very underweight
    b) Slightly underweight
    c) About the right weight
    d) Slightly overweight
    e) Very overweight

41. Which of the following are you trying to do about your weight?
    a) Lose weight
    b) Gain weight
    c) Stay the same weight
    d) I am not trying to do anything about my weight

The next questions are about you.

42. Which of the following describes you? Select one or more responses.
a) American Indian or Alaska Native
b) Asian
c) Black or African American
d) Hispanic or Latino
e) Native Hawaiian or Other Pacific Islander
f) White

43. What language do you mainly speak at home?
a) English only
b) Spanish only
c) Both English and Spanish
d) Other. Please write here: _____
e) I don't know

44. What language do you speak with friends?
a) English only
b) Spanish only
c) Both English and Spanish
d) Other. Please write here: _____
e) I don't know

These last questions are about social media. Please check one box for each letter.

45. <u>During the past 7 days,</u> how often have you used the following?

	Rarely/ Never	Once a week	Multiple times a week	Once a day	Multiple times a day
a) Desktop computer	☐	☐	☐	☐	☐
b) Laptop computer	☐	☐	☐	☐	☐
c) iPad or tablet	☐	☐	☐	☐	☐
d) Cell phone or smart phone	☐	☐	☐	☐	☐
e) iPod or other mp3 player	☐	☐	☐	☐	☐
f) TV	☐	☐	☐	☐	☐
g) Radio	☐	☐	☐	☐	☐
h) Video game console (e.g. play station, Xbox)	☐	☐	☐	☐	☐
i) Handheld gaming device	☐	☐	☐	☐	☐

46. List up to 3 ads for food, drinks, or restaurants that you have seen recently. Ads are something you might see in a magazine, on the radio or on TV that tell you about something that you can buy, tell us all the places where you saw or heard it (e.g. tv or the Internet) by checking the boxes below.

	TV	Internet	Mobile device	Radio	Magazine	Billboard	Other. Please write in where you saw or heard the advertisement.
a)_____	☐	☐	☐	☐	☐	☐	_____
b)_____	☐	☐	☐	☐	☐	☐	_____
c)_____	☐	☐	☐	☐	☐	☐	_____

47. On which social network site or sites do you have a profile? Please check yes or no for each letter.

	Yes	No
a) Facebook	☐	☐
b) Twitter	☐	☐
c) Instagram	☐	☐
d) Myspace	☐	☐
e) Youtube	☐	☐
f) Tumblr	☐	☐
g) Google+	☐	☐
h) Pinterest	☐	☐
i) Foursquare	☐	☐
j) Spotify	☐	☐
k) Snapchat	☐	☐
l) Reddit	☐	☐
m) Skype	☐	☐
n) Vimeo	☐	☐
o) Vine	☐	☐
p) Kik	☐	☐
q) Other. Please write here: _____	☐	☐
r) None, I am not on any social network sites	☐	☐

48. During this past year, list the 3 TV shows you watched most often?

a) _____

b) _____

c) _____

d) I did not watch TV.

Project SHAPE

First Name:

Last Name:

Date of Birth: ☐☐/☐☐/☐☐☐☐

M M D D Y Y Y Y

Gender: ☐ **M** ☐ **F** **(Please check one box)**

Grade Level: **6** **7** **8** **(Please circle one)**

Instructions:

Be sure to choose an answer that is the closest to what you think or feel.
Circle or check off one answer for each question.
If at any point, you have any questions, let the survey administrator know.
There is no right or wrong answers. We're interested in your opinions.

Please circle one answer for each question.

According to My Plate, please answer these questions about what a typical plate of food should look like for someone with a healthy diet.

1. How much of the plate in a typical meal should be fruits and vegetables?
   a) 1/8
   b) 1/4
   c) 1/2
   d) The whole plate
   e) I don't know

2. How much of the plate in a typical meal should be grains such as rice, bread, or oats?
   a) 1/8
   b) 1/4
   c) 1/2
   d) The whole plate
   e) I don't know

3. How much of the plate in a typical meal should be proteins such as meat, poultry, or seafood?
   a) 1/8
   b) 1/4
   c) 1/2
   d) The whole plate
   e) I don't know

The next questions ask about what you ate or drank during the past 7 days.

4. During the past 7 days, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? Do not count punch, Kool-Aid®, sports drinks, and other fruit flavored drinks.
   a) I did not drink 100% fruit juice during the past 7 days
   b) 1 to 3 times during the past 7 days
   c) 4 to 6 times during the past 7 days
   d) 1 time per day
   e) 2 times per day
   f) 3 times per day
   g) 4 or more times per day

5. During the past 7 days, how many times did you eat fruit?
   a) I did not eat fruit during the past 7 days
   b) 1 to 3 times during the past 7 days
   c) 4 to 6 times during the past 7 days

d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

6. During the past 7 days, how many times did you eat vegetables? Do not include potatoes.
a) I did not eat other vegetables during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

7. During the past 7 days, how many times did you drink a can, bottle, or glass of soda, such as Coke®, Pepsi®, or Sprite®?
a) I did not drink soda during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

8. During the past 7 days, how many times did you drink diet soda (i.e. soda that is diet, light, zero)?
a) I did not drink diet soda during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

9. During the past 7 days, how many times did you drink punch, sports drinks, sweetened fruit drinks or energy drinks?
a) I did not drink punch/sports/sweetened fruit/energy drinks during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

10. During the past 7 days, how many times did you eat sweets (e.g. candy, ice cream, sweet rolls, doughnuts, cookies, brownies, pies, or cake)?

a) I did not eat sweets during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

11. During the past 7 days, how many times did you eat salty snacks (e.g. chips, pretzels, popcorn, pork rinds, etc.)?

a) I did not eat salty snacks during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

12. During the past 7 days, how many times did you eat fast food (e.g. McDonalds, Taco Bell, Burger King, etc.)?

a) I did not eat fast food during the past 7 days
b) 1 to 3 times during the past 7 days
c) 4 to 6 times during the past 7 days
d) 1 time per day
e) 2 times per day
f) 3 times per day
g) 4 or more times per day

The questions in this section are to find out what you think about the amount you drink each day.

13. The amount of soda I drink each day is:

a) Too much
b) Just right
c) Too little
d) I don't drink soda

14. The amount of diet soda I drink each day is:

a) Too much
b) Just right
c) Too little
d) I don't drink diet soda

15. The amount of punch, sports drinks, sweetened fruit drinks or energy drinks I drink each day is:
a) Too much
b) Just right
c) Too little
d) I don't drink sports drinks

The next questions ask your opinions about eating.

16. How would you rate your eating habits?
a) Poor
b) Fair
c) Good
d) Excellent

17. How strongly do you agree with the following statements? Please check one box for each letter.

	Strongly Disagree	Disagree	Agree	Strongly Agree
a) My friends think it is important to eat healthy foods like fruits and vegetables	☐	☐	☐	☐
b) My friends diet to lose weight or keep from gaining weight	☐	☐	☐	☐

The next questions ask about your Physical Education classes.

18. How much do you enjoy physical education (PE) classes at school?
a) PE is very un-enjoyable
b) PE is somewhat un-enjoyable
c) PE is neither, un-enjoyable or enjoyable
d) PE is somewhat enjoyable
e) PE is very enjoyable
f) Not enrolled in PE

19. During an average PE class, how many minutes or hours do you spend actually exercising or playing sports?
a) Less than 10 minutes
b) 10 to 20 minutes
c) 21 to 30 minutes
d) 31 to 40 minutes
e) 41 to 50 minutes

f) 51 to 60 minutes
g) More than 60 minutes
h) I do not take PE

20. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
a) 0 days
b) 1 day
c) 2 days
d) 3 days
e) 4 days
f) 5 days

21. During the past 7 days, on how many days were you physically active for 60 minutes or more per day? This includes all activities in and out of school.
a) 0 days
b) 1 day
c) 2 days
d) 3 days
e) 4 days
f) 5 days
g) 6 days
h) 7 days

22. During the past 12 months, on how many sports teams did you play? Count any teams run by your school or in your community like AYSO, Little League Baseball, etc.
a) 0 teams
b) 1 team
c) 2 teams
d) 3 or more teams

23. On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?
a) 0 days
b) 1 day
c) 2 days
d) 3 days
e) 4 days
f) 5 days
g) 6 days
h) 7 days

These next questions are about how you feel about exercise and physical activity.

24. I would rather watch TV than play sports or be active.
a) Yes

b) No
c) Sometimes

25. People who play sports or are active seem to have a lot of fun doing it.
a) Yes
b) No
c) Sometimes

26. How do you feel about your ability to run a long way without stopping?
a) Great
b) Okay
c) Not good

27. How do you feel about your ability to play many different games and sports?
a) Great
b) Okay
c) Not good

28. Would you say you get too much, too little or just the right amount of physical activity each day?
a) Too much
b) Just right
c) Too little

The next questions ask about your physical activity. Physical activity means doing exercise like playing sports, running, jogging, bike riding, swimming, dancing, skating or any other activity that makes you breathe fast.

Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question. Please check one box for each letter.

29. During the past three months, my *friends* or *classmates*:

	Never	Rarely	A few times	Often	Very Often
a) Exercised with me	☐	☐	☐	☐	☐
b) Offered to exercise with me	☐	☐	☐	☐	☐
c) Gave me helpful reminders to exercise	☐	☐	☐	☐	☐
d) Gave me encouragement to stick with my exercise program	☐	☐	☐	☐	☐

e) Changed their schedule so we could exercise together	☐	☐	☐	☐	☐
f) Discussed exercise with me	☐	☐	☐	☐	☐
g) Criticized me or made fun of me for exercising	☐	☐	☐	☐	☐
h) Planned for exercise or recreational outings	☐	☐	☐	☐	☐
i) Helped plan activities around my exercise	☐	☐	☐	☐	☐
j) Asked me for ideas on how they can get more exercise	☐	☐	☐	☐	☐
k) Talked about how much they like to exercise	☐	☐	☐	☐	☐

The next questions also ask about your physical activity.

Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question. Please check one box for each letter.

30. During the past three months, my *family* or a member of my household:

	Never	Rarely	A few times	Often	Very Often
a) Exercised with me	☐	☐	☐	☐	☐
b) Offered to exercise with me	☐	☐	☐	☐	☐
c) Gave me helpful reminders to exercise	☐	☐	☐	☐	☐
d) Gave me encouragement to stick with my exercise program	☐	☐	☐	☐	☐
e) Changed their schedule so we could exercise together	☐	☐	☐	☐	☐
f) Discussed exercise with me	☐	☐	☐	☐	☐

g) Complained about the time I spend exercising	☐	☐	☐	☐	☐
h) Criticized me or made fun of me for exercising	☐	☐	☐	☐	☐
i) Gave me rewards for exercising (bought or gave me something)	☐	☐	☐	☐	☐
j) Planned for exercise or recreational outings	☐	☐	☐	☐	☐
k) Helped plan activities around my exercise	☐	☐	☐	☐	☐
l) Asked me for ideas on how they can get more exercise	☐	☐	☐	☐	☐
m) Talked about how much they like to exercise	☐	☐	☐	☐	☐

31. How often do the following stop you from getting exercise? Check one box for each letter.

	Never	**Rarely**	**A few times**	**Often**	**Very Often**
a) Self-conscious about my looks	☐	☐	☐	☐	☐
b) Lack of interest in physical activity	☐	☐	☐	☐	☐
c) Lack of self-discipline (will power)	☐	☐	☐	☐	☐
d) Lack of time	☐	☐	☐	☐	☐
e) Lack of energy	☐	☐	☐	☐	☐
f) I do not have anyone to do physical activity with me	☐	☐	☐	☐	☐
g) I do not enjoy physical activity	☐	☐	☐	☐	☐
h) Lack of equipment	☐	☐	☐	☐	☐
i) The weather is too bad	☐	☐	☐	☐	☐
j) Lack of skills	☐	☐	☐	☐	☐

k) I am too tired to exercise	☐	☐	☐	☐	☐
l) Lack of knowledge on how to do physical activities	☐	☐	☐	☐	☐
m) Lack of a convenient place to do physical activity	☐	☐	☐	☐	☐
n) I am too overweight	☐	☐	☐	☐	☐
o) Physical activity is boring	☐	☐	☐	☐	☐
p) My friends don't like to exercise	☐	☐	☐	☐	☐
q) I don't like to sweat	☐	☐	☐	☐	☐
r) Physical activity messes up my appearance (hair, clothes, make-up)	☐	☐	☐	☐	☐
s) I don't want to get too strong or muscular	☐	☐	☐	☐	☐
t) Homework	☐	☐	☐	☐	☐

How much do you agree or disagree with the following statements. Please check one box for each letter.

32. If I participate in regular physical activity or sports, then:

	Strongly disagree	**Somewhat disagree**	**Do not agree or disagree**	**Somewhat agree**	**Strongly agree**
a) I will meet new people	☐	☐	☐	☐	☐
b) I will lose weight	☐	☐	☐	☐	☐
c) I will build up my muscular strength	☐	☐	☐	☐	☐
d) I will feel less tension and stress	☐	☐	☐	☐	☐
e) I will improve my health or reduce my risk of disease	☐	☐	☐	☐	☐
f) I will improve my heart and lung fitness	☐	☐	☐	☐	☐
g) I will feel better about my body	☐	☐	☐	☐	☐

h) I will increase my energy level	☐	☐	☐	☐	☐
i) My body will look better	☐	☐	☐	☐	☐

33. How much do you agree or disagree with the following statements. Please check one box for each letter.

	Strongly disagree	**Somewhat disagree**	**Do not agree or disagree**	**Somewhat agree**	**Strongly agree**
a) At home there are enough supplies and pieces of sports equipment (like balls, bicycles, skates) to use for physical activity	☐	☐	☐	☐	☐
b) There are playgrounds, parks, or gyms close to my home or that I can get to easily	☐	☐	☐	☐	☐
c) It is safe to walk or jog alone in my neighborhood during the day	☐	☐	☐	☐	☐
d) It is difficult to walk or jog in my neighborhood because of things like traffic, no sidewalks, dogs, gangs, and so on	☐	☐	☐	☐	☐

The next questions are about body weight.

34. How do you describe your weight?
    a) Very underweight
    b) Slightly underweight
    c) About the right weight
    d) Slightly overweight
    e) Very overweight

35. Which of the following are you trying to do about your weight?
    a) Lose weight
    b) Gain weight
    c) Stay the same weight
    d) I am not trying to do anything about my weight

The next questions are about you.

36. Which of the following describes you? Select one or more responses.
a) American Indian or Alaska Native
b) Asian
c) Black or African American
d) Hispanic or Latino
e) Native Hawaiian or Other Pacific Islander
f) White

37. What language do you mainly speak at home?
a) English only
b) Spanish only
c) Both English and Spanish
d) Other. Please write here: _____
e) I don't know

38. What language do you speak with friends?
a) English only
b) Spanish only
c) Both English and Spanish
d) Other. Please write here: _____
e) I don't know

39. What is the highest level of education your mother or female guardian completed?
a) Less than high school
b) High school graduate or GED
c) Some college or technical school
d) College degree
e) More than college (master's degree or doctoral degree)
f) I don't know

40. What is the highest level of education your father or male guardian completed?
a) Less than high school
b) High school graduate or GED
c) Some college or technical school
d) College degree
e) More than college (master's degree or doctoral degree)
f) I don't know

The next questions are about your school environment.

41. How often do you learn about healthy eating in your classes at school?
   a) Never
   b) Sometimes
   c) Often
   d) Always

42. How often do you notice advertisements for healthy food or healthy eating in your classrooms, the cafeteria, or other places at your school?
   a) Never
   b) Sometimes
   c) Often
   d) Always

43. How often do you notice advertisements for soda, candy, or snack foods in your classrooms, the cafeteria, or other places at your school?
   a) Never
   b) Sometimes
   c) Often
   d) Always

44. How much effort has your school made to help students eat healthfully?
   a) None
   b) A little
   c) Some
   d) A lot

45. How strongly do you agree or disagree with the following statements? Please check one box for each letter.

	Strongly Disagree	Disagree	Agree	Strongly Agree
a) The food available at school makes it easy to eat healthfully	☐	☐	☐	☐
b) It is easier to buy unhealthy food than healthy food at school	☐	☐	☐	☐
c) It is easy to buy or get fresh fruit at school	☐	☐	☐	☐
d) The healthy food at school is low quality	☐	☐	☐	☐
e) There are more unhealthy places to go out to eat at than healthy places in your neighborhood	☐	☐	☐	☐

f) It is easier to find unhealthy food in your neighborhood than healthy food	☐	☐	☐	☐

The next questions are about sleep.

46. On a school night (Sunday – Thursday), how many hours of sleep do you get?
    a) 4 or less hours
    b) 5 hours
    c) 6 hours
    d) 7 hours
    e) 8 hours
    f) 9 hours
    g) 10 or more hours

47. On a weekend night (Friday and Saturday), how many hours of sleep do you get?
    a) 4 or less hours
    b) 5 hours
    c) 6 hours
    d) 7 hours
    e) 8 hours
    f) 9 hours
    g) 10 or more hours

48. How often do you think you get enough sleep?
    a) Always
    b) Usually
    c) Sometimes
    d) Rarely
    e) Never

49. Do you consider yourself to be…
    a) a good sleeper
    b) a poor sleeper

50. After waking in the morning do you usually feel?
    a) Tired and groggy
    b) Awake and alert

These last questions are about advertisements.

51. How <u>often</u> do you pay attention to ads when they appear?
    a) Never
    b) Rarely

c) Sometimes
d) Regularly
e) Always

52. How much attention do you pay to ads you see or hear?
a) Not at all
b) Very little
c) A fair amount
d) A lot

53. During the past 7 days, how often did you snack on junk food (e.g. chips, cookies, ice cream) while you were doing something else like watching TV, using the computer/iPad/Tablet, playing video games, or using social media?
a) Never
b) Rarely
c) Sometimes
d) Usually
e) Always

54. On a school day (Monday – Friday) when you are NOT at school, how many hours do you spend doing the following? This includes anytime before or after school.

Pick the number closest to the amount of time you spend doing these things. Please check one box for each letter.

	No time at all	**Less than 1 Hour**	**1 Hour**	**2 Hours**	**3 Hours**	**4 Hours**	**5+ Hours**
a) Listening to music on the radio or online (e.g. Spotify, Pandora, online radio)	☐	☐	☐	☐	☐	☐	☐
b) Playing online video games	☐	☐	☐	☐	☐	☐	☐
c) Playing video games (game consoles like Xbox, Playstation, or handheld devices like DS or 3DS or using phone or tablet app)	☐	☐	☐	☐	☐	☐	☐

d) Watching online videos (e.g. YouTube)	☐	☐	☐	☐	☐	☐	☐
e) Watching TV live	☐	☐	☐	☐	☐	☐	☐
f) Streaming or recorded TV shows or movies that have commercials (e.g. Hulu)	☐	☐	☐	☐	☐	☐	☐
g) Streaming TV shows or movies that have NO commercials (e.g. Netflix or Amazon Prime)	☐	☐	☐	☐	☐	☐	☐
h) Using social media sites (e.g. Snapchat, Facebook, Instagram, Twitter)	☐	☐	☐	☐	☐	☐	☐
i) Using the internet/visiting websites	☐	☐	☐	☐	☐	☐	☐

Appendix A3 – FITNESSGRAM Testing Procedures

Appendix Table A3.1 FITNESSGRAM Testing Procedures[1]

FITNESSGRAM Component	Test Options	Procedure	Will be used?
Aerobic Capacity	PACER test	Students run across a 20-meter distance ("lap") at a specified pace that gets faster each minute. Pace is kept with a CD with recorded beeps. The recorded score is the total number of laps completed on pace (i.e., before a beep).	
	One-Mile-Run	Alternative to PACER. Students are timed as they run a distance of one mile.	
	Walk Test	Alternative to PACER. Students are timed as they walk a distance of one mile.	
Body Composition	Skinfold Measurements	Measurements are taken of the triceps and calf using a caliper at the middle of the skin fold.	
	Body Mass Index	Alternative to Skinfold Measurements. Students must remove shoes. A stadiometer is recommended for obtaining accurate measurements of height. If unavailable, a tape measure attached to a wall is used. A high-quality digital scale is recommended for measurements of weight. Fractions of an inch or pound are dropped and the lower whole number is used.	✓
Strength and Endurance	Push-Up	Using a pre-recorded cadence of approximately 20 push-ups per minute, the number of push-ups students complete are counted until they can no longer continue.	
	Pull-Up	Alternative to Push-Up. The number of pull-ups performed by students is recorded. There is no time limit, but movement should be rhythmical and continuous.	
	Flexed Arm Hang	Alternative to Push-Up. Students grasp a bar with an overhand grip and raise the body off of the floor to a position in which the chin is above the bar. The number of seconds that the student maintains the correct position is recorded.	
Flexibility	Sit and Reach	One leg is fully extended and the other is bent at the knee. Students reach forward	

		with both hands along a scale and hold the position for measurement, and this is repeated for the other leg.	
	Shoulder Stretch	Students reach with the right hand over the right shoulder and down the back, while at the same time placing the left hand behind the back and trying to touch the fingers of the right hand. A “yes” or “no” is recorded for whether or not the fingers touch, and this is repeated for the other side as well.	
Abdominal Strength	Curl-Up	Using a pre-recorded cadence of approximately 20 curl-ups per minute, the number of curl-ups students complete are counted until they can no longer continue, up to a maximum of 75.	
Trunk Strength	Trunk Lift	From a prone position (facedown), students lift their upper body off of the floor, and the distance from the floor to the student’s chin is recorded.	

[1] Meredith et al., 2010

Appendix A4 – SPARC Instrument

School Physical Activity Opportunities Report Card – Spaces Audit

School ______ District ______ Date ______

1
Name of area *abbrv. to 15 characters* — Dimensions

___ yds X ___ yds
+ ___ yds X ___ yds

mark "X" for all that apply

Used for...	Shade: If outdoor,	Surface ← *mark "X" for the one that best typifies surface*
PE	% shaded by ...	blacktop
recess	trees	grass
lunch	roof	earth
sports	building	wood
afterschool	other *(specify)*	other *(specify)*
other *(specify)*		

PA Equip./demarcations *e.g. basketball hoops, climbing structure, court lines*

2
Name of area *abbrv. to 15 characters* — Dimensions

___ yds X ___ yds
+ ___ yds X ___ yds

mark "X" for all that apply

Used for...	Shade: If outdoor,	Surface ← *mark "X" for the one that best typifies surface*
PE	% shaded by ...	blacktop
recess	trees	grass
lunch	roof	earth
sports	building	wood
afterschool	other *(specify)*	other *(specify)*
other *(specify)*		

PA Equip./demarcations *e.g. basketball hoops, climbing structure, court lines*

3
Name of area *abbrv. to 15 characters* — Dimensions

___ yds X ___ yds
+ ___ yds X ___ yds

mark "X" for all that apply

Used for...	Shade: If outdoor,	Surface ← *mark "X" for the one that best typifies surface*
PE	% shaded by ...	blacktop
recess	trees	grass
lunch	roof	earth
sports	building	wood
afterschool	other *(specify)*	other *(specify)*
other *(specify)*		

PA Equip./demarcations *e.g. basketball hoops, climbing structure, court lines*

4
Name of area *abbrv. to 15 characters* — Dimensions

___ yds X ___ yds
+ ___ yds X ___ yds

mark "X" for all that apply

Used for...	Shade: If outdoor,	Surface ← *mark "X" for the one that best typifies surface*
PE	% shaded by ...	blacktop
recess	trees	grass
lunch	roof	earth
sports	building	wood
afterschool	other *(specify)*	other *(specify)*
other *(specify)*		

PA Equip./demarcations *e.g. basketball hoops, climbing structure, court lines*

5
Name of area *abbrv. to 15 characters* — Dimensions

___ yds X ___ yds
+ ___ yds X ___ yds

mark "X" for all that apply

Used for...	Shade: If outdoor,	Surface ← *mark "X" for the one that best typifies surface*
PE	% shaded by ...	blacktop
recess	trees	grass
lunch	roof	earth
sports	building	wood
afterschool	other *(specify)*	other *(specify)*
other *(specify)*		

PA Equip./demarcations *e.g. basketball hoops, climbing structure, court lines*

6
Name of area *abbrv. to 15 characters* — Dimensions

___ yds X ___ yds
+ ___ yds X ___ yds

mark "X" for all that apply

Used for...	Shade: If outdoor,	Surface ← *mark "X" for the one that best typifies surface*
PE	% shaded by ...	blacktop
recess	trees	grass
lunch	roof	earth
sports	building	wood
afterschool	other *(specify)*	other *(specify)*
other *(specify)*		

PA Equip./demarcations *e.g. basketball hoops, climbing structure, court lines*

Appendix A5 – Study One and Two Variables

Appendix Table A5.1 Study One and Two Dependent Variables

Dependent Variables				
Variable (Data Source)	**Question(s)**	**Response options**	**Coding**	**Study #**
Daily PA (Survey)	During the past 7 days, on how many days were you active for 60 minutes or more per day? This includes all activities in and out of school.	0-7 days	0-7 days	1
Daily PA Change Score (Survey)	During the past 7 days, on how many days were you active for 60 minutes or more per day? This includes all activities in and out of school.	0-7 days	Calculated by subtracting baseline daily PA from follow up daily PA, resulting in a range of -7 to 7	1
Muscle Strengthening PA (Survey)	On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?	0-7 days	0-7 days	1
Muscle Strengthening PA Change Score (Survey)	On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?	0-7 days	Calculated by subtracting baseline muscle strengthening PA from follow up muscle strengthening PA, resulting in a range of -7 to 7	1
Fruit Consumption (Survey)	During the past 7 days, how many times did you eat fruit?	0, 1-3 times during past 7 days, 4-6 times during past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day	Quasi-continuous: 0-28 fruits per week	1, 2

Fruit Consumption Change Score (Survey)	During the past 7 days, how many times did you eat fruit?	0, 1-3 times during past 7 days, 4-6 times during past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day	Calculated by subtracting baseline fruit consumption from follow up fruit consumption, resulting in a range of -28 to 28	1
Vegetable Consumption (Survey)	During the past 7 days, how many times did you eat vegetables?	0, 1-3 times during past 7 days, 4-6 times during past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day	Quasi-continuous: 0-28 vegetables per week	1, 2
Vegetable Consumption Change Score (Survey)	During the past 7 days, how many times did you eat vegetables?	0, 1-3 times during past 7 days, 4-6 times during past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day	Calculated by subtracting baseline vegetable consumption from follow up vegetable consumption, resulting in a range of -28 to 28	1
Recommended Daily PA (Survey)	During the past 7 days, on how many days were you active for 60 minutes or more per day? This includes all activities in and out of school.	0-7 days	0 (did not meet recommendation: 0-6 days) vs. 1 (met recommendation: 7 days)	2
Recommended Muscle Strengthening PA (Survey)	On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?	0-7 days	0 (did not meet recommendations: 0-2 days) vs. 1 (met recommendation: 3-7 days)	2
Unhealthy Dietary Behaviors (Survey)	During the past 7 days, how many times did you drink a can, bottle, or glass of soda, such as Coke, Pepsi, or Sprite?	0, 1-3 times during past 7 days, 4-6 times during past 7 days, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day	Quasi-continuous: 0-28 sodas/diet sodas/sugar-sweetened beverages/sweets/salty snacks/fast food per week	2

	During the past 7 days, how many times did you drink diet soda (i.e. soda that is diet, light, zero)? During the past 7 days, how many times did you drink punch, sports drinks, sweetened fruit drinks or energy drinks? During the past 7 days, how many times did you eat sweets (e.g. candy, ice cream, sweet rolls, doughnuts, cookies, brownies, pies, or cake)? During the past 7 days, how many times did you eat salty snacks (e.g. chips, pretzels, popcorn, pork rinds, etc.)? During the past 7 days, how many times did you eat fast food (e.g. McDonalds, Taco Bell, Burger King, etc.)?		Summed to create total unhealthy dietary behaviors: 0-168 unhealthy items per week	

Appendix Table A5.2 Study One and Two Individual Level Independent Variables

Independent Variables: Individual Level

Variable (Data Source)	Question(s)	Response options	Coding	Study #
Perceived school health environment (Survey)	How often do you learn about healthy eating in your classes at school? How often do you notice advertisements for healthy food or healthy eating in your classrooms, the cafeteria, or other places at your school? How much effort has your school made to help students eat healthfully?	4-point Likert scale from Never to Always or None to A lot	Scored each item 0-3 and summed for a total between 0-12.	2
PA Attitudes (Survey)	I would rather watch TV than play sports or be active. People who play sports or are active seem to have a lot of fun doing it. How do you feel about your ability to run a long way without stopping? How do you feel about your ability to play many different games and sports?	No/Not Good, Sometimes/Okay, and Yes/Great	Scored 0-2. Summed to create PA Attitudes scale (0-8), and dichotomized to reflect negative (0-4) and positive (5-8) attitudes towards PA (*Hearts N' Parks Community Mobilization Guide*, 2001)	1
Perceived Safety (Survey)	It is safe to walk or jog alone in my neighborhood during the day.	5-point Likert scale from Strongly disagree to Strongly agree	Second item reverse coded to reflect positive feelings of safety. Scored each as 0-4	1

	It is difficult to walk or jog in my neighborhood because of things like traffic, no sidewalks, dogs, gangs, and so on.		and summed together. Dichotomized into unsafe (0-4) and safe (5-8)	
Perceived Access – PA (Survey)	At home there are enough supplies and pieces of sports equipment (like balls, bicycles, skates) to use for physical activity. There are playgrounds, parks, or gyms close to my home or that I can get to easily.	5-point Likert scale from Strongly disagree to Strongly agree	Scored each as 0-4 and summed together. Dichotomized into low (0-4) and high (5-8) access	1
Friend Support for PA (Survey)	10 items related to support for physical activity from friends or classmates in the previous 3 months (e.g., "My friends or classmates game me helpful reminders to exercise.")	5-point Likert scale from Never to Very Often	Scored 0-4 and summed to create a scale score (0-40). Dichotomized into low friend support (0-20) and high friend support (21-40) (Leslie et al., 1999; Sallis et al., 1987)	1
Family Support for PA (Survey)	10 items related to support for physical activity from family or members of the household in the previous 3 months (e.g., "My family or a member of my household game me helpful reminders to exercise.")	5-point Likert scale from Never to Very Often	Scored 0-4 and summed to create a scale score (0-40). Dichotomized into low family support (0-20) and high family support (21-40) (Leslie et al., 1999; Sallis et al., 1987)	1

Nutrition Campaign Knowledge (Survey)	According to MyPlate, how much of the plate in a typical meal should be fruits and vegetables? According to MyPlate, how much of the plate in a typical meal should be grains, such as rice, bread, or oats? According to MyPlate, how much of the plate in a typical meal should be proteins such as meat, poultry, or seafood?	1/8, 1/4, 1/2, The whole plate, I don't know	All correct vs. not all correct	1
Perceived Weight Status (Survey)	How do you describe your weight?	Very underweight to Very overweight	Underweight vs. Right weight vs. Overweight vs. Very Overweight	1
Weight Intentions (Survey)	Which of the following are you trying to do about your weight?	Lose weight, Gain weight, Stay the same weight, Nothing	Lose weight vs. Not lose weight	1

Actual Weight Status (FITNESSGRAM)	Height (inches) and weight (pounds)	Continuous	Calculated body mass index (BMI) and gender- and age-specific percentiles using the 2000 CDC Growth Charts for ages 2 to <20 years. Percentile <5 = underweight; ≥5 and <85 = healthy weight; ≥85 and <95 = overweight; and ≥95 = obese (Kuczmarski et al., 2000)	1

Appendix Table A5.3 Study One and Two School Level Independent Variables

Independent Variables: School Level			
Variable (Data Source)	**Question(s)**	**Coding**	**Study #**
School Socioeconomic Status – SES (California Department of Education)	Percent of students participating in National School Breakfast and Lunch Programs	Continuous	1, 2
Size (California Department of Education)	Enrollment	Continuous	1, 2
Type (California Department of Education)	School type	Charter vs. Magnet vs. Regular	1, 2
PA Spaces (SPARC)	Amount of PA space (in thousand square yards)	Continuous	1, 2
Aggregate Perceived School Health Environment (Survey)	Mean of Perceived School Health Environment by school	Continuous	2

Appendix Table A5.4 Study One and Two Control Variables

Control Variables				
Variable (Data Source)	**Question(s)**	**Response options**	**Coding**	**Study #**
Gender (Survey and FITNESSGRAM)	Gender	Male, Female	Male vs. Female	1, 2
Race/ethnicity (Survey)	Which of the following describes you? Select one or more responses.	American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Other	Latino vs. Non-Latino	1, 2
Language spoken at home (Survey)	What language do you mainly speak at home?	English only, Spanish only, Both English and Spanish, Other	English only vs. Spanish only vs. Both vs. Other	1, 2
Female caregiver education(Survey)	What is the highest level of education your mother or female guardian completed?	Less than high school to More than college	Less than high school vs. High school vs. Some college vs. College vs. More than college	1, 2
Intervention status	Intervention or Control School	N/A	Intervention vs. Control	1, 2

Appendix A6 – Semi-Structured Interview Guide

1. Tell me about your role as _____ in your school.
    - How long have you been at this school?
    - What other responsibilities do you have?

2. Could you tell me about some things your school has done to promote healthy eating?
    - Describe the foods and beverages available in various locations (meals, a la carte, vending, classrooms, concessions, fundraisers, parties, etc.).
        - Has this changed over time?
    - What kinds of things do you think keep students from eating healthfully?
    - What kinds of things do you think schools could do to make it easier for students to eat in healthful ways at school?
    - What kinds of things have not worked to help students eat healthfully?

3. Could you tell me about some things your school has done to promote physical activity?
    - Describe the physical activity environment (availability of equipment/facilities, policies, intramural or intermural sports, etc.).
        - How can students be physically active during school time or before/after school?
        - Has this changed over time?
    - What kinds of things do you think keep students from getting more exercise?
        - Are there different barriers for girls and boys?
    - What kinds of things do you think schools could do to make it easier for students to get more physical activity at school?
    - What kinds of things have not worked to help students be more active?

4. Could you tell me about the most challenging problems (barriers) to implement health education and health-related activities for students in your school?

5. What has facilitated making changes at your school to promote healthy behaviors?
    - What has been most helpful in promoting health at school?
    - Is there a health "champion" or team? How did this team form?

6. How would you describe a healthy school community?
    - What elements contribute to making a school community "healthy"
    - What elements make this sustainable?

7. What is your opinion about the role of schools in addressing concerns about health (e.g., healthy eating, physical activity, healthy relationships, mental health)?
    - Whose role is it?

8. How does health fit with your school's mission, priorities and values?

- Schools have many areas of focus. What is the importance placed on each area at your school? Why?
- How does your school manage competing priorities?

9. What one thing is most important to change in your school to promote the physical and mental health of your students?

Appendix A7 – Structured Interview Questions and Demographic Inventory

	Yes	No	I don't know
1. The school has a written wellness policy.	☐	☐	☐
2. The school has 1 nurse for every 750 students.	☐	☐	☐
3. The school has 1 counselor for every 250 students.	☐	☐	☐
4. The school has a health coordinator (i.e., a staff member who takes the lead for any health promotion efforts).	☐	☐	☐
5. The school has a school health committee, school health advisory council, or coordinated school health team.	☐	☐	☐
6. The school has a staff wellness program that is offered to all staff.	☐	☐	☐
7. The school has a school-based health center or clinic on site.	☐	☐	☐

	Strongly Agree	Agree	Disagree	Strongly Disagree	I don't know
8. School administration supports efforts to promote health among all school community stakeholders, including staff, students, and families.	☐	☐	☐	☐	☐
9. Nutrition education is integrated into other school subjects (e.g., math, science, social studies.)	☐	☐	☐	☐	☐
10. The school provides opportunities for physical activity outside of physical education classes.	☐	☐	☐	☐	☐
11. The food available at school makes it easy to eat healthfully.	☐	☐	☐	☐	☐
12. It is easier to buy unhealthy food than healthy food at school.	☐	☐	☐	☐	☐
13. Healthy food is advertised in classrooms, the cafeteria, or other places in the school.	☐	☐	☐	☐	☐
14. Soda, candy, or snack foods are advertised in classrooms, the cafeteria, or other places in the school.	☐	☐	☐	☐	☐

15. The school staff is committed to serve as role models for healthy behavior.	☐	☐	☐	☐	☐
16. Professional development opportunities are made available that are specific to health education or promotion.	☐	☐	☐	☐	☐
17. Equipment and facilities for physical activity at school are maintained in good condition.	☐	☐	☐	☐	☐
18. Mental health practices (e.g., mindfulness meditation) are integrated into the school day for staff and students.	☐	☐	☐	☐	☐
19. Being healthy is part of the school's mission, priorities, and values.	☐	☐	☐	☐	☐

Demographic Survey

1. Gender
   - Female
   - Male

2. Which of the following describes you? (Select one or more responses)
   - American Indian or Alaska Native
   - Asian
   - Black or African American
   - Hispanic or Latino
   - Native Hawaiian or Other Pacific Islander
   - White
   - Other: _____

3. What is your current job title?

4. How many years have you had your current job title?

5. How many years have you worked at your current school?

6. How many total years have you worked as an educator?

7. List all other titles you have held as an educator.

8. List your current teaching certifications or credentials.

Appendix A8 – IRB Exemption

EXEMPTION CERTIFICATION
New Study

DATE:	4/17/2018
TO:	MONIQUE GILL, MPH COMMUNITY HEALTH SCIENCES
FROM:	WENDY BRUNT PRINCIPAL ANALYST
RE:	IRB#18-000420 Educator Perspectives on Health Promotion in Middle Schools Version: 3.13.18

The UCLA Institutional Review Board (UCLA IRB) has determined that the above-referenced study meets the criteria for an exemption from IRB review. UCLA's Federalwide Assurance (FWA) with Department of Health and Human Services is FWA00004642.

Any modifications to the research procedures must be submitted to the OHRPP for prospective review and certification of exemption prior to implementation. The project must be renewed by the expiration date if work is to continue.

Submission and Review Information:

Certification Date	4/17/2018
Expiration Date	4/16/2023

Regulatory Determinations

-- **Exempt Certification** - This research has been certified as exempt from IRB review per 45 CFR 46.101, category 2.

Appendix B1 – Additional Tables: Research Question 1.3

Appendix Table B1.1. Hierarchical Linear Regression Models Predicting Changes in Physical Activity and Dietary Behaviors

Coefficients	Change in Number of Days of 60 Minutes of PA B (SE(B)) N = 2,158	Change in Number of Days of Muscle-Strengthening PA B (SE(B)) N = 2,161	Change in Frequency of Fruit Consumption B (SE(B)) N = 2,181	Change in Frequency of Vegetable Consumption B (SE(B)) N = 2,165
Fixed Effects				
Individual Level Factors				
Positive PA Attitude	0.40 (0.10)***	-0.22 (0.14)	0.03 (0.49)	0.35 (0.42)
Safe Neighborhood	-0.06 (0.09)	-0.09 (0.12)	-0.11 (0.43)	-0.54 (0.36)
High Access to PA Resources	0.35 (0.09)***	0.12 (0.12)	-0.17 (0.42)	-0.32 (0.36)
High Friend Support for PA	0.31 (0.11)**	-0.08 (0.16)	-0.94 (0.45)	-1.39 (0.47)**
High Family Support for PA	0.11 (0.09)	0.19 (0.13)	-0.65 (0.45)	0.31 (0.39)
Nutrition Campaign Knowledge	-0.21 (0.13)	-0.31 (0.19)	-0.54 (0.66)	-0.76 (0.56)
Weight Perception				
Underweight (ref)				
Right Weight	0.15 (0.11)	0.07 (0.16)	0.12 (0.54)	-0.85 (0.46)
Overweight	-0.05 (0.14)	0.00 (0.20)	-0.05 (0.70)	-0.95 (0.60)
Very Overweight	0.18 (0.21)	0.32 (0.29)	-0.17 (1.03)	-0.76 (0.89)
Trying to Lose Weight	0.16 (0.10)	-0.04 (0.14)	0.14 (0.39)	0.22 (0.42)
Weight Status				
Healthy (ref)				
Overweight	-0.01 (0.12)	0.14 (0.16)	0.47 (0.57)	0.53 (0.49)
Obese	-0.03 (0.12)	0.10 (0.17)	0.07 (0.60)	-0.20 (0.51)
Underweight	-0.21 (0.23)	0.15 (0.32)	2.10 (1.12)	-0.20 (0.96)
Control Variables				
Female	-0.26 (0.30)	-0.62 (0.09)***	1.45 (1.49)	0.71 (1.28)
Latino	-0.05 (0.11)	0.01 (0.16)	0.69 (0.56)	0.28 (0.48)
Language at Home				

English (ref)				
Spanish	0.22 (0.18)	0.31 (0.25)	-0.35 (0.88)	-0.62 (0.75)
English and Spanish	0.01 (0.12)	0.05 (0.16)	0.04 (0.57)	-0.34 (0.49)
Other	0.05 (0.16)	0.31 (0.22)	1.17 (0.77)	0.83 (0.66)
Mother's Education				
Less than High School (ref)				
High School	0.12 (0.13)	0.10 (0.18)	1.19 (0.65)	-0.26 (0.56)
Some College	0.23 (0.16)	0.34 (0.22)	1.05 (0.78)	0.83 (0.67)
College	0.27 (0.14)	0.14 (0.20)	1.06 (0.70)	0.68 (0.60)
More than College	0.31 (0.17)	-0.06 (0.24)	1.06 (0.84)	0.07 (0.71)
Don't know	0.03 (0.12)	-0.14 (0.17)	1.18 (0.61)	0.55 (0.52)
Intervention School	-0.14 (0.13)	-0.26 (0.26)	-0.15 (0.65)	1.19 (0.55)*
Baseline Level of Behavior	-0.78 (0.02)***	-0.15 (0.03)***	-0.21 (0.10)*	-0.12 (0.09)
School Level Factors				
% Meal Program Participation	-0.00 (0.00)	-0.00 (0.00)	-0.01 (0.02)	-0.00 (0.02)
Gender * % Meal Program Participation	-0.00 (0.00)	-0.00 (0.01)	0.02 (0.02)	-0.01 (0.02)
Enrollment	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)*
School Type				
Regular (ref)				
Magnet	0.50 (0.14)***	0.44 (0.29)	0.09 (0.68)	-0.02 (0.59)
Charter	0.46 (0.32)	1.24 (0.65)	0.79 (1.58)	-1.62 (1.35)
PA Space at School[2]	-0.00 (0.00)**	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Intercept	3.47 (0.41)***	1.41 (0.82)	1.90 (2.02)***	0.73 (1.73)
Random Effects				
School Level Error Variance[1]	0.00	0.07**	0.00	0.00

* p < 0.05, ** p < 0.01, *** p < 0.001. Note: PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B1.2. Hierarchical Linear Regression Models Predicting Changes in Physical Activity and Dietary Behaviors

Coefficients	Change in Number of Days of 60 Minutes of PA B (SE(B)) N = 2,158	Change in Number of Days of Muscle-Strengthening PA B (SE(B)) N = 2,161	Change in Frequency of Fruit Consumption B (SE(B)) N = 2,181	Change in Frequency of Vegetable Consumption B (SE(B)) N = 2,165
Fixed Effects				
Individual Level Factors				
Positive PA Attitude	0.40 (0.10)***	-0.22 (0.14)	-0.05 (0.49)	0.36 (0.42)
Safe Neighborhood	-0.06 (0.09)	-0.09 (0.12)	-0.11 (0.43)	-0.53 (0.36)
High Access to PA Resources	0.35 (0.09)***	0.12 (0.12)	-0.19 (0.42)	-0.32 (0.36)
High Friend Support for PA	0.31 (0.11)**	-0.08 (0.16)	-0.97 (0.55)	-1.38 (0.47)**
High Family Support for PA	0.11 (0.09)	0.19 (0.13)	-0.64 (0.45)	0.31 (0.39)
Nutrition Campaign Knowledge	-0.21 (0.13)	-0.31 (0.19)	-0.53 (0.66)	-0.77 (0.56)
Weight Perception				
Underweight (ref)				
Right Weight	0.15 (0.11)	0.07 (0.16)	0.13 (0.54)	-0.86 (0.46)
Overweight	-0.05 (0.14)	0.00 (0.20)	-0.05 (0.70)	-0.95 (0.60)
Very Overweight	0.18 (0.21)	0.32 (0.29)	-0.13 (1.02)	-0.78 (0.89)
Trying to Lose Weight	0.16 (0.10)	-0.03 (0.14)	0.14 (0.49)	0.22 (0.42)
Weight Status				
Healthy (ref)				
Overweight	-0.01 (0.12)	0.14 (0.16)	0.51 (0.57)	0.52 (0.49)
Obese	-0.03 (0.12)	0.09 (0.17)	0.07 (0.60)	-0.20 (0.51)
Underweight	-0.21 (0.23)	0.15 (0.32)	2.12 (1.12)	-0.21 (0.96)
Control Variables				
Female	-0.83 (0.27)**	-0.77 (0.37)*	-1.36 (1.31)	0.36 (1.12)
Latino	-0.05 (0.11)	0.01 (0.16)	0.68 (0.56)	0.28 (0.48)
Language at Home				
English (ref)				
Spanish	0.23 (0.18)	0.31 (0.25)	-0.35 (0.88)	-0.62 (0.75)

English and Spanish	0.01 (0.12)	0.05 (0.16)	0.08 (0.57)	-0.36 (0.49)
Other	0.05 (0.16)	0.31 (0.22)	1.21 (0.77)	0.81 (0.66)
Mother's Education				
Less than High School (ref)				
High School	0.12 (0.13)	0.09 (0.18)	1.14 (0.65)	-0.24 (0.56)
Some College	0.23 (0.16)	0.34 (0.22)	0.97 (0.78)	0.86 (0.67)
College	0.27 (0.14)	0.14 (0.20)	1.02 (0.70)	0.69 (0.60)
More than College	0.31 (0.17)	-0.06 (0.24)	1.01 (0.84)	0.09 (0.71)
Don't know	0.02 (0.12)	-0.13 (0.17)	1.11 (0.61)	0.58 (0.52)
Intervention School	-0.14 (0.13)	-0.26 (0.26)	-0.19 (0.65)	1.20 (0.56)*
Baseline Level of Behavior	-0.78 (0.02)***	-0.14 (0.03)***	-0.20 (0.10)*	-0.12 (0.09)
School Level Factors				
% Meal Program Participation	-0.01 (0.00)*	-0.00 (0.01)	-0.00 (0.02)	-0.01 (0.01)
Enrollment	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)*
Gender * Enrollment	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
School Type				
Regular (ref)				
Magnet	0.50 (0.14)***	0.44 (0.29)	0.10 (0.68)	-0.02 (0.59)
Charter	0.47 (0.32)	1.25 (0.65)	0.96 (1.58)	-1.68 (1.35)
PA Space at School[2]	-0.00 (0.00)**	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Intercept	3.80 (0.41)***	1.65 (0.82)*	1.95 (2.01)	-0.57 (1.73)
Random Effects				
School Level Error Variance[1]	0.00	0.07**	0.00	0.00

* p < 0.05, ** p < 0.01, *** p < 0.001. Note: PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B1.3. Hierarchical Linear Regression Models Predicting Changes in Physical Activity and Dietary Behaviors

Coefficients	Change in Number of Days of 60 Minutes of PA B (SE(B)) N = 2,158	Change in Number of Days of Muscle-Strengthening PA B (SE(B)) N = 2,161	Change in Frequency of Fruit Consumption B (SE(B)) N = 2,181	Change in Frequency of Vegetable Consumption B (SE(B)) N = 2,165
Fixed Effects				
Individual Level Factors				
Positive PA Attitude	0.40 (0.10)***	-0.22 (0.14)	-0.03 (0.49)	0.35 (0.42)
Safe Neighborhood	-0.06 (0.09)	-0.09 (0.12)	-0.11 (0.43)	-0.53 (0.36)
High Access to PA Resources	0.35 (0.09)***	0.12 (0.12)	-0.18 (0.42)	-0.32 (0.36)
High Friend Support for PA	0.31 (0.11)**	-0.09 (0.16)	-0.96 (0.55)	-1.41 (0.47)**
High Family Support for PA	0.11 (0.09)	-0.19 (0.13)	-0.66 (0.45)	0.32 (0.39)
Nutrition Campaign Knowledge	-0.20 (0.13)	-0.31 (0.19)	-0.52 (0.66)	-0.76 (0.56)
Weight Perception				
Underweight (ref)				
Right Weight	0.15 (0.11)	0.07 (0.16)	0.14 (0.54)	-0.86 (0.47)
Overweight	-0.05 (0.14)	0.00 (0.20)	-0.02 (0.70)	-0.99 (0.60)
Very Overweight	0.17 (0.21)	0.32 (0.29)	-0.12 (1.02)	-0.82 (0.89)
Trying to Lose Weight	0.16 (0.10)	-0.03 (0.14)	0.12 (0.49)	0.24 (0.42)
Weight Status				
Healthy (ref)				
Overweight	-0.02 (0.12)	0.14 (0.16)	0.50 (0.57)	0.50 (0.49)
Obese	-0.03 (0.12)	0.10 (0.17)	0.08 (0.60)	-0.20 (0.51)
Underweight	-0.20 (0.23)	0.16 (0.32)	2.12 (1.12)	-0.20 (0.96)
Control Variables				
Female	-0.36 (0.14)*	-0.38 (0.20)***	1.45 (1.49)	0.75 (0.59)
Latino	-0.05 (0.11)	0.01 (0.16)	0.67 (0.56)	0.30 (0.48)
Language at Home				
English (ref)				
Spanish	0.22 (0.18)	0.31 (0.25)	-0.36 (0.88)	-0.63 (0.75)

English and Spanish	0.01 (0.12)	0.04 (0.16)	0.06 (0.57)	-0.37 (0.49)
Other	0.05 (0.16)	0.31 (0.22)	1.22 (0.77)	0.80 (0.66)
Mother's Education				
Less than High School (ref)				
High School	0.12 (0.13)	0.09 (0.18)	1.15 (0.65)	-0.25 (0.56)
Some College	0.23 (0.16)	0.34 (0.22)	0.97 (0.78)	0.86 (0.67)
College	0.27 (0.14)	0.14 (0.20)	1.03 (0.70)	0.69 (0.60)
More than College	0.31 (0.17)	-0.06 (0.24)	1.03 (0.84)	0.07 (0.71)
Don't know	0.02 (0.12)	-0.14 (0.17)	1.13 (0.61)	0.55 (0.52)
Intervention School	-0.14 (0.13)	-0.25 (0.26)	-0.18 (0.65)	1.22 (0.56)*
Baseline Level of Behavior	-0.78 (0.02)***	-0.15 (0.03)***	-0.20 (0.10)*	-0.12 (0.09)
School Level Factors				
% Meal Program Participation	-0.01 (0.00)*	-0.00 (0.01)	0.00 (0.02)	-0.01 (0.01)
Enrollment	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)*
School Type				
Regular (ref)				
Magnet	0.62 (0.17)***	0.57 (0.32)	0.14 (0.82)	0.52 (0.70)
Charter	0.36 (0.37)	1.12 (0.70)	-0.16 (1.79)	-0.74 (1.53)
Gender * School Type				
Regular (ref)				
Magnet	-0.23 (0.17)	-0.23 (0.24)	-0.08 (0.84)	-0.98 (0.72)
Charter	0.20 (0.37)	0.24 (0.51)	2.21 (1.80)	-1.90 (1.54)
PA Space at School[2]	-0.00 (0.00)**	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Intercept	3.49 (0.39)***	1.40 (0.80)	1.23 (1.90)	-0.84 (1.63)
Random Effects				
School Level Error Variance[1]	0.00	0.07**	0.00	0.00

* p < 0.05, ** p < 0.01, *** p < 0.001. Note: PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B1.4. Hierarchical Linear Regression Models Predicting Changes in Physical Activity and Dietary Behaviors

Coefficients	Change in Number of Days of 60 Minutes of PA B (SE(B)) N = 2,158	Change in Number of Days of Muscle-Strengthening PA B (SE(B)) N = 2,161	Change in Frequency of Fruit Consumption B (SE(B)) N = 2,181	Change in Frequency of Vegetable Consumption B (SE(B)) N = 2,165
Fixed Effects				
Individual Level Factors				
Positive PA Attitude	0.40 (0.10)***	-0.22 (0.14)	-0.03 (0.49)	0.35 (0.42)
Safe Neighborhood	-0.06 (0.09)	-0.09 (0.12)	-0.11 (0.43)	-0.54 (0.36)
High Access to PA Resources	0.35 (0.09)***	0.13 (0.12)	-0.17 (0.42)	-0.32 (0.36)
High Friend Support for PA	0.32 (0.11)**	-0.08 (0.16)	-0.94 (0.45)	-1.42 (0.47)**
High Family Support for PA	0.11 (0.09)	-0.19 (0.13)	-0.65 (0.45)	0.30 (0.39)
Nutrition Campaign Knowledge	-0.21 (0.13)	-0.32 (0.19)	-0.54 (0.66)	-0.76 (0.56)
Weight Perception				
Underweight (ref)				
Right Weight	0.15 (0.11)	0.07 (0.16)	0.12 (0.54)	-0.85 (0.46)
Overweight	-0.05 (0.14)	0.00 (0.20)	-0.04 (0.70)	-0.97 (0.60)
Very Overweight	0.17 (0.21)	0.32 (0.29)	-0.17 (1.03)	-0.83 (0.89)
Trying to Lose Weight	0.16 (0.10)	-0.04 (0.14)	0.11 (0.39)	0.25 (0.42)
Weight Status				
Healthy (ref)				
Overweight	-0.02 (0.12)	0.14 (0.16)	0.49 (0.57)	0.51 (0.49)
Obese	-0.03 (0.12)	0.10 (0.17)	0.07 (0.60)	-0.21 (0.51)
Underweight	-0.21 (0.23)	0.14 (0.32)	2.08 (1.12)	-0.15 (0.96)
Control Variables				
Female	-0.48 (0.25)	-0.64 (0.34)***	-0.89 (1.21)	1.50 (1.03)
Latino	-0.05 (0.11)	0.01 (0.16)	0.67 (0.56)	0.30 (0.48)
Language at Home				
English (ref)				

Spanish	0.22 (0.18)	0.31 (0.25)	-0.36 (0.88)	-0.62 (0.75)
English and Spanish	0.01 (0.12)	0.05 (0.16)	0.06 (0.57)	-0.36 (0.49)
Other	0.05 (0.16)	0.30 (0.22)	1.17 (0.77)	0.83 (0.66)
Mother's Education				
Less than High School (ref)				
High School	0.12 (0.13)	0.10 (0.18)	1.15 (0.65)	-0.23 (0.56)
Some College	0.24 (0.16)	0.35 (0.22)	1.00 (0.78)	0.86 (0.67)
College	0.27 (0.14)	0.14 (0.20)	1.04 (0.70)	0.69 (0.60)
More than College	0.32 (0.17)	-0.05 (0.24)	1.04 (0.84)	0.07 (0.71)
Don't know	0.03 (0.12)	-0.13 (0.17)	1.15 (0.61)	0.56 (0.52)
Intervention School	-0.14 (0.13)	-0.26 (0.26)	-0.19 (0.65)	1.24 (0.56)*
Baseline Level of Behavior	-0.78 (0.02)***	-0.15 (0.03)***	-0.21 (0.10)*	-0.12 (0.09)
School Level Factors				
% Meal Program Participation	-0.00 (0.00)*	-0.00 (0.01)	0.00 (0.02)	-0.01 (0.01)
Enrollment	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)*
School Type				
Regular (ref)				
Magnet	0.50 (0.14)***	0.44 (0.29)	0.09 (0.68)	-0.03 (0.59)
Charter	0.45 (0.32)	1.25 (0.66)	0.92 (1.58)	-1.78 (1.35)
PA Space at School[2]	-0.00 (0.00)**	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Gender * PA Space at School[2]	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Intercept	3.58 (0.41)***	1.57 (0.82)	1.67 (1.99)	1.29 (1.71)
Random Effects				
School Level Error Variance[1]	0.00	0.07**	0.00	0.00

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Note: PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix B2 – Additional Tables: Research Question 2.2a

Appendix Table B2.1. Hierarchical Logistic Regression Models Predicting Meeting Physical Activity Recommendations

Coefficients	Met Daily PA Recommendation OR (95% CI) N = 4,610	Met Muscle-Strengthening PA Recommendation OR (95% CI) N = 4,604
Fixed Effects		
Perception of SHE	0.97 (0.82, 1.13)	0.93 (0.80, 1.07)
% Meal Program Participation	0.99 (0.98, 1.00)	0.99 (0.98, 1.01)
Perception of SHE * % Meal Program Participation	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Enrollment	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
School Type		
Regular (ref)		
Magnet	1.07 (0.75, 1.53)	1.31 (0.79, 2.19)
Charter	1.16 (0.62, 2.17)	2.35 (0.85, 6.50)
PA Space at School[2]	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Average SHE	0.66 (0.46, 0.95)*	0.81 (0.47, 1.40)
Female	0.47 (0.41, 0.55)***	0.52 (0.46, 0.59)***
Latino	0.82 (0.67, 1.02)	0.93 (0.77, 1.13)
Language at Home		
English (ref)		
Spanish	1.21 (0.88, 1.66)	1.22 (0.93, 1.61)
English and Spanish	1.06 (0.85, 1.31)	1.19 (0.99, 1.43)
Other	1.16 (0.88, 1.53)	1.16 (0.90, 1.50)
Mother's Education		
Less than High School (ref)		
High School	1.22 (0.95, 1.57)	1.04 (0.85, 1.27)
Some College	1.46 (1.09, 1.96)*	1.14 (0.89, 1.46)
College	1.37 (1.05, 1.80)*	1.11 (0.89, 1.40)
More than College	1.66 (1.23, 2.25)**	1.32 (1.02, 1.71)*
Don't know	1.24 (0.97, 1.57)	0.91 (0.75, 1.10)
Intervention School	0.99 (0.78, 1.26)	0.52 (0.36, 0.75)***
Random Effects		
School Level Error Variance[1]	0.10	0.27***

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B2.2. Hierarchical Logistic Regression Models Predicting Meeting Physical Activity Recommendations

Coefficients	Met Daily PA Recommendation OR (95% CI) N = 4,610	Met Muscle-Strengthening PA Recommendation OR (95% CI) N = 4,604
Fixed Effects		
Perception of SHE	1.01 (0.90, 1.13)	1.15 (1.04, 1.27)**
% Meal Program Participation	0.99 (0.98, 1.00)	1.00 (0.99, 1.02)
Enrollment	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Perception of SHE * Enrollment	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
School Type		
Regular (ref)		
Magnet	1.06 (0.74, 1.52)	1.33 (0.79, 2.22)
Charter	1.18 (0.63, 2.20)	2.39 (0.86, 6.63)
PA Space at School[2]	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Average SHE	0.67 (0.47, 0.96)*	0.81 (0.47, 1.40)
Female	0.47 (0.41, 0.55)***	0.52 (0.46, 0.59)***
Latino	0.82 (0.66, 1.01)	0.93 (0.77, 1.12)
Language at Home		
English (ref)		
Spanish	1.21 (0.88, 1.66)	1.22 (0.92, 1.60)
English and Spanish	1.06 (0.85, 1.31)	1.18 (0.98, 1.43)
Other	1.16 (0.88, 1.53)	1.16 (0.90, 1.50)
Mother's Education		
Less than High School (ref)		
High School	1.22 (0.95, 1.57)	1.03 (0.84, 1.26)
Some College	1.47 (1.09, 1.97)*	1.13 (0.89, 1.45)
College	1.38 (1.05, 1.81)*	1.11 (0.89, 1.40)
More than College	1.67 (1.23, 2.25)**	1.32 (1.02, 1.71)*
Don't know	1.24 (0.97, 1.58)	0.91 (0.75, 1.10)
Intervention School	0.99 (0.78, 1.26)	0.52 (0.36, 0.75)***
Random Effects		
School Level Error Variance[1]	0.11	0.27***

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B2.3. Hierarchical Logistic Regression Models Predicting Meeting Physical Activity Recommendations

Coefficients	Met Daily PA Recommendation OR (95% CI) N = 4,610	Met Muscle-Strengthening PA Recommendation OR (95% CI) N = 4,604
Fixed Effects		
Perception of SHE	0.99 (0.94, 1.05)	1.09 (1.03, 1.15)**
% Meal Program Participation	0.99 (0.98, 1.00)	1.00 (0.99, 1.02)
Enrollment	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
School Type		
Regular (ref)		
Magnet	0.84 (0.53, 1.36)	1.29 (0.72, 2.31)
Charter	0.78 (0.36, 1.71)	2.55 (0.84, 7.72)
Perception of SHE * School Type		
Regular (ref)		
Magnet	1.06 (0.98, 1.15)	1.00 (0.94, 1.07)
Charter	1.12 (0.98, 1.27)	0.98 (0.88, 1.10)
PA Space at School[2]	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Average SHE	0.68 (0.48, 0.97)*	0.82 (0.47, 1.42)
Female	0.47 (0.41, 0.55)***	0.52 (0.46, 0.59)***
Latino	0.82 (0.66, 1.01)	0.93 (0.77, 1.12)
Language at Home		
English (ref)		
Spanish	1.21 (0.88, 1.66)	1.22 (0.93, 1.60)
English and Spanish	1.06 (0.86, 1.31)	1.19 (0.99, 1.43)
Other	1.16 (0.88, 1.53)	1.16 (0.90, 1.50)
Mother's Education		
Less than High School (ref)		
High School	1.22 (0.95, 1.57)	1.03 (0.84, 1.26)
Some College	1.47 (1.09, 1.97)*	1.14 (0.89, 1.45)
College	1.38 (1.05, 1.82)*	1.11 (0.89, 1.40)
More than College	1.66 (1.23, 2.24)**	1.32 (1.02, 1.72)*
Don't know	1.24 (0.97, 1.58)	0.91 (0.75, 1.10)
Intervention School	0.98 (0.77, 1.25)	0.52 (0.36, 0.75)***
Random Effects		
School Level Error Variance[1]	0.10	0.27***

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B2.4. Hierarchical Logistic Regression Models Predicting Meeting Physical Activity Recommendations

Coefficients	Met Daily PA Recommendation OR (95% CI) N = 4,610	Met Muscle-Strengthening PA Recommendation OR (95% CI) N = 4,604
Fixed Effects		
Perception of SHE	0.99 (0.89, 1.10)	1.17 (1.07, 1.29)***
% Meal Program Participation	0.99 (0.98, 1.00)	1.00 (0.99, 1.02)
Enrollment	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
School Type		
Regular (ref)		
Magnet	1.07 (0.74, 1.53)	1.32 (0.79, 2.21)
Charter	1.19 (0.63, 2.22)	2.35 (0.84, 6.60)
PA Space at School[2]	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Perception of SHE * PA Space at School[2]	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Average SHE	0.67 (0.47, 0.96)*	0.82 (0.47, 1.42)
Female	0.47 (0.41, 0.55)***	0.52 (0.46, 0.59)***
Latino	0.82 (0.66, 1.02)	0.93 (0.77, 1.12)
Language at Home		
English (ref)		
Spanish	1.21 (0.88, 1.66)	1.22 (0.93, 1.60)
English and Spanish	1.06 (0.85, 1.31)	1.19 (0.99, 1.43)
Other	1.16 (0.88, 1.53)	1.16 (0.90, 1.50)
Mother's Education		
Less than High School (ref)		
High School	1.22 (0.95, 1.57)	1.03 (0.84, 1.26)
Some College	1.46 (1.09, 1.96)*	1.14 (0.89, 1.45)
College	1.37 (1.05, 1.80)*	1.11 (0.89, 1.40)
More than College	1.66 (1.23, 2.25)**	1.32 (1.02, 1.72)*
Don't know	1.24 (0.97, 1.57)	0.91 (0.75, 1.10)
Intervention School	0.99 (0.78, 1.26)	0.52 (0.36, 0.75)***
Random Effects		
School Level Error Variance[1]	0.11	0.27***

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix B3 – Additional Tables: Research Question 2.3a

Appendix Table B3.1. Hierarchical Linear Regression Models Predicting Dietary Behaviors

Coefficients	Frequency of Unhealthy Item Consumption B (SE(B)) N = 4,519
Fixed Effects	
Perception of SHE	0.41 (0.73)
% Meal Program Participation	0.20 (0.05)***
Perception of SHE * % Meal Program Participation	-0.01 (0.01)
Enrollment	0.00 (0.00)
School Type	
Regular (ref)	
Magnet	-0.09 (1.30)
Charter	0.86 (2.24)
PA Space at School[2]	-0.00 (0.00)
Average SHE	-4.49 (1.29)***
Female	-1.84 (0.61)**
Latino	-2.17 (0.96)*
Language at Home	
English (ref)	
Spanish	0.98 (1.39)
English and Spanish	1.29 (0.94)
Other	-1.33 (1.30)
Mother's Education	
Less than High School (ref)	
High School	1.28 (1.02)
Some College	0.24 (1.25)
College	0.80 (1.14)
More than College	1.00 (1.31)
Don't know	2.27 (0.97)*
Intervention School	-1.17 (0.85)
Intercept	25.7 (7.57)**
Random Effects	
School Level Error Variance[1]	0.00

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B3.2. Hierarchical Linear Regression Models Predicting Dietary Behaviors

Coefficients	Frequency of Fruit Consumption B (SE(B)) N = 4,620	Frequency of Vegetable Consumption B (SE(B)) N = 4,584	Frequency of Unhealthy Item Consumption B (SE(B)) N = 4,519
Fixed Effects			
Perception of SHE	0.17 (0.28)	0.22 (0.16)	-0.80 (0.50)
% Meal Program Participation	-0.03 (0.01)*	-0.02 (0.01)	0.17 (0.03)***
Enrollment	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Perception of SHE * Enrollment	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
School Type			
Regular (ref)			
Magnet	0.25 (0.53)	0.64 (0.53)	-0.22 (1.30)
Charter	0.90 (0.93)	1.12 (0.96)	0.84 (2.23)
PA Space at School[2]	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Average SHE	-0.31 (0.54)	-0.47 (0.55)	-4.37 (1.29)**
Female	-0.40 (0.24)	-0.67 (0.20)**	-1.82 (0.61)**
Latino	-0.68 (0.37)	-0.61 (0.31)	-2.22 (0.96)*
Language at Home			
English (ref)			
Spanish	1.88 (0.53)***	0.89 (0.45)*	1.03 (1.39)
English and Spanish	0.90 (0.36)*	0.33 (0.31)	1.32 (0.94)
Other	0.69 (0.50)	1.74 (0.42)***	-1.32 (1.30)
Mother's Education			
Less than High School (ref)			
High School	0.51 (0.39)	0.41 (0.33)	1.31 (1.02)
Some College	0.64 (0.48)	0.64 (0.41)	0.28 (1.25)
College	1.18 (0.44)**	1.33 (0.37)***	0.83 (1.14)
More than College	1.30 (0.50)*	1.66 (0.43)***	1.03 (1.31)
Don't know	0.59 (0.37)	0.57 (0.32)	2.30 (0.97)*
Intervention School	0.19 (0.35)	0.14 (0.36)	-1.17 (0.85)
Intercept	12.2 (2.95)***	9.50 (3.02)**	29.6 (7.10)***
Random Effects			
School Level Error Variance[1]	0.04	0.13*	0.00

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B3.3. Hierarchical Linear Regression Models Predicting Dietary Behaviors

Coefficients	Frequency of Fruit Consumption B (SE(B)) N = 4,620	Frequency of Vegetable Consumption B (SE(B)) N = 4,584	Frequency of Unhealthy Item Consumption B (SE(B)) N = 4,519
Fixed Effects			
Perception of SHE	-0.32 (0.10)**	0.30 (0.09)**	-0.30 (0.27)
% Meal Program Participation	-0.03 (0.01)*	-0.02 (0.01)	0.17 (0.03)***
Enrollment	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
School Type			
Regular (ref)			
Magnet	0.80 (0.74)	1.03 (0.68)	-1.33 (1.88)
Charter	1.99 (1.24)	1.52 (1.19)	-1.22 (3.14)
Perception of SHE * School Type			
Regular (ref)			
Magnet	-0.14 (0.13)	-0.10 (0.11)	0.32 (0.35)
Charter	-0.30 (0.23)	-0.12 (0.19)	0.55 (0.59)
PA Space at School[2]	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Average SHE	-0.34 (0.53)	-0.48 (0.54)	-4.42 (1.29)**
Female	-0.40 (0.24)	-0.67 (0.20)**	-1.83 (0.61)**
Latino	-0.66 (0.37)	-0.61 (0.31)	-2.16 (0.96)*
Language at Home			
English (ref)			
Spanish	1.88 (0.53)***	0.89 (0.45)*	1.00 (1.39)
English and Spanish	0.89 (0.36)*	0.33 (0.31)	1.32 (0.94)
Other	0.69 (0.50)	1.74 (0.42)***	-1.32 (1.30)
Mother's Education			
Less than High School (ref)			
High School	0.50 (0.39)	0.41 (0.33)	1.30 (1.02)
Some College	0.64 (0.48)	0.64 (0.41)	0.25 (1.25)
College	1.16 (0.44)**	1.32 (0.37)***	0.83 (1.14)
More than College	1.30 (0.50)*	1.66 (0.43)***	0.98 (1.31)
Don't know	0.59 (0.37)	0.57 (0.32)	2.29 (0.97)*
Intervention School	0.21 (0.34)	0.15 (0.35)	-1.20 (0.85)
Intercept	11.8 (2.86)***	9.25 (2.96)**	28.1 (7.01)***
Random Effects			
School Level Error Variance[1]	0.03	0.12*	0.00

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B3.4. Hierarchical Linear Regression Models Predicting Dietary Behaviors

Coefficients	Frequency of Fruit Consumption B (SE(B)) N = 4,620	Frequency of Vegetable Consumption B (SE(B)) N = 4,584	Frequency of Unhealthy Item Consumption B (SE(B)) N = 4,519
Fixed Effects			
Perception of SHE	0.81 (0.17)***	0.44 (0.15)**	-0.03 (0.45)
% Meal Program Participation	-0.03 (0.01)*	-0.02 (0.01)	0.17 (0.03)***
Enrollment	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
School Type			
Regular (ref)			
Magnet	0.23 (0.51)	0.63 (0.53)	-0.09 (1.30)
Charter	0.73 (0.88)	1.06 (0.94)	0.78 (2.24)
PA Space at School[2]	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Perception of SHE * PA Space at School[2]	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Average SHE	-0.36 (0.51)	-0.48 (0.54)	-4.53 (1.29)***
Female	-0.41 (0.24)	-0.67 (0.20)**	-1.84 (0.61)**
Latino	-0.67 (0.37)	-0.61 (0.31)	-2.16 (0.96)*
Language at Home			
English (ref)			
Spanish	1.91 (0.53)***	0.90 (0.45)*	0.99 (1.39)
English and Spanish	0.90 (0.36)*	0.33 (0.31)	1.30 (0.94)
Other	0.70 (0.50)	1.74 (0.42)***	-1.32 (1.30)
Mother's Education			
Less than High School (ref)			
High School	0.51 (0.39)	0.41 (0.33)	1.29 (1.02)
Some College	0.64 (0.48)	0.64 (0.41)	0.25 (1.25)
College	1.15 (0.44)**	1.31 (0.37)***	0.79 (1.14)
More than College	1.32 (0.50)**	1.67 (0.43)***	0.99 (1.31)
Don't know	0.60 (0.37)	0.57 (0.32)	2.27 (0.97)*
Intervention School	0.19 (0.33)	0.14 (0.35)	-1.17 (0.85)
Intercept	9.9 (2.80)***	8.71 (2.97)**	27.5 (7.10)***
Random Effects			
School Level Error Variance[1]	0.01	0.12*	0.00

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix B4 – Additional Tables: Perceptions of School Health Environment

Appendix Table B4.1. Hierarchical Linear Regression Model Predicting Perceived School Health Environment Score

Coefficients	Frequency of Learning about Healthy Eating at School B (SE(B)) N = 4,667	Frequency of Noticing Healthy Advertisements at School B (SE(B)) N = 4,662	Effort Made by School to Help Students Eat Healthfully B (SE(B)) N = 4,661
Fixed Effects			
Female	-0.01 (0.02)	0.03 (0.03)	0.01 (0.03)
Latino	-0.01 (0.03)	-0.04 (0.04)	0.03 (0.04)
Language at Home			
English (ref)			
Spanish	0.02 (0.05)	-0.03 (0.06)	0.03 (0.06)
English and Spanish	0.06 (0.03)	-0.01 (0.04)	0.06 (0.04)
Other	0.02 (0.04)	-0.01 (0.05)	0.01 (0.06)
Mother's Education			
Less than High School (ref)			
High School	0.06 (0.03)	0.03 (0.04)	0.11 (0.05)*
Some College	0.04 (0.04)	0.10 (0.05)	0.04 (0.05)
College	0.03 (0.04)	0.03 (0.05)	0.11 (0.05)*
More than College	0.02 (0.04)	0.01 (0.05)	-0.03 (0.06)
Don't know	0.04 (0.03)	0.03 (0.04)	0.03 (0.04)
Intervention School	0.03 (0.05)	-0.06 (0.04)	-0.05 (0.08)
Intercept	1.00 (0.05)***	1.26 (0.05)***	1.54 (0.08)***
Random Effects			
School Level Error Variance[1]	0.01***	0.00**	0.02***

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

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

Appendix Table B4.2. Hierarchical Logistic Regression Models Predicting Meeting Physical Activity Recommendations

Coefficients	Met Daily PA Recommendation OR (95% CI) N = 4,610	Met Muscle-Strengthening PA Recommendation OR (95% CI) N = 4,604
Fixed Effects		
Frequency of learning about healthy eating at school		
Never (ref)		
Sometimes	0.95 (0.78, 1.16)	1.24 (1.05, 1.47)*
Often	1.01 (0.78, 1.30)	1.58 (1.27, 1.96)***
Always	1.24 (0.83, 1.86)	2.17 (1.47, 3.18)***
Frequency of noticing healthy advertisements at school		
Never (ref)		
Sometimes	0.84 (0.69, 1.03)	1.01 (0.84, 1.20)
Often	0.81 (0.64, 1.03)	1.09 (0.89, 1.34)
Always	1.05 (0.78, 1.42)	0.99 (0.75, 1.30)
Effort Made by School to Help Students Eat Healthfully		
None (ref)		
A little	1.02 (0.80, 1.30)	1.07 (0.87, 1.32)
Some	1.05 (0.82, 1.33)	1.05 (0.85, 1.29)
A lot	1.33 (1.01, 1.75)*	1.19 (0.94, 1.52)
% Meal Program Participation	0.99 (0.98, 1.00)	1.00 (0.99, 1.02)
Enrollment	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
School Type		
Regular (ref)		
Magnet	1.06 (0.74, 1.52)	1.29 (0.76, 2.19)
Charter	1.14 (0.61, 2.15)	2.32 (0.81, 6.61)
PA Space at School[2]	0.99 (0.98, 1.00)	0.99 (0.97, 1.01)
Average SHE	0.66 (0.46, 0.94)*	0.83 (0.47, 1.45)
Female	0.48 (0.41, 0.55)***	0.52 (0.46, 0.59)***
Latino	0.81 (0.65, 1.00)	0.93 (0.77, 1.12)
Language at Home		
English (ref)		
Spanish	1.21 (0.88, 1.66)	1.22 (0.92, 1.60)
English and Spanish	1.07 (0.86, 1.32)	1.18 (0.98, 1.42)
Other	1.16 (0.88, 1.54)	1.16 (0.90, 1.50)
Mother's Education		
Less than High School (ref)		
High School	1.21 (0.94, 1.56)	1.03 (0.84, 1.26)

Some College	1.49 (1.11, 2.00)**	1.14 (0.89, 1.46)
College	1.36 (1.04, 1.80)*	1.12 (0.89, 1.40)
More than College	1.65 (1.22, 2.23)**	1.31 (1.01, 1.71)*
Don't know	1.23 (0.97, 1.57)	0.91 (0.75, 1.10)
Intervention School	0.99 (0.78, 1.26)	0.52 (0.36, 0.75)**
Random Effects		
School Level Error Variance[1]	0.10	0.28***

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

Appendix Table B4.3. Hierarchical Linear Regression Models Predicting Dietary Behaviors

Coefficients	Frequency of Fruit Consumption B (SE(B)) N = 4,620	Frequency of Vegetable Consumption B (SE(B)) N = 4,584	Frequency of Unhealthy Item Consumption B (SE(B)) N = 4,519
Fixed Effects			
Frequency of learning about healthy eating at school			
Never (ref)			
Sometimes	0.21 (0.33)	0.26 (0.28)	-0.92 (0.85)
Often	0.84 (0.42)*	0.61 (0.36)	2.57 (1.09)*
Always	3.05 (0.71)***	2.87 (0.60)***	6.04 (1.86)**
Frequency of noticing healthy advertisements at school			
Never (ref)			
Sometimes	0.00 (0.34)	-0.09 (0.29)	-0.73 (0.89)
Often	0.18 (0.40)	0.26 (0.34)	-1.50 (1.03)
Always	0.55 (0.53)	0.61 (0.45)	-0.33 (1.37)
Effort Made by School to Help Students Eat Healthfully			
None (ref)			
A little	-0.45 (0.40)	0.30 (0.34)	-3.58 (1.05)**
Some	-0.71 (0.40)	-0.25 (0.34)	-5.43 (1.05)***
A lot	-0.12 (0.47)	0.38 (0.40)	-3.07 (1.22)*
% Meal Program Participation	-0.03 (0.01)*	-0.02 (0.01)	0.16 (0.03)***
Enrollment	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
School Type			
Regular (ref)			
Magnet	0.19 (0.52)	0.58 (0.51)	-0.23 (1.29)
Charter	0.75 (0.90)	0.99 (0.94)	0.35 (2.22)
PA Space at School[2]	-0.03 (0.02)	-0.02 (0.02)	-0.05 (0.05)
Average SHE	-0.21 (0.52)	-0.38 (0.53)	-4.24 (1.28)**
Female	-0.35 (0.24)	-0.63 (0.20)**	-1.65 (0.61)**
Latino	-0.67 (0.37)	-0.61 (0.31)	-2.15 (0.95)*
Language at Home			
English (ref)			
Spanish	1.88 (0.53)***	0.92 (0.45)*	0.91 (1.38)
English and Spanish	0.91 (0.36)*	0.36 (0.31)	1.30 (0.93)
Other	0.71 (0.50)	1.77 (0.42)***	-1.27 (1.29)
Mother's Education			
Less than High School (ref)			
High School	0.50 (0.39)	0.41 (0.33)	1.23 (1.02)

Some College	0.65 (0.48)	0.68 (0.41)	0.25 (1.24)
College	1.17 (0.44)**	1.33 (0.37)***	0.70 (1.13)
More than College	1.21 (0.50)*	1.61 (0.43)***	0.57 (1.30)
Don't know	0.56 (0.37)	0.56 (0.32)	2.08 (0.97)*
Intervention School	0.20 (0.34)	0.15 (0.35)	-1.18 (0.84)
Intercept	12.3 (2.84)***	9.31 (2.93)**	30.9 (6.99)***
Random Effects			
School Level Error Variance[1]	0.03	0.11*	0.00

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

Note: SHE = school health environment, PA = physical activity

[1]Significance of school and student level error variance were tested using likelihood ratio tests.

[2]Unit: thousand square yards

References

Abril, C. R., & Gault, B. M. (2006). The state of music in the elementary school: The principal's perspective. *Journal of Research in Music Education*, *54*(1), 6–20. https://doi.org/10.1177/002242940605400102

Agron, P., Berends, V., Ellis, K., & Gonzalez, M. (2010). School wellness policies: Perceptions, barriers, and needs among school leaders and wellness advocates. *Journal of School Health*, *80*(11), 527–535.

Alberga, A. S., Sigal, R. J., Goldfield, G., Prud' homme, D., & Kenny, G. P. (2012). Overweight and obese teenagers: Why is adolescence a critical period? *Pediatric Obesity*, *7*(4), 261–273. https://doi.org/10.1111/j.2047-6310.2011.00046.x

Alexander, D., & Lewis, L. (2014). *Condition of America's public school facilities: 2012-13.* (No. NCES 2014-022). Retrieved from U.S. Department of Education website: https://nces.ed.gov/pubs2014/2014022.pdf

Allensworth, D. D., & Kolbe, L. J. (1987). The comprehensive school health program: Exploring an expanded concept. *Journal of School Health*, *57*(10), 409–412. https://doi.org/10.1111/j.1746-1561.1987.tb03183.x

American Psychological Association. (2018). *Stress in America™ Generation Z* (p. 11). Washington, D.C.: Stress in America Survey.

American School Health Association. (2016). *ASHA position statement – The Every Student Succeeds Act: Implications for K-12 health education and physical education*. ASHA Board.

Armoni, M., Rafaeloff, R., Barzilai, A., Eitan, A., & Karnieli, E. (1987). Sex differences in insulin action on glucose transport and transporters in human omental adipocytes. *The Journal of Clinical Endocrinology & Metabolism*, *65*(6), 1141–1146. https://doi.org/10.1210/jcem-65-6-1141

Armstrong, S., Wong, C. A., Perrin, E., Page, S., Sibley, L., & Skinner, A. (2018). Association of physical activity with income, race/ethnicity, and sex among adolescents and young adults in the United States: Findings from the National Health and Nutrition Examination Survey, 2007-2016. *JAMA Pediatrics*, *172*(8), 732. https://doi.org/10.1001/jamapediatrics.2018.1273

Association for Supervision and Curriculum Development [ASCD]. (1996). Finding common ground in an era of fragile support. Retrieved December 20, 2017, from InfoBrief website: http://www.ascd.org/publications/newsletters/policy-priorities/dec96/num07/toc.aspx

ASCD & CDC. (2014). *Whole School, Whole Community, Whole Child: A collaborative approach to learning and health*. Retrieved from ASCD website: http:// www.ascd.org/ASCD/pdf/siteASCD/publications/wholechild/ wscc-a-collaborative-approach.pdf

Assor, A., & Connell, J. P. (1992). The validity of students' self-reports as measures of performance affecting self-appraisals. In D. H. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 25–47). New York, NY: Routledge.

Babey, S. H., Hastert, T. A., Yu, H., & Brown, E. R. (2008). Physical activity among adolescents: When do parks matter? *American Journal of Preventive Medicine*, *34*(4), 345–348. https://doi.org/10.1016/j.amepre.2008.01.020

Bailey-Davis, L., Virus, A., McCoy, T. A., Wojtanowski, A., Vander Veur, S. S., & Foster, G. D. (2013). Middle school student and parent perceptions of government-sponsored free school breakfast and consumption: A qualitative inquiry in an urban setting. *Journal of the Academy of Nutrition and Dietetics*, *113*(2), 251–257. https://doi.org/10.1016/j.jand.2012.09.017

Barber, B. K., Stolz, H. E., Olsen, J. A., Collins, W. A., & Burchinal, M. (2005). Parental support, psychological control, and behavioral control: Assessing relevance across time, culture, and method. *Monographs of the Society for Research in Child Development*, *70*(4), i–147.

Basch, C. E. (2011). Healthier students are better learners: A missing link in school reforms to close the achievement gap. *Journal of School Health*, *81*(10), 593–598.

Battistich, V., Solomon, D., Kim, D., Watson, M., & Schaps, E. (1995). Schools as communities, poverty levels of student populations, and students' attitudes, motives, and performance: A multilevel analysis. *American Educational Research Journal*, *32*(3), 627–658. https://doi.org/10.3102/00028312032003627

Bauer, K. W., Yang, Y. W., & Austin, S. B. (2004). "How can we stay healthy when you're throwing all of this in front of us?" Findings from focus groups and interviews in middle schools on environmental influences on nutrition and physical activity. *Health Education & Behavior*, *31*(1), 34–46. https://doi.org/10.1177/1090198103255372

Bauer, U. E., Briss, P. A., Goodman, R. A., & Bowman, B. A. (2014). Prevention of chronic disease in the 21st century: Elimination of the leading preventable causes of premature death and disability in the USA. *The Lancet*, *384*(9937), 45–52.

Ben-Shlomo, Y., & Kuh, D. (2002). A life course approach to chronic disease epidemiology: Conceptual models, empirical challenges and interdisciplinary perspectives. *International Journal of Epidemiology*, *31*(2), 285–293. https://doi.org/10.1093/ije/31.2.285

Bhatia, R., Jones, P., & Reicker, Z. (2011). Competitive foods, discrimination, and participation in the National School Lunch Program. *American Journal of Public Health*, *101*(8), 1380–1386. https://doi.org/10.2105/AJPH.2011.300134

Biddle, S. J. H., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine*, *45*(11), 886–895. https://doi.org/10.1136/bjsports-2011-090185

Birch, L., Savage, J. S., & Ventura, A. (2007). Influences on the development of children's eating behaviours: From infancy to adolescence. *Canadian Journal of Dietetic Practice and Research: A Publication of Dietitians of Canada*, *68*(1), s1.

Blum, R. W., Astone, N. M., Decker, M. R., & Mouli, C. (2014). A conceptual framework for early adolescence: A platform for research. *International Journal of Adolescent Medicine and Health*, *26*(3), 321–331. https://doi.org/10.1515/ijamh-2013-0327

Blume, H. (2016). Union-commissioned report says charter schools are bleeding money from traditional ones. *Los Angeles Times*. Retrieved from

https://www.latimes.com/local/education/me-union-charter-study-20160509-snap-story.html

Borraccino, A., Lemma, P., Iannotti, R. J., Zambon, A., Dalmasso, P., Lazzeri, G., … Cavallo, F. (2009). Socioeconomic effects on meeting physical activity guidelines: Comparisons among 32 countries. *Medicine & Science in Sports & Exercise*, *41*(4), 749–756. https://doi.org/10.1249/MSS.0b013e3181917722

Bosworth, K., Ford, L., & Hernandaz, D. (2011). School climate factors contributing to student and faculty perceptions of safety in select Arizona Schools. *Journal of School Health*, *81*(4), 194–201. https://doi.org/10.1111/j.1746-1561.2010.00579.x

Bourdieu, P. (1985). The social space and the genesis of groups. *Information (International Social Science Council)*, *24*(2), 195–220.

Bourdieu, P. (1989). *The state nobility: Elite schools in the field of power*. Stanford, CA: Stanford University Press.

Bradley, B. J., & Greene, A. C. (2013). Do health and education agencies in the United States share responsibility for academic achievement and health? A review of 25 years of evidence about the relationship of adolescents' academic achievement and health behaviors. *Journal of Adolescent Health*, *52*(5), 523–532. https://doi.org/10.1016/j.jadohealth.2013.01.008

Braveman, P. A., Kumanyika, S., Fielding, J., LaVeist, T., Borrell, L. N., Manderscheid, R., & Troutman, A. (2011). Health disparities and health equity: The issue is justice. *American Journal of Public Health*, *101*(S1), S149–S155. https://doi.org/10.2105/AJPH.2010.300062

Briefel, R. R., Crepinsek, M. K., Cabili, C., Wilson, A., & Gleason, P. M. (2009). School food environments and practices affect dietary behaviors of U.S. public school children. *Journal of the American Dietetic Association*, *109*(2), S91–S107. https://doi.org/10.1016/j.jada.2008.10.059

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513–531. http://dx.doi.org/10.1037/0003-066X.32.7.513

Bronfenbrenner, U. (1994). Ecological models of human development. In *International Encyclopedia of Education* (2nd ed., Vol. 3). Oxford: Elsevier.

Bronfenbrenner, U. (1999). Environments in developmental perspective: Theoretical and operational models. In S. L. Friedman & T. D. Wachs (Eds.), *Measuring environment across the life span: Emerging methods and concepts* (pp. 3–28).

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research*, *6*(1), 97–113. https://doi.org/10.1177/1468794106058877

Budd, E., Schwarz, C., Yount, B., & Haire-Joshu, D. (2012). Factors influencing the implementation of school wellness policies in the United States, 2009. *Preventing Chronic Disease*. https://doi.org/10.5888/pcd9.110296

Burns, R., & Crawford, C. (1999). School shootings, the media, and public fear: Ingredients for a moral panic. *Crime, Law and Social Change*, *32*(2), 147–168.

Burrows, T., Goldman, S., Pursey, K., & Lim, R. (2017). Is there an association between dietary intake and academic achievement: A systematic review. *Journal of Human Nutrition and Dietetics*, *30*(2), 117–140. https://doi.org/10.1111/jhn.12407

Cairney, J., Kwan, M. Y., Velduizen, S., Hay, J., Bray, S. R., & Faught, B. E. (2012). Gender, perceived competence and the enjoyment of physical education in children: A longitudinal examination. *International Journal of Behavioral Nutrition and Physical Activity*, *9*(1), 26. https://doi.org/10.1186/1479-5868-9-26

California Department of Education. (2009). *Physical education framework for California public schools, kindergarten through grade twelve*. Sacramento, CA: California Dept. of Education.

California Department of Education. (2015, March). DataQuest. Retrieved January 21, 2016, from Selected School Level Data website: http://dq.cde.ca.gov/dataquest/

Carlson, S. A., Densmore, D., Fulton, J. E., Yore, M. M., & Kohl III, H. W. (2009). Differences in physical activity prevalence and trends from 3 US surveillance systems: NHIS, NHANES, and BRFSS. *Journal of Physical Activity & Health*, *6*(1), S18–S27.

CDC. (2005). *Trends in leisure-time physical inactivity by age, sex, and race/ethnicity - United States, 1994-2004*. *54*(39), 991–994.

CDC. (2013). CDC health disparities and inequalities report - United States, 2013. *Morbidity and Mortality Weekly Report*, *62*(Suppl 3), 1–187.

Centers for Disease Control and Prevention [CDC]. (2016a). *At a glance 2016: National Center for Chronic Disease Prevention and Health Promotion*. Retrieved from Centers for Disease Control and Prevention website: https://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2016/nccdphp-aag.pdf

CDC. (2016b). 2013 Youth Risk Behavior Survey. Retrieved July 19, 2016, from http://www.cdc.gov/yrbss

CDC. (2016c). *Results from the School Health Policies and Practices Study*. Retrieved from U.S. Department of Health and Human Services. Centers for Disease Control and Prevention website: https://www.cdc.gov/healthyyouth/data/shpps/pdf/shpps-results_2016.pdf

CDC, & National Center for Health Statistics [NCHS]. (2013). *NHANES National Youth Fitness Survey*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

CDC. (2017a). 2017 High School Youth Risk Behavior Survey. Retrieved September 7, 2018, from http://www.cdc.gov/yrbss

CDC. (2017b). 2017 Middle School Youth Risk Behavior Survey. Retrieved September 7, 2018, from http://www.cdc.gov/yrbss

CDC. (2019). Suicide among youth. Retrieved April 3, 2019, from https://www.cdc.gov/healthcommunication/toolstemplates/entertainmented/tips/SuicideYouth.html

Chiang, R. J., Meagher, W., & Slade, S. (2015). How the whole school, whole community, whole child model works: creating greater alignment, integration, and collaboration between health and education. *Journal of School Health*, *85*(11), 775–784.

Christie, D., & Viner, R. (2005). 1 Adolescent development. *ABC of Adolescence*, *98*, 1.

Chumlea, W. C., Knittle, J. L., Roche, A. F., Siervogel, R. M., & Webb, P. (1981). Size and number of adipocytes and measures of body fat in boys and girls 10 to 18 years of age. *The American Journal of Clinical Nutrition*, *34*(9), 1791–1797.

Cohen, D. A., Ghosh-Dastidar, B., Conway, T. L., Evenson, K. R., Rodriguez, D. A., Beckman, R., … Lytle, L. (2014). Energy balance in adolescent girls: The trial of activity for adolescent girls cohort: Energy Balance in Adolescent Girls. *Obesity*, *22*(3), 772–780. https://doi.org/10.1002/oby.20536

Cohen, R. Y., Brownell, K. D., & Felix, M. R. (1990). Age and sex differences in health habits and beliefs of schoolchildren. *Health Psychology*, *9*(2), 208.

Coldwell, S. E., Oswald, T. K., & Reed, D. R. (2009). A marker of growth differs between adolescents with high vs. low sugar preference. *Physiology & Behavior*, *96*(4–5), 574–580. https://doi.org/10.1016/j.physbeh.2008.12.010

Cole, B. L., Tan, A., Fielding, J., & Yancey, A. K. (2011). *School physical activity opportunities report card (SPARC): Maximizing opportunities for school-based physical activity* [Policy Brief]. Retrieved from Active Living Research website: http://www.ph.ucla.edu/hs/health-impact/docs/SPARC_Policy_Brief31Aug2011.pdf

Colgrove, J. (2004). Between persuasion and compulsion: Smallpox control in Brooklyn and New York, 1894-1902. *Bulletin of the History of Medicine*, *78*(2), 349–378. https://doi.org/10.1353/bhm.2004.0062

Colorafi, K. J., & Evans, B. (2016). Qualitative descriptive methods in health science research. *HERD: Health Environments Research & Design Journal*, *9*(4), 16–25. https://doi.org/10.1177/1937586715614171

Cooke, L. J., & Wardle, J. (2005). Age and gender differences in children's food preferences. *British Journal of Nutrition*, *93*(05), 741. https://doi.org/10.1079/BJN20051389

Creswell, J. W. (2012). *Educational research: planning, conducting, and evaluating quantitative and qualitative research* (4th ed). Boston: Pearson.

Creswell, J. W., & Plano Clark, V. L. (2011). Choosing a mixed methods design. In J. W. Creswell & V. L. Plano Clark, *Designing and Conducting Mixed Methods Research* (2nd ed.). Thousand Oaks, Californinia: SAGE Publications, Inc.

Dale, D., Corbin, C. B., & Dale, K. S. (2000). Restricting opportunities to be active during school time: Do children compensate by increasing physical activity levels after school? *Research Quarterly for Exercise and Sport*, *71*(3), 240–248. https://doi.org/10.1080/02701367.2000.10608904

Davis, T. M. (2014). School choice and segregation: "Tracking" racial equity in magnet schools. *Education and Urban Society*, *46*(4), 399–433. https://doi.org/10.1177/0013124512448672

Day, S. E., Hinterland, K., Myers, C., Gupta, L., Harris, T. G., & Konty, K. J. (2016). A school-level proxy measure for individual-level poverty using school-level eligibility for free and reduced-price meals. *Journal of School Health*, *86*(3), 204–214. https://doi.org/10.1111/josh.12371

de Ridder, C. M., Thijssen, J. H., Bruning, P. F., Van den Brande, J. L., Zonderland, M. L., & Erich, W. B. (1992). Body fat mass, body fat distribution, and pubertal development: a longitudinal study of physical and hormonal sexual maturation of girls. *The Journal of Clinical Endocrinology & Metabolism*, *75*(2), 442–446. https://doi.org/10.1210/jcem.75.2.1639945

Dedoose web application (Version 8.1.8). (2019). Retrieved from www.dedoose.com

Demory-Luce, D., Morales, M., Nicklas, T., Baranowski, T., Zakeri, I., & Berenson, G. (2004). Changes in food group consumption patterns from childhood to young adulthood: The Bogalusa Heart Study. *Journal of the American Dietetic Association*, *104*(11), 1684–1691. https://doi.org/10.1016/j.jada.2004.07.026

Ding, D., Sallis, J. F., Kerr, J., Lee, S., & Rosenberg, D. E. (2011). Neighborhood environment and physical activity among youth. *American Journal of Preventive Medicine*, *41*(4), 442–455. https://doi.org/10.1016/j.amepre.2011.06.036

Doak, C. M., Visscher, T. L. S., Renders, C. M., & Seidell, J. C. (2006). The prevention of overweight and obesity in children and adolescents: A review of interventions and programmes. *Obesity Reviews*, *7*(1), 111–136. https://doi.org/10.1111/j.1467-789X.2006.00234.x

Dobbins, M., DeCorby, K., Robeson, P., Husson, H., & Tirilis, D. (2009). School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6-18. *Cochrane Database of Systematic Reviews*, (1). https://doi.org/10.1002/14651858.CD007651

Drucker, P. F. (1993). *Post-capitalist society*. New York: Harper Business.

Duffy, J. (1974). *A history of public health in New York City: 1866-1966*. New York: Russell Sage Foundation.

Dumith, S. C., Gigante, D. P., Domingues, M. R., & Kohl, H. W. (2011). Physical activity change during adolescence: A systematic review and a pooled analysis. *International Journal of Epidemiology*, *40*(3), 685–698. https://doi.org/10.1093/ije/dyq272

Duncan, S. C., Duncan, T. E., & Strycker, L. A. (2005). Sources and types of social support in youth physical activity. *Health Psychology*, *24*(1), 3–10. https://doi.org/10.1037/0278-6133.24.1.3

Durant, N., Harris, S. K., Doyle, S., Person, S., Saelens, B. E., Kerr, J., … Sallis, J. F. (2009). Relation of school environment and policy to adolescent physical activity. *Journal of School Health*, *79*(4), 153–159.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, *48*(2), 90–101. https://doi.org/10.1037/0003-066X.48.2.90

Elder, G. H. (1998). The life course as developmental theory. *Child Development*, *69*(1), 1–12.

Elder, G. H., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the Life Course* (pp. 3–19). New York, NY: Kluwer Academic/Plenum Publishers.

Emanuel, A. S., McCully, S. N., Gallagher, K. M., & Updegraff, J. A. (2012). Theory of planned behavior explains gender difference in fruit and vegetable consumption. *Appetite*, *59*(3), 693–697. https://doi.org/10.1016/j.appet.2012.08.007

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science*, *196*(4286), 129–136.

Erikson, E. H. (1994). *Identity, youth and crisis*. New York: Norton.

Esteban-Cornejo, I., Carlson, J. A., Conway, T. L., Cain, K. L., Saelens, B. E., Frank, L. D., … Sallis, J. F. (2016). Parental and adolescent perceptions of neighborhood safety related to

adolescents' physical activity in their neighborhood. *Research Quarterly for Exercise and Sport*, *87*(2), 191–199. https://doi.org/10.1080/02701367.2016.1153779

Fairclough, S., & Stratton, G. (2004). "Physical education makes you fit and healthy": Physical education's contribution to young people's physical activity levels. *Health Education Research*, *20*(1), 14–23. https://doi.org/10.1093/her/cyg101

Fakhouri, T. H. I., Hughes, J. P., Burt, V. L., Song, M., Fulton, J. E., & Ogden, C. L. (2014). *Physical activity in U.S. youth aged 12-15 years, 2012.* (NCHS Data Brief No. 141). Hyattsville, MD: National Center for Health Statistics.

Fang, F., Kang, S.-P., & Liu, S. (2004). Measuring mindset change in the systemic transformation of education. *Association for Educational Communications and Technology*.

Fisher, B. W., Nation, M., Nixon, C. T., & McIlroy, S. (2017). Students' perceptions of safety at school after Sandy Hook. *Journal of School Violence*, *16*(4), 349–360. https://doi.org/10.1080/15388220.2015.1133310

Fisher, D. L., & Fraser, B. J. (1983). A comparison of actual and preferred classroom environments as perceived by science teachers and students. *Journal of Research in Science Teaching*, *20*(1), 55–61. https://doi.org/10.1002/tea.3660200106

Florence, M. D., Asbridge, M., & Veugelers, P. J. (2008). Diet quality and academic performance. *Journal of School Health*, *78*(4), 209–215. https://doi.org/10.1111/j.1746-1561.2008.00288.x

Fox, M. K., Dodd, A. H., Wilson, A., & Gleason, P. M. (2009). Association between school food environment and practices and body mass index of U.S. public school children. *Journal*

of the American Dietetic Association, *109*(2), S108–S117. https://doi.org/10.1016/j.jada.2008.10.065

Frankenberg, E., & Siegel-Hawley, G. (2013). A segregating choice? An overview of charter school policy, enrollment trends, and segregation. In G. Orfield & E. Frankenberg (Eds.), *Educational delusions: Why choice can deepen inequality and how to make schools fair* (pp. 129–145). Berkeley, CA: University of California Press.

Freedman, D. A., & Bell, B. A. (2009). Access to healthful foods among an urban food insecure population: Perceptions versus reality. *Journal of Urban Health*, *86*(6), 825–838. https://doi.org/10.1007/s11524-009-9408-x

Galliher, R. V., Rostosky, S. S., & Hughes, H. K. (2004). School belonging, self-esteem, and depressive symptoms in adolescents: An examination of sex, sexual attraction status, and urbanicity. *Journal of Youth and Adolescence*, *33*(3), 235–245. https://doi.org/10.1023/B:JOYO.0000025322.11510.9d

Garcia, A. W., Broda, M. A. N., Frenn, M., Coviak, C., Pender, N. J., & Ronis, D. L. (1995). Gender and developmental differences in exercise beliefs among youth and prediction of their exercise behavior. *Journal of School Health*, *65*(6), 213–219.

Gase, L. N., Gomez, L. M., Kuo, T., Glenn, B. A., Inkelas, M., & Ponce, N. A. (2017). Relationships among student, staff, and administrative measures of school climate and student health and academic outcomes. *Journal of School Health*, *87*(5), 319–328. https://doi.org/10.1111/josh.12501

Gee, G. C., Hing, A., Mohammed, S., Tabor, D. C., & Williams, D. R. (2019). Racism and the life course: Taking time seriously. *American Journal of Public Health*, *109*(S1), S43–S47. https://doi.org/10.2105/AJPH.2018.304766

Geertz, C. (1973). *The interpretation of cultures: selected essays*. New York: Basic Books.

Gerteis, J., Izrael, D., Deitz, D., LeRoy, L., Ricciardi, R., Miller, T., & Basu, J. (2014). *Multiple chronic conditions chartbook* (No. Q14-0038). Rockville, MD: Agency for Healthcare Research and Quality.

Gidlow, C. J., Cochrane, T., Davey, R., & Smith, H. (2008). In-school and out-of-school physical activity in primary and secondary school children. *Journal of Sports Sciences*, *26*(13), 1411–1419. https://doi.org/10.1080/02640410802277445

Giles-Corti, B., Sallis, J. F., Sugiyama, T., Frank, L. D., Lowe, M., & Owen, N. (2015). Translating active living research into policy and practice: One important pathway to chronic disease prevention. *Journal of Public Health Policy*, *36*(2), 231–243.

Gill, M., Chan-Golston, A. M., Rice, L. N., Cole, B. L., Koniak-Griffin, D., & Prelip, M. L. (2016). Consistency of moderate to vigorous physical activity in middle school physical education. *Family & Community Health*, *39*(4), 283–292. https://doi.org/10.1097/FCH.0000000000000115

Gill, M., Chan-Golston, A. M., Rice, L. N., Roth, S. E., Crespi, C. M., Cole, B. L., … Prelip, M. L. (2017). Correlates of social support and its association with physical activity among young adolescents. *Health Education & Behavior*, 109019811771482. https://doi.org/10.1177/1090198117714826

Gill, M., Chan-Golston, A. M., Rice, L. N., Roth, S. E., Crespi, C. M., Cole, B. L., … Prelip, M. L. (2018). Correlates of social support and its association with physical activity among young adolescents. *Health Education & Behavior*, *45*(2), 207–216. https://doi.org/10.1177/1090198117714826

Gill, M., Roth, S. E., Chan-Golston, A. M., Rice, L. N., Crespi, C. M., Koniak-Griffin, D., … Prelip, M. L. (Forthcoming). Evaluation of an intervention to increase physical activity in low-income, urban middle schools. *Journal of School Health*.

Gill, M., Roth, S. E., Rice, L. N., Prelip, M. L., & Koniak-Griffin, D. (2018). "You only teach PE and it doesn't really matter": Middle school PE teachers' perspectives on intervention efforts to increase physical activity. *The Journal of School Nursing*, 105984051879503. https://doi.org/10.1177/1059840518795039

Gillman, M. W., Rifas-Shiman, S. L., Frazier, A. L., Rockett, H. R., Camargo, C. A., Field, A. E., … Colditz, G. A. (2000). Family dinner and diet quality among older children and adolescents. *Archives of Family Medicine*, *9*(3), 235–240.

Goodenow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *The Journal of Early Adolescence*, *13*(1), 21–43. https://doi.org/10.1177/0272431693013001002

Gordon-Larsen, P. (2006). Inequality in the built environment underlies key health disparities in physical activity and obesity. *PEDIATRICS*, *117*(2), 417–424. https://doi.org/10.1542/peds.2005-0058

Gore, F. M., Bloem, P. J., Patton, G. C., Ferguson, J., Joseph, V., Coffey, C., … Mathers, C. D. (2011). Global burden of disease in young people aged 10–24 years: A systematic

analysis. *The Lancet*, *377*(9783), 2093–2102. https://doi.org/10.1016/S0140-6736(11)60512-6

Gu, X., & Tucker, K. L. (2017). Dietary quality of the US child and adolescent population: Trends from 1999 to 2012 and associations with the use of federal nutrition assistance programs. *The American Journal of Clinical Nutrition*, *105*(1), 194–202. https://doi.org/10.3945/ajcn.116.135095

Guhin, J. (2018). Urban public high schools: Self-actualization vs. citizenship? In J. D. Hunter & R. S. Olson (Eds.), *The content of their character: Inquiries into the varieties of moral formation* (pp. 21–41). New York, NY: Finstock & Tew Publishers.

Gunderson, G. W. (2003). *The National School Lunch Program: Background and development*. New York: Nova Science Publishers.

Gustafson, A., Wu, Q., Spees, C., Putnam, N., Adams, I., Harp, D., … Taylor, C. (2014). How adolescents and parents food shopping patterns and social interaction when shopping is associated with dietary outcomes in rural communities. *Journal of Obesity & Weight Loss Therapy*, *04*(02). https://doi.org/10.4172/2165-7904.1000214

Gustafson, S. L., & Rhodes, R. E. (2006). Parental correlates of physical activity in children and early adolescents. *Sports Medicine*, *36*(1), 79–97. https://doi.org/10.2165/00007256-200636010-00006

Haack, S. A., & Byker, C. J. (2014). Recent population adherence to and knowledge of United States federal nutrition guides, 1992-2013: A systematic review. *Nutrition Reviews*, *72*(10), 613–626. https://doi.org/10.1111/nure.12140

Hager, E. R., Rubio, D. S., Eidel, G. S., Penniston, E. S., Lopes, M., Saksvig, B. I., … Black, M. M. (2016). Implementation of local wellness policies in schools: Role of school systems, school health councils, and health disparities. *Journal of School Health*, *86*(10), 742–750. https://doi.org/10.1111/josh.12430

Hallal, P. C., Victora, C. G., Azevedo, M. R., & Wells, J. C. K. (2006). Adolescent physical activity and health: A systematic review. *Sports Medicine (Auckland, N.Z.)*, *36*(12), 1019–1030.

Hanson, M. D., & Chen, E. (2007a). Socioeconomic status and health behaviors in adolescence: A review of the literature. *Journal of Behavioral Medicine*, *30*(3), 263–285. https://doi.org/10.1007/s10865-007-9098-3

Hanson, M. D., & Chen, E. (2007b). Socioeconomic status, race, and body mass index: The mediating role of physical activity and sedentary behaviors during adolescence. *Journal of Pediatric Psychology*, *32*(3), 250–259. https://doi.org/10.1093/jpepsy/jsl024

Hastings, R. W. (1912). Medical inspection of schools. *American Journal of Public Health*, *2*(12), 971–976.

Hayden-Wade, H. A., Stein, R. I., Ghaderi, A., Saelens, B. E., Zabinski, M. F., & Wilfley, D. E. (2005). Prevalence, characteristics, and correlates of teasing experiences among overweight children vs. non-overweight peers. *Obesity Research*, *13*(8), 1381–1392. https://doi.org/10.1038/oby.2005.167

Hearts N' Parks community mobilization guide. (2001, June). Retrieved from http://file.lacounty.gov/dpr/cms1_033069.pdf

Hesse-Biber, S. N., & Leavy, P. (2011). *The practice of qualitative research* (2nd ed). Los Angeles: SAGE.

Hills, A. P., & Byrne, N. M. (2010). An overview of physical growth and maturation. In J. Jürimäe, A. P. Hills, & T. Jürimäe (Eds.), *Cytokines, Growth Mediators and Physical Activity in Children during Puberty* (pp. 1–13). https://doi.org/10.1159/000321968

Hills, A. P., Byrne, N. M., Lindstrom, R., & Hill, J. O. (2013). 'Small changes'' to diet and physical activity behaviors for weight management.' *Obesity Facts*, *6*(3), 228–238.

Hills, A. P., Dengel, D. R., & Lubans, D. R. (2015). Supporting public health priorities: Recommendations for physical education and physical activity promotion in schools. *Progress in Cardiovascular Diseases*, *57*(4), 368–374. https://doi.org/10.1016/j.pcad.2014.09.010

Hoelscher, D. M., Evans, A., Parcel, G. S., & Kelder, S. H. (2002). Designing effective nutrition interventions for adolescents. *Journal of the American Dietetic Association*, *102*(3), S52–S63.

Holmbeck, G. N. (2002). A developmental perspective on adolescent health and illness: An introduction to the special issues. *Journal of Pediatric Psychology*, *27*(5), 409–415.

Holmbeck, G. N., & Shapera, W. E. (1999). Research methods with adolescents. In P. C. Kendall, J. N. Butcher, & G. N. Holmbeck (Eds.), *Handbook of research methods in clinical psychology* (2nd ed., pp. 634–661). New York: Wiley.

Horn, M. B., Freeland, J., & Butler, S. M. (2015). Schools as community hubs: Integrating support services to drive educational outcomes. *Discussion Papers on Building Healthy Neighborhoods*, (3).

Institute of Medicine [IOM]. (1997). *Schools and health: Our nation's investment* (D. Allensworth, E. Lawson, L. Nicholson, & J. Wyche, Eds.). https://doi.org/10.17226/5153

IOM, & Food and Nutrition Board. (2013). *Committee on physical activity and physical education in the school environment; Food and Nutrition Board; Institute of Medicine; Kohl HW III, Cook HD, editors. Washington (DC): National Academies Press (US); 2013 Oct 30.* Retrieved from The National Academy Press website: https://www.ncbi.nlm.nih.gov/books/NBK201490/#sec_011

Jabs, J., & Devine, C. M. (2006). Time scarcity and food choices: An overview. *Appetite*, *47*(2), 196–204. https://doi.org/10.1016/j.appet.2006.02.014

Jennings, J., & Rentner, D. S. (2006). Ten big effects of the No Child Left Behind Act on public schools. *Phi Delta Kappan*, *88*(2), 110–113.

Jones, A. M., & Zidenberg-Cherr, S. (2015). Exploring nutrition education resources and barriers, and nutrition knowledge in teachers in California. *Journal of Nutrition Education and Behavior*, *47*(2), 162–169. https://doi.org/10.1016/j.jneb.2014.06.011

Kaestle, C. F. (2001). Federal aid to education since World War II: Purposes and politics. In J. Jennings (Ed.), *The Future of the Federal Role in Elementary and Secondary Education* (pp. 13–35). Washington, D.C.: Center on Education Policy.

Katz, D. L., O'Connell, M., Yeh, M.-C., Nawaz, H., Njike, V., Anderson, L. M., … others. (2005). Public health strategies for preventing and controlling overweight and obesity in school and worksite settings. *MMWR Recomm Rep*, *54*(2). Retrieved from http://origin.glb.cdc.gov/Mmwr/preview/mmwrhtml/rr5410a1.htm

Kennedy, E., & Davis, C. (1998). US Department of Agriculture School Breakfast Program. *The American Journal of Clinical Nutrition*, *67*(4), 798S–803S.

Kennedy, E., Meyers, L., & Layden, W. (1996). The 1995 Dietary Guidelines for Americans. *Journal of the American Dietetic Association*, *96*(3), 234–237. https://doi.org/10.1016/S0002-8223(96)00072-7

Kim, H., Sefcik, J. S., & Bradway, C. (2017). Characteristics of qualitative descriptive studies: A systematic review. *Research in Nursing & Health*, *40*(1), 23–42. https://doi.org/10.1002/nur.21768

Kober, N. (2007). Why we still need public schools: Public education for the common good. *Center on Education Policy*.

Kontak, J. C. H., McIsaac, J.-L. D., Penney, T. L., Kuhle, S., & Kirk, S. F. L. (2017). The picture of health: Examining school-based health environments through photographs. *Health Promotion International*, 322–330. https://doi.org/10.1093/heapro/daw027

Koplan, J. P., Liverman, C. T., & Kraak, V. I. (2005). Preventing childhood obesity: Health in the balance – Executive summary. *Journal of the American Dietetic Association*, *105*(1), 131–138. https://doi.org/10.1016/j.jada.2004.11.023

Kort, M. (1984). The delivery of primary health care in American public schools, 1890-1980. *Journal of School Health*, *54*(11), 453–457. https://doi.org/10.1111/j.1746-1561.1984.tb08912.x

Kubik, M. Y., Lytle, L. A., & Story, M. (2005). Schoolwide food practices are associated with body mass index in middle school students. *Archives of Pediatrics & Adolescent Medicine*, *159*(12), 1111–1114. https://doi.org/10.1001/archpedi.159.12.1111

Kuczmarski, R. J., Cynthia L. Ogden, Laurence M. Grummer-Strawn, Katherine M. Flegal, Shumei S. Guo, Rong Wei, … Clifford L. Johnson. (2000). CDC growth charts: United States. *Advance Data*, (314), 1–27.

Lafleur, M., Strongin, S., Cole, B. L., Bullock, S. L., Banthia, R., Craypo, L., … García, R. (2013). Physical education and student activity: Evaluating implementation of a new policy in Los Angeles public schools. *Annals of Behavioral Medicine*, *45*(S1), 122–130. https://doi.org/10.1007/s12160-012-9431-0

Lambert, V. A., & Lambert, C. E. (2012). Qualitative descriptive research: An acceptable design. *Pacific Rim International Journal of Nursing Research*, *16*(4), 255–256.

Langford, R., Bonell, C., Komro, K., Murphy, S., Magnus, D., Waters, E., … Campbell, R. (2017). The health promoting schools framework: Known unknowns and an agenda for future research. *Health Education & Behavior*, *44*(3), 463–475.

Larson, N. I., Neumark-Sztainer, D., Hannan, P. J., & Story, M. (2007). Family meals during adolescence are associated with higher diet quality and healthful meal patterns during young adulthood. *Journal of the American Dietetic Association*, *107*(9), 1502–1510. https://doi.org/10.1016/j.jada.2007.06.012

Lee, C. D., Blair, S. N., & Jackson, A. S. (1999). Cardiorespiratory fitness, body composition, and all-cause and cardiovascular disease mortality in men. *The American Journal of Clinical Nutrition*, *69*(3), 373–380.

Leech, R. M., McNaughton, S. A., & Timperio, A. (2014). The clustering of diet, physical activity and sedentary behavior in children and adolescents: A review. *International Journal of Behavioral Nutrition and Physical Activity*, *11*(1), 4.

Leslie, E., Owen, N., Salmon, J., Bauman, A., Sallis, J. F., & Lo, S. K. (1999). Insufficiently active Australian college students: Perceived personal, social, and environmental influences. *Preventive Medicine*, *28*(1), 20–27.

Lewallen, T. C., Hunt, H., Potts-Datema, W., Zaza, S., & Giles, W. (2015). The Whole School, Whole Community, Whole Child Model: A new approach for improving educational attainment and healthy development for students. *Journal of School Health*, *85*(11), 729–739. https://doi.org/10.1111/josh.12310

Lien, N., Lytle, L. A., & Klepp, K.-I. (2001). Stability in consumption of fruit, vegetables, and sugary foods in a cohort from age 14 to age 21. *Preventive Medicine*, *33*(3), 217–226. https://doi.org/10.1006/pmed.2001.0874

Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, 80–94. https://doi.org/10.2307/2626958

Lobstein, T., Jackson-Leach, R., Moodie, M. L., Hall, K. D., Gortmaker, S. L., Swinburn, B. A., … McPherson, K. (2015). Child and adolescent obesity: Part of a bigger picture. *The Lancet*, *385*(9986), 2510–2520. https://doi.org/10.1016/S0140-6736(14)61746-3

Lohrmann, D. K. (2010). A complementary ecological model of the coordinated school health program. *Journal of School Health*, *80*(1), 1–9. https://doi.org/10.1111/j.1746-1561.2009.00460.x

Lucarelli, J. F., Alaimo, K., Mang, E., Martin, C., Miles, R., Bailey, D., … Liu, H. (2014). Facilitators to promoting health in schools: Is school health climate the key? *Journal of School Health*, *84*(2), 133–140. https://doi.org/10.1111/josh.12123

Lytle, L. A., Varnell, S., Murray, D. M., Story, M., Perry, C., Birnbaum, A. S., & Kubik, M. Y. (2003). Predicting adolescents' intake of fruits and vegetables. *Journal of Nutrition Education and Behavior*, *35*(4), 170–178. https://doi.org/10.1016/S1499-4046(06)60331-X

Maïano, C., Lepage, G., Aimé, A., Morin, A. J. S., Bayard, C., Dansereau-Trahan, É., … Vallerian, A. (2018). Perceived weight-related victimization and physical activity outcomes among adolescents with overweight and obesity: Indirect role of perceived physical abilities and fear of enacted stigma. *Psychology of Sport and Exercise*, *34*, 70–78. https://doi.org/10.1016/j.psychsport.2017.08.007

Malina, R. M., Bouchard, C., & Bar-Or, O. (2004). *Growth, maturation, and physical activity* (2nd ed). Champaign, Ill: Human Kinetics.

Mallam, K. M., Metcalf, B. S., Kirkby, J., Voss, L. D., & Wilkin, T. J. (2003). Contribution of timetabled physical education to total physical activity in primary school children: Cross sectional study. *BMJ*, *327*, 592–593. https://doi.org/10.1136/bmj.327.7415.592

Marble, S. (2013). Origins of the physical profile. *Military Medicine*, *178*(8), 887–892. https://doi.org/10.7205/MILMED-D-13-00039

Marchant, G. J., Paulson, S. E., & Rothlisberg, B. A. (2001). Relations of middle school students' perceptions of family and school contexts with academic achievement. *Psychology in the Schools*, *38*(6), 505–519.

Martin, J. (2008). Overview of federal child nutrition legislation. In J. Martin & C. Oakley (Eds.), *Managing child nutrition programs: Leadership for excellence* (2nd ed., pp. 145–199). Sudbury, Mass: Jones and Bartlett.

McKenzie, T. L., & Lounsbery, M. A. F. (2009). School physical education: The pill not taken. *American Journal of Lifestyle Medicine*, *3*(3), 219–225. https://doi.org/10.1177/1559827609331562

McKenzie, T. L., Prochaska, J. J., Sallis, J. F., & LaMaster, K. J. (2004). Coeducational and single-sex physical education in middle schools: Impact on physical activity. *Research Quarterly for Exercise and Sport*, *75*(4), 446–449.

McKenzie, T. L., Sallis, J. F., & Nader, P. R. (1991). System for observing fitness instruction time. *J Teach Phys Educ*, *11*, 195–205.

McKinnon, R. A., Orleans, C. T., Kumanyika, S. K., Haire-Joshu, D., Krebs-Smith, S. M., Finkelstein, E. A., … Ballard-Barbash, R. (2009). Considerations for an obesity policy research agenda. *American Journal of Preventive Medicine*, *36*(4), 351–357. https://doi.org/10.1016/j.amepre.2008.11.017

McLaughlin, C., & Clarke, B. (2010). Relational matters: A review of the impact of school experience on mental health in early adolescence. *Educational and Child Psychology*, *27*(1), 91.

McMurrer, J., & Kober, N. (2007). *Choices, changes, and challenges: Curriculum and instruction in the NCLB era*. Washington, D.C.: Center on Education Policy.

McNeil, J., Cameron, J. D., Finlayson, G., Blundell, J. E., & Doucet, É. (2013). Greater overall olfactory performance, explicit wanting for high fat foods and lipid intake during the mid-luteal phase of the menstrual cycle. *Physiology & Behavior*, *112–113*, 84–89. https://doi.org/10.1016/j.physbeh.2013.02.008

Means, R. K. (1975). *Historical perspectives on school health*. Thorofare, NJ: Charles B. Slack, Inc.

Meendering, J., Kranz, E., Shafrath, T., & McCormack, L. (2016). Bigger ≠ better: The comprehensiveness and strength of school wellness policies varies by school district size. *Journal of School Health*, *86*(9), 653–659. https://doi.org/10.1111/josh.12419

Mendez, S. L., Yoo, M. S., & Rury, J. L. (2017). A brief history of public education in the United States. In R. A. Fox & N. K. Buchanan (Eds.), *The Wiley Handbook of School Choice* (pp. 13–27). https://doi.org/10.1002/9781119082361.ch1

Meredith, M. D., Welk, G., & Cooper Institute (Eds.). (2010). *FitnessGram/ActivityGram: Test administration manual* (Updated Fourth Edition). Champaign, IL: Human Kinetics.

Mielke, G. I., Brown, W. J., Nunes, B. P., Silva, I. C. M., & Hallal, P. C. (2017). Socioeconomic correlates of sedentary behavior in adolescents: Systematic review and meta-analysis. *Sports Medicine*, *47*(1), 61–75. https://doi.org/10.1007/s40279-016-0555-4

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (Third edition). Thousand Oaks, Califorinia: SAGE Publications, Inc.

Minaker, L. M., Storey, K. E., Raine, K. D., Spence, J. C., Forbes, L. E., Plotnikoff, R. C., & McCargar, L. J. (2011). Associations between the perceived presence of vending machines and food and beverage logos in schools and adolescents' diet and weight status. *Public Health Nutrition*, *14*(08), 1350–1356. https://doi.org/10.1017/S1368980011000449

Mitchell, M. M., Bradshaw, C. P., & Leaf, P. J. (2010). Student and teacher perceptions of school climate: A multilevel exploration of patterns of discrepancy. *Journal of School Health*, *80*(6), 271–279. https://doi.org/10.1111/j.1746-1561.2010.00501.x

Morton, K. L., Atkin, A. J., Corder, K., Suhrcke, M., & van Sluijs, E. M. F. (2016). The school environment and adolescent physical activity and sedentary behaviour: A mixed-studies systematic review. *Obesity Reviews*, *17*(2), 142–158. https://doi.org/10.1111/obr.12352

Murray, S. D., Hurley, J., & Ahmed, S. R. (2015). Supporting the whole child through coordinated policies, processes, and practices. *Journal of School Health*, *85*(11), 795–801. https://doi.org/10.1111/josh.12306

Musu-Gillette, L., Zhang, A., Wang, K., Zhang, J., Kemp, J., Diliberti, M., & Oudekerk, B. A. (2018). *Indicators of school crime and safety: 2017* (No. (NCES 2018-036/NCJ 251413)). Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, and Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice.

Naiman, D. I., Leatherdale, S. T., Gotay, C., & Mâsse, L. C. (2015). School factors associated with the provision of physical education and levels of physical activity among elementary school students in Ontario. *Can J Public Health*, *106*(5). https://doi.org/10.17269/cjph.106.4899

NASPE, & American Heart Association [AHA]. (2012). *2012 Shape of the nation report: Status of physical education in the USA.* Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance.

National Association for Sport and Physical Education [NASPE]. (2004). *Moving into the future: National standards for physical education* (No. 2nd edition). Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance.

National Commission on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. *The Elementary School Journal*, *84*(2), 113–130. https://doi.org/10.1086/461348

National School Lunch Act, Pub. L. No. 396, 60 230 (1946).

Neumark-Sztainer, D., Story, M., Perry, C., & Casey, M. A. (1999). Factors influencing food choices of adolescents. *Journal of the American Dietetic Association*, *99*(8), 929–937. https://doi.org/10.1016/S0002-8223(99)00222-9

Neumark-Sztainer, D., Wall, M. M., Larson, N., Story, M., Fulkerson, J. A., Eisenberg, M. E., & Hannan, P. J. (2012). Secular trends in weight status and weight-related attitudes and behaviors in adolescents from 1999 to 2010. *Preventive Medicine*, *54*(1), 77–81. https://doi.org/10.1016/j.ypmed.2011.10.003

Neumark-Sztainer, D., Wall, M., Perry, C., & Story, M. (2003). Correlates of fruit and vegetable intake among adolescents. *Preventive Medicine*, *37*(3), 198–208. https://doi.org/10.1016/S0091-7435(03)00114-2

Nickerson, A. B., & Nagle, R. J. (2005). Parent and peer attachment in late childhood and early adolescence. *The Journal of Early Adolescence*, *25*(2), 223–249. https://doi.org/10.1177/0272431604274174

Nielsen, S. (2002). Trends in food locations and sources among adolescents and young adults. *Preventive Medicine*, *35*(2), 107–113. https://doi.org/10.1006/pmed.2002.1037

No Child Left Behind Act of 2001 [NCLB], Pub. L. No. 107–110, 20 20 (2002).

O'Neil, A., Quirk, S. E., Housden, S., Brennan, S. L., Williams, L. J., Pasco, J. A., … Jacka, F. N. (2014). Relationship between diet and mental health in children and adolescents: A

systematic review. *American Journal of Public Health*, *104*(10), e31–e42. https://doi.org/10.2105/AJPH.2014.302110

Ortega, A. N., Albert, S. L., Sharif, M. Z., Langellier, B. A., Garcia, R. E., Glik, D. C., … Prelip, M. L. (2015). Proyecto MercadoFRESCO: A multi-level, community-engaged corner store intervention in East Los Angeles and Boyle Heights. *Journal of Community Health*, *40*(2), 347–356. https://doi.org/10.1007/s10900-014-9941-8

Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, *70*(3), 323–367. https://doi.org/10.3102/00346543070003323

Owen, M. B., Curry, W. B., Kerner, C., Newson, L., & Fairclough, S. J. (2017). The effectiveness of school-based physical activity interventions for adolescent girls: A systematic review and meta-analysis. *Preventive Medicine*, *105*, 237–249. https://doi.org/10.1016/j.ypmed.2017.09.018

Pate, R. R. (2006). Promoting physical activity in children and youth: A leadership role for schools. *Circulation*, *114*(11), 1214–1224. https://doi.org/10.1161/CIRCULATIONAHA.106.177052

Pate, R. R., & Hohn, R. C. (1994). A contemporary mission for physical education. In R. R. Pate & R. C. Hohn (Eds.), *Health and fitness through physical education* (pp. 1–8). Champaign, IL: Human Kinetics.

Pearson, N., Biddle, S. J., & Gorely, T. (2009). Family correlates of fruit and vegetable consumption in children and adolescents: A systematic review. *Public Health Nutrition*, *12*(02), 267. https://doi.org/10.1017/S1368980008002589

Pearson, N., Braithwaite, R., & Biddle, S. J. (2015). The effectiveness of interventions to increase physical activity among adolescent girls: A meta-analysis. *Academic Pediatrics*, *15*(1), 9–18.

Perlmann, J., & Margo, R. A. (2001). *Women's work? American schoolteachers, 1650-1920*. Chicago: University of Chicago Press.

Pietrobelli, A., Boner, A. L., & Tatò, L. (2005). Adipose tissue and metabolic effects: New insight into measurements. *International Journal of Obesity*, *29*(S2), S97–S100. https://doi.org/10.1038/sj.ijo.0803079

Powell, L. M., Slater, S., Chaloupka, F. J., & Harper, D. (2006). Availability of physical activity–related facilities and neighborhood demographic and socioeconomic characteristics: A national study. *American Journal of Public Health*, *96*(9), 1676–1680. https://doi.org/10.2105/AJPH.2005.065573

Prelip, M. L., Slusser, W. M., Lange, L., Vecchiarielli, S., & Neumann, C. (2010). Participatory prevention research model promotes environmental change for healthier schools. *Health Promotion Practice*, *11*(1), 54–61. https://doi.org/10.1177/1524839908321608

Prelip, M. L., Slusser, W., Thai, C. L., Kinsler, J., & Erausquin, J. T. (2011). Effects of a school-based nutrition program diffused throughout a large urban community on attitudes, beliefs, and behaviors related to fruit and vegetable consumption. *Journal of School Health*, *81*(9), 520–529. https://doi.org/10.1111/j.1746-1561.2011.00622.x

Prelip, M. L., Thai, C. L., Toller Erausquin, J., & Slusser, W. (2011). Improving low-income parents' fruit and vegetable intake and their potential to impact children's nutrition. *Health Education*, *111*(5), 391–411. https://doi.org/10.1108/09654281111161220

Prochaska, J. J., Rodgers, M. W., & Sallis, J. F. (2002). Association of parent and peer support with adolescent physical activity. *Research Quarterly for Exercise and Sport*, *73*(2), 206–210. https://doi.org/10.1080/02701367.2002.10609010

Produce for Better Health Foundation. (2019). History - PBH Foundation. Retrieved March 30, 2019, from http://www.pbhfoundation.org/about/history

Ralston, K., Newman, C., Clauson, A., Guthrie, J., & Buzby, J. (2008). The National School Lunch Program: Background, trends, and issues. Economic Research Report Number 61. *US Department of Agriculture*.

Rasberry, C. N., Slade, S., Lohrmann, D. K., & Valois, R. F. (2015). Lessons learned from the Whole Child and Coordinated School Health approaches. *Journal of School Health*, *85*(11), 759–765. https://doi.org/10.1111/josh.12307

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed). Thousand Oaks: Sage Publications.

Reddy, R., Rhodes, J. E., & Mulhall, P. (2003). The influence of teacher support on student adjustment in the middle school years: A latent growth curve study. *Development and Psychopathology*, *15*(01), 119–138. https://doi.org/10.1017/S0954579403000075

Regan, P. A. (1976). A historical study of the school nurse role. *Journal of School Health*, *46*(9), 518–521. https://doi.org/10.1111/j.1746-1561.1976.tb02045.x

Rentner, D. S., Kober, N., & Frizzell, M. (2017). *States reflect on year one implementation of ESSA: Planning for progress*. Washington, D.C.: Center on Education Policy.

Resnick, M. D. (1997). Protecting adolescents from harm: Findings from the National Longitudinal Study on Adolescent Health. *JAMA*, *278*(10), 823. https://doi.org/10.1001/jama.1997.03550100049038

Reynolds, K. D., Baranowski, T., Bishop, D. B., Farris, R. P., Binkley, D., Nicklas, T. A., & Elmer, P. J. (1999). Patterns in child and adolescent consumption of fruit and vegetables: Effects of gender and ethnicity across four sites. *Journal of the American College of Nutrition*, *18*(3), 248–254. https://doi.org/10.1080/07315724.1999.10718859

Reynolds, K. D., Yaroch, A. L., Franklin, F. A., & Maloy, J. (2002). Testing mediating variables in a school-based nutrition intervention program. *Health Psychology*, *21*(1), 51–60. https://doi.org/10.1037/0278-6133.21.1.51

Richmond, T. K. (2006). Can school income and racial/ethnic composition explain the racial/ethnic disparity in adolescent physical activity participation? *PEDIATRICS*, *117*(6), 2158–2166. https://doi.org/10.1542/peds.2005-1920

Ridgers, N. D., Salmon, J., Parrish, A.-M., Stanley, R. M., & Okely, A. D. (2012). Physical activity during school recess. *American Journal of Preventive Medicine*, *43*(3), 320–328. https://doi.org/10.1016/j.amepre.2012.05.019

Riel, V., Parcel, T. L., Mickelson, R. A., & Smith, S. S. (2018). Do magnet and charter schools exacerbate or ameliorate inequality? *Sociology Compass*, *12*(9), e12617. https://doi.org/10.1111/soc4.12617

Ringwalt, C., Hanley, S., Ennett, S. T., Vincus, A. A., Bowling, J. M., Haws, S. W., & Rohrbach, L. A. (2011). The effects of no child left behind on the prevalence of evidence-based drug

prevention curricula in the nation's middle schools. *Journal of School Health*, *81*(5), 265–272. https://doi.org/10.1111/j.1746-1561.2011.00587.x

Roeser, R. W., Eccles, J. S., & Sameroff, A. J. (2000). School as a context of early adolescents' academic and social-emotional development: A summary of research findings. *The Elementary School Journal*, *100*(5), 443–471.

Rogers, J., Franke, M., Yun, J.-E. E., Ishimoto, M., Diera, C., Geller, R. C., … Brenes, T. (2017). Teaching and learning in the age of Trump: Increasing stress and hostility in America's high schools. *UCLA IDEA*.

Rosa, E. M., & Tudge, J. (2013). Urie Bronfenbrenner's Theory of Human Development: Its evolution from ecology to bioecology. *Journal of Family Theory & Review*, *5*(4), 243–258. https://doi.org/10.1111/jftr.12022

Roy, K. M., Tubbs, C. Y., & Burton, L. M. (2004). Don't have no time: Daily rhythms and the organization of time for low-income families. *Family Relations*, *53*(2), 168–178. https://doi.org/10.1111/j.0022-2445.2004.00007.x

Rukavina, P. B., & Li, W. (2007). School physical activity interventions: Do not forget about obesity bias. *Obesity Reviews*, *0*(0), 070801231117001-??? https://doi.org/10.1111/j.1467-789X.2007.00403.x

Russo, C. J. (2016). An overview of the Every Student Succeeds Act. *School Business Affairs*, *82*(3).

Rutter, M. (1991). Pathways from childhood to adult life: The role of schooling. *Pastoral Care in Education*, *9*(3), 3–10. https://doi.org/10.1080/02643949109470747

Rutter, M., Maughan, B., Mortimore, P., & Ouston, J. (1979). *Fifteen-thousand hours: Secondary schools and their effects on children*. London: Open Books.

Salam, R. A., Das, J. K., Lassi, Z. S., & Bhutta, Z. A. (2016). Adolescent health and well-being: Background and methodology for review of potential interventions. *Journal of Adolescent Health*, *59*(4), S4–S10. https://doi.org/10.1016/j.jadohealth.2016.07.023

Sallis, J. F. (2002). 1996-2000 Amherst Health & Activity Study. Retrieved July 19, 2016, from http://sallis.ucsd.edu/documents/measures_documents/amherst_studentsurvey.pdf

Sallis, J. F., Grossman, R. M., Pinski, R. B., Patterson, T. L., & Nader, P. R. (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine*, *16*(6), 825–836.

Sallis, J. F., McKenzie, T. L., Beets, M. W., Beighle, A., Erwin, H., & Lee, S. (2012). Physical education's role in public health: Steps forward and backward over 20 years and HOPE for the future. *Research Quarterly for Exercise and Sport*, *83*(2), 125–135.

Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine & Science in Sports & Exercise*, 963–975. https://doi.org/10.1097/00005768-200005000-00014

Salmon, J., Booth, M. L., Phongsavan, P., Murphy, N., & Timperio, A. (2007). Promoting physical activity participation among children and adolescents. *Epidemiologic Reviews*, *29*(1), 144–159. https://doi.org/10.1093/epirev/mxm010

Sánchez, V., Hale, R., Andrews, M., Cruz, Y., Bettencourt, V., Wexler, P., & Halasan, C. (2014). School wellness policy implementation: Insights and recommendations from two rural

school districts. *Health Promotion Practice*, *15*(3), 340–348. https://doi.org/10.1177/1524839912450878

Saporito, S. (2003). Private choices, public consequences: Magnet school choice and segregation by race and poverty. *Social Problems*, *50*(2), 181–203. https://doi.org/10.1525/sp.2003.50.2.181

Sawyer, S. M., Afifi, R. A., Bearinger, L. H., Blakemore, S.-J., Dick, B., Ezeh, A. C., & Patton, G. C. (2012). Adolescence: A foundation for future health. *The Lancet*, *379*(9826), 1630–1640.

Schuler, B. R., Saksvig, B. I., Nduka, J., Beckerman, S., Jaspers, L., Black, M. M., & Hager, E. R. (2018). Barriers and enablers to the implementation of school wellness policies: An economic perspective. *Health Promotion Practice*, 152483991775210. https://doi.org/10.1177/1524839917752109

Schunk, D. H., & Meece, J. L. (Eds.). (1992). *Student perceptions in the classroom*. New York, NY: Routledge.

Scott, J. A. (1919). The Lions Club health camp. *The Public Health Nurse*, *11*(12), 964–966.

Seidman, I. (2013). *Interviewing as qualitative research* (4th ed.). New York, NY: Teachers College Press.

Sharma, M. (2006). School-based interventions for childhood and adolescent obesity. *Obesity Reviews*, *7*(3), 261–269.

Singh, A., Uijtdewilligen, L., Twisk, J. W. R., van Mechelen, W., & Chinapaw, M. J. M. (2012). Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment. *Archives of Pediatrics & Adolescent Medicine*, *166*(1), 49–55. https://doi.org/10.1001/archpediatrics.2011.716

Sisson, S. B., Church, T. S., Martin, C. K., Tudor-Locke, C., Smith, S. R., Bouchard, C., … Katzmarzyk, P. T. (2009). Profiles of sedentary behavior in children and adolescents: The US National Health and Nutrition Examination Survey, 2001–2006. *International Journal of Pediatric Obesity*, *4*(4), 353–359. https://doi.org/10.3109/17477160902934777

Sjöström, L., Smith, U., Krotkiewski, M., & Björntorp, P. (1972). Cellularity in different regions of adipose tissue in young men and women. *Metabolism*, *21*(12), 1143–1153. https://doi.org/10.1016/0026-0495(72)90109-6

Small, M. L., Allard, S. W., Allard, S. W., & Small, M. L. (2013). *Reconsidering the urban disadvantaged: The role of systems, institutions, and organizations*. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/0002716213479317

Smetana, J. G., Campione-Barr, N., & Metzger, A. (2006). Adolescent development in interpersonal and societal contexts. *Annual Review of Psychology*, *57*(1), 255–284. https://doi.org/10.1146/annurev.psych.57.102904.190124

Smith, D. W., Steckler, A. B., McCormick, L. K., & McLeroy, K. R. (1995). Lessons learned about disseminating health curricula to schools. *Journal of Health Education*, *26*(1), 37–43. https://doi.org/10.1080/10556699.1995.10603074

Snelling, A. (2012). The obesity epidemic: A call for health educators to lead. *American Journal of Health Education*, *43*(3), 132–134. https://doi.org/10.1080/19325037.2012.10599229

Sondel, B., Baggett, H. C., & Dunn, A. H. (2018). “For millions of people, this is real trauma”: A pedagogy of political trauma in the wake of the 2016 U.S. Presidential election. *Teaching and Teacher Education*, *70*, 175–185. https://doi.org/10.1016/j.tate.2017.11.017

SPARK. (2015). The evolution of physical education. Retrieved December 8, 2017, from The Official SPARK Blog website: http://www.sparkpe.org/blog/the-evolution-of-physical-education/

Spradlin, T., Gard, G., Huang, V., Kopp, B., & Malik, A. (2012). Childhood obesity and nutrition issues in the United States: An update on school-based policies and practices. *Education Policy Brief*, *10*(1).

Spring, J. (2008). Research on globalization and education. *Review of Educational Research*, *78*(2), 330–363. https://doi.org/10.3102/0034654308317846

StataCorp. (2017). *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LP.

Steinberg, L. (1996). *Adolescence* (5th ed.). Boston: McGraw-Hill.

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, *9*(2), 69–74. https://doi.org/10.1016/j.tics.2004.12.005

Sterdt, E., Liersch, S., & Walter, U. (2014). Correlates of physical activity of children and adolescents: A systematic review of reviews. *Health Education Journal*, *73*(1), 72–89.

Stolp, S., Wilkins, E., & Raine, K. D. (2015). Developing and sustaining a healthy school community: Essential elements identified by school health champions. *Health Education Journal*, *74*(3), 299–311. https://doi.org/10.1177/0017896914541818

St-Onge, M.-P., Keller, K. L., & Heymsfield, S. B. (2003). Changes in childhood food consumption patterns: A cause for concern in light of increasing body weights. *The American Journal of Clinical Nutrition*, *78*(6), 1068–1073.

Story, M., Nanney, M. S., & Schwartz, M. B. (2009). Schools and obesity prevention: Creating school environments and policies to promote healthy eating and physical activity. *Milbank Quarterly*, *87*(1), 71–100. https://doi.org/10.1111/j.1468-0009.2009.00548.x

Story, M., Ph. D., Kaphingst, K. M., & French, S. (2006). The role of schools in obesity prevention. *The Future of Children*, *16*(1), 109–142. https://doi.org/10.1353/foc.2006.0007

Strazdins, L., Griffin, A. L., Broom, D. H., Banwell, C., Korda, R., Dixon, J., … Glover, J. (2011). Time scarcity: Another health inequality? *Environment and Planning A: Economy and Space*, *43*(3), 545–559. https://doi.org/10.1068/a4360

Strazdins, L., Welsh, J., Korda, R., Broom, D., & Paolucci, F. (2016). Not all hours are equal: Could time be a social determinant of health? *Sociology of Health & Illness*, *38*(1), 21–42. https://doi.org/10.1111/1467-9566.12300

Strong, W. B., Malina, R. M., Blimkie, C. J. R., Daniels, S. R., Dishman, R. K., Gutin, B., … Trudeau, F. (2005). Evidence based physical activity for school-age youth. *The Journal of Pediatrics*, *146*(6), 732–737. https://doi.org/10.1016/j.jpeds.2005.01.055

Stullich, S., Eisner, E., McCrary, J., & Roney, C. (2006). National assessment of Title I: Interim report. Volume I: Implementation of Title I. *National Center for Education Evaluation and Regional Assistance*.

Suls, J., & Rothman, A. (2004). Evolution of the biopsychosocial model: Prospects and challenges for health psychology. *Health Psychology*, *23*(2), 119–125. https://doi.org/10.1037/0278-6133.23.2.119

Taheri, S., Lin, L., Austin, D., Young, T., & Mignot, E. (2004). Short sleep duration is associated with reduced leptin, elevated ghrelin, and increased body mass index. *PLoS Medicine*, *1*(3), e62. https://doi.org/10.1371/journal.pmed.0010062

Telford, R. M., Telford, R. D., Olive, L. S., Cochrane, T., & Davey, R. (2016). Why are girls less physically active than boys? Findings from the LOOK longitudinal study. *PLOS ONE*, *11*(3), e0150041. https://doi.org/10.1371/journal.pone.0150041

Thapa, A., Cohen, J., Guffey, S., & Higgins-D'Alessandro, A. (2013). A review of school climate research. *Review of Educational Research*, *83*(3), 357–385.

Thornton, L. E., Cameron, A. J., McNaughton, S. A., Waterlander, W. E., Sodergren, M., Svastisalee, C., … Crawford, D. A. (2013). Does the availability of snack foods in supermarkets vary internationally? *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 56. https://doi.org/10.1186/1479-5868-10-56

Tienken, C. H., & Zhao, Y. (2013). How common standards and standardized testing widen the opportunity gap. In P. L. Carter & K. G. Welner, *Closing the opportunity gap: What America must do to give every child an even chance*. New York, NY: Oxford University Press.

Todd, A., Street, S., Ziviani, J., Byrne, N., & Hills, A. P. (2015). Overweight and obese adolescent girls: The importance of promoting sensible eating and activity behaviors from the start of the adolescent period. *International Journal of Environmental Research and Public Health*, *12*(2), 2306–2329. https://doi.org/10.3390/ijerph120202306

Trivedi, S., Burton, A., & Oden, J. (2014). Management of pediatric obesity: A lifestyle modification approach. *The Indian Journal of Pediatrics*, *81*(2), 152–157. https://doi.org/10.1007/s12098-013-1138-0

Trudeau, F., Laurencelle, L., & Shephard, R. J. (2004). Tracking of physical activity from childhood to adulthood. *Medicine & Science in Sports & Exercise*, *36*(11), 1937–1943. https://doi.org/10.1249/01.MSS.0000145525.29140.3B

UCLA Center for Health Policy Research. (2013). *2011-2012 California Health Interview Survey*. Retrieved from http://ask.chis.ucla.edu

UCLA Center for Health Policy Research. (2015). *2013-2014 California Health Interview Survey*. Retrieved from http://healthpolicy.ucla.edu/chis/design/Documents/chis2013teenquestionnaire.pdf

UCLA Center for Health Policy Research. (2017). *California Health Interview Survey: AskCHIS*. Retrieved from http://ask.chis.ucla.edu

UCLA Center to Eliminate Health Disparities, & Samules & Associates. (2007). *Failing fitness: Physical activity and physical education in schools*. Los Angeles, CA: The California Endowment.

Unger, J. B., Reynolds, K., Shakib, S., Spruijt-Metz, D., Sun, P., & Johnson, C. A. (2004). Acculturation, physical activity, and fast-food consumption among Asian-American and Hispanic Adolescents. *Journal of Community Health*, *29*(6), 467–481. https://doi.org/10.1007/s10900-004-3395-3

Urdan, T., & Klein, S. (1998). Early adolescence: A review of the literature. *Retrieved From* https://www.rti.org/sites/default/files/resources/early_adolescence.pdf

U.S. Department of Agriculture. (2012). Choose My Plate. Retrieved December 22, 2017, from www.choosemyplate.gov

U.S. Department of Agriculture. (2013). National school lunch program and school breakfast program: Nutrition standards for all foods sold in school as required by Healthy, Hunger-Free Kids Act of 2010; Final Rule. *Federal Register*, *78*(125), 38068–39919.

U.S. Department of Agriculture. (2019). Nutrition standards for school meals. Retrieved March 30, 2019, from Nutrition Standards for School Meals website: https://www.fns.usda.gov/school-meals/nutrition-standards-school-meals

U.S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

U.S. Department of Health and Human Services. (2011). *Healthy People 2020*. Retrieved from www.healthypeople.gov/2020

U.S. Department of Health and Human Services. (2018). *2018 Physical Activity Guidelines for Americans* (No. 2nd edition). Washington, D.C.: U.S. Department of Health and Human Services.

U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2015). *2015-2020 Dietary Guidelines for Americans* (No. 8th Edition; p. 144). Retrieved from https://health.gov/dietaryguidelines/2015/resources/2015-2020_Dietary_Guidelines.pdf

Utter, J., Scragg, R., & Schaaf, D. (2006). Associations between television viewing and consumption of commonly advertised foods among New Zealand children and young adolescents. *Public Health Nutrition*, *9*(05). https://doi.org/10.1079/PHN2005899

Valli, L., & Buese, D. (2007). The changing roles of teachers in an era of high-stakes accountability. *American Educational Research Journal*, *44*(3), 519–558. https://doi.org/10.3102/0002831207306859

Van Der Horst, K., Paw, M. J. C. A., Twisk, J. W. R., & Van Mechelen, W. (2007). A brief review on correlates of physical activity and sedentariness in youth: *Medicine & Science in Sports & Exercise*, *39*(8), 1241–1250. https://doi.org/10.1249/mss.0b013e318059bf35

van Sluijs, E. M. F., McMinn, A. M., & Griffin, S. J. (2007). Effectiveness of interventions to promote physical activity in children and adolescents: Systematic review of controlled trials. *BMJ*, *335*(7622), 703–703. https://doi.org/10.1136/bmj.39320.843947.BE

Vieno, A., Santinello, M., Pastore, M., & Perkins, D. D. (2007). Social support, sense of community in school, and self-efficacy as resources during early adolescence: An integrative model. *American Journal of Community Psychology*, *39*(1–2), 177–190. https://doi.org/10.1007/s10464-007-9095-2

Viner, R. M., Ozer, E. M., Denny, S., Marmot, M., Resnick, M., Fatusi, A., & Currie, C. (2012). Adolescence and the social determinants of health. *The Lancet*, *379*(9826), 1641–1652.

Ward, S., Bélanger, M., Donovan, D., Caissie, I., Goguen, J., & Vanasse, A. (2015). Association between school policies and built environment, and youth's participation in various types of physical activities. *Journal of School Health*, *85*(7), 423–432.

Wechsler, H., Devereaux, R. S., Davis, M., & Collins, J. (2000). Using the school environment to promote physical activity and healthy eating. *Preventive Medicine*, *31*(2), S121–S137. https://doi.org/10.1006/pmed.2000.0649

Weininger, E. B. (2002). Pierre Bourdieu on social class and symbolic violence. *Alternative Foundations of Class Analysis*, 119–171.

Wellard, I. (2009). *Sport, masculinities and the body.* New York, NY: Routledge.

Whitaker, A., Torres-Guillen, S., Morton, M., Jordan, H., Coyle, S., Mann, A., & Sun, W.-L. (2019). *Cops and no counselors: How the lack of school mental health staff is harming students*. Retrieved from American Civil Liberties Union website: https://www.aclu.org/report/cops-and-no-counselors

Whitt-Glover, M. C., Taylor, W. C., Floyd, M. F., Yore, M. M., Yancey, A. K., & Matthews, C. E. (2009). Disparities in physical activity and sedentary behaviors among US children and adolescents: Prevalence, correlates, and intervention implications. *Journal of Public Health Policy*, S309–S334.

WHO. (2001). *The second decade: Improving adolescent health and development*. Retrieved from World Health Organization website: http://www.who.int/maternal_child_adolescent/documents/frh_adh_98_18/en/

WHO. (2009). *Global health risks: Mortality and burden of disease attributable to selected major risks*. World Health Organization.

WHO. (2018). Nutrition. Retrieved January 8, 2018, from Health Topics website: http://www.who.int/topics/nutrition/en/

Williams, P. G., Holmbeck, G. N., & Greenley, R. N. (2002). Adolescent health psychology. *Journal of Consulting and Clinical Psychology*, *70*(3), 828–842. https://doi.org/10.1037//0022-006X.70.3.828

World Health Organization [WHO]. (2014). *Global status report on noncommunicable diseases 2014.*

Young, D. R., Felton, G. M., Grieser, M., Elder, J. P., Johnson, C., Lee, J.-S., & Kubik, M. Y. (2007). Policies and opportunities for physical activity in middle school environments. *Journal of School Health*, *77*(1), 41–47.

Young, I. (2005). Health promotion in schools: A historical perspective. *Promotion & Education*, *12*(3–4), 112–117.

Zeng, H. Z., Hipscher, M., & Leung, R. W. (2011). Attitudes of high school students toward physical education and their sport activity preferences. *Journal of Social Sciences*, *7*(4), 529.

Zimmerman, E. B., Woolf, S. H., & Haley, A. (2015). Understanding the relationship between education and health: A review of the evidence and an examination of community perspectives. In R. M. Kaplan, M. L. Spittel, & D. H. David (Eds.), *Population health: Behavioral and social science insights* (pp. 347–384). Rockville, MD: Agency for Healthcare Research and Quality.