
[All ETDs from UAB](#)

[UAB Theses & Dissertations](#)

2014

Exploring The Impact Of Youth Participation In Community Service On Health Behaviors

Kymber Nigel Williams
University of Alabama at Birmingham

Follow this and additional works at: <https://digitalcommons.library.uab.edu/etd-collection>

Recommended Citation

Williams, Kymber Nigel, "Exploring The Impact Of Youth Participation In Community Service On Health Behaviors" (2014). *All ETDs from UAB*. 3337.
<https://digitalcommons.library.uab.edu/etd-collection/3337>

This content has been accepted for inclusion by an authorized administrator of the UAB Digital Commons, and is provided as a free open access item. All inquiries regarding this item or the UAB Digital Commons should be directed to the [UAB Libraries Office of Scholarly Communication](#).

EXPLORING THE IMPACT OF YOUTH PARTICIPATION IN COMMUNITY
SERVICE ON HEALTH BEHAVIORS

by

KYMBER NIGEL WILLIAMS

LAURA TALBOTT-FORBES, CHAIR
DAVID W. COOMBS
RETTA R. EVANS
CONNIE L. KOHLER
JAMES B. WEAVER III

A DISSERTATION

Submitted to the graduate faculty of The University of Alabama at Birmingham,
in fulfillment of the requirements for the degree of
Doctor of Philosophy

BIRMINGHAM, ALABAMA

2014

Copyright by
Kymber Nigel Williams
2014

EXPLORING THE IMPACT OF YOUTH PARTICIPATION IN COMMUNITY SERVICE ON HEALTH BEHAVIORS

KYMBER NIGEL WILLIAMS

HEALTH EDUCATION AND HEALTH PROMOTION

ABSTRACT

Although the majority of adolescents in the United States are considered healthy, they continue to engage in a myriad of health risk behaviors that may manifest into adulthood. The prevalence of adolescent health risks is well documented. Prosocial behaviors (i.e., community service, volunteerism) may contribute to reducing risky health behaviors among adolescents, but this connection has yet to be solidified. Previous research has suggested that volunteerism may have beneficial and developmental outcomes for adolescents. However, the relationship between adolescent community service participation and improved physical health outcomes has not been fully explored.

The purpose of this study is to examine the relationship between community service participation and physical health behaviors among Massachusetts high school students. Study data were obtained from a state-wide representative sample of high school students (grades 9th through 12th) who participated in the 2009 Massachusetts Youth Risk Behavior Survey (MYRBS). The MYRBS is conducted biannually by the Massachusetts Department of Education with funding from the Centers for Disease Control and Prevention (CDC).

The theoretical basis for this study was derived from two well-documented theories that have been previously applied to adolescent behavior. Constructs from the Social Cognitive and Problem Behavior theories were used to inform the conceptual framework of this study. A secondary data analysis of the 2009 MYRBS was used to

explore the relationship between community service participation and health behaviors among adolescents. Regression models were constructed to examine the impact of youth volunteerism upon health behaviors and related covariates.

Given limited prior research, exploring the role of adolescent community service participation and health behaviors provided an opportunity to better understand one aspect of positive youth development as a viable prevention strategy for addressing negative health behaviors, such as tobacco, alcohol and drug use or sexual behavior. Study findings support previous studies that have suggested that adolescents who engage in community service were less likely to engage in risky health behaviors. These results constituted an initial step toward understanding community service participation and its impact on risky health behaviors among adolescents. However, results were based on a single geographically limited sample and should be interpreted with caution.

Keywords: adolescents, prosocial behavior, health risk behaviors, problem behavior theory, social cognitive theory, protective health behaviors

DEDICATION

This dissertation is dedicated to Dr. Maxcine Cannon Maxfield (1945-2013), an exceptional woman, wife, sister, mother, aunt, grandmother, friend, colleague, scholar, advocate, mentor, soror, teacher, and so much more. She inspired my life through her grace, strength, faith, laughter and boundless love and enthusiasm for family and friends alike. She was there for me always, guiding me through some of the most important years of my life. Thus, her impact on my life will always have a special place in my heart. She is gone way too soon, but never ever forgotten. I profoundly miss her and thank her for her inspiration, encouragement, and love.

ACKNOWLEDGEMENTS

As I culminate my many years of graduate study and present this dissertation, I wish to thank my committee members who were more than generous with their guidance, expertise and precious time to better my work. Without your support, this dissertation would not be possible.

I express my deepest gratitude to my dissertation chair, mentor and advisor, Dr. Laura Forbes, for not only her unwavering support, but her excellent guidance, caring, and patience during my growth and development as a scholar. I am forever grateful for your patience and encouragement during this dissertation process. I thank Dr. James Weaver III for his mentoring, encouraging words, constructive criticism, and one-on-one time and attention during busy semesters and periods of life. Thank you for sharing your research insights, methodological knowledge, and statistical expertise during countless hours spent assisting me with the statistical analysis and writing process.

I thank Dr. Terry Parker for sharing his enthusiasm and efforts that benefit adolescents as well as his encouragement and valuable comments on my work. Additionally, I thank Dr. Louis Ross for not only his encouragement over the years, but, his willingness to drop everything at a moment's notice and offer advice and feedback on my work.

I also thank my parents, Mr. and Mrs. Wallace E. Williams, Jr., for always supporting me with encouraging words, listening ears, and most of all their best wishes in reaching my goals. Thank you for teaching me that with God all things are possible.

In addition, I especially thank my husband, Derrick Wilson, for his love, support and understanding during the years of my quest to pursue and conquer this terminal degree as a part of my educational and professional goals. I know that you made sacrifices in order for me to obtain this degree. Thank you for your patience and encouragement.

Last, but not least, to my network of friends, family, mentors, and colleagues, many thanks for providing a listening ear, encouragement, and comic relief during those times when my frustration was high and my motivation was low. Your support was invaluable.

Most importantly, I thank God, for life, health, energy, and the resources that He has given me to reach one of my highest educational and professional goals. For without Him I could not have survived this arduous process and made one of my dreams come true (Philippians 4:6).

In closing, I would never have been able to finish my dissertation without the guidance of my committee members, assistance and encouragement from dear friends (like Eula Moore) and colleagues (Drs. Zewditu Demissie and Hope King), and unwavering support from my family and husband—and for that I am eternally grateful.

TABLE OF CONTENTS

	<i>Page</i>
ABSTRACT.....	iii
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
LIST OF TABLES.....	xii
LIST OF FIGURES	xiv
CHAPTER	
1 INTRODUCTION	1
Statement of the Problem.....	1
Adolescent Behavior Change.....	2
Influence of the School and Community Environments.....	3
Participation in Prosocial Behaviors	5
Purpose of the Research.....	6
Significance of the Study.....	7
Delimitations.....	8
Assumptions.....	9
Computerized Search.....	9
Definition of Terms.....	11
2 LITERATURE REVIEW	14
Brief Overview of Voluntary Service	14
Brief Description of Volunteers	15
Volunteerism and Youth	17
Academic Achievement and Adolescent Health Risk Behaviors	20
The Role of Schools and Student Health	24
Adolescent Health Behaviors: A National Overview	28
Unintentional Injuries and Violence	29
Tobacco Use.....	32
Alcohol and Other Drug Use	34

TABLE OF CONTENTS (Continued)

	<i>Page</i>
CHAPTER	
Sexual Behaviors that Contribute to Unintentional Pregnancy, STDs, and HIV Infections	38
Unhealthy Dietary Behaviors	40
Physical Inactivity	42
National Health Guidelines Related to Adolescent Obesity Prevention	44
Youth and Health Risk Behavior in Massachusetts: MYRBS Survey Results	45
Adolescent Health Behaviors: A Summary	47
Prosocial Behavior and Volunteerism: The Connection	48
Positive Youth Development	51
Youth Community Involvement Through Volunteerism	52
Community Service Participation Among Youth: Is It A Protective Factor?	54
Adult Volunteerism	54
Youth Volunteerism and Health Risk Behaviors	55
Youth Volunteerism and An Overarching Theoretical Framework	60
Understanding Adolescent Health Behavior: A Theoretical Framework	63
Behavioral and Social Science Theories	63
Social Cognitive Theory	64
Reciprocal Determinism Explained	65
Adolescent Health and Prosocial Behaviors	66
Summary	69
Problem Behavior Theory	70
Three Systems of Explanatory Domains	71
Dynamic Interaction: Personality, Environmental System, and Behavior	73
Concepts of Protective and Risk Factors	74
Summary	76
Making the Case for the Study	77
 3 RESEARCH METHODOLOGY	 79
Description of the Youth Risk Behavior Surveillance System and Survey	80
National Youth Risk Behavior Surveillance System Overview	80
YRBSS Survey Procedures	80
YRBS Data Processing Procedures	81
Description of the National Youth Risk Behavior Survey	83
Validity and Reliability	83
Data Collection	84
Description of the 2009 Massachusetts Youth Risk Behavior Survey	84
Population and Sample	85
Data Processing Procedures	85
Study Measures	88

TABLE OF CONTENTS (Continued)

	<i>Page</i>
CHAPTER	
Community Service	89
Individual Characteristics	90
Demographics	90
Environmental Variables.....	94
Correlations Among Individual Characteristic Variables	96
Health Outcomes.....	97
Risky Health Behaviors.....	98
Health Risk Behaviors.....	101
Healthy Behaviors	103
Analytic Strategy	106
Data Analysis	107
4 RESULTS	109
Exploring Community Service and Health Outcomes.....	109
Health Risk Behaviors.....	109
Health Risk Factors	124
Healthy Behaviors.....	130
Summary	139
5 SUMMARY AND CONCLUSIONS	145
Discussion	145
Summary of the Study Results.....	146
Understanding the Relationship Between Youth Community Service and Health Outcomes	148
Understanding the Contributing Factors of Adolescent Community Service Participation	149
Community Service Participation: Model 1.....	149
Demographic Characteristics (Sex, Age, Race/Ethnicity): Model 2.....	153
Environmental Factors (Talk with Parents, Talk with Teacher, Sad and Hopeless feelings): Model 3.....	158
Academic Achievement: Model 4.....	162
Limitations	166
Conclusions.....	171
Recommendations.....	173
Implications for School Health	177
Future Directions	180
LIST OF REFERENCES	184

TABLE OF CONTENTS (Continued)

	<i>Page</i>
APPENDIX	
A PROTOCOL NUMBER: N120807002/EXPLORING THE IMPACT OF YOUTH PARTICIPATION IN COMMUNITY SERVICE ON ACADEMIC ACHIEVEMENT AND HEALTH BEHAVIORS	202
B COPY OF 2009 MASSACHUSETTS YOUTH RISK BEHAVIOR SURVEY INSTRUMENT	204
C YOUTH RISK BEHAVIOR SURVEILLANCE SYSTEM: OVERVIEW	231

LIST OF TABLES

<i>Table</i>	<i>Page</i>
3.1 Frequency Distribution of Community Service	90
3.2 Frequency Distribution of Demographic Variables	93
3.3 Frequency Distribution of Environmental and Academic Achievement Variables	95
3.4 Spearman Correlation Coefficients across Predictor Variables	97
3.5 Frequency Distribution of Risky Health Behaviors Variables	100
3.6 Frequency Distribution of Health Risk Behavior Variables	102
3.7 Frequency Distribution of Healthy Behaviors Variables	105
4.1 Multiple Logistic Regression Models Examining Tobacco Use and Community Service	111
4.2 Multiple Logistic Regression Models Examining Alcohol Use and Community Service	114
4.3 Multiple Logistic Regression Models Examining Marijuana Use and Community Service	117
4.4 Multiple Logistic Regression Models Examining Hard Drug Use and Community Service	120
4.5 Multiple Logistic Regression Models Examining Sexual Intercourse and Community Service	123
4.6 Multiple Logistic Regression Models Examining BMI-based Overweight and Community Service	125
4.7 Multiple Logistic Regression Models Examining BMI-based Obesity and Community Service	127

LIST OF TABLES

<i>Table</i>		<i>Page</i>
4.8	Multiple Logistic Regression Models Examining Physical Activity Guidelines Met and Community Service	132
4.9	Multiple Logistic Regression Models Examining Aerobic Physical Activity Guidelines Met and Community Service	135
4.10	Multiple Logistic Regression Models Examining TV/Computer/Video game Guidelines Met and Community Service.....	138
4.11	Summary of Youth Community Service and Health Behaviors Study Effects by Model	142

LIST OF FIGURES

<i>Figure</i>	<i>Page</i>
1 <i>Health People 2020</i> adolescent health objectives	24
2 Study Conceptual Framework.....	62
3 The reciprocal determination of behavior, person, and environment	65

CHAPTER 1

INTRODUCTION

Adolescence is a unique period in the life cycle that presents special challenges and opportunities. Adolescents are defined as individuals aged 10 to 19 years and young adults, as aged 20 to 24 years; a population group that comprises 21% of the U.S. population (U.S. Census Bureau, 2008). Adolescence is a period of accelerated growth and change that bridges the complex transition from childhood to young adulthood. During this transition, adolescents and young adults experience pivotal biological, cognitive, emotional, and social changes (MacKay & Duran, 2007). The second decade of life is often a turbulent period when adolescents experience hormonal changes, physical maturation, and frequently, opportunities to engage in problem or risk behaviors (MacKay & Duran, 2007). Adolescents also develop independent attitudes, establish patterns of behaviors, and make lifestyle choices that affect both their current and future health (MacKay & Duran, 2007).

Statement of the Problem

This dissertation will focus on the fact that adolescents are engaging in potentially risky health behaviors and that participation in community service may affect these behaviors; however, there is not a large body of literature to support this notion. Adolescents are confronted with societal and peer-related pressures that may persuade them to engage in health risk behaviors, such as having unprotected sex at earlier ages

and using tobacco, alcohol, or other drugs (Centers for Disease Control and Prevention [CDC], 2010c, 2011b, 2012e; MacKay & Duran, 2007; National Center for Health Statistics, 2011, 2010). These adolescent health behaviors may be positively impacted by community service participation (Eccles & Barber, 1999; Kuperminc, Holditch, & Allen, 2001; Schine, 1990) an extracurricular activity provided most often via school affiliation (Planty, Bozick, & Regnier, 2006). The following discussion will explore adolescent behavior change, influences of the school and community environments, and participation in prosocial behaviors.

Adolescent Behavior Change

The creation of safe and nurturing environments in which adolescents can thrive, build confidence, and ultimately gain self-protective skills that will propel them into healthy adulthood is the aim of many educational and public health programs and policies (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004b). Opportunities to learn health promoting skills and behaviors may be found in a variety of community settings and experiences; each intended to build youth developmental assets and ultimately minimize adolescent chances of adopting negative health behaviors (Benson, Scales, Hamilton, & Sesma, 2006). Adolescence is a critical time in which health behavior patterns are influenced and may be altered, perhaps to be more or less like their parents, and to be more or less influenced by their peers. Relatedly, adolescent involvement in some health behaviors are easier to predict and chronicle than others because they occur together in clusters (Baranowski, Perry, & Parcel, 2002; Damon, Menon, & Bronk, 2003).

Adult health behaviors can be difficult to change. However, positive change in adolescents is not impossible. Research shows that intervening with adolescents before they develop unhealthy behaviors is vitally important (Ievers-Landis & Witherspoon, 2009). Moreover, establishing positive health behaviors in childhood and adolescence is imperative as it has ramifications for lifelong health status. Many of the health behavior patterns initiated and developed during adolescence determine potential health status and risk for developing chronic diseases into adulthood and later decades (CDC, 2010c; National Research Council and Institute of Medicine, 2009). A teenager, for example, who begins smoking cigarettes at the age of 14 years, may have a decreased life expectancy in comparison to a teenager who never smoked cigarettes. Therefore, being able to influence an adolescent's ability to understand and identify factors that positively contribute to overall health and well-being is critical for long-term health.

Influence of the School and Community Environments

The social environment in which youth live significantly contributes to their development and influences personal health status. Influential environments for adolescents typically include a combination of the family, church or school (Raskoff & Sundeen, 1998; Sundeen & Raskoff, 2000). The family or home environment and parents are thought to be the most directly influential to youth development (Eisenberg, Fabes, & Spinrad, 2007). Health-related behaviors such as exercise, alcohol or tobacco use, and nutrition, for example, are generally learned at a young age from those persons within the adolescent's environment—parents, caregivers, and peers—to name a few (Bandura, 1997; Baranowski, 1990).

After the family, schools are one of the primary entities responsible for youth development and welfare as well as promoting positive health and social behaviors among adolescents (Eccles & Gootman, 2002; Smith, 2003). In the United States, schools offer direct contact with more than 50 million students for at least 6 hr a day during critical years of social, physical, and intellectual development (National Center for Education Statistics, 2011). Schools are a critical setting for disease prevention and a cost-effective location for conducting health promotion and education activities by providing direct access to youth (Bradley & Greene, 2013). Positive school environments are associated with decreased occurrences of risky health behaviors among adolescents (Catalano, Bergland, et al., 2004a; Catalano, Haggerty, Oesterie, Fleming, & Hawkins, 2004b; Resnick et al., 1997). School curricula that focus on health issues provide students with the opportunity to develop critical thinking and problem-solving skills, which foster their ability to make informed individual health decisions that may influence current and future health outcomes (Smith, 2003).

The relationship between academic achievement and health risk behaviors has been explored by researchers during the last 20 years (Allensworth, Wyche, Lawson, & Nicholson, 1997; CDC, 2010c, 2011a; Eccles & Barber, 1999; Murphey, Lamonda, Carney, & Duncan, 2004; Smith, 2003). Researchers who studied academic achievement and health outcomes found that student academic achievement is strongly associated with adult health outcomes (Datar, Sturm, & Magnabosco, 2004; Grossman & Kaestner, 1997; Taras & Potts-Datema, 2005). Findings showed that, among adolescents, those with higher achievement levels are less likely to participate in health risk behaviors (CDC, 2010c, 2011a). Conversely, adolescents with poor academic performance (e.g., poor

grades, lower standardized test scores, and reduced educational attainment) are at greater risk for engaging in health risk behaviors, such as early sexual initiation, violence, and physical inactivity (CDC, 2010c, 2011a; National Center for Health Statistics, 2011).

Adolescents are part of a larger environmental context and are influenced by multiple societal institutions including schools, community organizations, religious affiliations, and public health agencies. A collaborative effort between community partners can play a significant role in determining adolescent health and could collectively exert a remarkable impact on the behavior and health outcomes of young people (Catalano, Bergland, et al., 2004a). Coordination and collaboration across multiple disciplines and systems can strengthen efforts to address categorical health outcomes and societal issues. Such joint efforts can promote a more comprehensive approach to addressing adolescent health, create opportunities for healthy development, and bring about significant positive changes that benefit youth (Allensworth, Lewallen, Stevenson, & Katz, 2011; Basch, 2011; Smith, 2003).

Participation in Prosocial Behaviors

Prosocial behavior encompasses positive actions and activities, such as community service participation, that are generally viewed as being beneficial to oneself or others (Penner, Dovidio, Piliavin, & Schroeder 2005). The relationship between prosocial behaviors and health behaviors among adolescents has not been widely studied; despite a growing body of literature that suggests there is an association (Eccles & Barber, 1999; Eisenberg et al., 2007; Kuperminc, Holditch, & Allen, 2001; Schine, 1990). There has been a recent national interest in youth community service participation

or volunteerism; and youth participation has been either encouraged or required by school districts (Benson, Clary, & Scales, 2007). These youth-centered forms of volunteer service may also be referred to as youth development, service learning, community service, and civic engagement, for example (Billig, 2004; Scales & Roehlkepartain, 2004).

A connection between adult volunteerism or community service participation and improved health outcomes has been established (Lam, 2012; Oman, 2007; Penner et al., 2005; Piliavin, 2003; Wilson, 2012; Van Willigen, 2000) and can serve as a basis for continued support of this prosocial behavior among youth. However, the connection between community service participation and physical health, specifically, health risk behaviors, among adolescents has not been fully studied (Benson et al., 2007; Wink & Dillon, 2007). To date, the majority of empirical research studies have focused on indicators or antecedents for youth involvement in community service. Examples include exposure to parental role modeling, gains in student academic achievement, and alignment with religious involvement or beliefs (McLellan & Youniss, 2003; Sundeen & Raskoff, 1994).

Purpose of the Research

Preventing unhealthy adolescent health behaviors continues to be a national public health priority. Previous research studies indicate that a connection between adult volunteerism and improved health outcomes has been established (Lam, 2012; Oman, 2007; Penner et al., 2005; Piliavin, 2003; Wilson, 2012; Van Willigen, 2000). Therefore, it follows that the same rationale could serve as a basis for examining community service

participation and its impact on the health behavior of adolescents. The connection between community service participation and physical health, specifically, health risk behaviors, among adolescents has not been as widely studied (Benson et al., 2007; Feldman & Matjasko, 2005; Wink & Dillon, 2007). The primary focus of empirical research studies have focused on indicators or antecedents for youth involvement in community service, but not necessarily a connection to physical health. Hence, the purpose of this study is to examine the relationship between community service participation and physical health behaviors among Massachusetts high school students.

Significance of the Study

The results of this study will provide greater insight into the strength of community service participation as a protective factor against adolescent health risk behaviors among high school students in the state of Massachusetts. Use of the study results will provide information for the development of interventions or programs that could help improve school-based health education, promotion, and prevention programs for adolescents and support positive youth development. Study findings could be useful in planning and designing school-based health education and risk prevention interventions or programs that would incorporate the components of the *National Health Education Standards* (Joint Committee on National Health Education Standards, 2007). These interventions or programs could ultimately help the state of Massachusetts measure progress and meet adolescent-focused *National Health Objectives for 2020* (U.S. Department of Health and Human Services, 2012a).

Study findings might also provide insights for state health and education policy makers to better understand the beneficial relationship between community service participation and its influence on the health behaviors of Massachusetts high school students. Positive results could perhaps inform a more comprehensive vision for the development of education reform, which may include a community service participation requirement for students. It is imperative that current and future state leaders understand the importance of collaboration between education, public health, and the community to positively impact student success (Allensworth et al., 2011; Basch, 2011; Smith, 2003). After all, the health and well-being of adolescents have a major impact on the overall health of society. Today's youth are tomorrow's leaders.

Delimitations

Delimitations for the study were as follows:

- 1) The study will use cross-sectional data from the 2009 Massachusetts Youth Risk Behavior Survey (MYRBS).
- 2) Generalizations of results are limited to youth enrolled in the Massachusetts school system.
- 3) Causal or cause and effect-type conclusions cannot be made based upon a correlational study.
- 4) The study was concerned with adolescent health risk behaviors in high school (grades 9-12) and does not consider other school age groups.

Assumptions

Assumptions for the study were as follows:

- 1) It is assumed that the 2009 MYRBS data indicate youth health risk behaviors in Massachusetts high school students in an objective manner and that the voluntary responses are the views of the youth participants. Nonresponses to the survey questions would be random in nature.
- 2) It is assumed that the survey respondents would have basic, objective health knowledge in areas to which the risk behaviors referred.
- 3) It is assumed that a majority of questions in the MYRBS covered the youth health risk behaviors that contribute to morbidity, mortality, and social problems occurring during both adolescence and adulthood; and
- 4) Finally, it is assumed that the students had certain health knowledge and certain reading ability to understand and respond to the survey questions.

Computerized Search

In the last quarter of a century, the study of volunteerism has assumed a place at the core of the social sciences. In fact, articles on volunteer work can be found in an ever-expanding range of scholarly journals (Wilson, 2012). As such, there are many academic avenues in which to locate publications, including, a variety of academic disciplines and fields as well as the various terms that are used to discuss the topics of community service/volunteerism, health risk behavior, and adolescents/youth. Upon examination of the literature, the majority of relevant publications were found in the fields of public health, education, psychology, sociology, criminal justice, economics, and business

management. Scholars from several different disciplines and countries have contributed to a body of work that is becoming more theoretically sophisticated and methodologically rigorous. It is to the credit of these scholars that a wide-range of disciplinary approaches can be found and that interdisciplinary research is more common (Wilson, 2012).

The scholarly articles referenced in the literature review were obtained through multiple computer-based searches using ISI Web of Knowledge, PubMed, PSYCHInfo (Ovid), Education Resource Information Center (ERIC), and Google Scholar. Search results yielded a multitude of relevant empirical and non-empirical journal articles. MeSH subject headings and primary key words and descriptors used in these searches included, but were not limited to, combinations of these primary terms: prosocial behavior; altruism; community service; volunteering; volunteerism; volunteer work; civic engagement; community involvement; service learning; young people; students; high school; grades; education; smoking, tobacco; drugs; marijuana; obesity; alcohol; physical activity; prevention; youth; sexual behavior; academic performance; adolescents; academic achievement; after school activities; extracurricular activity; protective factors; health; health risk factors; health risk behaviors; positive youth development; volunteer work; well-being; youth assets; civic responsibility; Social Cognitive Theory; Problem Behavior Theory; and reciprocal determinism. Sample search pairings included “adolescents, volunteering, health behavior;” “adolescents, community service, health risk behavior;” “community service, youth, health;” “prosocial behavior, adolescents, health risk factors;” “youth, volunteer work, well-being;” and “adolescents, volunteering, academic achievement, health.” Search results were narrowed to include only articles that met the following criteria: (a) were relevant, peer-reviewed journal articles; (b) were

available and accessible electronically; (c) were published within the past 25 years; (d) were written in the English language, and (e) referenced study subjects who were school- or college-aged in the United States. After applying these criteria, a total of nearly 200 peer-reviewed articles and books were examined and then selected for inclusion in this literature review.

Definition of Terms

For the purpose of this study, the following terms are defined:

Academic Achievement: Academic achievement includes standardized test scores in subject areas such as reading, math and language arts; grade point averages (GPA); classroom test scores; and other formal assessments (CDC, 2011a).

Adolescence: Adolescence (ages 10 to 19 years) is a period of accelerated growth and change that bridges the complex transition from childhood to young adulthood (MacKay & Duran, 2007).

Community Involvement: Community involvement is generally used to refer to the contributions of an individual or group (of individuals) to the community in which they reside (Stukas & Dunlap, 2002).

Community Service: Community service or volunteerism is work that is performed for no monetary compensation and with the intention of benefiting others (Planty et al., 2006).

Positive Youth Development: Positive youth development is an intentional, pro-social approach that engages youth within their communities, schools, organizations, peer groups, and families in a manner that is productive and constructive; recognizes, utilizes,

and enhances youths' strengths; and promotes positive outcomes for young people by providing opportunities, fostering positive relationships, and furnishing the support needed to build on their leadership strengths (Interagency Working Group on Youth Programs, 2012).

Prosocial Behavior: Prosocial behavior is defined as any voluntary, intentional action that produces a positive or beneficial outcome for the recipient regardless of whether that action is costly to the donor, neutral in its impact, or beneficial (Gruesec, Davidov, & Lundell, 2004).

School Connectedness: School connectedness refers to the belief by students that adults in the school care about their learning and about them as individuals. Researchers have studied the concept under a variety of names such as school bonding, school climate, teacher support, and school engagement (Blum & Libbey, 2004; McNeely & Falci, 2004).

Social Cognitive Theory: Social Cognitive Theory, developed by Dr. Albert Bandura during the 1970s, assumes that people and their environments interact continuously. Therefore, human behavior is explained in terms of a three-way, dynamic, reciprocal theory in which personal factors, environmental influences, and behavior continually interact, so that people not only learn through their own experiences, by also observing the actions of others and the results of their actions (National Cancer Institute, 2005).

Youth Health Behaviors: Youth health behaviors are defined as behaviors related to the leading causes of morbidity and mortality among U.S. adolescents related to six categories of risky health behaviors: 1) behaviors that contribute to unintentional injuries

and violence; 2) tobacco use; 3) alcohol and other drug use; 4) sexual behaviors that contribute to unintentional and STDs, including human immunodeficiency virus (HIV) infections; 5) unhealthy dietary behaviors; and 6) physical inactivity (CDC, 2010c).

CHAPTER 2

LITERATURE REVIEW

Brief Overview of Voluntary Service

In the past two decades, volunteerism has grown by leaps and bounds in the United States. The Edward M. Kennedy Serve America Act of 2009 (Public Law 111-13 [H.R. 1388]), the National and Community Service Trust Act of 1993 (Public Law 103-82 [H.R. 2010]), and the National and Community Service Act of 1990 (Public Law 106-170), demonstrate federal efforts to increase community service participation among American youth as well as adults (Corporation for National and Community Service, 2013). Community service or volunteer service is work that is performed for no monetary compensation and with the intention of benefiting others (Planty et al., 2006).

Volunteerism involves prosocial action in an organizational context, which is planned and that continues for an extended period of time (Penner et al., 2005). And these benefits accrue not only for those who volunteer, but also to the members of the community who receive the services of the volunteers. Successfully offering assistance to another individual is experienced positively, in part, because it relieves the negative feelings caused by witnessing another's problem (Penner et al., 2005). Therefore, Penner and colleagues (2005) found that many decide to volunteer because community service is seen as positive, strongly encouraged, and intended to improve the well-being of not only others but society in general. Community service is not univocal, but includes a variety of

activities that range from participating in the Saturday afternoon car wash for charity, tutoring peers in one's classroom or school, working regular shifts at a soup kitchen, or participating in walkathons to support a health concern (McLellan & Youniss, 2003).

According to the Center for Information and Research on Civic Learning and Engagement (CIRCLE, 2009), volunteer rates have been found to vary tremendously across states and age groups as well as to vary annually. In 2007, the average state volunteer service rates calculated for 16 to 18 year-olds ranged from a high of 48% to a low of 14%. The national volunteer rate among this same age group was 27%. Calculated state volunteer rates for college-age adults (19 to 24 year olds) were found to be generally lower. The national rate of volunteerism for this same age group was 18% in 2007. For those adults aged 25 years or older, state volunteer rates calculated in 2007 ranged from a high of 43% to a low of 19%; while the national rate was 28% on average (CIRCLE, 2009).

Brief Description of Volunteers

Recently, researchers have studied elements that factor into the decision to volunteer (Penner et al., 2005; Piliavin, 2003; Wilson, 2012). There are differences in participation rates for volunteerism based upon race/ethnicity, gender, and SES. Findings from the Bureau of Labor and Statistics indicated that whites had the highest community service participation rate, followed by African Americans, Asians, and Hispanics (Planty et al., 2006).

Race/ethnicity. In the United States, members of ethnic groups (e.g., African Americans, Hispanic/Latinos) historically have been less likely to volunteer than White Americans. According to Penner and colleagues (2005), part of the reason for these ethnic differences could be attributed to social exclusion (process by which individuals or groups are systematically blocked from rights, opportunities, or resources that are normally available to members of society of which they belong) or probably the high levels of racial segregation and inequality experienced by ethnic groups in the United States (Wilson, 2012). The role of race/ethnicity as it relates to education, income and other SES variables and the impact on adult volunteering is not totally clear (Penner et al., 2005). Thus, additional research is warranted.

Gender. Pertaining to gender differences, females are more likely to volunteer than males. They are also less likely to be found in leadership roles. Survey research shows that men and women volunteer for different hours and different types of activities. Regrettably, survey-based research on gender differences does not do a good job of explaining this difference, thus, ethnographic studies are needed (Penner et al., 2005; Wilson, 2012).

Sociodemographics. Additionally, community service participation is strongly associated with education and income. Possible explanations are that better educated, wealthier people have more free time to donate or are better integrated into and involved with their communities (Penner et al., 2005). However, more research is needed since the differences cannot be simply explained by the amount of free time (Wilson, 2012).

Turning to religion, both youth and adults identify with a religious affiliation and being a volunteer. Volunteering for one's church or religious institution is reported as the most common form of volunteering in the United States. Youth and adults who identify more strongly with an organized religion also have a higher prevalence of other types of volunteer activities (Penner et al., 2005).

Key factors. The adult literature on participation in volunteering has identified key factors associated with involvement in community service activities. Studies indicate that increased participation in community service is associated with perceived self-efficacy (a person's belief about their ability to organize and execute courses of action necessary to achieve a goal) and beliefs that community change is desirable and can be achieved (Altman et al., 1998, Catalano, Berglund, et al., 2004a; Catalano, Haggerty, et al., 2004b; Lam, 2012). Factors such as perceived policy control, sense of community, and empowerment have also been associated with adult involvement or engagement in community change initiatives (Altman et al., 1998).

Volunteerism and Youth

Schools by themselves cannot solve the nation's most serious health and social problems regarding young people. However, schools have a critical role to play in partnering with community agencies and organizations to improve the health and well-being of youth. One approach to consider, when attempting to impact the health of American's youth, is student involvement in extracurricular activities, such as community service or volunteerism (Niemi, Hepburn, & Chapman, 2000).

In general, youth who volunteer are more likely to believe that they can make a positive difference in their community. Research suggests that the most important contributors to youth volunteerism are the socialization processes youth are exposed to through their families, schools, and churches. All of these environmental exposures may offer a model or emphasize the importance of helping others; thereby, leading youth to also actively engage in volunteerism or community service-related behaviors (Raskoff & Sundeen, 1998; Sundeen & Raskoff, 2000). Moreover, youth who adopt a practice of volunteerism are more likely to continue the practice into adulthood; at which time the probability of volunteering has been found to increase with age (Penner et al., 2005; Van Willigen, 2000).

Volunteerism or community service participation among high school students, for example, has risen in recent years given the mental, physical, and social benefits afforded to youth who are actively engaged in activities that benefit the community (Altman et al., 1998; Martin & Brown, 2008; Wilson, 2012). Because of the mutual benefits for students and communities, increases in volunteer participation have sparked interest from representatives of schools, churches, governmental agencies, parent groups, and student organizations. Schools have come to see community service as an important developmental asset when it comes to youth development (Niemi et al, 2000; Planty et al., 2006).

The Corporation for National and Community Service (CNCS) (2008) reported that community service activities in America's schools had reached a new peak, with 68% of all K-12 schools offering or recognizing service opportunities for their students. High schools were especially supportive of community service activities, with 86%

recognizing it as important (CNCS, 2008). Recent growth in community service activities has resulted in school systems expecting students to become involved in various forms of service activities and projects. Further, even though, community service participation can be performed by students during non-school hours and does not have to be school affiliated, school systems at both the state and local levels have established community service within academic courses or encouraged community service outside of the classroom (Niemi et al., 2000). In some cases, schools require students to perform community service to pass a class, as a prerequisite for graduation, or simply encourage voluntary service as an extracurricular activity to benefit the community (Benson et al., 2007; Sundeen & Raskoff, 1994). Schools with students participating in recognized community service activities often arranged some of these activities in part (CNCS, 2008). Relatedly, either supporting or providing positive opportunities, such as community service participation, during non-school hours is important as many high school students who volunteer benefit from the experience (Eisenberg et al., 2007).

Community service participation can be beneficial to the development of young people. However, studies on the impact of community service participation usually refer to the influence that volunteerism has had on the recipient of the volunteer service rather than the participant or volunteer (Haski-Leventhal, Ronel, York, & Ben-David, 2008). Another aspect of research examines what influences an adolescent to volunteer. Those studies have found that common indicators for community service participation among youth include parental role modeling, positive academic achievement, and religious involvement/beliefs (McLellan & Youniss, 2003; Sundeen & Raskoff, 1994). Researchers have found that student volunteerism may help reduce several health risk

behaviors, such as drug use, violence, and early pregnancy (Haski-Leventhal et al., 2008). However, limited research has focused specifically on the physical health benefits to youth involved in community service participation as compared to adults (Benson et al., 2007; Wink & Dillon, 2007).

Academic Achievement and Adolescent Health Risk Behaviors

Previous research investigations have suggested that efforts designed to promote academic achievement or success among youth may also help reduce health risk behaviors. In 1990, *Code Blue*, a report from the National Commission on the Role of the School and the Community in Improving Adolescent Health stated, “Efforts to improve school performance that ignore health are ill-conceived, as are health improvement efforts that ignore education” (Bradley & Greene, 2013, p. 9). In 1992, the relationship between substance use and low academic performance was described in the literature as “mutually reinforcing” (Bradley & Greene, 2013). Likewise, a 1997 national task force convened by the Institute of Medicine of the National Academy of Sciences (Bradley & Greene, 2013) concluded the following:

Schooling is the only universal entitlement for children in the United States. The committee believes that students, as a part of this entitlement, should receive the health-related programs and services necessary for them to derive maximum benefit from their education and to enable them to become healthy, productive adults. (p.14)

This quote, due to its importance to the education community, has been cited and referenced in many current studies, policy statements, and compilation documents

when supporting the notion that there is an established relationship between academic achievement and adolescent health (Allensworth et al., 1997; Basch, 2011; Murphey et al., 2004).

Over the last two decades, researchers have found that promoting academic achievement (commonly indicated by academic grades or GPA) among school-aged youth is especially important for adolescents who are susceptible to engaging in risky health behaviors (Allensworth et al., 1997; Hawkins, 1997). These risky health behaviors are consistently related to poor grades, lower standardized test scores, and reduced educational attainment (CDC, 2011a). Prior research results show that the academic success of America's youth is negatively associated with health risk outcomes, including early sexual initiation, violence, and physical inactivity (CDC, 2009a, 2009b, 2009c, 2009d, 2009e, 2011a; National Center for Health Statistics, 2011). Poor nutrition, substance abuse, sedentary behavior, violence, depression, and suicide have also been found to be negatively associated with school performance (Bradley & Greene, 2013; Murray et al., 2007). In contrast, Hawkins (1997) found that promoting academic achievement may reduce the likelihood of engaging in behaviors that threaten students' health and their academic performance. Student academic achievement has been positively related to the avoidance of health risk behaviors, such as cigarette smoking, alcohol, and marijuana use as well as delayed initiation of sex, in prior research studies (Murphey et al., 2004).

Given the empirical findings connecting student academic achievement to health behavior outcomes, the CDC administers the biennial National Youth Risk Behavior Survey (YRBS), which monitors priority health risk behaviors that contribute to the

leading causes of death, disability, and social problems among youth in the United States. The national and state surveys periodically include a question about student academic grades, which is not standard on every YRBS administration. The use of student GPA or grade estimates is a common way that researchers have measured academic achievement in previous research studies about the connection of academic achievement and adolescent health behaviors (Allen, 2005; Bradley & Greene, 2013; Meece, Anderman, & Anderman, 2006). Although the validity of self-reported grades can be questionable, prior research has found that self-reported grades generally predict outcomes similar to that of actual grades or GPAs (Kuncel, Credé, & Thomas, 2005).

To illustrate, the 2009 YRBS asked students about academic grades earned and provided seven response options—“Mostly A’s, Mostly B’s, Mostly C’s, Mostly D’s, Mostly F’s, None of these grades, and Not sure.” Findings from the national sample of adolescent respondents to the 2009 YRBS survey demonstrated that 31% of students received mostly A’s, 40% received mostly B’s, 19% received mostly C’s, 6% received mostly D’s or F’s, and 4% reported receiving none of these grades or not sure (CDC, 2010b). The YRBS survey found a relationship between decreasing student academic achievement and increasing health risk behaviors in many of the measured health behaviors.

Survey findings from the National 2009 YRBS indicated a negative association between academic achievement and six health risk behaviors pertaining to youth (i.e., tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases; behaviors that contribute to unintentional injury and violence; unhealthy dietary behaviors; and physical inactivity) regardless of

gender, race/ethnicity, and grade level (CDC, 2009a, 2009b, 2009c, 2009d, 2009e). These health risk behaviors account for nearly 75% of the mortality and morbidity found in adolescents and young adults, which in many cases is entirely preventable (CDC 2010c).

Academic achievement has been found to be an excellent indicator for the overall well-being of youth as well as a primary predictor and determinant of adult health outcomes (CDC, 2011a; National Center for Health Statistics, 2011). To further illustrate the connection between health outcomes and academic achievement, the federal government acknowledges this connection in the document entitled: *Healthy People 2020*. *Healthy People 2020* is a set of goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States. Released by the U.S. Department of Health and Human Services each decade, *Healthy People 2020* reflects the idea that setting objectives and providing science-based benchmarks to track and monitor progress can motivate and focus action (See Figure 1). The document provides a comprehensive set of 10-year, national goals and objectives for improving the health of all Americans, including youth. *Healthy People 2020* contains 42 topic areas with nearly 600 objectives and 1,200 measures, including those specific to the topic of adolescent health. Given the importance and relevance of the connection between student academic achievement and health behavior, *Healthy People 2020* includes a specific health objective related to the prevention of risky health behaviors and the impact of academic achievement on America's youth (U.S. Department of Health and Human Services, 2012a).

Healthy People 2020 Adolescent Health Objectives

AH-5: Increase educational achievement of adolescents and young adults.

ECBP-2: Increase the proportion of elementary, middle, and senior high schools that provide comprehensive school health education to prevent health problems in the following areas: unintentional injury; violence; suicide; tobacco use and addiction; alcohol or other drug use, unintended pregnancy, HIV/AIDS, and STD infection; unhealthy dietary patterns; and inadequate physical activity.

Figure 1. Healthy People 2020 adolescent health objectives.

The Role of Schools and Student Health

Health and education are integrally related. Both public health and education sectors are striving for the same overall goal—to improve the well-being of our society. According to Smith (2003), the mission of education is to create actively engaged citizens. Relatedly, the mission of public health is to create a healthy population. The purpose of the national education system is to educate individuals to improve the community while public health promotes environmental and social change to improve the lives of individuals. Together they are natural partners. Therefore, when working collectively, public health and education professionals can reduce school absenteeism, improve academic achievement, and increase graduation rates; which in turn will help increase the quality of a healthy life during adolescence and into adulthood (Allensworth et al., 2011; Allensworth et al., 1997; Bradley & Greene, 2013).

CDC's 2009 YRBS data indicate that education levels and health outcomes are highly correlated. For students, unhealthy behaviors and educational challenges may influence each other, or have common root causes. Research indicates that adolescents who do not complete high school are likely to become adults who have higher rates of illness, lower health literacy, unemployment problems, and earlier deaths than those who graduate from high school (Allensworth et al., 2011; Allensworth et al., 1997; Bradley & Greene, 2013). When public health and education sectors collaborate on efforts such as school-based prevention programs, services, and surveillance that address common outcome objectives, improvements in student health and academic achievement are noted (Allensworth et al., 2011; Allensworth et al., 1997; Bradley & Greene, 2013).

Among school-aged youth, academic achievement, health status, and health risk behaviors are related in an interdependent, cyclical fashion. Poor school performance predicts health-compromising behaviors and physical, mental, and emotional problems. This cycle of negative behaviors, established by adolescents during the school years, has profound consequences for the success and productivity of American communities. Schools are a key part of the solution to this challenge of healthy, academically achieving youth (Bradley & Greene, 2013; Murray et al., 2007). Research investigations support the idea that healthy students learn better and much emphasis is placed solely on the role of the school system. However, with the many societal entities in place to shape youth behaviors it is unrealistic to expect that schools can close the gaps in education and eliminate youth health concerns alone. Schools are a place where pivotal growth and development take place and are where more than 50 million youth spend the majority of their day (National Center for Education Statistics, 2011). Nevertheless, other societal

entities should not be overlooked including families, communities, health care systems, legislators, churches/religious organizations, and the media. All of these social institutions could contribute to solving youth health problems and to furthering some aspect of general education and youth development. By systematically addressing academic achievement and health behaviors, schools in cooperation with other societal entities can potentially reduce educational- and health-related disparities (Basch, 2011).

National education and professional organizations recognize the close relationship between public health and education, as well as the need to foster student health and well-being within the educational environment (Basch, 2011; Bradley & Greene, 2013; CDC, 2011a; Smith, 2003). As a matter of fact, a review of primary research by Murray and colleagues (2007), for example, focused on school-based health interventions and their effects on student academic achievement. Given the evidence presented about the interrelationship of risky health behaviors and academic achievement, it is important that education and public health organizations continue to work collaboratively to invest in our nation's youth (Basch, 2011; Bradley & Greene, 2013; Smith, 2003).

The important role of schools in addressing youth health issues has been recognized by leading educational and professional organizations and policy making groups. Basch (2011) reported that policies or guidelines have been identified or proposed to address youth health issues by the following organizations: the National Association of State Boards of Education, National School Boards Association, Council of Chief State School Officers, Association for Supervision and Curriculum Development and their "New Compact to Educate the Whole Child," American Academy of Pediatrics

and National Association of School Nurses, and A Broader, Bolder Approach to Education; and by leading governmental agencies such as the CDC.

Furthermore, the American Association for Health Education (an association of the American Alliance for Health, Physical Education, Recreation and Dance) produced the *2007 National Health Education Standards* (Joint Committee on National Health Education Standards, 2007), which were designed to support schools in meeting the essential goal of enabling students to acquire the knowledge and skills needed to promote personal health (Basch, 2011; Smith, 2003). The education standards are comprised of eight objectives, which include the following: (a) Students will comprehend concepts related to health promotion and disease prevention to enhance health; (b) Students will analyze the influence of family, peers, culture, media, technology, and other factors on health behaviors; (c) Students will demonstrate the ability to access valid information, products, and services to enhance health; (d) Students will demonstrate the ability to use interpersonal communication skills to enhance health and avoid or reduce health risks; (e) Students will demonstrate the ability to use decision-making skills to enhance health; (f) Students will demonstrate the ability to use goal-setting skills to enhance health; (g) Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks; and (h) Students will demonstrate the ability to advocate for personal, family, and community health (American Cancer Society, 2013). The support of these organizations is important when it comes to the health of America's adolescents as it demonstrates that education about health should be an integral part of the school curriculum at all levels of education.

To conclude, the health of students is connected to their academic success, and the academic success of students is connected with their health (CDC, 2009a, 2009b, 2009c, 2009d, 2009e, 2011a; Murphey, et al., 2004; Murray et al., 2007; National Center for Health Statistics, 2011). Scientific reviews have documented that school-based health education programs can have a positive impact on educational outcomes (e.g., academic performance) while also serving to reduce health risk behaviors (Datar, Sturm, & Magnabosco, 2004; Grossman & Kaestner, 1997; Taras & Potts-Datema, 2005). High school students' participation in community service programs is associated with positive educational measures such as school attendance, grade point average, self-esteem, and academic motivation (Balsano, 2005). With greater than 95% of children and adolescents aged 5-17 years are enrolled in the nation's school system (National Center for Education Statistics, 2011), school-based health programs, including community service participation or volunteerism (also referred to as service learning), and policies might be one of the most efficient means to prevent or reduce health risk behaviors among adolescents (Blum, McNeely, & Rinehart, 2002).

Adolescent Health Behaviors: A National Overview

Patterns of behavior adopted during adolescence may have long-term consequences on their health and overall quality of life. To that end, behavioral patterns established during adolescence determine one's potential health status and risk for developing chronic diseases into adulthood and later decades (Committee on Adolescent Health Care Services and Models of Care for Treatment, Prevention, and Healthy Development, National Research Council, & Institute of Medicine, 2009). Several

important public health and social problems either peak or start during adolescence. It has been established that these problems lead to the following health risk behaviors and the resulting consequences: homicide; suicide; motor vehicle crashes (including those caused by drinking and driving); substance use and abuse; smoking; sexually transmitted infections (including HIV; and unplanned teen pregnancies (CDC, 2010c).

The CDC monitors the leading health risk behaviors that contribute to morbidity and mortality using several surveillance systems, including the YRBS. The CDC's YRBS monitors six categories of health risk behaviors: 1) behaviors that contribute to unintentional injuries and violence; 2) tobacco use; 3) alcohol and other drug use; 4) sexual behaviors that contribute to unintentional and STDs, including HIV infections; 5) unhealthy dietary behaviors; and 6) physical inactivity (CDC, 2010c). These six leading health risk behaviors will be discussed in order to provide a broad national overview of adolescent health and the disease burden. However, it should be noted that for the purposes of this study, the health risk behaviors of tobacco, alcohol, marijuana, and hard drug use; sexual behavior; physical activity; BMI-based overweight and obesity; and sedentary behavior will be examined.

Unintentional Injuries and Violence

Injuries and violence are a significant public health issue that is widespread in society. Both unintentional injuries and those caused by acts of violence are among the top 15 killers for Americans of all ages. More specifically, injuries kill more adolescents than all other diseases combined (CDC, 2011c). An injury is defined as "unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical,

electrical, or chemical energy or from the absence of such essentials as heat or oxygen" (U.S. Department of Health and Human Services, 2012a). Injuries are the leading cause of death and disability, for people aged one to 34 years, in the United States (U.S. Department of Health and Human Services, 2012a) of which there are two types: unintentional and intentional. Unintentional injuries are defined as those caused by motor vehicle crashes and fires; while intentional injuries refers to violence and suicide. CDC's YRBS monitors the following adolescent behaviors that contribute to (a) unintentional injuries: "rarely or never wore a bicycle helmet;" "rarely or never wore a seat belt;" rode with a driver who had been drinking alcohol;" "drove when drinking alcohol;" "texted or e-mailed while driving" and those that contribute to (b) intentional injuries: "carried a weapon;" "carried a gun;" "carried a weapon on school property;" threatened or injured with a weapon on school property;" "in a physical fight;" "injured in a physical fight;" "bullied on school property;" "electronically bullied;" "dating violence;" forced to have sexual intercourse;" seriously considered attempting suicide;" "made a suicide plan;" and "attempted suicide" (CDC, 2010c).

Injuries requiring medical attention, or resulting in restricted activity, affect more than 20 million children and adolescents (250 per 1,000 persons) and cost \$17 billion annually for medical treatment (Danseco et al., 2000). The leading causes of death among adolescents (aged 12-19 years) mainly result from injury-related causes—48% from unintentional injuries (including 73% from motor vehicle accidents), 13% from homicides, 11% from suicides, and 28% from other causes—a trend that has tended to increase over the last 10 years (National Center for Health Statistics, 2010). Nevertheless,

injuries are not necessarily accidents and can be prevented by changing the environment, individual behavior, social norms, legislation, and governmental and institutional policy.

Violence is the "threatened or actual use of physical force or power against another person, against oneself, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, or deprivation" (Foege, Rosenberg, & Mercy, 1995). In 2010, for example, nearly 5,000 young people aged 10 to 24 years were victims of homicide, making youth violence the second leading cause of death for this age group (CDC, 2011c). Among homicide victims, the majority of deaths were male (86%) compared to female (14%). Overall, the prevalence of violence in adolescents decreased in the last decade. However, a continuing concern is the extent to which violence disproportionately affects young African American males.

Suicide (taking one's own life) is a public health problem that affects adolescents. For youth between the ages of 10 to 24 years, suicide is the third leading cause of death. It results in approximately 4,600 lives lost each year. The top three methods used in suicides of young people include firearm (45%), suffocation (40%), and poisoning (8%) (CDC, 2013).

Deaths from youth suicide are only part of the problem. In 2011, CDC's national YRBS found that 16% of students reported seriously considering suicide, 13% reported creating a plan, and 8% reporting trying to take their own life in the 12 months preceding the survey (CDC, 2012e). Each year, approximately 157,000 youth between the ages of 10 and 24 years receive medical care for self-inflicted injuries at emergency departments across the United States (CDC, 2013). Thus, more young people survive suicide attempts than actually die.

Suicide affects all youth, but some groups are at higher risk than others. Boys are more likely than girls to die from suicide. Girls, however, are more likely to report attempting suicide than boys. Cultural variations in suicide rates also exist, with Native American/Alaskan Native youth having the highest rates of suicide-related fatalities. The 2011 national YRBS survey found that Hispanic youth were more likely to report attempting suicide than their Black and White, non-Hispanic peers (CDC, 2012e).

Tobacco Use

According to CDC (2012d), smoking and smokeless tobacco use are initiated and established primarily during adolescence. Each day in the United States, approximately 3,800 young people less than 18 years of age smoke their first cigarette. It is estimated that 1,000 youth under age 18 years become daily cigarette smokers (Substance Abuse and Mental Health Services Administration, 2010). Upon examining current youth tobacco use patterns, several key findings are noted. More than 3.6 million adolescents under the age of 18 are current smokers (CDC, 2012d; U.S. Department of Health and Human Services, 2012b). Nearly one quarter (18%) of all high school students are current smokers (20 % of males, 16% of females) (CDC, 2011b). Comparatively, if adolescents do not currently smoke tobacco, almost one fifth are current smokers by the time they leave high school (University of Michigan, Monitoring the Future Study, 2011).

Nearly all tobacco use begins in childhood and adolescence. As a matter of fact, 88% of adult cigarette smokers who smoke daily, report that they started smoking by the age of 18 years (U.S. Department of Health and Human Services, 2012b). Use of multiple tobacco products, including cigarettes, cigars, and smokeless tobacco, is common among

young people. Findings from the 2009 YRBS indicated that nationwide 26% of students had reported current tobacco use, current smokeless tobacco use or current cigar use (CDC, 2010c). While there is progress being made in reducing tobacco use among youth, there are far too many youth still using tobacco. The newer evidence suggests that peer influence is strongly associated with initiation and perhaps a trajectory of heavier use (Bernat et al., 2008). Additional factors that are predictive of youth tobacco use include: gender, impulsivity and risk-taking, and emotional influence (U.S. Department of Health and Human Services, 2012b).

Smoking cigarettes during adolescence frequently precedes the use of smokeless tobacco and other types of drugs. Tobacco use by youth and young adults causes both immediate and long-term damage. One of the most serious health effects is nicotine addiction, which prolongs tobacco use and can lead to severe health consequences (U.S. Department of Health and Human Services, 2012b). Smoking tobacco during adolescence also produces significant health problems, including respiratory illnesses, decreased physical fitness, and potential effects on lung growth and maximum lung function (U.S. Department of Health and Human Services, 1994).

In addition to cigarette smoking, cigars and smokeless tobacco products (including chewing tobacco and snuff) are used by adolescents. Nearly one in five White adolescent males (12-17 years old) uses smokeless tobacco and 1 in 10 young adults (18-25 years old) smokes cigars (U.S. Department of Health and Human Services, 2012b). The prevalence of cigar smoking is somewhat higher than that of smokeless tobacco use, overall. According to the 2009 National Youth Tobacco Survey (NYTS) –15% of high school males and 7% of high school females reported the use of cigars in the past 30

days. The prevalence of current cigar smoking is highest among White (12%) and Hispanic (12%) high school students, followed by students of other race/ethnicities (8%) and Blacks (7%) (U.S. Department of Health and Human Services, 2012b).

Cigarette smoking and use of smokeless tobacco among adolescents has fluctuated over the past 25 years. After years of steady progress, declines in tobacco use by youth have slowed for cigarette smoking and stalled for smokeless tobacco (CDC, 2012d). Nevertheless, tobacco use is the single most preventable cause of disease, disability, and death in the United States. Each year, an estimated 443,000 people die prematurely from smoking or exposure to secondhand smoke. Since more than 80% of adult smokers begin smoking before age 18 years (CDC, 2012d), prevention efforts in early adolescence are paramount to decreasing the number of adult smokers and preventable deaths due to tobacco use (CDC, 2012d).

Alcohol and Other Drug Use

Substance use by American young people is a rapidly changing phenomenon, requiring frequent assessments and reassessments. Since the mid-1960s, when substance use burgeoned in the general youth population, illicit drug use has remained a major concern for the nation. Three widely used substances—tobacco, alcohol, and illicit drugs—are the leading causes of morbidity and mortality during adolescence as well as later in life. More than half of new illicit drug users begin with marijuana (Substance Abuse and Mental Health Services Administration, 2012b). The next most common illicit drug used by youth is prescription pain relievers, followed by inhalants, which are most common among younger teens (Substance Abuse and Mental Health Services

Administration, 2012b). Results from the 2011 national YRBS survey of high school students indicated that 39% had drunk alcohol, 23% had used marijuana, and 18% had smoked cigarettes during the 30 days before the survey (CDC, 2012e).

Nationally, alcohol and other drug use among adolescents remain a major public health problem. Substance use (taking of alcohol or drug) and abuse (any harmful use of alcohol or drugs) increase the risk for injuries, violence, HIV infection, and other diseases (U.S. Department of Health and Human Services, 2007). Alcohol is the most commonly used and abused drug among persons less than 21 years of age in the United States (U.S. Department of Health and Human Services, 2007). Alcohol use and alcohol-related consequences are responsible for more than 4,700 annual deaths among underage youth (CDC, 2012a). Although drinking by persons under the age of 21 is illegal, young people aged 12 to 20 years consume 11% of all alcohol in the United States (Office of Juvenile Justice and Delinquency Prevention, 2005). On average, underage drinkers consume more drinks per drinking occasion than adult drinkers (National Research Council and Institute of Medicine, 2004). In 2010, there were approximately 189,000 emergency rooms visits by persons under age 21 for injuries and other conditions related to alcohol consumption (Substance Abuse and Mental Health Services Administration, 2012a).

In the United States, there are multiple agencies that collect data related to alcohol use and patterns of consumption in adolescents. These data are collected yearly and for differing purposes and aggregation of multiple datasets poses a challenge as the questions are not all framed the same. Therefore, study findings must be discussed separately. The 2011 YRBS (Eaton et al., 2012) found that among high school students (grades 9 to 12), during the past 30 days, 39% drank some amount of alcohol; 22% binge drank; 8% drove

after drinking alcohol; and 24% rode with a driver who had been drinking alcohol—all negative health behaviors that can impact the lives of youth. The National Survey on Drug Use and Health (2011) reported that 1 in 4 youth (25%) aged 12 to 20 years drank alcohol and 16% reported binge drinking (a pattern of drinking that brings a person's blood alcohol concentration (BAC) to 0.08 grams or above) (Substance Abuse and Mental Health Services Administration, 2012b). Additionally, the 2011 Monitoring the Future (MTF) Survey reported that 33% of 8th graders and 70% of 12th graders had tried alcohol, and 13% of 8th graders and 40% of 12th graders drank during the past month (Johnston et al., 2011).

Adolescent drug use is associated with a variety of negative consequences, including increased risk of serious drug use later in life, school failure, and poor judgment which may increase risk for accidents, violence, unplanned and unsafe sex, and suicide among youth. Illicit drug use among teenagers has risen largely due to the increasing popularity of marijuana. According to the National Institute on Drug Abuse (2012), marijuana use by adolescents declined from the late 1990s until the mid-to-late 2000s, but recently has been on the rise. In 2011, 7% of 8th graders, 18% of 10th graders, and 23% of 12th graders used marijuana in the past month, up from 6%, 14%, and 19% respectively in 2007. Daily use has also increased among adolescents in that 7% of 12th graders now use marijuana every day, compared to 5% in the mid-2000s (National Institute on Drug Abuse, 2012). Clearly, marijuana use among adolescents is growing. It is suggested that this growth in marijuana use is based upon a combination of factors—less societal stigma surrounding the drug; decriminalization of the drug; ease of access to acquire the drug; decreased perceptions of the drug being harmful; rapid erosion of anti-

marijuana attitudes in our society; and the legalization of medical marijuana in nearly 20 states and the District of Columbia (Johnston et al., 2014; U.S. Department of Justice, 2014).

Monitoring the Future (MTF) is a longitudinal study of American adolescents, college students, and adults through age 50 years. It is conducted annually by the University of Michigan's Institute for Social Research and is supported by the National Institute on Drug Abuse. Every year, the MTF survey measures drug, alcohol, and tobacco use and related attitudes among 8th, 10th, and 12th graders. Recent findings suggest that nonmedical use of prescription and over-the-counter medications remain a significant part of the teen drug problem. In 2011, 15% of high school seniors used a prescription drug non-medically in the past year. Data for specific drugs show that the most commonly abused prescription drugs by teens are the pain relievers Vicodin, OxyContin, and the stimulant Adderall. It is believed that two factors have led to the increase in abuse. First, the availability of prescription drugs is increasing from many sources, including the family medicine cabinet, the Internet, and doctors. Second, many adolescents believe that prescription drugs are safer to take than others like "street drugs" (National Institute on Drug Abuse, 2012).

However, positive trends in the past several years have occurred, including reduced use of inhalants and less use of cocaine, especially crack cocaine. The use of inhalants by younger teens have dropped significantly between 2010 and 2011, from 8% of 8th graders and 6% of 10th graders to 7% and 5%, respectively. Use of crack cocaine by 12th graders during the past year dropped from 1.4% to 1.0%. Other hard drugs, such as heroin, methamphetamine, and hallucinogens, have been found to be holding fairly

steady (National Institute on Drug Abuse, 2012). Despite these decreases, ecstasy (MDMA) use seems to be having a resurgence among older teens. Past-month use of ecstasy by 12th graders, for example, increased from 1.4% in 2010 to 2.3% in 2011. This increase may reflect the fact that, like marijuana, ecstasy is no longer considered as dangerous as it once was by adolescents. From 2005 to 2011, the percentage of 12th graders who said that trying ecstasy once or twice would be risky dropped from 60% to 49% (National Institute on Drug Abuse, 2012).

Overall, findings from the 2011 MTF survey are generally positive. Illicit drug use has decreased from the peaks of the last several decades. Survey results currently demonstrate that the use of most illicit drugs among the nation's teenagers are either holding steady from last year or showing modest declines.

Sexual Behaviors that Contribute to Unintentional Pregnancy, STDs, and HIV Infections

Many young people engage in sexual risk behaviors that can result in unintended health outcomes. According to CDC's 2009 national YRBS, many adolescents begin having sexual intercourse at early ages: 46% of high school students have had sexual intercourse and 6% reported first sexual intercourse before the age of 13 years (CDC, 2010c). Nationwide, 4.5 of every 10 students reported ever having sexual intercourse in 2009. The 2009 national YRBS indicated that the prevalence of having ever had sexual intercourse was higher among Black (65%) and Hispanic (49%) students as compared to White (42%) students; higher among Black female (58%) and White female (45%) students as compared to Hispanic female (45%) students; and higher among Black male (72%) and Hispanic male (53%) students as compared to White male (40%) students

(CDC, 2010c). Overall, the prevalence of having ever had sexual intercourse among students was higher among Black males (72%) and Hispanic males (53%) when compared to Black females (58%) and Hispanic females (45%), respectively (CDC, 2010c). In sum, minority youth are at significantly greater risk than White students when it comes to engaging in sexual activity.

Although 15-24 year-olds represent only one quarter of the sexually active population, they account for nearly half (9.1 million) of the 19 million new cases of sexually transmitted infections (STIs) each year. Human papillomavirus (HPV) infections account for about half of STIs diagnosed among 15–24-year-olds each year. HPV is extremely common, often asymptomatic and generally harmless. However, certain types, if left undetected and untreated, can lead to cervical cancer. Trichomoniasis and chlamydia are the next most common STI diagnoses among 15-24 year olds; combined, they account for slightly more than one-third of diagnoses each year. Genital herpes and gonorrhea together account for about 12% of diagnoses. HIV, syphilis and hepatitis B account for less than 1% of diagnoses (Guttmacher Institute, 2013).

The HIV risk for most youth begins when they start having sex or using alcohol or drugs; both actions which can lead to risky behaviors. High school students, who were surveyed in the national 2011YRBS (CDC, 2012c), reported that 47% had ever had sexual intercourse. The students also reported that 34% had had sexual intercourse during the previous 3 months. Further, of those who were sexually active, 40% did not use a condom the last time they had sex; 77% did not use birth control pills or Depo-Provera to prevent pregnancy the last time they had sex; and 15% had had sex with four or more people during their life. These sexual risk behaviors place adolescents at risk for

contracting HIV infection, other STDs, and unintended pregnancy. More specifically, about 1 in 4 (26%) of all new HIV infections is among youth aged 13 to 24 years; with about 4 in 5 of these infections occurring in males (CDC, 2012c). Nearly 60% of new infections in youth occur in African Americans, about 20% in Hispanics/Latinos, and about 20% in Whites (CDC, 2012c). Likewise, almost half of the 19 million new STDs each year are among young people aged 15–24 years (Weinstock, Berman, & Cates, 2004).

In sum, CDC's 2009 YRBS showed that 34% of students reported having sexual intercourse during the three months before the survey and 40% did not use a condom (CDC, 2010c). Young persons (aged 13-29 years) accounted for 39% of all new HIV infections in the United States (CDC, 2010c). Relatedly, the national teen pregnancy rate continues to be one of the highest in the developed world. More than 400,000 teen girls aged 15-19 years gave birth in 2009 (Hamilton, Martin, & Ventura, 2010). For comparison's sake, young persons aged 15-29 years comprised 21% of the U.S. population in 2010. These figures document the changes over the last several years in sexual activity among adolescents. To reduce sexual risk behaviors and related health problems among youth, schools and other youth-serving organizations can help young people (a) support behaviors that reduce their risk for HIV, other STDs, and unintended pregnancy and (b) adopt lifelong, pro-health attitudes and behaviors.

Unhealthy Dietary Behaviors

Healthy eating is associated with reduced risk for many diseases, including several of the leading causes of death: heart disease, cancer, stroke, and diabetes (Dietary

Guidelines Advisory Committee, 2010). Healthy eating in childhood and adolescence is important for proper growth and development and can prevent health problems such as obesity, dental caries, iron deficiency, and osteoporosis (CDC, 1998; Dietary Guidelines Advisory Committee, 2010). However, most American youth do not meet the recommendations for eating 2½ cups to 6½ cups of fruits and vegetables each day and do not eat the minimum recommended amounts of whole grains (2–3 ounces each day), for example.

Previous research has showed that empty calories from added sugars and solid fats contribute to 40% of the daily caloric intake for children and adolescents aged 2-18 years, which affects the overall quality of their diets (Reedy & Krebs-Smith, 2010). Approximately half of these empty calories come from six sources: soda; fruit drinks; dairy desserts; grain desserts; pizza; and whole milk (Reedy & Krebs-Smith, 2010). Additionally, adolescents drink more full-calorie soda per day than milk. For example, males aged 12-19 years drink an average of 22 ounces of full-calorie soda per day, more than twice their intake of fluid milk (10 ounces); and females drink an average of 14 ounces of full-calorie soda and only 6 ounces of fluid milk (Forshee, Anderson, & Storey, 2006).

Childhood nutrition can have an impact on the long-term health of adults. Diets that are high in saturated fats and sugar, plus low in fruits and vegetables constitute a significant risk factor for adolescent health problems. Research studies have showed that healthy lifestyle habits, including healthy eating and physical activity, can lower the risk of becoming obese and developing related diseases (e.g., heart disease, cancer, stroke, and diabetes) (Daniels et al. 2005).

Physical Inactivity

Regular physical activity during childhood and adolescence yields benefits. Participating in regular physical activity has been found to: improve strength and endurance; help build healthy bones and muscles; help control weight; reduces anxiety and stress; increase self-esteem; and may improve blood pressure and cholesterol levels (U.S. Department of Health and Human Services, 2008a). In contrast, physical inactivity increases one's risk for dying prematurely, dying of heart disease, and developing illnesses, such as diabetes, colorectal cancer, and high blood pressure (U.S. Department of Health and Human Services, 2008a). In the 2008 *Physical Activity Guidelines for Americans*, the U.S. Department of Health and Human Services recommends that children and adolescents engage in ≥ 60 min of physical activity daily. Most of the ≥ 60 min/day should be either moderate- or vigorous-intensity aerobic physical activity. The guidelines indicate that children and adolescents (aged 6-17 years) should participate in vigorous intensity, muscle-strengthening, and bone-strengthening activities at least three days of the week (CDC, 2011d; U.S. Department of Health and Human Services, 2008b). Regular physical activity is important for optimal health. Being physically active during one's lifetime can control weight; reduce the risk of cardiovascular disease; reduce the risk for type 2 diabetes and metabolic syndrome; reduce the risk of some cancers; strengthen bones and muscles; improve mental health and mood; and increase chances of living longer (U.S. Department of Health and Human Services, 2008b).

In the YRBS national survey, 77% of children aged 9-13 years reported participating in free-time physical activity during the previous 7 days (CDC, 2010a). In 2011, only 29% of high school students had participated in at least 60 min per day of

physical activity on each of the seven days before the survey (CDC, 2012e). Further, fourteen percent of high school students had not participated in 60 min or more of any kind of physical activity on any day during the seven days before the survey (CDC, 2012e). Schools play a particularly critical role by establishing a safe and supportive environment with policies and practices that support healthy behaviors. Schools also provide opportunities for students to learn about and practice healthy eating and physical activity behaviors (CDC, 2011d). However, participation in physical activity declines as youth age and leave the school system (CDC, 2012e).

Overweight and obesity occur when fewer calories are expended; including calories burned through physical activity rather than are taken in through food and beverages. Physical activity and caloric intake both must be considered when trying to control body weight. During the past several decades, obesity rates for all population groups—regardless of age, sex, race, ethnicity, SES, education level, or geographic region—have increased markedly (CDC, 2011b).

Obesity has more than doubled in children and tripled in adolescents in the past 30 years. Healthy eating and regular physical activity play a substantial role in preventing chronic diseases, including heart disease, cancer, and stroke, which are the three leading causes of death among adults aged >18 years. Poor diet and physical inactivity among adolescents can lead to an increased risk for certain chronic health conditions, including high blood pressure, type 2 diabetes, and obesity. Engaging children and adolescents in healthy eating and regular physical activity can lower their risk for obesity and related chronic diseases (CDC, 2011b, 2011d).

National Health Guidelines Related to Adolescent Obesity Prevention

It has been well understood that physical inactivity and eating too many calories can lead to obesity in adolescents. Childhood obesity can be harmful and should be prevented. Body mass index (BMI) is a measure used to determine childhood overweight and obesity. It is calculated using a child's weight and height. BMI does not measure body fat directly, but it is a reasonable indicator of body fatness for most children and adolescents. The CDC and the American Academy of Pediatrics (AAP) recommend the use of BMI to screen for overweight and obesity in children and adolescents beginning at 2 years old. Adolescents are considered to be at “healthy weight” status when they are in the 5th percentile to less than the 85th percentile (CDC, 2014).

Physical activity is essential for health at any age. National guidelines for Americans recommend that children and adolescents engage in at least 60 min of physical activity daily (U.S. Department of Health and Human Services, 2008). According to CDC's YRBS, 35% of national high school students watched television for three or more hours on an average school day on average. Research indicates that there is an interaction effect of television watching and physical activity in terms of obesity among children and adolescents.

The AAP recommends no more than two hours of quality television/videos daily. However, many children and adolescents exceed the number of recommended hours (AAP, 2013). According to the AAP (2013), today's children and adolescents are spending an average of nearly 8 hr a day on entertainment media, including televisions, computers, phones and other electronic devices. As a result, many negative associations of electronic media use have been reported as relating to reduced physical activity,

overweight, and unhealthy dietary behavior (Gorely, Marshall, & Biddle, 2004). Consequently, studies that follow children over long periods of time have consistently found that the more TV children watch, the more likely they are to gain excess weight (Boone, Gordon-Larsen, Adair, & Popkin, 2007; Danner, 2008; Henderson, 2007; Rey-Lopez, Vicente-Rodriguez, Biosca, & Moreno, 2008). Despite recommendations to promote regular physical activity and reduce television viewing, childhood obesity continues to be a serious health issue in the United States.

Youth and Health Risk Behavior in Massachusetts: MYRBS Survey Results

Nationally, adolescents face significant health problems, many of which are directly attributable to engaging in risky health behaviors. By way of comparison, following is an overview of the health status of adolescents in the state of Massachusetts, when examining the risky health behaviors that contribute to the leading causes of adult mortality and morbidity. The report, *Health and Risk Behaviors of Massachusetts Youth, 2009*, presents key indicators of the behavioral and health risks reported by middle school and high school youth who participated in the Massachusetts Youth Risk Behavior Survey (MYRBS). After examining survey responses by middle school and high school students, the Massachusetts Department of Elementary and Secondary Education (2011b) reported these key findings:

1. Several adolescent risk behaviors, especially those related to substance use, have decreased since 2003. Compared to 2003, a lower percentage of high school students in 2009 were drinking alcohol before age 13 (25% vs. 17%), ever smoking cigarettes (53% vs. 43%) or using methamphetamines (6% vs. 3%) or having been

offered, sold or given drugs on school property in the past year (32% vs. 26%). Also, fewer students reported ever having been diagnosed with a sexually transmitted disease (2% vs. 6%).

2. A few behaviors have become worse in recent years. From 2003 to 2009, past month smokeless tobacco use increased from 4% vs. 6%, and drinking the recommended three glasses of milk per day decreased (19% to 13%). From 2007 to 2009, fewer high school athletes reported using mouth guards (57% to 47%).

3. Many risk behaviors begin in middle school. It is clear that many young adolescents engage in risky behaviors well before they reach the 9th grade. In 2009, some middle school students reported ever smoking cigarettes (15%), ever drinking alcohol (28%), ever using marijuana (9%), or injuring themselves on purpose (15%).

4. Many important risk areas remain unchanged since 2003. Among high school students, there have been no statistically significant changes in the percent reporting any lifetime sexual intercourse (currently 46%), condom use at last intercourse among sexually active youth (35%), or ever having been/gotten someone pregnant (6%). Also unchanged are high school students' reports of being in a physical fight at school (9%), riding with a driver who had been drinking (27%), or making a suicide attempt in the past year (7%).

5. Indicators of nutrition, physical activity, and weight among Massachusetts youth have not shown improvement since 2003. Currently, 27% of middle school students and 25% of high school students are either overweight or obese according to their own self-reported height and weight. At the high school level, only 14% ate the recommended five servings of fruits and vegetables and only 36% ate breakfast every

day—two behaviors associated with lower levels of overweight. Further, only one third of middle school (33%) and high school (34%) students engaged in the recommended 60 min of moderate to vigorous physical activity on at least 5 days of the week. Only 58% of high school students attended physical education class in an average week.

6. More students report factors that help to protect against risky behavior. Factors such as academic achievement, close relationships with parents or caregivers, a belief that school staff are supportive, and involvement in community service have been recognized as potential protective factors among adolescents because of the association with lower rates of risk behaviors. Compared to 2003, significantly more students in 2009 reported that they felt there was a teacher in their school they could talk to about a problem (64% vs. 71%) or there was a parent or adult family member they could talk to about things important to them (78% vs. 83%).

Overall, results show continued improvements in many important areas, such as some indicators of substance use, including tobacco, alcohol and drug use. These improvements attest to the success of efforts by schools, community programs, healthcare workers, and families to foster the healthy development of youth in Massachusetts. In spite of clear successes, there are still behaviors in which improvements have not yet been observed; most notably, sexual risk behaviors, nutrition and physical activity, all areas that warrant continued concern and attention.

Adolescent Health Behaviors: A Summary

Based upon previous research, it has been widely established that adolescent health behaviors are a major public health problem. Moreover, multiple sources have

documented that the top health issues facing today's adolescents include obesity; tobacco, alcohol, and drug use; sexual activity; and emotional health, for instance (CDC, 2012e, 2011b, 2010c; MacKay & Duran, 2007; Martin & Brown, 2008; National Center for Health Statistics, 2011; National Research Council and Institute of Medicine, 2009). Nonetheless, many high school students continue to engage in unhealthy behaviors that place them at risk and are harmful or dangerous to their health and welfare. These behavioral patterns established during adolescence, impact adult health status and increase the potential for developing chronic diseases (National Research Council and Institute of Medicine, 2009).

Prosocial Behavior and Volunteerism: The Connection

Prosocial behavior is defined as any voluntary, proactive and reactive responses to the needs of others that serve to promote the welfare of others regardless of whether the response is costly to the donor, neutral in its impact, or beneficial (Eisenberg et al., 2007; Grusec et al., 2004; Hastings et al., 2007). A range of affective and behavioral elements comprise the scope of prosocial development in adolescents, including empathy, sympathy, compassion, concern, comforting, helping, sharing, cooperating, volunteering, and donating (Hastings et al., 2007). Prosocial behavior represents a broad category of positive actions, such as community service, that are defined by some significant segment of society and/or one's social group as generally being beneficial to others (Penner et al., 2005).

Most analyses of the factors, resulting in the development of prosocial behavior, indicate that the behavior increases with age through infancy, preschool, childhood, and

into adolescence (Eisenberg et al., 2007). Gender is also one of the most consistent correlates of prosocial behavior. Across multiple studies, girls (and women) have been found to be more prosocial than their male counterparts. However, the rationale for gender differences is not clear cut. Researchers find that it is difficult to determine the degree to which the gender differences reflect a true difference, since differences could be based upon sex-role stereotypes, moral reasoning, empathy/sympathy responses, age, or other factors (Eisenberg et al., 2007).

Further understanding of prosocial development in adolescents begins with research on parents as agents of youth growth and development. Psychologists have found that children are more prosocial when they have formed secure attachment relationships with their parents. Children are thought to become more prosocial over time, especially when exposed to strong parental ties. Parents may foster children's prosocial behavior by modeling concern for the needs of others and promoting an attitude of care and concern for the general welfare of others. Moreover, children are more likely to behave in prosocial ways toward family members, peers, and others, when parents model the behavior and also when they receive positive support and reinforcement for their actions (Eisenberg et al., 2007; Hastings et al., 2007).

Research findings indicate that predictors of engagement in community service activities depend upon whether another person in the family, such as a parent or caregiver has previously participated in community service (Penner et al., 2005). In other words, the best predictor of youth participation in community service is whether or not youth are exposed to parents who model volunteering behavior. To demonstrate, McLellan and Youniss (2003) found that parents who volunteer have children who volunteer. Parents

provide opportunities for adolescents to witness the direct modeling effects of volunteering behavior (Lam, 2012). Further findings suggest that adolescents whose parents participate in high levels of community involvement are more likely to be involved in the community like their parents. Parents may have a direct influence on the prosocial values and behavior of adolescents (Eisenberg et al., 2007).

Since adolescence is an important stage of youth's overall social and emotional development as they transition to adulthood, prior evidence suggests that during this time, youth develop a sense of purpose and intentions to accomplish tasks that are not only meaningful to them, but to others within their surroundings (Damon, Menon, & Bronk, 2003). This focus on youth's potential and moral development as well as interactions with the communities in which they live is generally referred to as positive youth development (Benson et al., 2006). Positive youth development emphasizes the positive attributes of youth and focuses on working to develop the strengths and assets in youth to promote prosocial behaviors (e.g., volunteering to benefit others) (Eisenberg et al., 2007; Penner et al., 2005).

Prosocial behavior has been shown to influence youth engagement in extracurricular activities, such as community service. Researchers find that adolescents are more prosocial when they come from stable and economically secure homes; have close and friendly relationships with their siblings; have kind, caring, helpful, and considerate peers and friends; and obtain experience taking care of the needs of others through volunteer and community service activities (Hastings et al., 2007). Furthermore, past studies have connected participation in extracurricular activities to overall positive youth development, better educational outcomes (or academic achievement), and fewer

problem behaviors, such as drinking (Eccles & Barber, 1999). A longitudinal study by Reinders and Youniss (2006) found that adolescents who were required to perform community service as a part of their school requirements later reported that they were more likely to engage in prosocial behaviors, which in turn increased their likelihood of volunteering in the future. Hence, taking part in activities, such as volunteering to collect food or clothing for those in need, has the potential to further youth development and contribute to their health and well-being into adulthood (Eccles et al., 2003; Mahoney & Cairns, 1997).

Positive Youth Development

Positive youth development is an intentional, prosocial approach that engages youth within their communities, schools, organizations, peer groups, and families in a manner that is both productive and constructive. Previous research has shown that youth grow in a variety of ways as they reach adulthood and evidence exists that engaging in prosocial behaviors or extracurricular activities during adolescence is beneficial (Eccles & Barber, 1999; Eisenberg et al., 2007; Fredricks & Eccles, 2006; Penner et al., 2005). Youth participation in extracurricular activities can lead to overall positive youth development, better educational outcomes, and fewer problem behaviors (Eccles et al., 2003; Mahoney & Cairns, 1997).

According to Scales and colleagues (2000) researchers know that healthy adolescence means more than being free of health risks and health-related problems. Healthy adolescence should be defined broadly in terms of positive youth development. Moreover, healthy adolescence would involve positive developmental outcomes such as

adoption of prosocial behavior (e.g., volunteering) and could have the potential to yield adolescents who are seen as thriving when contrasted with the consequences of adopting or engaging in health risk behaviors (Catalano, Berglund, et al., 2004a; Larson, 2006).

Research by Mahoney et al. (2005) suggests that positive youth development includes the potential for a decreased risk of developing problem behaviors in the present and an increased likelihood for healthy behaviors in the future. This holistic view connects health education and health promotion—two necessary components for adolescents to become healthy and functioning adults who contribute to society (Catalano, Haggerty, et al., 2004b). Likewise, adding community service participation as another component might help to further the ways adolescents can be productive and take their place as members of society. However, a better understanding of the mechanisms through which different risk and protective factors influence youth development, health promotion, and health prevention of problem behaviors is needed.

Youth Community Involvement Through Volunteerism

Community involvement refers to the contributions of an individual or group to benefit their community of residence. Similar to volunteerism, community involvement activities may include unpaid work activities traditionally engaged in by volunteers, involve civic participation such as working with nonprofit organizations, serving on community boards and committees, or organizing block clubs (Stukas & Dunlap, 2002). One opportunity for community involvement is the presentation of events or activities in different environments that encourage youth to participate in prosocial actions, such as volunteerism. Community service opportunities could be encouraged and offered in the

school environment, for instance. With over 95% of youth (aged 5 to 17 years) enrolled in school, this institution has the greatest influence on an adolescent's life outside of the family (Smith, 2003). The health and well-being of children has been connected to their academic performance. Because the relationship between health and education is reciprocal, it is important that schools address health issues (Smith, 2003).

During adolescence, it is important that youth have the opportunity to interact with positive-oriented peers and for involvement in roles in which they can contribute to the elevation of their family, school, neighborhood, peers, or the larger community (Catalano, Berglund, et al., 2004a). Youth participating in volunteer activities were found to have better grades in school and an ambition for higher education, higher self-confidence, inner motivation to accomplish tasks, and less behavior problems (Haski-Leventhal et al., 2008; Kuperminc, Holditch, & Allen, 2001). In addition to personal gains, youth volunteers were found to have more positive attitudes toward society. More specifically, volunteers acquired social responsibility, had more knowledge about others in their community, improved their skills, and were more capable of decision making than non-volunteers (Haski-Leventhal et al., 2008; Kuperminc et al., 2001). It is suggested that community service or volunteerism pinpoints an element of personal character that not only fosters positive youth development, but has positive societal value (Murphey et al., 2004; Planty et al., 2006).

It has been established that volunteerism and involvement in community-minded activities have been associated with the development of prosocial characteristics in children and youths (Pancer & Pratt, 1999). Pratt, Hunsberger, Pancer, and Alisat (2003) found that youths who described their "ideal" selves as kind and caring were more

involved in community activities that focused on helping others. A reciprocal relationship appears evident based on prior research. Therefore, positive community involvement has the potential to improve the development of prosocial behaviors in adolescents.

Community Service Participation Among Youth: Is It A Protective Factor?

Adult Volunteerism

Empirical studies have found that adult participation in volunteer activities have a positive effect on psychological health (Penner et al., 2005; Piliavin, 2003; Wilson, 2012), physical health (Lam, 2012; Penner et al., 2005; Piliavin, 2003; Wilson, 2012), and longevity (Piliavin, 2003; Van Willigen, 2000). Volunteerism benefits have been measured by several different studies and each time the benefits were positively correlated with life satisfaction and perceived physical health (Penner et al., 2005), especially among older adults (Van Willigen, 2000). Further, these prior research studies, concerning the beneficial aspects of community service participation on adult health, have led to the development of the current study pertaining to adolescent health.

Community service participation tends to emanate from adolescent membership in social networks, which generally involve family and friends. Social clubs, churches, political organizations, and others should be considered as sources that expose youth to opportunities for volunteering as well as social traditions and ideologies; which are essential to the development of prosocial behavior (i.e., any voluntary, proactive and reactive responses to the needs of others) (McLellan & Youniss, 2003). As such, volunteerism or community service participation among high school students has been on the rise in recent years (Altman et al., 1998; Martin & Brown, 2008; Niemi et al., 2000).

Yet, to date, there remains a paucity of studies and consequently limited evidence connecting community service participation to the prevention or reduction of health risk behaviors among adolescents.

Youth Volunteerism and Health Risk Behaviors

Adolescent behaviors are influenced by a variety of factors, which can determine or influence individual behaviors. Risk factors are conditions or variables associated with a lower likelihood of positive outcomes and a higher likelihood of negative or socially desirable outcomes. Protective factors have the reverse effect—they enhance the likelihood of positive outcomes and lessen the likelihood of negative consequences from exposure to risk (Jessor, Turbin, & Costa, 1998).

The prevalence of health behavior problems and consequences among youth is well documented. Adolescents can engage in multiple types of health risk behaviors that can lead to negative consequences. Common examples include homicide; suicide; motor vehicle crashes (including those caused by drinking and driving); substance use and abuse; smoking; and unprotected sexual behavior, resulting in sexually transmitted infections (including HIV) and unplanned teen pregnancies (CDC, 2010c). Health risk behaviors contribute to the leading causes of morbidity and mortality among youth and are often initiated and established during adolescence (CDC, 2010c).

Governmental efforts to increase community service participation among American youth and adults have been demonstrated by the passage of The Edward M. Kennedy Serve America Act of 2009, the National and Community Service Trust Act of 1993, and the National and Community Service Act of 1990. Likely, due to the

introduction of the community service acts of the 1990s, there have been several studies over the last few years documenting the mental and physical health benefits of volunteerism among adults (Penner et al., 2005; Piliavin, 2003; Wilson, 2012), physical health (Lam, 2012; Penner et al., 2005; Piliavin, 2003), and longevity (Piliavin, 2003; Wilson, 2012; Van Willigen, 2000). In contrast, the literature assessing the relationship between volunteerism or community service participation among youth and any potential improvement in their mental or physical health resulting from community service participation is not well documented. Few past studies have suggested strong connections involving youth health risk behaviors and the connection to prosocial youth behaviors or involvement, such as community service (Duncan et al., 2002). Following is a selected synthesis of previous research studies pertaining to youth, health risk behaviors, and community service.

An early study by Landers and Landers (1978) documented a relationship between adolescents' extracurricular activities and adult educational attainment, occupation, and income even after controlling for social class and ability. This study also documented a protective association between extracurricular activity participation (e.g., volunteering) and involvement in delinquent and other risky behaviors (Eccles & Barber, 1999). This landmark study led the way for other researchers to examine the benefits or costs of how adolescents spend their discretionary time.

During the 1980s and 1990s, there was promising evidence that volunteerism may contribute to reducing health risks among adolescents (e.g., teenage pregnancy, substance use, school failure) (Kuperminc et al., 2001). An early study by Schine (1990) indicated a strong program of community service, structured to give adolescents an opportunity to

participate and to experience the empowerment that comes with making a difference, can be a positive first step toward addressing some critical health issues (O'Donnell et al., 1999). Another study, by Allen, Philiber, Herrling, and Kuperminic (1997), randomly assigned nearly 700 high students at 25 national sites to either a control condition or to participate in a “developmentally focused” intervention that included volunteer service as a primary component. Compared to non-volunteers, adolescent volunteers had significantly lower rates of teen pregnancy and school dropout rates nine months later. In examining protective effects of prosocial behavior, Jessor et al. (1998) measured prosocial behavior as involvement in volunteer work, family activities, and school clubs (other than sports). This study found that while factors that directly impact health-related behaviors have a stronger effect, activities like prosocial involvement—activities that do not have a direct impact on health-related behaviors—also play an important role in health. Relatedly, in Eccles and Barber's (1999) investigation, prosocial behavior was measured by participation in volunteer work and/or church attendance. These researchers studied the associations pertaining to present and future risk behaviors. Analyses found that students indicating involvement in one of these prosocial behaviors in the 10th grade, compared to those who did not, reported lower levels of alcohol and drug use in a two year follow up.

In the early 2000s, several studies provided evidence that high school students who engaged in community service were less likely to smoke marijuana, abuse alcohol, perform poorly in school, become pregnant, commit delinquent acts, or be arrested (Haski-Leventhal et al., 2008; Kuperminc et al., 2001; Lam, 2012; Penner et al., 2005). To investigate the relationship of prosocial activities to health-related behaviors and

outcomes among youth, the Search Institute conducted studies based upon responses to a 156-item survey. The studies, collectively involving more than 1 million students in grades 6 through 12 in more than 1,000 communities, presented correlations indicating that adolescents who report higher levels of developmental assets (a set of social and psychological strengths that function to enhance health outcomes for children and adolescents (Scales et al., 2000) are less likely to engage in risky behaviors, such as early sexual intercourse and alcohol and other drug use, and more likely to achieve positive outcomes (e.g., volunteering, school success). The relationships between the developmental assets and youth outcomes have been shown to be consistently strong, whereas, involvement in the prosocial activity of volunteering is modestly related to health indicators (Scales et al., 2000).

Another study by Murphey et al. (2004) examined the relationship of volunteerism, along with five other developmental assets (e.g., participation in non-sports-related extracurricular activities) and several health risk behaviors (e.g., use of alcohol, cigarettes, and marijuana), and health promotion behaviors (e.g., seat belt use, exercise) for nearly 31,000 Vermont youth. Study findings were mixed. Results indicated that (a) the total number of assets was negatively related to the risk behaviors and positively related to health promotional activities and (b) volunteering was the single most important asset for exercise and was not significantly related to the health risk behaviors of alcohol use, sexual activity, and contemplating suicide (Benson et al., 2007).

Benson and colleagues (2007) reviewed research that focused on prosocial behaviors (e.g., community service, church attendance) in studies with large adolescent samples. This research documented that prosocial behavior was moderately and

positively associated with indicators of thriving, such as academic or school success, helping friends/neighbors, valuing diversity, maintaining good health and exhibiting leadership, for example. In addition, prosocial behavior seems to be connected, but not significantly associated with risky health behaviors, such as alcohol or illicit drug use, violence, school problems, and gambling. It should be noted, however, that the concept of adolescent health can be thought of in several ways and the measure of volunteer activity may be approximate; both of which could impact the outcome of research investigations (Schwartz, Keyl, Marcum, & Bode, 2008).

This collective body of work indicates that adolescent participation in extracurricular activities, such as community service, may be an important factor in protecting youth from involvement in health risk behaviors. Further, the literature suggests that participation in these types of prosocial activities can be associated with positive academic, psychosocial, and behavioral outcomes (Feldman & Matjasko, 2005). Such research demonstrates the potential of youth volunteerism as a viable intervention to prevent risky health behaviors among adolescents.

Although previous research has found associations between participation in extracurricular activities and academic outcomes, for instance, no other research has found an association specifically between community service participation and health risk behaviors among youth. In previous studies involving adolescents and volunteerism, the emphasis has been mainly on two potential outcomes: (a) preventing negative behaviors and (b) intellectual, psychological, social growth and development. In the first case, the focus has been on how volunteering can prevent adolescents from engaging in health behaviors (e.g., sexual activity, drugs, drinking) that are detrimental, both in the present

and future. In the second case, the focus has been on how volunteering can teach positive attributes such as citizenship, problem-solving, moral reasoning, and empathy; or how it can assist adolescents to feel better about themselves (Piliavin, 2003).

To date, most of the studies examining the relationship between community service and health among adults have shown positive associations. Thus, exploring the relationship between the intersection of community service participation and adolescent health risk behaviors has merit. Community service participation may serve as a protective factor against negative health behaviors. Relating youth participation in community service activities to improved health behavior outcomes is a relationship that has not been fully explored and warrants further empirical study.

Youth Volunteerism and An Overarching Theoretical Framework

According to Eisenberg and colleagues (2007), early psychology research on the socialization of children's prosocial behavior was built upon the basis of what is now known as Social Cognitive Theory (SCT) (Bandura, 1977b). Researchers have highlighted the importance of perceived self-efficacy in terms of it playing a role in the causal processes determining the likelihood of prosocial behavior resulting in youth (Eisenberg et al., 2007). Prosocial behavior depends on the perceived ability to help others which is an element difficult to measure in a controlled laboratory environment. Moreover, prosocial interactions taking place in the larger societal context and assessing a natural interaction in a confined or contrived setting may not be reflective of intended human interactions (Eisenberg et al., 2007).

It is therefore essential to foster prosocial behavior and values during adolescence. Activities that are likely to expose adolescents to messages about the importance of altruistic actions generally provide psychological motivation to act or participate. As such, prosocial behavior encourages the healthy development of youth, resulting in the practice of volunteering to address community or social problems to benefit society as a whole (Lam, 2012). This research study intends to utilize the tenets of SCT and Problem Behavior Theory (PBT) as frameworks for conceptualizing and understanding the relationship between community service participation and youth health risk behaviors.

Given the nature of this study examining the association between community service participation and adolescent health risk behaviors, the diagram below (see Figure 2) uses Bandura's SCT as an organizational structure to broadly show the main study variables selected from the 2009 MYRBS dataset and how they might interplay with each other. A conceptual framework is being utilized because associations between antisocial behaviors (also referred to as health risk behaviors, such as smoking, drinking, etc.) and prosocial behaviors (i.e., volunteerism/community service) in youth are not yet completely understood or well defined at the theoretical level (Duncan et al., 2002). Research over the last several decades has attempted to address and expand upon interpretations of prior study findings and theoretical developments and applications. Because conflicting findings and limitations of the studies have hindered interpretation (Duncan et al., 2002), additional theories and concepts that may contribute to the conceptual understanding of the association of prosocial behaviors, such as volunteerism, and risky youth health behaviors (or antisocial behaviors) are being explored.

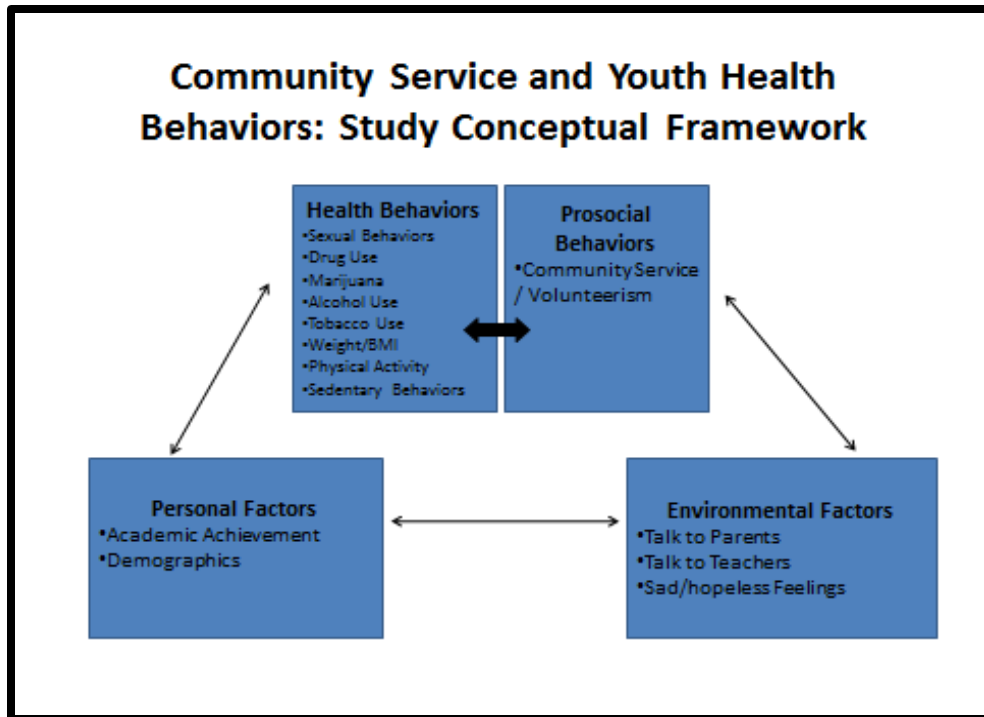


Figure 2. Study Conceptual Framework.

Based upon findings from previous research studies, which help establish that youth community service participation may reduce risky health behaviors (Haski-Leventhal et al., 2008; Kuperminc et al., 2001; Lam, 2012; Penner et al., 2005), it is hypothesized that the main study variables—community service participation and adolescent health risk behaviors—are associated. Thus, the SCT was used as the conceptual framework for the study. With regards to the study, the following should be noted: (a) the conceptual framework is for explanatory purposes in that it might help to understand why the association may exist; (b) the conceptual framework is for organizational purposes because it does not include all the constructs of the SCT (as they are not directly applicable to the study); and (c) the association directionality may be

difficult to determine because all of the variables needed for testing are not present within the existing secondary dataset. Furthermore, the study data are cross-sectional, so the constructs are all measured at the same point in time and given the type of data it is not possible to determine causality.

Understanding Adolescent Health Behavior: A Theoretical Framework

There are many theoretical explanations that help with understanding an individual's participation in behaviors that affect health outcomes. Behavioral and social science theories are essential in understanding why individuals engage in risky health behaviors and why they adopt health protective behaviors. As standard practice, behavioral theory has become an integral part of the efforts to improve public health by providing a framework for studying and understanding how individuals behave and change (National Cancer Institute, 2005). Health behavior can be explained using many factors, categorized as either internal (e.g., beliefs, attitudes, skills) or external (e.g., social environment, social support). These factors help make sense of individual health behavior, suggest ways to achieve behavior change, or provide guidance for health promotion practice (Baranowski, Perry, & Parcel, 2002).

Behavioral and Social Science Theories

Health risk behaviors for adolescents do not occur in isolation from one another. They tend to co-occur among adolescent populations (Ozer, Park, Paul, Brindis, & Irwin, 2003). For instance, prior research has established associations between adolescent substance use and other risky health behaviors. Specifically, the use of alcohol and illicit drugs is associated with sexual behaviors that place adolescents at increased risk for

unintended pregnancy and sexually transmitted diseases, including HIV. Substance use is also related to unintentional injury (Ozer et al., 2003).

Relationships among various youth problems have been well established. By comparison, the literature assessing the relationship between prosocial behaviors in youth (e.g., volunteering) and antisocial behaviors (e.g., substance use) has been documented; but, is far from clear (Duncan et al., 2002). To begin to understand how community service participation and youth health risk behaviors may be related, one must first understand the theoretical and behavioral underpinnings related to adolescents, community service, and health risk behaviors. For that reason, this study will be conceptually, guided by constructs derived from the SCT and PBT.

Social Cognitive Theory

SCT provides a structure for understanding, predicting, and changing human behavior. According to Baranowski et al. (2002), SCT addresses both the psychosocial dynamics underlying health behavior and the methods of promoting behavior change. The cognitive aspects of the theory emphasize what individuals think and how those thoughts affect behavior. Individual behavior is explained as a triadic, dynamic, and reciprocal model, in which behaviors (e.g., prosocial and health behaviors), personal factors (e.g., demographics, academic achievement, knowledge and attitudes), and environmental factors (e.g., school environment) all interact (see Figure 3) (Maibach & Cotton, 1995). The fundamental premise of the SCT theory, developed by Albert Bandura, is that psychological and environmental factors combine and influence the development of specific behaviors (Bandura, 1977a, 1977b, 1989, 2001; Bandura &

Walters, 1963; Glanz, Rimer, & Lewis, 2002). As such, the foundation of Bandura's (1986) conception of reciprocal determinism is based upon the view that (a) personal factors in the form of cognition, affect, and biological events, (b) behavior, and (c) environmental influences create interactions that result in a dynamic interplay (Pajares & Schunk, 2001).

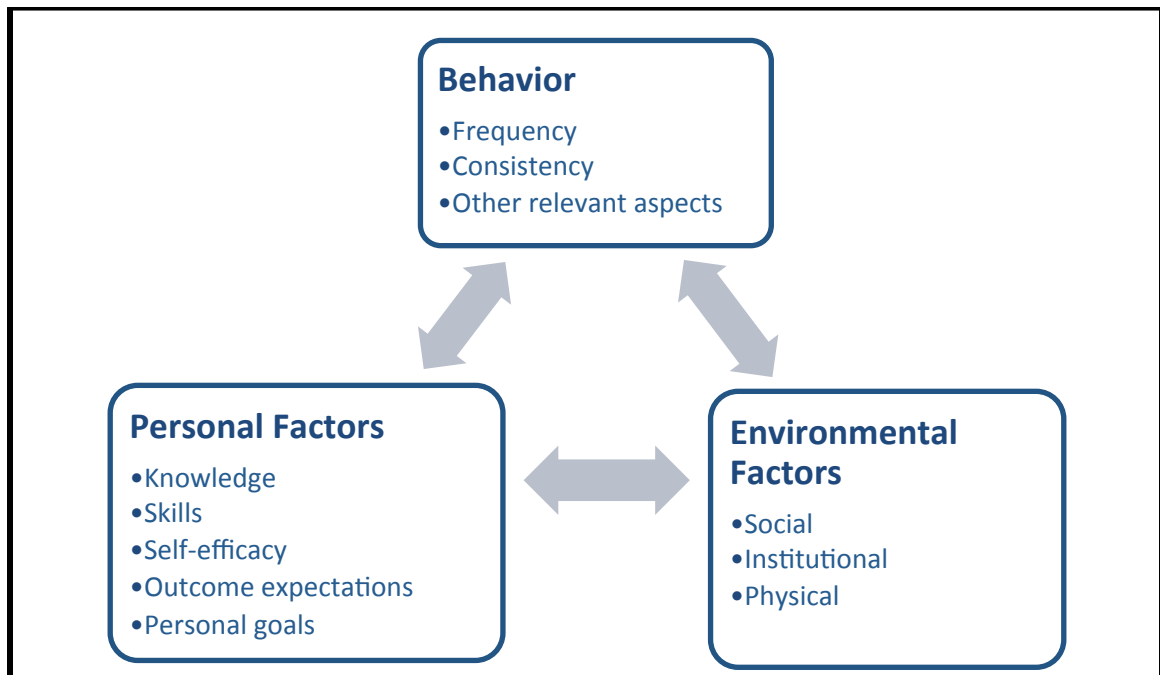


Figure 3. The reciprocal determination of behavior, person, and environment.

Reciprocal Determinism Explained

Reciprocal determinism shows that there is a constant dynamic interaction among an individual's behavior, the environment within which the behavior occurs, and characteristics of the individual performing the behavior (Baranowski, 1990; Baranowski et al., 2002). Within the theoretical construct, the first interaction between the individual

and the behavior involves the influences of an individual's thoughts on actions and vice versa. The second interaction between the individual and the environment involves human beliefs and cognitive competencies that are developed and modified by social influences and structures within the environment. The third interaction, between the environment and behavior, involves an individual's behavior determining the aspects of their environment and in turn their behavior is modified by that environment.

The three factors of environment, person, and behavior are constantly influencing each other. Behavior is not simply the result of the environment and the person, just as the environment is not simply the result of the person and behavior (Baranowski et al., 2002). The environment is multifaceted and can provide opportunities to model or promote prosocial behavior. These opportunities for prosocial involvement provide events and activities across different social environments that encourage youth to participate in prosocial behaviors (Catalano, Berglund, et al., 2004a).

Adolescent Health and Prosocial Behaviors

SCT explains how individuals acquire and maintain certain behavioral patterns, while also providing the basis for intervention strategies (Bandura, 1997b). Evaluating behavioral change depends on the three factors of environment, person, and behavior. An individual's behavior is uniquely determined by these factors.

Environmental factors. Environment refers to the factors that can affect a person's behavior and are categorized in social, institutional, and physical environments. Social environment includes family members, friends, classmates, and colleagues.

Institutional environment includes schools, organizations, employers, churches or governments, for example. Physical environment is the size of a room, the ambient temperature or the availability of certain foods. Environment and situation provide the framework for understanding behavior (Baranowski, 1990; Parraga, 1990).

Environments are complex. The environment provides the social and physical situation within which the person must function (Baranowski et al., 2002). There is evidence that all levels of the social environment directly affect the behavior of young people (Baranowski, 1990). Youth behaviors are influenced at the individual, peer, family, school, community, and societal levels. Health outcomes for adolescents are grounded in their social environments and frequently mediated by their behaviors. In fact, one such behavior is the initiation of smoking. Nearly, all tobacco use begins in adolescence. This is the time in life of great vulnerability to social influences. Peer influence is paramount during this time, since youth with greater numbers of peers who smoke are more likely to begin smoking themselves (CDC, 2012d).

Environments include opportunities for observational learning. Observational learning (or modeling) occurs when a person watches the actions of another person and the reinforcements that that person receives in order to learn a new behavior or change a current behavior (Bandura, 1997). Family and friends are often the pathways by which people come to volunteer. By hearing stories from their parents and being brought along as adolescents, individuals often develop and accept that they too will often volunteer (Penner et al., 2005). As noted previously by Penner and colleagues (2005), people are more likely to volunteer and commit more strongly to community service activities if their parents have also been volunteers. The behavior of role models, such as parents and

peers, and the consequences of that behavior influence youth behavior (Bandura, 1977a, 1977b), including health behaviors such as substance use.

Behavioral factors. Behavior may result from characteristics of a particular person or the environment (Baranowski et al., 2002). Prosocial behavior covers the broad range of actions intended to benefit one or more people other than oneself—actions such as helping, comforting, sharing, and cooperation (Penner et al., 2005). One such action is that of volunteerism or community service, which involves prosocial behavioral actions in an organizational context (working for a charity or service organization) that are important, planned, and that continue for an extended period of time (Penner et al., 2005). As noted above by Penner and colleagues (2005), the best predictor of youth participation in community service is whether or not youth are exposed to parents who model volunteering behavior. McLellan and Youniss (2003) also found that parents who volunteer have children who volunteer (Lam, 2012).

Volunteerism by adolescents should reduce the incidence of dangerous and antisocial behaviors and increase community participation or involvement as adults, which is consistent with the assumption that volunteering behavior has a positive impact on youth development (Penner et al., 2005). Relatedly, these actions increase volunteers' self-efficacy, which in turn allows them to have confidence in their ability to take action (e.g., prosocial behavior, community service) and overcome barriers (e.g., risky health behaviors; poor academic performance) (Bandura, 1997, 1995). Previous research, based upon well-controlled, cross-sectional and longitudinal studies, has demonstrated that high school students who engage in community service or volunteering are less likely to

smoke marijuana, abuse alcohol, perform poorly in school, become pregnant, commit delinquent acts or become arrested (Lam, 2012).

Personal factors. Personal factors can be described as an individual's capabilities to self-determine or self-regulate behavior, analyze and apply experiences, and learn by observing others (Baranowski et al., 2002). These personal factors are unique as they are inherent to the individual and manifest as an individual difference in a given environment (Perry & Jessor, 1985). The primary personal factors found to be predictive of health behaviors among youth include knowledge levels, values, functional meanings, self-image, and self-efficacy (Baranowski et al., 2002).

Self-efficacy is probably the single most important determinant in terms of influencing personal behavior. Self-efficacy is the confidence to engage (or not engage) in a specific health behavior (Bandura, 1977a, 1977b, 1997). If an individual has a great sense of self-efficacy, they can use their capabilities to change behaviors even when faced with obstacles or challenges (Bandura, et al., 2001; Baranowski et al., 2002; National Cancer Institute, 2005). The construct of self-efficacy has been evaluated in relation to a number of health-related behaviors, such as physical activity, sexual behavior, and substance use (Baranowski et al., 2002; Catalano, Berglund, et al., 2004a; Pajares & Schunk, 2001).

Summary

Behavior is viewed as being influenced by a combination of personal and outside factors and events (Schiavo, 2007). Given the complexities of SCT (Bandura, 1977a,

1977b) behavior can best be explained as the result of three reciprocal factors: behavior, personal factors, and environment; otherwise known as the concept of reciprocal determinism (Baranowski et al., 2002; Schiavo, 2007). SCT proposes that each of these factors interacts with each other, thus, changing one of the factors changes all of them. In sum, reciprocal determinism was chosen as the main construct within SCT that would best represent the complex relationship between prosocial behavior (i.e., community service participation) and health risk behaviors pertaining to youth as well as potentially offer an opportunity to influence or change negative or antisocial adolescent health behaviors.

Problem Behavior Theory

A number of behavioral theories have been developed to explain the common factors that underlie the connection between youth and risky health behaviors. One such theory is Problem Behavior Theory (PBT) (Jessor & Jessor, 1977), a social-psychological framework developed to account for variation in adolescent involvement in a variety of problem behaviors as well as positive/prosocial (or conventional) behaviors. The historical foundation of PBT was developed initially from Merton's (1957) concept of anomie and Rotter's (1954) social learning theory (Jessor & Jessor, 1977). Today, PBT attempts to explain behavioral outcomes such as substance use and risky sexual behaviors. The theory includes both concepts of *problem behaviors and conventional behaviors*. Problem behaviors are behaviors that have been defined as a source of concern or undesirable by the norms of society. Examples include drinking, smoking, drug use, and sexual activity. In contrast, positive behaviors include volunteering, church

attendance, involvement in school activities, and other prosocial behaviors that are socially approved and normatively expected as appropriate for adolescents (Donovan et al., 1991; Jessor, 1991). The fundamental premise of the theory is that all behavior is the result of person-environment interaction, which is similar to SCT's reciprocal determinism.

Three Systems of Explanatory Domains

According to Jessor and Jessor (1977), the PBT theoretical framework encompasses three major domains or systems of explanatory variables: 1) the behavior system, 2) the personality system, and 3) the perceived environment system (Jessor, 1991; Jessor et al., 1998). Within the framework, the domains can be described as follows:

Behavior system. The behavior system includes both problem and positive or conventional behaviors. Problem behavior is defined as behavior that departs from the social and legal norms of society, such as underage drinking, risky and impaired driving, violating the rights of others, irresponsible sexual activity, and the use of illicit drugs. In contrast, conventional behaviors are those that are socially and normatively expected and accepted, such as church attendance and involvement in school activities (Donovan et al., 1991).

Personality system. The personality system includes a patterned and interrelated set of relatively enduring, sociocognitive variables—values, expectations, beliefs,

attitudes, and orientations toward self and society—that reflect social learning and developmental experience (Jessor, 1991; Jessor & Jessor, 1977). The system involves a composite of psychological factors and includes the (a) motivational-instigation structure, which is determined by value placed on achievement and independence; (b) the personal belief structure, which is related to an individual's concept of self, relative to society; and (c) personal control structure, which gives an individual the rationale for not participating in problem behaviors. Problem behavior, in the personality domain, is often related to low achievement, focus on independence, adoption of values that are counter to social expectations, and low self-esteem (Donovan et al., 1991) as well as greater social criticism, higher alienation, lower self-esteem, greater attitudinal tolerance of deviance, and lower religiosity (Jessor, 1991; Jessor & Jessor, 1977).

Perceived environment. The concepts that constitute the perceived environment system include social controls, models, and support. The perceived environment system includes two structures: (a) distal, inclusive of an individual's relationship to his or her support network, and (b) proximal, which deals with an individual's environment but in relationship to available models of behavior. Problem behavior in the environment is often related to high peer approval; peer models; low parental control, support, and influence; and incompatibility between parental and peer expectations (Donovan et al., 1991). Perceived environment variables are also distinguished on the basis of the directness or conceptual closeness of their relations to problem behavior. Problem behavior proneness in the perceived environment system includes low parental disapproval of problem behavior, high peer approval of problem behavior, high peer

models for problem behavior, low parental controls and support, low peer controls, low compatibility between parent and peer expectations, and low parent (relative to peer) influence (Jessor, 1991; Jessor & Jessor, 1977).

Each of the three systems or domains are composed of explanatory variables that serve either as instigations for engaging in problem behavior or controls against involvement in problem behavior. PBT holds that when confrontation occurs between the personality system and perceived environment system, behavioral problems take place. Consequently, it is the balance between instigations and controls that determines the degree of proneness for problem behavior within each system (Jessor, 1991; Jessor et al., 1991).

Dynamic Interaction: Personality, Environmental System, and Behavior

PBT states that problem behaviors should be seen as purposeful, meaningful, goal-oriented, and functional rather than random. Hence, research studies have showed the applicability of PBT when examining the problem behaviors within adolescent populations (Donovan et al., 1991; Perry & Jessor, 1985). Previous research findings demonstrate that problem (or antisocial) behaviors in adolescence can be instrumental in gaining peer acceptance and respect; establishing autonomy from parents; rejecting the norms and values of conventional authority; coping with anxiety, frustration and the anticipation of failure; confirming for self and significant others certain attributes of identity; and affirming maturity and making a transition out of childhood and toward a more adult status (Jessor, 1991).

Further, adolescent “psychosocial proneness” or the interaction among an adolescent’s personality, environmental system, and behavior, is a useful predictor of engagement in problem behavior (Donovan et al., 1991). This concept of “psychosocial proneness” suggests that adolescents who engage in one type of risk behavior are also more likely to engage in other types. The concept of proneness in specifying the likelihood of the occurrence of problem behavior is essentially synonymous with the concept of risk. Another principle of this theory, social factors, includes the roles that peers, parents, and schools play in the life of an adolescent. Consistent with Problem Behavior Theory, this principle also assumes that risk-taking behaviors may evolve over time and fulfill youth developmental needs such as autonomy, mastery, and intimacy (Donovan et al., 1991).

Concepts of Protective and Risk Factors

Within the last two decades, Jessor (1991) restructured PBT to include the concepts of protective and risk factors. Protective factors provide the controls to prevent or mitigate problem behaviors, while risk factors increase or support problem behaviors. Therefore, although risk factors can play a strong role in the determination of adolescent problem behaviors, their influence is moderated by protective factors. According to Jessor (1998), risk factors that contribute to the formation of most adolescent problem behaviors are low self-esteem, low success expectations, a sense of alienation and desperation (personality system); orientation toward antisocial friends and parents as well as peers with problem behavior (perceived environment); and disconnection with conventional institutions and the lack of academic success in school (behavior system).

Protective factors are described as positive relationships with adults, supportive family relationships, and exposure to conventional friends' models of behavior; good school results; involvement in prosocial groups and social activities; positive attitude toward school; religious faith; and volunteer activity (Jessor, 1998). According to Jessor (1992), it is useful to think of protective factors as operating within each of the three conceptual domains or systems. Protective factors can be exemplified in three ways: 1) by peer models of positive/prosocial behaviors and strict social controls in the perceived environment; 2) by placing a high value on academic achievement, health, and intolerance of deviance in the personality domain; and 3) by supporting involvement in positive/prosocial behavior, such as church attendance and school clubs, and participation in community service in the behavior domain. Protective factors such as these should serve to lessen, counter or balance the impact and efforts of risk factors that often befall adolescents (Jessor, 1992).

Jessor (1998) has found that protective factors can interact with risk factors in such a way that when protection is high, the risk factors have little impact on problem behavior. Conversely, when there is no protection, a linear relationship exists between risk factors and problem behaviors. To illustrate, Penner and colleagues (2005) found that there is evidence for the impact of prosocial behaviors, such as adolescent volunteering behavior, on dangerous and antisocial behaviors (Duncan et al., 2002). These results highlight the importance of promoting protective factors through the development of youth interventions or programs rather than adopting more conventional approaches.

Jessor (1998) describes adolescent problem behavior as being derived from three interactive systems or domains of psychosocial influence: the behavior system, the

personality system, and the perceived environment. And, since problem behaviors are connected, isolating alcohol and drug use or sexual behaviors as independent actions rather than considering the whole behavior system along with associated personality and perceived environment, would be counterproductive to any attempts of improving adolescent health behavior.

Protective factors (e.g., positive relationships with adults or friends, good grades, positive school attitudes, involvement in prosocial activities, religious faith) diminish the influence of factors that put adolescents at risk (e.g., low self-esteem, alienation, negative peers, lack of community involvement, lack of school success). Previous research findings support the moderating function of protective factors to offset risk behaviors among adolescents (Jessor, 1992; Jessor et al., 1998). Therefore, PBT shows that problem behaviors are interrelated and that any single problem behavior, such as smoking and alcohol or drug use, must be viewed within the complex system of adaptive and problem behavior, personality, and perceived environment.

Summary

SCT, used in concert with PBT, provides a useful framework for conceptualizing volunteerism and health risk behaviors among adolescents and considering the effects on youth development. PBT explains the connection between youth and risky health behaviors. SCT explains human behavior as an interaction of personal factors, behavior, and the environment. Using the constructs of these two behavior theories allows for exploration and understanding in regard to adolescent functioning and behavior adoption.

Making the Case for the Study

Contemporary explanations of the complexities of human behavior are increasingly predicated on the dynamic interaction and balance of personal factors with environmental factors. Thus, research and theory suggest the possibility of a synergistic relationship between adolescence, community service participation, and health risk behaviors. Longitudinal studies support the role of community service participation in reducing problem behaviors, including those related to physical health. To illustrate, prior research by Eccles and Barber (1999) found that 10th grade students who were involved in prosocial activities (defined as “attending church and/or participating in volunteer and community service-type activities”) had better academic performance and reported less involvement in problem behaviors in 12th grade (Kuperminc et al., 2001).

Psychosocial risk and protective factors have been shown to account for substantial amounts of variance in adolescent problem behaviors. Further, the associations between risk and protection to problem behavior are robust with respect to multiple outcomes (e.g., drinking, drug use, delinquent behavior) for both males and females, for younger and older adolescents, across groups with varying socioeconomic status, and across race/ethnicity subgroups (Jessor et al., 2003). Conceptually, protective factors decrease the likelihood of underage drinking, for example. These psychosocial protective factors can influence teen alcohol use by sustaining an orientation to conventional institutions, such as school and church, and through participation in prosocial activities (e.g., community service, volunteer work) that are incompatible with problem health behavior. According to Jessor and colleagues (1991), protective factors are conceptually distinct from risk factors, and do not merely constitute the absence of

risk. Protective factors have their own direct effects on behavior and can moderate the relationship between risk factors and behavior (Jessor et al., 1991).

Based upon existing research, there is a likelihood of an association between adolescent prosocial behavior (i.e., community service/volunteerism) and risky health behaviors (Donovan et al., 1991; Eccles & Barber, 1999; Jessor, 1992; Murphey et al., 2004; Penner et al., 2005). Moreover, it is hypothesized that these prosocial behaviors and health risk behaviors among youth are negatively related. And so, if prosocial behaviors such as volunteer work and academic achievement are highly related to adolescent health behaviors, it may be possible to promote them and achieve the general development of socially valuable behaviors in youth. Then, if high levels of engagement in these desirable behaviors are negatively related to problem behaviors such as risky health behaviors like smoking, it may be possible to prevent undesirable problems by promoting these desirable behaviors to youth. However, the precise pathways by which youth community service participation relates to or influences health risk behaviors among adolescents have yet to be illuminated in a single, coherent theoretical or empirically tested model (Marzana, Marta, & Pozzi, 2012). Thus, further study is merited.

CHAPTER 3

RESEARCH METHODOLOGY

This cross-sectional study analyzed data from the 2009 Massachusetts Youth Risk Behavior Survey (MYRBS), a self-administered questionnaire, conducted in classrooms during a regular high school class period. This chapter presents a detailed description of the research methodology and procedures used in the study. More specifically, the survey instrument, data sources, and data analyses are described. The study was submitted to the Institutional Review Board (IRB) for Human Use at the University of Alabama at Birmingham. Permission was secured prior to the data analysis (See Appendix A).

The purpose of this study was to examine the relationship between community service participation (e.g., helping others, volunteer work) and health risk behaviors (e.g., tobacco, alcohol, and drug use, sedentary behaviors) among adolescents in Massachusetts public high schools. Research questions were developed based on this notion. This study examined the following primary research questions:

- 1) What relationship, if any, exists between youth community service participation and health risk behaviors among adolescents?
- 2) To what extent is youth community service participation related to adolescent health risk behaviors?
- 3) Does youth community service participation serve as a protective factor against adolescent health risk behaviors?

The research questions were tested in a manner that controlled for demographic or individual characteristics, school environment, and student academic achievement.

Description of the Youth Risk Behavior Surveillance System and Survey

National Youth Risk Behavior Surveillance System Overview

The national school-based Youth Risk Behavior Surveillance System (YRBSS) is the only surveillance system designed to monitor a wide range of priority health risk behaviors among high school students. It is primarily comprised of the national Youth Risk Behavior Survey (YRBS), which is conducted by the CDC (Appendix C). The YRBS has been conducted every 2 years since its 1991 inception in the spring of odd numbered years. The survey was designed to monitor health risk behaviors among a representative sample of 9th-12th grade students, who attend public and private U.S. schools. The national YRBS uses a three-stage cluster sample design to ensure national representation of students in enrolled in grades 9 through 12. The sampling frame consisted of all public and private schools with students in at least one of the grades from nine to twelve from each of the 50 states and the District of Columbia. To adjust for school and student nonresponse and oversampling of African American and Hispanic students, CDC applies a weight based on student sex, race/ethnicity, and grade level to each record (Brener et al., 2013).

YRBSS Survey Procedures

Operational procedures are used in the administration of the state, territorial, tribal, and large urban school district surveys. Training and technical assistance for state,

territorial, and local agencies and tribal governments is provided by both CDC and Westat, which has served as CDC's technical assistance contractor since the inception of the YRBSS for the administration of the survey. Through a contract with Westat, the CDC has provided comprehensive technical assistance to sites conducting the YRBS surveys. The technical assistance is proactive and covers the entire survey process.

The CDC and Westat provide technical assistance on multiple aspects of system and survey administration, including survey planning; sample selection; questionnaire modification; survey administration; gaining parental permission; data processing; weighting; report generation; and dissemination of results. Sites are ultimately responsible for administering the surveys. However, the role of the CDC and its technical assistance contractor is to help ensure that the survey administration runs smoothly and yields sufficient response rates and high-quality data. Technical assistance is available through different modes, such as written materials (e.g., the YRBS Handbook), monthly electronic newsletters, a toll-free telephone number, e-mail, pass-word protected Website, and in-person site visits. Additionally, Westat has worked with the CDC to develop tools for providing technical assistance. These tools include: instructional materials, communication tools, and specialized software (Brener et al., 2013).

YRBS Data Processing Procedures

Data processing for state, territorial, tribal, and large urban school district YRBS surveys is a collaborative effort between CDC and its technical assistance contractor that provides a system of checks and balances. All except for a few sites completed questionnaires (or answer sheets) are sent to the contractor. They are then scanned and a

raw electronic dataset is constructed. Certain sites scan their answer sheets and send the raw electronic dataset to the contractor. The contractor sends all raw datasets to CDC. They are then edited to identify out-of-range responses, logical inconsistencies, and missing data. The data cleaning and editing process is performed using the Survey Data Management System (SDMS), which CDC developed in 1999 to process all YRBSS data and produce reports (CDC, 2013b).

Quality control checks are performed on each standard questionnaire. Responses that conflict in logical terms are both set as missing, and data are not imputed. Questionnaires with less than 20 valid responses remaining after the editing process are deleted from the dataset. Additionally, data edits are applied to the height, weight, and BMI variables to ensure that the results are biologically plausible. These three variables are set to missing when an observation lies outside logical limits developed by CDC's Division of Nutrition, Physical Activity, and Obesity.

Last, edited datasets are sent to Westat, the technical assistance contractor, for weighting. Surveys that do not have an overall response rate of $\geq 60\%$ and appropriate documentation are not weighted. If response rates are sufficient, documentation is complete, and the site followed sampling protocols correctly, the contractor weights the data according to approved procedures and sends the weights to CDC, who merges the weights onto the edited data file (Brener et al., 2013). It should be noted that a weight is applied to each student record to adjust for student nonresponse and the distribution of students by grade, sex, and race/ethnicity in each jurisdiction. Therefore, weighted estimates are representative of all students in grades 9-12 in each jurisdiction (Brener et al., 2013).

Description of the National Youth Risk Behavior Survey

The national school-based YRBS was developed by the CDC and conducted by state and local education and health agencies. The national YRBS is conducted every two years (from February through May of each odd-numbered year) to monitor the prevalence of health risk behaviors among a representative sample of 9th-12th grade students aged 12 to 18 years old. The survey is distributed to all public and private schools in the United States.

Validity and Reliability

Content validity refers to the extent to which a measure thoroughly and appropriately assesses the skills and characteristics it is intended to measure. CDC indicates that the YRBS has adequate validity in measuring risk-taking behaviors in adolescents. Reliability assures that the survey instrument is one that is relatively free from measurement error. The reliability of YRBS has been assessed using test-retest protocol. Overall, the YRBS survey is considered to be a reliable and valid instrument for measuring health risks and behaviors among adolescents (Brener et al., 2013).

Biennially, the CDC administers the national YRBS survey, which asks about health risk behaviors in those areas most closely associated with youth and adult morbidity and mortality: tobacco use, alcohol and other drug use, behaviors related to intentional and unintentional injuries (i.e., fighting, drunk driving, and suicide attempts), sexual behavior, dietary behavior, and physical activity. It should be noted that survey questions can change from one administration cycle to the next, but the categories of behaviors always remain the same.

Data Collection

The CDC's IRB granted approval for the national YRBS, which also allows state and large urban school districts to conduct the voluntary survey. Parents receive a letter at home indicating that they can decline their child's participation in the survey. A student may also decide not to participate in the survey. Students are orally instructed and receive written instructions on the survey instrument indicating that if they are not comfortable answering a question, they may leave it blank. Since the survey is completed anonymously; no student names or identifying information is placed on the survey. To ensure student privacy, survey administrators use cover sheets for responses on answer sheets or standard booklets and seal recorded responses after questionnaire completion. The only demographic data collected about the students is their gender, age, race/ethnicity, and sexual orientation. To ensure consistency in the process of data collection, trained data collectors visited students' schools to explain the study using a standardized script before they distributed the questionnaires.

Description of the 2009 Massachusetts Youth Risk Behavior Survey

This study used data from the 2009 MYRBS, which is administered by the Massachusetts Department of Elementary and Secondary Education with collaboration and funding from the CDC (See Appendix B). The MYRBS has been conducted every 2 years since 1993 to measure health risk behaviors among high school students. These risky health behaviors are related to the leading causes of morbidity and mortality among youth and adults in the United States. These behaviors include: tobacco use, alcohol and other drug use, behaviors related to intentional and unintentional injuries (i.e., fighting,

drunk driving, and suicide attempts), sexual behavior, dietary behavior, and physical activity.

Population and Sample

The 2009 MYRBS included a representative sample of public school students in grades 9 through 12. Using a specialized software program (PCSample), the Massachusetts sample was drawn in two steps or stages: 1) schools were selected with probability proportional to the enrollment of the school and 2) then, classes were selected within schools with equal probability. All Massachusetts public high school students in grades 9 through 12, including students with special needs and students with limited English proficiency, had an equal probability of being selected. Students in the sampled classes within the sampled schools who attended on the day the survey was given filled out an anonymous, self-administered, written questionnaire. Trained survey administrators conducted the surveys in the participating schools. Data were weighted to reduce biases associated with differing patterns of nonresponse and to reflect the demographic distribution of all students attending Massachusetts public high schools.

Data Processing Procedures

The 2009 MYRBS was conducted in 59 randomly selected public high schools. Data were collected from public schools within the Massachusetts Department of Elementary and Secondary Education via self-administered, anonymous surveys. Data were weighted to reduce any biases associated with differing patterns of nonresponse and to reflect the demographic distribution of all students attending Massachusetts public

high schools (Massachusetts Department of Elementary and Secondary Education, 2011a). Weighted results mean that the overall response rate was at least 60% and representative of all students in grades 9-12 attending public schools in Massachusetts.

In each grade level at each school, a classroom of students, in a required course, were randomly selected to receive and voluntarily complete the pencil-and-paper survey. Participating schools used existing policies for obtaining parental consent for student participation. All students present on the day of data collection were eligible. Student participation was voluntary and there were no incentives offered.

Data from the MYRBS were selected for this study because Massachusetts was the first state to consistently include a question assessing student participation in community service on the survey. A limited number of states that participate in the national YRBS ask the community service question. Those states are Massachusetts, Vermont, North Carolina, Ohio, New Hampshire, Nevada, Texas, Connecticut, New Jersey, and Maine. Of those states, Massachusetts was chosen as the data source for this study because the state has asked the question for the most number of years (2001-2013), consecutively. It also has the highest student response rates consistently and offers survey respondents that reflect youth demographics (i.e., age, race/ethnicity, sex/gender).

Response Rates and Sample Characteristics. The CDC considers the MYRBS dataset to be representative of all public high school students in the state because both school and student response rates are consistently high (at or above 75-80%). Specifically, the overall response rate of the 2009 MYRBS survey was 68% (= student response rate x school response rate). Due to this high overall response rate, data from the

survey can be considered representative of all public high school students in Massachusetts, according to CDC standards. It should be noted that the state has a reputation for producing high-quality data.

Of the Massachusetts public high school students who submitted completed questionnaires, a total of 2,707 questionnaires were deemed usable for the study. As can be seen in Table 3.2, the study participants had the following demographics characteristics: there were more males (50.9%) than females (49.1%); there were more ninth graders (27.1%) as compared to tenth graders (25%), eleventh graders (24.6%), and twelfth graders (23.3%); and the majority were White (non-Hispanic) (71.6%) as compared to Black or African American (8.6%), Hispanic or Latino (13.1%), Asian or Pacific Islander (3.6%), and “Other or Multiple Ethnicity (3.1%).” Table 3.1 also provides the frequency data for the study participants. Youth not currently enrolled in a Massachusetts high school were excluded from the study.

Generalizability. The 2009 MYRBS data provided the necessary sample size and population representation to conduct the study. Additionally, due to the high overall response rate, the 2009 MYRBS dataset was weighted to reduce any biases associated with differing patterns of non-response and to reflect the demographic distribution of all students attending Massachusetts public high schools.

In summary, the 2009 MYRBS dataset met the criteria necessary for the study for several reasons: (a) it consistently contained a question on community service; (b) the longitudinal survey design allowed for the collection of historical data; (c) it contained a set of variables to control for possible confounding factors; (d) it included the key health

behaviors; (e) it contained quantitative data; (f) it is recently conducted; and (g) it focused on the study population of youth.

Study Measures

The 2009 MYRBS measures categories of youth health risk behaviors. Every variable drawn from the 2009 MYRBS required some transformation. In some cases, levels of selected variables in the MYRBS were collapsed to achieve sufficient cell size and to facilitate subsequent analyses. Additionally, it was necessary to create dummy variables (nominal variables that distinguish two or more distinct levels, categories or attributes of the variable and can be used to code information concerning group membership into a series of binary distinctions) to use in subsequent modeling (Crosby, DiClemente, & Salazar, 2006). One category would be used as the referent group, and each of the other categories would be compared to it. The referent group would be coded as zero, and the other category would be coded as one (Crosby et al., 2006). To illustrate, Student responses to the feelings question were either “Yes or No.” The variable was modified or recoded, where yes = 1 and no = 0. More detailed explanations of dummy variables can be found elsewhere (Kleinbaum et al., 1998; Pedhazur, 1997). Missing data were addressed in the dataset, yielding 2,707 usable, completed survey responses for the study.

Behavior can best be explained as the result of three reciprocal factors: behavior, personal factors, and environment; otherwise known as the concept of reciprocal determinism (Bandura, 1977a, 1977b). Bandura’s SCT served as the organizing framework guiding this analysis. SCT guided the identification of personal factors (e.g.,

age, sex, grade in school, race/ethnicity, BMI, feeling sad or hopeless); environmental factors (e.g., having the opportunity or access to talk to a teacher, parent or adult); and behavioral factors (e.g., tobacco/alcohol/drug use, being sexually active). To explore the association between community service participation and health risk behaviors among adolescents, the following categories of measures were selected for analysis:

demographics or individual characteristics; community service participation; academic achievement; and environmental factors that affect physical health. The health behaviors included in the study were tobacco use; alcohol use; hard drug use; sexual behavior; BMI-based weight; physical activity; and sedentary behavior (i.e., screen time).

The focal variable used in the study was community service participation (measured in levels of None, 1-4 hr 5-9 hr, and 10+ hr per month). The association among community service participation and health behaviors (i.e., tobacco use; alcohol use; marijuana use; hard drug use; sexual behavior; weight/BMI; physical activity; and sedentary behavior) and individual characteristics (i.e., school environment; student academic achievement; and demographics) were examined. The following describes the specific measures used in this cross-sectional study.

Community Service

Prosocial activity was measured by adolescent participation in community service or youth volunteerism. Community service participation was assessed by student responses to the question, “In an average month when you are in school, how many hours do you spend on volunteer work, community service, or helping people outside of your home without getting paid? (Do not include community service work that you are

required to do as a punishment.)” [Q115]. Student response options included the following: “0 hours; 1 to 4 hours; 5 to 9 hours; or 10 or more hours.” This measure was transformed and individual dummy variables were created for each of the levels of community service. Overall, the majority of participants were not involved in community service (53.1%) on a monthly basis as compared to those who did participate in community service (46.9%). Distribution used in the study was displayed in Table 3.1. No hours or zero hours were used as the reference category in subsequent analyses.

Table 3.1

Frequency Distribution of Community Service

Variable	Frequency	Weighted percentages†
Community Service (<i>n</i> = 2,621)		
None	1,375	53.1
1-4 hours per month	865	32.9
5-9 hours per month	224	8.4
10+ hours per month	157	5.6
Missing	86	

Note. The overall usable sample size was 2,707. However, the number of usable responses differs across study variables. † Weighted percentages are representative of all students in grades 9-12 attending public schools in Massachusetts.

Individual Characteristics

Demographics

Demographic characteristics of the study sample were assessed using six questions from the survey instrument. The questions assessed age, sex, race/ethnicity, school grade level and academic achievement. The variables were selected and then transformed for analyses.

Age. Respondent age was assessed by student responses to the question, “How old are you?” [Q1]. Student responses were “12 years old or younger; 13 years old; 14 years old; 15 years old; 16 years old; 17 years old; and 18 years old or older.” Twelve and thirteen year olds comprised eight responses out of the total, but they were not included in with responses from the fourteen year olds. Instead the responses were categorized as missing due to the small number of respondents. The variable was modified and individual dummy variables were created for each of the remaining five levels of the age variable. Distribution used in the study was displayed in Table 3.2. The study population was comprised of students ranging in age from 14 year olds (9.9%); 15 year olds (24.9%); 16 year olds (26.9%); 17 year olds (25.5%) to 18 year olds or older (12.8%). Age 16 years was used as the reference category in analysis.

Sex. Respondent sex was assessed by student responses to the question, “What is your sex?” [Q2]. Student response options were either “Female or Male.” Student’s sex or gender was used as an item in the analysis and was coded as a dichotomous variable. The study population was comprised of more males (50.9%) than females (49.1%). Distribution used in the study was displayed in Table 3.2. Males were designated as the reference group in the analysis.

Race/ethnicity. Respondent race/ethnicity was assessed by student responses to two questions, “What is your race?” [Q5]. Student responses were “American Indian or Alaska Native; Asian; Black or African American; Native Hawaiian or Other Pacific Islander; or White” and “Are you Hispanic or Latino?” [Q4]. Student responses were

either “Yes or No.” This measure used a census-style classification, treating “Hispanic” as an ethnicity and categorizing respondents to this category as “Hispanic,” regardless of which race they endorsed. Additionally, the American Indian or Alaskan Native (AIAN) and Native Hawaiian or other Pacific Islander, these categories were collapsed into the “Other” category because of the low number of responses.

For ease of analysis, a “Race/Ethnicity” [RACEETH] composite variable (variables that are constructed from more than one response option) was used. Therefore, the original eight levels of race/ethnicity were decreased. The variables were modified and individual dummy variables were created for each of the remaining levels of the “Race/Ethnicity” variable. Operationally five race/ethnicity categories were used for this study: “White; African American or Black; Hispanic; Asian; and Other.” The majority of the study participants were White (non-Hispanic) (71.6%) when compared to Hispanic or Latino (13.1%) and Black or African American (8.6%) students. Distribution used in the study is displayed in Table 3.2. Whites were used as the reference group in the analysis.

Grade level. Respondent grade level was assessed by student responses to the question, “In what grade are you?” [Q3]. Student responses were either “9th grade, 10th grade, 11th grade, 12th grade, ungraded or other grade.” The “ungraded or other grade” categories were excluded for ease of analysis. The variables were modified and individual dummy variables were created for the remaining levels of the grade variable. The study population was comprised of more ninth graders (27.1%) when compared to other grades— tenth graders (25%), eleventh graders (24.6%), and twelfth graders

(23.3%). Distribution used in the study is displayed in Table 3.2. Eleventh grade was used as the reference category.

Table 3.2

Frequency Distribution of Demographic Variables

Variables	Frequency	Weighted percentages †
Demographics		
Sex (<i>n</i> = 2,701)		
Female	1,334	49.1
Male	1,367	50.9
Missing	6	
Age (<i>n</i> = 2,695)		
14 yrs old	255	9.9
15 yrs old	638	24.9
16 yrs old	750	26.9
17 yrs old	716	25.5
18 yrs old	336	12.8
Missing	12	
Race/Ethnicity (<i>n</i> = 2,646)		
African American	244	8.6
Asian	131	3.6
Hispanic	442	13.1
Other	116	3.1
White	1,713	71.6
Missing	61	
Grade in school (<i>n</i> = 2,682)		
9 th	700	27.1
10 th	635	25.0
11 th	747	24.6
12 th	600	23.3
Missing	25	

Note. The initial sample size was 2,707. However, the number of usable responses differs across variables. † Weighted percentages are representative of all students in grades 9–12 attending public schools in Massachusetts.

Student academic achievement. Respondent academic achievement was assessed by student responses to the question, “During the past 12 months, how would you describe your grades in school?” [Q88]. Student responses were self-reported and included these options—“Mostly A's; Mostly B's; Mostly C's; Mostly D's; Mostly F's;

None of these grades; and Not sure.” The “None of these grades” and “Not sure” categories were excluded from the study for ease of analysis. The variable was modified and dummy variables were created. Responses were categorized into four responses—“Mostly A’s; Mostly B’s; Mostly C’s; and Mostly D’s and F’s.” Study participants provided self-reported grades of mostly A’s (25.3%); mostly B’s (45.4%); mostly C’s (21.7%); and mostly D’s and F’s (7.6%). Distribution used in the study was displayed in Table 3.3. Mostly B’s was used as the reference category in the analysis.

Environmental Variables

Environmental factors influence the development of specific behaviors (Bandura, 1963, 1977a, 1977b, 1989, 2001; Glanz et al., 2002). Positive school and social environments are associated with decreased occurrences of risky health behaviors among adolescents (Catalano, Haggerty, et al., 2004b). Environmental variables were assessed by student responses to three questions related to their school environment.

Talk with teacher. Respondent opportunity to talk with a teacher or adult was assessed by student responses to the question, “Is there at least one teacher or other adult in this school that you can talk to if you have a problem?” [Q94]. Student response options were “Yes, No, or Not Sure.” Seventy-one percent of study participants reported that they could talk to at least one teacher or adult in the school if they had a problem; 28.6% reported that they could not talk to at least one teacher or adult. Distribution used in the study was displayed in Table 3.3. No or Not having a teacher to talk to was the reference category used in the analysis.

Talk with parents. Respondent opportunity to talk with a parent or adult was assessed by student responses to the question, “Can you talk with at least one of your parents or other adult family members about things that are important to you?” [Q95]. Student response options for both questions were “Yes, No, or Not Sure.” Eighty-three percent of study participants reported that they could talk with at least one parent or other adult family member about things that are important; 16.7% reported that they could not talk with at least one parent or other adult family member. Distribution used in the study was displayed in Table 3.3. No or Not having a parent or adult to talk to was the reference category used in the analysis.

Table 3.3

Frequency Distribution of Environmental and Academic Achievement Variables

Variables	Frequency	Weighted percentages†
Environmental		
Talk with a parent (<i>n</i> = 2,684)		
Yes	2,222	83.3
No	462	16.7
Missing	21	
Talk with a teacher (<i>n</i> = 2,694)		
Yes	1,902	71.4
No	792	28.6
Missing	13	
Sad/hopeless feelings (<i>n</i> = 2,666)		
Yes	652	24.0
No	2,014	76.0
Missing	41	
Self-reported grades (<i>n</i> = 2,568)		
Mostly As	669	25.3
Mostly Bs	1,148	45.4
Mostly Cs	557	21.7
Mostly D/Fs	194	7.6
Missing	139	

Note. The initial sample size was 2,707. However, the number of usable responses differs across predictor variables. † Weighted percentages are representative of all students in grades 9–12 attending public schools in Massachusetts.

Sad or hopeless feelings. Respondent feelings were assessed by student responses to the question, “During the past 12 months, did you ever feel sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?” [Q23]. Student responses to the feelings question were either “Yes or No.” Among the study participants, 24% reported having felt sad or hopeless as compared to 76% who did not have those feelings. Distribution used in the study was displayed in Table 3.3. Not feeling sad or hopeless was the reference category used in the analysis.

Correlations Among Individual Characteristic Variables

In order to understand the pattern of the relationship between the focal variable and the predictor variables, Spearman correlation coefficients were computed for the eight variables. Coefficients were displayed in Table 3.4. Student age previously has been shown to correlate with grade level in school. This was the case within the 2009 MYRBS data set. A very high, significant correlation was apparent between the “age” and “grade in school” variables ($r_s = .87$; $p < .05$). Recognizing that a correlation of this intensity could lead to issues of multicollinearity, the “grade in school” variable was omitted from analysis (Heeringa, West & Berglund, 2010).

Table 3.4

Spearman Correlation Coefficients across Predictor Variables

	Community service	Age	Grade level in school	Sex	Self-reported grades	Talk to teacher	Talk to parent	Sad/hopeless feelings
Community service	1.00	0.09* n=2,556	0.12* n=2,597	0.07* n=2,615	0.23* n=2,495	0.11* n=2,612	0.07* n=2,605	-0.00 n=2,588
Age		1.00	0.88* n=2,619	-0.08* n=2,632	0.01 n=2,505	0.08* n=2,622	0.01 n=2,617	-0.01 n=2,601
Grade level in school			1.00	-0.02 n=2,679	0.08* n=2,547	0.10* n=2,669	0.02 n=2,663	-0.02 n=2,644
Sex/Gender				1.00	0.14* n=2,562	0.03 n=2,688	0.04 n=2,681	0.12* n=2,661
Self-reported grades					1.00	0.13* n=2,558	0.15* n=2,552	-0.16* n=2,533
Talk to teacher						1.00	0.24* n=2,679	-0.09* n=2,656
Talk to parent							1.00	-0.24* n=2,651
Sad/hopeless feelings								1.00

Note. Initial sampling size was 2,707, but the number of usable responses differs across predictor variables. * $p < 0.05$ level, using Bonferroni adjustment.

Health Outcomes

Several adolescent health behaviors were assessed as part of this cross-sectional study. The health behaviors were measured by student responses to 14 survey questions. The health behavior study measures were organized into the following categories—five risky health behaviors (i.e., alcohol, tobacco, marijuana, hard drug use; sexual intercourse); two health risks (i.e., overweight, obesity); and three healthy behaviors (i.e., aerobic and physical activity guidelines met, TV/computer/video game use guidelines met).

Risky Health Behaviors

Tobacco use. Respondent tobacco use was assessed by student responses to three questions, “During the past 30 days, on how many days did you smoke cigarettes?” [Q30]. Student response options included— “0 days; 1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; or All 30 days.” “During the past 30 days, on how many days did you use chewing tobacco, snuff, or dip, such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen?” [Q36]. Student response options included— “0 days; 1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; or All 30 days.” “During the past 30 days, on how many days did you smoke cigars, cigarillos, or little cigars?” [Q38]. Student response options included— “0 days; 1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; or All 30 days.”

Since the tobacco product usage occurrence was low in this category, the tobacco use composite variable [QNANYTOB] was utilized. The variable was dichotomized into “30 day tobacco use” or “no tobacco use” as the two respondent categories. Seventy-six percent of study participants reported that they did not use tobacco during the past 30 days; 24% reported using tobacco. Distribution used in the study was displayed in Table 3.5. Zero days or No tobacco use was the reference category for analysis.

Alcohol use. Respondent alcohol use was assessed by student responses to the question, “During the past 30 days, on how many days did you have at least one drink of alcohol?” [Q41]. Student response options included— “0 days; 1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; or All 30 days.” The variable was modified and individual dummy variables were created for each remaining level of alcohol use. Fifty-

six percent of study participants reported having had at least one drink of alcohol during the past 30 days; 44% reported no alcohol use. Distribution used in the study was displayed in Table 3.5. Zero days or no alcohol use was the reference category used for analysis.

Marijuana use. Respondent marijuana use was measured by student responses to the question, “During the past 30 days, how many times did you use marijuana?” [Q47]. Student response options included— “0 times; 1 or 2 times; 3 to 9 times; 10 to 19 times; 20 to 30 times; or 40 or more times.” The variables were modified and individual dummy variables were created for the marijuana use variable. Seventy-three percent of study participants reported marijuana use during the past 30 days; 27% reported no marijuana use. Distribution used in the study was displayed in Table 3.5. Zero times or no marijuana use was the reference category used for analysis.

Hard drug use. Respondent hard drug use was assessed when students were asked the following four questions regarding the use of several illegal drugs, “During your life, how many times have you used any form of cocaine, including powder, crack or freebase?” [Q49]; “During your life, how many times have you used heroin (also called smack, junk, or China White)?” [52]; “During your life, how many times have you used methamphetamines (also called speed, crystal, crank, or ice)?” [Q53]; and “During your life, how many times have you used ecstasy (also called MDMA, E or X)?” [Q54]. Student response options included the following: “0 days; 1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; or All 30 days.”

Due to low usage of many of the illegal drugs, a composite dummy variable was created to measure hard drug use. The composite variable was dichotomized into “lifetime drug use” or “no lifetime drug use” as the two respondent categories. Ninety-one percent of study participants reported that they did not use hard drugs in their lifetime; 9% reported that they used hard drugs in their lifetime. Distribution used in the study was displayed in Table 3.5. No lifetime drug use was the reference category used for analysis.

Table 3.5

Frequency Distribution of Risky Health Behaviors Variables

Variables	Frequency	Weighted percentages†
Risky health behaviors		
Alcohol use (<i>n</i> = 2,583)		
Yes	1,118	43.6
No	1,465	56.4
Missing	124	
Tobacco use (<i>n</i> = 2,576)		
Yes	595	23.9
No	1,981	76.1
Missing	131	
Marijuana use (<i>n</i> = 2,638)		
Yes	700	27.1
No	1,938	72.9
Missing	69	
Hard drug use (<i>n</i> = 2,675)		
Yes	238	9.0
No	2,437	91.0
Missing	32	
Sexual intercourse (<i>n</i> = 2,480)		
Yes	1,152	46.4
No	1,328	53.6
Missing	227	

Note. The initial sample size was 2,707. However, the number of usable responses differs across outcome variables. † Weighted percentages are representative of all students in grades 9-12 attending public schools in Massachusetts.

Sexual behavior. Respondent sexual behavior was assessed by student responses to the question, “During your life, with how many people have you had sexual intercourse?”[Q60]. Student response options included— “I have never had sexual intercourse; 1 person; 2 people; 3 people; 4 people; 5 people; or 6 or more people.” The variable was modified and individual dummy variables were created for the sexual behavior variable. Fifty-four percent of study participants reported not having sexual intercourse; 46% reported having had sexual intercourse. Distribution used in the study was displayed in Table 3.5. Never had sexual intercourse was the reference category used for analysis.

Health Risk Behaviors

Two measures of body weight were used in this study. Both measures, based on self-reported individual respondent BMI scores, were provided by MYRBS. BMI is a number calculated based upon a person’s weight and height. BMI is a reliable indicator of body fatness for most children and adolescents. Adolescents are considered to be at healthy weight status when they are in the 5th percentile to less than the 85th percentile, according to the AAP (CDC, 2014).

Questions about student height and weight were included in the survey instrument, but in order to protect student privacy, responses were redacted within the data set. For height students were asked the question, “How tall are you without your shoes on?” [Q6]. Student responses were individually written in “feet and inches” on the survey. To obtain weight status students were asked the question, “How much do you weigh without your shoes on?” [Q7]. Student responses were individually written in

“pounds” on the survey. The MYRBS dataset included composite measures classifying respondents using BMI-based recommendations from CDC and the AAP (CDC, 2014).

Overweight. The first composite measure reported the “Percentage of students who were overweight (i.e., at or above the 85th percentile but below the 95th percentile for body mass index (BMI), by age and sex)” [QNOWT]. Fourteen percent of the study participants were classified as overweight and 86% as not overweight when compared to recommendations (See Table 3.6). Meeting the recommendation of not being overweight was used as the reference category in the analysis.

Table 3.6

Frequency Distribution of Health Risk Behavior Variables

Variables	Frequency	Weighted percentages†
Health risk behaviors		
BMI-based overweight (<i>n</i> = 2,511)		
Yes	369	14.3
No	2,142	85.7
Missing	196	
BMI-based obesity (<i>n</i> = 2,511)		
Yes	279	11.0
No	2,232	89.0
Missing	196	

Note. The initial sample size was 2,707. However, the number of usable responses differs across outcome variables. † Weighted percentages are representative of all students in grades 9–12 attending public schools in Massachusetts.

Obese. The second composite measure reported the “Percentage of students who were obese (i.e., at or above the 95th percentile for BMI, by age and sex)” [QNOBESE]. Eleven percent of the study participants were classified as obese and 89% as not obese

when compared to recommendations (See Table 3.6). Meeting the recommendation of not being obese was used as the reference category in the analysis.

Healthy Behaviors

Three health behavior measures were used in the study. Two measures were concerning physical activity and one on electronic usage, specifically TV, computer, and video game usage. For all three measures survey responses were transformed using national guidelines.

The measures of physical activity were labeled as physical activity and aerobic physical activity. Both physical activity measures were modified by CDC based upon the *2008 Physical Activity Guidelines for Americans*, which recommended that children and adolescents (ages 6 to 17 years) engage in ≥ 60 min of daily physical activity. The majority of those daily ≥ 60 min should be either moderate- or vigorous-intensity aerobic physical activity (U.S. Department of Health and Human Services, 2008b).

Physical activity. Students were asked—“During the past 7 days, on how many days were you physically active for a total of at least 60 min per day?”— to assess physical activity [80]. Student response options included— “0 days; 1 day; 2 days; 3 days; 4 days; 5 days; 6 days; or 7 days.” The recoded measure reflected the “Percentage of students who were physically active for a total of at least 60 min per day on 5 or more of the past 7 days” [“Yes” or “No”; QN80]. Thirty-four percent of the study participants met the physical activity guidelines (≥ 60 min of daily physical activity daily) (See Table

3.7). Respondents not meeting the national guideline for children and adolescents were the reference category used for analysis.

Aerobic physical activity. Students were asked— “On how many of the past 7 days did you exercise or participate in physical activity for at least 20 min that made you sweat and breathe hard, such as basketball soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities?”-- to assess aerobic physical activity [Q113]. Student response options included –“0 days; 1 day; 2 days; 3 days; 4 days; 5 days; 6 days; or 7 days.” The recoded measure summarized the “Percentage of students who exercised or participated in physical activity for at least 20 min that made them sweat and breathe hard, such as basketball soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities, on three or more of the past seven days” [“Yes” or “No”; QN113]. Sixty-three percent of the study participants met the aerobic physical activity guidelines (See Table 3.7). Not meeting the national guideline for children and adolescents was the reference category used for analysis.

Screen Time (TV and computer/video game use). Screen time is defined as time spent viewing or in front of electronic devices. The AAP recommends that children, adolescents and teens should spend no more than two hours per day engaged in viewing high-quality entertainment media (e.g., television, computers, electronic games or cell phones). Additionally, AAP recommends discouraging screen media exposure for children <2 years of age; however, the screen time for many children and adolescents, appears to exceed these recommendations (American Academy of Pediatrics, 2013).

Table 3.7

Frequency Distribution of Healthy Behavior Variables

Variables	Frequency	Weighted percentages†
Healthy behaviors		
Physical activity guidelines met (<i>n</i> = 2,641)		
Yes	867	33.5
No	1,774	66.5
Missing	66	
Aerobic physical activity guidelines met (<i>n</i> = 2,647)		
Yes	1,634	62.8
No	1,013	37.2
Missing	60	
TV/computer/ video game guidelines met (<i>n</i> = 2,643)		
Yes	835	32.0
No	1,808	68.0
Missing	64	

Note. The initial sample size was 2,707. However, the number of usable responses differs across outcome variables. † Weighted percentages are representative of all students in grades 9-12 attending public schools in Massachusetts.

To assess screen time behavior in this study, respondents were asked two questions about TV viewing and computer use. Students were asked— “On an average school day, how many hours do you watch TV?” [Q81]. Student response options included— “I do not watch TV on an average school day; Less than 1 hour per day; 1 hour per day; 2 hours per day; 3 hours per day; 4 hours per day; or 5 or more hours per day.” Additionally, students were asked “On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as Nintendo, Game Boy, Play Station, Xbox, computer games and the Internet)” [Q82]. Student response options included— “I do not play video or computer games or use a computer for something that is not school work; Less than 1

hour per day; 1 hour per day; 2 hours per day; 3 hours per day; 4 hours per day; or 5 or more hours per day.”

Study participants who reported two or less hours per day in total across both of the questions were classified as meeting the AAP guidelines. As can be seen in Table 3.7, 32% of the study participants reported 2 hr or less of screen time per day. The reference category used for analysis was not meeting the guideline for screen time use.

Analytic Strategy

The 2009 MYRBS employed a two-stage, cluster sample design. It is a design in which schools are randomly selected, followed by random selection of classrooms within the schools; to produce a representative sample of students in grades 9 through 12. Specifically, schools are selected using implicit stratification (a CDC software sampling technique) that was based on school enrollment size. The sampling frame was determined using the Common Core of Data from the National Center for Education Statistics (CDC, 2013b). This sampling strategy yielded estimates reflecting the student population within the state of Massachusetts.

The data were weighted to reduce potential biases due to nonresponse and to sampling error. A weight was associated with each questionnaire to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non-response. The weighted percentages are estimates that are representative of all students in grade 9-12 attending public schools in Massachusetts. The CDC provided the final weights, variance stratum, and the PSU (primary sampling unit). The stratum and PSU variables were provided in the MYRBS data file (CDC, 2013b).

Missing data can pose a threat to the internal validity and external validity of the study (Croninger & Douglas, 2005; Raghunathan, 2004). The main source of missing data in the 2009 MYRBS is item-nonresponse, in which partial data are only available for survey participants. To account for missing data, CDC procedures were followed in that responses were reviewed and set to missing; but, missing responses were not imputed prior to data weighting (CDC, 2013b).

Data Analysis

A correlational study design was used to investigate associations among community service, individual characteristics, and health outcome measures. Descriptive and inferential statistics were performed to address the research questions. All data analyses for the 2009 MYRBS were conducted using SAS® 9.3 software (SAS Institute, Inc., Cary, NC); with PROC SURVEYFREQ and PROC SURVEYLOGISTIC procedures used to account for the complex sampling design (Lee & Forthofer, 2006; Korn & Graubord, 1999; Martin, 2012).

The focal predictor variable was community service (none, 1-4, 5-9, and 10+ hr per month). The individual characteristics included demographic measures (i.e., sex, age, race/ethnicity), three environmental measures (talk with parent, talk with teacher, sad and hopeless feelings) and academic achievement. The five health risk behaviors (alcohol, tobacco, marijuana, hard drugs, sexual intercourse), two health risk factors (BMI-based overweight, BMI-based obesity), and three healthy behaviors (physical activity guidelines met, aerobic physical activity guidelines met, TV/Computer/Video game use guidelines meet) were the health outcome variables. Multiple logistic regression analyses were conducted for each of the 10 health outcome measures.

Four separate, multiple-logistic regression, models were computed for each of the health outcome measures. The models were constructed in subsequent steps in the following order— community service was entered first (Model 1); demographic characteristics were added in Model 2; environmental factors were added in Model 3; and academic achievement was added in Model 4. For each model, adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were reported. The Akaike Information Criterion (AIC), a measure of goodness-of-fit of statistical models, was used to compare the amount of information explained across the models, with lower AIC models indicating improved model fit (Tabachnick & Fidell, 2007).

CHAPTER 4

RESULTS

This study examined the relationship between levels of community service participation and health risk behaviors among adolescents in Massachusetts public high schools. Four separate, multiple logistic regression models were computed for each of the 10 health outcome measures. The models were constructed in subsequent steps with community service levels entered initially in Model 1; demographic characteristics added in Model 2; environmental factors added in Model 3; and academic achievement added in Model 4. Odds ratios and 95% CIs, Wald χ^2 , and AIC for the models are reported in Tables 4.1 through 4.10.

Exploring Community Service and Health Outcomes

Health Risk Behaviors

The five health risk behavior measures were analyzed first; specifically, tobacco, alcohol, marijuana, and hard drugs along with sexual behavior. Student's self-report measures were examined. Four models described above are presented for each measure.

Tobacco use. In Model 1, community service was regressed on tobacco use. As can be seen in Table 4.1, students participating in 1-4 hr per month of community service were less likely to report tobacco use than those not engaged in community service (OR = 0.72, 95% CI = 0.59, 0.87) [reference group]. No significant associations were found for the other two levels of community service (5-9 and 10+ hr/month) in the model.

Demographic measures were added to the second logistic regression model (Model 2). Females, as compared to males (reference group), were less likely to report using tobacco (OR = 0.48, 95% CI = 0.37, 0.62). Compared to 16 year olds (reference group), 14 year olds (OR = 0.60, 95% CI = 0.39, 0.93) and 15 year olds (OR = 0.67, 95% CI = 0.49, 0.90) were less likely to use tobacco; while 18 year olds (OR = 1.89, 95% CI = 1.25, 2.86) were more likely to use tobacco. Examining race/ethnicity, African American (OR = 0.37, 95% CI = 0.22, 0.62), Asian (OR = 0.31, 95% CI = 0.16, 0.62) and Hispanic students (OR = 0.58, 95% CI = 0.42, 0.78) were less likely to report using tobacco as compared to White students (reference group). Despite the addition of these demographic measures, the associations between tobacco use and community service (1-4 hr/month) was unchanged. The addition of demographic measures in Model 2 resulted in an AIC Δ of 8.1% and improved the explanatory power of the model. The AIC is a measure of statistical model fit used to compare the amount of information explained across logistic regression models. A lower AIC value indicates a model is a better fit for the observed data (Tabachnick & Fidell, 2007).

In Model 3, students who described being able to talk to a teacher were less likely to report tobacco use (OR = 0.70, 95% CI = 0.55, 0.88). Students who described sad and hopeless feelings reported being twice as likely to use tobacco (OR = 2.18, 95% CI =

Table 4.1

<i>Multiple Logistic Regression Models Examining Tobacco Use and Community Service</i>				
	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	0.72* (0.59, 0.87)	0.71* (0.57, 0.87)	0.74* (0.59, 0.92)	0.89 (0.71, 1.12)
5-9 hours per month	0.88 (0.61, 1.27)	0.85 (0.57, 1.28)	0.88 (0.60, 1.31)	1.14 (0.71, 1.83)
10+ hours per month	0.91 (0.56, 1.50)	0.87 (0.50, 1.52)	0.94 (0.53, 1.66)	1.19 (0.64, 2.23)
Female	--	0.48* (0.37, 0.62)	0.43* (0.34, 0.56)	0.48* (0.37, 0.62)
Age				
14 yrs old	--	0.60* (0.39, 0.93)	0.55* (0.36, 0.85)	0.52* (0.32, 0.83)
15 yrs old	--	0.67* (0.49, 0.90)	0.66* (0.48, 0.90)	0.63* (0.46, 0.86)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	1.21 (0.95, 1.55)	1.25 (0.95, 1.64)	1.28 (0.99, 1.65)
18 yrs old	--	1.89* (1.25, 2.86)	1.97* (1.30, 2.98)	1.93* (1.26, 2.95)
Race/Ethnicity				
African American	--	0.37* (0.22, 0.62)	0.32* (0.20, 0.53)	0.28* (0.17, 0.46)
Asian	--	0.31* (0.16, 0.62)	0.28* (0.14, 0.54)	0.33* (0.17, 0.46)
Hispanic	--	0.58* (0.42, 0.78)	0.49* (0.35, 0.66)	0.41* (0.31, 0.55)
Other	--	1.12 (0.77, 1.63)	0.98 (0.66, 1.45)	0.84 (0.54, 1.31)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.74 (0.51, 1.07)	0.83 (0.56, 1.23)
Talk with a teacher	--	--	0.70* (0.55, 0.88)	0.73* (0.56, 0.94)
Sad/hopeless feelings	--	--	2.18* (1.71, 2.78)	1.77* (1.35, 2.32)

Self-reported grades	--	--	--	--
Mostly As	--	--	--	0.46* (0.32, 0.66)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	1.75* (1.37, 2.24)
Mostly D/Fs	--	--	--	2.37* (1.49, 3.77)
<hr/>				
Model-specific				
<i>n</i>	2,506	2,444	2,409	2,301
Wald χ^2 statistic	$\chi^2(3) = 11.31^{**}$	$\chi^2(12) = 295.58^{**}$	$\chi^2(15) = 347.82^{**}$	$\chi^2(18) = 427.42^{**}$
AIC	295,205.3	271,424.7	258,645.5	237,931.1

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

1.71, 2.78). The pattern of associations observed for levels of community service and demographic measures were essentially unchanged. Adding environmental measures in Model 3 resulted in an AIC Δ of 4.7%.

Self-reported grades were included in Model 4. As can be seen in Table 4.1, those reporting mostly A's were less likely to report using tobacco when compared to students who reported mostly B's (reference group) (OR = 0.46, 95% CI = 0.32, 0.66). Students reporting grades of mostly C's (OR = 1.75, 95% CI = 1.37, 2.24) or D's/F's (OR = 2.37, 95% CI = 1.49, 3.77) were more likely to use tobacco. The pattern of associations for demographic and environmental measures was similar to those seen in Model 3. The

associations between tobacco use and community service levels were lost in Model 4. The addition of self-reported grades resulted in an AIC Δ of 8.0% in Model 4.

Alcohol use. In Model 1, community service was regressed on alcohol use. As can be seen in Table 4.2, no significant associations were found for the three levels of community service (1-4, 5-9 and 10+ hr/month) in the model.

In Model 2, demographics were added to the logistic regression model. No significant associations were found in comparing females to males (reference group) for alcohol use. Compared to 16 year olds (reference group), 14 year olds (OR = 0.63, 95% CI = 0.48, 0.82) and 15 year olds (OR = 0.70, 95% CI = 0.52, 0.94) were less likely to use alcohol; while 18 year olds (OR = 1.67, 95% CI = 1.25, 2.23) were more likely to use alcohol. Examining race/ethnicity, African American (OR = 0.68, 95% CI = 0.49, 0.96) and Asian students (OR = 0.41, 95% CI = 0.27, 0.61) were less likely to report using alcohol as compared to White students (reference group). Despite the addition of these demographic measures, the associations between alcohol use and community service levels were not significant. The addition of demographic measures in Model 2 resulted in an AIC Δ of 4.7%.

In Model 3, there were no significant associations among students who reported being able to talk to a teacher or talk to a parent. Students who described sad and hopeless feelings, reported being more likely to use alcohol (OR = 1.73, 95% CI = 1.39, 2.16). The pattern of associations observed for community service levels and demographic measures was essentially unchanged. Adding environmental measures in Model 3 resulted in an AIC Δ of 2.5% and improved the explanatory power of the model.

Self-reported grades were included in Model 4. As can be seen in Table 4.2, those students reporting mostly A's were less likely to report using alcohol compared with students who reported mostly B's (reference group) (OR = 0.64, 95% CI = 0.51, 0.80). Students reporting grades of mostly C's (OR = 1.54, 95% CI = 1.19, 1.99) or D's/F's (OR = 1.70, 95% CI = 1.16, 2.51) were more likely to use alcohol. While the pattern of association for demographic and environmental measures was similar to those seen in Model 3, new significant associations were found in Model 4. Female students were more likely to use alcohol (OR = 1.18, 95% CI = 1.01, 1.39). Also, Hispanic students were less likely to use alcohol (OR = 0.74, 95% CI = 0.56, 0.98). In Model 4, no significant associations were evident between alcohol use and levels of community service. The addition of self-reported grades resulted in an AIC Δ of 5.9% in Model 4.

Table 4.2

Multiple Logistic Regression Models Examining Alcohol Use and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	0.90 (0.74, 1.10)	0.84 (0.69, 1.03)	0.86 (0.70, 1.05)	0.96 (0.78, 1.19)
5-9 hours per month	0.86 (0.67, 1.11)	0.77 (0.58, 1.02)	0.78 (0.58, 1.04)	0.87 (0.63, 1.20)
10+ hours per month	0.94 (0.70, 1.28)	0.87 (0.61, 1.25)	0.89 (0.62, 1.27)	0.99 (0.68, 1.42)
Female	--	1.12 (0.96, 1.32)	1.06 (0.89, 1.27)	1.18* (1.01, 1.39)
Age				
14 yrs old	--	0.63* (0.48, 0.82)	0.62* (0.48, 0.81)	0.61* (0.47, 0.79)
15 yrs old	--	0.70* (0.52, 0.94)	0.73* (0.54, 0.99)	0.69* (0.49, 0.96)
16 yrs old	--	Ref.	Ref.	Ref.

17 yrs old	--	1.17 (0.96, 1.43)	1.22 (0.98, 1.51)	1.22 (0.98, 1.52)
18 yrs old	--	1.67* (1.25, 2.23)	1.73* (1.29, 2.32)	1.73* (1.29, 2.31)
Race/Ethnicity				
African American	--	0.68* (0.49, 0.96)	0.64* (0.46, 0.89)	0.59* (0.42, 0.83)
Asian	--	0.41* (0.27, 0.61)	0.39* (0.27, 0.58)	0.42* (0.28, 0.62)
Hispanic	--	0.86 (0.67, 1.10)	0.80 (0.62, 1.02)	0.74* (0.56, 0.98)
Other	--	1.07 (0.68, 1.68)	0.99 (0.62, 1.57)	0.89 (0.54, 1.45)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.78 (0.60, 1.01)	0.79 (0.60, 1.03)
Talk with a teacher	--	--	0.86 (0.72, 1.04)	0.90 (0.73, 1.09)
Sad/hopeless feelings	--	--	1.73* (1.39, 2.16)	1.45* (1.19, 1.78)
Self-reported grades	--	--	--	--
Mostly As	--	--	--	0.64* (0.51, 0.80)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	1.54* (1.19, 1.99)
Mostly D/Fs	--	--	--	1.70* (1.16, 2.51)
Model-specific				
<i>n</i>	2,516	2,456	2,427	2,319
Wald χ^2 statistic	$\chi^2(3) = 2.86^{**}$	$\chi^2(12) = 74.10^{**}$	$\chi^2(15) = 232.41^{**}$	$\chi^2(18) = 479.37^{**}$
AIC	371,817.6	354,499.8	345,760.6	325,472.6

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

Marijuana use. In Model 1, community service was regressed on marijuana use. As can be seen in Table 4.3, a significant protective effect was evident for all three levels of community service (1-4, 5-9 and 10+ hr/month) in the model. Compared to students not engaged in community service (reference group), those reporting 1-4 hr per month (OR = 0.73, 95% CI = 0.58 - 0.93), 5-9 hours per month (OR = 0.70, 95% CI = 0.51, 0.96), and 10+ hours per month of community service (OR = 0.71, 95% CI = 0.54, 0.95) were less likely to report marijuana use.

Demographic measures were added to the logistic regression model (Model 2) next. Females, as compared to males (reference group), were less likely to report using marijuana (OR = 0.69, 95% CI = 0.55, 0.85). Compared to 16 year olds (reference group), 14 year olds (OR = 0.44, 95% CI = 0.26, 0.77) and 15 year olds (OR = 0.59, 95% CI = 0.42, 0.83) were less likely to use marijuana; while 17 year olds (OR = 1.26, 95% CI = 1.03, 1.54) and 18 year olds (OR = 1.40, 95% CI = 1.03, 1.90) were more likely to use marijuana. Examining race/ethnicity, Asian (OR = 0.48, 95% CI = 0.27, 0.83) and Hispanic students (OR = 0.64, 95% CI = 0.48, 0.86) were less likely to report using marijuana as compared to White students (reference group). Upon addition of these demographic measures, the associations between marijuana use and all three levels of community service remained significant. The addition of demographic measures in Model 2 resulted in an AIC Δ of 6.2%.

In Model 3, students who described being able to talk to a teacher were less likely to report marijuana use (OR = 0.70, 95% CI = 0.53, 0.92). Students who described sad and hopeless feelings reported being more likely to use marijuana (OR = 1.90, 95% CI = 1.60, 2.25). The pattern of associations observed for the levels of community service and

demographic measures remained. Adding environmental measures in Model 3 resulted in an AIC Δ of 4.1%.

Self-reported grades were included in Model 4. Compared to students who reported mostly B's (reference group), students reporting mostly A's were less likely to report using marijuana (OR = 0.69, 95% CI = 0.53, 0.91). Students reporting grades of mostly C's (OR = 2.01, 95% CI = 1.44, 2.81) or D's/F's (OR = 2.37, 95% CI = 1.43, 3.91) were twice as likely to use marijuana. While the pattern of associations for demographic and environmental measures is similar to that seen in Model 3, the protective effect for all three levels of community service was no longer evident. Adding self-reported grades in Model 4 resulted in an AIC Δ of 7.3%.

Table 4.3

Multiple Logistic Regression Models Examining Marijuana Use and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	0.73* (0.58, 0.93)	0.72* (0.57, 0.91)	0.73* (0.58, 0.93)	0.85 (0.67, 1.07)
5-9 hours per month	0.70* (0.51, 0.96)	0.64* (0.45, 0.89)	0.62* (0.44, 0.87)	0.73 (0.49, 1.09)
10+ hours per month	0.71* (0.54, 0.95)	0.67* (0.51, 0.87)	0.70* (0.52, 0.94)	0.80 (0.60, 1.09)
Female	--	0.69* (0.55, 0.85)	0.64* (0.52, 0.79)	0.72* (0.59, 0.89)
Age				
14 yrs old	--	0.44* (0.26, 0.77)	0.43* (0.25, 0.75)	0.43* (0.24, 0.77)
15 yrs old	--	0.59* (0.42, 0.83)	0.59* (0.43, 0.83)	0.55* (0.39, 0.77)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	1.26* (1.03, 1.54)	1.31* (1.08, 1.60)	1.34* (1.09, 1.66)

18 yrs old	--	1.40* (1.03, 1.90)	1.46* (1.08, 1.98)	1.46* (1.05, 2.04)
Race/Ethnicity				
African American	--	0.78 (0.49, 1.23)	0.71 (0.46, 1.12)	0.58* (0.37, 0.90)
Asian	--	0.48* (0.27, 0.83)	0.45* (0.26, 0.80)	0.52* (0.29, 0.94)
Hispanic	--	0.64* (0.48, 0.86)	0.56* (0.41, 0.77)	0.49* (0.35, 0.69)
Other	--	1.10 (0.73, 1.66)	1.02 (0.68, 1.56)	0.86 (0.54, 1.37)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.81 (0.60, 1.09)	0.89 (0.65, 1.21)
Talk with a teacher	--	--	0.70* (0.53, 0.92)	0.73* (0.54, 0.98)
Sad/hopeless feelings	--	--	1.90* (1.60, 2.25)	1.61* (1.35, 1.92)
Self-reported grades	--	--	--	--
Mostly As	--	--	--	0.69* (0.53, 0.91)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	2.01* (1.44, 2.81)
Mostly D/Fs	--	--	--	2.37* (1.43, 3.91)
Model-specific				
<i>n</i>	2,564	2,501	2,465	2,352
Wald χ^2 statistic	$\chi^2(3) = 12.19^{**}$	$\chi^2(12) = 146.28^{**}$	$\chi^2(15) = 420.86^{**}$	$\chi^2(18) = 432.32^{**}$
AIC	321,035.91	301,122.96	288,930.5	267,885.6

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

Hard drug use. In Model 1, community service was regressed on hard drug use.

As can be seen in Table 4.4, significant associations were found for two levels of

community service (1-4 and 5-9 hr/month) in the model; thus, indicating a protective effect. Compared to students not engaged in community service (reference group), those reporting 1-4 hr per month (OR = 0.60, 95% CI = 0.46 - 0.77) and 5-9 hr per month (OR = 0.37, 95% CI = 0.20, 0.67) of community service were less likely to report hard drug use.

In Model 2, demographics were added to the logistic regression model. Females, as compared to males (reference group), were less likely to report using hard drugs (OR = 0.68, 95% CI = 0.50, 0.92). Compared to 16 year olds (reference group), 15 year olds (OR = 0.41, 95% CI = 0.25, 0.67) were less likely to use hard drugs. Examining race/ethnicity, African American students (OR = 0.43, 95% CI = 0.19, 0.94) were less likely to report using hard drugs as compared to White students (reference group). Upon addition of these demographic measures, the associations between hard drug use and community service levels remained significant across two levels of community service (1-4 and 5-9 hr/month). The addition of demographic measures in Model 2 resulted in an AIC Δ of 8.3%.

In Model 3, students who described being able to talk to a teacher were less likely to report hard drug use (OR = 0.54, 95% CI = 0.37, 0.78). Students who described sad and hopeless feelings reported being three times more likely to use hard drugs (OR = 3.19, 95% CI = 2.21, 4.60). The pattern of associations observed for hard drug use, on two levels of community service (1-4 and 5-9 hr/month) and demographic measures remained significant. In Model 4, the pattern of associations observed for the community service levels and demographic measures were unchanged. Adding environmental measures in Model 3 resulted in an AIC Δ of 9.6%.

Self-reported grades were included in Model 4. Compared to students who reported mostly B's (reference group), there was no association among students reporting mostly A's. Students reporting grades of mostly C's (OR = 2.03, 95% CI = 1.58, 2.60) or D's/F's (OR = 2.66, 95% CI = 1.62, 4.39) were twice as likely to use hard drugs. The pattern of associations observed for the community service levels and demographic measures were unchanged in Model 4, with one exception— female students were no longer more likely to report hard drug use than male students. Adding self-reported grades in Model 4 resulted in an AIC Δ of 9.3%.

Table 4.4

Multiple Logistic Regression Models Examining Hard Drug Use and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	0.60* (0.46, 0.77)	0.57* (0.43, 0.75)	0.56* (0.39, 0.80)	0.61* (0.43, 0.87)
5-9 hours per month	0.37* (0.20, 0.67)	0.35* (0.19, 0.66)	0.30* (0.17, 0.54)	0.33* (0.15, 0.71)
10+ hours per month	0.94 (0.48, 1.82)	0.71 (0.34, 1.50)	0.81 (0.36, 1.82)	0.79 (0.30, 2.12)
Female	--	0.68* (0.50, 0.92)	0.60* (0.42, 0.87)	0.68 (.46, 1.01)
Age				
14 yrs old	--	0.50 (0.24, 1.01)	0.42* (0.20, 0.90)	0.31* (0.12, 0.77)
15 yrs old	--	0.41* (0.25, 0.67)	0.38* (0.23, 0.63)	0.36* (0.20, 0.63)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	1.20 (0.82, 1.75)	1.29 (0.87, 1.92)	1.35 (0.91, 1.99)
18 yrs old	--	1.58 (0.99, 2.49)	1.60* (1.05, 2.44)	1.57* (1.07, 2.31)
Race/Ethnicity				
African	--	0.43* (0.19, 0.92)	0.26* (0.11, 0.61)	0.21* (0.09, 0.50)

American		0.94)	0.59)	0.50)
Asian	--	0.77 (0.40, 1.49)	0.70 (0.36, 1.36)	0.68 (0.30, 1.57)
Hispanic	--	1.15 (0.79, 1.67)	0.90 (0.61, 1.34)	0.82 (0.52, 1.28)
Other	--	1.82 (0.87, 3.82)	1.47 (0.69, 3.17)	1.20 (0.50, 2.85)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.76 (0.53, 1.07)	0.82 (0.55, 1.22)
Talk with a teacher	--	--	0.54* (0.37, 0.78)	0.61* (0.40, 0.92)
Sad/hopeless feelings	--	--	3.19* (2.21, 4.60)	2.61* (1.82, 3.74)
Self-Reported grades	--	--	--	--
Mostly As	--	--	--	0.62 (0.37, 1.02)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	2.03* (1.58, 2.60)
Mostly D/Fs	--	--	--	2.66* (1.62, 4.39)
<hr/>				
Model-specific				
<i>n</i>	2,602	2,534	2,495	2,379
Wald χ^2 statistic	$\chi^2(3) = 26.60^{**}$	$\chi^2(12) = 114.72^{**}$	$\chi^2(15) = 184.75^{**}$	$\chi^2(18) = 393.56^{**}$
AIC	163,312.4	149,727.87	135,345.5	122,786.4

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

† The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

Sexual intercourse. In Model 1, community service was regressed on sexual intercourse. As can be seen in Table 4.5, significant associations were found for only one level of community service (1-4 hr/month) in the model (OR = 0.78, 95% CI = 0.63, 0.97); indicating a protective effect.

In Model 2, demographics were added to the logistic regression model. No significant associations were found in comparing females to males (reference group) for sexual intercourse. Compared to 16 year olds (reference group), 14 year olds (OR = 0.36, 95% CI = 0.25, 0.53) and 15 year olds (OR = 0.43, 95% CI = 0.33, 0.57) were less likely to engage in sexual intercourse; while 17 year olds (OR = 1.91, 95% CI = 1.47, 2.49) were more likely and 18 year olds (OR = 2.59, 95% CI = 1.93, 3.48) were twice as likely to engage in sexual intercourse. Examining race/ethnicity, Asian students (OR = 0.48, 95% CI = 0.34, 0.68) were less likely and Hispanic students (OR = 1.67, 95% CI = 1.28, 2.18) were more likely to report engaging in sexual intercourse as compared to White students (reference group). In spite of the addition of these demographic measures, the associations found between sexual intercourse and levels of community service were significant across two levels of community service (1-4 and 10+ hr/month). The addition of demographic measures in Model 2 resulted in an AIC Δ of 11.0%.

In Model 3, students who described being able to talk to a parent were less likely to report engaging in sexual intercourse (OR = 0.64, 95% CI = 0.51, 0.80). Students who reported sad and hopeless feelings reported being twice as likely to engage in sexual intercourse (OR = 2.28, 95% CI = 1.81, 2.88). In Model 3, the pattern of associations observed for the community service levels and demographic measures was essentially unchanged. Adding environmental measures in Model 3 resulted in an AIC Δ of 4.2%.

Self-reported grades were included in Model 4. When examining students who reported mostly B's (reference group), students reporting grades of mostly A's (OR = 0.68, 95% CI = 0.52, 0.90) were less likely to engage in sexual intercourse. Students reporting grades of mostly C's (OR = 1.91, 95% CI = 1.48, 2.47) were more likely to

engage in sexual intercourse and those students reporting mostly D's/F's were three times as likely to engage in sexual intercourse (OR = 3.58, 95% CI = 2.38, 5.39). While the pattern of associations for demographic and environmental measures was similar to that seen in Model 3, the associations between sexual intercourse and community service levels were not significant across the three levels of community service. Adding self-reported grades in Model 4 resulted in an AIC Δ of 7.8%.

Table 4.5

Multiple Logistic Regression Models Examining Sexual Intercourse and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	0.78* (0.63,0.97)	0.73* (0.60, 0.90)	0.75* (0.61, 0.93)	0.90 (0.70, 1.16)
5-9 hours per month	0.77 (0.49, 1.19)	0.65 (0.41, 1.01)	0.68 (0.43, 1.08)	0.83 (0.50, 1.38)
10+ hours per month	0.77 (0.49, 1.20)	0.64* (0.42, 0.98)	0.66 (0.43, 1.03)	0.77 (0.48, 1.23)
Female	--	0.94 (0.79, 1.13)	0.88 (0.73, 1.06)	0.97 (0.79, 1.18)
Age				
14 yrs old	--	0.36* (0.25, 0.53)	0.35* (0.24, 0.51)	0.29* (0.20, 0.43)
15 yrs old	--	0.43* (0.33, 0.57)	0.44* (0.34, 0.58)	0.41* (0.30, 0.55)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	1.91* (1.47, 2.49)	2.04* (1.56, 2.67)	2.16* (1.65, 2.84)
18 yrs old	--	2.59* (1.93, 3.48)	2.83* (2.12, 3.77)	2.81* (2.13, 3.71)
Race/Ethnicity				
African American	--	1.29 (0.94, 1.78)	1.16 (0.83, 1.62)	0.99 (0.74, 1.35)
Asian	--	0.48* (0.34, 0.68)	0.45* (0.31, 0.65)	0.51* (0.34, 0.75)

Hispanic	--	1.67* (1.28, 2.18)	1.46* (1.10, 1.93)	1.29 (0.96, 1.74)
Other	--	1.48 (0.86, 2.49)	1.30 (0.75, 2.27)	1.14 (0.64, 2.04)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.64* (0.51, 0.80)	0.70* (0.55, 0.88)
Talk with a teacher	--	--	0.89 (0.71, 1.11)	0.98 (0.78, 1.23)
Sad/hopeless feelings	--	--	2.28* (1.81, 2.88)	2.01* (1.58, 2.56)
Self-reported grades	--	--	--	--
Mostly As	--	--	--	0.68* (0.52, 0.90)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	1.91* (1.48, 2.47)
Mostly D/Fs	--	--	--	3.58* (2.38, 5.39)
<hr/>				
Model-specific				
<i>n</i>	2,426	2,369	2,337	2,231
Wald χ^2 statistic	$\chi^2(3) = 5.87^{**}$	$\chi^2(12) = 315.10^{**}$	$\chi^2(15) = 652.20^{**}$	$\chi^2(18) = 1,240.33^{**}$
AIC	361,071.2	321,214.5	307,778.0	283,877.5

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

Health Risk Factors

Two health risk factor measures— BMI-based overweight and BMI-based obesity—were analyzed. For each measure, four previously described models were computed. Results are reported in Tables 4.6 and 4.7.

Table 4.6

Multiple Logistic Regression Models Examining BMI-based Overweight and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	0.84 (0.66, 1.08)	0.88 (0.68, 1.15)	0.90 (0.70, 1.16)	0.95 (0.74, 1.21)
5-9 hours per month	0.97 (0.62, 1.54)	0.98 (0.60, 1.62)	0.99 (0.60, 1.64)	1.14 (0.70, 1.86)
10+ hours per month	0.79 (0.43, 1.44)	0.81 (0.44, 1.49)	0.83 (0.45, 1.51)	0.86 (0.49, 1.52)
Female	--	1.09 (0.84, 1.41)	1.06 (0.80, 1.39)	1.05 (0.79, 1.40)
Age				
14 yrs old	--	1.41 (0.94, 2.12)	1.38 (0.92, 2.06)	1.32 (0.87, 2.01)
15 yrs old	--	1.04 (0.79, 1.39)	1.04 (0.78, 1.39)	1.04 (0.75, 1.43)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	0.85 (0.62, 1.18)	0.86 (0.63, 1.18)	0.91 (0.67, 1.24)
18 yrs old	--	0.87 (0.57, 1.33)	0.89 (0.58, 1.37)	0.84 (0.54, 1.31)
Race/Ethnicity				
African American	--	1.91* (1.37, 2.67)	1.85* (1.34, 2.56)	1.74* (1.26, 2.41)
Asian	--	0.72 (0.41, 1.27)	0.72 (0.41, 1.27)	0.74 (0.42, 1.32)
Hispanic	--	1.63* (1.14, 2.33)	1.56* (1.09, 2.25)	1.52* (1.03, 2.24)
Other	--	1.34 (0.85, 2.12)	1.29 (0.82, 2.05)	1.30 (0.82, 2.07)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.84 (0.60, 1.16)	0.78 (0.55, 1.10)
Talk with a teacher	--	--	0.82 (0.62, 1.08)	0.85 (0.62, 1.16)
Sad/hopeless feelings	--	--	1.12 (0.82, 1.52)	1.13 (0.83, 1.54)
Self-reported grades	--	--	--	--
Mostly As	--	--	--	0.76 (0.55,

				1.04)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	1.23 (0.91, 1.67)
Mostly D/Fs	--	--	--	0.80 (0.39, 1.64)
<hr/>				
Model-specific				
<i>n</i>	2,445	2,397	2,359	2,257
Wald χ^2 statistic	$\chi^2(3) =$ 2.14**	$\chi^2(12) =$ 39.11**	$\chi^2(15) =$ 61.13**	$\chi^2(18) =$ 112.82**
AIC	216,205.9	208,065.5	205,334.6	192,571.2

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

BMI-based overweight. In Model 1, community service was regressed on BMI-based overweight. As can be seen in Table 4.6, no significant associations were found for all three levels of community service (1-4, 5-9 and 10+ hr/month) in the model.

Demographics measures were added to the logistic regression model (Model 2). No significant associations were found in comparing females to males (reference group) when examining BMI-based overweight. Compared to 16 year olds (reference group), no significant associations were found in assessing other age groups (14, 15, 17 and 18 year olds). When examining race/ethnicity, African American (OR = 1.91, 95% CI = 1.37, 2.67) and Hispanic students (OR = 1.63, 95% CI = 1.14, 2.33) were more likely to report being overweight as compared to White students (reference group). In spite of the addition of these demographic measures, no associations between BMI-based overweight and levels of community service emerged. The addition of demographic measures in Model 2 resulted in an AIC Δ of 3.8%.

Table 4.7

*Multiple Logistic Regression Models Examining BMI-based
Obesity and Community Service*

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	0.65* (0.48, 0.87)	0.72* (0.53, 0.98)	0.70* (0.51, 0.95)	0.72* (0.52, 0.98)
5-9 hours per month	0.99 (0.61, 1.63)	1.09 (0.62, 1.89)	1.10 (0.63, 1.90)	1.17 (0.68, 2.02)
10+ hours per month	1.34 (0.84, 2.16)	1.44 (0.87, 2.37)	1.31 (0.78, 2.22)	1.35 (0.78, 2.33)
Female	--	0.47* (0.35, 0.63)	0.44* (0.33, 0.58)	0.44* (0.33, 0.59)
Age				
14 yrs old	--	1.03 (0.64, 1.65)	1.02 (0.63, 1.66)	1.00 (0.63, 1.60)
15 yrs old	--	1.22 (0.90, 1.65)	1.23 (0.91, 1.66)	1.25 (0.92, 1.68)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	1.05 (0.77, 1.43)	1.04 (0.75, 1.48)	1.02 (0.73, 1.42)
18 yrs old	--	0.89 (0.54, 1.47)	0.88 (0.52, 1.49)	0.81 (0.46, 1.41)
Race/Ethnicity				
African American	--	2.07* (1.29, 3.33)	2.12* (1.31, 3.44)	1.90* (1.12, 3.22)
Asian	--	1.25 (0.81, 1.92)	1.23 (0.79, 1.91)	1.21 (0.75, 1.93)
Hispanic	--	1.63* (1.09, 2.43)	1.58* (1.05, 2.40)	1.60* (1.03, 2.47)
Other	--	1.77* (1.08, 2.90)	1.75* (1.07, 2.86)	1.67* (1.03, 2.72)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.92 (0.59, 1.43)	0.94 (0.60, 1.49)
Talk with a teacher	--	--	1.33 (0.91, 1.93)	1.33 (0.92, 1.91)
Sad/hopeless feelings	--	--	1.47* (1.10, 1.96)	1.39* (1.01, 1.93)
Self-reported grades	--	--	--	--
Mostly As	--	--	--	0.95 (0.65,

				1.38)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	1.23 (0.87, 1.74)
Mostly D/Fs	--	--	--	1.16 (0.65, 2.05)
<hr/>				
Model-specific				
<i>n</i>	2,445	2,397	2,359	2,257
Wald χ^2 statistic	$\chi^2(3) = 10.87^{**}$	$\chi^2(12) = 68.56^{**}$	$\chi^2(15) = 142.55^{**}$	$\chi^2(18) = 194.10^{**}$
AIC	179,367.3	171,735.6	169,044.3	162,798.8

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

In Model 3, there were no significant associations among students who reported being able to talk to a parent, students who described being able to talk to a teacher and students who described sad and hopeless feelings. There was no observable pattern of associations for community service and demographic measures across any of the levels of community service. Adding environmental measures in Model 3 resulted in an AIC Δ of 1.3% and improved the explanatory power of the model.

Self-reported grades were included in Model 4. Compared to students who reported mostly B's (reference group), no significant associations were found for students reporting mostly A's, mostly C's or mostly D's/F's. No patterns of associations were observed between BMI-based overweight and levels of community service in Model 4. Adding self-reported grades in Model 4 resulted in an AIC Δ of 6.2%.

BMI-based obesity. In Model 1, community service was regressed on BMI-based obesity. As can be seen in Table 4.7, a significant association was found; indicating a protective effect. Compared to students not engaged in community service (reference group), those reporting 1-4 hours per month of community service (OR =0.65, 95% CI = 0.48, 0.87) were less likely to report BMI-based obesity.

In Model 2, demographic measures were added to the logistic regression model. Females as compared to males (reference group) were less likely to report BMI-based obesity (OR = 0.47, 95% CI = 0.35, 0.63). Compared to 16 year olds (reference group), no significant associations were found among other age groups (14, 15, 17 and 18 year olds). Examining race/ethnicity, African American (OR = 2.07, 95% CI = 1.29, 3.33), Hispanic students (OR = 1.63, 95% CI = 1.09, 2.43) and other students (OR = 1.77, 95% CI = 1.08, 2.90) were more likely to report being obese as compared to White students (reference group). Despite the addition of these demographic measures, the associations between BMI-based obesity and levels of community service were significant for 1-4 hours per month of community service. The addition of demographic measures in Model 2 resulted in an AIC Δ of 4.3%.

In Model 3, students who described sad and hopeless feelings reported being more likely to be obese (OR = 1.47, 95% CI = 1.10, 1.96). There were no significant associations found when examining students who described being able to talk to a parent or teacher. The pattern of associations observed for community service levels and demographic measures was unchanged. Adding environmental measures in Model 3 resulted in an AIC Δ of 1.6% and improved the explanatory power of the model.

Self-reported grades were included in Model 4. Compared to students who reported mostly B's (reference group), there were no significant associations observed among students reporting mostly A's, mostly C's or mostly D's/F's. The pattern of associations for demographic and environmental measures was similar to that seen in Model 3. A significant association was evident between 1-4 hr per month of community service and BMI-based obesity, but not for the other two levels (5-9 and 10+ hr/month) in Model 4. Adding self-reported grades in Model 4 resulted in an AIC Δ of 3.7%.

Healthy Behaviors

The three healthy behavior measures— physical activity guidelines met, aerobic physical activity guidelines met, and TV/computer/video game use guidelines met (or screen time guidelines)— were analyzed. As explained in chapter 3, all three measures survey responses were transformed using national guidelines. For each health behavior measure, four models were computed.

Physical activity guidelines met. In Model 1, community service was regressed on physical activity guidelines met. As can be seen in Table 4.8, a significant protective effect was evident for all three levels of community service (1-4, 5-9 and 10+ hr/month) in the model. Compared to students not engaged in community service (reference group), those reporting 1-4 hr per month (OR = 1.47, 95% CI = 1.16, 1.86), 5-9 hours per month (OR = 1.50, 95% CI = 1.13, 1.98), and 10+ hours per month of community service (OR = 1.59, 95% CI = 1.09, 2.32) were more likely to report meeting physical activity guidelines.

Demographics measures were added to the logistic regression model (Model 2). Females as compared to males (reference group) were less likely to report meeting physical activity guidelines (OR = 0.46, 95% CI = 0.38, 0.55). Compared to 16 year olds (reference group), 14 year olds (OR = 1.64, 95% CI = 1.22, 2.19) were more likely to meet physical activity guidelines. Examining race/ethnicity, African American (OR = 0.58, 95% CI = 0.41, 0.84) and Hispanic students (OR = 0.68, 95% CI = 0.52, 0.90) were less likely to report meeting physical activity guidelines as compared to White students (reference group). Even with the addition of these demographic measures, the associations between physical activity guidelines met and levels of community service were significant across all three levels of community service. The addition of demographic measures in Model 2 resulted in an AIC Δ of 6.1%.

In Model 3, students who described being able to talk to a teacher were more likely to report meeting physical activity guidelines (OR = 1.47, 95% CI = 1.19, 1.83). Students who described sad and hopeless feelings reported being less likely to meet physical activity guidelines (OR = 0.63, 95% CI = 0.51, 0.79). The pattern of associations observed for community service levels and demographic measures remained. Adding environmental measures in Model 3 resulted in an AIC Δ of 2.9% and improved the explanatory power of the model.

Self-reported grades were included in Model 4. Compared to students who reported mostly B's (reference group), students reporting mostly D's/F's were less likely to report meeting physical activity guidelines (OR = 0.55, 95% CI = 0.39, 0.78). No associations were found in students reporting grades of mostly A's or mostly C's. While the pattern of associations for demographic and environmental measures was similar to

that seen in Model 3, there was one exception. The significant association found for Hispanic students was lost in Model 4. The protective effect of community service participation remained evident across all three levels of community service in Model 4. Adding self-reported grades in Model 4 resulted in an AIC Δ of 4.9%.

Table 4.8

Multiple Logistic Regression Models Examining Physical Activity Guidelines Met and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	1.47* (1.16, 1.86)	1.59* (1.22, 2.05)	1.54* (1.20, 1.98)	1.45* (1.12, 1.89)
5-9 hours per month	1.50* (1.13, 1.98)	1.74* (1.28, 2.35)	1.76* (1.32, 2.36)	1.70* (1.25, 2.32)
10+ hours per month	1.59* (1.09, 2.32)	1.88* (1.31, 2.68)	1.85* (1.31, 2.63)	1.73* (1.25, 2.41)
Female	--	0.46* (0.38, 0.55)	0.46* (0.39, 0.56)	0.44* (0.36, 0.52)
Age				
14 yrs old	--	1.64* (1.22, 2.19)	1.68* (1.28, 2.21)	1.73* (1.29, 2.34)
15 yrs old	--	1.24 (0.98, 1.58)	1.22 (0.95, 1.57)	1.26 (0.96, 1.65)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	0.91 (0.70, 1.20)	0.87 (0.66, 1.15)	0.85 (0.64, 1.12)
18 yrs old	--	0.91 (0.68, 1.21)	0.90 (0.69, 1.18)	0.90 (0.68, 1.20)
Race/Ethnicity				
African American	--	0.58* (0.41, 0.84)	0.63* (0.44, 0.90)	0.64* (0.45, 0.91)
Asian	--	0.78 (0.54, 1.13)	0.81 (0.55, 1.19)	0.80 (0.56, 1.16)
Hispanic	--	0.68* (0.52, 0.90)	0.74* (0.56, 0.99)	0.74 (0.54, 1.01)
Other	--	1.21 (0.82, 1.80)	1.33 (0.88, 2.02)	1.39 (0.93, 2.07)

White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	1.09 (0.75, 1.58)	1.05 (0.71, 1.56)
Talk with a teacher	--	--	1.47* (1.19, 1.83)	1.39* (1.12, 1.73)
Sad/hopeless feelings	--	--	0.63* (0.51, 0.79)	0.65* (0.51, 0.82)
Self-Reported grades	--	--	--	--
Mostly As	--	--	--	1.15 (0.86, 1.53)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	0.87 (0.69, 1.11)
Mostly D/Fs	--	--	--	0.55* (0.39, 0.78)
<hr/>				
Model-specific				
<i>n</i>	2,611	2,544	2,502	2,386
Wald χ^2 statistic	$\chi^2(3) = 13.79^{**}$	$\chi^2(12) = 387.41^{**}$	$\chi^2(15) = 471.55^{**}$	$\chi^2(18) = 682.74^{**}$
AIC	356,277.7	334,456.7	324,682.8	308,884.6

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

Aerobic physical activity guidelines met. In Model 1, community service was regressed on aerobic physical activity guidelines met. As can be seen in Table 4.9, a significant protective effect was evident for all three levels of community service (1-4, 5-9 and 10+ hr/month) in the model. Compared to students not engaged in community service (reference group), those reporting 1-4 hr per month (OR = 0.73, 95% CI = 0.58 - 0.93), 5-9 hr per month (OR = 0.70, 95% CI = 0.51 - 0.96), and 10+ hr per month of community service (OR = 0.71, 95% CI = 0.54, 0.95) were more likely to report meeting aerobic physical activity guidelines.

In Model 2, demographics measures were added to the logistic regression model. Females as compared to males (reference group) were less likely to report meeting aerobic physical activity guidelines (OR = 0.50, 95% CI = 0.41, 0.62). Compared to 16 year olds (reference group), 14 year olds (OR = 1.46, 95% CI = 1.04, 2.04) and 15 year olds (OR = 1.46, 95% CI = 1.12, 1.90) were more likely to meet aerobic physical activity guidelines. Examining race/ethnicity, African American (OR = 0.46, 95% CI = 0.33, 0.63), Asian (OR = 0.42, 95% CI = 0.31, 0.58) and Hispanic students (OR = 0.59, 95% CI = 0.46, 0.75) were less likely to report meeting aerobic physical activity guidelines as compared to White students (reference group). Despite the addition of these demographic measures, the associations between aerobic physical activity guidelines met and levels of community service remained significant across all three levels of community service. The addition of demographic measures in Model 2 resulted in an AIC Δ of 6.7%.

In Model 3, students who described being able to talk to a parent (OR = 1.42, 95% CI = 1.10, 1.82) and talk to a teacher (OR = 1.59, 95% CI = 1.34, 1.88) were more likely to report meeting aerobic physical activity guidelines. Students who described sad and hopeless feelings reported being less likely to meet aerobic physical activity guidelines (OR = 0.82, 95% CI = 0.68, 0.99). The pattern of associations observed in Model 2 for community service levels and demographic measures was evident. Adding environmental measures in Model 3 resulted in an AIC Δ of 3.4% and improved the explanatory power of the model.

Self-reported grades were included in Model 4. Compared to students who reported mostly B's (reference group), students reporting mostly D's/F's were less likely to report meeting aerobic physical activity guidelines (OR = 0.42, 95% CI = 0.28, 0.63).

For students reporting grades of mostly A's or mostly C's, no significant associations were found. The protective effect remained evident across all three levels of community service in Model 4. Adding self-reported grades in Model 4 resulted in an AIC Δ of 5.7%.

Table 4.9

Multiple Logistic Regression Models Examining Aerobic Physical Activity Guidelines Met and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	1.95* (1.60, 2.38)	2.05* (1.67, 2.51)	1.99* (1.61, 2.46)	1.87* (1.53, 2.29)
5-9 hours per month	1.70* (1.25, 2.30)	1.96* (1.37, 2.80)	1.98* (1.42, 2.77)	1.97* (1.38, 2.81)
10+ hours per month	1.91* (1.20, 3.04)	2.19* (1.40, 3.42)	2.11* (1.32, 3.38)	2.09* (1.30, 3.38)
Female	--	0.50* (0.41, 0.62)	0.49* (0.40, 0.60)	0.45* (0.36, 0.57)
Age				
14 yrs old	--	1.46* (1.04, 2.04)	1.52* (1.10, 2.10)	1.64* (1.15, 2.33)
15 yrs old	--	1.46* (1.12, 1.90)	1.46* (1.11, 1.92)	1.45* (1.07, 1.98)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	0.98 (0.79, 1.22)	0.94 (0.74, 1.18)	0.91 (0.71, 1.19)
18 yrs old	--	0.89 (0.65, 1.22)	0.87 (0.65, 1.17)	0.87 (0.64, 1.18)
Race/Ethnicity				
African American	--	0.46* (0.33, 0.63)	0.51* (0.37, 0.69)	0.51* (0.38, 0.68)
Asian	--	0.42* (0.31, 0.58)	0.47* (0.34, 0.66)	0.48* (0.36, 0.64)
Hispanic	--	0.59* (0.46, 0.75)	0.64* (0.50, 0.83)	0.70* (0.55, 0.90)
Other	--	0.73 (0.47, 1.42)	0.80 (0.49, 1.31)	0.84 (0.52, 1.35)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	1.42* (1.10, 1.83)	1.39* (1.07, 1.80)

			1.82)	1.81)
Talk with a teacher	--	--	1.59* (1.34, 1.88)	1.50* (1.27, 1.78)
Sad/hopeless feelings	--	--	0.82* (0.68, 0.99)	0.88 (0.72, 1.08)
Self-Reported grades	--	--	--	--
Mostly As	--	--	--	1.06 (0.83, 1.36)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	0.90 (0.70, 1.16)
Mostly D/Fs	--	--	--	0.42* (0.28, 0.63)
<hr/>				
Model-specific				
<i>n</i>	2,616	2,548	2,506	2,389
Wald χ^2 statistic	$\chi^2(3) = 59.21^{**}$	$\chi^2(12) = 175.96^{**}$	$\chi^2(15) = 375.75^{**}$	$\chi^2(18) = 450.56^{**}$
AIC	365,839.8	341,179.7	329,498.8	310,615.3

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

TV/computer/video game use guidelines met. In Model 1, community service was regressed on TV/computer/video game use guidelines met. As can be seen in Table 4.10, a significant protective effect was evident for levels of community service in the model. Compared to students not engaged in community service (reference group), those reporting 1-4 hr per month (OR = 0.73, 95% CI = 0.58, 0.93) and 5-9 hr per month (OR = 1.39, 95% CI = 1.12, 1.71) were more likely to report meeting TV/computer/video game use guidelines.

Demographics measures were added to the logistic regression model (Model 2). Female students as compared to male students (reference group) were more likely to

report meeting TV/computer/video game use guidelines (OR = 1.29, 95% CI = 1.08, 1.54). Compared to 16 year olds (reference group), 17 year olds (OR = 1.37, 95% CI = 1.10, 1.71) were more likely to report meeting TV/computer/video game use guidelines. Examining race/ethnicity, African American (OR = 0.66, 95% CI = 0.50, 0.87) and Asian students (OR = 0.55, 95% CI = 0.36, 0.83) were less likely to report meeting TV/computer/video game use guidelines as compared to White students (reference group). Despite the addition of these demographic measures, the associations between TV/computer/video game use guidelines met and levels of community service remained significant across two levels of community service (1-4 and 5-9 hr/month). The addition of demographic measures in Model 2 resulted in an AIC Δ of 3.9%.

In Model 3, there were no significant associations found among students who described being able to talk to a parent, talk to a teacher or described sad and hopeless feelings. The pattern of associations observed across two levels of community service (1-4 and 5-9 hours/month) remained. Adding environmental measures in Model 3 resulted in an AIC Δ of 1.7% and improved the explanatory power of the model.

Self-reported grades were included in Model 4. Compared to students who reported mostly B's (reference group), students reporting mostly A's were more likely to report meeting TV/computer/video game use guidelines (OR = 1.27, 95% CI = 1.03, 1.56). There were no associations found among students reporting grades of mostly C's or mostly D's/F's. While the pattern of associations for demographic and environmental measures was similar to that seen in Model 3, an association remained between 1-4 hours per month of community service and TV/computer/video game use guidelines met. Adding self-reported grades in Model 4 resulted in an AIC Δ of 4.5%.

Table 4.10

Multiple Logistic Regression Models Examining TV/Computer/Video game Guidelines Met and Community Service

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Community service				
None	Ref.	Ref.	Ref.	Ref.
1-4 hours per month	1.45* (1.24, 1.69)	1.37* (1.18, 1.60)	1.38* (1.17, 1.61)	1.27* (1.07, 1.50)
5-9 hours per month	1.39* (1.12, 1.71)	1.32* (1.07, 1.63)	1.26* (1.02, 1.55)	1.16 (0.93, 1.46)
10+ hours per month	1.43 (0.89, 2.28)	1.42 (0.87, 2.34)	1.45 (0.88, 2.38)	1.37 (0.82, 2.27)
Female	--	1.29* (1.08, 1.54)	1.31* (1.10, 1.56)	1.26* (1.05, 1.51)
Age				
14 yrs old	--	1.18 (0.89, 1.56)	1.19 (0.90, 1.57)	1.20 (0.90, 1.60)
15 yrs old	--	0.99 (0.71, 1.38)	1.01 (0.72, 1.41)	1.02 (0.74, 1.41)
16 yrs old	--	Ref.	Ref.	Ref.
17 yrs old	--	1.37* (1.10, 1.71)	1.40* (1.13, 1.74)	1.40* (1.12, 1.76)
18 yrs old	--	1.40 (0.91, 2.16)	1.35 (0.87, 1.10)	1.28 (0.80, 2.04)
Race/Ethnicity				
African American	--	0.66* (0.50, 0.87)	0.64* (0.48, 0.85)	0.63* (0.49, 0.82)
Asian	--	0.55* (0.36, 0.83)	0.55* (0.37, 0.82)	0.51* (0.34, 0.77)
Hispanic	--	0.80 (0.63, 1.02)	0.79 (0.62, 1.02)	0.78 (0.59, 1.02)
Other	--	0.67 (0.45, 1.00)	0.67 (0.45, 1.01)	0.66 (0.43, 1.01)
White	--	Ref.	Ref.	Ref.
Talk with a parent	--	--	0.98 (0.78, 1.23)	0.97 (0.78, 1.22)
Talk with a teacher	--	--	0.96 (0.80, 1.15)	0.93 (0.77, 1.13)
Sad/hopeless feelings	--	--	1.05 (0.88, 1.24)	1.18* (1.00, 1.39)
Self-Reported grades	--	--	--	--

Mostly As	--	--	--	1.27* (1.03, 1.56)
Mostly Bs	--	--	--	Ref.
Mostly Cs	--	--	--	0.80 (0.63, 1.01)
Mostly D/Fs	--	--	--	0.97 (0.65, 1.42)
<hr/>				
Model-specific				
<i>n</i>	2,620	2,553	2,510	2,393
Wald χ^2 statistic	$\chi^2(3) = 25.90^{**}$	$\chi^2(12) = 126.28^{**}$	$\chi^2(15) = 134.51^{**}$	$\chi^2(18) = 187.69^{**}$
AIC	351,101.4	337,529.9	331,894.9	316,949.3

* Confidence intervals (95% CI) not containing the null value (1.00) are statistically significant at $p < .05$.

** $p < .0001$ for Wald χ^2 tests.

†The Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the amount of information explained across the logistic regression models. A lower AIC value indicates a model is a better fit for the observed data.

Summary

The relationship between community service participation and health risk behaviors among adolescents enrolled in Massachusetts public high schools were examined in this study. Drawing on existing theories and previous research, four statistical models were developed and tested. The statistical models were focused on (a) community service participation levels (Model 1); (b) demographic characteristics (Model 2); (c) environmental factors (Model 3); and (d) academic achievement (Model 4). All models were tested to explore direct and moderating factors leading to health outcomes.

Three study research questions were explored. These included (a) the relationship between youth community service participation and adolescent health risk behaviors, (b) the extent to which youth community service participation related to adolescent health

risk behaviors, and (c) whether youth community service participation was a protective factor against adolescent health risk behaviors.

Several findings emerged from this study as can be seen in Table 4.11. Results from this study demonstrated that youth community service participation can serve as a protective factor for several adolescent health behaviors. Study findings are summarized below in the following categories: health risk behaviors, health risk factors, and healthy behaviors.

Health risk behaviors (alcohol, tobacco, marijuana, hard drugs, sexual intercourse). Community service participation was related to three of the five health risk behaviors. Marijuana use was where community service participation provided a protective effect through Model 3. Then, once self-reported grades were added to the model, the effect of the community service variable was no longer significant. Community service participation was also associated with tobacco use suggesting a protective effect through Model 3 for community service participation at 1-4 hr per month. Hard drug use was where community service participation was found to be significant and protective in all models at the levels of 1-4 hr per month and 5-9 hr per month. Community service participation was not related to two health risks behaviors, which include alcohol and sexual intercourse. This finding suggests that community service participation was protective against tobacco, marijuana, and hard drug use.

Health risk factors (BMI-based overweight, obesity). No association was found between community service participation and BMI-based overweight. However, BMI-

based obesity was related to community service participation through Model 4 at the community service level of 1-4 hr per month. This finding suggests that participating in some level of community service activity (1-4 hr/month) may be protective against obesity.

Healthy behaviors (physical activity guidelines met, aerobic physical activity guidelines met, TV/computer/video game use guidelines met). Community service participation was associated across all four models for physical activity guidelines met and aerobic physical activity guidelines met. Community service participation may facilitate meeting the national physical activity guidelines. There is a relationship between community service participation and TV/computer/video game use guidelines met through Model 4 for community service 1-4 hr per month and 5-9 hr per month. This finding suggests that participating in community service may facilitate meeting the national TV/computer/video game use guidelines of no more than 2 hr per day of adolescent screen time.

Table 4.11

Summary of Youth Community Service and Health Behaviors Study Effects by Model

Health Outcomes	Model 1 (community service)	Model 2 (demographic measures added)	Model 3 (environmental measures added)	Model 4 (self-reported grades added)	Results
Risky health behaviors					
Tobacco use	1-4 hours	1-4 hours	1-4 hours	None	Participation in 1-4 hrs. of CS = less likely to report tobacco use; Association held for addition of demographic & environmental measures; Association is lost due to self-reported grades
Alcohol use	None	None	None	None	No association
Marijuana use	All 3 levels	All 3 levels	All 3 levels	None	Participation in 3 levels of CS = less likely to report marijuana use; Association held for addition of demographic & environmental measures; Association is lost due to self-reported grades
Hard drug use	1-4 hours; 5-9 hours	1-4 hours; 5-9 hours	1-4 hours; 5-9 hours	1-4 hours; 5-9 hours	Participation in 2 levels of CS = less likely to report hard drug use; Association held for addition of demographic, environmental measures & self-reported grades; Community service (CS) is protective across all 4 models at 2 levels of CS

Sexual intercourse	1-4 hours	1-4 hours	1-4 hours	None	Participation in 1-4 hrs. of CS = less likely to report sexual intercourse; Association held for addition of demographic & environmental measures; Association is lost due to self-reported grades
Health risk behaviors					
BMI-based overweight	None	None	None	None	No association
BMI-based obesity	1-4 hours	1-4 hours	1-4 hours	1-4 hours	Participation in 1-4 hrs. of CS = less likely to report being obese; Association held for addition of demographic, environmental measures & self-reported grades; Community service is protective for all 4 models, but at the lowest level of participation
Healthy behaviors					
Physical activity guidelines met	All 3 levels	All 3 levels	All 3 levels	All 3 levels	Participation in 3 levels of CS = more likely to report meeting physical activity guidelines; Association held for addition of demographic, environmental measures & self-reported grades; Community service is protective across all 4 models; CS

					increases the likelihood of meeting the national guidelines
Aerobic physical activity guidelines met	All 3 levels	All 3 levels	All 3 levels	All 3 levels	Participation in 3 levels of CS = more likely to report meeting physical activity guidelines; Association held for addition of demographic, environmental measures & self-reported grades; Community service is protective across all 4 models; CS increases the likelihood of meeting the national guidelines
TV/computer/video game guidelines met	1-4 hours; 5-9 hours	1-4 hours; 5-9 hours	1-4 hours; 5-9 hours	1-4 hours	Participation in CS = more likely to report meeting screen time guidelines; Association held for addition of demographic, environmental measures & self-reported grades; CS increases the likelihood of meeting the national guidelines at the 1-4 hr. level

CHAPTER 5

SUMMARY AND CONCLUSIONS

Discussion

The present study examined the relationship between community service participation and health risk behaviors among Massachusetts high school students. Most of the research conducted to date has rarely explored the associations between community service participation and adolescent health risk behaviors. The present study specifically examines adolescent health risk behaviors, thereby elucidating some of the interesting and relevant dynamics related to how community service participation impacts adolescent health outcomes. Three research questions were examined within four statistical models. The models focused on (a) community service participation, (b) demographic characteristics, (c) environmental factors, and (d) academic achievement.

This chapter begins with a discussion of the findings from the four study models. The discussion specifically addresses the main results for each model, the key findings from previous research, and the ways in which schools may be able to address the study results to benefit the students. Finally, the limitations, conclusions and recommendations of the study are discussed, along with insights regarding possible future directions for research.

Summary of the Study Results

Adolescent participation in extracurricular activities such as community service (volunteerism) is a productive use of adolescents' leisure time and can provide opportunities for positive youth development (Eccles & Gootman, 2002; Larson, 2000). Extracurricular activities have been positively related to academic outcomes (e.g., grades, school connectedness); psychological outcomes (e.g., self-efficacy, self-esteem); and reduced problem behaviors (e.g., substance abuse, delinquency) in adolescents (Feldman & Matjasko, 2005; Fredricks & Eccles, 2008, 2006; Guèvremont, Findlay, & Kohen, 2014). Nevertheless, existing research has yet to provide a clear explanation for the complex relationship that exists between adolescent community service participation and health behaviors. The present study contributes to the current body of research by examining the relationship between adolescent community service participation and health behaviors. These findings suggest that involvement in community service participation has a positive impact on health risk behaviors and youth development in addition to complimentary research by Guèvremont et al. (2014). Results of these two new studies are encouraging and present findings related to health outcomes that had not been fully examined by prior research.

The present study demonstrates that youth community service participation can serve as a protective factor for adolescent health behaviors with demographics, the environment, and academic achievement impacting the relationship. Different associations with adolescent health behaviors or outcomes are found for youth participation in volunteer activity. The majority of the health behaviors or outcomes are associated with varying levels of adolescent community service participation. In

particular, adolescent community service participation is protective for tobacco, marijuana, and hard drug use; sexual behavior; BMI-based obesity; aerobic and physical activity guidelines met; and TV/computer/video game guidelines met. In contrast, there are no associations between community service participation and alcohol use or BMI-based overweight.

The analyses also reveal an association with sex/gender and eight out of ten health behaviors with the exception of sexual behavior and BMI-based overweight. Age is strongly associated for all adolescent health behaviors with the exception of two health risk behaviors—BMI-based overweight and BMI-based obesity. Associations are found with race/ethnicity for all adolescent health outcomes when compared to White students. Environmental factors are associated with several health outcomes, with the exception of alcohol use, BMI-based overweight and obesity, and TV/computer/video game guidelines met. Academic achievement (self-reported grades) is associated with all adolescent health outcomes with the exception of BMI-based overweight and BMI-based obesity. These study findings are consistent with prior research as extracurricular activities and youth volunteerism can be associated with a number of constructive academic, emotional, and behavioral outcomes (Feldman & Matjasko, 2005; Guèvremont et al., 2014).

Despite a large body of research relating youth involvement to positive outcomes, researchers have failed to specifically distinguish the positive relationship between adolescent community service participation and health outcomes. Current study findings suggest that community service participation is associated with several adolescent health outcomes and that community service participation may be a viable and actionable intervention for influencing adolescent health behaviors and development. Community

service opportunities are available and open to all students as compared to other types of extracurricular activities like sports or athletics, which can be competitive and only open to a limited number of students. Therefore, community service participation is perhaps a prevention and intervention strategy that could be aimed at positively influencing the adolescent population.

Understanding the Relationship Between Youth Community Service and Health Outcomes

It is widely accepted that one of the main threats to adolescent health is preventable risk behaviors (CDC, 2012e). Youth participation in health risk behaviors has long been a source of concern to parents, educators, and adolescent health care providers. Those concerns are well documented. Recent survey results revealed that within the past thirty days American high school students had consumed alcohol; used marijuana; smoked cigarettes; and engaged in sex without having used a condom at last contact within the past 30 days (CDC, 2012e). These health behaviors place students at risk for the leading causes of morbidity and mortality. Adolescent problem behavior has been examined in this study using Bandura's SCT (Bandura, 1977) and Jessor's PBT (Jessor & Jessor, 1977). The theories were used to conceptualize the psychosocial factors that relate to the development of problematic health behaviors in adolescence. Some adolescents become involved in multiple risk behaviors with the likelihood of involvement increasing with age (Baranowski et al., 2002). Thus, there is a need for interventions that can have an impact over a range of prospective health risk behaviors during the adolescent years. Perhaps, one such intervention is community service or volunteerism that is tailored to interest and maximize adolescent involvement and participation.

The present correlational study findings are consistent with previous research related to adolescent volunteerism. Past studies have found that there is an association between adolescents' prosocial behavior (e.g., extracurricular activities) and risky health behaviors (Donovan et al., 1991; Eccles & Barber, 1999; Jessor, 1992; Murphey et al., 2004; Penner et al., 2005). Earlier investigations demonstrated that youth volunteering helped reduce several health risk behaviors, such as drug use, violence, and early pregnancy (Haski-Leventhal et al., 2008; Kuperminc et al., 2001; Lam, 2012; Martin & Brown, 2008; Penner et al., 2005;) and had a positive impact on adolescent success in school (Balsano, 2005; Haski-Leventhal et al., 2008;). Current study results, therefore, lead to the supposition that youth participation in community service can positively impact health risk behaviors by providing students with an alternative way to spend their leisure or free time.

Understanding the Contributing Factors of Adolescent Community Service Participation

This study adds to the current field of research by examining the associations of youth participation in community service with a variety of health risk behaviors. In general, the associations between community service participation and adolescent health risk behaviors are mostly positive. Study findings are discussed as they pertain to previous research and potential school recommendations in the sections to follow.

Community Service Participation: Model 1

Health outcomes. Study findings show that adolescent involvement in community service (1-4, 5-9, or 10+ hr per month) is positively associated with health

behaviors. Students who participate in more hours of community service are less likely to be involved in negative or risky health behaviors, which include tobacco, alcohol, marijuana and hard drug use and sexual behavior. Conversely, students who participate in more hours of community service are more likely to be involved in positive or healthy behaviors including, meeting national guidelines for physical activity, aerobic physical activity, TV/computer/video game use guidelines, and BMI-based obesity measures.

The results suggest that adolescent community service participation is protective against tobacco, marijuana, and hard drug use and sexual behavior. It is also protective against BMI-based obesity, aerobic and physical activity guidelines met, and TV/computer/video game guidelines met. Community service is not protective against alcohol use and BMI-based overweight due to the lack of association. In contrast, community service participation is protective for meeting the national guidelines for physical activity and TV/computer/video game usage (or screen time use); which are health promoting behaviors. The findings from this study suggest that in addition to engagement in sports (one of the most popular activities), community service participation can be protective for many of the adolescent health behaviors examined. These protective effects have been found to enhance the likelihood of positive outcomes and lessen the likelihood of negative consequences from exposure to health risks (Jessor et al., 1998).

With respect to the primary research question of this study, a positive relationship is found between adolescent community service participation and health behaviors. This finding is consistent with a seminal study conducted by Eccles and Barber (1999). In that study, adolescents who participated in prosocial activities, such as volunteerism and

sports participation, had the most consistently positive outcomes—high academic achievement and low rates of involvement in risky health behaviors (Eccles & Barber, 1999). These prosocial activities served as a protective influence for the outcomes studied (Eccles & Barber, 1999; Fredricks & Barber, 2008, 2006).

As expected from previous research, the present results illustrate that students who volunteer are less likely to be involved in risky health behaviors during the high school years compared to their non-involved peers (Eccles et al., 2003). There are several factors that might attempt to explain the relationship between community service participation and adolescent health risk behaviors. This study does not offer a rationale for why community service is protective. However, leading researchers have pointed out a variety of plausible explanations. These include adolescent participation in community service could (a) provide relief from boredom, (b) teach values and moral lessons, (c) offer perceived peer status; allow interaction with positive role models, (d) offer constructive use of leisure time, (e) establish positive social support networks, and (f) provide leadership and interpersonal skills and knowledge (Eccles & Barber, 1999; Kuperminc et al., 2001; Landers & Landers, 1978). These potential explanations are not necessarily considered mutually exclusive, but may work in combination to influence the context of development as adolescence is a period of influence, growth and potential. Future research is warranted to better understand these explanations for the relationship.

Leisure time. Today's adolescents have more discretionary time now than in the past. Time is a resource that can be used productively or not. This study considers community service as a leisure time activity (i.e., free time outside of school or work

activities) on which youth can spend their time (Sharp et al., 2006). After-school time has been identified as a time of risk in that it can be prime time for youth to get in trouble; generally, due to the lack of adult supervision. In prior research, volunteerism has been viewed and studied as a means for helping adolescents “stay out of trouble.” Studies about youth suggest that volunteering behavior reduces the likelihood of engaging in problem behaviors (Wilson, 2000). Leisure time activities have been identified as a potential developmental time and schools as a developmental setting. Both have been suggested as a means to facilitate positive youth development (Sharp et al., 2006).

This study suggests that participation in community service is associated with positive outcomes, thus, there is merit in the encouraging youth to give back during their free time. Adolescents can learn how to think about and experience volunteer work orchestrated through schools, for example. Adolescents who volunteer during their high school years develop more prosocial attitudes and are more likely to volunteer in college and later in their adult life (Eccles & Barber, 1999; Wilson, 2000;). Previous researchers have found that free or leisure time activities can offer unique developmental and growth opportunities for adolescents that are not only constructive, but prepare them for adulthood (Larson, 2000, 2001). Schools are a logical institution in which to encourage and support adolescent community service participation (Sundeen & Raskoff, 1994) because of the unique role in teaching students to be not only educated, but healthy, productive adults. Since schools are believed to encourage volunteering behavior among adolescents, it is natural to consider the school as a setting for an intervention or program related to promoting positive student health outcomes. However, more research is warranted in identifying the role of schools as well as the specific mechanisms through

which participation in structured activities, such as community service participation, may influence adolescent health outcomes, growth, and development.

Community service participation could be a positive way to encourage adolescents to use their free time to help others and perhaps avoid the pitfalls associated with adolescence. Engaging adolescents through community service participation not only benefits society as a whole, but also the adolescents themselves by encouraging positive youth development and discouraging involvement in negative health behaviors. In this study, student respondents indicated that community service participation was considered a leisure time activity. This finding aligns with research by Wilson (2000), who demonstrated that volunteering is not only beneficial for the helper, but, also for those person(s) who are helped. In the case of adults, volunteerism yields positive effects for life-satisfaction, self-esteem, self-rated health, and for educational and occupational achievement, functional ability, and mortality reduction (Wilson, 2000). These same results could be hypothesized about adolescents. However, due to limited studies involving youth and volunteerism benefits, more research is needed to determine what involvement in community service does or does not explain about adolescent outcomes, including engagement in health risk behaviors.

Demographic Characteristics (Sex, Age, Race/Ethnicity): Model 2

The literature on adolescent community service participation suggests that demographic characteristics such as age, sex/gender, and race/ethnicity have some influence on adolescent volunteerism and these factors were included in the current study. Study results showed that relationships exist between community service

participation and adolescent health behaviors, but varied by demographic characteristics. It is notable that the addition of the demographic characteristics did not change the focal relationship with community service participation across the health behaviors.

Sex. There is an association between health behaviors and sex/gender. Female students are less likely than male students to report the use of tobacco, marijuana, and hard drugs. They are also less likely to be classified as meeting the national guidelines for BMI-based obesity and aerobic and physical activity guidelines. In contrast, female students were more likely than male students to use alcohol and meet TV/computer/video game use guidelines. There is no association of sex/gender with sexual behavior and BMI-based overweight.

The present results suggest that the above associations appear to be moderated by sex/gender; that is, participation in community service is perhaps differentially associated with the health outcomes for girls vs. boys. There also appears to be a protective effect for female students who volunteer. When looking at males, the study findings suggest that more attention may need to be provided to male students in hopes of mitigating their involvement in risky health behaviors. A school-based, community service intervention could be designed especially for male students to offer them an alternative to potential engagement in negative health behaviors, such as using tobacco, alcohol, or marijuana. As an illustration, male students could be offered the opportunity to participate in a school-based shop class where they repair beds for a homeless shelter. This type of structured setting would allow for connection to an experienced teacher as well as instruction and controlled access to shop equipment needed to perform the service.

Age. Student age is associated with many of the adolescent health behaviors examined in the study. Adolescents aged 14 and 15 years old (compared to 16 year olds) appear to be protected from these health risk behaviors—tobacco, alcohol, marijuana and hard drug use and sexual behavior. They are also more likely to meet the aerobic and physical activity guidelines as well as the TV/computer/video game use or screen time guidelines. There is no association between student age and BMI-based overweight and BMI-based obesity. The results from the present study suggest that community service may reduce the likelihood of adolescents engaging in risky behavior that could negatively impact some physical health behaviors.

Research trends show that of those adolescents who volunteer, it is generally the older adolescents who are volunteering more than the younger ones (Child Trends, 2010; Chou, 1998). On the other hand, age is a recognized barrier to access for several vices, such as tobacco, alcohol or hard drugs used in risky health behavior. Given that the findings of this study suggest the protectiveness of younger age, it could be proposed that community service participation might play a role in the prevention of negative health behaviors. In fact, younger students prior to age 16 years could be targeted with interventions or programs focused on volunteerism because they are normally exposed to less negative health behaviors than their older counterparts. Middle school might be a critical time in adolescence to offer an intervention like community service because by high school youth may be less impacted by a program. The literature suggests that providing youth with prosocial opportunities and involvement earlier may lead to less antisocial behavior as they progress through adolescence and into young adulthood (Feldman & Matjasko, 2005). To illustrate, younger students could be partnered with a

teacher or parent and allowed to help their community by serving soup and sandwiches at a local homeless shelter or by building and tending a community garden. Both of these activities could model prosocial behavior and demonstrate the benefits of helping others within the community.

Race/ethnicity. Student race/ethnicity is associated with all ten of the adolescent health behaviors examined in the study. Study results indicate that African American, Asian and Hispanic students (compared to White students) are less likely to report tobacco, alcohol, marijuana, and hard drug use. Asian students are less likely to report engaging in sexual behavior, while Hispanic students are more likely to engage in sexual behavior. African American and Hispanic students are more likely to meet BMI-based overweight and obesity guidelines as compared to White students. In terms of healthy behaviors, African American and Hispanic students are less likely to report meeting both the aerobic and physical activity guidelines. African American and Asian students are less likely to meet the TV/computer/video game use or screen time guidelines. The health behaviors resulting in a correlation are seen as protective for ethnic or nonWhite students.

While previously published findings on the connection between ethnicity and volunteerism have been found to be limited and conflicting, it might be beneficial to engage ethnic students (nonWhite) in a community service opportunity. Research by Raskoff and Sundeen (2001) and others (Frase, 1995) has indicated that Asian American adolescents formally volunteered more than Whites, Latinos or Blacks; while Nolin et al. (1997) ranked White adolescents as volunteering the most of any racial/ethnic group. This trend of volunteerism presents an opportunity for the development of a possible

intervention. As such, present study results suggest the need for future research that would explore racial/ethnic differences, learn how to increase community service participation among ethnic groups, and develop school-based programs or interventions that would directly appeal to nonWhite students. What's more, with the implementation of these tailored interventions or programs, it might be possible to positively impact the health outcomes of ethnic students. To illustrate, a community service activity could be designed that would allow ethnic students to engage with the community by volunteering at a nursing home or assisting at a voter registration drive. However, to understand the complexities of adolescent community service participation and health outcomes among different racial/ethnic groups, more research is necessary.

In summary, study findings parallel those found in previous investigations in that female students are more likely than male students to volunteer (Gibson, 2008; Nolin et al., 1997). Rates of volunteerism also appear to increase as youth move from early to late stage adolescence; and factors such as age or gender can moderate the effectiveness of community service participation on adolescent health outcomes (Kuperminc et al., 2001). The current study findings suggest that sex/gender and age should be considered in designing appropriate interventions, such as community service programs for adolescents. Tailored interventions that guide adolescents into performing more community service could have different effects on males and females, adolescents of varying ages and of different race/ethnicities, and ultimately adolescent health outcomes. Given limited study results, further research on the impact of sex/gender and race/ethnicity on community service participation and adolescent health outcomes is warranted and would also be an important contribution to the field.

Environmental Factors (Talk with Parent, Talk with Teacher, Sad and Hopeless feelings): Model 3

As previously discussed, environmental factors can influence the development of specific youth behaviors and positive school environments; both of which are associated with decreased occurrences of risky health behaviors among adolescents. The present study generally defines environmental factors as student opportunities to talk to a parent/family member regarding important things, talk to a teacher/adult regarding problems, and report sad or hopeless feelings during the past 12 months. Overall, environmental factors included in Model 3 are positively associated with community service participation and adolescent health behaviors except for BMI-based overweight and BMI-based obesity.

Study findings reveal that environmental factors can positively impact student health behavior. Specifically, in the study, sad or hopeless feelings are found to be related to these health behaviors—tobacco, alcohol, marijuana and hard drug use; sexual behavior; BMI-based obesity; aerobic and physical activity guidelines met; and TV/computer/video game use guidelines met. Students who felt sad or hopeless report being more likely to engage in health risk behaviors and meeting screen time guidelines; but, less likely to meet national guidelines related to physical activity and BMI-based obesity. Additionally, student reports concerning the opportunity to talk with a parent or teacher about matters of importance or problems are correlated with risky health behaviors as well as healthy behaviors. Students who talked to a teacher or with a parent are less likely to use tobacco, marijuana and hard drugs; and engage in sexual behavior. Conversely, students who talk to a parent or teacher are more likely to meet the aerobic and physical activity guidelines. Talking with a parent or teacher, however, is not

associated with alcohol use, BMI-based overweight, BMI-based obesity and meeting the TV/computer/video game use guidelines. The study findings suggest that having the ability to talk to a parent or teacher may influence adolescent involvement in risky health behaviors. Hence, it is important to consider whether parents or educators will have an impact on encouraging school-based community service participation and decreasing negative health outcomes.

Self-efficacy. The study results appear consistent with the theoretical underpinnings of a social cognitive perspective that emphasizes that the environment has the potential to influence adolescents' behavior through the impact it has on their self-efficacy. Self-efficacy focuses on adolescents' beliefs in terms of their abilities or capabilities regarding specific tasks and activities (Bandura, 1977a, 1977b, 1989, 2001), such as avoiding risky health behaviors. Interestingly, in this study environmental factors were correlated with risky health behaviors, such as tobacco and marijuana use, and healthy behaviors, as well as meeting the national guidelines for physical activity. The study findings also suggest that community service participation could be a plausible intervention that results in mitigating adolescent health risk behaviors and encourage health promoting behaviors. Previous studies have shown that self-efficacy is a strong predictor of adolescent behaviors (Pajares & Miller, 1994; Zimmerman & Cleary, 2006). Specifically, Bandura's (1997) research has demonstrated that there are specific things that can be done to influence self-efficacy. For instance, adolescents' self-efficacy could potentially increase by learning from their previous personal experiences of volunteering; watching others volunteer; receiving encouragement to engage in volunteer behaviors

from parents, educators or peers; and experiencing a positive emotional state as a result of engaging in community service activities.

As discussed previously, prosocial behaviors such as community service, promoted and modeled by both parents and educators, can directly impact adolescent health behaviors. These behaviors cannot be explained independently of how adolescents explain their own abilities, self-regulation, and perceptions of control over health outcomes (Bandura, 1986, 1989). Adolescents with a highly developed sense of efficacy are able to exert influence over their own behaviors through self-reflective and self-regulatory processes (Bandura, 1989). Thus, if adolescents effectively regulate the demands of their environment, their ability to participate in community service programs and interventions might lead to increased knowledge of healthy behaviors, which, in turn, might lead to higher self-worth and engagement in healthier behaviors (Zimmerman & Cleary, 2006).

Mentoring. The present study demonstrates that students who report having an opportunity to talk with a parent or teacher about matters of importance or problems are associated with both health risk behaviors and health promoting behaviors. In the case of talking to a teacher, this finding suggests that adolescents perceive that they have an adult at school to go to if they feel the need. Having access to adults, such as teachers or counselors, provides a mentoring opportunity, which could help reduce adolescent engagement in risky health behaviors or encourage involvement in positive health behaviors. Focusing on these relationships could be important as adolescents spend a large portion of their day in school. Adults within the school system have the power to

potentially affect the behaviors of youth, even by indirect means in some cases.

Interventions, such as community service participation, aimed at improving youth physical health, could have benefits, including youth development and academic achievement (Allensworth et al., 2011; Basch, 2011; Smith, 2003). More research should be conducted to determine how best to foster mentoring relationships, between students and adults within schools, in the context of helping students develop by providing volunteer service to the community.

School environment. Schools look to produce well-rounded students. This study suggests that environmental factors are important in reducing adolescent involvement in risky health behaviors and promoting youth development. Previous research found that decreased occurrences of risky health behaviors among adolescents are associated with positive school environments (Catalano, Berglund, et al., 2004a; Catalano, Haggerty, et al., 2004b; Resnick et al., 1997). School environments and practices can work in tandem to affect adolescent health behavior and not only academic achievement. Hence, the environment in which the specific practices are implemented can determine whether adolescents agree with, adopt, or follow the practices and show changes in their behaviors. The school environment and practices that adolescents are exposed to can contribute to their self-awareness, self-motivation, self-efficacy and competence when engaging in healthy behaviors.

Successful adolescent psychosocial development entails both the absence of negative behavioral and psychosocial indicators as well as the presence of positive indicators (Bundick, 2010). Protective factors such as community service participation

can reduce the impact of the confrontation and decrease health risk behaviors in the school environment (Jessor, 1992). Schools can influence students' risky health behaviors through a variety of ways, including support for student involvement in volunteerism and community service. One can speculate that parents or educators can foster and develop a positive school environment by promoting community service participation, which could directly affect adolescent health behaviors. Educators inadvertently serve as gatekeepers to school extracurricular activities. Under their direction and sponsorship, there are a number of ways that student involvement in a school-based, community service intervention could support the community. For example, educators and students could work together to organize a food drive to support a food bank, or parents and students could work with a local church to collect and provide school supplies to youth who are in need, or educators and students could take a field trip to a community park for a clean-up day. By creating structured, safe and nurturing environments that focus on building youth assets, chances for engaging in health risk behaviors are minimized and the end result is likely to be young adults who are healthy and productive.

Academic Achievement: Model 4

Based upon previous research, there is an inverse association between student academic achievement and health risk behaviors (Allensworth et al., 2011; Bradley & Greene, 2013; CDC, 2011a; Datar et al., 2004; Grossman & Kaestner, 1997; Taras & Potts-Datema, 2005). In the current study, academic achievement is operationalized as self-reported grades earned during the past 12 months. Generally, a student who receives a grade of A (where a 4.0 GPA equals an A) is deemed to have achieved, whereas a student who has received a grade of F (where a 1.0 GPA equals an F) is deemed not to

have achieved. As expected, study findings show that students reporting mostly A's (compared to those reporting mostly B's) are less likely to use tobacco, alcohol and marijuana; less likely to engage in sexual behavior; but, more likely to meet the TV/computer/video game guidelines. By comparison, students reporting mostly C's and D/F's (compared to those reporting mostly B's) are more likely to use tobacco, alcohol, marijuana, and hard drugs and engage in sexual behavior. They are also less likely to meet aerobic and physical activity guidelines. There was no association found between student self-reported grades and BMI-based overweight or BMI-based obesity. Study findings also demonstrate that students who reported earning Mostly A's were more likely to be involved in community service as compared to students earning Mostly B's. Students who report earning Mostly D's and F's were less likely to be involved in community service.

Based upon study results, self-reported grades appear to be a moderator variable (explains the circumstances that cause an association between two variables). The addition of student self-reported grades (to Model 4) results in a loss of association with community service participation as it divides the grades into positive (i.e., Mostly A's and B's) and negative (i.e., Mostly D's and F's) categories. This pattern of findings parallels prior research findings from Eccles, Barber, Stone and Hunt (2003) who found that participation in extracurricular activities, such as community service or service learning, have been associated with high school GPA, school engagement, and educational aspirations (e.g., Youniss, McLellan, & Yates, 1999), as well as to higher educational achievement (e.g., Barber et al., 2001; Youniss et al., 1999). Similarly, the study findings relate to prior research that finds that academic achievement serves as a

strong indicator for the overall well-being of youth and a primary predictor of adult health outcomes (CDC, 2011a; Datar et al., 2004; Grossman & Kaestner, 1997; Taras & Potts-Datema, 2005). However, there is one caveat with the current study findings related to the fact that it is possible that students who already do well in school may be more likely to participate in community service. For that reason, it may be more difficult to reach clarity with regards to the findings.

Despite the possibility of unmeasured student characteristics like motivation, the present study findings suggest that community service participation is protective against tobacco, alcohol, and marijuana use or sexual behavior for students who volunteer as compared to their non-volunteering peers; behaviors that are commonly considered to be teenage taboos. This finding supports the collection of prior research studies that continue to demonstrate that there is an established relationship between academic achievement and adolescent health outcomes (Bradley & Greene, 2013; Basch, 2011; Hawkins, 1997; Murphey et al., 2004; Murray et al., 2007). Considering the evidence presented, there is merit in continuing to explore the potential role of youth community service participation and academic achievement related to the impact on adolescent health outcomes. Connecting community service participation and academics could play a role in reducing the likelihood of adolescent engagement in health risk behaviors that would ultimately threaten student academic performance.

In summary, promoting academic achievement (commonly indicated by academic grades or GPA) among school-aged youth, who are susceptible to engaging in risky health behaviors, may reduce the likelihood of behaviors that would threaten students' health and their academic performance (Hawkins, 1997). Findings from the current study

are consistent with prior research which showed that academic achievement has been associated with the avoidance of cigarette smoking, alcohol, and marijuana as well as delayed sexual initiation (Murphey et al., 2004). An additional review by Murray and colleagues (2007) that was focused on school health-based interventions and academic achievement found an association between risky adolescent health behaviors and poor academic achievement (Murray et al., 2007). Community service participation may offer an opportunity for a school-based intervention that would not only improve student academic achievement, but also positively impact adolescent health behaviors.

The concept of school-based service learning dates back to the foundational writings of John Dewey (1938), the modern father of experiential education, who pointed to the collective importance of social and intellectual development. During the 20th century, service learning morphed into the concept of experiential learning, both of which form the basis for linking school-based community service to school curriculum and student experiences. This linkage allows for a more integrated approach where students could learn and develop through active participation in structured volunteer opportunities that meet community needs as well as academic requirements (Meinhard, Foster, & Wright, 2009; Mooney & Edwards, 2001). To illustrate, for high school students who are currently studying civics and government or social studies, there could be an opportunity to serve the community by tutoring immigrants who are preparing for their U.S. citizenship exam. This illustration allows students to think about the skills and knowledge needed to improve the life of someone else in the community versus focusing on themselves—a tendency often exhibited among adolescents. Student involvement in a school-based intervention focused on volunteerism could suggest that adolescents would

have less free time to engage in risky health behaviors. Conceivably, students who volunteer could experience improved academic achievement and physical health benefits within the experiential learning context.

Limitations

The findings of this study were drawn from the 2009 MYRBS and should be considered in the context of several limitations. First, the data collected were based on cross-sectional and self-report responses. The association between community service participation and adolescent health risk behaviors was examined, but no conclusions about causal relationships could be drawn. The current study was correlational and only described the relationships found among the study measures. Correlation does not imply causation is the rule. Therefore, it was not possible to explain why a relationship exists or determine the direction of the relationship between community service participation and adolescent health risk behaviors.

A second limitation was that estimates of the associations may not be generalizable to the majority of adolescents attending high school in the United States. The associations represent adolescents who attend public high schools in Massachusetts. Since students from only one state were represented, regional limitations and difficulties with self-reported health behaviors may exist. Thus, limiting how generalizable the results of the study can be when applied to students outside of Massachusetts.

A third limitation was that measures were based on self-report data obtained from students who completed the MYRBS survey. Much of what is known and published about adolescent health behavior is derived from self-reported measures (Siegel et al.,

1998). Hence, the question of respondent honesty (and validity of survey data) is ever-present when interpreting survey findings (Siegel et al., 1998). Students may provide misleading or socially acceptable responses, despite assurances of confidentiality and requests for honesty, when responding to surveys. Self-reported data may be subject to error or bias for several reasons, including inaccurate recall of events or answers to questions that reflect what students think survey administrators would want to record (e.g., social desirability). Stewart (2012) states that frequently, there are differences in actual observations of behaviors versus self-reported frequencies of the behaviors. This is likely because young people want to look better to others by over reporting socially desirable behaviors and underreporting the undesirable behaviors. It could also be a case of the limitations of human memory and selective attention biases distorting self-reported behaviors (Brener et al., 2003; Stewart, 2012). Therefore, it cannot be completely determined whether the respondents tended to over-report or under-report health risk behaviors. Questions related to accurate reporting are particularly important when considering sensitive questions such as those related to sexual behavior and hard drug or alcohol use (Brener et al., 2003; Siegel et al., 1998). Regardless of the stated limitations, self-report data can be useful (Stewart, 2012). This is especially the case when examining information that is not easily observed such as perceptions, preferences, opinions, and attitudes; all of which are only accessible by the person who holds them. Assessing youth health risk behaviors as part of research activities necessitates the use of self-report measures (Brener et al., 2003). Moreover, there is an advantage to using self-report data because it provides access to the respondents' own views and perceptions, which are generally unobtainable in any other direct way.

A fourth limitation was primarily related to the collection of data in the school setting. The data were obtained from the MYRBS survey and are only applicable to youth who are enrolled and attend public high schools in the state of Massachusetts. School enrollment generally captures the youth population who report being enrolled full time in school during the academic year. The information reported by the surveyed students would only apply to high school-aged youth who are currently enrolled in high school. Therefore, a proportion of Massachusetts youth are not represented in the study results, including those who are classified as drop outs, homeless, incarcerated, or home schooled, for instance. This results in a limited description of the population.

A fifth limitation came from examining the psychosocial and socioeconomic characteristics of the Massachusetts youth or selected sample versus other U.S. youth. While the Massachusetts sample was comprised of youth living in the Northeast, there are likely differences between these youth and those representing other geographic regions. Another point of consideration is that there may also be distinct differences among respondents with respect to their genetics and personality factors. There could also be differences in the social or physical environments. The socioeconomic status of parents could play a role in the differences among respondents. Additionally, the racial/ethnic differences in the communities in which the youth live or the local culture of the community where youth grow up, may be a factor in respondent differentiations. This constellation of psychosocial factors may contribute to high-risk behaviors (Jessor, 1991). Youth living in Massachusetts are not likely to be comparable to those living in other regions of the country due to the perceived differences in psychosocial and socioeconomic factors.

A sixth limitation was based upon the way the data were collected. The 2009 MYRBS is a self-administered, pencil-and-paper survey given in a classroom during the school day. Based upon how and where the survey was administered, there could be a data collection bias based upon several factors including (a) having the teacher in the room while the survey is being administered, (b) having students responding together in a classroom and not working in isolation, or (c) having males and females taking the survey together in the same class room versus separately (Stewart, 2012). These factors could lead to a prejudiced response to the survey questions. It is also worth considering whether it would make a difference or not in student responses if the students were given options, such as being allowed to take the survey online or electronically versus taking it in writing or taking the survey in their bedroom at home versus in the classroom at school.

A seventh limitation was related to the research process and the utilization of existing secondary data as compared to primary data collection. The research questions posed in the study could only be derived from the available data and were dependent on the way that the CDC survey was created, meaning the existing questions and exact wording of the questions were utilized. This process is referred to by some as data mining since secondary data that was not originally collected to answer a predetermined set of research questions was used (Boslaugh, 2007; Hofferth, 2005; Vartanian, 2011). As a result, this study was data-driven rather than driven by research questions based upon the applicable use of health behavior theory prospectively; which could potentially allow higher orders of hypothesis testing.

A final limitation was related to conducting research on this topic. Upon reviewing the wealth of literature using basically the generic term “volunteering,” “community service,” or a variation, it was determined that a vast array of very disparate activities and terms were used (See chapter 1). Likewise, no single definition was found to operationalize the various terms. This point can be illustrated in that there are different types of volunteerism (e.g., formal vs. informal) and volunteerism can be mixed with other relevant topics, such as youth development or civic and social engagement (Wilson, 2000). It is probably not productive to try and describe or explain all volunteer- or community service-related activities with the same set of theories or to treat all activities as if they were the same with respect to type, definition, measurement, or consequences and outcomes (Wilson, 2000). As a matter of fact, there should be more consensus building occurring among researchers and across the disciplines that are assessing this phenomenon.

In spite of the limitations presented, this study documents the association between community service participation and adolescent health behaviors. Analyzing data from the 2009 MYRBS allowed for the generalization of the findings to the population of public high school students in the state of Massachusetts by grade level, sex/gender, and race/ethnicity as well as provided insight into adolescent health behaviors and volunteerism. Further, interpretation of the results should be made with careful consideration of possible bias that may have resulted from the self-report nature of the dataset. Results from this study contribute to the growing body of literature on adolescent time use, health outcomes, and positive youth development.

Conclusions

This study makes an important contribution to the field of adolescent health, in spite of the acknowledged limitations. The study builds upon the existing literature and adds to the growing knowledge base by offering insights into the role community service participation and the school environment can play on adolescent health behaviors. Additionally, the study positions community service participation as an actionable intervention against adolescent health risk behaviors. This finding is important as previous research suggests that participation in community service during the high school years provides a protective effect in terms of involvement in adolescent health behaviors (Feldman & Matjasko, 2005). Extracurricular activities, such as community service, also play a part in promoting academic achievement (Eccles et al., 2003; Landers & Landers 1978). Like other investigations, this study shows that demographic characteristics may contribute to community service participation and better health outcomes, including higher academic achievement aspirations, lower substance use, and a more positive attitude toward school (Fredericks & Eccles, 2008). This study should be considered foundational and could be used as the basis of future longitudinal research studies examining the impact of volunteerism or community service participation on the physical health of adolescents.

Understanding factors that positively contribute to the health and welfare of youth during the adolescent development period is important. Identifying possible routes to better health early may reveal pathways that have long-term effects lasting into adulthood. Although many research questions remain unanswered, present study results conclude that adolescents who participate in community service may benefit because

prosocial involvement is a protective factor. This study lends support for the use of community service participation for understanding and possibly affecting the health outcomes of adolescents. Moreover, the study results suggest that school-based community service may be a viable intervention or approach for potentially impacting adolescent health behaviors, such as decreasing hard drug use, obesity and screen time use or meeting national guidelines designed to increase physical activity and decrease TV/computer/video game use. Providing volunteer opportunities also may offer a means to prevent these health behaviors from occurring among younger adolescents before they take a foothold.

Even with the limitations of this study, there are suggested benefits for adolescents who volunteer. Prosocial behaviors such as community service participation or volunteerism should be seen as actionable in that it is a factor that can be modified or tailored to fit the adolescent. Youth community service participation or volunteerism may offer more than a vehicle for keeping adolescents out of trouble or a means for filling up leisure time. It can be a prevention vehicle to influence and develop adolescents before negative behaviors, such as alcohol, tobacco or drug use, take hold. For example, involvement in community service could provide an opportunity for less motivated students to become more involved with their school and community, which could boost self-esteem and minimize health risks. Further, it may offer a preventive approach for fostering positive adolescent health behavior and addressing the myriad of academic, emotional, social, behavioral, and health-related problems that can exist during adolescence.

Recommendations

There is a growing body of research—in sociology, education, public health, leisure studies and adolescent development to name a few—demonstrating the beneficial effects of youth participation in structured prosocial behaviors and extracurricular activities. Participation has been positively connected to academic, health and psychological outcomes; civic engagement; and avoidance of problem behaviors (Fredricks & Eccles, 2006, 2008). In addition, leisure or free time activities have been identified as a unique developmental setting that facilitates positive adolescent development. Although limited, existing research suggests that adolescents will be more likely to structure their environment in order to seek out interesting activities when they are internally motivated by a specific purpose, a goal or intrinsic pleasure (Sharp et al., 2006). These prior research findings suggest the need for intervention strategies that interest, motivate and engage adolescents.

One such intervention strategy could be adolescent community service participation. Few studies have examined community service participation in association with health outcomes in adolescents. The present study helps to fill that gap by showing an association with 8 of the 10 health outcomes examined. The study findings suggest that adolescent community service participation is largely protective against risky health behaviors. These findings also suggest that adolescent community service participation could be a viable means to beneficially engage students by involving educators and parents in adolescent development as well as bolstering student self-esteem and addressing feelings of sadness or hopelessness. Consequently, the study results indicate

that community service participation could serve as an actionable intervention for mitigating adolescent health risk behaviors.

Interventions or programs aimed at leading adolescents toward altruistic practices or prosocial behaviors like volunteerism could enhance development, growth, and health status over their lifetime (Benson et al., 2007; Wink & Dillon, 2007). Wink and Dillon (2007) noted that adults who were classified as altruistic during adolescence were less likely during older adulthood to engage in health risk behaviors such as smoking or drinking, and more likely to engage in preventive health behaviors (Wink & Dillon, 2007). Thus, school-based interventions or programs aimed at teaching the importance of community service should be developed and tested with adolescents. Involving youth in the actual development of the intervention would perhaps offer the qualities of experiential learning in that students could decide themselves to be personally involved in the learning experience by actively participating in their own learning and taking a personal role in the direction of learning. Interventions should also be designed in such a way to provide youth with opportunities to practice decision making, communication, goal-setting, self-assessment, and self-management skills (Vieno et al., 2007). School-sponsored community service participation allows students to actually learn by doing, which is one of the main steps that comprise experiential learning.

Researchers find that youth participation in community service can help adolescents think of (a) others who have greater needs than they do, (b) themselves as able to make a difference in other's lives, and (c) their community as a place they belong and with which they can identify and have an impact (Vieno et al., 2007). Involvement or participation in structured community service programs allow adolescents to thrive and

prepare for adulthood. As a matter of fact, there is evidence that good youth development programs provide adolescents with access to caring adults and responsible peers, as well as skill-building activities that are associated with doing well in school and maintaining good physical health, thereby, avoiding risky behaviors (Eccles & Gootman, 2002; Scales et al., 2000). Schools and communities should work collaboratively to support community service as an intervention that best meets the developmental needs of adolescents.

Providing community service opportunities as a potential intervention and development opportunity should involve both the school system and the community. Working together they could create a program that serves as a community service or volunteer placement service center, for example. The school could provide a student advisor to oversee, produce and distribute an e-newsletter to the student body, which would make students aware of potential volunteer opportunities. Likewise, the school could host a center, which would provide a place for students to come and review an online database of screened and approved community-based volunteer opportunities. In addition to working with the student advisor, a specialized computer program could be developed and made available to students interested in volunteerism. The computer program would allow the students to enter their information, search and then be matched with appropriate volunteer opportunities from organizations who need student volunteers. The value of such a placement service is that it allows students to be matched with approved volunteer opportunities that meet their interest and criteria for participation. Further, the premise of the placement service is that it is based on the social cognitive approach, specifically reciprocal determinism, which allows for connecting adolescents

to community service opportunities that fit their needs and interests. Perhaps engaging the students in a community service opportunity they choose would allow them to focus on prosocial or health-promoting behaviors versus antisocial or risky health behaviors.

Consistent with prior research, high school students who engaged in community service were less likely to smoke marijuana, abuse alcohol, perform poorly in school, become pregnant, commit delinquent acts, or be arrested (Haski-Leventhal et al., 2008; Kuperminc et al., 2001; Lam, 2012; Penner et al., 2005). Adolescents were also found to receive positive youth development experiences due to their involvement in community service participation (Benson et al., 2006; Eccles & Barber, 1999; Eccles et al., 2003; Mahoney & Cairns, 1997; Reinders & Youniss, 2006;). The findings of this study coupled with prior research suggest that intervention strategies, such as adolescent community service participation, may play a useful role in the more comprehensive approach of mitigating risky health behaviors and negative health outcomes in adolescents. As noted, adolescents involved in constructive, supervised community service opportunities experience benefits such as a sense of belonging, positive peer relationships, high self-esteem, and a sense of competence and efficacy (Murphey et al., 2004). By providing instruction and volunteerism opportunities, schools can potentially influence adolescents' beliefs and values about the relatedness of their academic performance and health behaviors. More importantly, school-based community service programs or interventions may offer a means to prevent or counteract any adverse consequences that could result from student engagement in risky health behaviors.

Implications for School Health

Given the current picture of adolescent health, adolescents are heading in a direction that will add to the national burden of chronic diseases. The health risk behaviors in which adolescents are engaged are a major public health concern. *Healthy People 2020* targets adolescents in two key national objectives and several related health indicators (U.S. Department of Health and Human Services, 2012a). One objective strives to increase educational achievement of adolescents and young adults. The other objective strives to increase the proportion of elementary, middle, and senior high schools that provide comprehensive school health education to prevent health problems. Research indicates the importance of prevention in attempting to keep adolescents from developing behaviors that will result in negative health consequences. Hence, prevention programs or interventions should aim to increase knowledge and to decrease health risk behaviors in adolescence when the impact can be the greatest.

Health education for adolescents must go beyond knowledge alone, recognizing that knowledge alone does not translate to behavior change. Without knowledge, behavior change is not informed. Adolescents must, therefore, be made aware of the benefits community service participation can bring to their life as compared to the challenges associated with unstructured free or leisure time. As suggested in the *National Health Education Standards* (Joint Committee on National Health Education Standards, 2007), schools and communities should be challenged to build and support excellence in health education. Thus, when developing health education programs or behavioral interventions for the youth population, it is important for schools and the community to work in collaboration to offer students interesting and meaningful opportunities for

programs, including community service participation. Schools are a critical setting for disease prevention and a cost-effective location for conducting health education and promotion activities. As a result of this study which examined the relationship between youth health risk behaviors and community service, educators and public health professionals should forge a working relationship with community partners. This joint relationship may result in the development of tailored, school-or community-based programs or interventions and related activities designed to promote positive health behaviors and increase academic performance—a mutual goal—among adolescents, as well as encourage stronger ties to the community.

Schools have always been an important place for interventions or programs to improve student health and promote the healthful development of adolescents (Catalano, Berglund, et al., 2004a; Catalano, Haggerty, et al., 2004b). Schools are also one of the primary entities responsible for youth development and promotion of positive health and social behaviors among adolescents (Smith, 2003). Given the central role that school plays in the lives of students, it can be one of the best environmental influences. Positive school environments are associated with decreased occurrences of risky health behaviors among adolescents (Catalano, Berglund, et al., 2004a; Catalano, Haggerty, et al., 2004b; Resnick et al., 1997). Relatedly, adolescents who participate in community service opportunities and activities may be less likely to engage in risky health behaviors (Kuperminc et al., 2001).

In conjunction with focusing on student academic achievement, perhaps schools could provide an intervention program to reduce selected student health risk behaviors by promoting and providing opportunities for volunteerism and community service

participation. Educators could be trained to use their influence with students to go beyond academics and deliver a community service participation program to improve student health. Educators could also be trained to support their students by offering a means of increasing school connectedness and ways to encourage parental support of volunteerism; both of which could have a positive influence on students' feelings about and engagement in school and their health outcomes (McNeely & Falci, 2004). The students themselves could learn from the experience of helping others and serving their community; plus, share their results, reactions and observations with their peers.

Conceivably, development of a school-based, community service intervention or program should be structured, including elements like building partnerships with voluntary agencies, providing opportunities for students to share their experiences with others, and helping students understand the context for and result of their volunteering behavior. As a consequence, it seems plausible that the more positive the volunteering experiences of the students, the greater the likelihood of continued volunteerism in the future. There is support for this type of program in that intervention research has found that adolescents involved in constructive, supervised community service experience a protective effect (i.e., benefits such as a sense of belonging, positive peer relationships, high self-esteem, and a sense of competence and efficacy) (Murphey et al., 2004). Since schools play a vital role in positive youth development, the strategy of offering community service opportunities to students should be encouraged. Additionally, the potential benefits of student involvement in school-based community service activities should be both promoted and supported by school boards, school administrators, principals, educators, and parents as well as students.

Future Directions

The current study was designed to serve as an investigation of the relationship between community service participation and adolescent health risk behaviors. More research is needed to identify and understanding the specific mechanisms through which youth participation in structured activities, such as volunteerism, may influence youth development. This research is particularly important in determining how prosocial behavior may impact adolescent leisure time, prevent adolescent health risk behaviors, and facilitate positive youth development (Eccles et al., 2003; Eccles & Gootman, 2002). Findings of this study are meant to not only stimulate discussion, but to highlight the need for future research to explore these associations.

Based on study results, several future directions seem promising. First, correlational studies are useful in establishing associations between social influences and health behaviors. For that reason, it would be worthwhile to pursue longitudinal investigations (Windle et al., 2004) because they would substantiate and extend the cross-sectional findings of existing research studies. Future researchers might perhaps consider using the current study's findings to design additional studies examining ways in which volunteering behavior may affect adolescents through the developmental years and transitions that occur from childhood through adolescence with special emphasis on the transition from middle school to high school. Specifically, future investigations can add to the literature with longitudinal studies designed to examine the long-term implications of prosocial behaviors like volunteerism on adolescent's positive and negative health behaviors. Since prior research indicates that students in elementary school (fifth grade specifically) are less likely to engage in unhealthy behaviors, fifth graders could serve as

a baseline age group with regards to documenting health behaviors during adolescence (Windle et al., 2004). Moreover, most health behaviors are shaped over time by social environments, such as schools. It is appropriate then to begin prevention efforts with fifth grade students in elementary schools, enabling longitudinal studies to be designed to compare school impact across elementary, middle, and high schools. It could also be appropriate to include additional contexts, such as sibling influence, peer relationships, teacher influence, and community norms (Catalano, Berglund, et al., 2004a; Hastings et al., 2007; Lam, 2012). Another consideration would be to design a longitudinal study that would be structured in such a way as to distinguish between initiation or escalation or reduction of adolescent health risk behaviors.

Second, further studies examining gender, SES, and race/ethnicity differences on volunteering behavior and adolescent health behaviors are necessary. The literature on community service has identified key factors and differences. Given the noted differences in patterns of volunteering by sex/gender, race/ethnicity, and SES as well as rates of health disparities (Penner et al., 2005; Planty et al., 2006; Wilson, 2012), it would be extremely useful for future studies to go a step further and examine these differences among Latino/Hispanic, African American, Asian and White adolescents. Much of the research has focused on White suburban, middle-class youths. There is a need for studies examining the association between community service and health behaviors for ethnic/racial or minority students living in different environmental contexts (Fredricks & Eccles, 2006).

Third, studies incorporating the potential effects of adolescent peers are suggested given the influence they can have on behavior, such as whether an adolescent volunteers

or not. Interactions with peers can provide both positive and negative developmental opportunities. In two separate studies, Fredricks and Eccles (2006, 2008) found that peer or friendship characteristics may partially explain the relationship between extracurricular activity participation, socio-emotional well-being, and risk-taking behaviors, like having tried alcohol, tobacco or marijuana. Prior research provides support for understanding how peer influences are likely to be relevant to community service participation. Therefore, further examination of the associations among volunteerism, peer characteristics, and youth outcomes, including health, is warranted.

Last, there is a need to design a study that examines motivation. Motivation is an important self-selection and self-report factor to include in a study to determine the basis for why adolescents may engage in community service. It would be expected that highly motivated youth or youth who are more likely to be good students decide to volunteer or engage in extracurricular activities (Fredricks & Eccles, 2006). However, it would be beneficial to know what could predict a favorable response to this prosocial behavior of volunteerism. Intrinsic characteristics to the student, such as temperament, should also be considered given that other research has suggested that adolescent temperament can affect outcomes, such as sports participation. Factors such as these may motivate or impede participation in activities, such as community service participation, and thus, could be examined in future research. Knowing the reasons why adolescents decide to engage or become involved in volunteer activities during their high school years may play an important role and should be explored.

Although future studies are warranted, the present study of the impact of community service participation on adolescent health outcomes provides encouraging

results. Findings from this study suggest that a school-based community service intervention or program that is structured and designed to promote good health behaviors, academic achievement, and positive youth development among youth would be beneficial. In the end, it appears that perhaps a community service intervention or program that is thoughtfully designed and implemented might benefit not only the community and school, but, ultimately, the adolescents, resulting in a win-win situation for all.

LIST OF REFERENCES

- Allen, J. D. (2005). Grades as valid measures of academic achievement of classroom learning. *The Clearing House*, 78(5), 218-223.
- Allen, J. P., Philiber, S., Herrling, S., & Kuperminc, G.P. (1997). Preventing teen pregnancy and academic failure: Experimental evaluation of a developmentally based approach. *Child Development*, 68, 729-742.
- Allensworth, D. D., Lewallen, T. C., Stevenson, B. & Katz, S. (2011). Addressing the needs of the whole child: What public health can do to answer the education sector's call for a stronger partnership. *Preventing Chronic Disease*, 8(2), A44. Retrieved from http://www.cdc.gov/pcd/issues/2011/mar/10_0014.htm
- Allensworth, D. D., Wyche J., Lawson E., & Nicholson L. (Eds.). (1997). *Schools and health: Our nation's investment - Final report of the committee on comprehensive school health programs in grades K-12*. Washington, D.C.: Institute of Medicine, National Academy of Science.
- Altman, D. G., Feighery, E., Robinson, T. N., Haydel, K. F., Strausberg, L., Lorig, K., & Killen, J. D. (1998). Psychosocial factors associated with youth involvement in community activities promoting heart health. *Health Education & Behavior*, 25(4), 489-500.
- American Academy of Pediatrics (2013). Committee on Public Education. Children, adolescents, and the media (policy statement). *Pediatrics*, 132(5), 958-961.
- American Cancer Society (2007). National Health Education Standards. Retrieved from <http://www.cancer.org/healthy/morewaysacshelpsyoustaywell/schoolhealth/national-health-education-standards-2007>.
- Balsano, A. (2005). Youth civic engagement in the United States: Understanding and addressing the impact of social impediments of positive youth and community development. *Applied Developmental Science*, 9(4), 188-201.
- Bandura, A. J. (1977a). Self-efficacy: Toward a unifying theory of behavioral change. *Psychology Review*, 84(2), 191-215.
- Bandura, A. J. (Ed.). (1995). *Self-efficacy in changing societies*. New York, NY: Cambridge University Press.

- Bandura, A. J. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Bandura, A. J. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. J. (1977b). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. J. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of child development: Vol. 6. Six theories of child development* (pp. 1-60). Greenwich, CT: JAI Press.
- Bandura, A. J. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Bandura, A. J., Barbaranelli, C., Caparara, G. V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development*, 72(1), 197-206.
- Bandura, A. J., & Walters, R. H. (1963). *Social learning and personality development*. New York, NY: Holt, Rinehart & Winston.
- Barber, B. L., Eccles, J. S., & Stone, M. R. (2001). Whatever happened to the jock, the brain, and the princess? Young adult pathways linked to adolescent activity involvement and social identity. *Journal of Adolescent Research*, 14, 429-455.
- Baranowski, T., Perry C. L., & Parcel, G. S. (2002). How individuals, environments, and health behavior interact. In K. Glanz, B. Rimer, & F. M. Lewis (Eds.), *Health behavior and health education: Theory research and practice* (pp. 165-184). San Francisco, CA: John Wiley & Sons, Inc.
- Baranowski, T. (1990). Reciprocal determinism at the stages of behavior change: An integration of community, personal and behavioral perspectives. *International Quarterly of Community Health Education*, 10(4), 297-327.
- 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.
- Benson, P. L., Clary, G. E., & Scales, P. C. (2007). Altruism and health: Is there a link during adolescence? In S.G. Post (Ed.), *Altruism and health: Perspectives from empirical research* (Chapter 7, pp. 97-115). New York, NY: Oxford University Press.
- Benson, P. L., Scales, P. C., Hamilton, S. F., & Sesma, A., Jr. (2006). Positive youth development: Theory, research, and applications. In R. M. Lerner (Vol. Ed.) & W. Damon & R. M. (Eds.), *Handbook of child psychology: Vol 1. Theoretical models of human development* (6th ed., pp. 894-941). Hoboken, NJ: John Wiley.

- Billig, S. H. (2004). Heads, hearts, and hands: The research on K-12 service-learning. *Growing to greatness 2004*, 12-25.
- Blum, R. W., & Libbey, H. (2004). School Connectedness—strengthening health and education outcomes for teenagers. *Journal of School Health*, 74, 229-299.
- Blum, R. W., McNeely, C., & Rinehart, P. M. (2002). *Improving the odds: The untapped power of schools to improve the health of teens*. Minneapolis, MN: Center for Adolescent Health and Development, University of Minnesota.
- Boone J. E., Gordon-Larsen P., Adair L. S., & Popkin, B. M. (2007). Screen time and physical activity during adolescence: longitudinal effects on obesity in young adulthood. *International Journal of Behavior, Nutrition and Physical Activity*, 4, 26. doi:10.1186/1479-5868-4-26
- Boslaugh, S. (2007). *Secondary data sources for public health: A practical guide*. New York, New York: Cambridge 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.
- Brener, N. D., Kann, L., Shanklin, S., Kinchen, S., Eaton, D. K., Hawkins, J., & Flint, K. H. (2013). Methodology of the youth risk behavior surveillance system—2013. *Morbidity and Mortality Weekly Report Recommendations and Reports*, 62(RR01), 1-23. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6201a1.htm>
- Bundick, M. J. (2010). Extracurricular activities, positive youth development, and the role of meaningfulness of engagement. *The Journal of Positive Psychology: Dedicated to furthering research and promoting good practice*, 6(1), 57-74. doi: 10.1080/17439760.2010.536775
- Catalano, R. F., Berglund, M. L., Ryan, J. A. M., Lonczak, H. S., & Hawkins, J. D. (2004a). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *The Annals of the American Academy of Political and Social Science*, 591, 98-124. doi: 10.1177/0002716203260102
- Catalano, R. F., Haggerty, K. P., Oesterie, S., Fleming, C. B., & Hawkins, J. D. (2004b). The importance of bonding to schools for healthy development: Findings from the social development research group. *The Journal of School Health*, 74(7), 252-262.

- Center for Information and Research on Civic Learning and Engagement. (2009). *Youth volunteering in the states: 2002 to 2007*. Retrieved from <http://www.civicyouth.org/youth-volunteering-in-the-states-2002-to-2007/>
- Centers for Disease Control and Prevention. (1998). Recommendations to prevent and control iron deficiency in the United States. *Morbidity and Mortality Weekly Report*, 47(RR-3),1–29. Retrieved from <http://www.cdc.gov/mmwr/pdf/rr/rr4703.pdf>
- Centers for Disease Control and Prevention. (2009a). *Alcohol and other drug use and academic achievement*. Retrieved from http://www.cdc.gov/healthyyouth/health_and_academics/pdf/alcohol_other_drug.pdf
- Centers for Disease Control and Prevention. (2009b). *Physical inactivity and unhealthy dietary behaviors and academic achievement*. Retrieved from http://www.cdc.gov/healthyyouth/health_and_academics/pdf/physical_inactivity_unhealthy_weight.pdf
- Centers for Disease Control and Prevention. (2009c). *Sexual risk behaviors and academic achievement*. Retrieved from http://www.cdc.gov/healthyyouth/health_and_academics/pdf/sexual_risk_behaviors.pdf
- Centers for Disease Control and Prevention. (2009d). *Unintentional injury and violence-related behaviors and academic achievement*. Retrieved from http://www.cdc.gov/healthyyouth/health_and_academics/pdf/unintentional_injury_violence.pdf
- Centers for Disease Control and Prevention. (2009e). *Tobacco use and academic achievement*. Retrieved from http://www.cdc.gov/healthyyouth/health_and_academics/pdf/tobacco_use.pdf
- Centers for Disease Control and Prevention. (2010a). *The association between school-based physical activity, including physical education, and academic performance*. Retrieved from http://www.cdc.gov/healthyyouth/health_and_academics/pdf/pa-pe_paper.pdf
- Centers for Disease Control and Prevention. (2010b). *Health & academics data and statistics*. Retrieved from http://www.cdc.gov/healthyyouth/health_and_academics/data.htm
- Centers for Disease Control and Prevention. (2010c). Youth risk behavior surveillance – United States, 2009 (Surveillance Summaries). *Morbidity and Mortality Weekly Report*, 59(SS-5). Retrieved from <http://www.cdc.gov/mmwr/pdf/ss/ss5905.pdf>
- Centers for Disease Control and Prevention. (2011a). *Health & academics*. Retrieved from http://www.cdc.gov/HealthyYouth/health_and_academics/index.htm

- Centers for Disease Control and Prevention. (2011b). *Youth Risk Behavior Surveillance System (YRBSS)*. Retrieved from <http://www.cdc.gov/HealthyYouth/yrbs/index.htm>
- Centers for Disease Control and Prevention. (2011c). National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS). Retrieved from <http://www.cdc.gov/injury/wisqars>
- Centers for Disease Control and Prevention (2011d). School health guidelines to promote healthy eating and physical activity. *Morbidity and Mortality Weekly Report: Recommendations and Reports*, 60(5), 1-80.
- Centers for Disease Control and Prevention. (2012a). *Fact sheet: Alcohol use and health*. Retrieved from <http://www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm>
- Centers for Disease Control and Prevention. (2012b). *Fact sheet: Age 21 minimum legal drinking age*. Retrieved from <http://www.cdc.gov/alcohol/fact-sheets/mla.htm>
- Centers for Disease Control and Prevention. (2012c). Vital signs: HIV infection, testing, and risk behaviors among youths — United States. *Morbidity Mortality Weekly Report*, 61(47), 971-976. Retrieved from <http://www.cdc.gov/vitalsigns/HIVAmongYouth/index.html>
- Centers for Disease Control and Prevention. (2012d). *Youth and tobacco use*. Retrieved from http://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm
- Centers for Disease Control and Prevention. (2012e). Youth risk behavior surveillance — United States, 2011. *Morbidity and Mortality Weekly Report*, 61(SS-4). Retrieved from <http://www.cdc.gov/mmwr/pdf/ss/ss6104.pdf>
- Centers for Disease Control and Prevention. (2013a). *Suicide prevention: Youth suicide*. Retrieved from http://www.cdc.gov/violenceprevention/pub/youth_suicide.html
- Centers for Disease Control and Prevention. (2013b). Methodology of the Youth Risk Behavior Surveillance System — 2013. *Morbidity Mortality Weekly Report*, 62(RR-1), 1-23. Retrieved from <http://www.cdc.gov/mmwr/pdf/rr/rr6201.pdf>
- Centers for Disease Control and Prevention. (2014). *About BMI for Children and Teens*. Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html.
- Child Trends (2010). Volunteering. *Child Trends Data Bank*. Retrieved from <http://www.childtrendsdatabank.org/archivepgs/20.htm>.

- Chou, K-L. (1998). Effects of age, gender, and participation in volunteer activities on the altruistic behavior of Chinese adolescents. *The Journal of Genetic Psychology*, 159(2), 195-201.
- Committee on Adolescent Health Care Services and Models of Care for Treatment, Prevention, and Healthy Development, National Research Council, & Institute of Medicine. (2009). *Adolescent health services: Missing opportunities*. R. S., Lawrence, J. A. Gootman, and L. J. Sim (Eds.). Washington, D.C.: National Academies Press.
- Corporation for National and Community Service. (2008). Office of Research and Policy Development. *Community service and service-learning in America's schools, 2008*. Retrieved from http://www.nationalservice.gov/pdf/08_1112_lsa_prevalence.pdf
- Corporation for National and Community Service. (2013). *Corporation for national and community service: Our history and legislation*. Retrieved from http://www.nationalservice.gov/about/role_impact/history.asp
- Croninger, R. G., & Douglas, K. M. (2005). Missing data and institutional research in survey research. In P. D. Umbach (Ed.), *Emerging issues: New directions for institutional research* (pp. 33-50). San Francisco, CA: Jossey-Bass.
- Crosby, R. A., DiClemente, R. J., & Salazar, L. F. (Eds.). (2006). *Research Methods In Health Promotion*. San Francisco, CA: John Wiley & Sons, Inc.
- Damon, W., Menon, J., & Bronk, K. C. (2003). The development of purpose during adolescence. *Applied Developmental Science*, 7(3), 119-128.
- Daniels, S. R., Arnett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., Robinson, T. N., Scott, B. J., St. Jeor, S., & Williams, C. L. (2005). Overweight in children and adolescents: Pathophysiology, consequences, prevention, and treatment. *Circulation*, 111(15), 1999-2012.
- Danner F. W. (2008). A national longitudinal study of the association between hours of TV viewing and the trajectory of BMI growth among US children. *Journal of Pediatric Psychology*, 33(10), 1100-1107.
- Dansec E. R., Miller T. R., & Spicer R. S. (2000). Incidence and costs of 1987–1994 childhood injuries: Demographic break downs. *Pediatrics*, 105(2), E27.
- Datar, A., Sturm, R., & Magnabosco, J. L. (2004). Childhood overweight and academic performance: National study of kindergartners and first-graders. *Obesity Research*, 12(1), 58-68.

- Dietary Guidelines Advisory Committee. (2010). *Report of the Dietary Guidelines Advisory Committee on the dietary guidelines for Americans, 2010*. Retrieved from <http://www.cnpp.usda.gov/dietaryguidelines.htm>
- Donovan, J. E., Jessor, R., & Costa, F. M. (1991). Adolescent health behavior and conventionality-unconventionality: An extension of problem-behavior theory. *Healthy Psychology, 10*(1), 52-61.
- Duncan, S. C., Duncan, T. E., Strycker, L. A., & Chaumeton, N. R. (2002). Relations between youth antisocial and prosocial activities. *Journal of Behavioral Medicine, 25*(5), 425-438.
- Eaton, D. K., Kann, L., Kinchen, S. A., Shanklin, S., Flint, K. H., Hawkins, J., Harris, W. A., Lowry, R., McManus, T., Chyen, D., Whittle, L., Lim, C., & Wechsler, H. (2012). Youth risk behavior surveillance—United States, 2011. *Morbidity and Mortality Weekly Report, Surveillance Summary, 61*(SS-04), 1–162.
- Eccles, J. S., & Barber, B. L. (1999). Student council, volunteering, basketball, or marching band: What kind of extracurricular involvement matters? *Journal of Adolescent Research, 14*(1), 10-43.
- Eccles, J. S., Barber, B. L., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues, 59*(4), 865-889.
- Eccles, J. S., & Gootman, J. A. (Eds.) (2002). *Community programs to promote youth development*. Washington, DC: National Academy Press.
- Eisenberg, N., Fabes, R. A., & Spinrad, T. L. (2007). Prosocial development. In W. Damon, R. M. Lerner (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology*. Vol. 3: Social, emotional, and personality development (6th ed., pp. 646-718). Hoboken, NJ: John Wiley & Sons.
- Feldman, A. F., & Matjasko, J. L. (2005). The role of school-based extracurricular activities in adolescent development: A comprehensive review and future directions. *Review of Educational Research, 75*, 159-210.
- Foege, W. H., Rosenberg, M. L., & Mercy, J. A. (1995). Public health and violence prevention. *Current Issues in Public Health, 1*, 2-9.
- Forshee, R. A., Anderson, P. A., & Storey, M. L. (2006). Changes in calcium intake and association with beverage consumption and demographics: Comparing data from CSFII 1994–1996, 1998 and NHANES 1999–2002. *Journal of the American College of Nutrition, 25*(2), 108-116.
- Frase, M. (1995). *Community service performed by high school students*. Washington, DC: National Center for Educational Statistics.

- Fredricks, J. A., & Eccles, J. S. (2008). Extracurricular involvement and adolescent adjustment: impact of duration, number of activities, and breadth of participation. *Applied Developmental Science, 10*(3), 132-146.
- Fredricks, J. A., & Eccles, J. S. (2006). Is extracurricular participation associated with beneficial outcomes? Concurrent and longitudinal relations. *Developmental Psychology, 42*(4), 698-713.
- Gibson, T. (2008). Religion and civic engagement among America's youth. *The Social Science Journal, 45*, 504-514.
- Glanz, K., Rimer, B. K., & Lewis, F. M. (2002). *Health behavior and health education: Theory, research and practice* (3rd ed.). San Francisco, CA: Wiley & Sons.
- Gorely, T., Marshall, S. J., & Biddle S.J. H. (2004). Couch kids: Correlates of television viewing among youth. *International Journal of Behavioral Medicine, 11*(3), 152-163.
- Grossman, M., & Kaestner, R. (1997). Effects of education on health. In J. R. Behrman & N. Stacey (Eds.), *The social benefits of education*. Ann Arbor, MI: University of Michigan Press.
- Grusec, J. E., Davidov, M., & Lundell, L. (2004). Prosocial and helping behavior. In P. K. Smith & C. H. Hart (Eds.), *Blackwell handbook of childhood social development* (pp. 457-474). Malden, MA: Blackwell Publishing, Ltd.
- Guèvremont, A., Findlay, L., & Kohen, D. (2014). Organized extracurricular activities: Are in-school and out-of-school activities associated with different outcomes for Canadian youth? *Journal of School Health, 84*(5), 317-325.
- Guttmacher Institute (2013). Facts on American teens' sexual and reproductive health. Retrieved from <http://www.guttmacher.org/pubs/FB-ATSRH.html>).
- Hamilton, B. E., Martin, J. A., & Ventura, S. J. (2010). Births: Preliminary data for 2009. *National Vital Statistics Reports, 59*(3), 1-102.
- Haski-Leventhal, D., Ronel, N., York, A. S., & Ben-David, B. M. (2008). Youth volunteering for youth: Who are they serving? How are they being served? *Children and Youth Services Review, 30*(7), 834-846.
- Hastings, P. D., Utendale, W. T., & Sullivan, C. (2007). The socialization of prosocial development. In J. E. Grusec and P. D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 638-664). New York, NY: The Guilford Press.
- Hawkins, J. D. (1997). Academic performance and school success: Sources and consequences. In R. P. Weissberg, T. P. Gullotta, R. L. Hampton, B. A. Ryan, G. R. Adams (Eds), *Healthy children 2010: Enhancing children's wellness* (Issues in

- Children's and Families' Lives ed., pp. 278-305). Thousand Oaks, CA: Sage Publications.
- Heeringa, S., West, B. T., & Berglund, P. A. (2010). *Applied survey data analysis (Chapman & Hall/CRC statistics in the social and behavioral sciences series)*. Boca Raton, FL: Chapman & Hall/CRC.
- Henderson V. R. (2007). Longitudinal associations between television viewing and body mass index among white and black girls. *Journal of Adolescent Health, 41*(6), 544-550.
- Hofferth, S. (2005). Secondary data analysis in family research. *Journal of Marriage and Family, 67*, 891-907.
- Ievers-Landis, C. E., & Witherspoon, D. (2009). Chapter 25: Lifestyle interventions for the young. In S. Schumaker, J. Ockene & K. Riekert (Eds.), *The Handbook of Health Behavior Change*, 3rd ed. New York, NY: Springer Publishing Company.
- Interagency Working Group on Youth Programs. (2012). *Positive youth development*. Retrieved from <http://www.findyouthinfo.gov/youth-topics/positive-youth-development>
- Jessor, R. (1998). New perspectives on adolescent risk behavior. In R. Jessor (Ed), *New perspectives on adolescent risk behavior* (pp. 1-10). New York, NY: Cambridge University Press.
- Jessor, R. (1991). Risk behavior in adolescence: A psychosocial framework for understanding and action. *Journal of Adolescent Health, 12*, 597-605.
- Jessor, R. (1992). Risk behavior in adolescence: A psychosocial framework for understanding and action. *Developmental Review, 12*(4), 374-390.
- Jessor, R., Donovan, J. E., & Costa, F. M. (1991). *Beyond adolescence: Problem behavior and young adult development*. New York, NY: Cambridge University Press.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York, NY: Academic Press.
- Jessor, R., Turbin, M. S., & Costa, F. M. (1998). Protective factors in adolescent health behavior. *Journal of Personality and Social Psychology, 75*(3), 788-800.
- Jessor, R., Turbin, M. S., Costa, F. M., Dong, Q., Zhang, H., & Wang, C. (2003). Adolescent problem behavior in China and the United States: A cross-national study of psychosocial protective factors. *Journal of Research on Adolescence, 13*(3), 329-360.

- Johnston, L. D., O'Malley, P. M., Miech, R. A., Bachman, J. G., & Schulenberg, J. E. (2014). *Monitoring the Future national results on drug use: 1975-2013: Overview, Key Findings on Adolescent Drug Use*. Ann Arbor: Institute for Social Research, The University of Michigan. Retrieved from <http://www.monitoringthefuture.org/pubs/monographs/mtf-overview2013.pdf>
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2011). *Monitoring the future national results on adolescent drug use: Overview of key findings*. Ann Arbor, MI: Institute for Social Research, The University of Michigan.
- Joint Committee on National Health Education Standards (2007). National Health Education Standards, *Achieving Excellence, Second Edition*. The American Cancer Society, Atlanta, Georgia.
- Kleinbaum, D.G., Kupper, L.L., Muller, K.E., & Nizam, A. (1998). *Applied regression analysis and other multivariable methods* (3rd ed). Pacific Grove, CA: Duxbury Press.
- Korn, E. L., & Graubard, B. I. (1999). Analyses using multiple surveys. In *Analysis of health surveys*. New York, NY: Wiley, Inc., 278-303.
- Kuncel, N.R., Credé, M., & Thomas, L.L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review Of Educational Research*, 75(1): 63-82. doi: 10.3102/00346543075001063
- Kuperminc, G. P., Holditch, P. T., & Allen, J. P. (2001). Volunteering and community service in adolescence. *Adolescent Medicine: State of the Art Reviews*, 12(3), 445-457.
- Lam, C. (2012). Prosocial involvement as a positive youth development construct: A conceptual review (Article ID769158). *The Scientific World Journal*, 2012, 1-8. doi: 10.1100/2012/7969158
- Landers, D., & Landers, D. (1978). Socialization via interscholastic athletics: Its effect on delinquency. *Sociology of Education*, 51, 299-301.
- Larson, R. W. (2001). How U.S. children and adolescents spend time: What it does (and doesn't) tell us about their development. *American Psychological Society*, 10(5), 160-164.
- Larson, R. W. (2006). Positive youth development, willful adolescents, and mentoring. *Journal of Community Psychology*, 34(6), 677-689.

- Larson, R. W. (2000). Towards a psychology of positive youth development. *American Psychologist*, 55, 170-183.
- Lee, E. S., & Forthofer, R. N. (2006). Analyzing complex survey data. In A. J. Sobczak (Eds.), *Quantitative applications in the social sciences* (2nd ed., pp. 11-20). Thousand Oaks, CA: Sage Publications.
- MacKay, A.P., & Duran, C. (2007). *Adolescent health in the United States, 2007*. National Center for Health Statistics, Centers for Disease Control and Prevention (DHHS publication no. 2008-1034). Retrieved from <http://www.cdc.gov/nchs/data/misc/adolescent2007.pdf>
- Mahoney, J. L., & Cairns, R. B. (1997). Do extracurricular activities protect against early dropout? *Developmental Psychology*, 33(2), 241-253.
- Mahoney, J. L., Larson, R. W., Eccles, J. S., & Lord, H. (2005). Organized activities as developmental contexts for children and adolescents. In Mahoney, J.L., Larson, R.W., & Eccles, J.S. (Eds.), *Organized Activities as Contexts of Development; Extracurricular Activities, After-School and Community Programs* (pp. 3-22). Mahwah, NJ: Lawrence Erlbaum Associate, Inc.
- Maibach, E. W., & Cotton, D. (1995). Moving people to behavior change: A staged social cognitive approach to message design. In E. W. Maibach & R. L. Parrott (Eds.), *Designing health messages: Approaches from communication theory and public health practice* (pp. 41-64). Thousand Oaks, CA: Sage Publications, Inc.
- Martin, K. (2012). *Analyzing data from complex samples using PROC SURVEYFREQ in SAS® 9.2*. Maternal, Child and Adolescent Health Program, California Department of Public Health. Retrieved from <http://www.wuss.org/proceedings/10/HOC/Analyzing%20Data%20from%20Complex%20Samples%20Using%20PROC%20SURVEYFREQ%20in%20SAS%C2%AE%209.2.pdf>.
- Martin, P., & Brown, B. (2008). *The school environment and adolescent well-being: Beyond academics*. Child Trends Research Brief (publication #2008-26). Washington, D.C.: Child Trends.
- Marzana, D., Marta, E., & Pozzi, M. (2012). Social action in young adults: Voluntary and political engagement. *Journal of Adolescence*, 35(3), 497-507.
- Massachusetts Department of Elementary and Secondary Education. (2011a). *Youth risk behavior survey*. Retrieved from <http://www.doe.mass.edu/cnp/hprograms/yrbs>
- Massachusetts Department of Elementary and Secondary Education. (2011b). *Health and risk behaviors of Massachusetts youth, 2009*. Retrieved from <http://www.doe.mass.edu/cnp/hprograms/yrbs>

- McLellan, J. A., & Youniss, J. (2003). Two systems of youth service: Determinants of voluntary and required youth community service. *Journal of Youth Adolescence*, 32(1), 47-58.
- McNeely, C., & Falci, C. (2004). School connectedness and the transition into and out of health-risk behavior among adolescents: A comparison of social belonging and teacher support. *Journal of School Health*, 74(7), 284-292. doi: 10.1111/j.1746-1561.2004.tb08285.x
- Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology*, 57, 487-503. doi: 10.1146/annurev.psych.56.091103.070258
- Meinhard, A., Foster, M., & Wright, P. (2009). Rethinking school-based community service:
The importance of a structured program. *The Philanthropist*, 20(1), 5-22.
- Mooney L. A. & Edwards, B. (2001). Experiential learning in sociology: Service learning and other community-based learning initiatives. *Teaching Sociology*, 29(2), 181-194.
- Murphey, D. A., Lamonda, K. H., Carney, J. K., & Duncan, P. (2004). Relationships of a brief measure of youth assets to health-promoting and risk behaviors. *Journal of Adolescent Health*, 34(3), 184-191.
- Murray, N. G., Low, B. J., Hollis, C., Cross, A. W., & Davis, S. M. (2007). Coordinated school health programs and academic achievement: A systematic review of the literature. *Journal of School Health*, 77(9), 589-600.
- National Cancer Institute. (2005). *Theory at a glance: A guide for health promotion practice* (2nd ed.). Washington, D.C.: U.S. Department of Health and Human Services.
- National Center for Education Statistics. (2011). *Enrollment for the 100 largest school districts, by enrollment size in 2009: Fall 2009, 2008-09, and federal fiscal year 2011*. Retrieved from http://nces.ed.gov/programs/digest/d11/tables/dt11_097.asp
- National Center for Health Statistics (2010). *NCHS Data Brief (No. 37): Mortality Among Teenagers Aged 12-19 Years: United States, 1999-2006*. Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db37.htm>
- National Center for Health Statistics. (2011). *Health, United States, 2010: With special feature on death and dying*. Hyattsville, MD: U.S. Department of Health and Human Services.

- National Commission on the Role of the School and Community in Improving Adolescent Health (1990), National Association of State Boards of Education, American Medical Association. *Code Blue: Uniting for Healthier Youth*. Alexandria, VA: National Association of State Boards of Education.
- National Institute on Drug Abuse. (2012). *2011 Monitoring the Future (MTF) survey report. Drug facts: High school and youth trends*. Retrieved from <http://www.drugabuse.gov/publications/drugfacts/high-school-youth-trends>
- National Research Council and Institute of Medicine, (2004). Committee on Developing a Strategy to Reduce and Prevent Underage Drinking, & Division of Behavioral and Social Sciences and Education. *Reducing underage drinking: A collective responsibility*. R. J. Bonnie & M. E. O'Connell (Eds). Washington, D.C.: The National Academies Press.
- National Research Council and Institute of Medicine (2009). Committee on Adolescent Health Care Services and Models of Care for Treatment, Prevention, and Healthy Development. *Adolescent health services: Missing opportunities*. R. S. Lawrence, J. A. Gootman, & L. J. Sim (Eds). Washington, D.C.: The National Academies Press.
- Niemi, R. G., Hepburn, M. A., & Chapman, C. (2000). Community service by high school students: A cure for civic ills? *Political Behavior*, 22(1), 45-69.
- Nolin, M. J., Chaney, B., Chapman, C., & Chandler, K. (1997). *Student participation in community service activity*. Washington D.C.: U.S. Department of Education, National Center For Educational Statistics.
- O'Donnell, L., Stueve, A., San Doval, A., Duran, R., Haber, D., Atnafou, R., Johnson, N., Grant, U., Murray, H., Juhn, G., Tang, J., & Piessens, P. (1999). The effectiveness of the reach for health community youth service learning program in reducing early and unprotected sex among urban middle school students. *American Journal of Public Health*, 89(2), 176-181.
- Office of Juvenile Justice and Delinquency Prevention. (2005). *Drinking in America: Myths, realities, and prevention policy*. Washington, D.C.: U.S. Department of Justice, Office of Justice Programs, Author.
- Oman, D. (2007). Does volunteering foster physical health and longevity? In S.G. Post (Ed.), *Altruism and health: Perspectives from empirical research* (Chapter 1, pp. 15-32). New York, NY: Oxford University Press.
- Ozer, E. M., Park, M. J., Paul, T., Brindis, C. D., & Irwin, C. E., Jr. (2003). *American's adolescents: Are they healthy?* Retrieved from <http://www.nihcm.org/pdf/AA2003.pdf>

- Pajares, F., & Schunk, D. H. (2001). Self-beliefs and school success: Self-efficacy, self-concept, and school achievement. In R. Riding & S. Rayner (Eds.), *Self-perception* (pp. 239-266). London, U.K.: Ablex Publishing.
- Pancer, S. M., & Pratt, M. W. (1999). Social and family determinants of community service involvement in Canadian youth. In J. Youniss & M. Yates (Eds.), *Roots of civic identity: International perspectives on community service and activism in youth* (pp. 32-55). New York, NY: Cambridge University Press.
- Parraga, I. M. (1990). Determinants of food consumption. *Journal of American Dietetic Association*, 90(5), 661-663.
- Pedhazur, E.J. (1997). *Multiple regression in behavioral research: Explanation and prediction* (3rd ed.). New York, NY: Harcourt Brace College Publishers.
- Penner, L. A., Dovidio, J. F., Piliavin, J. A., & Schroeder, D. A. (2005). Prosocial behavior: Multilevel perspectives. *Annual Review of Psychology*, 56, 365-392.
- Perry, C. L., & Jessor, R. (1985). The concept of health promotion and the prevention of adolescent drug use. *Health Education Quarterly*, 12(2), 169-184.
- Piliavin, J. A. (2003). Doing well by doing good: Benefits for the benefactor. In C. L. M. Keyes & J. Haidt (Eds.), *Flourishing: The positive personality and the life well lived* (pp. 227-247). Washington, D.C.: American Psychological Association.
- Planty, M., Bozick, R., & Regnier, M. (2006). Helping because you have to or helping because you want to? Sustaining participation in service work from adolescence through young adulthood. *Youth & Society*, 38(2), 177-202.
- Pratt, M. W., Hunsberger, B., Pancer, S. M., & Alisat, S. (2003). A longitudinal analysis of personal values socialization: Correlates of a moral self-ideal in late adolescence. *Social Development*, 12(4), 563-585.
- Raghunathan, T. E. (2004). What do we do with missing data? Some options for analysis of incomplete data. *Annual Review of Public Health*, 25, 99-117.
- Raskoff, S. A., & Sundeen, R. A. (2001). Cultural diversity and high school community service: the relationships between ethnicity and students' perceptions. *Nonprofit and Voluntary Sector Quarterly*, 30(4), 720-746. doi: 10.1177/0899764001304006
- Raskoff, S., & Sundeen, R. A. (1998). Youth socialization and civic participation: The role of secondary schools in promoting community service in southern California. *Nonprofit and Voluntary Sector Quarterly*, 27(1), 66-87.

- Reedy, J., & Krebs-Smith, S.M. (2010). Dietary sources of energy, solid fats, and added sugars among children and adolescents in the United States. *Journal of the American Dietetic Association*, 110(10), 1477-1484.
- Reinders, H., & Youniss, J. (2006). School-based required community service and civic development in adolescents. *Applied Developmental Science*, 10(1), 2-12.
- Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., & Udry, J. R. (1997). Protecting adolescents from harm: Findings from the national longitudinal study on adolescent health. *Journal of the American Medical Association*, 278(10), 823-832.
- Rey-Lopez J. P., Vicente-Rodriguez G., Biosca M., & Moreno L. A. (2008). Sedentary behaviour and obesity development in children and adolescents. *Nutrition, Metabolism and Cardiovascular Diseases*, 18(3), 242-251.
- SAS Institute. Survey design specification, software version 9.3, Cary, NC: SAS Institute Inc.
- Scales, P. C., Benson, P. L., Leffert, N., & Blyth, D. A. (2000). Contribution of developmental assets to the prediction of thriving among adolescents. *Applied Developmental Science*, 4(1), 27-46.
- Scales, P. C., & Roehlkepartain, E. C. (2004). Service to others: A “gateway asset” for school success and healthy development. In National Youth Leadership Council. *Growing to greatness: The state of service-learning project*. St. Paul, MN: Author.
- Schiavo, R. (2007). Current health communication theories and issues. In R. Schiave (Ed.), *Health communication: From theory to practice* (pp. 30-70). San Francisco, CA: Jossey-Bass.
- Schine, J. A. (1990). A rationale for youth community service. *Social Policy*, 20(4), 5-11.
- Schwartz, C. E., Keyl, P. M., Marcum, J. P., & Bode, R. (2009). Helping others shows differential benefits on health and well-being for male and female teens. *Journal of Happiness Studies*, 10, 431-448. doi: 10.1007/s10902-008-9098-1
- Sharp, E. H., Caldwell, L. L., Graham, J. W., & Ridenour, T. A. (2006). Individual motivation and parental influence on adolescents’ experiences of interest in free time: A longitudinal examination. *Journal of Youth and Adolescence*, 35, 359-372.
- Siegel, D.M., Aten, M.J., Roghmann, K.J. (1998). Self-reported honesty among middle and high school students responding to a sexual behavior questionnaire. *Journal of Adolescent Health*, 23(1), 20-28.

- Smith, J. (2003). *Education and public health: Natural partners in learning for life*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Stewart, D.W. (2012). Secondary analysis and archival research: Using data collected by others. In H. Cooper, P. Camic, D. Long, A.T. Panter, D. Rindskopf & K. Sher (Eds.), *APA handbook of research methods in psychology, Vol. 3: Data analysis and research publication* (pp. 473-484. Washington, DC, US: American Psychological Association. doi: 10.1037/13621-024.
- Stukas, A. A., & Dunlap, M. R. (2002). Community involvement: Theoretical approaches and educational initiatives. *Journal of Social Issues*, 58(3), 411-427.
- Substance Abuse and Mental Health Services Administration. (2010). *Results from the 2010 national survey on drug use and health: Summary of national findings*. Retrieved from <http://www.samhsa.gov/data/NSDUH/2k10NSDUH/2k10Results.pdf>.
- Substance Abuse and Mental Health Services Administration. (2012a). *The DAWN Report: Highlights of the 2010 Drug Abuse Warning Network (DAWN) Findings on Drug-Related Emergency Department Visits*. Rockville, MD: Center for Behavioral Health Statistics and Quality.
- Substance Abuse and Mental Health Services Administration. (2012b). *Results from the 2011 National Survey on Drug Use and Health: Summary of National Findings* (NSDUH Series H-44, HHS Publication No. SMA 12-4713). Rockville, MD: Author.
- Sundeen, R. A., & Raskoff, S. A. (2000). Ports of entry and obstacles: Teenagers' access to volunteer activities. *Nonprofit Management and Leadership*, 11(2), 179-197.
- Sundeen, R. A., & Raskoff, S. A. (1995). Teen volunteers and their values. *Nonprofit and Voluntary Sector Quarterly*, 24, 337-357.
- Sundeen, R. A., & Raskoff, S. A. (1994). Volunteering among teenagers in the United States. *Nonprofit and Voluntary Sector Quarterly*, 23(4), 383-403.
- Taras, H., & Potts-Datema, W. (2005). Obesity and student performance at school. *Journal of School Health*, 75(8), 291-295.
- Tabachnick B. G., & Fidell L. S. (2007) *Using Multivariate Statistics, 5th ed*. Boston, MA: Allyn & Bacon.
- University of Michigan, & Monitoring the Future Study. (2011). *Trends in prevalence of use of cigarettes in grades 8, 10, and 12*. Retrieved from <http://www.monitoringthefuture.org/data/11data/pr11cig1.pdf>

- U.S. Census Bureau. (2008). *2008 population estimates: National characteristics, national sex, age, race and Hispanic origin*. Retrieved from <http://www.census.gov/popest/data/historical/2000s/vintage/index.html>
- U.S. Department of Health and Human Services. (1994). Preventing tobacco use among young people: A report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Office on Smoking and Health. Retrieved from http://www.cdc.gov/tobacco/data_statistics/sgr/1994/index.htm
- U.S. Department of Health and Human Services. (2000). *Healthy people 2010* (2nd ed., vols. 1 & 2). Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of Health and Human Services. (2007). *The Surgeon General's call to action to prevent and reduce underage drinking*. Rockville, MD: U.S. Department of Health and Human Services.
- U.S. Department of Health and Human Services. (2008a). *Physical activity guidelines advisory committee report*. Washington, D.C.: U.S. Department of Health and Human Services.
- U.S. Department of Health and Human Services. (2008b). *2008 physical activity guidelines for Americans*. Washington, D.C.: U.S. Department of Health and Human Services.
- U.S. Department of Health and Human Services. (2012a). *Healthy people 2020*. Washington, D.C.: Office of Disease Prevention and Health Promotion. Retrieved from <http://www.healthypeople.gov/2020>
- U.S. Department of Health and Human Services. (2012b). *Preventing tobacco use among youth and young adults: A report of the Surgeon General*. Retrieved from <http://www.surgeongeneral.gov/library/reports/preventing-youth-tobacco-use/>
- U.S. Department of Justice (2014). *The dangers and consequences of marijuana abuse*. Washington, D.C.: U.S. Department of Justice, Drug Enforcement Administration, Demand Reduction Section. Retrieved from <http://www.justice.gov/dea/docs/dangers-consequences-marijuana-abuse.pdf>
- Van Willigen, M. (2000). Differential benefits of volunteering across the life course. *Journal of Gerontology*, 55B(5), S308-S318.
- Vartanian, T. P. (2011). *Secondary data analysis: Pocket guides to social work research methods*. New York, New York: Oxford University Press, Inc.

- 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.
- Weinstock, H., Berman, S., & Cates, W. (2004). Sexually transmitted diseases among American youth: Incidence and prevalence estimates, 2000. *Perspectives on Sexual and Reproductive Health*, 36(1), 6-10.
- Wilson, J. (2012). Volunteerism research: A review essay. *Nonprofit and Voluntary Sector Quarterly*, 41(2), 176-212.
- Wilson, J. (2000). Volunteering. *Annual Review of Sociology*, 26, 215-240. doi: 10.1146/annurev.soc.26.1.215.
- Windle, M., Grunbaum, J. A., Elliott, M., Tortolero, S. R., Berry, S., Gilliland, J., & Kolbe, L. (2004). Healthy passages: A multilevel, multimethod longitudinal study of adolescent health. *American Journal of Preventive Medicine*, 27(2), 164-172.
- Wink, P., & Dillon, M. (2007). Do generative adolescents become healthy older adults? In S.G. Post (Ed.), *Altruism and health: Perspectives from empirical research* (Chapter 3, pp. 43-55). New York, NY: Oxford University Press.
- Youniss, J., McLellan, J. A., Su, Y., & Yates M. (1999). The role of community service in identity development: Normative, unconventional, and deviant orientations. *Journal of Adolescent Research*, 14, 248-261.
- Zimmerman, B. J., & Cleary, T. J. (2006). Adolescents' development of personal agency: The role of self-efficacy beliefs and self-regulatory skill. *Self-efficacy beliefs of adolescents*, 5, 45-69.


APPENDIX A

PROTOCOL NUMBER: N120807002/EXPLORING THE IMPACT OF YOUTH
PARTICIPATION IN COMMUNITY SERVICE ON ACADEMIC ACHIEVEMENT
AND HEALTH BEHAVIORS

DATE: August 16, 2012

MEMORANDUM

TO: Kymber N. Williams
Principal Investigator

FROM: Cari Oliver, CIP 
Assistant Director, UAB OIRB

RE: Request for Determination—Human Subjects Research
**IRB Protocol #N120807002– Exploring the Impact of Youth Participation in
Community Service on Academic Achievement and Health Behaviors**

A member of the Office of the IRB has reviewed your application for Designation of Not Human Subjects Research for above referenced proposal.

The reviewer has determined that this proposal is **not** subject to FDA regulations and is **not** Human Subjects Research. Note that any changes to the project should be resubmitted to the Office of the IRB for determination.

470 Administration Building
701 20th Street South
205.934.3789
Fax 205.934.1301
irb@uab.edu

The University of
Alabama at Birmingham
Mailing Address:
AB 470
1530 3RD AVE S
BIRMINGHAM AL 35294-0104

APPENDIX B
COPY OF 2009
MASSACHUSETTS YOUTH RISK BEHAVIOR SURVEY INSTRUMENT

2009 Massachusetts Youth Risk Behavior Survey

This survey is about health behavior. It has been developed so you can tell us what you do that may affect your health. The information you give will be used to develop better health education for young people like yourself.

DO NOT write your name on this survey. The answers you give will be kept private. No one will know what you write. Answer the questions based on what you really do.

Completing the survey is voluntary. Whether or not you answer the questions will not affect your grade in this class. If you are not comfortable answering a question, just leave it blank.

The questions that ask about your background will be used only to describe the types of students completing this survey. The information will not be used to find out your name. No names will ever be reported.

THANK YOU VERY MUCH FOR YOUR HELP.

Directions

- Use a #2 pencil only
- Make dark marks
- Fill in response like this: A B • D
- If you change your answer, erase your old answer completely

1. How old are you?

- A. 12 years old or younger
- B. 13 years old
- C. 14 years old
- D. 15 years old
- E. 16 years old
- F. 17 years old
- G. 18 years old or older

2. What is your sex?

- A. Female
- B. Male

3. In what grade are you?

- A. 9th grade
- B. 10th grade
- C. 11th grade
- D. 12th grade
- E. Ungraded or other grade

4. Are you Hispanic or Latino?

- A. Yes
- B. No

5. What is your race? **(Select one or more responses.)**

A. American Indian or Alaska Native

B. Asian

C. Black or African American

D. Native Hawaiian or Other Pacific Islander

E. White

6. How tall are you without your shoes on?

Directions: Write your height in the shaded blank boxes. Fill in the matching oval below each number on your answer sheet.

Example:

Height	
Feet	Inches
5	11
③	⑩
④	①
●	②
⑥	③
⑦	④
	⑤
	⑥
	1. ⑦
	⑧
	⑨
	⑩
	●

7. How much do you weigh without your shoes on?

Directions: Write your weight in the shaded blank boxes. Fill in the matching oval below each number on your answer sheet.

Example:

Weight		
Pounds		
1	5	2
●	①	①
②	①	①
③	②	●
	③	③
	④	④
	●	⑤
	⑥	⑥
	⑦	⑦
	⑧	⑧
	⑨	⑨

8. During the past 12 months, how would you describe your grades in school?

- A. Mostly A's
- B. Mostly B's
- C. Mostly C's
- D. Mostly D's
- E. Mostly F's
- F. None of these grades
- G. Not sure

9. How long have you lived in the United States?

- A. Less than one year
- B. 1 to 3 years
- C. 4 to 6 years
- D. More than 6 years, but not my whole life
- E. I have always lived in the United States

10. Where do you typically sleep at night?

- A. At home with my parents or guardians
- B. At a friend's or relative's home with my parents or guardians
- C. At a friend's or relative's home without my parents or guardians
- D. In a supervised shelter with my parents or guardians
- E. In a supervised shelter without my parents or guardians
- F. In a hotel or motel, car, park, campground, or other public place with my parents or guardians
- G. In a hotel or motel, car, park, campground, or other public place without my parents or guardians
- H. Somewhere else

11. Which of the following best describes you?

- A. Heterosexual (straight)
- B. Gay or lesbian
- C. Bisexual
- D. Not sure

12. Do you have any long-term learning disabilities or emotional problems? (Long-term means 6 months or more)

- A. Yes
- B. No
- C. Not sure

13. Do you have any physical disabilities or long-term health problems? (Long-term means 6 months or more)

- A. Yes
- B. No
- C. Not sure

14. Is there at least one teacher or other adult in this school that you can talk to if you have a problem?

- A. Yes
- B. No
- C. Not sure

15. Can you talk with at least one of your parents or other adult family members about things that are important to you?

- A. Yes
- B. No
- C. Not sure

The next 3 questions ask about safety.

16. How often do you wear a seat belt when **riding** in a car driven by someone else?

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

17. During the past 30 days, how many times did you **ride** in a car or other vehicle **driven by someone who had been drinking alcohol**?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or more times

18. During the past 30 days, how many times did you **drive** a car or other vehicle **when you had been drinking alcohol?**

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or more times

The next 11 questions ask about violence-related behaviors.

19. During the past 30 days, on how many days did you carry **a weapon** such as a gun, knife, or club?

- A. 0 days
- B. 1 day
- C. 2 or 3 days
- D. 4 or 5 days
- E. 6 or more days

20. During the past 30 days, on how many days did you carry **a gun?**

- A. 0 days
- B. 1 day
- C. 2 or 3 days
- D. 4 or 5 days
- E. 6 or more days

21. During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club **on school property?**

- A. 0 days
- B. 1 day
- C. 2 or 3 days
- D. 4 or 5 days
- E. 6 or more days

22. During the past 30 days, on how many days did you **not** go to school because you felt you would be unsafe at school or on your way to or from school?

A. 0 days

B. 1 day

C. 2 or 3 days

D. 4 or 5 days

E. 6 or more days

23. During the past 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club **on school property**?

A. 0 times

B. 1 time

C. 2 or 3 times

D. 4 or 5 times

E. 6 or 7 times

F. 8 or 9 times

G. 10 or 11 times

H. 12 or more times

24. During the past 12 months, how many times were you in a physical fight?

A. 0 times

B. 1 time

C. 2 or 3 times

D. 4 or 5 times

E. 6 or 7 times

F. 8 or 9 times

G. 10 or 11 times

H. 12 or more times

25. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or more times

26. During the past 12 months, how many times were you in a physical fight **on school property**?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or 7 times
- F. 8 or 9 times
- G. 10 or 11 times
- H. 12 or more times

27. Have you ever been hurt physically by a date or someone you were going out with? (Include being hurt by being shoved, slapped, hit, or forced into any sexual activity.)

- A. I have never been on a date or gone out with anyone
- B. Yes, I have been hurt physically by a date or someone I was going out with
- C. No, I have **not** been hurt physically by a date or someone I was going out with

28. Has anyone ever had **sexual contact** with you against your will?

- A. Yes
- B. No

29. During the past 12 months, have you been a member of a gang?

A. Yes

B. No

The next question asks about bullying. Bullying is when 1 or more students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when 2 students of about the same strength or power argue or fight or tease each other in a friendly way.

30. During the past 12 months, have you ever been bullied on school property?

A. Yes

B. No

The next 6 questions ask about deliberately hurting yourself, sad feelings, and attempted suicide. Sometimes people feel so depressed about the future that they may consider attempting suicide, that is, taking some action to end their own life.

31. During the past 12 months, did you ever feel so sad or hopeless almost every day for **two weeks or more in a row** that you stopped doing some usual activities?

A. Yes

B. No

32. During the past 12 months, did you ever **seriously** consider attempting suicide?

A. Yes

B. No

33. During the past 12 months, did you make a plan about how you would attempt suicide?

A. Yes

B. No

34. During the past 12 months, how many times did you actually attempt suicide?

A. 0 times

B. 1 time

C. 2 or 3 times

D. 4 or 5 times

E. 6 or more times

35. **If you attempted suicide** during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?

A. **I did not attempt suicide** during the past 12 months

B. Yes

C. No

36. During the past 12 months, how many times did you do something to purposely hurt or injure yourself without wanting to die, such as cutting, burning, or bruising yourself on purpose?

A. 0 times

B. 1 or 2 times

C. 3 to 5 times

D. 6 to 9 times

E. 10 to 19 times

F. 20 or more times

The next 8 questions ask about tobacco use.

37. Have you ever tried cigarette smoking, even one or two puffs?

A. Yes

B. No

38. How old were you when you smoked a whole cigarette for the first time?

A. I have never smoked a whole cigarette

B. 8 years old or younger

C. 9 or 10 years old

D. 11 or 12 years old

E. 13 or 14 years old

F. 15 or 16 years old

G. 17 years old or older

39. During the past 30 days, on how many days did you smoke cigarettes?

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

40. During the past 30 days, on how many days did you smoke cigarettes **on school property**?

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

41. Have you ever smoked cigarettes daily, that is, at least one cigarette every day for 30 days?

- A. Yes
- B. No

42. During the past 12 months, did you ever try **to quit** smoking cigarettes?

- A. I did not smoke during the past 12 months
- B. Yes
- C. No

43. During the past 30 days, on how many days did you use **chewing tobacco, snuff, or dip**, such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen?

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

44. During the past 30 days, on how many days did you smoke **cigars, cigarillos, or little cigars**?

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

The next 5 questions ask about drinking alcohol. This includes drinking beer, wine, wine coolers, hard lemonade or hard cider, and liquor such as rum, gin, vodka, or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.

45. During your life, on how many days have you had at least one drink of alcohol?

- A. 0 days
- B. 1 or 2 days
- C. 3 to 9 days
- D. 10 to 19 days
- E. 20 to 39 days
- F. 40 to 99 days
- G. 100 or more days

46. How old were you when you had your first drink of alcohol other than a few sips?

- A. I have never had a drink of alcohol other than a few sips
- B. 8 years old or younger
- C. 9 or 10 years old
- D. 11 or 12 years old
- E. 13 or 14 years old
- F. 15 or 16 years old
- G. 17 years old or older

47. During the past 30 days, on how many days did you have at least one drink of alcohol?

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

48. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 to 5 days
- E. 6 to 9 days
- F. 10 to 19 days
- G. 20 or more days

49. During the past 30 days, on how many days did you have at least one drink of alcohol **on school property?**

- A. 0 days
- B. 1 or 2 days
- C. 3 to 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

The next 4 questions ask about marijuana use. Marijuana also is called grass, pot, weed, or reefer.

50. During your life, how many times have you used marijuana?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 to 99 times
- G. 100 or more times

51. How old were you when you tried marijuana for the first time?

- A. I have never tried marijuana
- B. 8 years old or younger
- C. 9 or 10 years old
- D. 11 or 12 years old
- E. 13 or 14 years old
- F. 15 or 16 years old
- G. 17 years old or older

52. During the past 30 days, how many times did you use marijuana?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

53. During the past 30 days, how many times did you use marijuana **on school property**?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

The next 8 questions ask about cocaine, ecstasy, and other drugs.

54. During your life, how many times have you used **any** form of cocaine, including powder, crack, or freebase?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

55. During your life, how many times have you used **ecstasy** (also called MDMA, E, or X)?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

56. During your life, how many times have you used **heroin** (also called smack, junk, or China White)?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

57. During your life, how many times have you used **methamphetamines** (also called speed, crystal, crank, or ice)?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

58. During your life, how many times have you taken **steroid pills or shots** without a doctor's prescription?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
59. During your life, how many times have you used a needle to inject any **illegal** drug into your body?
- A. 0 times
 - B. 1 time
 - C. 2 or more times
60. **During the past 30 days**, how many times did you sniff glue, breathe the contents of aerosol spray cans, or inhale any paints or sprays to get high?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
61. During the past 12 months, has anyone offered, sold, or given you an illegal drug **on school property**?
- A. Yes
 - B. No

The next 3 questions ask about communication and education on sexuality and AIDS prevention.

62. During the past 12 months, how often did you talk with your parents or other adults in your family about sexuality or ways to prevent HIV infection, other sexually transmitted diseases (STDs), or pregnancy?
- A. Not at all during the past 12 months
 - B. About once during the past 12 months
 - C. About once every few months
 - D. About once a month
 - E. More than once a month
63. Have you ever been taught about AIDS or HIV infection in school?
- A. Yes
 - B. No
 - C. Not sure
64. Have you ever been taught in school about how to use condoms?
- A. Yes
 - B. No
 - C. Not sure

The next 12 questions concern sexual behavior.

65. Have you ever had sexual intercourse?
- A. Yes
 - B. No
66. How old were you when you had sexual intercourse for the first time?
- A. I have never had sexual intercourse
 - B. 11 years old or younger
 - C. 12 years old
 - D. 13 years old
 - E. 14 years old
 - F. 15 years old
 - G. 16 years old
 - H. 17 years old or older
67. During your life, with how many people have you had sexual intercourse?
- A. I have never had sexual intercourse
 - B. 1 person
 - C. 2 people
 - D. 3 people
 - E. 4 people
 - F. 5 people
 - G. 6 or more people

68. During the past 3 months, with how many people did you have sexual intercourse?
- A. I have never had sexual intercourse
 - B. I have had sexual intercourse, but not during the past 3 months
 - C. 1 person
 - D. 2 people
 - E. 3 people
 - F. 4 people
 - G. 5 people
 - H. 6 or more people
69. Did you drink alcohol or use drugs before you had sexual intercourse the **last time**?
- A. I have never had sexual intercourse
 - B. Yes
 - C. No
70. The **last time** you had sexual intercourse, did you or your partner use a condom?
- A. I have never had sexual intercourse
 - B. Yes
 - C. No
71. The **last time** you had sexual intercourse, what **one** method did you or your partner use to **prevent pregnancy**? (Select only **one** response.)
- A. I have never had sexual intercourse
 - B. Birth control pills, patch, ring, or shot (Depo-Provera)
 - C. Emergency contraception ("Morning After Pill" or Plan B)
 - D. Condoms
 - E. Withdrawal
 - F. Some other method
 - G. No method was used to prevent pregnancy
 - H. Not sure
72. During your life, with whom have you had sexual contact?
- A. I have never had sexual contact
 - B. Females
 - C. Males
 - D. Females and males
73. How many times have you been pregnant or gotten someone pregnant?
- A. 0 times
 - B. 1 time
 - C. 2 or more times
 - D. Not sure

74. Have you ever been tested for HIV, the virus that causes AIDS? (Do not count tests done if you donated blood.)
- A. Yes
 - B. No
 - C. Not sure
75. Have you ever been tested for other sexually transmitted diseases (STDs) such as genital herpes, chlamydia, syphilis, or genital warts?
- A. Yes
 - B. No
 - C. Not sure
76. Have you ever been told by a doctor or nurse that you had HIV infection or any other sexually transmitted disease (STD)?
- A. Yes
 - B. No
 - C. Not sure

The next 7 questions ask about body weight.

77. How do **you** describe your weight?
- A. Very underweight
 - B. Slightly underweight
 - C. About the right weight
 - D. Slightly overweight
 - E. Very overweight
78. 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
79. During the past 30 days, did you **exercise** to lose weight or to keep from gaining weight?
- A. Yes
 - B. No

80. During the past 30 days, did you **eat less food, fewer calories, or foods low in fat** to lose weight or to keep from gaining weight?

A. Yes

B. No

81. During the past 30 days, did you **go without eating for 24 hours or more** (also called fasting) to lose weight or to keep from gaining weight?

A. Yes

B. No

82. During the past 30 days, did you **take any diet pills, powders, or liquids** without a doctor's advice to lose weight or to keep from gaining weight? (Do **not** include meal replacement products such as Slim Fast.)

A. Yes

B. No

83. During the past 30 days, did you **vomit or take laxatives** to lose weight or to keep from gaining weight?

A. Yes

B. No

The next 8 questions ask about food you ate or drank during the past 7 days. Think about all the meals and snacks you had from the time you got up until you went to bed. Be sure to include food you ate at home, at school, at restaurants, or anywhere else.

84. During the past 7 days, how many times did you eat **fruit** or drink **100% fruit juices**? (Do **not** count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)

A. I did not eat fruit or 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

85. During the past 7 days, how many times did you eat **green salad**?
- A. I did not eat green salad 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
86. During the past 7 days, how many times did you eat **potatoes**? (Do **not** count french fries, fried potatoes, or potato chips.)
- A. I did not eat potatoes 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
87. During the past 7 days, how many times did you eat **other vegetables** such as carrots, peas, broccoli, etc.? (Do **not** count green salad or 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
88. During the past 7 days, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do **not** include diet soda or diet pop.)
- A. I did not drink soda or pop 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

89. During the past 7 days, how many **glasses of milk** did you drink? (Include the milk you drank in a glass or cup, from a carton, or with cereal. Count the half pint of milk served at school as equal to one glass.)
- A. I did not drink milk during the past 7 days
 - B. 1 to 3 glasses during the past 7 days
 - C. 4 to 6 glasses during the past 7 days
 - D. 1 glass per day
 - E. 2 glasses per day
 - F. 3 glasses per day
 - G. 4 or more glasses per day
90. On how many of the past 7 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
91. In school, have you been taught how to choose foods that will keep you healthy and how to eat a balanced, nutritious diet?
- A. Yes
 - B. No
 - C. Not sure

The next 5 questions ask about physical activity

92. On how many of the past 7 days did you exercise or participate in physical activity for at least 20 minutes that made you sweat and breathe hard, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing or similar aerobic activities?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days

93. During the past 7 days, on how many days were you physically active for a total of **at least 60 minutes per day**? (Add up all the time you spend in any kind of physical activity that increases your heart rate and makes you breathe hard some of the time.)
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days
94. 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
95. During the past 12 months, on how many sports teams did you play? (Include any teams run by your school or community groups.)
- A. 0 teams
 - B. 1 team
 - C. 2 teams
 - D. 3 or more teams
96. In school, have you been taught how to follow a personal fitness plan, including setting fitness goals for yourself and keeping track of your progress?
- A. Yes
 - B. No
 - C. Not sure

The last 3 questions ask about how you spend your free time.

97. On an average school day, how many hours do you watch TV?
- A. I do not watch TV on an average school day
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day

98. In an average month when you are in school, how many hours do you spend on volunteer work, community service, or helping people outside of your home without getting paid? (Do not include community service work that you are required to do as a punishment.)
- A. 0 hours
 - B. 1 to 4 hours
 - C. 5 to 9 hours
 - D. 10 or more hours
99. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as Nintendo, Game Boy, Play Station, Xbox, computer games, and the Internet.)
- A. I do not play video or computer games or use a computer for something that is not school work
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day

This is the end of the survey.
Thank you very much for your help.

APPENDIX C

YOUTH RISK BEHAVIOR SURVEILLANCE SYSTEM: OVERVIEW



Youth Risk Behavior Surveillance System: Overview

What is the Youth Risk Behavior Surveillance System (YRBSS)?

The YRBSS was developed in 1990 to monitor priority health risk behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States. These behaviors, often established during childhood and early adolescence, include

- Behaviors that contribute to unintentional injuries and violence.
- Sexual behaviors that contribute to unintended pregnancy and sexually transmitted infections, including HIV infection.
- Alcohol and other drug use.
- Tobacco use.
- Unhealthy dietary behaviors.
- Inadequate physical activity.

In addition, the YRBSS monitors the prevalence of obesity and asthma.

From 1991 through 2013, the YRBSS has collected data from more than 2.6 million high school students in more than 1,100 separate surveys.

What are the purposes of the YRBSS?

The YRBSS was designed to

- Determine the prevalence of health risk behaviors.
- Assess whether health risk behaviors increase, decrease, or stay the same over time.
- Examine the co-occurrence of health risk behaviors.
- Provide comparable national, state, territorial, tribal, and local data.
- Provide comparable data among subpopulations of youth.
- Monitor progress toward achieving the Healthy People objectives and other program indicators.

What are the components of the YRBSS?

The YRBSS includes national, state, territorial, tribal government, and local school-based surveys of representative samples of 9th through 12th grade students. These surveys are conducted every two years, usually during the spring semester. The national survey, conducted by CDC, provides data representative of 9th through 12th grade students in public and private schools in the United States. The state, territorial, tribal government, and local surveys, conducted by departments of health and education, provide data representative of mostly public high school students in each jurisdiction.

The YRBSS also includes additional surveys conducted by CDC:

- A middle school survey conducted by interested states, territories, tribal governments, and large urban school districts.
- A 2010 study to measure physical activity and nutrition-related behaviors and determinants of these behaviors among a nationally representative sample of high school students.
- A series of methods studies conducted in 1992, 2000, 2002, 2004, and 2008 to improve the quality and interpretation of the YRBSS data.
- The National Alternative High School Youth Risk Behavior Survey conducted in 1998 among a representative sample of almost 9,000 students in alternative high schools.
- The National College Health Risk Behavior Survey conducted in 1995 among a representative sample of about 5,000 undergraduate students.

Where can I get more information? Visit www.cdc.gov/yrbss or call 800–CDC–INFO (800–232–4636).



National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Division of Adolescent and School Health

