

2015

A qualitative study of adolescent perceived school and home connectedness and eating behaviors in relation to BMI

Woolverton, Genevieve Alice

<https://hdl.handle.net/2144/16216>

Boston University

BOSTON UNIVERSITY
SCHOOL OF MEDICINE

Thesis

**A QUALITATIVE STUDY OF ADOLESCENT PERCEIVED
SCHOOL AND HOME CONNECTEDNESS AND
EATING BEHAVIORS IN RELATION TO BMI**

by

GENEVIEVE ALICE WOOLVERTON

B.A., Amherst College, 2012

Submitted in partial fulfillment of the
requirements for the degree of
Master of Science

2015

© 2015 by
GENEVIEVE ALICE WOOLVERTON
All rights reserved

Approved by

First Reader

Rebecca Perkins, M.D., M.Sc.
Assistant Professor of Obstetrics and Gynecology
Boston Medical Center

Second Reader

Tracy Richmond, M.D., M.P.H.
Assistant Professor of Pediatrics
Harvard Medical School
Research Scientist
Department of Adolescent Medicine
Boston Children's Hospital

**A QUALITATIVE STUDY OF ADOLESCENT PERCEIVED
SCHOOL AND HOME CONNECTEDNESS AND
EATING BEHAVIORS IN RELATION TO BMI
GENEVIEVE ALICE WOOLVERTON**

ABSTRACT

Introduction

Obesity is a major public health concern for youth in the United States. Eating behaviors, such as meal skipping and eating family dinner, are associated with obesity. School connectedness and family connectedness assess the degree to which an individual feels that he or she belongs in an environment, and strong feelings of school connectedness are associated with decreased BMI. This study qualitatively evaluates the relationships between feelings of home and school connectedness and specific eating behaviors associated with obesity in an adolescent population.

Methods

Participants were recruited from an adolescent clinic at Boston Children's Hospital. Inclusion criteria for recruitment included adolescents who were: Black/ African American or Hispanic and non-White, between 13 and 19 years of age, and living in the Boston neighborhoods of Dorchester, Roxbury, or Mattapan. Participants were interviewed using a semi-structured interview guide, and participant data was analyzed by systematically identifying thematic language in the data by identifying similar phrases, patterns of descriptions, and notable disparities in participant content.

Results

14 (10 females, 4 males; M=15.8 years of age) were enrolled and interviewed. Mean participant BMI was 27.3. 10 participants rarely/never skipped lunch, and 4 participants often/always skipped lunch. 6 participants ate dinner at home with their family always/often, and 4 rarely/never ate dinner at home with their family. Most reported that their school's community, quality of education, and small environments were the most important aspects of their school. Of the 4 participants who attended school in the suburbs, 3 were connected or very connected to their school and disconnected from their neighborhoods. Every participant expressed feeling safe at school, but many cited lack of safety as their least favorite aspect of their neighborhood. Some reported that they felt safe, even though they knew that their neighborhoods were unsafe.

Conclusion

Of the five students who felt 'very connected' to their schools, all but one always/often ate the food provided by their schools. These students discussed the ways in which their schools listened to student suggestions about school food. These feelings may suggest a stronger sense of feeling respected by one's school. Strong feelings of school connectedness in the majority of students who attend school in the suburbs warrant further exploration, as those who experience discordant home and school environments seemed more likely to embrace their school environment than their neighborhood environment. Furthermore, understanding how perceived neighborhood safety may contribute to feelings of home and neighborhood connectedness and possibly eating behaviors at or around home merits further examination.

TABLE OF CONTENTS

TITLE	i
COPYRIGHT PAGE	ii
READER APPROVAL PAGE	iii
ABSTRACT	iv
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF ABBREVIATIONS	ix
INTRODUCTION	1
Child and Adolescent Obesity in the United States	1
Environmental Contributors to Eating Behaviors and Obesity	4
School Connectedness	5
Home and Family Connectedness	8
Family Meals	9
Meal Skipping/ Infrequent Eating	10
Qualitative Research	11
Summary	12
SPECIFIC AIMS	14
METHODS	15
Study Design and Participant Recruitment	15
Interviews	17
Data Analysis	18
RESULTS	21
Eating Behaviors	23
School and Home Connectedness	24
BMI and Eating Behaviors in the Context of Home and School Connectedness	31
DISCUSSION	32
APPENDIX	39
Appendix A: Overview of METCO Program	39

Appendix B: Demographic Form..... 40
Appendix C: Interview Guide..... 42
LIST OF JOURNAL ABBREVIATIONS..... 45
REFERENCES 47
CURRICULUM VITAE..... 53

LIST OF TABLES

Table	Title	Page
1	Demographic Characteristics of the Participants	22
2	Weight Status of the Participants	23
3	Reported Lunch Source and Frequency of Lunch Skipping Among Participants	23
4	Frequency of Family Dinners Among Participants	24
5	Categories and Subcategories of Participants' Feelings of Home and School Connectedness	25
6	Participants' Feelings of Home and School Connectedness and Their BMIs and Eating Behaviors at Home and at School	32

LIST OF ABBREVIATIONS

BMI.....	Body Mass Index
CDC	Center for Disease Control and Prevention
NHANES	National Health and Nutrition Examination Survey

INTRODUCTION

Child and Adolescent Obesity in the United States

Child and adolescent obesity is one of the most significant public health issues in the United States today, contributing to various significant health issues.¹ As of 2012, 20.5% of US children between the ages of 12 and 19 were obese according to Body Mass Index (BMI). Although some studies have reported a leveling off of the childhood obesity rate, there have been no significant changes in obesity prevalence measured by BMI in youth between 2003-2004 and 2011-2012.²

Obesity in children and adolescents is not consistently distributed across racial and ethnic groups. 2009-2010 National Health and Nutrition Examination Survey (NHANES) data reported that, in adolescents between the ages of 12-19, obesity rates in non-Hispanic White boys and non-Hispanic Black boys were 17.5% and 22.6% respectively. In the same age group, obesity rates in non-Hispanic White girls and non-Hispanic Black girls were 14.7% and 24.8% respectively.³ Social, economic, and genetic factors have been explored to parse these disparities. Two large national studies have recently found that US children from low-income families had a more than two-fold increased risk of obesity than children from high-income families.^{4,5} Recent research suggests that many factors together – social determinants such as neighborhood environment, family relationships, and socioeconomic factors – may be some of the strongest determinants contributing to racial weight disparities among US children.⁶

Obese children and adolescents are more likely than their non-obese counterparts

to be obese adults and to face many adverse health risks as adults, specifically cardiovascular disease and Type 2 Diabetes.⁷ Moreover, obesity, glucose intolerance, and hypertension in childhood are strongly associated with premature death in adulthood. In one study, rates of premature death at a follow-up period of 23.9 years were more than double among those who were in the highest BMI quartile as children.⁸ In 2011-2012, approximately 1 in 5 children and adolescents between the ages of 8 and 17 had an adverse lipid concentration of triglycerides, high-density lipoprotein cholesterol, or non-high density lipoprotein cholesterol, and approximately 1 in 10 youth had borderline high or high blood pressure.⁹ Obesity in adulthood has been shown to be associated with an increased risk of osteoarthritis.¹⁰ A recent study by Mosca et al. explored the relationship between adolescent obesity and low bone density that often contributes to fractures and osteoarthritis in adulthood. Adolescence is a crucial period of growth during which bone formation exceeds resorption and skeletal mass reaches its peak. In this study, obesity in adolescents was associated with low bone mineral density and bone mineral content.¹¹

In addition to serious physical health risks associated with childhood and adolescent obesity, recent studies also highlight the negative social and mental health impact of obesity in youth. Overweight adolescents are more likely to feel socially isolated and to be peripheral to social networks compared to their normal-weighted peers.¹² Social isolation and peer rejection of obese adolescents is associated with low self-esteem, depressive symptoms, anxiety, and loneliness.¹³ A review paper about obesity and social victimization in adolescents discussed in detail the ways in which obese adolescents are marginalized by their peers.¹⁴ Neumark-Sztainer et al. showed that

the risk of being teased increased as weight increased among adolescents.¹⁵ Teasing predicts low self-esteem, body dissatisfaction, depressive symptoms, and suicidal ideation.¹⁶ Janssen et al. found that the more overweight or obese an adolescent is, the more likely he or she is to bully others and experience bullying from peers.¹⁷

Research has also demonstrated the association between obesity and depression, although the mechanisms by which these are related are still debated.^{18,19} There is significant evidence that inflammatory processes associated with obesity, such as elevated C-reactive protein, is elevated in depressed adults.²⁰ Capuron et al. examined an inflammatory marker, cytokine interleukin (IL)-6, and reported that cytokine injections, used as a treatment for some types of cancer, can induce significant depressive symptoms.²¹ This suggests that an inflammatory marker associated with obesity may induce some depressive symptoms. Recent research also suggests that depressive symptoms arising in adolescence likely contribute to the onset of obesity. Specifically, the increase in estrogen in adolescent girls entering puberty may induce some depressive symptoms, which in turn increases obesity.²² While these are important findings, there are also likely behavioral factors that are associated with and may contribute to both depression and obesity. For example, Goldschmidt et al. showed that among adolescent depressed females, frequent binge eating, a behavior associated with depression,²³ is a strong contributing factor to obesity.²⁴

Environmental Contributors to Eating Behaviors and Obesity

In understanding contributors and potential sites of intervention to the obesity epidemic, public health researchers have explored the environmental contexts in which young people live, study, and spend their free time.²⁵ A review article by Larson & Story, which explores the environmental correlates of dietary behaviors, showed that environmental food influences operate across many levels: individual factors such as food preference, social environment such as family and peers, physical environment such as food available around one's home, and macro-level environment such as income and socioeconomic status.²⁶ These levels are certainly linked to each other; for example, socioeconomic status affects where a person lives, which in turn may affect a person's social network. Research shows that youth and adults consume more calories when they eat in social groups than when they eat alone.²⁷ Specifically in one's social environment, Larson & Story reported that having friends with higher BMIs is associated with increased risk of obesity in adults and adolescents.²⁶ Moreover, Cortento et al. showed that adolescents are often influenced by their peer's food choices.²⁸

Larson & Story also explored the ways in which family members and the family home food environment influence youth dietary behaviors. Much research shows similarities in caloric intakes, food, and nutrients among family members. Obesity in youth was strongly associated with parental and sibling intake of fruit, vegetable, and fat.²⁶ Specifically, parents, especially those who prepare meals, significantly affect the eating behaviors of their family members. The more meals that a child eats with his or her family food preparer, the more similarly the child's fruit and vegetable intake

resembles the preparer's.²⁹ Research also shows that youth food choices at home depend on the types and the amounts of specific foods available; larger quantities of a specific food are associated with increased intake of that food in children.³⁰

Larson & Story also suggest that the physical school food environment has strong impacts on youth food behaviors,²⁶ as students consume between 19-50% of their total daily calories at school.³¹ Because of this, offering students healthy food that they choose to eat and enjoy eating is of great importance. Food offered by public schools as part of the National School Lunch and National School Breakfast program must meet the Dietary Guidelines for Americans.³² However, the increase over the past few decades in alternative food options at schools, such as snacks from vending machines, is correlated with the recent rise in obesity in school-aged children.²⁶ The 2007 Institute of Medicine (IOM) Report recommended that alternative food options at schools should only consist of fruit, vegetables, whole grains, and low or nonfat dairy, as the Dietary Guidelines for Americans suggests. However, currently only 16 states require nutrition standard for alternative food options offered at schools.³³ Based on these data, and because children and adolescents spend a large percentage of their waking hours in school, understanding how young people interact with the food offered by their schools is crucial.

School Connectedness

Much research has focused on the types of food and physical activity choices offered to children and adolescents by their school and home environments. However, adolescents may or may not partake in the food or activities offered at their schools based

on how connected they feel to their schools. Understanding the degree to which a student a student feels that he or she belongs at school is useful in considering weight related interventions in school environments.

School connectedness is a concept that stems from psychological research that asserts that the needs to belong, form bonds of friendship, and feel comfortable around others are fundamental and pervasive human motivations.³⁴ The Centers for Disease Control and Prevention (CDC) defines school connectedness as a student's belief that adults and peers at school care about their learning as well as about them as individuals.³⁵

Research about school connectedness and mental health is fairly robust, with positive feelings of school connectedness are associated with positive mental health outcomes. In a recent study, strong feelings of school connectedness were associated with lower depressive symptoms in a late adolescent population.³⁶ A longitudinal study explored the correlation between school connectedness and adolescent depression further by showing that mental health symptoms of depression and anxiety did not predict feelings of school connectedness. Instead, feelings of school connectedness were strongly correlated with concurrent mental health symptoms of depression and anxiety, and early feelings of poor school connectedness were significantly associated with future mental health problems.³⁷ Joyce et al. explored this relationship between school connectedness and adolescent depression further in a recent study by integrating teacher support, specifically feelings of being cared about by teachers, into questions about school connectedness. General feelings of school connectedness, as well as feeling cared about by teachers were both associated with significantly fewer depressive symptoms in the

population of adolescent students.³⁸

Research has also explored the potential relationship between feelings of school connectedness and effective participation in learning activities and academic performance. Babakhani reported that students who perceived acceptance, respect, supportiveness, and other self-reported positive feelings at school were more likely to participate in learning exercises in the classroom and in extracurricular activities.³⁹ This finding is of particular relevance to our study, as we are seeking to understand the potential association between school connectedness and choosing to participate in school meals. Another study specifically evaluated student academic performance and showed that student-reported feelings of school connectedness and belonging were associated with higher academic performance.⁴⁰ Although most school connectedness research is observational, one school belonging intervention study among first year African American college students showed increased grade point averages among those who received the intervention.⁴¹

Recent research has also provided initial evidence for the association between school connectedness and BMI. In a study of urban preadolescents, positive feelings of school connectedness were associated with lower BMIs. Specifically, a 1-unit increase in school climate score was associated with a 7.21-point decrease in BMI percentile.⁴² Richmond et al. showed that girls who reported feeling connected to their schools and who attended schools with high overall levels of school connectedness had lower BMIs.⁴³ The CDC also states that school connectedness is one of many protective factors against adolescent obesity.

Home and Family Connectedness

In addition to school settings, home and family environments also play significant roles in influencing adolescent eating behaviors, some of which are associated with obesity. Supportive family environments, measured by levels of family functioning, frequency of family meals, and parental modeling of healthy behaviors, have been shown to be associated with lower fast food consumption and lower BMIs in a youth population.⁴⁴ Maternal concern for healthful eating and maternal modeling of healthy eating are associated with an increased availability of fruits, vegetables, and milk at home. Adolescents whose mothers expressed concern for and modeled healthful eating were also more likely to make healthy choices while eating at home.⁴⁵ This highlights the importance of how adolescents perceive their mothers and may model their maternal concern of health and eating behaviors.

Moreover, just as school connectedness has been shown to be associated with decreased adolescent depression, as discussed above, positive feelings of family connectedness are also associated with adolescent mental well-being. Early research showed that positive family connectedness may protect teens from negative emotional experiences, suicidal thoughts, and violence.⁴⁶ In contrast, family dysfunction has been shown to be associated with increased risks of eating behavior pathologies such as binge eating.⁴⁷ Also, weight-related teasing from parents and parental encouragement to diet were associated with poor psychological health in adolescents.⁴⁸

Family connectedness may also protect against the psychological risks associated with obesity that are discussed above. One study showed that, among overweight

adolescent girls, those who reported strong feelings of family connectedness performed better in school and exhibited lower levels of emotional distress than overweight adolescent girls who reported poor feelings of family connectedness.⁴⁹

Family Meals

Strong feelings of family connectedness are associated with frequent family meals, especially eating dinner together as a family at home.⁵⁰ Studies that evaluate the frequency of family dinner and adolescent mental health show a consistent association between frequency of family dinner and emotional well-being measured as commitment to values, social interpersonal skills, and positive identify. Moreover, one study showed that in families who ate dinner together infrequently, adolescents were more likely to display high-risk behaviors such as substance use, antisocial behaviors, violence, school problems, eating disorder pathologies, and excessive weight loss. The study also reported that prioritizing family meals and eating in a home environment were associated with psychosocial well-being and inversely associated with depressive symptoms in overweight adolescents.⁴⁹

Frequent family dinner has also been associated with lower BMIs and healthier eating behaviors. Research shows that families who frequently eat dinner together in their kitchen or dining room have significantly lower BMIs in adults and children compared to families who eat elsewhere or families whose members eat dinner alone.⁵⁰ In adolescents, higher frequency of family meals was associated with lower rates of overweight and obesity in boys and girls.^{45,51} A study that examined influences of eating patterns among

adolescents found that eating dinner with parents was associated with consuming higher rates of fruits, vegetables, and dairy.⁵²

Evaluating the relationship between frequency of family dinners and obesity is particularly interesting because it brings together the concepts of family connectedness, psychological well-being, and eating behaviors associated with obesity. Because of the association between social and familial belonging and depression, and because of the relationship between depression and obesity, it seems that family dinners is an ideal venue in which to explore family connectedness and obesity.

Meal Skipping/ Infrequent Eating

While research shows that frequent family dinners are associated with decreased rates of adolescent obesity, there are many other specific eating behaviors that are associated with increased rates of obesity. For example, in an adult population, meal skipping, particularly breakfast skipping, has been shown to be strongly associated with increased obesity.⁵³

In youth, meal skipping at school is common, and recent research suggests that approximately 20% of school-aged children skip lunch at least three times per week.⁵⁴ In adolescents, research shows that meal frequency is inversely associated with BMI⁵⁵ and waist circumference,⁵⁶ and that meal skipping is associated with abdominal obesity and elevated triglycerides.⁵⁷ One study of adolescents reported that those who ate infrequently consumed 23% more calories per day compared to those who ate more frequently.⁵⁸ Skipping lunch at school has also been shown to be associated with a short-term

reduction in cognitive functioning in the afternoon.⁵⁹

While it is clear that skipping meals and eating infrequently correlate to increased obesity risk, the motivations for meal skipping have not been thoroughly explored. Because of the relationships between meal skipping and obesity and feelings of school connectedness and obesity, it is valuable to understand why students fail to participate in meals while at school.

Qualitative Research

Large-scale epidemiologic studies on which many of the findings discussed here are based can demonstrate associations between BMI and particular behaviors or environments, but they fail to provide understanding of the individual-level motivations or ‘whys’ behind these associations. Understanding the motivating factors behind specific behaviors – specifically skipping lunch at school and eating family dinners – may help future clinicians, schools, and/or public health officials design targeted interventions towards specific individuals and/or groups that share similar characteristics.⁶⁰

Qualitative research is an ideal means to perform exploratory work to understand the reasons behind behaviors. In contrast to traditional quantitative research, qualitative research seeks to understand the worldview and motivators of those being researched in their natural settings.⁶⁰

Summary

While high rates of obesity across a wide age range is a long-standing public health problem in the United States, the numerous complex and interconnected factors that contribute to obesity remain the subject of widespread research. Particular behaviors are known to be associated with and protective against obesity, but the motivations for unhealthy and healthy behaviors are not always clear and are likely related to why people interact with and choose to eat and move in their environments. Understanding that an environment is ‘healthy’ or ‘unhealthy’ does not address how and to what degree an individual interacts with his or her particular environments. Concepts such as school connectedness and family connectedness have been helpful in drawing associations between complex emotions of belonging in one’s environments and specific outcomes such as depression, BMI, and academic achievement. However, the missing link in this research is understanding which specific behaviors, on an individual level, contribute to the associations between feeling connected and having a particular outcome such as elevated BMI.

Therefore, we test hypotheses that attempt to explore obesity-specific behaviors – meal skipping and eating family dinner – with feelings of connectedness. First, we hypothesize that feelings of school connectedness are associated with (a) BMI and (b) lunch skipping at school and/or infrequent eating of food provided by a participant’s school. Secondly, we hypothesize that feelings of family and home connectedness are associated with (a) BMI and (b) eating family dinners frequently and enjoying the food

and eating environment at home. In both hypotheses, we hope to capture motivations for participating in school lunch and eating family dinners in our participants' own words.

SPECIFIC AIMS

The objective of the present study is to (1) understand the connection between feelings of school connectedness and eating behavior at school in the context of participants' BMIs. We also sought to (2) explore the relationship between family and home connectedness and eating behaviors at home in the context of participants' BMIs.

1. Qualitative data about eating behaviors at home and at school, physical activity, school connectedness, and home/family connectedness will be gathered by interviewing participants. All participants will be included in analysis.
2. Participants' responses to questions regarding lunch skipping behaviors, eating family dinners, school connectedness, and home/family connectedness will be examined.
3. Descriptive analysis and coding of interview transcripts will be performed for school connectedness and home/family connectedness.
4. These results may shed light on specific eating behaviors associated with feelings of home and school connectedness and/or the associations, if any, between feelings of home/school connectedness and BMI and specific eating behaviors and BMI.

METHODS

Study Design and Participant Recruitment

This study used a descriptive qualitative approach to explore the experiences of adolescents in their homes and at school generally and focused on eating and physical activity behaviors. Criteria for participant recruitment included adolescents who were (a) Black/ African American or Hispanic and non-White, (b) between 13 and 19 years of age, and (c) living in the Boston neighborhoods of Dorchester, Roxbury, or Mattapan. Patients who were not currently enrolled in high school, non-English speaking, or unable to assent were excluded. Recruitment to the study was performed in an adolescent medical clinic affiliated with an urban pediatric hospital in three ways.

We identified patients who met the above criteria based on information in their electronic health records and approached them in person during clinic visits. We briefly explained the study to them and asked if they would like to learn more. We then explained that the study consisted of one interview lasting approximately one hour that would take place in the clinic at a time that was convenient for them. We also informed potential participants that the goal of the study was to better understand how adolescents' perceptions of their home and school environments affect their health-related behaviors, specifically eating behaviors. If interested, we conducted an informed consent, which was signed by the participants' parent/legal guardian, and we collected contact information from the potential participant and often scheduled his or her study visit for a later date.

Providers in the clinic were also notified by the principle investigator about the specific criteria and goals of our study, and some providers notified us about their

patients who met criteria for our study. Some providers explained the study to their patients during a clinic visit, and if a patient expressed interest to their provider and agreed to be contacted by us, we later called or emailed them to schedule study visits. Alternatively, if the provider informed us about a potential participant but was unable to speak to that patient about the study directly, we made note of that patient so we could approach him or her at a future clinic visit to explain the study.

Finally, we recruited participants from a research registry of patients in the clinic who had previously expressed interest in participating in research studies. When potential participants express interest to research assistants in regards to any ongoing research study in person at the clinic, they have the option of joining the clinic's research registry by providing us with their phone number and/or email address. If a future study commences for which they are eligible, we are able contact them to see if they are interested in participating.

In all three recruitment methods, we aimed for representativeness across age range and between the genders. We also approached potential participants who attended different types of high schools in Boston and high schools in Boston's suburbs. Specifically, we sought participants who attended traditional, pilot, charter, and exam schools in the Boston Public School system, participants who attended high school at a public school in a nearby suburb through enrollment in Boston's METCO program, and participants who attended private schools in a Boston suburb. (Please see Appendix A for a brief overview of Boston's METCO program). Our aim of recruiting participants who attended a wide range of schools was to seek diversity in participant peer environment.

Participants who attend a Boston Public School at which the majority of students were of similar demographic background and from similar communities as they are likely had different experiences than those who attend school in the suburbs. Suburban schools around Boston, both private and public, educate students who mostly have very different demographic backgrounds and live in different communities than our participants. This diversity of experience allowed for richer analysis of school connectedness.

Interviews

Boston Children's Hospital's institutional review board approved the protocol with a parental consent form for youth under the age of 18 years to participate. A parent or legal guardian of participants under the age of 18 was informed of the study either in person or over the phone using a standardized adult parental consent form. On the form, they answered 'yes' or 'no' to being contacted in the future should questions arise about the participant's visit and 'yes' or 'no' about disclosing the participant's BMI to the study researchers. If consent was granted, BMI was obtained from the patient's electronic medical record. All participants were also asked to complete an assent form, which is a less comprehensive version of the adult consent form, before their study visit began. Participants also completed a brief demographic form before the interview, which included information about their families and schools. (Please see Appendix B for the Demographic Form).

A semi-structured interview guide was developed by the primary investigatory for our participants based on literature about adolescent eating and physical activity

behaviors and established research about school connectedness. (Please see Appendix C for the Interview Guide). In some cases, probing questions not written in the interview guide were also used to clarify participants' answers and/or to allow participants to elaborate when necessary. The goal of our interviews was to understand the lived experiences of our participants as clearly as possible. Interviews were scheduled at a time convenient for the participants and conducted in a private room in or near the referring clinic. A research assistant conducted all the interviews face-to-face. The interviews lasted approximately one hour and were audio recorded. All audio recordings, interview guides, and demographic forms were labeled using an anonymous numbering system. The confidentiality of our participants was completely preserved throughout the study. Upon completion of their study visit, participating youth were offered a \$25 Amazon gift card to show our appreciation of their participation and transportation costs, either in the form of parking garage validation or a train/bus pass valued at \$5.

Data Analysis

Interviews and data analysis were conducted concurrently, allowing us to revise the interview guide in an iterative fashion. After each interview, a research assistant transcribed the audio recording verbatim. Notes about the interview transcripts were made to provide descriptions of various aspects of the content and to identify similar and different characteristics in participants' answers to our questions. A research assistant then systematically identified thematic language in the data by identifying similar phrases, patterns of descriptions, and notable disparities in participant content.⁶¹ Using

characteristic descriptions and language from our participants, categories ('perceived school connectedness' for example) and explicitly defined subcategories in each category ('opinions of peers' for example) were determined according to similarities and differences in the data.⁶¹ Participants' answers were subsequently organized into subcategories of each category according to their language and expressed attitudes. Thematic content about feelings of school and home connectedness were of greatest interest to our study. Based on categorized and subcategorized participant descriptions of these themes, our research team hoped to better understand what contribute to feelings of connection to one's school and home in our population. These data also allowed us to assign two rankings, one for school connectedness and one for home connectedness, based on our participants' descriptions and feelings. For home connectedness and school connectedness, each participant was assigned a ranking of: very connected, connected, unsure, disconnected, or very disconnected.

Based on our hypothesis that feelings of school connectedness were associated with lunchtime eating behaviors at school and that feelings of home connectedness were associated with family dinners, we sought to understand the descriptive content of our participants in the context of these reported eating behaviors. We focused on interview data that addressed lunch skipping and family dinners because these behaviors are associated with obesity. Answers about skipping meals at school, which is positively associated with obesity, and eating family dinner, which is negatively associated with obesity, were sorted into categories of 'always,' 'often,' 'sometimes,' 'rarely,' and 'never.' To understand lunchtime eating behavior among those who ate lunch more

thoroughly, we then evaluated lunch source, and organized lunch source into categories: primarily school-provided, primarily purchased off campus, primarily lunch from home, either school-provided or off-campus, either school-provided or from home, and either off-campus or from home. These data were (1) assessed in relation to participant BMI and (2) cross-referenced with ranked feelings of home and school connectedness to evaluate potential associations between school connectedness and lunch skipping and school connectedness and lunch source.

RESULTS

Youth were targeted based on the inclusion criteria. Of 32 approached, 28 expressed initial willingness to participate, and of the 28 interested in participating, 14 (10 females, 4 males; M=15.8 years of age) were enrolled and interviewed. 11 enrolled participants were recruited via method (1), two were recruited via method (2), and one was recruited via method (3), as discussed above. Of the 14 who expressed interest in participating but did not enroll, four decided that they were no longer interested in participating, 10 could not be reached to schedule an enrollment visit, and one could not participate because of a major mental health concern expressed by the adolescent's provider. Demographic characteristics of the participants are summarized in Table 1.

The mean BMI of the 13 participants who disclosed their BMI was 27.3. According to the categories defined by the CDC's cutoffs for children and adolescents based on gender and age,⁶² 6 participants were 'normal' weighted, 2 participants were 'overweight,' and 5 participants were 'obese.' BMI characteristics of participants are summarized in Table 2.

Characteristics	Frequency	(%)
Gender		
Female	10	71
Male	4	29
Age		
13	2	14
14	1	7
15	1	7
16	6	43
17	2	14
18	2	14
19	0	0
Race		
Black/African American	13	93
Hispanic	2	14
Home Neighborhood		
Dorchester	9	64
Roxbury	3	21
Mattapan	2	14
School		
Boston Public School	10	71
Traditional	3	21
Charter	2	14
Innovation	0	0
Exam	1	7
Pilot	4	29
Non- Boston Public School	4	29
Suburban Public School though	3	21
METCO	1	7
Private School in suburb		
Years at Current School		
1	3	21
2	4	29
3	3	21
4	3	21
5	1	7
Self-Ranked Grades in School Compared to Peers		
1 (highest grades group)	2	14
2	9	64
3	3	21
4 (lowest grades group)	0	0

Table 1: Demographic Characteristics of the Participants (n=14)

Weight Status Category*	N (%)	Male, N (%)	Female, N (%)	Age (Mean)
Normal	6 (46)	2 (33)	4 (66)	15.3
Overweight	2 (15)	0	2 (100)	17
Obese	5 (38)	2 (40)	3 (60)	16

Table 2: Weight Status of the Participants (n=13). Weight Status Category* was calculated from BMI and adjusted for age and sex of each participant per CDC guidelines for adolescents. Age is presented in years. N = the total participants in each category.

Eating Behaviors

Of the 14 participants, 10 reported that they rarely or never skip lunch, and 4 participants reported that they often or always skip lunch. Behavior-specific data about skipping lunch, lunch source, and BMI are presented in Table 3.

Lunch Eating Behavior	N (%)	BMI (M)
Skips Lunch		
Always	1 (7.1)	32.5
Often	3 (21.4)	24.3
Sometimes	0 (0)	-
Rarely	1 (7.1)	41.1
Never	9 (64.2)	26.0
Lunch Source		
None (does not eat lunch)	1	32.5
Primarily school-provided	7	26.1
Primarily purchased off campus	2	20.0
Primarily lunch from home	0	-
Either school-provided or off-campus	1	32.1
Either school-provided or from home	2	21.2
Either off-campus or from home	1	41.1

Table 3: Reported Lunch Source and Frequency of Lunch Skipping Among Participants (n=14). N = the total participants in each category. BMI is presented as the mean for each category.

As Table 3 shows, it does not appear that students with higher BMIs were more likely to always or often skip lunch than those with lower BMIs. No particular lunch source

appeared to be associated with elevated BMI. However, it is difficult to draw conclusions about lunch eating behavior and BMI with only 14 participants.

Of the 12 participants who discussed their dinner eating behaviors, 6 reported that they eat dinner at home with their family members always or often, 2 reported sometimes, and 4 reported that they rarely or never eat dinner at home with their family members. Of the 4 who never or rarely ate dinner at home with their family members, the most common alternative was eating alone in their bedroom while family members were eating or returning home too late at night to eat with family members. We also compared within-participant lunch and dinner eating behaviors to account for the possibility that participants skip meals both at home and at school. However, of the four participants who always or often skipped lunch at school, none always or often skipped family dinner. Behavior-specific data about eating family dinner and BMI are presented in Table 4.

Dinner Eating Behavior	N (%)	BMI (M)
Eats sit-down dinner with family members		
Always	3	23.1
Often	3	37.7
Sometimes	3	20.6
Rarely	2	24.7
Never	2	28.2
Did not report	2	-

Table 4: Frequency of Family Dinners Among Participants (n=14) and mean BMI (n=13). N = the total participants in each category.

School and Home Connectedness

The coded categories of perceived feelings of school and home connectedness and respective subcategories are presented in Table 5.

Categories	Subcategories
Perceived Feelings of School Connectedness	Feelings of what is ‘important’ about school Opinions of peers Opinions of teachers and other adults at school Least favorite aspect of school Favorite aspect of school Opinions of school food Belonging
Perceived Feelings of Home Connectedness	Opinions of neighbors Trusted adults in neighborhood Least favorite aspect of neighborhood Belonging

Table 5: Categories and Subcategories of Participants’ Feelings of Home and School Connectedness.

School Connectedness Subcategory I: Feelings of what is ‘important’ about school

Most participants shared positive feelings in this subcategory. Many reported that their school’s connected community, quality of education, and small environments were the most important aspects of their school. Excerpts highlighting these feelings include:

“I think it’s a good community. I think all the teachers make you feel welcome and they make you feel like you can succeed and have the same chances as anybody else.”

“I’ve never been to a school where people are like actually eager to do their work. And actually everybody in the class helps each other out.”

School Connectedness Subcategory II: Opinions of peers

The majority of participants expressed positive opinions of their peers. Many used language such as respectful, accepting/ open, hard working, and friendly to describe their peers. Notable excerpts include:

“They’re pretty analytical thinkers. Open minded. So they have a different way of thinking. They don’t really judge you, so that is a great reason why I went to that school. They accept you for who you are.

“[The students] are respectful. They know when to get their work done, and they’re not really distracting, except for a handful of students. They know that there is a time and place for everything.”

Participants who attended public and private schools in the suburbs were more critical of their peers than those who attended school in Boston. These participants often described their peers as sheltered. One participant explained:

“Some kids are just really sheltered and don’t really know much about where I come from. It was hard at the beginning. My first year they had like a lot of strange questions that I was completely prepared for, because my mom and other people prepared me for these questions like ‘is it dangerous in your neighborhood?’ and like ‘have you seen anybody get shot?’ They base it off of like what they hear and stereotypes, but I don’t like blame them because they’re really sheltered. A lot of my friends have money. So I don’t mind like explaining to them where I come from and my background as friends and stuff.”

School Connectedness Subcategory III: Opinions of teachers and other adults at school

Participants shared positive opinions of their teachers, coaches, and guidance counselors at school, often describing them as kind, supportive, accepting, and helpful. Most negative opinions were in reference to a specific teacher and not adults at their school as a group. One participant said:

“They’re really helpful. The guidance office is really helpful. They really stuck with me when I was doing bad in school, they really helped me and pushed me and I really appreciate that. The teachers are very good as well. They really care about their jobs, which is always helpful.”

School Connectedness Subcategory IV: Least favorite aspect of school

Food was the most common answer to what students liked least about their school. The second most common answers included participants explaining that their school did not offer them the classes or academic options that they sought or that their school was specialized in an area in which they lacked interest. Some participants wished

that their commute to school were shorter or less complicated. Two participants reported that they liked everything about their school.

School Connectedness Subcategory V: Favorite aspect of school

A strong sense of a closely connected community and small size were the most shared responses to this subcategory. Other common favorite aspects included an atmosphere conducive to learning, specific favorite teachers, and future opportunities. All participants reported to have a favorite aspect of their school. A notable description was:

“It’s small... We’re about like 250 students in the whole high school...I feel like it’s better to connect with your teachers and your peers more. ‘Cause like it’s not just a face, most of each other know each other’s names, so we can all help each other. It’s like a smaller family kind of.”

School Connectedness Subcategory VI: Opinions of school food

Students’ expressed opinions of the food options at their schools varied greatly among our participants. A few participants reported that they liked the salad bar and/or healthier options at school. Many participants expressed negative opinions of the food offered to them at school. The most common complaints were bad taste, bland taste, processed/ not fresh, and not enough choice. One participant said:

“[Lunch is] really gross. Most of the stuff, I swear they just keep it one day and warm it up the next. They don’t ever make the stuff, and some of the stuff comes from like cans. It’s just disgusting.”

Students who attended public or private schools in the suburbs shared more positive opinions of the food served at school. They often recognized that their schools offered more food choices than other schools. One student explained:

“Compared to a lot of the other schools that I’ve heard about, we have *a lot* of different kinds of foods. I know at my school, we can make our own sandwich, so we can have it grilled, we can put anything on it. And a lot of schools don’t do that. And a lot of schools don’t have nachos.”

School Connectedness Subcategory VII: Belonging

Participants compared their feelings of connectedness and belonging at school verses in their home neighborhoods. The majority of participants reported that they felt more connected to their school than their home neighborhood or that they felt equally connected to both environments. Common factors that contributed to this sentiment were: spending more time at school than in their home neighborhoods, not living near other young people, and recognizing that their schools had stronger communities than their home neighborhoods. One participant explained developing feelings of connectedness to his school environment that differed greatly from his home environment:

“I feel like I fit in more at my school just for the fact that, I’m comfortable with them. Do you know how your environment, you adapt to it and then it becomes like a permanent thing? Like you grow up and you change. So like these two years that I’ve been at this school, I’ve adapted more to them, so like I’m more well behaved, and I speak properly, and I just feel more comfortable around them.”

Another participant explained feelings of not belonging at school, notably referring to her home neighborhood as “my environment.”

“I fit in better more in my environment. My neighborhood. I mean, I used to want to fit with my school because like, I felt that I would feel more included and involved. But, as I grew up, and I’ve seen how the people were. I just I wasn’t. I couldn’t.”

Home Connectedness Subcategory I: Opinions of neighbors

Opinions of neighbors among our participants were relatively split between positive and negative. Those who had negative opinions explained that they were often

isolated from people in their neighborhood outside of their household and interpreted people in their neighborhood as unfriendly and/or unsafe. Others explained that they don't know anyone in their neighborhood outside of their family, so they felt neutrally towards their neighbors. One participant shared an opinion of her neighbors that captured the emotions of many of our participants:

“I don't really go outside, so I don't really know.... I guess they seem like good people. I think they're all like striving for the same thing. I mean I think you have like, not losers, but the people who don't really strive for anything, and then you have people who are just genuinely nice.”

Home Connectedness Subcategory II: Trusted adults in neighborhood

While many participants felt isolated from their neighbors, a few mentioned that they could count on a trusted adult outside of their family in their neighborhood if need be. A few also explained that their neighbors look out for the safety of each other. Two examples of these sentiments include:

“We have this thing in our neighborhood where we say ‘everyone watches everyone’ so if you're parents aren't out there, you can still have another neighbor watching your kids.”

“I know that if I needed something, I could go to a neighbor... of if I was ever in trouble, I would have somewhere to go because they know me and my family.”

Home Connectedness Subcategory III: Least favorite aspect of neighborhood

While every participant expressed feeling safe at school, by contrast, most explained that lack of safety was their least favorite aspect of their home neighborhood. Many explained that they didn't feel safe going outside for a walk around their homes and subsequently felt isolated. The second most common complaints about home

neighborhoods were extreme noise and lack of community. One participant stated simply, “I have no friends out there.”

Home Connectedness Subcategory IV: Belonging

There was great variation in feelings of belonging and being connected to their home neighborhoods among participants. All participants expressed feelings of closeness to their own family members who shared their households. However, some felt totally disconnected from their neighborhood around their home. Others felt more strongly connected to their neighborhood than their school environment because they felt that their neighborhood community was stronger, they had known their neighbors for longer, and/or because they maintained friendships with neighbors throughout the summer, not just during the school year.

Discordance: Feelings of Connectedness Among Students who Attend Suburban Schools

Upon analysis of home and school connectedness in our participants, it became clear that students who attended school in Boston and students who attended school in the Boston suburbs spoke very differently about feelings of connectedness to their different environments. Since all of our participants live in the same three neighborhoods of Boston that have similar socioeconomic and cultural demographics, it was interesting to evaluate feelings of school connectedness among students who attend school in Boston verses students who attend school in the Boston suburbs. Of our four participants who attend school in the suburbs, three were ranked as connected or very connected to their

school and disconnected from their neighborhoods. These three participants spoke in detail about embracing a new and different environment at school, enjoying learning in a less crowded and more academically rigorous school, and feeling comfortable in the diversity of their suburban schools. Notable excerpts include:

“Being one of the top schools in the East Coast is pretty good because seeing where I come from, and the neighborhood that I come from, this is giving me a better opportunity for colleges and the future.”

“That area [around my school] is...a place where I just enjoy being a lot cause that’s more of my scene. It’s more laid back and chill and calm. There’s just never any confrontation or rowdiness ... And I don’t know, that’s like somewhere where I aspire to be in life.”

Moreover, all four participants who attend school in the suburbs are Black/African American and mentioned race without prompting when discussing their schools, often stating that being in a racial minority among primarily Caucasian peers was a challenge but also a positive aspect of their school experience. Racial and cultural diversity seemed important to them. One student explained at length:

“We are a diverse school. We have Caucasian or European-American kids and a few Caribbean kids and you have African American kids, and you have a very small amount of African American kids and Hispanic kids.... Not purposefully, but like a lot of times there are like slip-ups, and kids make race comments. So for me, it’s okay, I can explain and help you out. But outside, in the outside world, it may be problematic for someone else. We have a race and gender club, and I’m in it, because I felt the need to represent, especially cause a lot of guys of color, they don’t really like to talk about it. They’re just like, ‘whatever. I don’t care.’ But I feel passionate about it. There should be people like us included, cause there are things about us that they don’t know, and there’s things about them that we don’t know, like, their cultures and stuff like that. I feel like if we all talked about it, it wouldn’t be so awkward all the time, like you don’t know what to say. Like I don’t want to be talking and like walking on eggshells around people, when let’s be real, we’re in high school. We’re growing up. We’re adults. It’s time to be real with each other, and take the blindfolds off. And this is a life type of situation.”

BMI and Eating Behaviors in the Context of Home and School Connectedness

Data of individual participants' feelings of home and school connectedness and their BMIs and eating behaviors in these environments are presented below in Table 6.

BMI (M)		N (%)	n (%) never or rarely eat food provided by school	n (%) often or always eat food provided by school
	School Connectedness			
27.4	Very connected	5 (35)	1 (20)	4 (80)
28.3	Connected	3 (21)	2 (66)	1 (33)
-	Unsure	0 (0)	0 (0)	0 (0)
24.2	Disconnected	4 (28)	4 (100)	0 (0)
30.15	Very Disconnected	2 (14)	1 (50)	1 (50)
BMI (M)		N (%)	n (%) never or rarely eat family dinner	n (%) often or always eat family dinner
	Home Connectedness			
24.5	Very connected	2 (14)	1 (50)	1 (50)
23.6	Connected	4 (29)	2 (50)	2 (50)
40.4	Unsure	2 (14)	0 (0)	2 (100)
27.7	Disconnected	5*	0 (0)	3 (60)
20	Very Disconnected	(36) 1 (7)	0 (0)	1 (100)

Table 6: Participants' Feelings of Home and School Connectedness and Their BMIs and Eating Behaviors at Home and at School, (total n= 14). N = the total participants in each category. *Two of these respondents did not report family dinner eating habits.

DISCUSSION

Current research demonstrates that skipping meals is positively associated with obesity, and eating family meals frequently is negatively associated with obesity. With a small sample size of 14 participants, it was difficult to draw similar associations between the obesity related eating behaviors examined – skipping lunch and eating family dinner –and BMI. Our first hypothesis was based on research that shows that feelings of school connectedness and belonging at school are associated with BMI; students who feel strongly connected to their schools are more likely to have lower BMIs, and students who feel disconnected from their schools are more likely to have higher BMIs. Similar results about school connectedness and BMI were not shown in our data, likely due to our very small sample size.

Our comprehensive evaluation of school and home connectedness, however, shed light on the complex factors that contribute to feeling a sense of belonging to one's environment. The majority of our participants expressed a desire to feel closely connected to their schools and valued a strong school community and open and accepting peers and teachers. Those who spoke positively of their peers' behavior, work ethic, openness, and respect of differences were more likely to feel that they were strongly connected to their school and that their school had a strong community. Judgment towards peers, the most common being closed-mindedness, was associated with weak feelings of school connectedness. Understanding specifically what self-reported values and opinions of their school, peers, and teachers were associated with school connectedness in our population was useful in parsing this complex concept.

In terms of home environment, many of the same values that were expressed to discuss school connectedness, such as strong community and reverence of others, were used to discuss home connectedness. One significant factor that participants discussed in terms of home connectedness was neighborhood safety. While lack of sufficient safety was the most common complaint about neighborhood among our participants, these feelings did not correlate with feelings of disconnectedness to one's neighborhood. This may be related to the detailed ways in which participants explained that they knew that their neighborhoods were unsafe, and they often stayed inside and felt more isolated than they would feel in a safer neighborhood. However, when they were outside in their neighborhood, they personally perceived themselves as safe. Participants described this dichotomy by explaining that they were accustomed to their neighborhoods, and therefore felt safe, even though they knew that their neighborhoods were unsafe. Another common explanation was that they felt prepared to deal with an unsafe situation should one arise in their neighborhood. Understanding perceived safety versus actual safety was an important distinction in our evaluation of the factors that contribute to feelings of home and neighborhood connectedness.

Strong feelings of school connectedness in the majority of students who attend school in the suburbs warrant further exploration. Interestingly, no participants who attend school in the suburbs reported that they felt connected to both home and school equally, which was a common sentiment among our participants who live and attend school in Boston. In our small sample, students who experience discordant home and school environments seemed more likely to embrace their school environment and feel

that they belong at school more than in their home neighborhoods.

We also examined school eating behavior among participants who attend in Boston and participants who attend school in the suburbs. School proximity to home did not correlate with the likelihood that a participant frequently or infrequently ate the food offered at school. All participants who attended school in the suburbs expressed positive feelings about the food at their school, almost never skipped lunch, and frequently ate the food provided to them at school. Even the one participant of these four who felt very disconnected from her school and very connected to her home neighborhood much preferred the food at school to the food at home. She loved the choice of food options at school and enjoyed school lunch every day despite otherwise feeling very negatively towards her school community, peers, and teachers.

In addition, our participants who did not feel connected to their schools often made very logical arguments and criticisms of their schools, suggesting that some adolescents are studying in an environment that may not be the best fit for their learning and social styles. The Boston Public School system allows students who live in all neighborhoods of Boston to attend different types of schools, including smaller charter schools, more specialized pilot schools that focus on art or science for example, and more academically rigorous exam schools. In addition, METCO allows low-income high-achieving young people to attend public suburban schools, and private schools in the Boston area award academic and athletic scholarships to students. With these choices, low feelings of school connectedness may suggest that a participant in our population would be more likely to excel in a different school.

Our second hypothesis sought to evaluate the potential negative association between strong feelings of school connectedness and lunch eating behaviors and the potential positive association between strong feelings of home connectedness and eating family dinner. Of the five students who felt ‘very connected’ to their schools, all but one always or often ate the food provided by their schools. These students were more likely to discuss the positive health aspects of their school foods and the ways in which their schools had improved food options or listened to student suggestions and criticism about school food in the past. These feelings may suggest a stronger sense of feeling respected by one’s school, and this feeling of being valued may be associated with strong feelings of school connectedness in our population and/or better food offered at school.

On the other hand, students who felt ‘very connected’ or ‘connected’ to their schools and did not chose to eat the food at school spoke positively about their sense of belonging in their school communities and liked many aspects of their schools, including peers and teachers, but they were very critical of their school’s food. It seems that school connectedness may be enhanced by feeling positively about school food, as discussed above, but liking school food was not a not a requirement for school connectedness in our population.

In terms of family connectedness and eating family dinners, we did not see an association between strong feelings of family connectedness and frequency of family dinners. This is likely due to our questions about neighborhood connectedness that did not directly address feelings of family connectedness or unity. Our interviews have demonstrated that these are two very different concepts. All of our participants had many

signifiers of strong family unity such as speaking positively about family members and enjoying time spent at home. However, for many of our participants, the majority of time they spent in their neighborhoods was spent inside their family homes. In our evaluations, these participants often were ranked as being disconnected from their home neighborhoods because they spoke negatively about their neighborhoods in the subcategories outlined above. However, feeling disconnected from one's neighborhood is independent of feeling connected or disconnected from one's family. Future research about family connectedness should ensure that 'neighborhood' and 'family' are evaluated as two separate environments.

Our study was primarily limited by small sample size, which prevented us from drawing broad conclusions about school and home connectedness and eating behaviors. In addition, our evaluation of home connectedness was complicated by the differences expressed by our participants between neighborhood connectedness and home/family connectedness. Without specific questions that differentiated these environments, potential disparities were not captured in our data. Finally, our discussions about school connectedness revealed rich descriptions of feeling connected to one's school. However, as seen in our demographic information (Table 1), two other factors not discussed in our interviews – length of time at current school and self-ranked grades in school compared to peers – may have significantly contributed to feelings of school connectedness. While these factors may have contributed to a participant feeling more or less connected to his or her school, the subcategories evaluated in school connectedness did not address these factors.

Despite our limitations, our qualitative interview design and descriptive analyses of home and school connectedness were valuable tools in understanding specific factors that led to feeling connected to an environment in our population of adolescents. Understanding the language and emotions used in discussing school and home connectedness may guide future research in evaluating the associations between certain health behaviors and feelings of connectedness and potential ways in which schools can improve to make students feel more connected. Understanding the complexities of school connectedness in our population may also contribute to more valuable conversations between providers and patients about school connectedness.

APPENDIX A: OVERVIEW OF METCO PROGRAM

METCO, funded by the Commonwealth of Massachusetts, allows non-White students who live in Boston or Springfield to attend public schools in suburban towns around Boston or Springfield for free, transportation included. METCO's goals are:

“to expand educational opportunities, increase diversity, and reduce racial isolation by permitting students in Boston and Springfield to attend public schools in other communities that have agreed to participate. The program provides students of participating school districts the opportunity to experience the advantages of learning and working in a racially, ethnically, and linguistically diverse setting.”⁶³

METCO is the longest running voluntary school desegregation program in the United States, it has existed without protest from participating school districts for over 30 years, and it is often used as a model for other similar programs across the country.⁶⁴

The program was founded in 1966 in the wake of the Civil Rights Movement and the initiation of desegregation and bussing programs in schools across the country. Today, there are 3,300 students enrolled in METCO in 33 school districts in metropolitan Boston and four school districts outside of Springfield.⁶⁵ The majority of students currently enrolled in the METCO program are Black/ African American (73%).⁶⁶ Students are admitted to the METCO program based on their race (must be non-White), academic achievement to date, socioeconomic status, and the current availability of spots in METCO-participating schools.⁶⁷

APPENDIX B: DEMOGRAPHIC FORM

Study ID _____

Date _____

1. Gender:

Female

Male

2. What is your age (at most recent birthday)?

13 years old

17 years old

14 years old

18 years old

15 years old

19 years old

16 years old

3. Race/ Ethnicity (please select all that apply)

Hispanic or Latino Other

African-American or Black

4. What school grade are you in?

5th

6th

7th

8th

9th

10th

11th

12th

5. How many parents are living with you at home?

One

Two (or more)

None/foster care

Missing

6. Of the parent(s) living with you at home, what is the highest level of education that s/he completed?

8th grade or less

> 8th grade but not high school (HS) graduate

High school graduate, or GED

Business, trade, or vocational school after HS

Some college, but did not graduate

Graduated college or university

Professional degree beyond 4-year college

Don't know

Missing

7. What is your parents' occupation?

Mother: _____

Father: _____

8. If we were to divide your grade into 4 groups with group 1 having the highest grades and group 4 having the lowest grades, which group do you think you would be in?

- Group 1 (highest grades)
- Group 2
- Group 3
- Group 4 (lowest grades)

9. Tell us where you have attended school starting in kindergarten:

School 1: _____

Grades:

School 2: _____

Grades:

School 3: _____

Grades:

School 4: _____

Grades:

School 5: _____

Grades:

School 6: _____

Grades:

School 7: _____

Grades:

10. Permission to be re-contacted?

- Yes
- No

Best contact information:

11. Permission to record BMI?

- Yes
- No

Notes: (Include any unusual circumstances, events, etc.)

APPENDIX C: INTERVIEW GUIDE

Interviewer: “Thanks for agreeing to talk with me today. We are going to spend the next hour or so talking about the neighborhood you live in and the school you attend. We are especially focusing on ways in which your neighborhood and school affect your diet and exercise behaviors. As we discussed during the review of the informed consent, some teens may find some of the questions hard to answer. If you don’t want to answer any questions that is ok. In addition, there are no ‘right’ or ‘wrong’ answers, so please do your best to be honest. Just by talking to us you are making a valuable contribution. Feel free to take your time answering questions and if ever you feel that you’ve already answered a question, just let us know.”

General School and neighborhood questions (no more than 5 minutes)

- Tell me about your neighborhood. You can tell me anything that you think is important. (**below are prompts and they do not all have to be answered)
 - How long have you lived there?
 - What are the people in your neighborhood like?
 - What do you like most of least about your neighborhood?
 - How safe is it?
- Tell me about your school. You can tell me anything that you think is important.
 - How long have you lived there?
 - What are the people in your neighborhood like?
 - What do you like most of least about your neighborhood?
 - How safe is it?
- Tell me about feeling like you belong or are connected to your school or your neighborhood.
 - Do you feel similarly about both?
 - ***Do you feel like you fit in more or are more like other people at your school versus your neighborhood?

Dietary Questions

Interviewer: “As I mentioned in the beginning we are particularly interested in how your school and neighborhood influence your food choices and eating patterns as well as your physical activity. So now let’s talk about your diet or what you eat.”

- Walk me through what you typically eat on a school day.
 - Breakfast
 - What?
 - Where from (show on the map)?
 - With whom?
 - Lunch
 - What?
 - Where from (show on the map)?
 - With whom?

- Dinner
 - What?
 - Where from?
 - Who cooks?
 - With whom?
- Walk me through what you typically eat on the weekend days.
 - Breakfast
 - What?
 - Where from (show on the map)?
 - With whom?
 - Lunch
 - What?
 - Where from (show on the map)?
 - With whom?
 - Dinner
 - What?
 - Where from (show on the map)?
 - Who cooks?
 - With whom?
- What is different about weekend v. weekday eating?
- Which do you think is healthier, the food you eat at or around school or the food that you eat at or around home?
 - Why?
- Tell me about the food or diet culture at your school.
 - Tell me about the food choices at school.
 - Vending machines?
 - School lunch?
 - Off-campus options?
 - What do you like or dislike about the food options?
 - Are kids concerned with eating healthy?
 - Are your friends concerned about eating healthy?
 - Is there much weight talk or body shape and size discussion
 - At school?
 - Among your friends?
 - Do your friends or other students comment on what or how much you or other kids eat?
 - How do you eat compared to the other kids at school?
- Tell me about the food or diet culture in your family
 - Who food shops in your family?
 - Tell me about the food options available at home.
 - Do family members worry about eating healthy themselves or that you eat healthy?
 - Is there much weight talk or body shape and size discussion?
 - Do family members comment on what you or others are eating?

- Tell me about what you think influences what and when you eat—where you are, who you are with?
 - Friends, access, family, money

Physical activity questions

- Tell me about your physical activity in a typical weekday—this could include anything from walking to school to taking a Zumba class to playing on a team sport to dancing in your room—anything that gets your body moving.
- Tell me about your physical activity in a typical weekend.
- Can you show me on your map of school and neighborhood where you are typically active or where you walk or run?
- Tell me about how active kids are in your school.
 - How active are you compared to most kids at your school?
- Tell me about how active kids are in your neighborhood.
 - How active are you compared to most kids in your neighborhood?
- Is there anything you would change or build in your neighborhood that you think would make it easier for you to be active?
- Is there anything you would change or build in your school that you think would make it easier for you to be active?
- Is there anything else you would like to mention about your school and/or neighborhood before we end the interview?
- We are going to take the last few minutes to discuss the experience of doing this interview. Did you understand most of the questions? Did it feel comfortable or not comfortable for you? Do you have any suggestions on how we can improve the interview?

Thank you for taking time to speak with us.

LIST OF JOURNAL ABBREVIATIONS

Acad Pediatr	Academic Pediatrics
Am J Epidemiol	American Journal of Epidemiology
Am J Clin Nutr	American Journal of Clinical Nutrition
Ann Behav Med	Annals of Behavioral Medicine
Ann Epidemiol	Annals of Epidemiology
Arch Pediatr Adolesc Med	Archives of Pediatrics & Adolescent Medicine
Biol Psychiatry	Biological Psychiatry
Child Psychiat Hum D	Child Psychiatry and Human Development
Child Youth Serv Rev	Children and Youth Services Review
Eur J Clin Nutr	European Journal of Clinical Nutrition
Health Educ Res	Health Education Research
Int J Obes	International Journal of Obesity
Int J Obes Relat Metab Disord	International Journal of Obesity and Related Metabolic Disorders
J Adolesc	Journal of Adolescence
J Adolesc Health	Journal of Adolescent Health
J Am Diet Assoc	Journal of the American Dietetic Association
J Clin Oncol Res	Journal of Clinical Oncology and Research
J Clin Child Adolesc	Journal Of Clinical Child And Adolescent Psychology
J Law Med Ethics	Journal of Law, Medicine & Ethics

J Nutr Educ Behav	Journal of Nutrition Education and Behavior
J Psychiatr Res	Journal of Psychiatric Research
J Sch Nurs	The Journal of School Nursing
J Sch Health	The Journal of School Health
JAMA	JAMA: The Journal of the American Medical Association
JAMA Pediatr	JAMA Pediatrics
NEJM	New England Journal of Medicine
Obes Res	Obesity Research & Clinical Practice
Obesity Rev	Obesity Reviews

REFERENCES

1. World Health Organization. *Child Overweight and Obesity*. <http://www.who.int/dietphysicalactivity/childhood/en/>.
2. Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*, 311(8), 806-814.
3. Centers for Disease Control and Prevention, *Childhood Obesity Facts*. <http://www.cdc.gov/obesity/data/childhood.html>.
4. Singh, G. K., Siahpush, M., & Kogan, M. D. (2010). Rising social inequalities in US childhood obesity, 2003-2007. *Ann Epidemiol*, 20(1), 40-52.
5. Skelton, J. A., Cook, S. R., Auinger, P., Klein, J. D., & Barlow, S. E. (2009). Prevalence and trends of severe obesity among US children and adolescents. *Acad Pediatr*, 9(5), 322-329.
6. Rossen, L. M., & Talih, M. (2014). Social determinants of disparities in weight among US children and adolescents. *Ann Epidemiol*, 24(10), 705-713.
7. Dietz W. (1998) Health consequences of obesity in youth: childhood predictors of adult disease. *Pediatrics*. 101(3):518-525.
8. Franks, P. W., Hanson, R. L., Knowler, W. C., Sievers, M. L., Bennett, P. H., & Looker, H. C. (2010). Childhood obesity, other cardiovascular risk factors, and premature death. *NEJM*, 362(6), 485-493.
9. Kit, B. K., Kuklina, E., Carroll, M. D., Ostchega, Y., Freedman, D. S., & Ogden, C. L. (2015). Prevalence of and Trends in Dyslipidemia and Blood Pressure Among US Children and Adolescents, 1999-2012. *JAMA Pediatr*, 169(3), 272-79.
10. World Health Organization. *Obesity and Overweight Fact Sheet*. <http://www.who.int/mediacentre/factsheets/fs311/en/>.
11. Mosca, L. N., Goldberg, T. B., da Silva, V. N., da Silva, C. C., Kurokawa, C. S., Bisi Rizzo, A. C., & Corrente, J. E. (2014). Excess body fat negatively affects bone mass in adolescents. *Nutrition*, 30(7-8), 847-852.
12. Strauss, R. S., & Pollack, H. A. (2003). Social marginalization of overweight children. *Arch Pediatr Adolesc Med*, 157(8), 746-752.

13. Storch, E.A., & Masis-Warner, C. (2004). The relationship of peer victimization to social anxiety and loneliness in adolescent females. *J Adolesc*, 17, 351-362.
14. Robinson, S. (2006). Victimization of Obese Adolescents. *J Sch Nurs*, 22(4) 201-6.
15. Neumark-Sztainer, D., Falker, N., Story, M., Perry, C., Hannan, P.J., & Mulert, S. (2002). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. *Int J Obes*, 26, 123-131.
16. Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Arch Pediatr Adolesc Med*, 157, 733-38.
17. Janssen, I., Craig, W.M., Boyce, W.F., & Pickett, W. (2004). Associations between overweight and obesity with bullying behaviors in school-aged children. *Pediatrics*, 113, 1187-1194.
18. Onyike, C. U., Crum, R. M., Lee, H. B., Lyketsos, C. G., & Eaton, W. W. (2003). Is obesity associated with major depression? Results from the Third National Health and Nutrition Examination Survey. *Am J Epidemiol*, 158(12), 1139-1147.
19. Stunkard, A. J., Faith, M. S., & Allison, K. C. (2003). Depression and obesity. *Biol Psychiatry*, 54(3), 330-337.
20. Hafner S, Baghai TC, Eser D et al (2008) C-reactive protein is associated with polymorphisms of the angiotensin-converting enzyme gene in major depressed patients. *J Psychiatr Res*, 42, 163–165.
21. Capuron L, Ravaud A, Dantzer R (2000) Early depressive symptoms in cancer patients receiving interleukin 2 and/or interferon alpha-2b therapy. *J Clin Oncol Res*, 18, 2143–2151.
22. Byrne, M. L., O'Brien-Simpson, N. M., Mitchell, S. A., & Allen, N. B. (2015). Adolescent-Onset Depression: Are Obesity and Inflammation Developmental Mechanisms or Outcomes? *Child Psychiat Hum D*.
23. Mussell, M. P., Mitchell, J. E., de Zwaan, M., Crosby, R. D., Seim, H. C., & Crow, S. J. (1996). Clinical characteristics associated with binge eating in obese females: a descriptive study. *Int J Obes Relat Metab Disord*, 20(4), 324-331.
24. Goldschmidt, A. B., Wall, M. M., Choo, T. H., Larson, N. I., & Neumark-Sztainer, D. (2015). Mediators involved in the relation between depressive symptoms and weight status in female adolescents and young adults. *Int J Obes*.

25. Gordon-Larsen P, Nelson M, Page P, Popkin B. (2006). Inequality in the built environment underlies key health disparities in physical activity and obesity. *Pediatrics*, 117(2), 417-424.
26. Larson, N., & Story, M. (2009). A review of environmental influences on food choices. *Ann Behav Med*, 38 Suppl 1, S56-73.
27. Herman, C. P., Roth, D. A., & Polivy, J. (2003). Effects of the presence of others on food intake: a normative interpretation. *Psychology Bulletin*, 129(6), 873-886.
28. Contento, I. R., Williams, S. S., Michela, J. L., & Franklin, A. B. (2006). Understanding the food choice process of adolescents in the context of family and friends. *J Adolesc Health*, 38(5), 575-582.
29. Hannon, P. A., Bowen, D. J., Moinpour, C. M., & McLerran, D. F. (2003). Correlations in perceived food use between the family food preparer and their spouses and children. *Appetite*, 40(1), 77-83.
30. Savage, J. S., Fisher, J. O., & Birch, L. L. (2007). Parental influence on eating behavior: conception to adolescence. *J Law Med Ethics*, 35(1), 22-34.
31. Briefel, R. R., Crepinsek, M. K., Cabili, C., Wilson, A., & Gleason, P. M. (2009). School food environments and practices affect dietary behaviors of US public school children. *J Am Diet Assoc*, 109 (2 Suppl), S91-107.
32. Nutrition.gov. *School Lunch and Breakfast Programs*.
<http://www.nutrition.gov/food-assistance-programs/school-lunch-and-breakfast-programs>.
33. Institute of Medicine. (2007). *Nutrition standards for foods in schools: Leading the way toward healthier youth*. Washington, D.C.: National Academies Press.
34. Baumeister, R. F., & Leary, M. R. (1995). The Need to Belong - Desire for Interpersonal Attachments as a Fundamental Human-Motivation. *Psychological Bulletin*, 117(3), 497-529.
35. Centers for Disease Control and Prevention. *Adolescent and School Health: Protective Factors*.
<http://www.cdc.gov/healthyyouth/protective/connectedness.htm>.
36. Zhao, Y., & Zhao, G. (2015). Emotion regulation and depressive symptoms: Examining the mediation effects of school connectedness in Chinese late adolescents. *J Adolesc*, 40C, 14-23.

37. Shochet, I. M., Dadds, M. R., Ham, D., & Montague, R. (2006). School connectedness is an underemphasized parameter in adolescent mental health: Results of a community prediction study. *J Clin Child Adolesc*, 35(2), 170-179.
38. Joyce, H. D., & Early, T. J. (2014). The Impact of School Connectedness and Teacher Support on Depressive Symptoms in Adolescents: A Multilevel Analysis. *Child Youth Serv Rev*, 39, 101-107.
39. Babakhani, N. (2014). Perception of class and sense of school belonging and self-regulated learning: A causal model. *Procedia – Social and Behavioral Sciences*, 116, 1477-1482.
40. Hopson, L. M., & Lee, E. (2011). Mitigating the effect of family poverty on academic and behavioral outcomes: The role of school climate in middle and high school. *Child Youth Serv Rev*, 33(11), 2221-2229.
41. Walton, G. M., & Cohen, G. L. (2011). A Brief Social-Belonging Intervention Improves Academic and Health Outcomes of Minority Students. *Science*, 331(6023), 1447-1451.
42. Gilstad-Hayden, K., Carroll-Scott, A., Rosenthal, L., Peters, S. M., McCaslin, C., & Ickovics, J. R. (2014). Positive School Climate Is Associated With Lower Body Mass Index Percentile Among Urban Preadolescents. *J Sch Health*, 84(8), 502-506.
43. Richmond, T. K., Milliren, C., Walls, C. E., & Kawachi, I. (2014). School social capital and body mass index in the National Longitudinal Study of Adolescent Health. *J Sch Health*, 84(12), 759-768.
44. Berge, J. M., Wall, M., Larson, N., Forsyth, A., Bauer, K. W., & Neumark-Sztainer, D. (2014). Youth dietary intake and weight status: healthful neighborhood food environments enhance the protective role of supportive family home environments. *Health & Place*, 26, 69-77.
45. Boutelle, K. N., Birkeland, R. W., Hannan, P. J., Story, M., & Neumark-Sztainer, D. (2007). Associations between maternal concern for healthful eating and maternal eating behaviors, home food availability, and adolescent eating behaviors. *J Nutr Educ Behav*, 39(5), 248-256.
46. Resnick, M.D., Bearman, P.S., Blum, R.W., Bauman, K.E., Harris, K.M., Jones, J., Tabor, J., Beuhring, T., Sieving, R.E., Shew, M., Ireland, M., Bearinger, L.H., & Udry, J.R. (1997). Protecting adolescents from harm: Findings from the National Longitudinal Study on Adolescent Health. *JAMA*, 278(10), 823-832.

47. Steinberg, A. Phares, V. (2001). *Body Image, Eating Disorders, and Obesity in Youth: Assessment, Prevention, and Treatment*. Washington, DC. American Psychological Association.
48. Fulkerson, J. A., Story, M., Mellin, A., Leffert, N., Neumark-Sztainer, D., & French, S. A. (2006). Family dinner meal frequency and adolescent development: relationships with developmental assets and high-risk behaviors. *J Adolesc Health, 39*(3), 337-345.
49. Mellin, A. E., Neumark-Sztainer, D., Story, M., Ireland, M., & Resnick, M. D. (2002). Unhealthy behaviors and psychosocial difficulties among overweight adolescents: the potential impact of familial factors. *J Adolesc Health, 31*(2), 145-153.
50. Wansink, B., & van Kleef, E. (2014). Dinner rituals that correlate with child and adult BMI. *Obesity, 22*(5), E91-95.
51. Taveras, E. M., Rifas-Shiman, S. L., Berkey, C. S., Rockett, H. R., Field, A. E., Frazier, A. L., Gillman, M. W. (2005). Family dinner and adolescent overweight. *Obes Res, 13*(5), 900-906.
52. Videon, T. M., & Manning, C. K. (2003). Influences on adolescent eating patterns: the importance of family meals. *J Adolesc Health, 32*(5), 365-373.
53. Ma, Y., Bertone, E. R., Stanek, E. J., 3rd, Reed, G. W., Hebert, J. R., Cohen, N. L., Ockene, I. S. (2003). Association between eating patterns and obesity in a free-living US adult population. *Am J Epidemiol, 158*(1), 85-92.
54. Gross, S. M., Bronner, Y., Welch, C., Dewberry-Moore, N., & Paige, D. M. (2004). Breakfast and lunch meal skipping patterns among fourth-grade children from selected public schools in urban, suburban, and rural Maryland. *J Am Diet Assoc, 104*(3), 420-423.
55. Franko, D. L., Striegel-Moore, R. H., Thompson, D., Affenito, S. G., Schreiber, G. B., Daniels, S. R., & Crawford, P. B. (2008). The relationship between meal frequency and body mass index in black and white adolescent girls: more is less. *Int J Obes, 32*(1), 23-29.
56. Ritchie, L. D. (2012). Less frequent eating predicts greater BMI and waist circumference in female adolescents. *Am J Clin Nutr, 95*(2), 290-296.
57. House, B. T., Cook, L. T., Gyllenhammer, L. E., Schraw, J. M., Goran, M. I., Spruijt-Metz, D., Davis, J. N. (2014). Meal skipping linked to increased visceral adipose tissue and triglycerides in overweight minority youth. *Obesity, 22*(5),

E77-84.

58. House, B. T., Shearrer, G. E., Miller, S. J., Pasch, K. E., Goran, M. I., & Davis, J. N. (2015). Increased eating frequency linked to decreased obesity and improved metabolic outcomes. *Int J Obes*, 39(1), 136-141.
59. Muller, K., Libuda, L., Gawehn, N., Drossard, C., Bolzenius, K., Kunz, C., & Kersting, M. (2013). Effects of lunch on children's short-term cognitive functioning: a randomized crossover study. *Eur J Clin Nutr*, 67(2), 185-189.
60. Jones, Roger. (1995). Why do qualitative research? *British Medical Journal*, 311.
61. Berg, B., & Lune, H. (2012). *Qualitative research methods for the social sciences* (8th ed.). Boston: Pearson.
62. Centers for Disease Control and Prevention, About BMI for Children and Teens. http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html.
63. Massachusetts Department of Elementary and Secondary Education. *Grants and Other Financial Assistance Programs*. <http://www.doe.mass.edu/metco/>. 14 July 2014.
64. Eaton, Susan. *The Other Boston Busing Story*. New Haven, CT: Yale University Press, 2001.
65. Massachusetts Department of Elementary and Secondary Education. *METCO Program*. <http://www.doe.mass.edu/metco/>. 10 December 2014.
66. Massachusetts Department of Elementary and Secondary Education. *METCO Program Demographics*. <http://www.doe.mass.edu/metco/faq.html?section=d>. 19 December 2013.
67. Massachusetts Department of Elementary and Secondary Education. *Student Enrollment and Program Placement*. <http://www.doe.mass.edu/metco/faq.html?section=c>. 19 December 2013.

CURRICULUM VITAE

Genevieve Alice Woolverton

10 Old England Road. Chestnut Hill, MA. 02467

Tel: (617) 281-3681 E-mail: woolvertonalice@gmail.com. YOB: 1989

EDUCATION

Boston University School of Medicine Boston, MA | 2013- Present

- Candidate for M.S. in Medical Sciences with concentration in Mental Health Counseling and Behavioral Medicine.
- Excelled in challenging medical school courses in Biochemistry, Histology, Physiology, and Pathology during my first year.
- Completing mental health electives and an honors thesis at Children's Hospital during my second year.
- Expected May 2015 graduation.

Amherst College Amherst, MA | 2008- 2012

- B.A. in English *cum laude*. Overall GPA: 3.5, Major GPA: 3.92.
- Creative writing honors thesis, *The Night Side of Life*: a collection of short stories about chronic illness and human interaction.
- Completed pre-medical requirements. Additional coursework in statistics, anthropology, and medical history.

Five College Program in Culture, Health, and Science, Honors Recipient

- Completed courses that highlighted mechanisms of disease transmission, economic costs of disease, medical ethics, scientific research design, and global public health disparities.

WORK EXPERIENCE

Children's Hospital, Clinical Research Assistant Boston, MA | Sept. 2014- Present

- Performing clinical research about how home and school environments affect eating and exercise behaviors in a low-income adolescent population under the guidance of Tracy Richmond, MD, MPH.
- Recruiting participants, performing interviews, and writing a comprehensive paper detailing study results, which will be my honors thesis for my Masters degree at BU.

Harvard School of Public Health, Health Communication Associate

Boston, MA | Jul. 2012- Jul. 2013

- Managed two websites, "The Nutrition Source" and "The Obesity Prevention Source," which receive 15,000 views per day.
- Wrote and edited articles for the websites that distilled complex aspects of nutrition and obesity into clear reviews.

Joslin Diabetes Center, Research Intern, Vascular Cell Biology Laboratory

Boston, MA | Summer 2011

- Worked in George King MD's laboratory on research about Diabetic Retinopathy in the Joslin 50 Year Medalist cohort.
- Mastered western blot and cell culture techniques through independent protein analysis experiments.

Close Concerns, *Diabetes Consulting Associate* San Francisco, CA | Jan. 2011

- Worked under the guidance of Kelly Close, MBA, and learned about the business of new diabetes technology.
- Attended the 28th Annual J.P. Morgan Healthcare Conference.
- Co-wrote and submitted an abstract to the American Diabetes Association for an observational study that evaluated the adverse effects of continuous blood glucose monitoring; abstract was accepted for ADA's annual Scientific Sessions.

Massachusetts General Hospital, *Clinical Research Intern*

Boston, MA | Summer 2009, Jan. 2010, Summer 2010

- Shadowed and assisted Anne Thorndike, MD, MPH, who educates and treats patients who are at high cardiac risk.
- Organized and collected data for a food color-coding and choice architecture study at the MGH cafeteria. Presented data analysis and conclusions to team of MGH diabetes and obesity specialists. (Summer 2010)
- Conducted data analysis and assisted writing a paper about the spread of obesity through a social network. (Jan. 2010)
- Prepared comprehensive guidelines for treatments of obesity to be presented to MGH medical residents. (Summer 2009)

Amherst College Chemistry Department, *Teaching Assistant* Sept. 2011- Jan. 2012

- Directed a laboratory section of twenty Organic Chemistry students.
- Instructed proper technique, graded laboratory reports, and worked closely with an Organic Chemistry professor.

Amherst College Biology Department, *Teaching Assistant* Sept. 2010- Jan. 2011

- Co-directed a laboratory section of twenty-five students in an introductory molecular biology class.
- Assisted students in understanding and completion of laboratory activities and graded laboratory reports.

LEADERSHIP AND EXTRACURRICULAR ACTIVITIES

Amherst College Pre-Health Mentoring Program, *Student Mentor* Sept. 2011- May. 2012

- Selected via competitive application process to be a campus leader and mentor for pre-medical students.
- Worked closely with a younger pre-medical student to support and assist him in class selection, medical internships, and on-campus extracurricular activities. Provided him with moral support and encouragement.
- Helped organize group events with professors, mentors, and mentees that focused on pre-medical questions from mentees.

Charles Drew Health Professions Society, *Co-President* May 2011- May. 2012

- Campus leader who promoted cooperation and helpful communication among pre-medical students and with professors.
- Led a panel to help students learn about summer internship opportunities in the medical and public health fields.

Medical Education and Development for Low Income Families Everywhere

Sept 2010- May 2012

Co-President of Amherst College's Chapter

- Planned a benefit dinner to raise money and awareness for a medical clinic to be built in Pamplona, Peru.
- Raised money on campus to support “mobile clinic” trips, in which physicians and students organize temporary clinics in South American cities.

COMMUNITY OUTREACH

Medical Education and Development for Low Income Families Everywhere

Lima, Peru | March, 2013

Mobile Clinic Volunteer

- Set up mobile clinics in urban slum areas of Pamplona, Peru with local physicians, nurses, dentists, and volunteers.
- Delivered vital medical care, transportation, pharmaceuticals, and educational resources to those in need.
- Assisted in the complete building and painting of a large cement staircase to allow locals to access their homes that are located in dangerous mountainous regions.
- Led educational tooth brushing lessons for children.

Amherst College Emergency Medical Services, *Emergency Medical Technician*

Amherst, MA | Jan. 2009- May 2011

- Responded to illness and injury calls from members of the college community for triage and referral.
- Used and improved EMT skills such as cardiac assessment, splint construction, and diabetic management.

VELA Scholars Program, *Middle School Tutor* Amherst, MA | Jan. 2011- May 2011

- Met weekly with a 7th grade student to teach her important math concepts and writing skills and mentor her through the academic and extracurricular challenges of middle school.

Project Sunshine, *Volunteer* Springfield, MA | Sept. 2008- May 2012

- Participated in activities with children in the Ronald McDonald House and Shriners Hospital who were in long-term care.

SKILLS AND INTERESTS

- Proficient with Microsoft Office, Endnote, and Wordpress.
 - Excellent and efficient writer and editor.
 - Massachusetts Licensed Emergency Medical Technician (Basic), Certified First Responder, CPR certified.
 - Competitive sailor and dinghy racer. Top 20 nationally ranked Club 420 racer during the summers of 2007-2008.
-