Title
#consumingitall: Understanding The Complex Relationship Between Media Consumption And Eating Behaviors

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#consumingitall: Understanding The Complex Relationship Between Media Consumption And Eating Behaviors

A dissertation submitted in partial satisfaction of the

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in Public Health

by

Stephanie Lynn Albert

2017

ABSTRACT OF THE DISSERTATION

#consumingitall: Understanding The Complex Relationship Between Media Consumption And Eating Behaviors

by

Stephanie Lynn Albert

Doctor of Philosophy in Public Health

University of California, Los Angeles, 2017

Professor Michael L. Prelip, Co-Chair

Professor Deborah C. Glik, Co-Chair

Adolescents spend almost nine hours a day engaging with media. As a result, they are confronted with large amounts of obesogenic content that shapes their understanding of what are normal and acceptable eating behaviors. Utilizing primary data collected from a sample of 4,838 low-income, racially and ethnically diverse middle school students in Los Angeles County, I studied the effects of different types of media use (i.e., social media, TV/movies/videos, gaming, music, Internet) on dietary patterns and weight outcomes. I assessed (1) whether those effects were mediated by individual-level health behaviors (i.e., snacking while consuming media, sleep duration, physical activity); and (2) whether it was possible to buffer the deleterious effects of media consumption on eating behaviors by associating with friends who are perceived to place importance on eating healthfully, friends who are perceived to be dieters, or by having

classmates who eat more healthfully, or by having classmates who are on average slim. I also examined social media specifically and assessed whether the effects on dietary behaviors were exacerbated for individuals who perceive themselves to be overweight or are trying to lose weight. In this way, I was able to gain a clearer picture of the social and environmental determinants of obesity risk in adolescents.

I found that media consumption is consequential to the diet of middle school students. This was a robust finding. Independent of health behaviors, friends, classmates, weight status, and dieting behaviors, media consumption was associated with poor eating outcomes. Media consumption generally results in greater consumption of sugar-sweetened beverages, junk food and fast food and less consumption of fruits and vegetables. Strong support emerged that snacking on junk food while consuming media complements other unhealthful eating behaviors. There was relatively weak evidence that sleep duration or physical activity explained the relationship between media consumption and eating behaviors. Furthermore, I looked at contextual factors and showed that friend and classmate behaviors matter independent of media consumption. That is, one's social networks contribute to poor dietary behaviors. Finally, I examined social media use specifically and found that it was associated with poor dietary behaviors for both males and females. There was also weak evidence to suggest dieting buffers the deleterious effects of social media on eating behaviors for males. But more importantly, weight-related concerns and weight control behaviors served to restrain consumption of excess discretionary calories that come from things like sugar-sweetened beverages, junk food and fast food independent of social media consumption.

Understanding and addressing determinants of eating behaviors is of critical importance. In a complex society where youth are confronted with obesogenic content in media, peer

influences, and other socio-ecological factors, it is no wonder that obesity among young people is a complex and difficult issue to address. It will not be until more multi-level and well-informed public health efforts are implemented that any real change can be made in the eating behaviors and health outcomes of our youth. If this does not happen, it is unlikely that we will be able to halt or reverse the obesity epidemic among youth.

The dissertation of Stephanie Lynn Albert is approved.

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CHAPTER 1. INTRODUCTION

Problem Statement

Obesity among adolescents has nearly doubled in the last three decades.[1] Today 20.5% of 12-19 year olds are obese. Based on the estimated number of teens in the United States,[2] that translates to over 5,000,000 obese adolescents, more than every single person in the cities of Los Angeles and San Francisco combined.[3] These rates are consistently high across most racial and ethnic groups. Data from the 2011-2014 National Health and Nutrition Examination Survey (NHANES) show that 19.6% of White, 22.6% of Black and 22.8% of Hispanic adolescents are obese as compared to 9.4% of Asian adolescents.[1] Overweight youth are at significantly greater risk of becoming overweight adults,[4] indicating that obesity can be persistent and last throughout one's lifetime.

There are important physiological and psychosocial consequences of excess weight for adolescents. Obesity is associated with sleep disorders, respiratory problems, elevated blood pressure, lipid abnormalities and type 2 diabetes.[5] Overweight and obese youth are also at increased risk for negative body image, low self-esteem, depression,[6] discrimination and stigmatization.[4,7] Social network analyses have also recently shown that obese youth are more socially isolated than their healthy weight counterparts.[8] Furthermore, adult females who were obese as adolescents have less education, income, and a lower likelihood of being married as compared to healthy weight persons.[9]

Individuals make more than 200 decisions about food consumption per day.[10] Decisions regarding when and what to eat are not only controlled by physiological demands, but are also influenced by cues from the environment.[11] In addition to the physical and social environment,

mass media, marketing, and advertising are all environmental influences that contribute to adolescent eating behavior,[12] and the effects of exposure to these and other types of media can be consequential. Media consumption has been associated with overeating and obesity.[13] Furthermore, TV viewing is associated with positive perceptions towards and reduced perceived health risks of eating fast food,[14] increased caloric consumption[15] and obesity[16-18].

Today's youth live in a media saturated environment where they spend almost nine hours a day engaging with media.[19] This is inclusive of time spent watching TV, movies or online videos; playing computer or mobile games; using social media; using the Internet; reading; and listening to music.[19] As a result they are confronted with large amounts of obesogenic (i.e., causing obesity) content mainly in the form of advertising that plays into their construction of normal and acceptable eating behaviors. They see on average 16.2 food and beverage ads per day or almost 6,000 food and beverage ads a year on TV.[20] Furthermore, adolescents are confronted with 17 food related scenes per hour while watching TV.[21,22] These numbers do not begin to capture the totality of exposure to content that promotes excessive consumption of energy-dense nutrient-poor items. Integrated digital marketing campaigns (i.e., marketing efforts across various media) that target individuals through branded websites, online videos, advergaming, virtual worlds, cross promotions, mobile advertising and social media marketing across multiple platforms are becoming ominipresent.[23] User generated content, namely images of food shared through social media applications, may also promote unhealthful eating behaviors. These consistent and pervasive messages provide teens with a biased perception of what is considered normal regarding food and eating behaviors.

Theory helps to explain the influence of media on adolescent behavior. Social Cognitive Theory (SCT), one of the most widely applied theories of media effects research, posits that

people learn by observing modeled behavior.[24-27] Viewers identify with and want to be like those they see in the media. Adolescents witness their favorite characters consuming unhealthy foods without negative consequences of weight gain. As SCT would suggest, they emulate the unhealthful eating patterns depicted. Models have been used stimulate a range of actions including selecting foods and beverages. Thus, youth are vulnerable to the onslaught of food and beverage messages and it may translate into unhealthful dietary behaviors.

Aims

To study the impact of media consumption on health and specifically eating behavior I used data that were collected as part of an intervention study designed to increase moderate to vigorous physical activity (MVPA) among middle school students in the Los Angeles Unified School District. In this ancillary study I used a sample of 4,838 8th grade students from 16 middle schools to understand to what extent, in what ways, and for whom the media environment influenced eating behaviors. The aims for this study were:

Aim 1: To examine how individual-level health behaviors mediate the relationship between media consumption and eating behaviors. The goal of this aim was to establish a focal relationship between different types of media consumption and eating behaviors, and determine if snacking while consuming media, sleep duration, and/or physical activity mediated those relationships.

Aim 2: To examine how interpersonal exposures moderate the association between media consumption and eating behaviors. Specifically, the goal of this aim was to assess whether it was possible to buffer the deleterious effects of media consumption on eating behaviors by associating with friends who are perceived to place importance on eating healthfully, dieters, or by having classmates who eat more healthfully or who are on average slim.

Aim 3: To examine the association between social media use and eating behaviors. This aim addressed the question whether social media use was associated with eating behaviors and, if so, whether the effects are exacerbated for individuals who perceive themselves to be overweight or individuals trying to lose weight.

I utilized a cross-sectional survey design to study a population that is under-researched in regards to my questions of interest. These data, collected in 2016, came from on ongoing study in which youth were surveyed at two time points. However, only data from the second wave of data collection were used for this study. Survey participants were asked questions about their dietary habits, media consumption, as well as a range of other factors related to their health and well being. I used these data to describe how media consumption is related to eating behaviors using a multi-ethnic sample of urban middle school adolescents.

Significance

The dietary habits of adolescents are of great concern to public health professionals. A profile of suboptimal eating behaviors among adolescents has emerged. Because behaviors set during adolescence often persist into adulthood,[28] it is critical that we better understand factors that contribute to heavy consumption of calorie-dense foods and beverages. The literature is fairly well developed regarding eating behaviors/obesity among adolescents and how they use and consume media. What is less developed is the literature linking these two factors, particularly for young adolescents. To date the vast majority of research has looked primarily at TV exposure; additional research is needed to understand the effects of marketing and other obesogenic content on the behaviors of teens living in a media saturated environments,[29] particularly because teens live in an obesogenic environment where corporations spend billions

of dollars pushing products onto vulnerable consumers, a phenomenon that has global reach and consequence for population health and wellbeing.

Middle school adolescents are on the precipice of more adult roles and decision-making and are beginning to consume greater amounts of media. This makes them an important age group to study and intervene upon in order to improve health outcomes. It is essential that we develop an understanding of the ways in which cumulative consumption of media and specific types of media are related to eating behaviors. These efforts are a prerequisite to developing recommendations, interventions, and policies that may help to curb or halt the obesity epidemic among this vulnerable population.

CHAPTER 2. LITERATURE REVIEW

In this chapter I discuss the three major types of media communication research: media consumption, media content and media effects. I first describe the media landscape and quantify the amount of time youth, the population I studied, are devoting to the major categories of media while also highlighting important differences in use and access by gender, race and ethnicity, and socioeconomic status. I then briefly explore the type of content to which youth are being exposed while consuming media. I provide an overview of media effects research and what is currently known in regards to how media influences perceptions, eating behaviors, and weight status obesity as a result of media exposure and consumption. Finally, because this dissertation aimed to understand the complex relationship between media consumption and adolescent eating behaviors, I provide general profile of teen eating behavior and explain the ways in which hypothesized mechanisms (i.e., snacking while consuming media, sleep duration, physical activity, and friends/classmates) might explain or enhance that relationship.

Media Landscape

There has been a dramatic transformation in the media environment over the past decade,[30] with two driving forces leading to this change. The first was the advent and adoption of new technology which allowed people to consume media in more ways than were previously possible.[31] Among these innovations were portable devices such as tablets (e.g., iPads and Kindles), MP3 devices (e.g., iPods and other music players), and smartphones (i.e., phones that have internet access and run applications). All of these gadgets allowed individuals to interact with media wherever and whenever they want. Innovations also allowed people to consume whatever media they wanted. Individuals have become their own music and TV programmers

with the help of technology and new services. The ability to watch and listen to desired content "on demand" with the help of digital video recorders (DVRs) or other recording devices, and streaming services as Hulu, Netflix, Pandora, and Spotify, became a reality for most people in more developed countries.

The second major shift in the media environment was the emergence of social media. Although it already existed in a more nascent form, Facebook and other social media sites have transformed the way people interact with and consume media, and have gained tremendous popularity.[30,31] Facebook was launched in 2004 and spread beyond college campuses for the first time in 2005.[32] This year marked Twitter's 10 year anniversary.[33] Snapchat came into existence only five years ago in 2011. In only a little more than 10 years, social media has intensified our ability to connect quickly with others, changed how we search for information on the internet, and most fascinating from a marketing perspective, changed our own accessibility to others. Gone are the days of accessing the Internet from a general browser; now it is more common to utilize single purpose applications such as Facebook or Twitter applications.[34] Thus, there has been a shift to using more specialized single applications that promote a curated media experience rather than general use of the Internet.

Media is now categorized as either old/traditional media or new media. Old media has become synonymous with television, movies, and magazines.[35] Also included in traditional media are communication tools like books,[36] newspapers,[37] and music.[38] Common types of new media include the Internet, social networking sites, video/computer games, and even mobile phones.[35,38] Thus, new media encompasses both content and transmission devices. Moreover, commercial product marketing has been able to quickly adapt and exploit this environment.

Media Consumption

The changing media landscape is most evident for today's adolescents who are growing up in a pervasive, 24/7 media environment with almost unlimited media opportunities.[31] All forms of media, old and new, are a critical part of young people's media environment and they consume enormous amounts of it. The nearly constant connection to and utilization of media necessarily means that adolescents are confronted with an endless stream of messages that they use to construct their identities and their conceptualization of reality.[19,31]

A 2015 Common Sense Report found that on average teens (i.e., 13-18 year olds) in the United States spend almost nine hours a day engaging with media.[19] They assessed the media diet of youth which refers to the information and entertainment media consumed by an individual across multiple types of media[39] including the amount of time spent watching TV, movies or online videos; playing computer or mobile games; using social media; using the Internet; reading; and listening to music.[19] Interestingly, watching TV and listening to music are the two activities that youth continue to consistently spend the most time doing even after controlling for age, gender, socioeconomic status or race/ethnicity.[19] Furthermore, smartphones have enabled youth to be continuously online with nearly a quarter of all teens reporting being online "almost constantly".[30]

Family income, parental education and race/ethnicity have all been found to be associated with media consumption among youth.[19] Demographic characteristics were not associated with increased likelihood of using media, but rather were associated with increased time spent engaging in media-related activities. Specifically, the Common Sense study found that teens from lower-income families spend almost three hours a day more using media than their

counterparts from higher-income families (10:35 hours vs. 7:50 hours of total media use). Similarly, teens whose parents have a high school or less education spend almost two hours more engaged with media as compared to peers who have parents who have earned a college degree (9:39 vs. 7:49). Finally, Black youth spend more than two hours more a day using media than Hispanic or White youth (11:10, 8:51, and 8:27 respectively). This latter finding differs somewhat from an earlier Kaiser Family Foundation (Kaiser) study that found that both Black and Hispanic youth have more total media exposure than White youth (12:59, 13:00, and 8:36 respectively).[31] These findings were robust after controlling for important individual-level characteristics such as age, gender, parental education, family structure, and school grades. No data are available on use among other racial/ethnic groups such as Asians. Together these findings suggest there are important differences based on socioeconomic status and race/ethnicity that may be consequential if time spent using media is displacing other important activities such as doing homework. However, all groups are consuming a lot of media, with data suggesting what comprises a typical media diet continues to evolve reflecting shifts in the media environment.

Television

Despite a changing media landscape, TV still dominates media consumption. Kaiser has collected several waves of data documenting youth's media use. The study found that TV consumption increased by 38 minutes per day between 2004 and 2009.[31] Specifically, in 2009 youth engaged with TV content 4 hours and 29 minutes as compared to 3 hours and 51 minutes in 2004. The increase was reported to be a consequence of how youth were watching TV. They found that 41% of TV viewing was time-shifted (e.g., using a DVR or "on demand") or watched using a different platform than a traditional TV set (e.g., iPod or cell phone), thus having more options allowed for greater amounts of TV viewing. The 2015 Common Sense report, however,

found that youth reported spending 2 hours and 38 minutes watching TV.[19] This also included watching TV live (i.e., when originally broadcast) as well as time-shifted, TV on another device (e.g., computer or tablet) or watching online videos/DVDs. Although this appears to be less than the earlier Kaiser study, watching TV still accounted for the greatest proportion of the youth media diet. When analyses were limited to only those who report watching TV, the average amount of time increased to 3 hours and 15 minutes.

There are distinct differences in the amount of time engaged in TV viewing by important demographic characteristics. On average girls spend more time watching TV than boys (2:04 vs. 1:43).[19] There are no differences, however, in the percentage of youth that reported enjoying TV "a lot" or who watch it "every day" by gender. The 2015 Common Sense study also found that among all youth, Black teens spent almost one and a half hours more than White teens watching TV (3:41 vs. 2:22), and Hispanic teens fell between (2:47). Similarly, youth from lower-income households reported a higher number of minutes engaged with TV than middle- or higher-income households (3:24, 2:32, and 2:12 respectively). Finally, youth who have parents with less educational achievement also reported increased time watching TV. That is, children of college-educated parents spend almost an hour less time watching TV as compared to just under three hours for those who completed high school or some college.

Music

Youth continue to spend a considerable amount of time listening to music as it is the second most prevalent media activity among 8-18 years olds.[31] Kaiser found that youth reported spending on average of 47 additional minutes per day listening to music or other audio content between 2004 and 2009 (1:44 vs. 2:31).[31] Similar to what was found for TV, there were changes in how teens are listening to music due to the availability of technology such as the iPod, MP3 devices, mobile phones, and computers. Common Sense found that as of 2015 youth reported

spending on average a little less than two hours (1:54) per day listening to music.[19] This included listening to the radio, CDs, streaming through services such as Pandora or Spotify, or listening to music downloaded on a computer, tablet, iPod, smartphone or other MP3 device. When limited to just those that report ever listening to music, the average daily time spent on this activity increased by almost 30 minutes (1:54 vs. 2:20). Music clearly dominates media-activity preferences: 66% of teens said they listen to music every day as compared to 58% who reported watching TV every day and 45% who indicated they use social media every day.[19]

Male and female adolescents both spend a considerable amount of time listening to music and appear to derive enjoyment from this activity.[19] Yet, males spend less time than females (1:37 vs. 2:12) engaging in this activity. Further, a smaller percentage of males than females indicated they like it "a lot" (66% vs. 80%).[19] The Common Sense report found that White teens reported spending less time than their Black and Hispanic peers listening to music.[19] Additionally, youth who reside in higher-income households spend less time than youth in lower-income households listening to music. Yet, the amount of minutes spent on this activity daily was statistically indistinguishable from that of youth who reside in middle-income households. Moreover, there were no appreciable differences between youth residing in lower- and middle-income households. Finally, the pattern of findings regarding parental education did not conform to expectations. Youth from homes where the parents achieved the middle educational category (some college) reported listening to music for the highest number of minutes per day. On average youth from these households listened to music for almost 20 more minutes a day than those where the parents earned a college degree. While there were no statistically significant differences between the lowest and middle education group, there were

also no differences between the lowest and the highest, making these findings somewhat difficult to interpret.

Gaming

There are now multiple ways individuals can play games including using a console or handheld device, playing on computers, or using mobile devices such as smartphones, tablets or iPods. Kaiser initially looked at the amount of time youth spent playing games with either consoles or handheld devices (e.g., Sony Playstation Vita, Nintendo 3DS). That study found that the total amount of time youth engaged in playing video games increased substantially over time.[31] In just over a decade the time spent playing video games among all youth increased almost threefold from less than 30 minutes in 1999 to more than an hour in 2009 (0:26 vs. 1:13). When limited to those youth that reported playing games, the amount of time nearly doubled from just over an hour to almost two hours (1:05 vs. 1:59). Like TV, the increase in the amount of time dedicated to this activity was said to be attributable to technology including mobile phones and handheld devices.[31] Common Sense's 2015 report found that youth reported spending similar amounts of time spent on gaming. Specifically they found that among all teens 1 hour and 21 minutes per day was spent gaming.[19] However, a sizable proportion of youth (44%) indicated they spend no time on this activity. Therefore, when looking at only those that play games, on average they reported spending almost 2.5 hours doing so. Furthermore, the study found that the most common way youth currently participate in this activity is using a mobile device.

There are substantial differences between males and females in regards to video games. Common Sense found that 62% of boys as compared to just 20% of girls reported enjoying playing video games "a lot".[19] Not only were there differences in terms of amount of gratification associated with playing, there were actual differences in the amount of time

dedicated to this activity as well devices used to carry out these activities. Specifically, among all youth, males reported playing games on average two hours a day as compared to females who spent less than three-quarters of an hour on this activity (2:01 vs. 0:39). This finding is consistent with gender differences highlighted in the Kaiser study.[31] Both studies also found that boys utilize game consoles to a much larger degree than girls.[19,31] There have been mixed findings regarding disparities by race/ethnicity. The Kaiser study found that White youth engaged in gaming activities considerably less than their Black and Hispanic peers,[31] while Common Sense found that there were no differences by race/ethnicity.[19] Parental education was not associated with time spent playing games.[19,31]

Social Media

Contrary to popular belief, social media still trails old media in use and pleasure.[19] However, the amount of time youth spend engaging with social media has increased markedly over time. In 2009, among all youth, the average time per day spent using social networking sites was 22 minutes and among those that reported using these sites the average time was almost one hour (0:54).[31] At the time MySpace and Facebook were the prevailing social networking sites. By 2015 the average amount of time all youth were engaging with social media had more than tripled. Common Sense found that teens reported spending 1 hour and 11 minutes using social media and this time doubled to roughly two hours when limited to only those individuals who use social media.[19] Increased use of social media was facilitated by the use of smartphones.[19,30] Although more time has been dedicated to this activity, a sizeable proportion (44%) of youth reported not using social media at all, a minority (36%) reported enjoying using social media "a lot", and very few (10%) identified it as their "favorite" part of their media diet.[19]

Research has found the number of social networking sites used by teens is expanding, with most teens (71%) indicating that they use more than one social networking site.[30] Of the

sites asked about, Facebook remains the foremost used site. Specifically, 71% of teens said they used Facebook and 41% said they used it "most often". Teens report using other social networking sites including: Instagram (52%), Snapchat (41%), Twitter (33%), Google+ (33%) and Vine (14%).

Since the emergence of social media as a dominant force in the rapidly changing media landscape there has been dissimilarity between males and females in their usage.[19,30,31] Kaiser found in 2009 that an equal percentage of male and females used social media,[31] yet by 2015 a significantly larger proportion of girls used social media "on any given day" than boys (64% vs. 51%). Consistently studies have found that girls spend substantially more time using social media than their male counterparts.[19,31] Girls also dominate in other measures of social media adoption. For example, a larger percentage of girls report enjoying using it "a lot" (44% vs. 29%), say it is their favorite activity (14% vs. 5%), and use it every day (52% vs. 38%).[19] Furthermore, girls use visually oriented social media (e.g., Instagram, Snapchat, Pinterest) to a greater extent than boys.[30]

There are statistically significant differences in the amount of time dedicated to social media use [19,31] as well as in the use of particular social media sites[30] by race and ethnicity. Findings have been inconsistent, but evidence suggests that Black youth use social media more than White or Hispanic adolescents.[19] Family income has been shown to be associated with social media use. Those from the higher income households utilized social media less than those from middle- or lower-income households. Finally, differences in time use of social media by parental education have been found. Based on raw minutes, those that come from households with the lowest parental educational attainment (i.e., high school) spend the largest amount of

time using social media while those from households with the highest educational attainment (i.e., college degree) spend the least amount of time.

Media Multitasking

Media multitasking is defined as "using more than one medium at a time".[31] An early study of this phenomenon found that about 80% of youth reported multitasking, and of those that multitask, roughly 25% of the time they are consuming more than one type of media (e.g., watching TV while looking at websites or listening to music while using social media).[40] Although multitasking is not new, it is becoming a more common occurrence. One explanation offered for the increasing rates of multitasking is access to multiple forms of media in bedrooms.[41,42] Indeed living in highly-media saturated environments has been found to be associated with increased likelihood of media multitasking.[31,40] That is, factors such as higher exposure to media, having a prominent TV in the household and ownership/placement of a computer have all been associated with multi-tasking.[40] Researchers also suggested early on that media multitasking would exponentially increase as access to portable devices propagated.[40] Interestingly, media multitasking is more common among female adolescents than male adolescents, while no differences by race and ethnicity have been found.[31]

Particular forms of media lend themselves to multitasking more than others. Kaiser found that 73% of youth reported using at least one other media type "most of the time" or "some of the time" while listening to music.[31] A similar percentage reported multitasking while watching TV (68%) and using a computer (66%). A much smaller percentage of youth reported engaging with other forms of media while playing video games (48%). These findings suggest that level of engagement with an activity may be a predictor of multitasking.

Access

The 2015 Common Sense study found that the vast majority of homes in which teens live had a TV (95%), video game console (83%), smartphone (84%), laptop computer (77%), tablet (73%) and desktop computer (63%).[19] Nearly half of teens reported having a DVR (48%), portable game player (45%), or iPod (43%) in the household. When asked about personal ownership, as opposed to a device being available in the household, the majority of teens reported having a personal smartphone (67%) and having a TV in their bedroom (57%). Fewer indicated they owned their own laptop (45%), tablet (37%), portable game player (32%) or having a game console in their bedroom (34%).

Despite high rates of ownership of media devices, Common Sense found a "digital equity gap".[19] Income level and media technologies were found to be positively associated for both household devices and personal devices. Nearly all higher-income households (i.e., >$100,000) have a smartphone (93%) as compared to about two-thirds (65%) of lower-income households (i.e., <$35,000). This was true also for having a tablet, e-reader, or video game console in the household. Similarly, a larger proportion of youth from higher-income households had their own laptops or smartphones as compared to those from middle-income and lower-income households. However, smaller percentages of youth from these same higher-income households reported having TVs or video game consoles in their bedroom. There are also gaps between racial ethnic groups.[30] A Pew Research Center study found that Black teens were more likely than their Hispanic or White counterparts to have access to a smartphone (85%, 71%, and 71% respectively).[30] Fewer Black (79%) and Hispanic (82%) youth had access to desktop computers or laptops as compared to White (91%) youth. Finally, Hispanic youth were less likely than their Black or White peers to have game consoles (71%, 84%, and 85% respectively).

Media Content

It is clear that adolescents are spending a great deal of their daily lives consuming a variety of media to which they have high access. It is important to understand what they are being exposed to in terms of messages regarding foods, beverages and eating behaviors. I will briefly explore issues related to media content in regard to traditional advertising/marketing, digital advertising/marketing, TV and movie content, and social media. This section is not exhaustive of all media content studies; though it does give a sense of the obesogenic media content youth are confronted with during their daily lives.

Traditional Advertising and Marketing

Advertising and marketing messages reach individuals across multiple platforms including television, radio, magazines, music, and the Internet.[43] However, television still remains the most common way for advertisers to reach their audience.[44] Industry self-regulation pledges have done little, if anything, to change the amount of unhealthy food items advertised specifically to children and teens. In fact, advertising for fast food[45] and soda[46] have increased substantially since the Children's Food and Beverage Advertising Initiative (i.e., a 2006 voluntary pledge among leading food and beverage companies to change advertising directed towards children in an effort to promote healthier eating habits).[47] According to the Rudd Center for Food Policy and Obesity, adolescents view on average 16.2 food and beverage ads per day across an array of TV channels and programs.[20] Throughout 2011, adolescents ages 12-17 viewed 5,913 food and beverage ads during the year, most of which were on cable TV (81%). Early adolescents (12-14 year olds) viewed marginally more ads than older adolescents (15-17 year olds). Across all cable, network and syndicated stations, the majority of ads viewed by teens were on just 10 channels: Nick at Night, Nickelodeon, MTV, Cartoon Network, ABC Family

(now Freeform), Adult Swim, FX, Comedy Central, TBS, and USA. Older adolescents also viewed these ads on BET. The bulk of food and beverage ads were shown on Nick at Night, Nickelodeon, and MTV. Specifically, youth ages 2-17 saw on average 13.2 food and beverage ads per hour on Nick at Night, 7.6 on Nickelodeon, and 7.4 on MTV. Fast food advertisements comprised the largest proportion of food and beverage ads (24%) followed by cereal (12%), other restaurants (11%), candy (11%), prepared meals such as soups, pasta products, frozen meals (7%), juice/fruit drinks (7%), yogurt and other dairy (6%), sweet snacks (6%), crackers and savory snacks (2%), carbonated beverages (2%), bottled water (1%), and fruits and vegetables (1%). Thus, the overwhelming majority of advertisements are for foods and beverages with low nutritional quality, which is consistent with previous research.[22,48-50]

Digital Advertising and Marketing

Food marketing now commonly extends beyond television to other forms of digital marketing: social networking, interactive games, smartphones, videos and virtual worlds (i.e., a computer environment in which users interact in real time with other users).[51] Unfortunately, there is a dearth of research in this area due to the propriety nature of research funded and sponsored by the marketing industry for their products[43] and as a result the field remains underdeveloped.[52] Despite this, researchers have tried to quanify the number and quality of foods and beverages advertised to children on popular websites. One study reviewed 28 popular childrens' websites and found 77 branded food or beverage products advertised on either the homepage or one click away from the homepage.[53] Of those, 64% were for foods for which the Institute of Medicine discourages consumption because they do not meet the dietary guidlines or do not contain other recommended nutritients (e.g., Froot Loops cereal, Kraft Macaroni and Cheese, M&Ms candy). Similarly, another study assessing content of popular children's websites found that 83% of food ads on were on just four sites: Nick.com, NeoPets.com,

CartoonNetwork.com and DisneyChannel.Disney.com.[54] Of grave concern, is the fact that during the one-year study period, Nick.com had one billion food advertisements. The study team also found the most common products advertised were cereal, fast food resturants, and prepared meals. One noteable limitation of these studies is that they focus on websites that children visit which may be substantially different from websites that adolescents visit.

Advergaming is another strategy used by marketers. Typically advergames are a hybrid between online video games and advertising, making it difficult to differentiate between advertising and entertainment content.[55,56] These games usually feature a character that is based on a product (i.e., a branded item) or involve playing in a heavily branded environment.[23] On average youth spend an extended period of time engaging with advergames, playing for as much as 30 minutes at a time.[57] A study assessing food industry websites promoted on children's TV networks found that 80% have advergames.[55] Legend of Cheetocorn, can be found on the website for Flamin' Hot Cheetos. Additionally, that website has other videos and action-oriented content aimed at building engagement among youth.[58] Cheetos' marketing efforts includes twitter giveaways for user-generated videos and tie-in's with other video games. This is characteristic of an integrated digital marketing campaign that targets individuals through branded websites, online videos, advergaming, virtual worlds, cross promotions, mobile advertising and social media marketing across multiple platforms.[23] In these types of digital marketing campaigns the consumers become the marketers: "It's a real shift. It used to be a one way conversation from the marketer to the consumer and now the consumer is doing as much as the marketer is in getting the message across," said a marketing expert on Frontline's *Generation Like*.[59] Marketers are able to manipulate their audience, often teenagers, into selling products for them by clicking, liking, tweeting, and making videos about products. Companies can then

translate these online actions into currency through brand loyalty and increased sales.[59] Unfortunately, it is almost impossible to quantify adolescents' expsoure to and involvement with these efforts as research has not been able to adequately study digital marketing.[23]

TV and Movie Content

Product placement, or 'integrated marketing' where foods are eaten, discussed, or appear in the background of television shows, have become increasingly popular to supplement traditional TV advertising.[21,60] This may be a consequence of technology allowing individuals to view content without advertising.[56,60] It is also a mechanism to garner more advertising revenue for streamed content which relies less on traditional advertising. As always has been the case, viewing times for TV programming greatly exceeds advertising time, therefore, the content of the show may be of more importance than advertisements.[60] There is limited research regarding food depiction on TV but there is evidence to suggest a significant presence of food in TV programming. An early study (1990) found that on average there were 4.8 food references per 30 minutes of programming and that 60% of these references were for low-nutrient beverages (i.e., coffee, alcohol, sugar-sweetened beverages) and sweets (i.e., baked goods, candy, ice cream).[61] Others have found that youth are exposed to approximately 17 food related scenes per hour while watching TV,[21,22] which translates into observing a food related scene every 3.5 minutes. In an effort to understand what adolescents are specifically exposed to, Eisenberg and colleagues used self-reported data regarding favorite shows from 2,793 adolescents attending middle and high schools in Minnesota to conduct content analyses of food protrayals in TV programming.[60] The study team selected 3 epidodes from each of the 25 most watched shows and found that almost half the time characters ate on a show they were snacking (48%) rather than consuming breakfast, lunch or dinner. Snacks were also signficantly more likely to be "mostly unhealthy" as compared meals. These findings confirm earlier studies assessing TV shows with younger audiences

(preschoolers and tweens) which found far greater dipctions of unhealthy vs. healthy foods as part of televised programming.[21,62]

Movies also expose youth to food-related images and content. A study reviewing 100 films from 1991 to 2000 found that food appeared on screen every 4.2 minutes, typically in the background or as a set prop.[63] Overwhelmingly these foods were items considered to be unhealthy (i.e., high in fat, high in sugar). Another study of 200 of the top grossing box office movies from 1996 to 2005 found that brand placement was common in movies, with roughly 70% of films containing at least one branded food, beverage or restaurant.[64] Consistent with previously described research on TV and movies, brands represented were typically for energy-dense nutrient-poor products including candy, salty snacks, sugar-sweetened beverages and fast food establishments.

Social Media

Social media has led to an ever-growing number of applications that allow individuals to share images of food. A common term for this practice is "food porn". This term refers to "the act of styling and capturing food on mobile gadgets, eliciting an invitation to gaze and vicariously consume, and to tag images of food through digital platforms."[65] It has become a fundamental part of our digital literacy and is so ubiquitous that some restaurants have even banned the practice of taking food photos.[66] Despite moves to limit this activity, in 2014 #food was the 25th most common hashtag on Instagram.[65] As of August 13, 2016 there were 182,307,436 posts with #food. Other popular food-related hashtags include: #foodporn (94,851,820), #yummy (76,925,720), and #foodstagram (15,638,314).

Until now, the underlying message throughout the media content section is that individuals are being exposed to many products that are unhealthy and contribute to poor diets. However, social media also includes content that promotes healthful behaviors. For instance,

there are many popular hashtags on Instagram that identify healthy foods and lifestyles. Some of the most prevalent healthy food related hashtags are: #healthyfood (16,219,403), #fruit (12,963,844), #healthyeating (11,412,727), #vegetarian (9,498,729), and #veggies (5,229,481). There are a number of other hashtags associated with overall health such as #healthyliving, #healthylifestyle, #health, and #healthylife, all of which are tagged in millions of posts. Having a variety of popular hashtags and dedicated content to healthy lifestyles suggests that media can also be beneficial, particularly during adolescence when youth are known to seek information,[67] and the media is an important and powerful source of health information.[35]

Unfortunately, media can also be used to get information that has the potential to become dangerous. There are over 100 websites with dedicated content related to "thinspiration" (i.e., images or content that is designed to inspire weight loss) that encourage disordered eating and offer unsafe advice.[68] Websites that advocate for being fit (aka "fitspiration") rather than thin have been found to contain comparable amounts of messages regarding fat/weight and dieting/restraint as do pro-anorexia sites, thus they are no better than pro-eating disorder websites.[69] Recent studies have also highlighted an alarming presence and popularity of this type content on social media, and specifically on Twitter.[70,71] Profiles include "thinspiration" photos, "motivational" quotes, advice, and food restriction competitions.[71] Further exacerbating the problem is that individuals with body image or eating disorders actively seek out these types media sources.[13]

Individuals have the potential to be exposed to an abundance of messages and content related to food and behaviors through their use of social media. Some of that content might promote healthful eating and lifestyles while other content might promote unhealthful eating and

behaviors. Exposure, however, it is "user-centric" and in part personalized based on past actions, preferences, and social networks and this makes it difficult to interpret.

Media Effects

This section defines and provides an overview of the field of media effects studies. As the previous section described, the media environment is replete with obesogenic and "thinspiration" content. Therefore, I elucidate how consumption of media and the associated messages are associated with obesity and underweight.

History of Media Effects

Media effects are the "social or psychological changes that occur in consumers of media message systems (or in their social milieu or cultural values) as a result of being exposed to, processing, or acting on those mediated messages."[72] Bryant and Zillmann (2009) summarized the history of media effects research.[72] They describe research on media effects dating back to World War I when it was initially thought that media produced one "universally powerful (and negative)" effect on individuals. During this time, scholars viewed messages disseminated by mass media as "bullets" that were "fired" upon unsuspecting individuals. However, during the 1940's thought shifted to a more limited effects paradigm where scholars began to understand that media exposure did not result in uniform effects, and those effects were not as powerful as once thought. According to Bryant and Zillmann, the field saw another shift from the 1960's through the 1990's where studies showed that certain circumstances produced moderate-to-powerful effects of media. It was during this time that some of the most important theories of media effects were developed and adopted. More recently, scholars have realized the importance of not only studying the effect of media but also the process of effects (i.e., precursors of effects). In contrast to early beliefs about media messages having the power of a magic "bullet", a body of

literature emerged that indicated media effects were the result of cumulative exposure. That is, it was not one exposure to a powerful message but repeated and continuous exposure to a variety of messages that result in robust media effects.

Types of Media Effects

There are five broad categories of individual-level media effects: behavioral, attitudinal, cognitive, emotional and physiological.[72] Behavior effects are when individuals repeat actions depicted in media.[72] For example, purchasing a hamburger after seeing Paris Hilton's Carl's Jr. hamburger commercial. Attitudinal effects materialize when an individual's opinions, beliefs, and values change as a result of media messages.[72] An example of this is normalizing poor eating behavior because this is what is depicted in media. Viewers see characters eat junk food and stay the same weight. Consequently, they come to believe that is normal to have poor eating habits and those eating habits will not have negative repercussions because the actors modeling this behavior are not suffering any. Cognitive effects are the third type of individual-level media effect. This is where there are changes in knowledge following media consumption.[72] Cognitive effects might manifest in greater knowledge about healthful eating after seeking information on the Internet about balanced diets. Emotional effects are the mood states (e.g., anxiety, excitement) that arise in consumers of media.[72] Seeing several news stories and reports about high rates of heart attacks among overweight individuals might elicit emotional effects among similar individuals. Lastly, physiological effects are the bodily reactions from media consumption.[72] An example is an individual salivating while viewing a particularly appealing food porn image.

Media Effects Related to Obesity and Underweight

Noteworthy media effects associated with overeating and obesity have been documented in the literature.[13] Some studies have found that TV viewing is associated with escalated positive

perceptions and reduced perceived health risks of eating fast food,[14] increased caloric consumption[15] and obesity[16-18]. Contrary to popular belief, however, there is evidence to suggest that it is exposure to advertising/marketing rather than sedentary behavior that explains the relationship between TV viewing and eating behaviors/obesity.[29,43] However, there is still insufficient evidence to establish a causal relationship.[43] Emerging evidence indicates that exposure to advertising increases the importance of hedonic aspects of food (i.e., taste) in food choices, and food commercials stimulate activity in the brain's reward valuation region.[73] Furthermore, it is estimated that an absence of advertising of unhealthy foods on TV might have prevented 14% - 33% of obesity in U.S. children.[74] Because the vast majority of research has looked only at TV exposure, additional research is needed to understand the effects of marketing and other obesogenic content on attitudes, behaviors and obesity of teens living in a media saturated environment.[29] To date there is only one study that has assessed the effects of using social media on eating behaviors and weight status.[75] The authors found that time using social media was associated with increased odds of unhealthy eating behaviors but not higher Body Mass Index (BMI).

Another identified media effect deals with issues related to body image and disordered eating, both of which can be linked to being underweight.[13] Specifically, a meta analysis assessing the role of media in body image among women found small to moderate effects of traditional/old media on women being discontent with their bodies, internalizing a thin ideal, and disordered eating.[76] In other words, there are behavioral, attitudinal, and potentially cognitive and emotional effects associated with media consumption among women. SCT (discussed in detail in Chapter 3) posits that widespread representation of the thin ideal in media increases motivation to engage in behaviors associated with being thin.[13] Thinness is venerated as the ideal

and disordered eating is often enacted to achieve that aim. Modeling, an important construct of SCT, is believed to explain the correlation between exposure and these factors.[13]

Current Research

This section will provide a concise overview of the field of media effects research. It will include a review of scholarly activity in terms of the types of media platforms studied, research designs utilized, and important measurement issues. It will conclude with an examination of limitations and recommendations for future inquiry.

Research on Media Platforms and Methods

Researchers in the field of media effects have assessed the impact of various media platforms and utilized a variety of research designs. Potter and Riddle (2007) conducted a systematic review of 962 articles published between 1993 and 2005.[77] They found that the literature was dominated by studies involving the effects of television exposure (41.0%), and less common media platforms studied were all media/media use in general (19.9%), print media (19.0%), Internet (12.5%), and film (3.7%). It is important to note that this review is roughly 10 years old and the media landscape has changed tremendously. The focus of more recent studies may be shifting to newer forms of media; however, there is currently a dearth of studies assessing new media as it relates specifically to eating behaviors.

The authors also established that seven research methods have been utilized to study media effects: surveys (in class, telephone, mail), experiments (laboratory, field, quasi-experimental), qualitative (interviews, critical analysis, ethnography, textual analysis, historical analysis, rhetorical analysis, focus groups, case study, discourse analysis, reception analysis), secondary analysis, theory piece, review of literature (narrative review, meta-analysis), and content analysis. These studies were primarily surveys (32.0%), experiments (28.8%) and

qualitative studies (15.4%). The authors concluded by saying that that no method prevails in the field of media effects and instead is representative of a broad range social science methodologies.

Measuring Media Consumption

Data on media consumption has primarily been collected in two ways. The more robust way of collecting media consumption data is through media use diaries. Diaries document media-related activities over a specific time period. For example, Kaiser asked participants to record primary and secondary media activities every 30 minutes for seven days.[31] This allowed the study team to capture main media activities (e.g., listening to music, watching TV, playing video games, instant messaging, emailing) as well as secondary activities over an extended period of time that included both weekdays and weekends. The length of time individuals complete media use diaries varies. Although seven days may be ideal because it covers both work and leisure time, it may be impractical as individuals may not track their media diet fastidiously. Therefore shorter time periods have also been used.

An alternative method is to ask individuals to retrospectively report the number of hours they spent engaging in specific media activities. These questions may be asked of a typical day, of typical weekday (i.e., Monday-Friday), on a typical weekend day (i.e., Saturday or Sunday), repeated for weekday and weekend behavior, or it may be ask of the previous day so that responses will represent every day of the week depending on what day an individual completed a questionnaire or participated in an interview. This type of data collection has been critiqued because of discrepancies between self-reports and actual use; however, it has become commonplace out of necessity.[78,79] A review of media effects articles between 1995 and 2009 found that the overwhelming majority of studies (88.3%) used self-reported data, often reporting behaviors related to media exposure.[78] There have been calls to move beyond self-reported data

now that it is possible to collect actual media use and exposure directly from different platforms (e.g., Facebook, Twitter, Hulu).

Current Limitations of Research

In addition to concerns about the reliability of self-reported media consumption data, there are also limitations regarding the ability to measure exposure to content. As mentioned earlier, much of the information regarding exposure to digital advertising is propriety to the marketing industry.[43] Moreover a "revolution" in advertising where consumers are now also acting as marketers has researchers struggling to understand the effect it is having on young people. Researchers have not yet devised a way of quantifying exposure or determining effect to this type of advertising and marketing.[23] Although this dissertation does not measure advertising specifically, the assumption is that exposure to obesogenic content at least partially drives the relationship between media consumption and eating behaviors. There are several other important limitations regarding the existing literature. First, research regarding exposure to advertising has predominately focused on young children under the age of 12 resulting in a shortage of information regarding adolescents. Middle school children are a particularly under studied population. Second, media effects research has been dominated by research on TV, and less is known about cumulative consumption across multiple media platforms. Moreover, there is currently a dearth of literature on the relationship between new media, specifically social media, and health behaviors.[75] Third, there have been calls to study conditional media effects as it is believed that media consumption will effect people differentially,[80] yet more work in this area needs to be done. The purpose of this dissertation is to begin to fill these gaps in knowledge by studying the complex relationship between media consumption and eating behaviors among middle school adolescents.

Eating Behaviors among Adolescents

As noted in Chapter 1, the dietary habits of adolescents are of concern to public health professionals. A profile of suboptimal eating behaviors among adolescents has emerged; youth are failing to meet dietary guidelines. A key indicator of a healthy diet is fruit and vegetable consumption.[81] The 2015-2020 Dietary Guidelines recommend that healthy diets include consuming fruits, especially whole fruits, and a variety of vegetables from all subgroups (i.e., dark green, red and orange, legumes, starchy and other).[82] Specific recommendations are based on the height, weight, and activity level of the individual person. Research shows, however, only 66.3% of adolescents ages 12-19 consume fruit on any given day.[83] Substantially more adolescents (90%) consume vegetables on any given day. Differences in consumption of fruit were detected by race/ethnicity but not for vegetable intake. Taken together it is unlikely that youth are meeting dietary recommendations for fruit and vegetable intake.

There are several markers of less healthy diets, among those are fast food and sugar consumption. The most recent Dietary Guidelines suggest limiting calories consumed from saturated fats and sugars to have a healthier diet.[82] One major criticism of fast food is that the foods purchased from these establishments are typically high in fat, despite healthier options being available.[84] Furthermore, consumption of fast food is associated with higher caloric intake.[85] The 2011-2012 The National Health and Nutrition Examination Survey (NHANES) data indicate that just over one-third of children and adolescents consume fast food on any given day.[86] What is more, almost 12% of adolescents' daily calories come from fast food. Although no differences in fast food caloric intake were detected by sex, socioeconomic status (SES), or weight status, Asians consumed fewer calories from fast food than their White, Black, or Hispanic counterparts.[86]

Dietary Guidelines recommend consuming no more than 10% of daily calories from added sugar,[82] and the American Heart Association recommends limiting sugar consumption to less than or equal to 25 grams of sugar (i.e., 100 calories or approximately 6 teaspoons) per day,[87] yet it is common for adolescents to exceed these recommendations. Sugar is associated with poor health outcomes and is also addictive.[88] Data from the 2005-2008 NHANES suggests that 12-19 year olds are consuming almost 17% of their calories from added sugar.[89] Males consume more calories from added sugar. Specifically, on average males consume 442 daily calories from sugar whereas females consume 314.

Nearly 40% of added sugar comes from beverages. This is alarming because sugar-sweetened beverages are associated with poor diet quality, weight gain, and obesity.[90] There has been a push to reduce consumption of sugar-sweetened beverages and many have substituted these with diet drink options. Diet drinks may be no healthier than sugar-sweetened beverages; the artificial sugar in diet beverages has been found to increase hunger[91] and is associated with type 2 diabetes.[92] However, a substantial proportion of youth are drinking diet beverages, including calorie-free and low-calorie versions of sodas, fruit drinks, energy drinks, sports drinks, and carbonated water. Specifically, 9.5% of male and 17.4% of female adolescents 12-19 years old consume diet beverages on any given day.[93] White adolescents (15.3%) consume diet beverages at higher rates than do Black (6.8%) or Hispanic (7.5%) youth. There appears to be a significant linear trend in income with significantly higher proportion of higher SES (at or above 350% of the Poverty Income Ratio (PIR)) individuals consuming diet beverages than middle (130-349% PIR) or low SES (below 130% PIR).

It is important understand the eating behaviors of adolescents because patterns established during this time period often persist into adulthood.[28] During this developmental

period, youth experience increased independence[28] and undergo important behavioral changes[94]. A critical behavior change is the decline in dietary quality that seems to occur during adolescence, despite individuals having greater nutritional needs.[94-96] Specifically, fruit,[95,97] vegetable[97] and milk consumption decreases[97] while carbonated beverage consumption increases[95,97]. Changes in dietary behaviors are likely due to increased independence and autonomy to purchase foods/beverages from outside sources and reduced parental control. These obesogenic behaviors during adolescence can be extremely consequential to long-term health.

Determinants of Eating Behaviors

The literature has identified several potential mechanisms that explain the relationship between media consumption and obesity: snacking while consuming media, sleep duration, and physical activity. Additionally, peer influence has been found to be associated with eating behaviors. Although these mediators and moderators have been advanced in the literature, the link between exposure and effects are not well understood.[38] In this dissertation these factors are explored as determinants of adolescent eating behaviors.

Snacking While Consuming Media

One promising mechanism explaining the relationship between media consumption and eating behaviors is snacking while consuming media. Entertainment media is believed to influence snacking behavior in two ways.[60] First, media content sets up unrealistic expectations; healthy weight characters often indulge in unhealthy snacking without consequences of obesity or excessive dieting. Second, snacking behaviors in media normalizes an unhealthy behavior. Frequent viewing of this may result in audience members engaging in similar activities.

There is limited research on eating while using media, however, there is evidence to suggest that media use increases overall caloric intake.[98-100] It may mean that snacking on junk

foods is displacing other more healthful eating behaviors. Alternatively, increased caloric intake may be as result of just consuming more food. It has been posited that viewing conditions inhibit satiety cues resulting in increased consumption.[100] It is worth noting, however, that different types of media usage potentially have differential eating behavior effects. Gaming for example may be associated with less caloric intake. To the extent an individual needs to use both hands when gaming, it may be a "calorie-free" behavior.[101]

Sleep Duration

People are sleeping less for many reasons including late-night screen time (e.g., TV, iPad, smartphone).[102] This fact has become an emerging topic of scholarly interest. Researchers are exploring whether heavy media use displaces sleep.[103] According to a National Geographic documentary, *Sleepless in America,* the average American sleeps fewer than seven hours on a weeknight.[104] What is more, 70% of adolescents are sleep deprived. A recent study found that the light from screens disrupts melatonin secretion which may result in delayed sleep onset, shortened sleep duration, and interference with achieving high quality sleep.[105] This is particularly problematic considering a majority of youth have screens in their bedroom.[19]

Evidence suggests that dietary choices are influenced by sleep patterns. Specifically research has found increased food intake,[106-108] higher caloric consumption,[109-111] increased consumption of sweets among adolescents,[109] increased consumption of high-fat foods,[112,113] increased consumption of carbohydrates,[109,112-114] increased soda consumption,[115] lower fruit and/or vegetable intake,[114-116] and poorer diet quality[110,111] to be associated with insufficient sleep. Interestingly, consumption of more than three meals per day is associated with shortened sleep duration.[117] Some studies were able to find sex differences in eating behaviors.[114,118] Looking at the entire picture, findings suggest that sleep deprivation facilitates consumption of

quick and easy foods. Small increases in caloric intake can result in a 5-10 pound weight gain per year.[109] Thus, sleep can be very consequential to one's weight status.

In a seminal paper by Spiegal and colleagues, the authors explained that sleep deficiencies altered appetite hormones such that hunger was enhanced.[119] They found a decrease in leptin, a hormone that inhibits hunger, and an increase in ghrelin, a hormone that boosts hunger. This lead to increased appetite, specifically for high carbohydrate foods. Since then, there has been mixed success in replicating these findings and more recent research indicates appetite hormones are probably not the cause of changes in food intake.[102] Evidence suggests a more probable explanation for increased consumption is a greater proportion of awake time that is spent engaging in sedentary activities (e.g., watching TV), which often occurs simultaneously with snacking.[102] Another proposed mechanism is that inadequate sleep may also alter hedonic stimulus processing in the brain (i.e., reward system) thereby stimulating an urge to eat.[102]

Physical Activity

Some researchers have hypothesized that media consumption displaces healthful behaviors such as physical activity, although findings have been equivocal.[120] There is some support for the displacement hypothesis. For instance, a study utilizing data from the 2003 National Survey of Children's Health found that physical activity was minimized for those with the highest levels of daily screen time.[121] Conversely, a longitudinal study assessing the relationship between TV viewing and physical activity found that changes in time viewing TV did not correspond with changes in physical activity, indicating that there is a more complex association between physical activity and media consumption.[122]

The seemingly conflicting findings of these studies may be a result of different media platforms being tested. However, it may also be the case that the hypothesis is flawed. Media consumption is not identical to sedentary behavior. For example playing video games can

provide an opportunity to both use media and be physically active. These types of games are known as exergames. Thus, depending on the video game used, individuals may be expending a significant amount of energy.[101] The current Pokémon GO craze serves as an example where individuals walk great distances in an effort to find and catch Pokémon. Because media has become increasingly mobile, and the evidence remains inconclusive, it is important to continue to investigate this relationship.

Friends/Peers/Classmates

The role of the social environment becomes increasingly more important in determining eating behaviors as one gets older.[123] Youth decrease the amount of time spent with parents and increase the amount of time with their friends, facilitating opportunities for peer influence.[124] Research has demonstrated that a range of health behaviors can be affected by peers (e.g., smoking and alcohol consumption)[125] and there is emerging evidence to suggest this is true for eating behaviors as well.[126] A recent systematic review of youth friendship networks and dietary behavior identified four major findings: (1) unhealthful eating among friends was associated with individual's unhealthful eating, particularly for males; (2) total energy intake of best friends was associated with individual's total energy intake; (3) popularity was associated with consumption of unhealthy foods; and (4) over time individual's unhealthy eating mirrored that of their friends.[127] Interestingly, evidence was ambiguous as to the relationship between peers and healthful eating practices.

A number of potential mechanisms have been proposed to explain the influence of one's social network on eating behaviors. Social contagion (i.e., friends' behavior changes influence individual behavior changes) has been offered as a possible interpretation of findings.[126,127] In an article by Christakis and Fowler (2007), the authors found that adults were more likely to become overweight if their friends were overweight or obese.[128] The authors suggest that

changes in size among friends (i.e., weight gain or loss) results in altered social norms about body size and as a result individuals conform to new norms. Studies confirmed this for adolescents as well.[126]

Homophily (i.e., seeking out others who have similar behaviors) has been offered as an alternative explanation to the idea of social contagion.[126] Evidence suggests that individuals are selecting friends that are more similar to them in terms of body weight and/or behaviors (e.g., eating energy dense foods).[129] The authors suggest this may be due to self-selection or because marginalized overweight youth become friends with other marginalized individuals.

A third explanation offered, is modeling (i.e., seeing another engage in a behavior encourages the same behavior).[126] Research has consistently demonstrated that people tend to eat the same quantity and types of foods as they see others in their social network eat. This translates into eating more or less and of health(ier) or unhealthy items depending on their peers' consumption. Research shows the effects of modeling can be moderated by weight status, in that overweight youth are more sensitive and likely to replicate peer behavior than healthy weight individuals.[130]

Last, social norms (i.e., perceived approval for behavior or extent to which it is perceived others engage in behaviors) suggests people will continue to eat as much as they want except in the presence of others.[126] In other words, people are motivated to do what is socially acceptable and will avoid consuming more food than would be considered normal. This is related to the concept of impression management (i.e., people eat minimal amounts in order to preserve positive perceptions and not be viewed as someone who overeats[131]), which has been found to be a driving force in eating decisions.

Building off this review of the literature, the next chapter will detail relevant models and theories that have often been applied to nutrition and media effects research and describe how they will be used to guide this dissertation.

CHAPTER 3. THEORETICAL FRAMEWORK

This dissertation aims to understand to what extent, in what ways, and for whom the media environment influences eating behaviors. To accomplish this goal I draw upon the conceptual framework of the nutrition environment proposed by Glanz and colleagues (2005), in which media and advertising are hypothesized to be associated with eating patterns.[132] This framework is based on the Social Ecological Model. I also draw from Social Cognitive Theory,[24,25] a behavior change theory from psychology often applied to nutrition, obesity, and media effects. In this chapter I briefly describe this development period as it relates to media effects research,[67] then review the Social Ecological Model, the framework of the nutrition environment, and Social Cognitive Theory, and conclude with a presentation of an integrated theoretical framework that will serve as the foundation of this dissertation.

Adolescent Development and Media Effects Theory

Adolescence is more than an age range, it is a dynamic developmental period characterized by intense physical and mental changes. Establishing self identity, sexual identity and independence are some of the most essential developmental tasks associated with adolescence.[67] During this developmental period youth are refining a sense of self, testing different roles, and ultimately forming a single identity. The process of developing one's identity necessitates information seeking on salient topics, often from media sources, which then influences the development of attitudes, beliefs and behaviors.[67] Roberts and colleagues (2009) argue that "media speak to the unique needs of adolescents when they are highly susceptible to influence from any messages."[67] Thus, the media plays an extremely prominent role in personal identity. Social cognitive theory (discussed in greater detail below) has been one of the most

commonly applied theories used in the study of media effects on adolescents' attitudes and behaviors.

Social Ecological Model

The Social Ecological Model has been applied to the problem of obesity in an effort to better understand the problem in its entirety.[133-138] The Social Ecological Model is a framework used to understand the interplay between individuals and their environments.[139] In this framework, the environment is conceptualized as "nested structures" whereby the individual is at the center and surrounded by the other levels of environmental influence known as the microsystem, mesosystem, exosystem and macrosystem.[140] The central assumption of the Social Ecological Model is that there is a reciprocal relationship between each level of the environment and these levels both influence and are influenced by each other.[141]

Bronfenbrenner and McLeroy and colleagues described the levels of environmental influence in the following manner: the microsystem is the level closest to the individual and the one in which the individual has direct interactions.[140,141] Examples of the microsystem include siblings, caregivers, friends, classrooms and workplaces. The mesosystem is made up of the interplay between the different microsystems. In the mesosystem the individual microsystems exert influence on each other and do not function independently. The exosystem refers to the larger social system in which an individual is situated. Although the individual is not an active participant, he/she is affected by the exosystem. Finally, the macrosystem is the cultural environment (i.e., norms, beliefs, structural opportunities, and political institutions) that affects the individual as well as the other "nested" systems (i.e., micro-, meso- and exo-system). McLeroy and colleagues expanded on Bronfenbrenner's work, and borrowed from others, to propose a revised ecological model. In their interpretation intrapersonal factors, interpersonal

factors, institutional factors, community factors and public policy all contribute to health behaviors.[141]

Model of Community Nutrition Environments

A conceptual framework of how the nutrition environment influences eating behaviors was proposed by Glanz and colleagues.[132] This framework was based on the Social Ecological Model and depicts hypothesized direct and indirect pathways from the nutrition environment to eating. In the model the authors posit that government and/or industry policies affect food choices through four distinct nutrition environments. Those four environments are the: (1) community nutrition environment, including the number, type, and location of food outlets and accessibility of outlets (e.g., grocery stores, conveniences stores, fast food restaurants, and full-service restaurants); (2) consumer nutrition environment, relating to the availability of healthy options, price, in-store promotions, placement and nutrition information in and around the places where food is purchased; (3) organizational nutrition environment pertaining to the availability of food at home, school and work; and (4) information environment, referring to media and advertising. Glanz and colleagues conceived of the information environment differently than the three previously described environments. According to Glanz et al., this environment operates at a macro- (e.g., national/regional) or local-level (e.g., neighborhood/store or restaurant) and influences food preferences and choices.[132] The information environment is believed to be associated with eating patterns through psychosocial factors (e.g., attitudes, knowledge). Finally, their model accounts for individual-level factors such as sociodemographics and perceptions of the food environment.

Although policy and the community, consumer, and organizational nutrition environments are important, this dissertation will focus exclusively on the relationship between

the information environment as defined by the Glanz framework and eating behaviors. I chose this model because it explicitly links exposure to media to eating behaviors. However, I will expand on the model in several important ways. First, I will advance the conceptualization of the information environment. Throughout this dissertation, the information environment will be expanded to include consumption or exposure to all forms of media, including traditional media and new media. It is important that the conceptualization of the information environment evolves given that technology is rapidly advancing and is increasingly utilized for disseminating information.[26] Second, I propose that the information environment is at least partially mediated and moderated by additional individual-level factors besides those included in the model (i.e., snacking while using media, sleep, physical activity). Lastly, I propose there is a direct pathway between media consumption and eating patterns, which the current model does not include.

Social Cognitive Theory

SCT was first proposed by Albert Bandura in the 1970s.[142] Its roots are in Social Learning Theory which presumes that individuals learn behaviors or modify their behaviors by watching others.[27] The likelihood of imitating observed behavior is associated with several factors including: (1) attractiveness of the model, (2) similarity of the model to the audience, and (3) clarity of the modeled action. This theory evolved into SCT with the addition of the concept of self-efficacy (i.e., belief in one's abilities).[27] According to SCT, self-efficacy is the "most proximal predictor" of behavior.[143] SCT has three main components: (1) personal determinants, (2) environmental determinants, and (3) behavioral determinants.[24,25] Personal determinants include an individual's cognitive, affective and biological events. Environmental factors include physical and social environments external to the individual. Behavioral factors include the individual's behavioral capability (i.e., knowledge, skill-set) and self-regulation skills to control

one's behavior. The premise of the theory is that there is a bi-directional relationship between each of these components. This is known as reciprocal determinism, an interactive and dynamic three-way relationship between a person's cognition, behavior and environment.[24,25]

There are five assumptions related to SCT. First, people learn by observing role models that demonstrate a behavior.[24-27] Models can be real or fictional. That is, they can be people that are observable in real life (e.g., parent, teacher, sibling, friend) or they can be fictional characters that are part of books, television shows, movies or video games. Models are said to be most effective when they are deemed to be competent and have prestige or power.[26] Second, exposure to a behavior may or may not result in the adoption of that behavior.[26] Learning is an internal process; therefore, it may be delayed or may never occur. Third, people are motivated by goals such as social acceptance among classmates, popularity, or reaching an idealized weight, and they strive to achieve their goals.[27] Consequently, individuals choose actions that will help them accomplish goals. Fourth, social reinforcement and/or punishment have an indirect effect on learning.[27] Reinforcements can be consequential to whether a person will engage in a specific behavior and can be either negative (e.g., guilt, shame) or positive (e.g., self-perception, compliments, encouragement).[144] Moreover, reinforcements can be overt or concealed. For example, a person can provide overt criticism or praise about someone's eating habits or they can provide more subtle cues of reinforcement by providing opportunities to engage in a behavior (e.g., buying candy as a gift, offering a second serving of cake). There may also be unintended consequences of negative reinforcement. For example, an individual may discontinue a behavior in settings where negative reinforcement is expected, but continue when alone or where positive reinforcement is expected. Finally, behavior eventually becomes self-regulated through internal rewards for mastery.[26] Thus, rather than motivation stemming from negative feedback, it is

achieved by marshaling resources, overcoming obstacles, and reaching goals, which then serves to reinforce self-efficacy.

One of the most important features of SCT is that it can be used to explain the power of mass communication in shaping reality and behaviors. The media both constructs and reinforces social norms and values and individuals internalize and adopt practices from those normative depictions.[26] Technology and media have become so pervasive that individuals are exposed to a diverse and expanded range of models.[26] More and more new ideas, values, behaviors and practices are diffused through media exposure.

A recent example how the media has been used to diffuse information and serve as a tool for observational learning is the weight loss success story of Kim Kardashian. She recently earned a significant amount of media attention after announcing a 70-pound weight loss. Following the birth of her second child, Kardashian went on the Atkins Diet, which requires followers to eat a low-carb, high-protein diet. She tweeted, snapchatted and shared photos on Instagram documenting her diet journey. With her 77.9 million Instagram followers and 46.9 million Twitter followers, SCT would predict some people following her will increase their behavioral capability, improve their outcome expectancy, increase their self-efficacy, and receive reinforcements (all potential mediators of behavior change) enough to adopt and maintain a similar diet just because they observed Kardashian achieve her desired outcomes. Bandura argues that these motivational effects are dependent, however, on an individual's perceived ability to undertake behavior and a belief that similar outcomes are likely for themselves.[26]

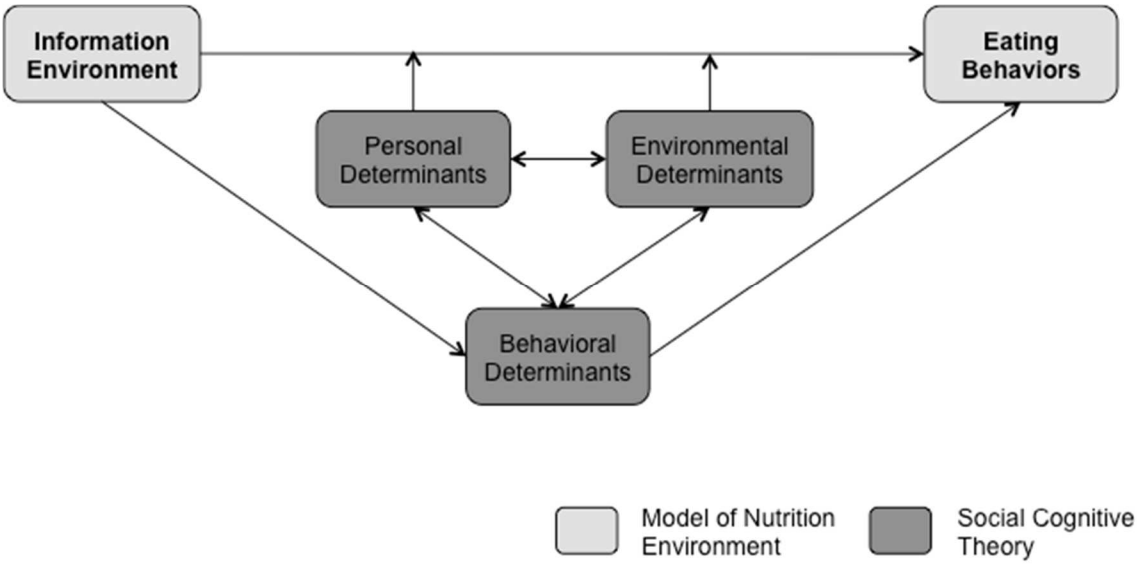
According to Bandura (2009), another function of modern media is to prompt previously learned behavior.[26] Social prompting is related to but separate from observational learning as described above because it does not rely on learning a new behavior nor does it require

disinhibition of actions because they are already socially acceptable.[26] Advertising and marketing regularly rely on the power of social prompting to enhance the persuasiveness of commercial messages.[26] Models have been used stimulate a range of actions from selecting foods and beverages to delaying or seeking gratification. Bandura suggests that messages are enhanced when a behavior is accompanied by rewards. Further, models of these behaviors are often people that are popular, good looking, or hold other characteristics that potential consumers deem to be highly regarded. For example, in 2005 Carl's Jr. used socialite Paris Hilton in an ad campaign to sell a new hamburger. The ad featured Hilton in a bathing suit, washing a car, and eating the hamburger. Carl's Jr. found that one month after the ad ran sales increased by 1.5%, suggesting the positive effect of having attractive influential person as a model.[145]

Integrated Theoretical Framework

I have developed an integrated framework that describes at the individual level what happens within a person to affect their eating behavior (see Figure 1). The integrated framework presented below uses the hypothesized relationship between the information environment and eating behaviors contained in Glanz and colleagues' model of the Community Nutrition Environment as a starting point. I then apply SCT to help to explain the relationship between these two constructs.

Figure 1. Integrated Theoretical Model



SCT explains how behaviors are the result of the reciprocal relationship between individual characteristics, the environment and behavioral determinants. This is critically important because eating decisions are not made in isolation. This is depicted in the model where I show that each of these are separate factors that co-occur but each has its own relationship to eating behaviors. Specifically, the association between the information environment and eating behaviors may be specific to personal determinants such as gender, BMI or perceived weight status. Similarly, the relationship may be conditional on environmental determinants such as friend or classmate behaviors. Lastly, the model portrays the fact that consumption of media may lead to unhealthful behaviors such as snacking while consuming media, inadequate sleep or insufficient physical activity, which in turn may impact dietary patterns. Note that these factors represent individual-level mediators that are not in the Glanz and colleagues model as described above thus expanding our understanding of the multilayered relationship between personal characteristics, social environment, and food consumption. The other important factor related to SCT is that it describes how individuals can learn new behaviors or be encouraged to engage in a

behavior through observational learning and social prompting. This is depicted in the model which includes a direct pathway between the information environment and eating behaviors. Thus, the model highlights a focal relationship while also acknowledging that there are other influences on the dependent variable.

It should also be noted that this integrated model only focuses on the constructs that were tested as part of this dissertation. There are additional factors that are not accounted for in this framework that may be associated with media consumption and eating behaviors such as age, emotional states, policies, other nutrition environments, or perceptions of those environments.

While this chapter discussed theories that have been applied to nutrition and media effects research, the next chapter will describe the methodology that was used to carry out this dissertation. It will also include a more specified model with measured variables (see Specified Model and Measured Variables in Chapter 4).

CHAPTER 4. METHODS

Research Design

I employed a cross-sectional survey design to explore the relationship between media consumption and eating behaviors among a sample of middle school adolescents. This dissertation will begin by looking at media consumption across all digital platforms. This is important because to date the research on media effects has focused primarily on TV.[77] Although time spent watching TV still dominates, the ways in which youth are able to engage with media, not just TV, has shifted dramatically with the invention and adoption of new technology.[31] Further, all forms of media are replete with obesogenic content. Lastly, media effects result from cumulative exposure rather than a single shot. Consequently, there is a need to study the overall media diet of youth as well as specific types of media exposure. The objectives of the study are to (1) determine if there is an association between cumulative media consumption and eating behaviors, (2) determine the individual-level mechanisms that explain the relationship, and (3) determine if effects are conditional on peer behaviors and peer characteristics. I will then limit the area of inquiry to just that of social media, an increasingly important source of media usage among youth. The objectives of that portion of the dissertation will be to (1) understand if there is an association between social media use and eating behaviors and (2) understand if those effects hold true for only some people and under specific conditions.

Aims and Research Questions

Aim 1: To examine how individual-level behaviors mediate the relationship between media consumption and eating behaviors**.** The goal of this aim was to establish focal relationships between different types of media consumption and eating behaviors, and determine if snacking

while consuming media, sleep duration, and/or physical activity mediated those relationships. The associated research questions were:

1. Is the amount of time spent consuming different sources of media associated with eating behaviors?
2. Does snacking while consuming media mediate the relationship between media consumption and eating behaviors?
3. Does amount of sleep mediate the relationship between media consumption and eating behaviors?
4. Does physical activity mediate the relationship between media consumption and eating behaviors?

Aim 2: To examine how interpersonal exposures moderate the association between media consumption and eating behaviors. Specifically, the goal of this aim was to assess whether it was possible to buffer the deleterious effects of media consumption on eating behaviors by associating with friends who are perceived to place importance on eating healthfully, dieters, or by having classmates who eat more healthfully or who are on average slim. The corresponding research questions were:

1. Is the relationship between media consumption and eating behaviors conditional on the perceived importance of eating healthy among friends?
2. Is the relationship between media consumption and eating behaviors conditional on perception that friends diet to keep from gaining weight or to lose weight?
3. Is the relationship between media consumption and eating behaviors conditional on actual eating behaviors of physical education classmates?

4. Is the relationship between media consumption and eating behavior conditional on the percentage of physical education classmates who are overweight or obese?

Aim 3: To examine the association between social media use and eating behaviors. This aim addresses the question whether social media use is associated with eating behaviors and, if so, whether the effects are exacerbated for individuals who are overweight and individuals trying to lose weight. The accompanying research questions were:

1. Is social media use associated with eating behaviors?
2. Is the relationship between social media usage and eating behaviors moderated by gender?
3. Is the relationship between social media usage and eating behaviors moderated by perceived weight status?
4. Is the relationship between social media usage and eating behaviors moderated by intention to lose weight?

Project SHAPE

The Intervention

In order to study the relationship between media consumption and eating behavior I am used a sample of 4,838 eighth grade students in Los Angeles (see School Recruitment and Sample sections below). These individuals attended one of 16 schools that participated in the Project SHAPE intervention. However, this dissertation is not an evaluation of that intervention, rather I used these data to conduct an ancillary study. In short, Project SHAPE aimed to increase moderate to vigorous physical activity (MVPA) among middle school students in the Los Angeles Unified School District (LAUSD). Physical education teachers were the direct targets of

the intervention rather than students. The assumption was that by improving the skills of teachers they would be able to increase MVPA among their students. Each participating teacher received up to 12 hours of Sports, Play & Active Recreation for Kids (SPARK) certification training.[146] The training was designed to build skills in the areas of class management, instructional techniques, and motivation in an effort to get students to move more. Intervention teachers were given SPARK educational materials at no cost for use in their schools as well as a $200 stipend for completing the 12-hour training. Additionally, participating intervention schools received $2500 in vouchers to purchase new sports equipment.

School Selection & Recruitment

The project aimed to work with middle schools located in medically underserved areas. According to the Health Resources and Services Administration of the U.S. Department of Health and Human Services, these are areas with insufficient primary care providers, high infant mortality, high poverty and/or an elderly population.[147] School specific inclusion criteria included: low-income student body (i.e., 50% of students qualify for free or reduced price lunch), racial/ethnic diversity (i.e., at least 50% of students are Black, Latino/Hispanic, Asian/Pacific Islander, American Indian/Alaska Native) and enrollment size. The project identified 48 schools that met those inclusion criteria and invited them to participate. Twenty-four schools expressed interest and 16 were recruited for participation (see Table 1 for school characteristics). Each school signed a Memorandum of Understanding agreeing to collaborate with the research team on this study. Eight schools were randomly assigned to the intervention condition and eight were assigned to control condition. Within participating schools, physical education teachers had the option of joining the project. Fifty teachers out of a possible 64 teachers (78.1%) agreed to participate (23 intervention teachers vs. 27 control teachers).

The participating schools fairly well matched the school inclusion criteria. However, there was some notable variation in terms of location, enrollment size, and percent of student population that were eligible for free or reduced price lunch or were racial or ethnic minorities. Schools were located in six of the eight Service Planning areas (i.e., geographic regions of Los Angeles County often used by the Department of Public Health for providing directed and relevant services[148]). On average schools had a little more than 1,300 students. However, there was substantial variation in school size with the smallest school having only 471 students enrolled as compared to the largest school, which had 2,553 matriculating students. Similarly, there was some variation in the percent of students that are low-income as measured by the percent that qualify for free or reduced price lunch. In this sample of schools, on average almost 80% of students are low-income, though some schools had as few as 40.5% of their student body that met this criterion. Lastly, the vast majority of students were racial or ethnic minorities.

Table 1. School Characteristics

Condition	Service Planning Area	Enrollment	% Free or Reduced Price Lunch	% Racial/Ethnic Minority
Intervention	SPA 4	614	81.9%	98.0%
Intervention	SPA 2	2,553	40.5%	69.8%
Intervention	SPA 7	1,789	83.8%	99.2%
Intervention	SPA 5	716	81.6%	95.0%
Intervention	SPA 2	1,046	93.0%	97.9%
Intervention	SPA 2	1,288	84.5%	91.5%
Intervention	SPA 6	965	84.8%	99.3%
Intervention	SPA 7	1,429	83.4%	99.2%
Control	SPA 2	952	79.8%	97.2%
Control	SPA 8	1,883	59.3%	84.3%
Control	SPA 2	1,303	88.3%	95.1%
Control	SPA 7	2,320	88.4%	99.7%
Control	SPA 2	1,697	55.2%	69.8%
Control	SPA 4	826	94.8%	99.3%
Control	SPA 8	1,496	75.3%	86.9%
Control	SPA 4	471	89.8%	99.8%
AVERAGE		**1,334**	**79.03%**	**92.63%**

Evaluation Design

This study employed a cluster randomized controlled trial design in which schools were randomly assigned to either intervention or control condition. The primary outcome measure was increased MVPA. The study team collected data on this construct using SOFIT (System of Observing Fitness Instruction Time). This is a validated method of collecting classroom-level activity.[149] Briefly, trained observers select four students in each class and observe and record their activities throughout the class period. The intensity of students' physical activity is recorded on a four-point scale: (1) sedentary (e.g., sitting or lying down), (2) light physical activity (e.g., standing or casual walking), (3) moderate physical activity (e.g.,, brisk walk or light jog), (4) vigorous (e.g.,, running or other intensive activity that would result in heavy breathing and sweat). These data were collected at three time points: pre-program implementation, mid-program implementation, and immediately following program implementation. The participating schools also provided FITNESSGRAM data to the study; these data included individual-level measurements of body composition (i.e., BMI and skinfold thickness), aerobic fitness (i.e., one mile run), and muscular strength/endurance (i.e., curl-up and pull-up).

In addition to physical activity and fitness assessments, students completed a survey before and immediately following the intervention. The survey was developed by the research team following a comprehensive review of the literature and existing survey instruments. The team adopted and adapted questions from existing measures, and when necessary, constructed new measures. The survey instrument was pretested with 18 students (9 males, 9 females; 6 6th grade, 12 7th grade). Minor modifications were made to improve parsimony and clarity and then retested with nine additional students (5 males, 4 females). The survey was designed to take approximately 30 minutes to complete. The main objective was to assess facilitators and barriers

to physical activity including, but not limited to, familial and peer support and access to physical activity space. The survey instrument also included questions on a variety of factors related to nutrition knowledge, attitudes and behaviors; the school food environment; free time activities; and sleep habits. These additional constructs were not expected to change as a result of the intervention. The research team modified the questionnaire between test administrations and as a result some questions unrelated to the primary objective of the intervention (i.e., increasing MVPA) were removed while new questions were added.

Participant Recruitment Procedures

All study protocols were approved by the Institutional Review Board of the UCLA Office of the Human Research Protection Program and the LAUSD's Program Evaluation and Research Branch.

At baseline, all 7th grade students enrolled in physical education classes were invited to participate in the study. Approximately one week prior to data collection a project representative went to each participating class to explain the study and to distribute information packets for students to bring home to their parents/caregivers. Students were instructed to bring back signed consent forms only if their parent/caregiver did not wish for them to participate. On the day of data collection students also had to provide verbal assent.

Data Collection Procedures

Baseline data were collected from 7th grade students between September and December 2014. Follow-up data were collected from 8th grade students between April and June 2016. Depending on the school size between two and six study personnel administered the survey in participants' physical education classes. Study staff provided verbal instructions on how to

complete the questionnaire in addition to informing students that participation was voluntary. Students were asked to read the survey and answer questions independently. All students sat in alphabetical order on the gymnasium floor while completing the instrument. The survey was only administered in English; therefore, Spanish-only speakers were not eligible to take the survey. Spanish-only speakers were given an alternative activity to complete (e.g., word search or crossword puzzle).

Sample

At baseline, 4,773 of the 6,201 7th grade students attending one of the participating schools completed the survey for an overall response rate of 77.0%. At follow-up, 4,866 of the 6,061 8th grade adolescents completed the survey for a response rate of 80%. This study only utilized the follow-up data. Furthermore, forty-eight individuals were excluded from the sample due to language proficiency issues. Thus, the final analytic sample was 4,838. See Chapter 5 for details about the sample.

Specified Model and Measured Variables

Figure 2 below expands on the integrated theoretical framework (Figure 1) presented in Chapter 3 by identifying measured variables that represent the theoretical constructs. The integrated theoretical framework used the hypothesized relationship between the information environment and eating behaviors proposed in Glanz and colleagues' model of the Community Nutrition Environment as a starting point. In this model the construct of the information environment is depicted with the measured variable media consumption. This was the primary independent variable for both Aims 1 and 2; however, in Aim 3 media consumption is referring

specifically to social media use. The construct of eating behaviors is depicted in this model also as eating behaviors and represents the primary outcome for Aims 1, 2 and 3 of this dissertation.

Individual, environmental and behavioral determinants of behaviors were illustrated in the integrated theoretical framework. In this model, they are represented with a number of measured variables. Individual characteristics include factors such as gender, BMI, perceived weight status. These variables take on different functions in the analyses. They may be moderators or control variables. Environmental determinants include friend or classmate characteristics and behaviors. These factors will be described in greater detail below. They will be tested as moderators of the relationship between media consumption and eating behaviors. Behavioral characteristics include behaviors such as snacking while using media, sleep duration, and physical activity. These factors will be tested as mediators. Finally, the specified model includes factors that are related to both independent and dependent variables (i.e., race/ethnicity, language use, caregiver educational attainment). These factors also correspond to individual level determinants of behaviors.

Figure 2. Specified Model With Measured Variables

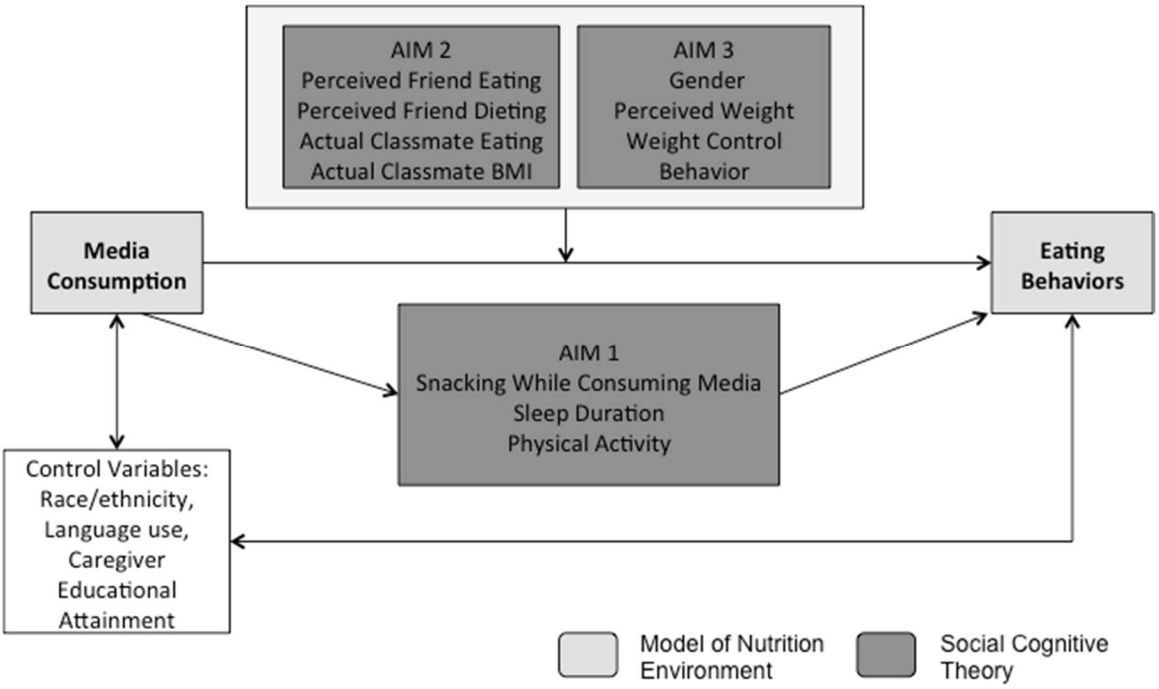


Table 2 provides a summary of all measured variables that will be used in this dissertation.

Table 2: Measured Variables

Description of variables	Coding	Type of variable[1]
Eating Behaviors		
Fruit and vegetables[2]	0 - 56	Dependent variable
Sugar-sweetened beverages[3]	0 - 56	Dependent variable
Diet soda[4]	0 - 28	Dependent variable
Junk food[5]	0 - 56	Dependent variable
Fast food[6]	0 - 28	Dependent variable
BMI percentile	0 - 100	Dependent variable
Cumulative media consumption (total hours)	0 - 24+	Independent variable
Social media use (hours)	0 - 5	Independent variable
TV/movies/videos (hours)[7]	0 - 20	Independent variable
Gaming (hours)[8]	0 - 10	Independent variable
Music (hours)	0 - 5	Independent variable
Internet (hours)	0 - 5	Independent variable
Snacking while consuming media[9]	0 - 4	Mediator
Sleep duration (hours)	4 - 10	Mediator
Physical activity (days ≥ 60 minutes)	0 - 7	Mediator
Friend influence- perception healthful eating is important to friends	Disagree=0; Agree=1	Moderator
Friend influence- perception friends are dieting to keep from gaining weight	Disagree=0; Agree=1	Moderator
Classmate fruit and vegetable (average)	0 - 56	Moderator
Classmate sugar-sweetened beverage (average)	0 - 56	Moderator
Classmate diet soda (average)	0 - 28	Moderator
Classmate junk food (average)	0 - 56	Moderator
Classmate fast food (average)	0 - 28	Moderator
Classmate Percent Overweight	0 - 100	Moderator
Gender	Male=0; Female=1	Moderator
Perceived weight status	Underweight/healthy weight=0; Overweight=1	Moderator
Intent to lose weight	No=0; Yes=1	Moderator
Race/ethnicity	Latino, White, Black, More than one, Other	Control
Language spoken at home	English-only, English & Spanish, Spanish-only, other	Control
Female & male caregiver education	Less than high school, High school, Some college, College degree, More than college, or Don't know	Control

[1] This chart indicates the primary role each of the measured variables will take in analyses.
[2] Total number of times fruits and vegetables were eaten during past 7 days
[3] Total number of times regular soda, punch, sports drinks, sweetened fruit drinks or energy drinks were consumed during past 7 days
[4] Total number of times diet soda was consumed during past 7 days
[5] Total number of times sweets (e.g., candy, ice cream, sweet rolls, cookies, pies, cakes) and salty snacks (e.g., chips, pretzels, popcorn, pork rinds) were consumed during past 7 days
[6] Total number of times fast food was consumed in past 7 days
[7] Total amount of time spent watching TV/movies/videos using different platforms
[8] Total amount of time spent gaming using different devices
[9]Pseudo continuous variable of frequency of snacking on junk food while doing something else

Dependent Variables

Eating Behaviors

There were five primary outcomes of interest for all three aims: fruit and vegetable consumption, sugar-sweetened beverage consumption, diet soda consumption, junk food consumption, and fast food consumption. These outcomes were measured using eight questions about eating such as "During the past 7 days, how many times did you eat fruit" or "During the past 7 days, how many times did you eat fast food (e.g., McDonalds, Taco Bell, Burger King)" (See Appendix A for questionnaire). Two questions were used to measure fruit and vegetable consumption, sugar-sweetened beverage consumption and junk food consumption. Only one item was used to measure diet soda and fast food consumption (See Table 3). The questions were adapted from the Youth Risk Behavior Survey (YRBS),[150] the California Health Interview Survey 2013-2014 Adolescent Questionnaire,[151] and the Network for a Healthy California High School Survey.[152]

For analyses, each question was treated as a continuous variable and was constructed such that it represented the total number of times a food or beverage was consumed over the past week. Responses to all items ranged from "I did not eat/drink at all during to the past 7 days" to "4 or more times per day". For analyses responses were coded as follows: no time at all = 0, 1-3 times during past 7 days = 2, 4-6 times during past 7 days = 5, 1 time per day = 7, 2 times per day = 14, 3 times per day = 21, 4 or more times per day = 28. When more than one question was used to capture a broad food or beverage category the total of each variable were summed together.

Table 3: Eating Behavior Questions

Eating Behaviors	Question: During past 7 days…	Coding[1]
Fruit and vegetables	how many times did you eat fruit? how many times did you eat vegetables?	0 times, 1-3 times, 4-6 times, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day
Sugar-sweetened beverages	how many times did you drink a can, bottle or glass of soda, such as Coke, Pepsi or Sprite? how many times did you drink a punch, sports drinks, sweetened fruit drinks or energy drinks?	0 times, 1-3 times, 4-6 times, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day
Diet soda	how many times did you drink diet soda (i.e., soda that is not diet, light, or zero)?	0 times, 1-3 times, 4-6 times, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day
Junk food	how many times did you eat sweets (e.g., candy, ice cream, sweet rolls, doughnuts, cookies, brownies, pies or cake)? how many times did you eat salty snacks (e.g., chips, pretzels, popcorn, pork rinds, etc)?	0 times, 1-3 times, 4-6 times, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day
Fast food	how many times did you eat fast food (e.g., McDonalds, Taco Bell, Burger King, etc)?	0 times, 1-3 times, 4-6 times, 1 time per day, 2 times per day, 3 times per day, 4 or more times per day

[1] 0 times=0 times; 1-3 times=2 times; 4-6 times=5 times; 1 time per day=7 times, 2 times per day=14 times; 3 times per day= 21 times; 4 times per day=28 times

BMI Percentile

For Aim 1 only I also looked at BMI percentile as an outcome. BMI percentile was calculated using height, weight, age, and gender. Physical education teachers collected these data between February and May 2016 as part of standardized FITNESSGRAM. In order to collect these data students were instructed to remove their shoes and had their height measured with a stadiometer and weight measured with a digital scale.[153] BMI percentiles were calculated by the study team using the 2000 Centers for Disease Control and Prevention (CDC) Growth Charts for ages 2 to < 20 years of age.[154] Individuals were then classified as "underweight" (i.e., less than the 5th percentile), "healthy weight" (i.e., 5th percentile to less than the 85th percentile),

"overweight" (i.e., 85th percentile to less than 95th percentile) and "obese" (i.e., equal to or greater than the 95th percentile) based on the CDC guidelines. FITNESSGRAM data were linked to surveys using student's name and date of birth. For analyses in Aim 1 this measured variable was used as a continuous variable. For Aim 2 this measure was dichotomized to "underweight/healthy weight" vs. "overweight/obese" in order to calculate the percent of the physical education class that were "overweight/obese" (see section on Moderators below for more details).

Note that BMI data were only available for a subset of participants. Of the 16 participating schools, only 15 provided FITNESSGRAM data. Five additional schools were missing a substantial amount of data (28% to 96%). Therefore, in analyses FITNESSGRAM data were used for participants from 10 schools (5 intervention and 5 control).

Independent Variables

Media Consumption

I looked at both specific media use (i.e., social media, TV/movies/videos, gaming, music, Internet) and cumulative media consumption as independent variables in this dissertation. Nine questions assessed the amount of time on a typical school day youth spend using various types of media. These questions were adapted from Project EAT 2010.[155] The original questions were modified to better reflect the most current media landscape. These questions were only on the post-test and pretested before follow-up data were collected with eight 8th grade students (4 males, 4 females) from one participating middle school. Cognitive interviews were done to ensure students understood the questions and answer options as phrased, to ensure that the items included were relevant to this particular age group, and to ask if there were other types of

media/ways of consuming media that should have been included. Following the cognitive interviews minor modifications to the survey questions were made.

The final survey instrument included the following media use options: (1) listening to music on the radio or online (e.g., Spotify, Pandora, online radio); (2) playing online video games; (3) playing video games using a console or handheld device; (4) watching online videos (e.g., YouTube); (5) watching live TV; (6) watching streamed or recorded TV or movies with commercials (e.g., Hulu); (7) watching streamed TV or movies with no commercials (e.g., Netflix, Amazon Prime); (8) using social media sites (e.g., Facebook, Instagram); and (9) using the internet/visiting websites. Responses to the nine items ranged from "no time at all" to "5 or more hours". For analyses responses were coded as follows: no time at all = 0, less than 1 hour = .5, 1 hour = 1, 2 hours= 2, 3 hours = 3, 4 hours = 4, and 5 or more hours = 5. These questions were then summed together to create the following five types of media use: social media use, TV/movies/videos, gaming, music, Internet (see Table 4). Cumulative media consumption was calculated by summing the nine questions. In some cases this variable exceeded 24 hours as adolescents often media multitask.[31]

Table 4: Media Consumption Questions

Media Use	Question: On a school day (Monday-Friday) when you are NOT at school, how many hours do you spend doing the following? This includes time before or after school.	Coding[1]
Social Media	Using social media sites (e.g., Snapchat, Facebook, Instagram, Twitter)	No time, less than 1 hour, 1 hour, 2 hours, 3 hours, 4 or more hours, 5+ hours
TV/movies/videos	Watching TV live	No time, less than 1 hour, 1 hour, 2 hours, 3 hours, 4 or more hours, 5+ hours
	Streaming or recorded TV shows or movies that have commercials (e.g., Hulu)	
	Streaming TV shows or movies that have NO commercials (e.g., Netflix or Amazon Prime)	
	Watching online videos (e.g., YouTube)	
Gaming	Playing online video games	No time, less than 1 hour, 1 hour, 2 hours, 3 hours, 4 or more hours, 5+ hours
	Playing video games (game consoles like Xbox, Playstation or handheld devices like DS or 3DS or using phone or tablet app)	
Music	Listening to music on the radio or online (e.g., Spotify, Pandora, online radio)	No time, less than 1 hour, 1 hour, 2 hours, 3 hours, 4 or more hours, 5+ hours
Internet	Using the Internet/visiting websites	No time, less than 1 hour, 1 hour, 2 hours, 3 hours, 4 or more hours, 5+ hours

[1] No time at all = 0, Less than 1 hour = .5, 1 hour = 1, 2 hours= 2, 3 hours = 3, 4 hours = 4, and 5 or more hours = 5.

Mediators

Snacking While Consuming Media

One question was used to measure snacking while consuming media. This question was developed de novo and pilot tested with the media consumption questions. The question asked respondents how often during the past 7 days did they snack on junk food (e.g., chips, cookies, ice cream) while doing something else like watching TV, using the computer/iPad/Tablet, playing video games or using social media. Answer response options were on a 5-point Likert scale from Never to Always. This variable was treated as a pseudo continuous variable for

purposes of analyses in order to test it as a mediator: Never = 0, Rarely = 1, Sometimes = 2, Usually = 3 and Always = 4.

Sleep Duration

To measure sleep duration a single item implemented from the YRBS was used: "On a school night (Sunday – Thursday), how many hours of sleep do you get".[150] Answer responses ranged from 4 hours or less to 10 or more hours. When analyzing these data this variable was treated as a continuous variable with 4 hours representing the fewest and 10 representing the greatest number of hours of sleep hours.

Physical activity

Physical activity was measured with one question from YRBS, "During the past 7 days, on how many days were you physically active for 60 minutes or more per day?" This question specified that it included time in and out of school. Response options ranged from 0 to 7 days.

Moderators

Influence of Friends and Classmates

Friend and classmate effects were explored in four separate in analyses. Two questions measured perceived behaviors among friends: "My friends think it is important to eat healthy foods like fruits and vegetables" and "My friends diet to lose weight or keep from gaining weight". Answer options ranged from "Strongly disagree" to "Strongly agree". These answer options were collapsed to "Disagree" versus "Agree" for analyses. These questions were adopted from the Project EAT survey.[155]

In order to reduce bias, I also constructed classroom level variables that allowed me to directly assess physical education classmates' behaviors and characteristics rather than relying on perceived information about friends. First, a classmate eating behavior score was calculated

for each eating outcome (i.e., fruits and vegetables, sugar-sweetened beverages, diet soda, junk food, fast food) for each person by averaging the number of times each eating behavior was reported for all students in a classroom excluding an individual's own consumption of that item. For example, if there were 20 students in a class the mean classmate consumption of fruit and vegetables for person 1 was the average number of times fruits and vegetables were consumed for persons 2-20. I repeated this for each classroom in each school and for each eating outcome. Second, I constructed a variable to represent the percent of the class that was overweight or obese based on BMI classification. I calculated this variable in the same manner described above for classroom eating behaviors. This latter variable is important because BMI is more readily visible than classmate eating behavior and I hypothesized it may act more influentially.

Gender

Gender was a dichotomous variable (male versus female) based on self-reported data.

Perceived Weight Status

Respondents were asked to describe their weight as weight "very underweight," "slightly underweight," "about the right weight," "slightly overweight," and "very overweight". This question was adopted from the YRBS[150] and was collapsed to "underweight/right weight" and "slightly overweight/very overweight" for analyses. The "underweight/right weight" category served as the reference category.

Weight Control Behavior

Weight control behavior was measured with one question from YRBS.[150] Participants were asked, "Which of the following are you trying to do about your weight?" Response options included "lose weight," "gain weight," "stay the same weight," and "I'm not trying to do

anything about my weight". I dichotomized this variable to "not trying to lose weight" versus "trying to lose weight". Not tying to lose weight served as the reference category.

Control Variables

Several variables functioned as controls throughout this dissertation. They included race/ethnicity, language spoken at home, female caregiver's educational attainment, male caregiver's educational attainment, and intervention status. Race/ethnicity was measured using a series of dummy variables (i.e., White, Black, Hispanic, More than one race, Other). White served as the reference group. Language use at home was similarly measured using a series of dummy variables (i.e., English-only, English and Spanish, Spanish-only, Other). English-only served as the reference group. Finally, both female and male caregivers' educational attainment were measured using dummy variables (i.e., less than high school, high school, some college, college, more than college, don't know). High school served as the reference group. Intervention status was a dichotomous variable and was based on whether participants were enrolled in an intervention or control school. Control status served as the reference group.

Data Analyses

Analyses were conducted using Stata 14.[156] Procedures to clean and screen these data included conducting univariate analyses (e.g., mean, standard deviation, plausible range and value), and assessing patterns of correlation and covariance. Although I did not formally perform structural equation modeling (SEM) in this dissertation, I used SEM commands in Stata for all analyses. It is important to note that the regression models fit using the SEM command produced the same coefficients as OLS models. The reason SEM was employed was because it supports the use of Full Information Maximum Likelihood (FIML). FIML is a modern method for the

handling of missing data in which all available data (i.e., both complete and incomplete cases) are utilized in the analyses by estimating the joint distributions of all variables.[157] FIML has been touted as an optimal method for addressing missing data because it is straightforward, will always produce the same results, and because only one model is used it eliminates the possibility of having incompatible imputation and analysis models sometimes found when doing multiple imputation.[158] Analyses for all three aims of this dissertation also used robust standard errors to account for the clustering of participants as they were nested within schools and classrooms. Finally, all analyses were stratified by gender except when noted (i.e., Aim 3 where gender was tested as moderator). Results were considered statistically significant when p-values were less than or equal to .05. Throughout this dissertation I have also noted anything less than .10 as marginally significant.

Aim 1

Examined how individual-level health behaviors mediate the relationship between media consumption and eating behaviors**.** The goal of this aim was to establish focal relationships between different types of media consumption and eating behaviors, and determine if snacking while consuming media, sleep duration, and/or physical activity mediated those relationships. The associated research questions were:

1. Is the amount of time spent consuming different sources of media associated with eating behaviors?
2. Does snacking while consuming media mediate the relationship between media consumption and eating behaviors?
3. Does amount of sleep mediate the relationship between media consumption and eating behaviors?

4. Does physical activity mediate the relationship between media consumption and eating behaviors?

In Aim 1 I first fit multiple regression models to examine the effects of each media type (i.e., social media, TV/movies/videos, gaming, music, Internet) simultaneously on each of the five eating outcomes (i.e., fruit and vegetables, sugar-sweetened beverages, diet soda, junk food, fast food) as well BMI percentile after controlling for individual-level health behaviors (i.e., snacking while consuming media, sleep duration, physical activity) and sociodemographic characteristics.

Next, I assessed the three individual-health behaviors as mediators of the relationship between media consumption and eating behaviors/weight status. Baron and Kenny's causal steps approach has traditionally been the most common way of testing mediation.[159] However, in an important paper critiquing this methodology Hayes (2009) outlines several explanations as to why this methodology is suboptimal including: (1) low power to detect an effect of the independent variable on the dependent variable if it is carried out through a mediating variable; (2) having to infer mediation based on multiple hypothesis tests rather than empirically testing for mediation; and, (3) the possibility of having an indirect path even when a component path is not significant.[159] For these reasons testing indirect effects has become the preferred analytical technique and I have done so in this dissertation.

Using path analysis, I simultaneously examined the indirect effect of each media type on one eating outcome at a time through one of the potential mediators at a time. For example, to assess snacking on junk food while consuming media as a mediator of the relationship between any type of media consumption and eating fruits and vegetables I ran the following analyses: (1) a regression simultaneously predicting snacking from all five media types while controlling for

sleep duration, physical activity, and sociodemographic characteristics; and, (2) a regression predicting fruit and vegetable consumption from snacking while controlling for all five media types, sleep duration, physical activity, and sociodemographic characteristics. These analyses allowed me to assess the following pathways: (a) the pathways from each media type (the independent variables) to snacking (the mediator), (b) the pathway from snacking (the mediator) to fruit and vegetable consumption (the dependent variable), and (c) the pathway from each media type (the independent variables) to fruit and vegetable consumption (the outcome). By conducting path analysis, I was able to determine if there were significant direct and indirect paths. As mentioned above, all analyses were stratified by gender so these analyses were restricted to a subset of the sample and had to be repeated for the opposite gender. Also, to reiterate, I repeated these two models for each eating outcome and also for BMI percentile. Please see Table 5 below for a depiction of the path analyses just described.

Table 5: Aim 1 Models[1]

Model Description	Model
Focal relationship	Eating Behavior = $\beta o + \beta_1$*Media type + ε
Focal relationship plus other media types	Eating Behavior = $\beta o + \beta 1$*Social Media+ β_2*TV + β_3*Gaming + β_4*Music + β_5*Internet + ε
Focal relationship plus controls	Eating Behavior = $\beta o + \beta 1$*Social Media+ β_2*TV + β_3*Gaming + β_4*Music + β_5*Internet + β_6*Controls + ε
Mediation	
Snacking while consuming media	1. Eating Behavior = $\beta o + \beta_1$*Snacking + β_2Social Media+ β_3*TV + β_4*Gaming + β_5*Music + β_6*Internet + β_7*Sleep + β_8*Physical activity + β_9*Controls + ε 2. Snacking = $\beta o + \beta_1$Social Media+ β_2*TV + β_3*Gaming + β_4*Music + β_5*Internet + β_6*Sleep + β_7*Physical activity + β_8*Controls + ε
Sleep duration	1. Eating Behavior = $\beta o + \beta_1$*Sleep + β_2Social Media+ β_3*TV + β_4*Gaming + β_5*Music + β_6*Internet + β_7*Snacking + β_8*Physical activity + β_9*Controls + ε 2. Sleep = $\beta o + \beta_1$Social Media+ β_2*TV + β_3*Gaming + β_4*Music + β_5*Internet + β_6*Snacking + β_7*Physical activity + β_8*Controls + ε
Physical activity	1. Eating Behavior = $\beta o + \beta_1$*Physical activity + β_2Social Media+ β_3*TV + β_4*Gaming + β_5*Music + β_6*Internet + β_7*Snacking + β_8*Sleep + β_9*Controls + ε 2. Physical Activity = $\beta o + \beta_1$Social Media+ β_2*TV + β_3*Gaming + β_4*Music + β_5*Internet + β_6*Snacking + β_7*Sleep + β_8*Controls + ε

[1] All models above were run for each eating outcome (i.e., fruits and vegetables, sugar-sweetened beverages, diet soda, junk food, and fast food) and for each gender.

Aim 2

Examined how interpersonal exposures moderate the association between media consumption and eating behaviors. Specifically, the goal of this aim was to assess whether it was possible to buffer the deleterious effects of media consumption on eating behaviors by associating with friends who are perceived to place importance on eating healthfully, dieters, or by having classmates who eat more healthfully or who are on average slim. The corresponding research questions were:

1. Is the relationship between media consumption and eating behaviors conditional on the perceived importance of eating healthy among friends?
2. Is the relationship between media consumption and eating behaviors conditional on perception that friends diet to keep from gaining weight or to lose weight?
3. Is the relationship between media consumption and eating behaviors conditional on actual eating behaviors of physical education classmates?
4. Is the relationship between media consumption and eating behavior conditional on the percentage of physical education classmates who are overweight or obese?

For Aim 2, I ran a series of sequential multiple regression models with interaction terms to determine if perceived friend behavior or actual classmate behavior/physical characteristics were directly associated and/or moderated the effect of cumulative media consumption on each eating behavior while controlling for demographic characteristics. When interactions were not significant, I ran supplemental analyses in which I omitted the interaction but left the components of the interaction term in the model to determine the direct effects friends and classmates. See Table 6 for description of the primary analyses.

Table 6: Aim 2 Models

Model Description	Model
Focal relationship plus controls	Eating Behavior = $\beta o + \beta_1$*Media consumption + β_2*Controls + ε
Moderation	
Friends think it is important to eat healthfully (perceived)[1]	Eating Behavior = $\beta o + \beta_1$*Media consumption + β_2*Friend healthful eating + β_3*(Media consumption * Friend healthful eating) + β_4*Controls + ε
Friends diet to keep from gaining weight (perceived)[2]	Eating Behavior = $\beta o + \beta_1$*Media consumption + β_2*Friend dieting eating + β_3*(Media consumption * Friend dieting) + β_4*Controls + ε
Classmate eating behaviors	Eating Behavior = $\beta o + \beta_1$*Media consumption + β_2*Classmate eating + β_3*(Media consumption * Classmate eating) + β_4*Controls + ε
Percent of classmate overweight or obese	Eating Behavior = $\beta o + \beta_1$*Media consumption + β_2*Classmate % overweight + β_3*(Media consumption * Classmate % overweight) + β_4*Controls + ε

Notes: All models above were run for each eating outcome (i.e., fruits and vegetables, sugar-sweetened beverages, diet soda, junk food, and fast food) and for each gender.
[1] Reference category is "disagree" that friends think it is important to eating healthfully.
[2] Reference category is "disagree" that friends diet to lose weight/keep from gaining weight.

Aim 3

Examined the association between social media use and eating behaviors. This aim addresses the question whether social media use is associated with eating behaviors and, if so, whether the effects are exacerbated for individuals who are overweight and individuals trying to lose weight. The accompanying research questions were:

1. Is social media use associated with eating behaviors?
2. Is the relationship between social media usage and eating behaviors moderated by gender?
3. Is the relationship between social media usage and eating behaviors moderated by perceived weight status?
4. Is the relationship between social media usage and eating behaviors moderated by intention to lose weight?

For Aim 3, I first ran simple linear regression models predicting eating behaviors from social media use for each eating outcome. Next, I added potential confounders to the model to test if the focal relationship remained robust to different model specifications. Initially I added just other media types and then I added sociodemographic characteristics. Then I performed a series of multiple regression analyses to test whether gender, perceived weight status, or weight control behavior moderated the relationship by including interaction terms to the model. The equations for each of the models are shown in Table 7. Similar to Aim 2, I ran additional regressions models without interaction terms to test the independent effect of weight status and weight control behaviors when interactions were not significant. Those ancillary analyses do not appear in the table below.

Table 7: Aim 3 Models

Model Description	**Model**
Focal relationship	Eating Behavior = $\beta o + \beta_1$*Social media + ε
Focal relationship plus other types of media use	Eating Behavior = $\beta o + \beta_1$*Social media + β_3*TV + β_4*Gaming + β_5*Music + β_6*Internet + ε
Focal relationship plus controls	Eating Behavior = $\beta o + \beta_1$*Social media + β_3*TV + β_4*Gaming + β_5*Music + β_6*Internet + β_7*Controls + ε
Moderation	
Gender[1]	Eating Behavior = $\beta o + \beta_1$*Social media + β_2*Female + β_3*(Social media * Female) + β_4*TV + β_5*Gaming + β_6*Music + β_7*Internet + β_8*Controls + ε
Perceived Weight Status[2]	Eating Behavior = $\beta o + \beta_1$*Social media + β_2*Overweight + β_3*(Social media * Overweight) + β_4*TV + β_5*Gaming + β_6*Music + β_7*Internet + β_8*Controls + ε
Weight Control Behavior[3]	Eating Behavior = $\beta o + \beta_1$*Social media + β_2*Dieting + β_3*(Social media * Dieting) + β_4*TV + β_5*Gaming + β_6*Music + β_7*Internet + β_8*Controls + ε

Notes: All models above were run for each eating outcome (i.e., fruits and vegetables, sugar-sweetened beverages, diet soda, junk food, and fast food) and for each gender (except when gender was the moderator of interest).
[1] Reference category is male.
[2] Reference category is underweight/healthy weight.
[3] Reference category is not dieting.

CHAPTER 5: RESULTS

Demographic Characteristics

Table 8 shows the demographic characteristics of the full Project SHAPE sample and then stratifies these by gender. There was equal distribution of males and females, participants were on average about 14 years old, and the majority identified as Latino and spoke both English and Spanish at home. About one-third of the sample reported that their female and male caregivers had a high school education or less. Interestingly, a similar proportion of the sample did not know the highest level of educational attainment of their caregivers. While most participants perceived themselves to be the "right" weight, a sizeable proportion (36.51%) thought they were "slightly" or "very" overweight. Likewise, based on the CDC classification of weight status categories for children and teens, a similar percentage of participants (40.22%) were identified as overweight or obese.

Important differences emerged when assessing comparability in demographic characteristics of males and females. A larger percentage of male participants identified as White and as another racial/ethnic group as compared to female participants. Conversely, more females identified as Latino than their male counterparts. Males also more often reported being monolingual (i.e., speaking English or Spanish only) whereas more females reported being bilingual (i.e., speaking both English at Spanish) at home. Although statistically significant differences were detected in the educational attainment of caregivers, the pattern was similar between males and females with similar percentages indicating caregivers had high school or less education, some college or more, or did not know. Finally, there were differences in both

perceived and actual weight status (i.e., BMI percentile and CDC classification) of males and females.

Table 8: Demographic Characteristics of the Project SHAPE Sample by Gender (n=4,838)

	Full Sample		Males		Females		
Characteristic	**N**	**Mean (SD) or Percent**	**N**	**Mean (SD) or Percent**	**N**	**Mean (SD) or Percent**	**p-value**
Gender	4,832		2,452		2,380		N/A
Male		50.75		100.00			
Female		49.25				100.00	
Age	4,831	14.07 (0.43)	2,449	14.09 (0.45)	2,376	14.05 (0.40)	p < .001
Race and Ethnicity	4,721		2,381		2,335		
White		8.88		10.54		7.15	p < .001
Latino		68.02		65.52		70.62	p < .001
Black		4.43		4.66		4.20	p = .438
Two or more		9.72		9.41		10.02	p = .477
Other		8.39		9.28		7.45	p = .023
Language Use	4,745		2,400		2,340		
English-only		27.25		29.96		24.44	p < .001
Spanish-only		7.59		8.75		6.41	p = .002
English and Spanish		57.43		52.88		62.14	p < .001
Other language		7.21		7.58		6.79	p = .294
Mother's Education	4,719		2,400		2,313		
Less than high school		16.34		13.38		19.46	p < .001
High school		20.58		20.38		20.84	p = .694
Some college		10.21		10.71		9.68	p = .246
College		16.49		18.08		14.79	p = .002
More than college		9.90		10.42		9.34	p = .215
Don't know		26.49		27.04		25.90	p = .373
Father's Education	4,713		2,396		2,311		
Less than high school		16.87		14.57		19.26	p < .001
High school		19.61		19.74		19.52	p = .845
Some college		9.10		9.35		8.83	p = .534
College		12.94		14.40		11.42	p = .002
More than college		8.38		9.02		7.70	p = .104
Don't know		33.10		32.93		33.28	p = .801
Self Perceived Weight Status	4,716		2,390		2,321		p < .001
Very underweight		2.57		3.10		2.02	
Slightly underweight		13.53		15.65		11.33	
Right weight		47.39		49.54		45.24	
Slightly overweight		30.36		26.90		33.95	
Very overweight		6.15		4.81		7.45	
Measured Weight							
BMI Percentile	3,391	68.36 (28.61)	1,706	67.37 (29.98)	1,685	69.35 (27.23)	p = .045
BMI Z-Score	3,391	0.67 (1.09)	1,706	0.65 (1.15)	1,685	0.69 (1.04)	p = .351
CDC Weight Categories	3,391		1,706		1,685		p = .002
Underweight		2.54		2.99		2.08	
Healthy weight		57.24		56.15		58.34	
Overweight		18.93		17.47		20.42	
Obese		21.29		23.39		19.17	

Notes: Ns vary due to missing data.

Behavioral Characteristics

As illustrated in Table 9, participants reported that they engage with media in excess of 14 hours on an average school day. This number does not account for media multitasking and as a result is likely overestimating media use time. Watching TV/movies/videos comprised the largest portion of the media diet of these youth (5.87 hours), followed by gaming (2.78 hours) and listening to music (2.32 hours).

As also seen in Table 9, these youth are eating poorly. Consumption of fruits and vegetables was low with participants reporting eating these items on average only 15.06 times in the last week, which is only slightly more than 2 times per day. Conversely, junk food consumption was quite high with an average intake of 9.96 times in the last week or almost 1.5 times per day. Youth reported consuming sugar-sweetened beverages and fast food less than daily. Eating behaviors diverged somewhat from reported dieting behaviors where more than half of respondents (56.49%) specified they were currently trying to lose weight. Snacking was also very high with about two-thirds indicating they "sometimes", "usually" or "always" snack on junk food while using media. Participants also reported sleeping on average almost 7.5 hours a night and exercising for 60 minutes or more 4.87 days per week.

There are gender differences in the amount of time youth spend using various types of media and in reported eating behaviors. Specifically, females spend more time on an average school day using social media, watching TV, listening to music, and using the Internet, whereas males spend a greater amount of time gaming. Furthermore, there are mixed findings regarding eating. Females consume fewer fruits and vegetables and more junk food than do males. Conversely, females consume fewer sugar-sweetened beverages and eat fast food less often than

their male counterparts. More females reported dieting and snacking than males. However, males have slightly longer sleep durations and are exercising for at least 60 minutes more often than their female peers.

Table 9: Media Consumption and Individual-Level Health Behaviors by Gender

	Full Sample		Males		Females		
Characteristic	**N**	**Mean (SD) or Percent**	**N**	**Mean (SD) or Percent**	**N**	**Mean (SD) or Percent**	**p-value**
Media Consumption (hours per day)	4,469	14.68 (8.59)	2,250	14.16 (8.65)	2,219	15.20 (8.51)	p = .001
Social Media	4,639	1.99 (1.80)	2,344	1.46 (1.61)	2,295	2.53 (1.82)	p < .001
TV/movies/videos	4,567	5.87 (4.34)	2,300	5.32 (4.11)	2,267	6.42 (4.48)	p < .001
Gaming	4,632	2.78 (3.01)	2,336	3.90 (3.24)	2,296	1.63 (2.25)	p < .001
Music	4,667	2.32 (1.71)	2,359	1.93 (1.63)	2,308	2.71 (1.71)	p < .001
Internet	4,633	1.73 (1.68)	2,344	1.56 (1.58)	2,289	1.91 (1.76)	p < .001
Eating Behaviors (times per week)							
F&V[2]	4,750	15.06 (12.44)	2,400	15.68 (12.83)	2,350	14.43 (12.00)	p = .001
SSB[3]	4,775	4.21 (6.00)	2,421	4.90 (6.65)	2,354	3.50 (5.16)	p < .001
Diet Soda	4,769	0.72 (3.14)	2,417	0.89 (3.59)	2,352	0.54 (2.59)	p < .001
Junk Food	4,745	9.96 (10.59)	2,403	9.61 (10.46)	2,342	10.31 (10.71)	p = .024
Fast Food	4,795	2.71 (4.44)	2,426	2.92 (4.82)	2,368	2.50 (4.00)	p = .001
Weight Control Behavior	4,716		2,390		2,326		p < .001
Not Dieting		43.51		51.05		35.77	
Dieting		56.49		48.95		64.23	
Snacking	4,698		2,387		2,320		p < .001
Never		5.53		6.85		4.18	
Rarely		20.69		22.75		18.58	
Sometimes		41.02		41.76		40.26	
Usually		23.31		21.24		25.43	
Always		9.45		7.40		11.55	
Sleep (hours)	4,610	7.43 (1.42)	2,330	7.51 (1.43)	2,280	7.34 (1.41)	p < .001
Physical Activity (days)[4]	4,782	4.87 (2.00)	2,423	4.87 (1.95)	2,359	4.20 (2.00)	p < .001

Notes:
Ns vary due to missing data.
SD = standard deviation
[1] Suboptimal count= count of suboptimal number of times a person consumed fruits, vegetables, sugar-sweetened beverages, diet soda, salty snacks, sweets, and fast food in the past 7 days.
[2] F&V = Fruit and Vegetables
[3] SSB = Sugar-sweetened beverages
[4] Physical activity for at least 60 minutes

Because males and females were not comparable on many important demographic and behavioral characteristics, all analyses conducted throughout this dissertation were stratified by gender.

Aim 1 Results

Aim 1 examined how individual-level health behaviors (i.e., snacking while consuming media, sleep duration, physical activity) mediate the relationships between the following: 1) media consumption (i.e., use of social media, TV/movies/videos, gaming, music, Internet) and eating behaviors (i.e., consumption of fruits and vegetables, sugar-sweetened beverages, diet soda, junk food, fast food); and, 2) media consumption and weight outcomes (i.e., BMI percentile). The goal was to establish a focal relationship between individual forms of media consumption and eating behaviors/weight status and then to determine if snacking while consuming media, sleep duration, and/or physical activity mediated those relationships. For all results the findings for males are presented first and then followed by females.

Correlations between Media Types, Eating Behaviors, Weight Status, and Health Behaviors

Tables 10 and 11 show the correlations between media use by type, eating outcomes, weight outcomes, and the potential mediators of interest for males and females separately. For males, all types of media use had weak to moderate positive correlations. The strongest correlations were between the Internet and TV/movies/videos (r=0.456) and the Internet and social media (r=0.431), while the weakest correlations were between gaming and social media (r=0.155) gaming and music (r=0.195). In terms of eating behaviors, all eating outcomes also had weak to moderate positive correlations. Fast food and junk food had the strongest correlation (r=0.459) while fast food and fruits and vegetables had the weakest correlation (r=0.057).

Consistent weak to moderate correlations between media types and between eating behaviors support the need to look at these as separate predictors and outcomes.

Among males, media types had weak correlations with most eating behaviors. Gaming was the only media type to be correlated, and negatively, with fruit and vegetable consumption (r=-0.096). All media types, however, were correlated with sugar-sweetened beverages (r=0.073 to r=0.163), junk food (r=0.099 to r=0.209), and fast food (r=0.116 to r=0.183). And with the exception of gaming, all media types were very weekly correlated with diet soda consumption (r=0.050 to r=0.075). No media types were correlated with BMI percentile. However, BMI percentile was positively correlated with diet soda (r=0.064) and negatively correlated with both junk food (r= -0.115) and fast food (r=-0.073).

All media types had negative and weak correlations with sleep duration (r=-0.060 to r=-0.124) for males. Similarly, sleep was negatively, and weakly, correlated with all eating outcomes besides fruit and vegetable consumption. TV/movies/videos (r=-0.057), gaming (r=-0.137) and the Internet (r=-0.064) each had negative but weak correlations with days of physical activity while music had a marginally significant and positive correlation (r=0.039). Physical activity was also positively correlated with fruit and vegetables (r=0.222), sugar sweetened beverages (r=0.041) and negatively correlated with diet soda (r=-0.053). Finally, all media were correlated with snacking (r=0.129 to r=0.274), which in turn was correlated with all eating behaviors (r=0.054 to r=0.309) and BMI percentile (r=-0.071).

Similar to males, among the female sample all media types had weak to moderate positive correlations (see Table 11). The strongest correlations were those between the Internet and social media (r=0.457) and music and social media (r=0.407) while the weakest were

gaming and social media (r=0.178) and music and gaming (r=0.210). All eating behaviors also had weak positive correlations. Fast food and junk food had the strongest correlation (r=0.392) and the weakest correlation was between fast food and fruit and vegetables (r=0.055). These findings further substantiate the need to look at media types as separate predictors and eating behaviors as separate outcomes.

Social media and TV/movies/videos were both weakly and negatively correlated with fruit and vegetable consumption (r=-0.065 and r=-0.050, respectively) among females. All media types had positive but weak (i.e., r <0.200) correlations with the remaining eating outcomes (i.e., sugar-sweetened beverages, diet soda, junk food, fast food). Unlike males, where no media types were correlated with BMI, among females, social media (r=0.063), gaming (r=0.111) and the Internet (r=0.063) all had weak but positive correlations with BMI percentile. Yet, among the all the eating outcomes BMI was only correlated with junk food consumption (r=-0.098).

For females, four media types demonstrated weak negative correlations with sleep duration: social media, gaming, music and the Internet. Among these the strongest correlation was between music and sleep duration (r=-0.142). Fewer eating outcomes were correlated with sleep for females than males. Only junk food (r=-0.052) and fast food (r=-0.060) had weak negative correlations. Again there were differences in the correlations found in media use and physical activity for females. Music was positively correlated with physical activity (r=0.050) and there was a marginal negative correlation with social media (r=-0.041). Both of these were quite weak. Physical activity was correlated with fruit and vegetable consumption (r=0.207) but not the other eating outcomes. Finally, snacking while consuming media was correlated with all media and eating outcomes as well as BMI percentile, though in an unexpected direction (r=-0.116). That is, there was in inverse relationship between snacking on junk food while

consuming media and BMI. As frequency of snacking increased BMI percentile decreased, which is contrary to what would be expected.

Table 10: Media Type, Eating Behaviors, BMI Percentile, Sleep Duration, Physical Activity and Snacking While Consuming Media Correlation Matrix (Males)

	SM	TV	Gaming	Music	Internet	FV	SSB	Diet Soda	Junk Food	Fast Food	BMI Pct	Sleep	Physical Activity	Snacking
SM	1.000													
TV	**0.392 §**	1.000												
Gaming	**0.155 §**	**0.409 §**	1.000											
Music	**0.388 §**	**0.343 §**	**0.195 §**	1.000										
Internet	**0.431 §**	**0.456 §**	**0.346 §**	**0.297 §**	1.000									
FV	0.009	-0.024	**-0.096 §**	0.029	-0.019	1.000								
SSB	**0.159 §**	**0.163 §**	**0.073 ‡**	**0.131 §**	**0.077 ‡**	**0.115 §**	1.000							
Diet Soda	**0.060 †**	**0.075 ‡**	0.015	**0.050 †**	**0.064 †**	**0.110 §**	**0.238 §**	1.000						
Junk Food	**0.201 §**	**0.209 §**	**0.099 §**	**0.125 §**	**0.166 §**	**0.149 §**	**0.395 §**	**0.262 §**	1.000					
Fast Food	**0.183 §**	**0.228 §**	**0.116 §**	**0.137 §**	**0.158 §**	**0.057 ‡**	**0.350 §**	**0.250 §**	**0.459 §**	1.000				
BMI Pct	-0.008	0.016	0.001	0.042	0.018	0.015	-0.039	**0.064 ‡**	**-0.115 §**	**-0.073 ‡**	1.000			
Sleep	**-0.070 ‡**	**-0.060 †**	**-0.072 ‡**	**-0.124 §**	**-0.105 §**	**0.094 §**	**-0.088 §**	**-0.107 §**	**-0.085 §**	**-0.064 ‡**	-0.037	1.000		
Physical Activity	0.032	**-0.057 ‡**	**-0.137 §**	0.039 *	**-0.064 †**	**0.222 §**	**0.041 †**	**-0.053 ‡**	-0.010	-0.029	-0.030	**0.134 §**	1.000	
Snacking	**0.202 §**	**0.274 §**	**0.273 §**	**0.129 §**	**0.188 §**	**-0.132 §**	**0.134 §**	**0.054 ‡**	**0.309 §**	**0.211 §**	**-0.071 ‡**	**-0.093 §**	**-0.149 §**	1.000

Notes: All significant vales ($p \leq .05$) are bolded.
* $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Table 11: Media Type, Eating Behaviors, BMI Percentile, Sleep Duration, Physical Activity and Snacking While Consuming Media Correlation Matrix (Females)

	SM	TV	Gaming	Music	Internet	FV	SSB	Diet Soda	Junk Food	Fast Food	BMI Pct	Sleep	Physical Activity	Snacking
SM	1.000													
TV	**0.423 §**	1.000												
Gaming	**0.178 §**	**0.299 §**	1.000											
Music	**0.407 §**	**0.371 §**	**0.210 §**	1.000										
Internet	**0.457 §**	**0.403 §**	**0.263 §**	**0.327 §**	1.000									
FV	**-0.065 ‡**	**-0.050 †**	-0.007	0.002	-0.026	1.000								
SSB	**0.103 §**	**0.157 §**	**0.108 §**	**0.083 ‡**	**0.098 §**	**0.083 ‡**	1.000							
Diet Soda	**0.067 ‡**	**0.074 ‡**	**0.060 ‡**	**0.044 †**	**0.057 ‡**	**0.125 §**	**0.251 §**	1.000						
Junk Food	**0.150 §**	**0.195 §**	**0.154 §**	**0.103 §**	**0.140 §**	**0.127 §**	**0.378 §**	**0.195 §**	1.000					
Fast Food	**0.115 §**	**0.143 §**	**0.142 §**	**0.097 §**	**0.103 §**	**0.055 ‡**	**0.279 §**	**0.276 §**	**0.392 §**	1.000				
BMI Pct	**0.063 †**	0.039	0.008	**0.111 §**	**0.063 †**	-0.035	-0.024	0.035	**-0.098 §**	-0.005	1.000			
Sleep	**-0.081 ‡**	-0.009	**-0.062 †**	**-0.142 §**	**-0.119 §**	0.021	-0.024	-0.027	**-0.052 †**	**-0.060 ‡**	-0.022	1.000		
Physical Activity	-0.041 *	-0.015	-0.018	**0.050 †**	-0.017	**0.207 §**	0.005	-0.004	-0.022	-0.030	-0.013	0.026	1.000	
Snacking	**0.301 §**	**0.297 §**	**0.138 §**	**0.120 §**	**0.213 §**	**-0.143 §**	**0.172 §**	0.040 *	**0.338 §**	**0.218 §**	**-0.116 §**	-0.003	**-0.138 §**	1.000

Notes: All significant vales ($p \leq .05$) are bolded

* $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Regression Models

Gender-stratified regression models were run to predict eating outcomes and BMI percentile from media consumption while controlling for other forms of media, race/ethnicity, language use, female and male caregiver educational attainment, snacking, and sleep duration, physical activity. Results for each outcome are presented in turn.

Fruit and Vegetables

In Table 12, the model predicting fruit and vegetable consumption among males showed that each additional hour spent gaming was associated with consumption of fruits and vegetables fewer times in the previous week ($b=-0.211$; $p<.05$). Moreover, no other types of media use were associated with fruit and vegetable consumption. Potential mediators of the relationship between media consumption and eating behaviors were also associated with fruit and vegetable consumption. Snacking while consuming media more frequently was associated with eating fruit and vegetable fewer times in the past week ($b=-1.185$, $p<.001$) whereas more sleep ($b=0.599$, $p<.001$) and more days of physical activity ($b=1.215$, $p<.001$) were each associated with increased fruit and vegetable consumption in the past week. Some control variables were also associated with fruit and vegetable consumption. Specifically, being Latino was marginally associated with consuming fruit and vegetables fewer times in the past week ($b=-1.470$). Conversely, Spanish-only speakers ($b=1.656$, $p<.10$) or "Other" language speakers ($b=3.436$, $p<.01$) were both associated with consumption of fruit and vegetables more times in the previous week.

Among females, each additional hour spent on social media was marginally associated with fruit and vegetables being consumed fewer times in the previous week ($b=-0.160$, $p<.10$).

Individual-level health behaviors (i.e., potential mediators) were associated with fruit and vegetable consumption. More frequent snacking was associated with consuming fruit and vegetables less often (b=-1.256, p<.001). In contrast, additional days of physical activity was associated with eating fruit and vegetables more times in the previous week (b=1.101, p<.001). In terms of control variables, Spanish-only speakers (b=2.826, p<.001), having a female caregiver with some college education (b=0.267, p<.01), not knowing the female caregiver's highest educational attainment (b=2.167, p<.01), and having male caregiver with more than a college education (b=1.988, p<.05) were all also associated with fruit and vegetable consumption more times in the past week.

Sugar-Sweetened Beverages

In the model predicting sugar-sweetened beverages for males, social media (b=0.372, p<.01) and TV/movies/videos (b=0.163, p<.01) were associated with consuming sugar-sweetened beverage more often. Similarly, music (b=0.180, p<.10) was marginally associated with consumption of these beverages more times in the past week. All three potential mediators were also associated with sugar-sweetened beverage consumption. Snacking more often (b=0.617, p<.01) and more days of physical activity (b=0.221, p<.01) were each associated with drinking additional sugar-sweetened beverages where as each additional hour of sleep (b=-0.347, p<.01) was associated with a reduction in the number of times these beverages were consumed. In regards to control variables, as compared to White youth, Latino youth (b=1.403, p<.01), Black youth (b=2.246, p<.01) and youth who were two or more race/ethnicities (b=1.831, p<.01) had increased sugar-sweetened beverage consumption.

Each additional hour of gaming was associated with a small increase in the number of times sugar-sweetened beverages were consumed among females (b=0.117, p<.05). Likewise, TV/movies/videos (b=0.103, p<.10) were also marginally associated with increased consumption. Snacking while consuming media was the only individual-level health behavior associated with sugar-sweetened beverages (b=0.684, p<.001). Some control variables predicted sugar-sweetened beverage consumption including identifying as Black which was associated with drinking additional sugar beverages (b=1.549, p<.05) and speaking "other" language at home which was associated with a reduction in sugar-sweetened beverages (b=-1.074, p<.01).

Diet Soda

Among males, no forms of media use were associated with diet soda consumption. In this model, sleep duration was the only statistically significant independent variable. Specifically, each additional hour of sleep was associated with a 0.245 reduction in the number of diet sodas consumed (p<.05). Furthermore, identifying as Latino was marginally significant (b=-.497, p<.10). Among females, no variables in the model predicted diet soda consumption.

Junk Food

Social media (b=0.637, p<.01) and TV/movies/videos (b=0.233, p<.05) were both independently associated with increased consumption of junk food among male participants. However, time spent gaming was also marginally associated with decreased junk food intake (b=-.129, p<.10). Snacking while consuming media was associated with a large increase in the number of times junk food was consumed in the previous week (b=2.793, p<.001). Sleep duration also was marginally significant suggesting that more sleep is associated with less

consumption of this food category (b=-.327, p<.10). No socio-demographic characteristics predicted junk food consumption for males.

In the model predicting junk food consumption among females, both TV/movies/videos (b=0.164, p<.01) and gaming (b=0.394, p<.01) were associated increases in the number of times junk food was eaten during the last week. Similar to males, snacking while consuming media was associated with a substantial increase in the number of times junk food was consumed (b=3.187, p<.001) in the previous week while longer sleep duration was associated with less consumption of this these types of foods (b=-.313, p<.05). Latinos (b=-2.320, p<.05) and those who identified as being two or more racial/ethnic groups (b=-1.668, p<.10) had lower junk food consumption, although the latter was only marginally significant. Finally, having a female caregiver with at least some college relative to having a high school degree was associated with less consumption of junk foods (b=-1.479, p<.05).

Fast Food

Engaging with social media and watching TV/movies/videos were each associated with consumption of fast food among male participants. Specifically, each additional hour spent using social media was associated with a 0.153 increase in the number of times fast food was consumed (p<.01). Additional time viewing TV/movies/videos was actually associated with a small, but statistically significant, decrease in the number of times fast was food consumption (b=-0.014, p<.01). The only potential mediator associated with fast food consumption was snacking while consuming media. In this model it was associated with eating fast food more often (b=0.831, p<.001). Several control variables predicted fast food consumption. Latino youth (b=1.366, p<.05) and Black youth (b=0.246, p<.01) were each associated with increased fast

food intake while male caregiver educational attainment was negatively associated with the number of times fast food was consumed. Specifically having a college education as compared to high school degree was associated with a 0.965 decrease in the frequency of fast food consumption ($p<.05$). Other educational categories (i.e., more than college, "don't know") approached statistical significance.

Gaming was the only media type that predicted fast food consumption among females. Specifically, each additional hour spent gaming was associated with a 0.153 increase in the number of times fast food was consumed in the previous week ($p<.01$). Snacking also was associated with increased occurrences of fast food consumption ($b=0.748$, $p<.001$). Sleep duration was marginally associated with less fast food consumption. No control variables predicted fast food consumption for females.

BMI Percentile

No specific media types predicted the BMI percentile of male participants. Oddly, snacking while consuming media was associated with a sizeable reduction in BMI percentile ($b=-2.299$, $p<.01$). Several socio-demographics characteristics predicted BMI percentile: Latinos ($b=6.944$, $p<.001$), two or more race/ethnicity categories ($b=6.618$, $p<.01$), speaking both English and Spanish in the home ($b=3.498$, $p<.05$), and speaking "other" language ($b=5.491$, $p<.001$) were all associated with increased BMI percentile. Conversely, having a male caregiver with a college education as compared to a high school education was associated with a large decrease in BMI percentile ($b=6.000$, $p<.001$). Among females, no variables in the model predicted BMI percentile.

Table 12: Effects of Media Consumption, Demographic Controls, Snacking While Consuming Media, Sleep Duration, and Days of Physical Activity on Eating Behavior Outcomes and BMI Percentile

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Media Type												
Social Media	0.060 (0.180)	-0.160 (0.157) *	**0.372 (0.140) ‡**	-0.008 (0.095)	0.057 (0.056)	0.051 (0.038)	**0.637 (0.189) ‡**	0.049 (0.187)	**0.153 (0.047) ‡**	-0.007 (0.058)	-0.673 (0.528)	0.122 (0.561)
TV	0.040 (0.095)	-0.060 (0.036)	**0.163 (0.049) ‡**	0.103 (0.054) *	0.050 (0.031)	0.023 (0.019)	**0.233 (0.096) †**	**0.164 (0.059) ‡**	**-0.014 (0.037) ‡**	0.041 (0.029)	0.174 (0.330)	0.046 (0.134)
Gaming	**-0.221 (0.111) †**	0.150 (0.138)	-0.004 (0.049)	**0.117 (0.051) †**	-0.045 (0.029)	0.040 (0.030)	-0.129 (0.068) *	**0.394 (0.147) ‡**	0.111 (0.074)	**0.153 (0.050) ‡**	-0.081 (0.138)	-0.369 (0.231)
Music	0.369 (0.236)	0.157 (0.130)	0.180 (0.097) *	0.027 (0.086)	0.016 (0.078)	-0.001 (0.025)	0.109 (0.153)	0.075 (0.165)	0.069 (0.059)	0.065 (0.073)	0.526 (0.626)	1.784 (0.509)
Internet	0.053 (0.186)	0.094 (0.167)	-0.188 (0.126)	0.052 (0.099)	0.056 (0.055)	0.021 (0.041)	0.239 (0.154)	0.089 (0.118)	0.680 (0.332)	0.019 (0.047)	0.361 (0.603)	1.131 (0.451)
Race/Ethnicity												
Latino	-1.470 (0.824) *	-1.228 (0.782)	**1.403 (0.488) ‡**	0.511 (0.433)	-0.497 (0.300) *	-0.167 (0.275)	-0.558 (0.805)	**-2.320 (0.979) †**	**1.366 (0.769) †**	0.001 (0.460)	**6.944 (1.982) §**	2.458 (2.638)
Black	-0.106 (1.443)	-0.465 (1.038)	**2.246 (0.689) ‡**	**1.549 (0.755) †**	0.147 (0.570)	0.098 (0.339)	-1.054 (1.268)	0.080 (1.749)	0.643 (0.554) *	0.881 (0.750)	0.500 (4.526)	5.589 (3.151)
Two or more	0.117 (1.042)	-0.333 (1.001)	**1.831 (0.617) ‡**	0.465 (0.669)	-0.159 (0.309)	-0.216 (0.229)	0.176 (0.602)	-1.668 (0.986) *	0.397 (0.387)	-0.037 (0.358)	**6.618 (2.546) ‡**	-0.771 (4.722)
Other	0.106 (1.126)	-0.176 (0.947)	0.652 (0.615)	0.087 (0.409)	-0.235 (0.412)	0.061 (0.299)	0.488 (0.878)	-0.833 (1.463)	-0.269 (0.376)	-0.118 (0.336)	3.683 (3.016)	-9.161 (5.319)
Language Use												
Spanish-only	1.656 (0.849) *	**2.826 (0.889) §**	0.175 (0.513)	-0.024 (0.449)	-0.137 (0.155)	0.853 (0.505)	-0.271 (0.757)	-0.339 (0.712)	-0.193 (0.467)	0.680 (0.595)	0.622 (1.991)	3.227 (3.588)
English + Spanish	0.917 (0.684)	0.466 (0.666)	0.378 (0.403)	0.189 (0.223)	-0.015 (0.299)	-0.032 (0.181)	-0.583 (0.495)	-0.110 (0.898)	0.342 (0.661)	0.360 (0.328)	**3.498 (1.716) †**	2.817 (1.263)
Other language	**3.436 (1.054) ‡**	0.805 (1.119)	-0.508 (0.431)	**-1.074 (0.328) ‡**	-0.396 (0.327)	-0.265 (0.214)	-0.271 (1.068)	-0.643 (0.675)	-0.439 (0.390)	-0.111 (0.337)	**5.491 (2.701) †**	3.038 (2.861)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Female Caregiver Educational Attainment												
< HS	-0.186	-0.432	-0.404	0.024	0.156	-0.511	-0.195	-0.484	-0.354	-0.190	-0.557	1.130
	(0.893)	(0.896)	(0.476)	(0.425)	(0.392)	(0.132)	(0.954)	(0.721)	(0.452)	(0.244)	(3.328)	(2.313)
Some	-0.346	**0.267**	-0.538	0.017	-0.052	0.074	0.360	**-1.479**	-0.043	-0.234	-2.983	7.022
College	(1.084)	**(0.795)** ‡	(0.424)	(0.354)	(0.267)	(0.372)	(0.835)	**(0.742)** †	(0.320)	(0.243)	(2.621)	(2.646)
College	-0.078	2.158	0.493	-0.241	-0.222	-0.222	0.923	-0.751	-0.234	0.100	-3.362	-2.964
	(0.808)	(0.790)	(0.482)	(0.371)	(0.245)	(0.146)	(0.864)	(0.980)	(0.497)	(0.279)	(2.145)	(1.361)
>College	0.914	1.377	-0.316	0.461	-0.204	-0.262	0.831	0.098	0.198	0.120	-1.475	-2.691
	(1.326)	(0.927)	(0.778)	(0.533)	(0.282)	(0.157)	(1.133)	(1.014)	(0.328)	(0.352)	(4.257)	(2.974)
Don't	-0.280	**2.167**	-0.213	0.424	0.282	-0.082	-0.402	0.432	-0.441	0.634	-4.503	0.706
know	(1.004)	**(0.880)** †	(0.486)	(0.288)	(0.334)	(0.212)	(0.820)	(0.862)	(0.444)	(0.479)	(4.008)	(3.398)
Male Caregiver Educational Attainment												
< HS	-1.660	-0.261	0.201	0.335	-0.041	-0.067	0.190	0.162	-0.293	0.273	3.673	2.783
	(1.056)	(0.662)	(0.338)	(0.452)	(0.322)	(0.124)	(0.649)	(0.721)	(0.339)	(0.276)	(3.126)	(3.272)
Some	0.397	-0.388	0.509	-0.386	-0.191	-0.314	0.450	0.494	-0.678	0.010	-1.585	-6.911
College	(0.937)	(0.688)	(0.490)	(0.310)	(0.335)	(0.186)	(0.669)	(0.881)	(0.291)	(0.367)	(2.876)	(2.167)
College	0.301	0.269	0.799	-0.200	-0.136	-0.102	0.835	0.185	**-0.965**	-0.341	**-6.000**	0.049
	(0.713)	(0.987)	(0.566)	(0.403)	(0.294)	(0.236)	(1.011)	(0.765)	**(0.497)** †	(0.261)	**(1.155)** §	(2.220)
>College	0.722	**1.988**	0.319	-0.333	0.043	-0.191	0.264	1.026	-0.657	-0.482	-5.759	-3.471
	(1.785)	**(0.943)** †	(0.555)	(0.500)	(0.461)	(0.207)	(0.709)	(0.819)	(0.385) *	(0.491)	(4.067)	(1.178)
Don't	-0.171	-1.434	0.776	0.017	-0.235	-0.107	1.129	-0.192	-0.106	-0.213	0.754	-1.918
know	(0.752)	(1.058)	(0.625)	(0.254)	(0.489)	(0.223)	(0.696)	(0.675)	(0.145) *	(0.422)	(3.379)	(2.488)
Individual Behaviors												
Snacking	**-1.185**	**-1.256**	**0.617**	**0.684**	0.089	0.038	**2.793**	**3.187**	**0.831**	**0.748**	**-2.299**	-4.368
	(0.335) §	**(0.211)** §	**(0.181)** ‡	**(0.139)** §	(0.117)	(0.071)	**(0.335)** §	**(0.319)** §	**(1.374)** §	**(0.146)** §	**(0.835)** ‡	(0.832)
Sleep	**0.599**	0.314	**-0.347**	-0.083	**-0.245**	-0.043	-0.327	**-0.313**	0.007	-0.159	-0.837	-0.332
(hours)	**(0.157)** §	(0.195)	**(0.116)** ‡	(0.064)	**(0.097)** †	(0.044)	(0.194) *	**(0.159)** †	(0.050)	(0.096) *	(0.661)	(0.552)
Physical	**1.215**	**1.101**	**0.221**	0.081	-0.073	0.004	0.151	0.099	0.744	0.013	-0.567	-0.453
activity	**(0.128)** §	**(0.130)** §	**(0.077)** ‡	(0.062)	(0.053)	(0.029)	(0.112)	(0.110)	(0.162)	(0.044)	(0.423)	(0.317)
Constant	**7.664**	10.063	1.950	0.619	**3.110**	0.753	3.466	**5.026**	0.153	0.920	**75.688**	73.751
	(1.438) §	(1.689)	(1.091) *	(0.978)	**(1.078)** ‡	(0.515)	(2.042) *	**(1.963)** §	(0.047)	(0.935)	**(9.011)** §	(4.070)
Model Statistics												
R2	0.083	0.074	0.070	0.062	0.027	0.023	0.137	0.144	0.095	0.080	0.050	0.089

Notes: All significant vales ($p \leq .05$) are bolded

Reference categories: Female=Male; Race/Ethnicity=White; Language use=English-only; Female and Male Caregiver Educational Attainment=High School

* $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Path Analysis

This section reports the findings of path models to test for mediation. Gender-stratified path models were run to estimate the magnitude and significance of hypothesized relationships between types of media consumption, individual level health behaviors (i.e., snacking while consuming media, sleep duration, physical activity), and eating behaviors. Results for each mediator are presented successively.

Evaluating Snacking While Consuming Media as a Potential Mediator

Fruits and Vegetables

For male students, the only specific type of media that had a statistically significant direct effect on fruit and vegetable consumption was gaming ($b=-0.221$, $p<.05$) (See Table 13). However, tests of indirect paths between media use and fruit and vegetable consumption revealed that there was a significant indirect path from social media use (indirect effect=-0.091, $p<.01$), TV/movies/videos (indirect effect=-0.043, $p<.01$), and gaming (indirect effect=-0.064, $p<.001$) to fruit and vegetable consumption through snacking frequency. Additional time spent interacting with social media, watching TV/movies/videos, and gaming were associated with snacking on junk food more frequently, which in turn was associated with eating fruit and vegetable fewer times in the past week.

For female students, none of the specific types of media had a significant direct effect with fruit and vegetable consumption; however, TV/movies/videos approached significance ($b=-0.060$, $p<.10$). There were significant indirect paths from social media (indirect effect=-0.147, $p<.001$), TV/movies/videos (indirect effect=0.054, $p<.001$), music (indirect effect=0.038, $p<.05$), and the Internet (indirect effect=-0.032, $p<.05$) to fruit and vegetable consumption through snacking frequency. Additionally, there was a marginally

significant indirect path from gaming (indirect effect=-0.019, p<.10). For social media, TV/movies/videos, gaming, and the Internet, more time spent using these forms of media was associated with increased snacking, and increased snacking then predicted fruit and vegetable consumption less often during the past week. Music had a different relationship to snacking. Additional time spent listening to music was associated with less frequent snacking.

Sugar-Sweetened Beverages

Social media (b=0.372, p<.01) and TV/movies/videos (b=0.163, p<.01) both had a direct relationship with consumption of sugar-sweetened beverages for male participants. Indirect paths from social media (indirect effect=0.047, p<.01), TV/movies/videos (indirect effect= 0.022, p<.01), and gaming (indirect effect=0.033, p<.01) to sugar-sweetened beverages through snacking were significant. Similar to the pattern found for fruit and vegetable consumption, more time spent using these types of media was associated with increased snacking frequency, while more frequent snacking was associated with increased consumption of these beverages.

Among the female students, there was only a significant direct effect from gaming to sugar-sweetened beverages (b=0.117, p<.05). The direct relationship between TV/movies/videos and sugar-sweetened beverages was marginally significant (b=0.103, p<.10). Although there were limited significant direct effects, indirect paths between social media (indirect effect=0.080, p<.001), TV/movies/videos (indirect effect=0.030, p<.01), gaming (indirect effect=0.011, p<.05), and music (indirect effect=-0.020, p<.05) to sugar-sweetened beverages through snacking were found. Additionally, there was a marginally significant indirect path from the Internet to sugar-sweetened beverages through snacking (indirect effect=0.017, p<.10). With the exception of music, more time spent using these other forms of media was associated with increased snacking,

and increased snacking was associated with increased sugar-sweetened beverage consumption. Conversely, for music there was an inverse relationship between time spent listening to music and snacking frequency.

Diet Soda

No statistically significant direct relationships between media use and diet soda consumption were detected for either males or females. Furthermore, no significant indirect paths were found through snacking for either males or females.

Junk Food

I did not assess whether there were indirect paths from the different media types to junk food consumption through snacking while consuming media because the snacking question specifically asked about junk food consumption. Thus, these foods would have been on both sides of the equation. This is the only portion of the dissertation not to look at junk food consumption as an outcome.

Fast Food

Parallel to what was found for sugar-sweetened beverages, social media ($b=0.228$, $p<.01$) and TV/movies/videos ($b=0.153$, $p<.01$) both had a direct relationship to fast food consumption among male students. Moreover, there was evidence of mediation for social media (indirect effect=0.057, $p<.001$), TV/movies/videos (indirect effect=0.027, $p<.001$) as well as gaming (indirect effect=0.040, $p<.01$). In other words, using these types of media predicted more frequent snacking and more frequent snacking then predicted consuming fast food more often.

Also like sugar-sweetened beverages for female participants, gaming was the only form of media to have a significant direct association with fast food consumption (b=0.153, p<.01). However, indirect paths from social media (indirect effect=0.087, p<.001), TV/movies/videos (indirect effect=0.032, p<.001), and music (indirect effect=-0.023, p<.01) to fast food consumption through snacking were found to be significant. A marginally significant indirect path was also found for gaming (indirect effect=0.012, p<.10). Besides music, time spent with these forms of media was associated with increased snacking, which in turn was associated with increased fast food consumption. Once again, music was associated with less frequent snacking.

BMI Percentile

Among male participants, no direct relationships between any type of media use and BMI percentile were found. Indirect paths were established for social media (indirect effect=-0.195, p<.001), TV/movies/videos (indirect effect=-0.077, p<.05), and gaming (indirect effect=-0.112). In this model, increased time spent using these forms of media were associated with increased snacking frequency, but paradoxically, increased snacking was associated with substantial decreases in BMI percentile.

Direct relationships were found between music (b=1.965, p<.001) and the Internet (b=1.003, p<.05) and BMI percentile for female students. Indirect paths from social media (indirect effect=-0.605, p<.001), TV/movies/videos (indirect effect=-0.206, p<.05), music (indirect effect=0.181, p<.05), and the Internet (indirect effect=-0.128, p<.05) were all significant. Media use (except music) was associated with increased snacking, and for a second time, snacking while consuming media was then associated with lower BMI percentile.

Table 13: The mediating effect of snacking on eating behaviors and BMI percentile by media type

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Social Media										
a	**0.077 (0.011) §**	**0.117 (0.013) §**	**0.077 (0.011) §**	**0.116 (0.013) §**	**0.077 (0.011) §**	**0.116 (0.013) §**	**0.077 (0.011) §**	**0.117 (0.013) §**	**0.085 (0.014) §**	**0.139 (0.011) §**
b	**-1.185 (0.335) §**	**-1.256 (0.211) §**	**0.617 (0.181) ‡**	**0.684 (0.139) §**	0.089 (0.117)	0.038 (0.071)	**0.744 (0.162) §**	**0.748 (0.146) §**	**-2.299 (0.835) ‡**	**-4.368 (0.550) §**
Total Effect	-0.031 (0.184)	**-0.306 (0.155) †**	**0.420 (0.140) ‡**	0.072 (0.093)	0.064 (0.055)	0.056 (0.041)	**0.285 (0.086) ‡**	0.080 (0.057)	-0.868 (0.548)	-0.484 (0.550)
Indirect Effect	**-0.091 (0.027) ‡**	**-0.147 (0.032) §**	**0.047 (0.015) ‡**	**0.080 (0.013) §**	0.007 (0.009)	0.004 (0.008)	**0.057 (0.015) §**	**0.087 (0.015) §**	**-0.195 (0.054) §**	**-0.605 (0.090) §**
Direct Effect	0.060 (0.180)	-0.160 (0.157)	**0.372 (0.140) ‡**	-0.008 (0.095)	0.057 (0.056)	0.051 (0.038)	**0.228 (0.084) ‡**	-0.007 (0.058)	-0.673 (0.528)	-0.484 (0.550)
TV/Movies										
a	**0.036 (0.007) §**	**0.043 (0.009) §**	**0.036 (0.007) §**	**0.043 (0.009) §**	**0.036 (0.007) §**	**0.043 (0.009) §**	**0.036 (0.007) §**	**0.043 (0.009) §**	**0.034 (0.008) §**	**0.047 (0.014) ‡**
b	**-1.185 (0.335) §**	**-1.256 (0.211) §**	**0.617 (0.181) ‡**	**0.684 (0.139) §**	0.089 (0.117)	0.038 (0.071)	**0.744 (0.162) §**	**0.748 (0.146) §**	**-2.299 (0.835) ‡**	**-4.368 (0.550) §**
Total Effect	-0.003 (0.095)	**-0.114 (0.041) ‡**	**0.186 (0.049) §**	**0.132 (0.048) ‡**	0.053 (0.031)	0.025 (0.018)	**0.180 (0.050) §**	**0.073 (0.028) ‡**	0.097 (0.322)	-0.161 (0.145)
Indirect Effect	**-0.043 (0.016) ‡**	**0.054 (0.015) §**	**0.022 (0.008) ‡**	**0.030 (0.009) ‡**	0.003 (0.004)	0.002 (0.003)	**0.027 (0.006) §**	**0.032 (0.006) §**	**-0.077 (0.038) †**	**-0.206 (0.091) †**
Direct Effect	0.040 (0.095)	-0.060 (0.036) *	**0.163 (0.049) ‡**	0.103 (0.054) *	0.050 (0.031)	0.023 (0.019)	**0.153 (0.047) ‡**	0.041 (0.029)	0.174 (0.330)	-0.161 (0.145)
Gaming										
a	**0.054 (0.010) §**	**0.015 (0.008) †**	**0.054 (0.010) §**	**0.016 (0.008) †**	**0.054 (0.010) §**	**0.016 (0.007) †**	**0.054 (0.010) §**	**0.016 (0.007) †**	**0.049 (0.009) §**	**0.006 (0.010)**
b	**-1.185 (0.335) §**	**-1.256 (0.211) §**	**0.617 (0.181) ‡**	**0.684 (0.139) §**	0.089 (0.117)	0.038 (0.071)	**0.744 (0.162) §**	**0.748 (0.146) §**	**-2.299 (0.835) ‡**	**-4.368 (0.550) §**
Total Effect	**-0.285 (0.109) ‡**	0.131 (0.136)	0.030 (0.052)	**0.128 (0.052) †**	-0.040 (0.029)	0.041 (0.029)	0.027 (0.043)	**0.166 (0.050) ‡**	-0.193 (0.148)	-0.394 (0.233)
Indirect Effect	**-0.064 (0.014) §**	-0.019 (0.010) *	**0.033 (0.011) ‡**	**0.011 (0.005) †**	0.005 (0.006)	0.001 (0.001)	**0.040 (0.013) ‡**	0.012 (0.006) *	**-0.112 (0.038) ‡**	-0.025 (0.045)
Direct Effect	**-0.221 (0.111) †**	0.150 (0.138)	-0.004 (0.049)	**0.117 (0.051) †**	-0.045 (0.029)	0.040 (0.030)	-0.014 (0.037)	**0.153 (0.050) †**	-0.081 (0.138)	-0.394 (0.233)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Music										
a	0.000 (0.015)	**-0.030 (0.014) †**	0.000 (0.016)	**-0.030 (0.014) †**	-0.000 (0.016)	**-0.030 (0.014) †**	0.000 (0.016)	**-0.030 (0.014) †**	-0.018 (0.013)	**-0.042 (0.020) †**
b	**-1.185 (0.335) §**	**-1.256 (0.211) §**	**0.617 (0.181) ‡**	**0.684 (0.139) §**	0.089 (0.117)	0.038 (0.071)	**0.744 (0.162) §**	**0.748 (0.146) §**	**-2.299 (0.835) ‡**	**-4.368 (0.550) §**
Total Effect	0.370 (0.226)	0.195 (0.116)	0.180 (0.096) *	0.006 (0.085)	0.016 (0.079)	-0.001 (0.025)	0.112 (0.076)	0.042 (0.075)	0.568 (0.616)	**1.965 (0.493) §**
Indirect Effect	0.001 (0.018)	**0.038 (0.019) †**	0.000 (0.010)	**-0.020 (0.010) †**	-0.000 (0.001)	-0.001 (0.002)	0.000 (0.012)	**-0.023 (0.009) ‡**	0.042 (0.035)	**0.181 (0.089) †**
Direct Effect	0.369 (0.236)	0.157 (0.130)	0.180 (0.097) *	0.027 (0.086)	0.016 (0.078)	-0.001 (0.025)	0.111 (0.074)	0.065 (0.073)	0.526 (0.626)	**1.965 (0.493) §**
Internet										
a	-0.002 (0.013)	**0.026 (0.012) †**	-0.003 (0.013)	**0.025 (0.012) †**	-0.003 (0.013)	**0.025 (0.012) †**	-0.003 (0.013)	**0.025 (0.012) †**	0.012 (0.012)	**0.029 (0.014) †**
b	**-1.185 (0.335) §**	**-1.256 (0.211) §**	**0.617 (0.181) ‡**	**0.684 (0.139) §**	0.089 (0.117)	0.038 (0.071)	**0.744 (0.162) §**	**0.748 (0.146) §**	**-2.299 (0.835) ‡**	**-4.368 (0.550) §**
Total Effect	0.055 (0.188)	0.062 (0.167)	-0.190 (0.126)	0.069 (0.104)	0.056 (0.055)	0.022 (0.041)	0.067 (0.061)	0.038 (0.051)	0.332 (0.599)	**1.003 (0.455) †**
Indirect Effect	0.003 (0.015)	**-0.032 (0.016) †**	-0.002 (0.008)	0.017 (0.010) *	-0.000 (0.001)	0.001 (0.002)	-0.002 (0.010)	0.019 (0.011)	-0.028 (0.033)	**-0.128 (0.052) †**
Direct Effect	0.053 (0.186)	0.094 (0.167)	-0.188 (0.126)	0.052 (0.099)	0.056 (0.055)	0.021 (0.041)	0.069 (0.059)	0.019 (0.047)	0.361 (0.603)	**1.003 (0.455) †**

Notes: Analyses control for race/ethnicity, language use at home, female caregiver educational attainment, male caregiver educational attainment, hours of sleep, days of physical activity, and other types of media.
a= IV -> M; b= M -> DV
Indirect Effect = a*b; Direct Effect =Total Effect - Indirect Effect; Total Effect = Direct Effect + Indirect Effect
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Evaluating Sleep Duration as a Potential Mediator

Fruit and Vegetables

As shown in Table 14 there was a significant, negative direct relationship between gaming and fruit and vegetable consumption among males (b=-0.221, p<.05). No other media types were associated with this dietary outcome. However, an indirect path from music to consumption of fruits and vegetables through sleep duration was significant (indirect effect=-0.061, p<.001), despite there not being a statistically significant direct relationship. Music consumption was negatively associated with sleep duration, and more sleep predicted additional fruit and vegetable consumption.

For females, there were no significant direct relationships between any media type and fruit and vegetable consumption. A marginally significant indirect path was seen from music to fruit and vegetable consumption by way of sleep duration (indirect effect=-0.034, p<.10). In this model, more time spent listening to music predicted less sleep. However, the relationship between sleep duration and fruit and vegetable consumption was not significant.

Sugar-Sweetened Beverages

Social media (b=0.372, p<.01) and TV/movies/videos (b=0.163, p<.01) both had independent direct relationships with sugar-sweetened beverage consumption among male participants. Additionally, music had a marginally significant direct effect (b=0.180, p<.10). Indirect paths were detected from music (indirect effect=0.035, p<.01) and the Internet (indirect effect=0.019, p<.05) to sugar-sweetened beverage consumption through sleep duration. Here greater amounts of music consumption and more time spent using the Internet were associated

with reduced sleep quantity while more sleep was associated with consumption of sugar-sweetened beverages fewer times in the previous week.

Among females, gaming was the only media type to have a statistically significant direct relationship to sugar-sweetened beverage consumption ($b=0.117$, $p<.05$). TV/movies/videos had marginally significant association ($b=0.103$, $p<.10$). No significant indirect paths were found for any of the media types through sleep duration.

Diet Soda

No statistically significant direct relationships between media use and diet soda consumption were detected for either males or females. However, for males only, there was a significant indirect path from music to diet soda consumption through hours of sleep (indirect effect=0.025, $p<.01$). Additional time spent listening to music was associated with less sleep and more sleep was associated with consuming diet soda a fewer number of times in the past week.

Junk Food

Two forms of media had direct associations with junk food consumption for males: social media ($b=0.637$, $p<.01$) and TV/movies/videos ($b=0.233$, $p<.05$). Incidentally, gaming was marginally significant ($b=-0.129$, $p<.01$). Although the relationship between music and junk food consumption was not significant, there was an indirect path through sleep duration (indirect effect=0.033, $p<.05$). In this model more time spent listening to music predicted a shorter sleep duration, but the relationship between sleep quantity and junk food consumption was not significant.

Among females, there were direct relationships between TV/movies/videos (b=0.164, p<.01) and gaming (b=0.394, p<.01) and the number of times junk food was consumed in the previous week. Sleep duration had an indirect effect on associations between time spent watching TV/movies/videos and consumption of junk food (indirect effect=-0.010, p<.05). Oddly, TV/movies/videos was associated with more sleep, which in turn was associated with less consumption of junk food.

Fast Food

For males only, there were significant direct effects of engaging with social media (b=0.228, p<.01) and viewing TV/movies/videos (b=0.153, p<.01) on fast food consumption. No significant indirect paths were found through snacking for either males or females.

BMI percentile

No statistically significant direct relationships between media use and BMI percentile were detected for male participants. Furthermore, no significant indirect paths were found through snacking.

Time spent listening to music (b=1.784, p<.001) and using the Internet (b=1.131, p<.05) each had a direct and positive association to BMI percentile for females. No indirect effects through sleep duration were found.

Table 14: Mediating effect of sleep duration on eating behaviors and BMI percentile by media type

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Social Media												
	-0.003	-0.024	-0.004	-0.024	-0.003	-0.024	-0.003	-0.024	-0.003	-0.024	-0.013	-0.019
a	(0.033)	(0.015)	(0.033)	(0.015)	(0.033)	(0.015)	(0.033)	(0.015)	(0.033)	(0.015)	(0.037)	(0.021)
	0.599	0.314	**-0.347**	-0.083	**-0.245**	-0.043	-0.327	**-0.313**	-0.106	-0.159	-0.837	-0.332
b	(0.157) §	(0.195)	**(0.116)** ‡	(0.064)	**(0.097)** †	(0.044)	(0.194)	**(0.159)** †	(0.145)	(0.096)	(0.661)	(0.552)
Total	0.058	-0.167	0.374	-0.006	0.058	0.052	**0.638**	0.057	**0.228**	-0.003	-0.663	0.128
Effect	(0.187)	(0.160)	(0.133) ‡	(0.054)	(0.055)	(0.038)	**(0.187)** ‡	(0.186)	**(0.082)** ‡	(0.058)	(0.527)	(0.562)
Indirect	-0.002	-0.008	0.001	0.002	0.001	0.001	0.001	0.008	0.000	0.004	0.010	0.006
Effect	(0.020)	(0.008)	(0.011)	(0.002)	(0.008)	(0.001)	(0.011)	(0.004)	(0.004)	(0.003)	(0.028)	(0.008)
Direct	0.060	-0.160	**0.372**	-0.008	0.057	0.051	**0.637**	0.049	**0.228**	-0.007	-0.673	0.122
Effect	(0.180)	(0.157)	**(0.140)** ‡	(0.095)	(0.056)	(0.038)	**(0.189)** ‡	(0.187)	**(0.084)** ‡	(0.059)	(0.528)	(0.561)
TV/Movies												
	0.013	**0.031**	0.013	**0.031**	0.013	**0.031**	0.013	**0.031**	0.013	**0.031**	**0.040**	**0.022**
a	(0.013)	**(0.008)** §	(0.013)	**(0.008)** §	(0.013)	**(0.008)** §	(0.013)	**(0.008)** §	(0.013)	**(0.008)** §	**(0.010)** §	**(0.008)** ‡
	0.599	0.314	**-0.347**	-0.083	**-0.245**	-0.043	-0.327	**-0.313**	-0.106	-0.159	-0.837	-0.332
b	**(0.157)** §	(0.195)	**(0.116)** ‡	(0.064)	**(0.097)** †	(0.044)	(0.194)	**(0.159)** †	(0.145)	(0.096)	(0.661)	(0.552)
Total	0.048	-0.051	**0.159**	0.100	0.047	0.022	**0.229**	0.154	**0.152**	0.158	0.142	0.038
Effect	(0.096)	(0.034)	**(0.047)** ‡	(0.054) *	(0.029)	(0.020)	**(0.098)** †	(0.061)	**(0.048)** ‡	(0.031)	(0.321)	(0.136)
Indirect	0.008	0.010	-0.005	-0.003	-0.003	-0.001	-0.004	**-0.010**	-0.001	-0.005	-0.033	-0.007
Effect	(0.009)	(0.006)	(0.004)	(0.002)	(0.003)	(0.001)	(0.005)	**(0.004)** †	(0.003)	(0.003)	(0.024)	(0.012)
Direct	0.040	-0.060	**0.163**	0.103	0.050	0.023	**0.233**	**0.164**	**0.153**	0.041	0.175	0.046
Effect	(0.095)	(0.036)	**(0.049)** ‡	(0.054) *	(0.031)	(0.020)	**(0.096)** †	**(0.059)** ‡	**(0.047)** ‡	(0.029)	(0.330)	(0.134)
Gaming												
	-0.004	**-0.026**	-0.004	**-0.026**	-0.004	**-0.026**	-0.004	**-0.026**	-0.004	**-0.026**	-0.006	**-0.032**
a	(0.012)	**(0.008)** ‡	(0.012)	**(0.008)** ‡	(0.012)	**(0.008)** §	(0.012)	**(0.008)** ‡	(0.012)	**(0.008)** §	(0.008)	**(0.008)** §
	0.599	0.314	**-0.347**	-0.083	**-0.245**	-0.043	-0.327	**-0.313**	-0.106	-0.159	-0.837	-0.332
b	**(0.157)** §	(0.195)	**(0.116)** ‡	(0.064)	**(0.097)** †	(0.044)	(0.194)	**(0.159)** †	(0.145)	(0.096)	(0.661)	(0.552)
Total	**-0.223**	0.142	-0.002	**0.120**	-0.044	0.041	-0.128	**0.402**	-0.013	**0.158**	-0.075	-0.358
Effect	**(0.110)** †	(0.141)	(0.050)	**(0.051)** †	(0.030)	(0.029)	(0.070) *	**(0.148)** ‡	(0.037)	**(0.051)** ‡	(0.131)	(0.235)
Indirect	-0.002	-0.008	0.002	0.002	0.001	0.001	0.001	0.008	0.000	0.004	0.005	0.011
Effect	(0.007)	(0.006)	(0.004)	(0.002)	(0.003)	(0.001)	(0.004)	(0.005)	(0.001)	(0.003)	(0.009)	(0.018)
Direct	**-0.221**	0.150	-0.004	**0.117**	-0.045	0.040	-0.129	**0.394**	-0.014	0.153	-0.081	-0.369
Effect	**(0.111)** †	(0.139)	(0.049)	**(0.051)** †	(0.029)	(0.030)	(0.068) *	**(0.147)** ‡	(0.037)	(0.050)	(0.138)	(0.232)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Music												
a	**-0.102 (0.016) §**	**-0.108 (0.018) §**	**-0.102 (0.016) §**	**-0.108 (0.018) §**	**-0.102 (0.016) §**	**-0.108 (0.018) §**	**-0.101 (0.016) §**	**-0.108 (0.018) §**	**-0.102 (0.016) §**	**-0.108 (0.018) §**	**-0.111 (0.025) §**	**-0.083 (0.025) ‡**
b	**0.599 (0.157) §**	0.314 (0.195)	**-0.347 (0.116) ‡**	-0.083 (0.064)	**-0.245 (0.097) †**	-0.043 (0.044)	-0.327 (0.194)	**-0.313 (0.159) †**	-0.106 (0.145)	-0.159 (0.096)	-0.837 (0.661)	-0.332 (0.552)
Total Effect	0.308 (0.235)	0.123 (0.125)	**0.215 (0.100) †**	0.036 (0.086)	0.041 (0.077)	0.004 (0.025)	0.143 (0.156)	0.109 (0.167)	0.122 (0.072) *	0.082 (0.069)	0.619 (0.637)	**1.811 (0.493) §**
Indirect Effect	**-0.061 (0.017) §**	-0.034 (0.020) *	**0.035 (0.013) ‡**	0.009 (0.007)	**0.025 (0.008) ‡**	0.005 (0.005)	**0.033 (0.017) †**	0.034 (0.017) *	0.011 (0.014)	0.017 (0.011)	0.093 (0.087)	0.028 (0.048)
Direct Effect	0.369 (0.236)	0.157 (0.130)	0.180 (0.097) *	0.027 (0.086)	0.016 (0.078)	-0.001 (0.025)	0.109 (0.153)	0.075 (0.165)	0.111 (0.074)	0.065 (0.073)	0.527 (0.626)	**1.784 (0.509) §**
Internet												
a	-0.056 (0.031) *	**-0.073 (0.008) §**	-0.055 (0.031) *	**-0.073 (0.008) §**	-0.057 (0.031) *	**-0.073 (0.008) §**	-0.057 (0.031) *	**-0.073 (0.008) §**	-0.057 (0.031) *	**-0.073 (0.008) §**	-0.053 (0.041)	**-0.064 (0.009) §**
b	**0.599 (0.157) §**	0.314 (0.195)	**-0.347 (0.116) ‡**	-0.083 (0.064)	**-0.245 (0.097) †**	-0.043 (0.044)	-0.327 (0.194)	**-0.313 (0.159) †**	-0.106 (0.145)	-0.159 (0.096)	-0.837 (0.661)	-0.332 (0.552)
Total Effect	0.019 (0.170)	0.071 (0.157)	-0.169 (0.129)	0.058 (0.100)	0.070 (0.055)	0.024 (0.042)	0.258 (0.154)	0.112 (0.113)	0.075 (0.060)	0.031 (0.028)	0.405 (0.591)	**1.152 (0.444) ‡**
Indirect Effect	-0.034 (0.022)	-0.023 (0.016)	**0.019 (0.010) †**	0.006 (0.005)	0.014 (0.008)	0.003 (0.003)	0.019 (0.013)	0.023 (0.013) *	0.006 (0.007)	0.012 (0.008)	0.044 (0.035)	0.021 (0.036)
Direct Effect	0.053 (0.186)	0.094 (0.167)	-0.188 (0.126)	0.052 (0.099)	0.056 (0.055)	0.021 (0.041)	0.239 (0.154)	0.089 (0.118)	0.069 (0.059)	0.019 (0.047)	0.361 (0.603)	**1.131 (0.451) †**

Notes: Analyses control for race/ethnicity, language use at home, female caregiver educational attainment, male caregiver educational attainment, frequency of snacking, days of physical activity, and other types of media.
a= IV -> M; b= M -> DV
Indirect Effect = a*b; Direct Effect =Total effect - Indirect Effect; Total Effect = Direct Effect + Indirect Effect
All significant vales ($p \leq .05$) are bolded; $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Evaluating Physical Activity as a Potential Mediator

Fruit and Vegetables

As shown in Table 15 there was a significant, negative relationship between gaming and consuming fruit and vegetables among males (b=-0.221, p<.05). No other media types had a direct relationship with this dietary outcome. Indirect paths from social media (indirect effect=0.101, p<.05), gaming (indirect effect=-0.071, p<.001), and music (indirect effect=0.118, p<.001) to fruit and vegetable consumption by way of days of physical activity were significant. More time spent using social media and listening to music was associated with increased physical activity, and more days of physical activity was then associated with increased fruit and vegetable consumption. Gaming, however, had an inverse relationship with physical activity.

There was a marginally significant direct effect from TV/movies/videos to fruit and vegetable consumption among females (b= -0.056, p<.10). Similar to males, days of physical activity had an indirect effect on the association between time spent listening to music and consumption of fruit and vegetables (indirect effect=0.093, p<.05). Again, more music predicted increased physical activity, and more physical activity predicted increased fruit and vegetable intake.

Sugar-Sweetened Beverages

For male participants, there were statistically significant direct effects from social media (b=0.371, p<.01) and TV/movies/videos (b=0.163, p<.01) to the number of sugar-sweetened beverages consumed during the last week. The relationship between music and sugar-sweetened beverage consumption approached significance (b=0.183, p<.10). Like what was found for fruits

and vegetables, there were indirect paths to sugar sweetened-beverage consumption from social media (indirect effect=0.018, $p<.05$), gaming (indirect effect=-0.013, $p<.05$), and music (indirect effect=0.022, $p<.01$) through physical activity. Both social media and music were associated with additional physical activity, which then was associated with increased sugar-sweetened beverage consumption. As mentioned above, gaming predicted less physical activity.

For females, the only media type to have a statistically significant direct relationship to sugar-sweetened beverage consumption was gaming ($b=0.117$, $p<.05$) and TV/movies/videos approached significance ($b=0.103$, $p<.10$). Physical activity did not mediate the relationship between any of the specific types of media and the frequency of consuming sugar-sweetened beverages.

Diet Soda

No statistically significant direct relationships between media use and diet soda consumption were detected for either males or females. Furthermore, no significant indirect paths were found through physical activity for either males or females.

Junk Food

Both social media ($b=0.637$, $p<.01$) and TV/movies/videos ($b=0.233$, $p<.05$) had a direct association with junk food for males. Gaming was also marginally significant ($b=-0.129$, $p<.01$). Among females, there were direct relationships between TV/movies/videos ($b=0.164$, $p<.01$) and gaming ($b=0.393$, $p<.01$) and the number of times junk food was consumed in the previous week. No significant indirect pathways were found through physical activity for either males or females.

Fast Food

For males there were direct effects from social media (b=0.227, p<.10) and TV/movies/videos (b=0.153, p<.01) to fast food consumption. For females there were direct effects from gaming (b=0.152, p<.01) to fast food consumption. Regardless of gender, there were no significant indirect paths.

BMI percentile

No form of media consumption had a direct association to BMI percentile for males. However, for females, there were direct effects of music (b=1.785, p<.001) and the Internet (b=1.132, p<.05) on BMI percentile. Significant indirect paths through physical activity were not established for either males or females.

Table 15: Mediating effect of days of physical activity on eating behaviors and BMI percentile by media type

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Social Media												
a	**0.083 (0.028) ‡**	-0.024 (0.033)	**0.084 (0.029) ‡**	-0.024 (0.033)	**0.083 (0.028) ‡**	-0.025 (0.033)	**0.083 (0.028) ‡**	-0.025 (0.033)	**0.083 (0.028) ‡**	-0.024 (0.033)	0.064 (0.041)	0.036 (0.044)
b	**1.214 (0.126) §**	**1.101 (0.131) §**	**0.219 (0.075) ‡**	0.081 (0.062)	-0.073 (0.054)	0.005 (0.029)	0.147 (0.112)	0.100 (0.111)	0.005 (0.050)	0.015 (0.045)	-0.541 (0.437)	-0.454 (0.333)
Total Effect	0.161 (0.175)	-0.191 (0.144)	**0.389 (0.144) ‡**	-0.010 (0.095)	0.050 (0.053)	0.050 (0.037)	**0.647 (0.187) ‡**	0.046 (0.187)	**0.227 (0.084) ‡**	-0.009 (0.059)	-0.704 (0.530)	0.105 (0.551)
Indirect Effect	**0.101 (0.040) †**	-0.026 (0.036)	**0.018 (0.008) †**	-0.002 (0.003)	-0.006 (0.005)	-0.000 (0.001)	0.012 (0.008)	-0.003 (0.004)	0.000 (0.004)	-0.000 (0.001)	-0.034 (0.031)	-0.017 (0.023)
Direct Effect	0.600 (0.180)	-0.165 (0.155)	**0.371 (0.141) ‡**	-0.008 (0.095)	0.057 (0.055)	0.050 (0.037)	**0.635 (0.189) ‡**	0.048 (0.187)	**0.227 (0.083) ‡**	-0.008 (0.059)	-0.700 (0.526)	0.121 (0.558)
TV/Movies												
a	-0.008 (0.013)	0.005 (0.010)	-0.008 (0.013)	0.005 (0.010)	-0.009 (0.013)	0.005 (0.010)	-0.008 (0.013)	0.005 (0.010)	-0.008 (0.013)	0.005 (0.010)	-0.008 (0.019)	0.000 (0.014)
b	**1.214 (0.126) §**	**1.101 (0.131) §**	**0.219 (0.075) ‡**	0.081 (0.062)	-0.073 (0.054)	0.005 (0.029)	0.147 (0.112)	0.100 (0.111)	0.005 (0.050)	0.015 (0.045)	-0.541 (0.437)	-0.454 (0.333)
Total Effect	0.030 (0.098)	-0.051 (0.039)	**0.162 (0.048) ‡**	0.103 (0.054) *	0.050 (0.031) *	0.024 (0.019)	**0.232 (0.096) †**	**0.165 (0.058) ‡**	**0.153 (0.047) ‡**	0.043 (0.029)	0.178 (0.333)	0.044 (0.126)
Indirect Effect	-0.010 (0.017)	0.005 (0.011)	-0.002 (0.003)	0.000 (0.001)	0.001 (0.001)	0.000 (0.000)	-0.001 (0.002)	0.001 (0.001)	-0.000 (0.000)	0.000 (0.000)	0.005 (0.012)	-0.000 (0.007)
Direct Effect	0.040 (0.095)	-0.056 (0.035)*	**0.163 (0.048) ‡**	0.103 (0.053) *	0.050 (0.031)	0.024 (0.019)	**0.233 (0.095) †**	**0.164 (0.058) ‡**	**0.153 (0.047) ‡**	0.043 (0.029)	0.174 (0.330)	0.044 (0.126)
Gaming												
a	**-0.059 (0.016) §**	-0.004 (0.014)	**-0.058 (0.016) §**	-0.003 (0.014)	**-0.058 (0.016) §**	-0.003 (0.014)	**-0.058 (0.016) §**	-0.004 (0.014)	**-0.058 (0.016) §**	-0.003 (0.015)	**-0.062 (0.021) ‡**	-0.003 (0.026)
b	**1.214 (0.126) §**	**1.101 (0.131) §**	**0.219 (0.075) ‡**	0.081 (0.062)	-0.073 (0.054)	0.005 (0.029)	0.147 (0.112)	0.100 (0.111)	0.005 (0.050)	0.015 (0.045)	-0.541 (0.437)	-0.454 (0.333)
Total Effect	**-0.292 (0.103) ‡**	0.142 (0.139)	-0.016 (0.047)	**0.117 (0.051) †**	-0.041 (0.027)	0.040 (0.029)	**-0.136 (0.065) †**	**0.393 (0.148) ‡**	-0.013 (0.037)	**0.152 (0.051) ‡**	-0.051 (0.146)	-0.370 (0.226)
Indirect Effect	**-0.071 (0.016) §**	-0.004 (0.016)	**-0.013 (0.005) †**	-0.000 (0.001)	0.004 (0.003)	-0.000 (0.000)	-0.009 (0.008)	-0.000 (0.002)	-0.000 (0.003)	-0.000 (0.000)	0.034 (0.028)	0.001 (0.012)
Direct Effect	**-0.221 (0.109) †**	0.146 (0.134)	-0.003 (0.049)	**0.117 (0.051) †**	-0.045 (0.029)	0.040 (0.029)	-0.128 (0.068) *	**0.393 (0.147) ‡**	-0.013 (0.037)	**0.152 (0.051) ‡**	-0.085 (0.138)	-0.371 (0.230)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)		BMI Percentile b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=1,489)	Female (n=1,427)
Music												
a	**0.097 (0.023) §**	**0.084 (0.035) †**	**0.098 (0.023) §**	**0.085 (0.035) †**	**0.098 (0.023) §**	**0.085 (0.035) †**	**0.097 (0.023) §**	**0.085 (0.035) †**	**0.098 (0.023) §**	**0.084 (0.035) †**	**0.098 (0.031) ‡**	**0.085 (0.040) †**
b	**1.214 (0.126) §**	**1.101 (0.131) §**	**0.219 (0.075) ‡**	0.081 (0.062)	-0.073 (0.054)	0.005 (0.029)	0.147 (0.112)	0.100 (0.111)	0.005 (0.050)	0.015 (0.045)	-0.541 (0.437)	-0.454 (0.333)
Total Effect	**0.488 (0.247) †**	0.259 (0.140) *	**0.205 (0.096) †**	0.034 (0.089)	0.009 (0.077)	-0.001 (0.024)	0.129 (0.150)	0.084 (0.168)	0.114 (0.074)	0.069 (0.076)	0.465 (0.637)	**1.746 (0.501) §**
Indirect Effect	**0.118 (0.027) §**	**0.093 (0.040) †**	**0.022 (0.008) ‡**	0.007 (0.007)	-0.007 (0.005)	0.000 (0.003)	0.014 (0.012)	0.008 (0.011)	0.000 (0.005)	0.001 (0.004)	-0.053 (0.048)	-0.039 (0.034)
Direct Effect	0.370 (0.236)	0.165 (0.134)	0.183 (0.099) *	0.027 (0.087)	0.016 (0.078)	0.001 (0.024)	0.115 (0.152)	0.076 (0.166)	0.114 (0.075)	0.068 (0.075)	0.518 (0.623)	**1.785 (0.511) §**
Internet												
a	-0.054 (0.034)	-0.011 (0.022)	-0.055 (0.034)	-0.011 (0.022)	-0.055 (0.034)	-0.011 (0.022)	-0.054 (0.034)	-0.011 (0.022)	-0.054 (0.034)	-0.010 (0.022)	-0.049 (0.051)	-0.006 (0.029)
b	**1.214 (0.126) §**	**1.101 (0.131) §**	**0.219 (0.075) ‡**	0.081 (0.062)	-0.073 (0.054)	0.005 (0.029)	0.147 (0.112)	0.100 (0.111)	0.005 (0.050)	0.015 (0.045)	-0.541 (0.437)	-0.454 (0.333)
Total Effect	-0.013 (0.207)	0.083 (0.171)	-0.205 (0.130)	0.051 (0.100)	0.060 (0.053)	0.022 (0.041)	0.224 (0.153)	0.088 (0.117)	0.065 (0.060)	0.020 (0.047)	0.406 (0.600)	**1.135 (0.456) †**
Indirect Effect	-0.066 (0.045)	-0.012 (0.025)	-0.012 (0.009)	-0.001 (0.002)	0.004 (0.004)	-0.000 (0.000)	-0.008 (0.008)	-0.001 (0.003)	-0.000 (0.003)	-0.000 (0.001)	0.026 (0.034)	0.003 (0.012)
Direct Effect	0.052 (0.189)	0.095 (0.168)	-0.193 (0.127)	0.052 (0.100)	0.056 (0.054)	0.022 (0.041)	0.232 (0.153)	0.089 (0.117)	0.065 (0.060)	0.020 (0.047)	0.380 (0.601)	**1.132 (0.454) †**

Notes: Analyses control for race/ethnicity, language use at home, female caregiver educational attainment, male caregiver educational attainment, hours of sleep, frequency of snacking, intervention status, and other types of media.
a= IV -> M; b= M -> DV
Indirect Effect = a*b; Direct Effect =Total effect - Indirect Effect; Total Effect = Direct Effect + Indirect Effect
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Summary of Findings

Gender-stratified regression models were run to predict eating outcomes and BMI percentile from media consumption while controlling for other forms of media, race/ethnicity, language use, female and male caregiver educational attainment, snacking, and sleep duration, physical activity. For males, social media and TV/movies/videos were each associated with increased consumption of sugar-sweetened beverages, junk food, and fast food net of other variables in the model. Gaming was also associated with decreased fruit and vegetable consumption. For females, TV/movies/videos was associated with increased consumption of junk food while gaming was also associated with increased consumption for sugar-sweetened beverages, junk food, and fast food, net of other variables in the model.

Evaluating Snacking While Consuming Media as a Potential Mediator: Generally, additional time spent using media was associated with increased frequency of snacking while consuming media. There were a few notable exceptions. For males, music and the Internet were not associated with snacking frequency. Furthermore, for females music was associated with less frequent snacking. Increased snacking, however, was associated with poor dietary behaviors (i.e. less fruit and vegetable consumption and more sugar-sweetened beverage and fast food consumption) for both males and females. For males, indirect pathways were found from social media, TV/movies/videos and gaming to eating outcomes through snacking. This was a consistent finding across fruit and vegetable, sugar-sweetened beverage and fast food consumption. For females, indirect pathways were consistently found from social media, TV/movies/videos and music to these three eating behaviors through snacking. Additionally, for females, there was an indirect path from the Internet to fruit and vegetable consumption through snacking as well as an indirect path from gaming to sugar-sweetened beverages through snacking.

Evaluating Sleep Duration as a Potential Mediator: For males, only music consumption was associated with sleep duration. Conversely, for females TV/movies/videos, gaming, music and the Internet were associated with sleep duration. TV/movies/videos, however, was the only media type to be associated with increased sleep duration whereas the other media types were negatively associated with sleep. There were mixed findings regarding the relationship between sleep duration and eating behaviors. For males, longer sleep was associated with more fruit and vegetable consumption and less sugar-sweetened beverages and diet soda consumption. For females, longer sleep was only associated with less junk food consumption. Significant indirect pathways were found from music to fruit and vegetable, sugar-sweetened beverage, diet soda, and junk food consumption through sleep duration for males. In addition, there was also a significant indirect path from the Internet to sugar-sweetened beverage consumption for males. For females, there was a significant indirect path found from TV/movies/videos to junk food consumption by way of sleep duration. Interestingly, additional time spent watching TV/movies/videos was associated with increased sleep and increased sleep then was associated with decreased consumption of junk food.

Evaluating Physical Activity as a Potential Mediator: Few media types were associated with physical activity. Specifically, for males, social media and music were both associated with increased physical activity whereas gaming was associated with decreased physical activity. For females, music was the only media type associated with physical activity. Physical activity also had limited associations with eating outcomes. For both males and females, increased physical activity was associated with increased consumption of fruits and vegetables. Additionally, physical activity was associated with increased sugar-sweetened beverage consumption for males. Three media types had indirect paths to fruit and vegetable and sugar-

sweetened beverage consumption for males: social media, gaming, and music. For females, there was only an indirect path from music to fruit and vegetable consumption through physical activity.

Aim 2 Results

The goal of this aim was to examine how interpersonal exposures moderate the association between cumulative media consumption (i.e., total media consumed on an average school day) and eating behaviors. Specifically, was it possible to buffer the deleterious effects of media consumption by associating with friends who are perceived to be healthy eaters or dieters, or by having classmates in physical education classes who eat more healthfully or are less overweight? Results from multiple regression models testing each of these moderators sequentially are presented below. They are followed by additional analyses that assess the direct effect of the moderators when interaction terms were not significant.

Perception That It is Important To Friends To Eat Healthfully

Table 16 shows perceiving that one's friends think it is important to eat healthfully moderated the relationship between cumulative media consumption and fast food consumption for males. Specifically, for male students who did not think their friends place importance on eating healthfully, each additional hour of media consumption was associated with a 0.163 increase in the number times fast food was consumed ($p<.001$). Subsequent analysis showed that for those males who do believe their friends think it is important to eat healthfully, each additional hour of media consumption was associated with a 0.120 increase in the times fast food was consumed ($p<.001$, not shown). For males, no other relationships between media usage and eating outcomes depended on whether or not a person believes their friends think it is important to eat healthfully.

Supplemental analyses were run without the interaction term in order to isolate the unique effect of media consumption and the perception that friends think it's important to eat

healthfully on eating behaviors. Table 17 shows that for males, total media consumption was associated with increased consumption of sugar-sweetened beverages (b=0.123, p<.001), diet soda (b=0.031, p<.01), and junk food (b=0.281, p<.001) and was also marginally associated with consumption of fruit and vegetables fewer times in the past week (b=-0.065, p<.01). Thus, media consumption was associated with worse eating behaviors. Furthermore, believing one's friends think it is important to eat healthfully was independently associated with consuming sugar-sweetened beverages (b=-.731, p<.01) and junk food (b=-1.597, p<.001) fewer times in the previous week. There was no association between perceiving it is important to one's friends to eat healthfully and the number of times fruit and vegetables or diet soda were consumed.

Among females, the coefficient on the interaction term between perceiving friends think it is important to eat healthfully and media consumption was marginally significant. Similar additional analyses to those described above were conducted to assess the independent effect of media consumption and perception about importance of eating healthfully among friends for female participants. Table 17 shows that cumulative media consumption was associated with worse eating behaviors for females. Namely, each additional hour of media was associated with increased sugar-sweetened beverages (b=0.092, p<.001), diet soda (b=0.026, p<.001), junk food (b=0.275, p<.001), and fast food (b=0.077, p<.001) intake. Perceptions about friends was associated with improved eating outcomes for fruit and vegetables (b=2.144, p<.001), sugar-sweetened beverages (b=-0.749, p<.01), diet soda (b=-0.270, p<.05), junk food (b=-1.226, p<.001), and fast food (b=-0.694, p<.001).

Table 16: Interaction Effects Of Perception That It Is Important to Friends To Eat Healthfully And Media Consumption On Eating Behaviors of Project SHAPE Participants

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Average Weekday Media Consumption										
Media (hours)	-0.081 (0.051)	-0.045 (0.059)	**0.127 (0.033) §**	**0.135 (0.046) ‡**	0.020 (0.024)	**0.034 (0.017) †**	**0.325 (0.075) §**	**0.386 (0.073) §**	**0.163 (0.032) §**	**0.081 (0.032) †**
Race/Ethnicity										
Latino	**-2.144 (0.887) †**	**-1.452 (0.737) †**	**1.209 (0.453) ‡**	0.486 (0.453)	-0.455 (0.323)	-0.158 (0.268)	-0.605 (0.757)	**-2.386 (0.994) †**	**0.680 (0.347) †**	0.005 (0.478)
Black	0.016 (1.241)	-1.148 (1.030)	**2.347 (0.651) §**	1.730 (0.735) †	0.261 (0.572)	0.129 (0.332)	-0.772 (1.141)	0.857 (0.857)	1.451 (0.749) *	1.079 (0.709)
Two or more	0.024 (0.931)	0.002 (1.098)	**1.667 (0.568) ‡**	0.498 (0.684)	-0.114 (0.296)	-0.211 (0.223)	-0.052 (0.548)	-1.499 (1.041)	0.563 (0.521)	-0.017 (0.322)
Other	-0.741 (1.169)	-0.790 (1.007)	0.587 (0.564)	0.214 (0.400)	-0.141 (0.427)	0.099 (0.291)	0.424 (0.780)	-0.147 (1.498)	0.407 (0.356)	0.097 (0.326)
Language Use										
Spanish-only	**2.427 (0.971) †**	**2.576 (0.993) ‡**	0.302 (0.531)	-0.060 (0.450)	-0.216 (0.203)	0.865 (0.501) *	-0.609 (0.889)	-0.604 (0.765)	-0.360 (0.385)	0.608 (0.626)
English & Spanish	**1.525 (0.721) †**	0.433 (0.605)	0.604 (0.417)	0.215 (0.235)	-0.024 (0.310)	-0.025 (0.177)	-0.528 (0.608)	-0.070 (0.895)	-0.168 (0.463)	0.349 (0.343)
Other language	**3.716 (1.259) ‡**	0.904 (1.054)	-0.440 (0.414)	**-1.174 (0.320) §**	-0.338 (0.312)	-0.276 (0.210)	0.029 (0.949)	-1.004 (0.665)	0.405 (0.627)	-0.225 (0.288)
Female Caregiver Educational Attainment										
< High School	-0.776 (0.826)	-0.587 (0.911)	-0.438 (0.456)	0.062 (0.380)	0.222 (0.401)	**-0.506 (0.134) §**	-0.003 (0.998)	-0.249 (0.614)	-0.386 (0.397)	-0.138 (0.248)
Some College	-0.442 (1.073)	0.650 (0.830)	-0.609 (0.438)	0.033 (0.352)	-0.028 (0.273)	0.071 (0.361)	0.193 (0.795)	-1.498 (0.786) *	-0.417 (0.434)	-0.200 (0.216)
College	0.104 (0.862)	**2.134 (0.831) ‡**	0.364 (0.508)	-0.252 (0.388)	-0.240 (0.250)	-0.204 (0.140)	0.632 (0.830)	-1.002 (0.940)	-0.139 (0.320)	0.072 (0.258)
> College	1.084 (1.375)	1.478 (1.008)	-0.336 (0.761)	0.497 (0.528)	-0.148 (0.265)	-0.232 (0.146)	0.554 (1.112)	-0.046 (1.120)	-0.316 (0.448)	0.151 (0.321)
Don't Know	-0.124 (1.030)	**1.861 (0.923) †**	-0.402 (0.441)	0.508 (0.273) *	0.227 (0.323)	-0.074 (0.212)	-0.675 (0.807)	0.769 (0.926)	0.113 (0.328)	0.720 (0.490)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Male Caregiver Educational Attainment										
< High School	-1.661 (1.104)	0.013 (0.614)	0.222 (0.351)	0.249 (0.456)	-0.036 (0.326)	-0.077 (0.128)	0.139 (0.596)	0.003 (0.843)	-0.450 (0.447)	0.191 (0.318)
Some College	0.341 (0.941)	-0.179 (0.646)	0.620 (0.467)	-0.357 (0.367)	-0.177 (0.333)	-0.301 (0.189)	0.600 (0.678)	0.660 (1.085)	-0.222 (0.360)	0.036 (0.413)
College	0.507 (0.685)	0.923 (0.776)	0.905 (0.579)	-0.245 (0.416)	-0.144 (0.292)	-0.114 (0.243)	0.978 (1.029)	-0.015 (0.914)	**-0.630 (0.285)** †	-0.418 (0.296)
> College	0.919 (1.925)	**2.675 (0.913)** ‡	0.454 (0.529)	-0.412 (0.487)	0.012 (0.467)	-0.209 (0.204)	0.615 (0.755)	0.665 (0.684)	-0.848 (0.444) *	-0.617 (0.504)
Don't Know	-0.718 (0.878)	-1.207 (0.982)	0.873 (0.586)	-0.051 (0.255)	-0.198 (0.501)	-0.112 (0.231)	1.432 (0.755) *	-0.416 (0.710)	-0.580 (0.381)	-0.275 (0.461)
Perceived Friend Behavior										
Friends Eat Healthfully	0.814 (1.343)	2.034 (1.372)	-0.649 (0.682)	0.297 (0.624)	-0.389 (0.439)	-0.090 (0.323)	-0.548 (1.128)	1.440 (1.412)	0.172 (0.389)	-0.615 (0.647)
Media*Friends Eat Healthfully	0.025 (0.083)	0.007 (0.072)	-0.006 (0.044)	-0.067 (0.048)	0.018 (0.029)	-0.011 (0.022)	-0.072 (0.060)	-0.169 (0.090) *	**-0.043 (0.021)** †	-0.005 (0.042)
Constant	**16.564 (1.339)** §	**13.500 (1.664)** §	**1.821 (0.655)** ‡	1.280 (1.161)	1.148 (0.658) *	0.567 (0.369)	**6.009 (1.402)** §	**7.286 (1.823)** §	0.937 (0.792)	1.427 (0.819) *
Model Statistics										
R^2	0.024	0.029	0.047	0.050	0.012	0.024	0.070	0.068	0.075	0.050

Reference categories: Race/Ethnicity= White; Language use= English-only; Female and Male Caregiver Educational Attainment = High school; and Friends EatHealthfully= Disagree that it is important to friends to eat healthfully

All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Table 17: Regression Models Predicting Eating Behaviors from Media Consumption and Perception That It Is Important To Friends To Eat Healthfully

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Average Weekday Media Consumption										
Media (hours)	-0.065 (0.038) *	-0.040 (0.030)	**0.123 (0.015) §**	**0.092 (0.019) §**	**0.031 (0.012) ‡**	**0.026 (0.007) §**	**0.281 (0.049) §**	**0.275 (0.34) §**	N/A	**0.077 (0.032) §**
Perceived Friend Behavior										
Friends Eat Healthfully	1.185 (0.761)	**2.144 (0.532) §**	**-0.731 (0.217) ‡**	**-0.749 (0.238) ‡**	-0.129 (0.150)	**-0.270 (0.126) †**	**-1.597 (0.416) §**	**-1.226 (0.240) §**	N/A	**-0.694 (0.185) §**
Constant	**16.324 (1.193) §**	**13.427 (1.330) §**	**1.879 (0.521) §**	**1.971 (0.910) †**	0.978 (0.520) *	**0.685 (0.296) †**	**6.94 (1.009) §**	**9.058 (1.400) §**	N/A	**1.479 (0.510) ‡**
Model Statistics										
R^2	0.024	0.029	0.047	0.047	0.012	0.024	0.069	0.064	N/A	0.050

Notes: Analyses control for race/ethnicity, language use at home, and female and male caregiver educational attainment.
Reference category: Friends Eat Healthfully= Disagree that friends eat healthfully
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Perception That Friends Diet To Keep from Gaining Weight Or To Lose Weight

Table 18 shows that for males and females none of the relationships between cumulative media consumption and eating behaviors depend on believing that one's friends diet to keep from gaining weight or to lose weight. Supplementary analyses equivalent to what was described above were run to determine the unique effect of these variables. As was found above, media consumption was associated with worse eating behaviors for both males and females. Among males, additional media use was associated with increased consumption of sugar-sweetened beverages ($b=0.127$, $p<.001$), diet soda ($b=0.031$, $p<.01$), junk food ($b=0.290$, $p<.001$), and fast food ($b=0.139$, $p<.001$) and marginally associated with decreased consumption of fruit and vegetables ($b=-0.071$, $p<.10$) (see Table 19). Results for females were analogous in that each additional hour of engagement with media was associated with increased consumption of sugar-sweetened beverages ($b=0.095$, $p<.001$), diet soda ($b=0.027$, $p<.001$), junk food ($b=0.279$, $p<.001$), and fast food ($b=0.080$, $p<.001$) and marginally associated with decreased consumption of fruit and vegetables ($b=-0.051$, $p<.10$). In terms of the independent effect of believing friends diet, for males it was associated with decreased junk food consumption ($b=-0.876$, $p<.05$). Finally, for females, thinking friends diet was marginally associated with increased diet soda consumption ($b=0.185$, $p<.10$).

Table 18: Interaction Effects Of Perception That Friends Diet And Media Consumption On Eating Behaviors Of Project SHAPE Participants

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Average Weekday Media Consumption										
Media (hours)	-0.095 (0.060)	-0.108 (0.060) *	**0.133 (0.031) §**	**0.117 (0.034) ‡**	0.032 (0.022)	0.011 (0.011)	**0.325 (0.046) §**	**0.304 (0.059) §**	**0.149 (0.024) §**	**0.061 (0.020) ‡**
Race/Ethnicity										
Latino	**-2.229 (0.877) †**	-1.302 (0.714) *	**1.245 (0.449) ‡**	0.469 (0.422)	-0.454 (0.316)	-0.142 (0.267)	-0.533 (0.768)	**-2.405 (0.943) †**	0.674 (0.356) *	0.036 (0.455)
Black	-0.008 (1.202)	-0.988 (1.018)	**2.352 (0.673) §**	**1.701 (0.724) †**	0.270 (0.569)	0.124 (0.336)	-0.773 (1.166)	0.808 (1.982)	1.444 (0.768) *	1.076 (0.729)
Two or more	-0.104 (0.949)	0.037 (1.048)	**1.751 (0.567) ‡**	0.493 (0.653)	-0.103 (0.298)	-0.174 (0.216)	0.100 (0.549)	-1.484 (1.006)	0.604 (0.531)	0.051 (0.345)
Other	-0.710 (1.141)	-0.586 (1.006)	0.540 (0.544)	0.164 (0.377)	-0.140 (0.430)	0.107 (0.302)	0.349 (0.799)	-0.205 (1.479)	0.346 (0.378)	0.095 (0.339)
Language Use										
Spanish-only	**2.386 (0.949) †**	**2.643 (0.919) ‡**	0.326 (0.519)	-0.113 (0.457)	-0.226 (0.205)	0.815 (0.488) *	-0.532 (0.883)	-0.729 (0.774)	-0.366 (0.376)	0.522 (0.627)
English & Spanish	**1.534 (0.709) †**	0.529 (0.627)	0.596 (0.404)	0.164 (0.223)	-0.050 (0.311)	-0.040 (0.187)	-0.500 (0.596)	-0.163 (0.880)	-0.201 (0.455)	0.315 (0.329)
Other language	**3.674 (1.208) ‡**	0.819 (1.089)	-0.402 (0.433)	**-1.130 (0.302) §**	-0.362 (0.310)	-0.264 (0.210)	0.136 (0.956)	-0.940 (0.670)	0.412 (0.635)	-0.190 (0.285)
Female Caregiver Educational Attainment										
< High School	-0.747 (0.836)	-0.621 (0.926)	-0.437 (0.471)	0.068 (0.394)	0.242 (0.400)	**-0.511 (0.129) §**	-0.040 (0.981)	-0.255 (0.625)	-0.381 (0.385)	-0.142 (0.250)
Some College	-0.407 (1.096)	0.740 (0.798)	-0.611 (0.452)	0.037 (0.348)	-0.025 (0.278)	0.077 (0.354)	0.185 (0.813)	-1.462 (0.814) *	-0.403 (0.430)	-0.202 (0.221)
College	0.121 (0.861)	**2.259 (0.781) ‡**	0.370 (0.503)	-0.294 (0.394)	-0.219 (0.241)	-0.217 (0.140)	0.603 (0.819)	-1.061 (0.950)	-0.136 (0.319)	0.031 (0.269)
> College	1.070 (1.395)	1.638 (0.960) *	-0.308 (0.787)	0.461 (0.553)	-0.143 (0.265)	-0.266 (0.155) *	0.599 (1.113)	-0.093 (1.121)	-0.278 (0.461)	0.071 (0.317)
Don't Know	-0.130 (1.045)	**1.939 (0.896) †**	-0.384 (0.436)	0.493 (0.279) *	0.244 (0.318)	-0.087 (0.217)	-0.667 (0.801)	0.748 (0.918)	0.115 (0.325)	0.689 (0.492)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Male Caregiver Educational Attainment										
< High School	-1.762 (1.109)	-0.088 (0.613)	0.274 (0.352)	0.274 (0.455)	-0.039 (0.340)	-0.023 (0.123)	0.270 (0.593)	0.072 (0.842)	-0.422 (0.445)	0.282 (0.311)
Some College	0.295 (0.958)	-0.156 (0.690)	0.625 (0.479)	-0.392 (0.352)	-0.176 (0.335)	-0.278 (0.193)	0.643 (0.667)	0.617 (1.077)	-0.207 (0.352)	0.064 (0.403)
College	0.552 (0.702)	0.865 (0.828)	0.866 (0.570)	-0.208 (0.403)	-0.162 (0.296)	-0.096 (0.245)	0.923 (0.980)	0.075 (0.875)	**-0.641 (0.272) †**	-0.389 (0.293)
> College	0.978 (1.948)	**2.620 (0.906) ‡**	0.391 (0.540)	-0.394 (0.479)	0.004 (0.468)	-0.170 (0.204)	0.510 (0.786)	0.726 (0.702)	-0.892 (0.476) *	-0.556 (0.479)
Don't Know	-0.761 (0.893)	-1.237 (0.989)	0.888 (0.571)	-0.041 (0.250)	-0.202 (0.495)	-0.084 (0.232)	1.482 (0.763) *	-0.376 (0.710)	-0.562 (0.372)	-0.233 (0.461)
Perceived Friend Behavior										
Friends Diet	-0.096 (1.542)	-1.357 (1.782)	-0.052 (0.715)	0.581 (0.534)	0.150 (0.393)	-0.246 (0.328)	0.108 (0.877)	0.910 (0.647)	0.397 (0.258)	-0.383 (0.246)
Media*Friends Diet	0.048 (0.090)	0.104 (0.082)	-0.012 (0.048)	-0.040 (0.038)	-0.002 (0.032)	0.028 (0.019)	-0.070 (0.064)	-0.045 (0.066)	-0.020 (0.028)	0.035 (0.024)
Constant	**17.303 (1.234) §**	**15.580 (1.758) §**	**1.327 (0.396) ‡**	1.160 (0.987)	0.822 (0.515)	**0.605 (0.287) †**	**5.360 (1.065) §**	**7.752 (1.457) §**	0.815 (0.655)	**1.150 (0.546) †**
Model Statistics										
R^2	0.023	0.024	0.045	0.043	0.011	0.025	0.067	0.061	0.072	0.045

Reference categories: Race/Ethnicity= White; Language use= English-only; Female and Male Caregiver Educational Attainment = high school; and Friends Diet= Disagree friends diet to keep from gaining weight or to lose weight

All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Table 19: Regression Models Predicting Eating Behaviors from Media Consumption and Perception that Friends Diet

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,445)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Average Weekday Media Consumption										
Media (hours)	-0.071 (0.036) *	-0.051 (0.030) *	**0.127 (0.015) §**	**0.095 (0.020) §**	**0.031 (0.012) ‡**	**0.027 (0.007) §**	**0.290 (0.049) §**	**0.279 (0.034) §**	**0.139 (0.025) §**	**0.080 (0.009) §**
Perceived Friend Behavior										
Friends Diet	0.579 (0.506)	0.213 (0.665)	-0.219 (0.434)	-0.023 (0.206)	0.119 (0.136)	0.185 (0.105) *	**-0.876 (0.415) †**	0.224 (0.548)	0.113 (0.215)	-0.153 (0.171)
Constant	**16.962 (0.933) §**	**14.879 (1.304) §**	**1.411 (0.466) ‡**	1.436 (0.886)	0.838 (0.478) *	0.408 (0.249)	**5.855 (1.036) §**	**8.076 (1.331) §**	0.959 (0.667)	**0.904 (0.426) †**
Model Statistics										
R^2	0.023	0.022	0.045	0.042	0.011	0.022	0.066	0.061	0.071	0.044

Notes: Analyses control for race/ethnicity, language use at home, and female and male caregiver educational attainment.
Reference category: Friends Diet= Disagree that friends diet to keep from gaining weight or to lose weight
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Reported Eating Behaviors of Physical Education Classmates

This set of analyses explored whether the actual eating behaviors of classmates moderated the effect of media consumption on eating behaviors. As illustrated in Table 20, none of the relationships between cumulative media consumption and eating behaviors depend on the actual eating behaviors of classmates for either males or females.

Additional regressions were run to further explore the role of classmate eating behaviors on individual-level eating behaviors (see Table 21). Media consumption had an independent effect on all eating outcomes for male participants. As has been shown in previous analyses, media consumption was associated with increased consumption of sugar-sweetened beverages ($b=0.124$, $p<.001$), diet soda ($b=0.030$, $p<.01$), junk food ($b=0.288$, $p<.001$), and fast food ($b=0.137$, $p<.001$) and was marginally associated with decreased consumption of fruit and vegetables ($b=-0.069$, $p<.10$). The frequency of fast food consumption among classmates was also independently associated with consumption of fast food among male participants. Classmates eating fast food more times in the previous week was associated with increased consumption of fast food among individuals ($b= 0.137$, $p<.001$). Likewise, sugar-sweetened beverage consumption among classmates was marginally associated with increased consumption of these types of beverages among individuals ($b=0.191$, $p<.10$).

Among female participants, media consumption was associated with all eating outcomes except fruit and vegetable consumption. Specifically, media consumption was associated with drinking sugar-sweetened beverages ($b=0.095$, $p<.001$) and diet soda ($b=0.027$, $p<.001$) and eating junk food ($b=0.279$, $p<.001$) and fast food ($b=0.079$, $p<.001$) more times in the past week. Classmate behavior was also of consequence for several outcomes. Greater intake among

classmates of fruit and vegetables (b=0.377, p<.001) and junk food (b=0.179, p<.01) were associated with increased consumption of these foods by individuals. Moreover, the number of times classmates ate fast food was marginally associated with the frequency of consuming fast food among individuals (b=0.196, p<.10).

Table 20: Interaction Effects of Classmates Eating and Media Consumption on Eating Behaviors of Project SHAPE Participants

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,377)	Male (n=2,442)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Average Weekday Media Consumption										
Media (hours)	-0.021 (0.153)	0.167 (0.225)	**0.188 (0.078) †**	0.070 (0.066)	0.029 (0.019)	**0.024 (0.008) ‡**	**0.390 (0.086) §**	0.203 (0.143)	**0.134 (0.051) ‡**	0.045 (0.028)
Race/Ethnicity										
Latino	**-2.118 (0.877) †**	-1.084 (0.731)	**1.153 (0.457) †**	0.456 (0.392)	-0.455 (0.324)	-0.186 (0.259)	-0.570 (0.785)	**-2.393 (0.966) †**	0.638 (0.350) *	-0.045 (0.467)
Black	-0.004 (1.242)	-0.757 (1.053)	**2.319 (0.656) §**	**1.720 (0.701) †**	0.264 (0.578)	0.133 (0.331)	-0.714 (1.193)	0.821 (1.982)	1.396 (0.740) *	1.043 (0.692)
Two or more	-0.058 (0.949)	-0.038 (1.045)	**1.715 (0.574) ‡**	0.509 (0.628)	-0.096 (0.304)	-0.208 (0.222)	0.122 (0.559)	-1.477 (0.990)	0.565 (0.512)	0.004 (0.352)
Other	-0.661 (1.141)	-0.716 (0.985)	0.516 (0.551)	0.163 (0.359)	-0.125 (0.427)	0.085 (0.301)	0.285 (0.820)	-0.219 (1.458)	0.304 (0.367)	0.025 (0.310)
Language Use										
Spanish-only	**2.463 (0.960) ‡**	**3.065 (1.068) ‡**	0.256 (0.540)	-0.153 (0.457)	-0.234 (0.200)	0.830 (0.510)	-0.623 (0.860)	-0.782 (0.781)	-0.439 (0.371)	0.520 (0.624)
English & Spanish	**1.584 (0.711) †**	0.579 (0.637)	0.545 (0.401)	0.164 (0.228)	-0.038 (0.308)	-0.042 (0.179)	-0.594 (0.599)	-0.150 (0.893)	-0.221 (0.451)	0.301 (0.331)
Other language	**3.699 (1.247) ‡**	0.892 (1.045)	-0.432 (0.430)	**-1.116 (0.292) §**	-0.347 (0.313)	-0.260 (0.200)	0.031 (0.985)	-0.926 (0.661)	0.419 (0.624)	-0.236 (0.303)
Female Caregiver Educational Attainment										
< High School	-0.791 (0.813)	-0.656 (0.900)	-0.414 (0.462)	0.050 (0.388)	0.227 (0.402)	**-0.506 (0.135) §**	-0.016 (0.965)	-0.243 (0.650)	-0.396 (0.381)	-0.121 (0.250)
Some College	-0.457 (1.094)	0.564 (0.805)	-0.602 (0.432)	0.045 (0.339)	-0.020 (0.281)	0.066 (0.361)	0.211 (0.799)	-1.470 (0.813) *	-0.390 (0.432)	-0.200 (0.226)
College	0.005 (0.853)	**1.994 (0.801) †**	0.417 (0.511)	-0.286 (0.381)	-0.205 (0.254)	-0.212 (0.140)	0.607 (0.808)	-1.094 (0.959)	-0.135 (0.313)	0.048 (0.264)
> College	0.890 (1.418)	1.457 (0.983)	-0.276 (0.778)	0.449 (0.531)	-0.135 (0.261)	-0.247 (0.146) *	0.602 (1.126)	-0.137 (1.123)	-0.287 (0.455)	0.109 (0.320)
Don't Know	-0.176 (1.053)	1.788 (0.922) *	-0.346 (0.424)	0.480 (0.531) *	0.257 (0.309)	-0.099 (0.210)	-0.614 (0.794)	0.725 (0.908)	0.118 (0.327)	0.675 (0.483)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
Male Caregiver Educational Attainment										
< High School	-1.693 (1.080)	-0.126 (0.621)	0.253 (0.361)	0.320 (0.461)	-0.031 (0.337)	-0.068 (0.129)	0.212 (0.585)	0.057 (0.828)	-0.439 (0.439)	0.240 (0.304)
Some College	0.335 (0.939)	-0.300 (0.702)	0.609 (0.442)	-0.347 (0.367)	-0.178 (0.336)	-0.308 (0.190)	0.609 (0.680)	0.581 (1.039)	-0.233 (0.360)	0.032 (0.389)
College	0.557 (0.691)	0.788 (0.776)	0.882 (0.569)	-0.186 (0.419)	-0.160 (0.297)	-0.099 (0.242)	0.922 (0.981)	0.072 (0.879)	**-0.624 (0.261)** †	-0.402 (0.270)
> College	1.019 (1.938	**2.334 (0.922)** †	0.434 (0.545)	-0.339 (0.497)	0.019 (0.477)	-0.195 (0.200)	0.444 (0.738)	0.750 (0.690	-0.848 (0.450) *	-0.564 (0.474)
Don't Know	-0.725 (0.879)	-1.246 (0.975)	0.861 (0.580)	-0.012 (0.262)	-0.202 (0.501)	-0.104 (0.229)	1.449 (0.774) *	-0.364 (0.698)	-0.560 (0.388)	-0.259 (0.453)
Classmate Eating Behavior										
F&V Classmates	0.193 (0.154)	**0.585 (0.209)** ‡								
Media*F&V Classmates	-0.006 (0.010)	-0.014 (0.015)								
SSB Classmates			**0.393 (0.170)** †	0.022 (0.210)						
Media*SSB Classmates			-0.015 (0.016)	0.006 (0.017)						
Diet Soda Classmates					0.149 (0.318)	0.092 (0.156)				
Media * Diet Soda					0.001 (0.026)	0.003 (0.005)				
Junk Food Classmates							**0.276 (0.118)** †	0.065 (0.225)		
Media * Junk Food Classmates							-0.010 (0.010)	0.007 (0.015)		
Fast Food Classmates									0.236 (0.196)	-0.017 (0.230)
Media * Fast Food Classmates									0.001 (0.017)	0.012 (0.010)
Constant	**14.267 (2.569)** §	5.907 (3.076) *	-0.275 (0.909)	1.388 (1.047)	0.794 (0.503)	0.469 (0.269) *	**2.753 (1.201)** †	**7.624 (2.341)** ‡	0.454 (0.739)	1.102 (0.578) *
Model Statistics										
R^2	0.023	0.031	0.046	0.043	0.012	0.023	0.065	0.063	0.074	0.048

Reference categories: Race/Ethnicity=White; Language use=English-only; and Female and Male Caregiver Educational Attainment=High school
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Table 21: Regressions Predicting Eating Behaviors from Media Consumption and Classmates' Eating Behavior

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,377)	Male (n=2,442)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Average Weekday Media Consumption										
Media (hours)	-0.069 (0.036) *	-0.048 (0.030)	**0.124 (0.078) §**	**0.095 (0.019) §**	**0.030 (0.011) ‡**	**0.027 (0.007) §**	**0.288 (0.049) §**	**0.279 (0.033) §**	**0.137 (0.025) §**	**0.079 (0.009) §**
Classmate Eating Behavior										
F&V Classmates	0.108 (0.089)	**0.377 (0.105) §**								
SSB Classmates			0.191 (0.115) *	0.108 (0.102)						
Diet Soda Classmates					0.171 (0.163)	0.138 (0.125)				
Junk Food Classmates							0.121 (0.103)	**0.179 (0.070) ‡**		
Fast Food Classmates									**0.251 (0.112) †**	0.196 (0.114) *
Constant	**15.543 (1.548) §**	**9.010 (1.907) §**	0.596 (0.546)	1.029 (1.131)	0.780 (0.551)	0.434 (0.280)	**4.305 (1.500) ‡**	**6.480 (1.336) §**	0.413 (0.755)	0.530 (0.404)
Model Statistics										
R^2	0.023	0.030	0.046	0.043	0.012	0.023	0.065	0.062	0.074	0.047

Notes: Analyses control for race/ethnicity, language use at home, and female and male caregiver educational attainment.
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Percentage of Classmates Overweight or Obese

Table 22 shows that for male participants, the relationships between cumulative media consumption and the five eating outcomes of interest do not depend on the percent of the physical education class that is overweight or obese. Secondary analyses run in which the both media consumption and percent of class overweight were both entered into the model indicated that media use was associated with all but fruit and vegetable consumption for males (see Table 23). Specifically, additional time spent consuming media predicted increased sugar-sweetened beverages ($b=0.115$, $p<.001$), junk food ($b=0.233$, $p<.001$), and fast food ($b=0.107$, $p<.001$) intake. There was also a marginally significant association between media and diet soda consumption ($b=0.023$, $p<.10$). The weight status of classmates was not associated with any of the eating outcomes.

Among female participants, when looking at fruit and vegetable consumption as the outcome, the interaction term for total number of hours of media consumption on an average school day and percent of the class that was overweight or obese was significant and positive. For individuals that have no overweight or obese students in their class, the effect of an additional hour of media is a 0.412 reduction in the number of times fruits and vegetables were consumed ($p<.001$). Furthermore, for individuals that consume no media, the effect of a 1 percent increase in the percent of the class that is overweight or obese is a 0.129 reduction in the number of times fruits and vegetables were consumed. This suggests the higher the percentage of overweight/obese students is in one's physical education class, the less pronounced the effect of media consumption is on fruit and vegetable consumption.

Supplemental analyses were conducted to assess the unique effects of these two factors on the remaining eating outcomes. Table 23 shows that media consumption was associated with inferior eating behaviors. Namely, additional time spent using media was associated more sugar-sweetened beverage consumption ($b=0.091$, $p<.001$), more diet soda consumption ($b=0.039$, $p<.001$), more junk food consumption ($b=0.273$, $p<.001$) and more fast food consumption ($b=0.066$, $p<.001$). The weight status of physical education classmates was associated with increased fast food consumption ($b=0.028$, $p<.05$) and moderately associated with increased diet soda consumption ($b=0.015$, $p<.10$).

Table 22: Interaction Effects of Overweight Classmates and Media Consumption on Eating Behaviors of Project SHAPE Participants

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)
Average Weekday Media Consumption										
Media (hours)	-0.073 (0.213)	**-0.412 (0.083) §**	0.135 (0.122)	0.184 (0.096) *	0.014 (0.070)	0.009 (0.060)	0.221 (0.234)	**0.476 (0.141) ‡**	**0.217 (0.094) †**	0.101 (0.087)
Race/Ethnicity										
Latino	**-3.736 (0.776) §**	**-1.644 (0.775) †**	0.733 (0.609)	**0.690 (0.321) †**	-0.498 (0.355)	0.164 (0.218)	**-1.437 (0.732) †**	-1.734 (1.096)	0.408 (0.541)	0.199 (0.622)
Black	-0.130 (1.482)	**-1.887 (0.894) †**	**2.661 (0.724) §**	**2.130 (0.763) ‡**	-0.098 (0.557)	-0.031 (0.305)	0.531 (1.629)	1.171 (1.892)	1.181 (0.797)	0.605 (0.452)
Two or more	-0.813 (0.744)	-0.883 (0.840)	**1.374 (0.690) †**	0.786 (0.652)	-0.183 (0.215)	-0.116 (0.161)	-0.004 (0.446)	-1.301 (1.052)	0.253 (0.550)	0.440 (0.231) *
Other	0.649 (1.048)	-1.230 (1.250)	0.720 (0.646)	**0.748 (0.346) †**	-0.333 (0.283)	0.139 (0.386)	0.316 (0.682)	0.261 (1.512)	0.388 (0.342)	0.150 (0.336)
Language Use										
Spanish-only	**3.869 (1.192) ‡**	1.536 (1.467)	0.261 (0.733)	**-0.614 (0.289) †**	0.052 (0.126)	0.539 (0.620)	0.259 (1.119)	0.204 (0.631)	-0.086 (0.499)	0.324 (1.032)
English & Spanish	**2.164 (0.733) ‡**	0.432 (0.611)	0.943 (0.545) *	-0.011 (0.348)	-0.063 (0.292)	-0.298 (0.212)	0.075 (0.347)	-0.600 (1.326)	-0.186 (0.659)	0.126 (0.460)
Other language	**3.075 (1.378) †**	0.638 (0.849)	-0.750 (0.395) *	**-1.190 (0.379) ‡**	-0.138 (0.193)	-0.230 (0.246)	-0.109 (0.848)	-1.169 (0.697) *	-0.358 (0.375)	-0.165 (0.355)
Female Caregiver Educational Attainment										
< High School	**-1.849 (0.857) †**	**-2.359 (0.884) ‡**	0.008 (0.717)	-0.189 (0.455)	0.283 (0.419)	**-0.555 (0.178) ‡**	-0.173 (1.166)	-0.327 (1.091)	-0.584 (0.381)	**-0.580 (0.290) †**
Some College	-1.304 (1.531)	-0.482 (0.584)	-0.551 (0.519)	0.299 (0.242)	0.112 (0.289)	0.211 (0.441)	0.159 (0.743)	**-2.107 (0.773) ‡**	-0.551 (0.587)	-0.073 (0.298)
College	-0.188 (1.250)	**1.610 (0.818) †**	0.048 (0.644)	-0.472 (0.429)	-0.137 (0.279)	-0.128 (0.185)	-0.154 (0.813)	-0.535 (0.936)	-0.409 (0.305)	-0.169 (0.341)
> College	0.385 (1.529)	0.959 (1.134)	-0.643 (0.914)	0.200 (0.427)	-0.221 (0.304)	-0.103 (0.164)	-0.180 (1.244)	0.485 (1.301)	-0.634 (0.454)	0.033 (0.434)
Don't Know	**-2.317 (0.926) †**	0.205 (1.097)	-0.280 (0.499)	0.362 (0.327)	0.269 (0.309)	0.061 (0.312)	0.002 (1.194)	0.690 (1.191)	0.333 (0.551)	0.631 (0.836)

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)
Male Caregiver Educational Attainment										
< High School	-0.561 (1.538)	-1.085 (0.887)	-0.349 (0.284)	0.447 (0.721)	0.405 (0.447)	0.106 (0.094)	0.301 (0.691)	-0.114 (1.173)	-0.014 (0.484)	**0.779 (0.372) †**
Some College	1.328 (0.972)	0.258 (0.974)	0.558 (0.630)	-0.205 (0.548)	0.007 (0.242)	-0.276 (0.276)	-0.016 (0.739)	1.132 (1.330)	0.012 (0.304)	0.161 (0.298)
College	0.896 (1.007)	0.466 (0.972)	0.306 (0.618)	-0.568 (0.583)	0.028 (0.274)	-0.157 (0.116)	**1.837 (0.842) †**	-0.234 (1.242	-0.239 (0.135) *	-0.240 (0.222)
> College	0.544 (1.881)	1.575 (1.172)	0.242 (0.542)	-0.276 (0.525)	0.045 (0.381)	-0.125 (0.275)	0.877 (0.930)	0.453 (0.909)	-0.451 (0.453)	-0.287 (0.550)
Don't Know	1.249 (0.708) *	-1.912 (1.332)	0.092 (0.707)	-0.172 (0.375)	-0.164 (0.289)	0.025 (0.368)	0.564 (0.974)	-0.924 (1.116)	-0.591 (0.473)	-0.057 (0.667)
Classmate Weight Status										
Percent Overweight	-0.020 (0.071)	**-0.129 (0.049) ‡**	0.014 (0.044)	0.046 (0.027) *	0.002 (0.031)	0.004 (0.019)	-0.022 (0.055)	0.086 (0.053)	0.035 (0.024)	0.041 (0.038)
Media*Percent Overweight	0.000 (0.005)	**0.009 (0.002) §**	0.000 (0.003)	-0.002 (0.003)	0.000 (0.002)	0.001 (0.001)	0.000 (0.005)	-0.005 (0.004)	-0.003 (0.002)	-0.001 (0.002)
Constant	**18.443 (3.123) §**	**22.166 (1.961) §**	1.378 (1.792)	-0.378 (1.317)	0.551 (1.243)	-0.061 (0.829)	**7.184 (2.593) ‡**	**4.902 (1.844) ‡**	-0.013 (1.236)	-0.669 (1.301)
Model Statistics										
R^2	0.039	0.039	0.045	0.052	0.016	0.035	0.052	0.062	0.060	0.048

Reference categories: Race/Ethnicity= White; Language use= English-only; and Female and Male Caregiver Educational Attainment = high school
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Table 23: Regression Models Predicting Eating Behaviors from Cumulative Media Consumption and Percent of Physical Education Class Overweight or Obese

	Fruit and Vegetables b(SE)		Sugar-Sweetened Beverages b(SE)		Diet Soda b(SE)		Junk Food b(SE)		Fast Food b(SE)	
	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)	Male (n=1,489)	Female (n=1,427)
Average Weekday Media Consumption										
Media (hours)	-0.087 (0.053)	N/A	**0.115 (0.021) §**	**0.091 (0.014) §**	0.023 (0.013) *	**0.039 (0.007) §**	**0.233 (0.049) §**	**0.273 (0.024) §**	**0.107 (0.019) §**	**0.066 (0.010) §**
Classmate Weight Status										
Percent Overweight	-0.025 (0.036)	N/A	0.007 (0.017)	0.013 (0.012)	0.006 (0.010)	0.015 (0.008) *	-0.018 (0.026)	0.014 (0.037)	-0.002 (0.012)	**0.028 (0.013) †**
Constant	**18.618 (1.716) §**	N/A	1.625 (0.923)	0.925 (0.931)	0.420 (0.465)	-0.481 (0.283) *	**7.029 (1.281) §**	**7.766 (1.268) §**	**1.412 (0.718) †**	-0.176 (0.536)
Model Statistics										
R^2	0.039	N/A	0.045	0.051	0.015	0.034	0.052	0.060	0.057	0.047

Notes: Analyses control for race/ethnicity, language use at home, and female and male caregiver educational attainment.
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Summary of Findings

The goal of this aim was to examine how interpersonal exposures moderate the association between cumulative media consumption (i.e., total media consumed on an average school day) and eating behaviors. Specifically, was it possible to buffer the deleterious effects of media consumption by associating with friends who are perceived to be healthy eaters or dieters, or by having classmates in physical education classes who eat more healthfully or are less overweight?

Perception That It is Important To Friends To Eat Healthfully: I found limited evidence that believing that friends think it is important to eat healthfully moderates the relationship between total media consumption and the five eating outcomes. It only moderated the relationship between media consumption and fast food for males, and in that case it buffered the relationship as I hypothesized. However, cumulative media consumption was independently associated with increased consumption of sugar-sweetened beverages, junk food and fast food for both males and females. Moreover, the perception that friends think it is important to eat healthfully was independently associated with more healthful behaviors. That is, for males, it was associated with less consumption of sugar-sweetened beverages and junk food. For females, it was associated with increased consumption of fruit and vegetables, and decreased consumption of sugar-sweetened beverages, junk food and fast food. Thus it is health promoting to "think" your friends think it is important to eat healthfully

Perception That Friends Diet to Keep From Gaining Weight or to Lose Weight: I found no evidence to suggest this modifies the relationship between cumulative media consumption and eating behaviors. What is more, it was only independently associated with

reduced junk food consumption of males. The lack of significant findings suggests that this factor does not significantly influence the eating behaviors of middle school adolescents.

Classmates Eating Behaviors: Although I hypothesized that the actual eating behaviors of classmates would moderate the relationship between cumulative media consumption and the five eating outcomes, there was no evidence to support this assertion. However, the independent effects model shows that media consumption was associated with increased consumption of all eating outcomes except fruit and vegetables. There was also some evidence to suggest classmates' behaviors may independently be associated with eating behaviors. For example for females, more consumption of fruit and vegetables among classmates was associated with more fruit and vegetable consumption among individuals. Conversely, some poor eating behaviors of classmates were associated with select poor eating behaviors of individuals (i.e. increased junk food for females and increased fast food for males). This suggests to the extent that classmates actually ate poorly it sometimes had a detrimental effect.

Percent of Classmates Overweight or Obese: There was weak evidence to suggest that this factor is associated eating behaviors of middle school adolescents. Unexpectedly, the higher the percentage of overweight/obese students is in one's physical education class, the less pronounced the effect of media consumption was on fruit and vegetable consumption for females. This finding was contrary to what would have been expected. Furthermore, percent of the class overweight or obese was only independently associated with increased fast food consumption of females. These findings should be interpreted with caution because it is based on a subset of individuals with FITNESSGRAM data, which are often biased.

Aim 3 Results

The goal of Aim 3 was to understand how social media consumption uniquely influences eating behaviors. In addition to determining whether social media use was associated with eating behaviors, I assessed whether the effects were exacerbated for females, individuals who perceived themselves to be overweight, and individuals who were trying to lose weight. Five consecutive models were run for each eating behavior outcome. The first model tested bivariate associations between social media use and an eating outcome. The second and third models included other forms of media and other potential confounders to test if the focal relationship remained robust to different model specifications. Finally the fourth and fifth models add in interaction terms to test whether perceived weight status or intention to lose weight moderates the relationship. Ancillary analyses were performed to test the independent effect of potential moderators when interaction terms were not significant.

Gender

I formally tested gender as a moderator of social media and each of the five eating outcomes. Gender moderated the relationship between social media consumption and fruit and vegetable consumption, sugar-sweetened beverages, junk food and fast food consumption. The only outcome it did not moderate was diet soda consumption. The effect of social media use on fruit and vegetable consumption was different and worse for females. Specifically, each additional hour of social media consumption was associated with a 0.095 increase in fruit and vegetable consumption ($p=0.620$) for males (see Table 24). For females, however, each additional hour of media consumption was associated with a -0.356 decrease in fruit and vegetable consumption ($p<.01$). It is important to note that the effect of social media use on

sugar-sweetened beverages, junk food and fast food consumption was different (and worse) for males. This suggests there is differential risk of social media use for males and females.

Table 24. Interaction Effects of Gender and Social Media on Eating Behaviors of Project SHAPE Participants (N=4,838)

	b (SE)				
	Fruit and Vegetables	Sugar-Sweetened Beverages	Diet Soda	Junk Food	Fast Food
Social Media	0.095	**0.435**	0.082	**0.855**	**0.347**
	(0.192)	**(0.136) ‡**	(0.060)	**(0.210) §**	**(0.089) §**
Female	**-0.646**	**-1.126**	**-0.399**	**0.871**	-0.062
	(0.313) †	**(0.336) ‡**	**(0.170) †**	**(0.341) †**	(0.181)
Social Media *	**-0.451**	**-0.368**	-0.040	**-0.423**	**-0.304**
Female	**(0.167) ‡**	**(0.172) †**	(0.073)	**(0.208) †**	**(0.109) ‡**

Notes: Analyses control for race/ethnicity, language use at home, female caregiver educational attainment, and male caregiver educational attainment.
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Fruit and Vegetables

There was no association between time spent engaging with social media and fruit and vegetable consumption among male students (see Table 24). This finding was consistent across all model specifications. Furthermore, the relationship did not depend on perception of weight status or dieting behavior. Table 25 shows the results of complementary analyses assessing the independent effect of perceiving oneself to be overweight or dieting on fruit and vegetable eating behaviors. Perceiving oneself to be overweight as compared to being underweight/right weight was associated with a 0.849 reduction in the number of times fruits and vegetables were consumed during the previous week ($p < .01$). Dieting status was not associated with fruit and vegetable consumption.

As can be seen in Table 25 Model 1, the regression predicting the number of times fruit and vegetables were consumed from social media use showed a small association between these two measures for females. Each additional hour of social media use was associated with fewer

number of times fruit and vegetables were consumed (b=-.431, p<.01). As can be seen in Model 2, the inclusion of other forms of media use led to a very minor increase (6%) in the association between social media use and fruit and vegetable intake. The addition of control variables in Model 3 resulted in a drop (17%) in the association between social media use and fruit and vegetable consumption. Although the coefficient was reduced in this model, it remained significant which suggests this was not a spurious relationship. When other forms of media, race/ethnicity, language use at home, and caregiver educational attainment were controlled for, each additional hour spent using social media was associated with consumption of fruits and vegetables less often (b=-0.380, p<.01). Furthermore, the more inclusive model explained a larger percentage of the variability of eating fruits and vegetables. Models 4 and 5 indicate that the relationship between social media use and fruit and vegetable consumption use did not depend on either self-perceived weight status or dieting behavior.

Because neither interaction was significant additional analyses were run to test for direct associations between overweight status and dieting on fruit and vegetable consumption (see Table 26). These analyses revealed the focal relationship between social media use and fruit and vegetable intake was consistent with previously described findings. Additionally, perceiving oneself to be overweight as compared to being underweight/right weight was not associated with fruit and vegetable consumption. Somewhat unexpectedly, actively trying to lose weight was marginally associated with a reduction in fruit and vegetable intake (b=-1.241, p<.10). This finding was contrary to what would have been expected.

Table 25: Regression Models Predicting Fruit and Vegetable Consumption From Social Media Use

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,443)	Female (n=2,375)	Male (n=2,443)	Female (n=2,375)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)
Media Types (hours)										
Social Media	0.067	**-0.431**	0.056	**-0.456**	0.055	**-0.380**	0.117	**-0.505**	-0.034	**-0.430**
	(0.202)	**(0.133)** ‡	(0.202)	**(0.136)** ‡	(0.189)	**(0.141)** ‡	(0.207)	**(0.200)** †	(0.190)	**(0.196)** †
TV			0.006	**-0.107**	-0.015	**-0.110**	-0.011	**-0.111**	-0.021	**-0.117**
			(0.102)	**(0.047)** †	(0.098)	**(0.042)** ‡	(0.098)	**(0.041)** ‡	(0.096)	**(0.039)** ‡
Gaming			**-0.424**	0.043	**-0.379**	0.115	**-0.379**	0.114	**-0.378**	0.114
			(0.109) §	(0.142)	**(0.102)** §	(0.142)	**(0.103)** §	(0.143)	**(0.100)** §	(0.142)
Music			0.358	**0.287**	0.410	**0.278**	0.406	**0.291**	0.405	**0.304**
			(0.254)	**(0.124)** †	(0.239) *	**(0.117)** †	(0.242) *	**(0.113)** †	(0.235) *	**(0.115)** ‡
Internet			-0.004	0.044	-0.069	0.020	-0.063	0.023	-0.080	0.026
			(0.194)	(0.152)	(0.187)	(0.162)	(0.186)	(0.164)	(0.192)	(0.165)
Race/Ethnicity										
Latino					**-2.241**	-1.447	**-2.207**	-1.378	**-2.281**	-1.302
					(0.857) ‡	(0.809) *	**(0.842)** ‡	(0.784) *	**(0.864)** ‡	(0.788) *
Black					-0.404	-0.938	-0.468	-0.945	-0.308	-0.981
					(1.257)	(1.083)	(1.248)	(1.097)	(1.283)	(1.092)
Two or more					-0.309	-0.106	-0.231	-0.053	-0.354	-0.070
					(0.943)	(1.090)	(0.933)	(1.085)	(0.937)	(1.081)
Other					-0.706	-0.715	-0.661	-0.678	-0.653	-0.717
					(1.160)	(1.070)	(1.178)	(1.070)	(1.143)	(1.092)
Language Use										
Spanish only					**2.403**	**2.841**	**2.423**	**2.865**	**2.327**	**2.798**
					(0.900) ‡	**(0.932)** ‡	**(0.913)** ‡	**(0.975)** ‡	**(0.929)** †	**(0.908)** ‡
English &					**1.411**	0.597	**1.440**	0.612	**1.325**	0.609
Spanish					**(0.659)** †	(0.604)	**(0.657)** †	(0.611)	**(0.659)** †	(0.602)
Other language					**3.620**	0.907	**3.697**	0.968	**3.542**	0.997
					(1.223) ‡	(1.088)	**(1.220)** ‡	(1.116)	**(1.232)** ‡	(1.131)
Female Caregiver Educational Attainment										
< High School					-0.822	-0.617	-0.810	-0.593	-0.809	-0.550
					(0.825)	(0.926)	(0.823)	(0.911)	(0.832)	(0.910)
Some College					-0.412	0.617	-0.446	0.685	-0.344	0.678
					(1.042)	(0.785)	(1.603)	(0.715)	(1.050)	(0.744)
College					0.150	**2.296**	0.171	**2.285**	0.185	**2.288**
					(0.836)	**(0.818)** ‡	(0.844)	**(0.813)** ‡	(0.846)	**(0.822)** ‡

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,443)	Female (n=2,375)	Male (n=2,443)	Female (n=2,375)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)
Female Caregiver Educational Attainment (continued)										
> College					1.015	1.641	1.025	1.632	1.059	1.648
					(1.429)	(0.956) *	(1.413)	(0.947) *	(1.439)	(0.960) *
Don't know					-0.026	**1.930**	-0.059	**1.898**	0.030	**1.861**
					(1.077)	**(0.874) †**	(1.081)	**(0.865) †**	(1.088)	**(0.872) †**
Male Caregiver Educational Attainment										
< High School					-1.704	-0.046	-1.633	-0.020	-1.737	-0.016
					(1.064)	(0.618)	(1.074)	(0.616)	(1.068)	(0.613)
Some College					0.332	-0.190	0.305	-0.200	0.359	-0.298
					(0.909)	(0.692)	(0.914)	(0.689)	(0.898)	(0.706)
College					0.424	0.893	0.333	0.890	0.488	0.858
					(0.691)	(0.787)	(0.689)	(0.798)	(0.711)	(0.778)
> College					0.896	**2.625**	0.800	**2.592**	0.939	**2.483**
					(1.883)	**(0.887) ‡**	(1.894)	**(0.909) ‡**	(1.869)	**(0.925) ‡**
Don't know					-0.714	-1.215	-0.707	-1.204	-0.738	-1.193
					(0.863)	(1.013)	(0.864)	(1.023)	(0.878)	(1.011)
Weight & Dieting										
Overweight							-0.481	-1.313		
							(0.491)	(1.261)		
SM*Overweight							-0.268	0.306		
							(0.282)	(0.318)		
Dieting									0.580	-1.497
									(0.650)	(0.791) *
SM*Dieting									0.198	0.105
									(0.366)	(0.184)
Constant	**15.580**	**15.515**	**16.536**	**15.331**	**17.161**	**14.817**	**17.278**	**15.223**	**16.956**	**15.582**
	(0.551) §	**(0.555) §**	**(0.908) §**	**(0.804) §**	**(0.873) §**	**(1.087) §**	**(0.842) §**	**(1.263) §**	**(0.843) §**	**(1.354) §**
Model Statistics										
R^2	0.000	0.004	0.012	0.006	0.031	0.026	0.032	0.027	0.032	0.029

Reference categories: Race/Ethnicity=White; Language Use=English-only; Female and Male Caregiver Educational Attainment=High school; Overweight= Underweight/Healthy Weight; and Dieting=Not currently trying to lose weight

All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Table 26: Supplemental Regression Models Predicting Fruit and Vegetable Consumption from Social Media and Overweight Status or Dieting Behavior

	Model 1: Overweight b(SE)		Model 2: Dieting b(SE)	
	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)
Social Media	0.037 (0.186)	**-0.379 (0.142)** ‡	0.065 (0.191)	**-0.362 (0.145)** †
Overweight	**-0.849 (0.301)** ‡	-0.525 (0.669)		
Dieting			0.868 (0.131)	-1.241 (0.694) *
Constant	**17.383 (0.870)** §	**14.934 (1.151)** §	**16.817 (0.983)** §	**15.434 (1.230)** §
Model Statistics				
R^2	0.031	0.027	0.032	0.029

Notes: Analyses control for other media types, race/ethnicity, language use at home, and female and male caregiver educational attainment.
Reference categories: Overweight = underweight/right weight; Dieting=not trying to lose weight
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Sugar Sweetened Beverages

Among male participants, the regression predicting consumption of sugar-sweetened beverages from social media use showed a significant bivariate association. Each additional hour of social media use was associated with an increase in the number of times sugar-sweetened beverages were consumed (b=0.659, p<.01). As can be seen in Model 2, the inclusion of other forms of media use led to a substantial decrease (32%) in the association between social media use and sugar-sweetened beverage consumption. The addition of control variables in Model 3 resulted in another small decrease (3%) in the association, yet it remained significant. Every additional hour of social media use was associated with a 0.436 increase in the number of sugar-sweetened beverages consumed, net of other variables in the model (p<.01). In other words, every two and a half hours of social media resulted in drinking roughly 1 more sugary drink per day. Model 4 suggests this relationship was not conditional on one's perception of their weight status. Yet, Model 5 shows the interaction term for dieting and social media was marginally significant. Table 28 shows additional analyses that were run to assess the independent effect of overweight status and weight control behaviors on sugar sweetened beverages. Holding all else

constant, males who perceived themselves to be overweight as compared those who did not consumed sugar-sweetened beverages 0.827 fewer times in the previous week ($p<.01$). Moreover, trying to lose weight was also associated with less sugar-sweetened beverage consumption ($b= -0.857$, $p<.01$).

The relationship between social media use and sugar-sweetened beverages appears to be different for females. Model 1 shows that there was a significant and positive focal relationship between time spent engaging with social media and sugar-sweetened beverages ($b=0.296$, $p<.01$). However, this relationship was attenuated when other types of media are entered into the model and it was no longer significant. Models 4 and 5 show that the relationship was not moderated by self-perceived weight status or dieting behaviors. In separate analyses the relationship between social media use and sugar-sweetened beverage consumption remained unchanged (see Table 28). Identifying as overweight was negatively associated with consuming these beverages ($b=-1.016$, $p<.001$) as was trying to lose weight ($b=-0.919$, $p<.01$).

Table 27: Regression Models Predicting Sugar-Sweetened Beverage Consumption From Social Media Use

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,443)	Female (n=2,375)	Male (n=2,443)	Female (n=2,375)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)
Media Types										
Social Media	**0.659 (0.114) §**	**0.296 (0.986) ‡**	**0.450 (0.143) ‡**	0.095 (0.094)	**0.436 (0.138) ‡**	0.067 (0.093)	**0.484 (0.139) ‡**	0.121 (0.111)	**0.587 (0.139) §**	0.078 (0.136)
TV			**0.189 (0.046) §**	**0.134 (0.048) ‡**	**0.183 (0.050) §**	**0.128 (0.047) ‡**	**0.187 (0.050) §**	**0.127 (0.048) ‡**	**0.189 (0.049) §**	**0.122 (0.048) †**
Gaming			0.026 (0.054)	**0.143 (0.053) ‡**	0.021 (0.052)	**0.131 (0.053) †**	0.023 (0.051)	**0.133 (0.053) †**	0.021 (0.052)	**0.132 (0.053) †**
Music			**0.249 (0.098) †**	0.026 (0.090)	**0.225 (0.097) †**	0.020 (0.085)	**0.222 (0.097) †**	0.037 (0.088)	**0.232 (0.095) †**	0.037 (0.086)
Internet			-0.193 (0.124)	0.055 (0.104)	-0.184 (0.131)	0.074 (0.104)	-0.179 (0.129)	0.082 (0.101)	-0.170 (0.136)	0.079 (0.103)
Race/Ethnicity										
Latino					**1.304 (0.445) ‡**	0.529 (0.439)	**1.340 (0.457) ‡**	0.614 (0.430)	**1.337 (0.453) ‡**	0.629 (0.425)
Black					**2.239 (0.674) ‡**	**1.700 (0.727) †**	**2.187 (0.681) ‡**	**1.679 (0.738) †**	**2.133 (0.716) ‡**	**1.657 (0.746) †**
Two or more					**1.757 (0.593) ‡**	0.552 (0.676)	**1.839 (0.597) ‡**	0.610 (0.658)	**1.805 (0.625) ‡**	0.566 (0.677)
Other					0.609 (0.580)	0.199 (0.415)	0.652 (0.583)	0.271 (0.394)	0.564 (0.572)	0.196 (0.430)
Language Use										
Spanish only					0.159 (0.525)	-0.131 (0.452)	0.175 (0.527)	-0.041 (0.461)	0.222 (0.516)	-0.180 (0.451)
English & Spanish					0.356 (0.423)	0.158 (0.227)	0.384 (0.418)	0.227 (0.234)	0.445 (0.407)	0.167 (0.227)
Other language					-0.461 (0.416)	**-1.128 (0.308) §**	-0.389 (0.411)	**-1.031 (0.339) ‡**	-0.391 (0.412)	**-1.071 (0.349) ‡**
Female Caregiver Educational Attainment										
< High School					-0.399 (0.468)	0.048 (0.391)	-0.382 (0.434)	0.099 (0.380)	-0.406 (0.474)	0.097 (0.391)
Some College					-0.537 (0.456)	0.068 (0.356)	-0.566 (0.471)	0.192 (0.332)	-0.608 (0.473)	0.113 (0.351)
College					0.488 (0.513)	-0.296 (0.394)	0.504 (0.516)	-0.296 (0.377)	0.467 (0.504)	-0.300 (0.402)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,443)	Female (n=2,375)	Male (n=2,443)	Female (n=2,375)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)
Female Caregiver Educational Attainment (continued)										
> College					-0.275	0.443	-0.268	0.508	-0.306	0.461
					(0.791)	(0.540)	(0.782)	(0.555)	(0.785)	(0.553)
Don't know					-0.247	0.486	-0.277	0.485	-0.308	0.436
					(0.482)	(0.284) *	(0.480)	(0.278) *	(0.494)	(0.289)
Male Caregiver Educational Attainment										
< High School					0.259	0.318	0.320	0.336	0.290	0.342
					(0.344)	(0.454)	(0.352)	(0.460)	(0.358)	(0.453)
Some College					0.554	-0.387	0.522	-0.470	0.519	-0.468
					(0.479)	(0.337)	(0.477)	(0.364)	(0.485)	(0.351)
College					0.764	-0.220	0.680	-0.282	0.697	-0.250
					(0.590)	(0.395)	(0.594)	(0.389)	(0.597)	(0.387)
> College					0.346	-0.361	0.266	-0.451	0.305	-0.475
					(0.548)	(0.481)	(0.549)	(0.484)	(0.550)	(0.473)
Don't know					0.876	-0.038	0.881	-0.091	0.905	-0.021
					(0.618)	(0.245)	(0.618)	(0.234)	(0.634)	(0.238)
Weight & Dieting										
Overweight							-0.514	-0.698		
							(0.282) *	(0.400) *		
SM*Overweight							-0.229	-0.124		
							(0.165)	(0.102)		
Dieting									-0.380	-0.929
									(0.305)	(0.475) *
SM*Dieting									-0.329	0.004
									(0.172) *	(0.119)
Constant	**3.939**	**2.753**	**2.958**	**1.994**	**1.312**	1.476	**1.439**	1.592	**1.413**	1.950
	(0.265) §	**(0.389) §**	**(0.257) §**	**(0.374) §**	**(0.432) ‡**	(0.858) *	**(0.431) ‡**	(0.892) *	**(0.384) §**	(1.033) *
Model Statistics										
R^2	0.026	0.011	0.042	0.032	0.055	0.045	0.059	0.055	0.061	0.052

Reference categories: Race/Ethnicity=White; Language Use=English-only; Female and Male Caregiver Educational Attainment=High school; Overweight= Underweight/Healthy Weight; and Dieting=Not currently trying to lose weight

All significant vales ($p \leq .05$) are bolded; *$p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Table 28: Supplemental Regression Models Predicting Sugar-Sweetened Beverage Consumption from Social Media and Overweight Status or Dieting Behavior

	Model 1: Overweight b(SE)		Model 2: Dieting b(SE)	
	Male (n=2,444)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)
Social Media	**0.416 (0.136)** ‡	0.070 (0.090)	**0.425 (0.138)** ‡	0.081 (0.090)
Overweight	**-0.827 (0.255)** ‡	**-1.016 (0.213)** §		
Dieting			**-0.857 (0.267)** ‡	**-0.919 (0.286)** ‡
Constant	**1.528 (0.446)** ‡	1.708 (0.888) *	**1.649 (0.4399** §	**1.944 (0.964)** †
Model Statistics				
R^2	0.058	0.054	0.059	0.052

Notes: Analyses control for other media types, race/ethnicity, language use at home, and female and male caregiver educational attainment.
Reference categories: Overweight = underweight/right weight; Dieting=not trying to lose weight
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Diet Soda

Model 1 in Table 29 shows there was a positive bivariate association between social media use and consumption of diet soda for both males and females. This relationship was mitigated when other forms of media were entered into the model. Thus it does not appear that social media was associated with diet soda consumption, regardless of the gender of the participant. Models 4 and 5 also show that the relationship does not depend on self-perceived weight status or dieting behavior. Furthermore, additional analyses showed that there were no direct relationships between self-perceived weight status or dieting behavior and diet soda consumption (see Table 30).

Table 29: Regression Models Predicting Diet Soda Consumption From Social Media Use

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,444)	Female (n=2,374)	Male (n=2,444)	Female (n=2,374)	Male (n=2,444)	Female (n=2,377)	Male (n=2,444)	Female (n=2,377)	Male (n=2,444)	Female (n=2,377)
Media Types (hours)										
Social Media	**0.142**	**0.097**	0.057	0.052	0.062	0.055	0.029	0.033	0.051	0.011
	(0.062) †	**(0.033) ‡**	(0.050)	(0.042)	(0.052)	(0.042)	(0.069)	(0.049)	(0.084)	(0.038)
TV			0.054	0.024	0.054	0.023	0.053	0.023	0.054	0.024
			(0.029) *	(0.018)	(0.029) *	(0.019)	(0.030) *	(0.018)	(0.029) *	(0.018)
Gaming			-0.030	0.042	-0.032	0.042	-0.032	0.042	-0.032	0.041
			(0.029)	(0.030)	(0.028)	(0.029)	(0.028)	(0.029)	(0.028)	(0.029)
Music			0.034	0.005	0.033	0.004	0.035	0.005	0.032	0.002
			(0.076)	(0.026)	(0.076)	(0.024)	(0.079)	(0.025)	(0.075)	(0.026)
Internet			0.076	0.022	0.073	0.024	0.072	0.024	0.072	0.024
			(0.056)	(0.042)	(0.053)	(0.042)	(0.054)	(0.042)	(0.054)	(0.042)
Race/Ethnicity										
Latino					-0.445	-0.148	-0.453	-0.144	-0.451	-0.152
					(0.320)	(0.275)	(0.319)	(0.276)	(0.318)	(0.276)
Black					0.202	0.125	0.226	0.125	0.210	0.134
					(0.549)	(0.339)	(0.553)	(0.342)	(0.560)	(0.338)
Two or more					-0.121	-0.189	-0.147	-0.186	-0.128	-0.185
					(0.308)	(0.227)	(0.312)	(0.227)	(0.306)	(0.227)
Other					-0.138	0.080	-0.150	0.082	-0.133	0.073
					(0.440)	(0.304)	(0.438)	(0.309)	(0.441)	(0.305)
Language Use										
Spanish only					-0.206	0.837	-0.204	0.833	-0.213	0.851
					(0.185)	(0.509)	(0.189)	(0.520)	(0.192)	(0.506) *
English &					-0.064	-0.046	-0.068	-0.049	-0.074	-0.045
Spanish					(0.300)	(0.187)	(0.301)	(0.192)	(0.300)	(0.185)
Other language					-0.386	-0.257	-0.406	-0.256	-0.393	-0.252
					(0.330)	(0.209)	(0.326)	(0.210)	(0.323)	(0.209)
Female Caregiver Educational Attainment										
< High School					0.227	**-0.512**	0.222	**-0.512**	0.229	**-0.514**
					(0.401)	**(0.134) §**	(0.397)	**(0.133) §**	(0.402)	**(0.133) §**
Some College					-0.027	0.083	0.018	0.084	0.020	0.085
					(0.272)	(0.367)	(0.272)	(0.365)	(0.278)	(0.366)
College					-0.222	-0.219	-0.227	-0.220	-0.218	-0.218
					(0.242)	(0.146)	(0.242)	(0.146)	(0.245)	(0.148)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,444)	Female (n=2,374)	Male (n=2,444)	Female (n=2,374)	Male (n=2,444)	Female (n=2,377)	Male (n=2,444)	Female (n=2,377)	Male (n=2,444)	Female (n=2,377)
Female Caregiver Educational Attainment (continued)										
> College					-0.165	-0.254	-0.166	-0.260	-0.161	-0.260
					(0.275)	(0.154) *	(0.279)	(0.154) *	(0.281)	(0.156) *
Don't know					0.244	-0.080	0.254	-0.085	0.249	-0.077
					(0.327)	(0.214)	(0.322)	(0.217)	(0.322)	(0.213)
Male Caregiver Educational Attainment										
< High School					-0.025	-0.066	-0.038	-0.064	-0.028	-0.070
					(0.332)	(0.124)	(0.337)	(0.123)	(0.334)	(0.124)
Some College					-0.179	-0.311	-0.161	-0.306	-0.176	-0.310
					(0.328)	(0.189)	(0.343)	(0.192)	(0.333)	(0.189)
College					-0.177	-0.105	-0.154	-0.101	-0.171	-0.105
					(0.302)	(0.240)	(0.302)	(0.240)	(0.303)	(0.242)
> College					-0.004	-0.190	0.024	-0.189	0.001	-0.177
					(0.466)	(0.211)	(0.483)	(0.212)	(0.470)	(0.214)
Don't know					-0.173	-0.112	-0.174	-0.106	-0.175	-0.114
					(0.494)	(0.226)	(0.494)	(0.234)	(0.493)	(0.223)
Weight & Dieting										
Overweight							-0.011	-0.141		
							(0.236)	(0.213)		
SM*Overweight							0.123	0.053		
							(0.180)	(0.096)		
Dieting									0.073	-0.111
									(0.192)	(0.106)
SM*Dieting									0.024	0.069
									(0.128)	(0.045)
Constant	**0.683**	**0.289**	**0.450**	0.124	0.914	0.500	**0.923**	**0.552**	0.888	**0.570**
	(0.119) §	**(0.081) §**	**(0.183)** †	(0.117)	(0.479) *	(0.266) *	**(0.468)** †	**(0.262)** †	(0.507) *	**(0.244)** †
Model Statistics										
R^2	0.004	0.005	0.009	0.009	0.015	0.022	0.016	0.022	0.015	0.023

Reference categories: Race/Ethnicity=White; Language Use=English-only; Female and Male Caregiver Educational Attainment=High school; Overweight= Underweight/Healthy Weight (perceived); and Dieting=Not currently trying to lose weight

All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$ § $p < .001$

Table 30: Regressions Predicting Diet Soda Consumption from Social Media and Overweight Status or Dieting Behavior

	Model 1: Overweight b(SE)		Model 2: Dieting b(SE)	
	Male (n=2,444)	Female (n=2,377)	Male (n=2,444)	Female (n=2,377)
Social Media	0.066 (0.054)	0.055 (0.042)	0.063 (0.052)	0.054 (0.042)
Overweight	0.158 (0.126)	-0.004 (0.108)		
Dieting			0.108 (0.139)	0.053 (0.112)
Constant	0.875 (0.492) *	0.501 (0.264) *	0.871 (0.516) *	
Model Statistics				
R^2	0.015	0.022	0.015	0.022

Notes: Analyses control for other media types, race/ethnicity, language use at home, and female and male caregiver educational attainment.
Reference categories: Overweight = underweight/right weight; Dieting=not trying to lose weight
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Junk Food

As can be seen in Table 31 Model 1, the regression predicting junk food consumption from social media use shows a substantial association between these two measures for males. Each additional hour of social media use was associated with an increase of consuming junk food 1.317 more times in the previous week ($p<.001$). As can be seen in Model 2, there was a 40% decrease in the association between social media use and junk food intake when other forms of media were included in the model. The addition of control variables in Model 3 resulted in an increase (7%) in the association between social media use and junk food consumption. When other forms of media, race/ethnicity, language use at home, and caregiver educational attainment are controlled for, each additional hour of time spent using social media was associated with a 0.848 increase in the number of times junk food was consumed in the previous week ($p<.001$). This translates into junk food being consumed 1 more time for every additional 1.18 hours of social media use. Model 4 indicates that the relationship between social media use and junk food consumption use did not depend on self-perceived weight status. Similar to sugar-sweetened beverages, however, the relationship did appear to depend on dieting behavior. For males who

are not dieting, 1 hour of additional social media use was associated with eating junk food 1.134 more times ($p<.001$). Among males who are dieting, each additional hour of social media use was associated with eating junk food 0.508 more times ($p<.05$) (not shown). Again, these results suggest that dieting buffers the deleterious effects of social media consumption. Finally, the extra analyses designed to assess whether there are independent effects of weight status showed that perceiving oneself to be overweight was associated with a reduction in the number of times junk food was consumed in the past week ($b=-1.348$, $p<.01$).

Among females, there was a significant, positive bivariate association between social media use and junk food consumption ($b=0.887$, $p<.001$). This relationship was weakened by 44% when other types of media were entered into the model. The addition of control variables in Model 3 resulted in another 13% drop in the association. Despite attenuation, the relationship between social media use and junk food consumption remained significant. Specifically, an additional hour of social media use was associated with a 0.432 increase in the number of times junk food was consumed. As can be seen in Model 4, there was a marginally significant interaction of weight status and social media use. Because it was only marginally significant, supplemental analyses testing the independent effect of perceiving oneself to be overweight were run and it was found to be associated with reduced junk food consumption ($b=-2.035$, $p<.001$). Lastly, the interaction of dieting status and social media was not significant but subsequent analyses reveled that there was an independent relationship between dieting behavior and junk food consumption. Specifically, trying to lose weight was associated with a substantial decrease in the number to times junk food was consumed ($b=-2.930$, $p<.001$).

Table 31: Regression Models Predicting Junk Food Consumption From Social Media Use

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,441)	Female (n=2,375)	Male (n=2,441)	Female (n=2,375)	Male (n=2,442)	Female (n=2,378)	Male (n=2,442)	Female (n=2,378)	Male (n=2,442)	Female (n=2,378)
Media Types (hours)										
Social Media	**1.317 (0.187) §**	**0.887 (0.143) §**	**0.796 (0.186) §**	**0.498 (0.163) †**	**0.848 (0.188) §**	**0.432 (0.178) †**	**0.922 (0.262) §**	**0.609 (0.191) ‡**	**1.134 (0.263) §**	**0.728 (0.160) §**
TV			**0.334 (0.103) ‡**	**0.299 (0.041) §**	**0.339 (0.103) ‡**	**0.294 (0.042) §**	**0.345 (0.101) ‡**	**0.291 (0.044) ‡**	**0.353 (0.105) ‡**	**0.274 (0.043) §**
Gaming			0.023 (0.088)	**0.457 (0.158) ‡**	0.029 (0.086)	**0.452 (0.156) ‡**	0.031 (0.087)	**0.457 (0.158) ‡**	0.028 (0.088)	**0.456 (0.157) ‡**
Music			0.130 (0.187)	- 0.015 (0.176)	0.145 (0.186)	0.003 (0.173)	0.141 (0.184)	0.034 (0.179)	0.163 (0.193)	0.056 (0.172)
Internet			**0.297 (0.147) †**	0.216 (0.126) *	0.243 (0.145) *	0.190 (0.128)	0.253 (0.144) *	0.205 (0.128)	0.274 (0.142) *	0.202 (0.137)
Race/Ethnicity										
Latino					-0.517 (0.701)	**-2.252 (0.965) †**	-0.457 (0.692)	**-2.085 (0.932) †**	-0.442 (0.693)	**-1.930 (0.932) †**
Black					-1.099 (1.238)	0.783 (1.910)	-1.185 (1.218)	0.730 (0.730)	-1.332 (1.228)	0.583 (1.881)
Two or more					0.118 (0.587)	-1.357 (1.008)	0.242 (0.548)	-1.245 (0.995)	0.218 (0.642)	-1.335 (1.027)
Other					0.404 (0.837)	-0.221 (1.575)	0.484 (0.836)	-0.086 (1.545)	0.301 (0.841)	-0.172 (1.621)
Language Use										
Spanish only					-0.618 (0.895)	-0.769 (0.737)	-0.595 (0.890)	-0.557 (0.707)	-0.442 (0.876)	-0.981 (0.656)
English & Spanish					-0.831 (0.599)	-0.219 (0.914)	-0.788 (0.579)	-0.070 (0.918)	-0.600 (0.588)	-0.200 (0.921)
Other language					-0.191 (1.020)	-0.926 (0.683)	-0.078 (1.028)	-0.733 (0.688)	-0.003 (1.077)	-0.819 (0.744)
Female Caregiver Educational Attainment										
< High School					-0.038 (0.991)	-0.329 (0.605)	-0.008 (0.989)	-0.237 (0.596)	-0.059 (0.984)	-0.199 (0.612)
Some College					0.281 (0.824)	-1.344 (0.805) *	0.230 (0.816)	-1.106 (0.822)	0.109 (0.838)	-1.227 (0.800)
College					0.723 (0.840)	-1.047 (0.959)	0.751 (0.824)	-1.05 (0.908)	0.659 (0.835)	-1.064 (0.900)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,441)	Female (n=2,375)	Male (n=2,441)	Female (n=2,375)	Male (n=2,442)	Female (n=2,378)	Male (n=2,442)	Female (n=2,378)	Male (n=2,442)	Female (n=2,378)
Female Caregiver Educational Attainment (continued)										
> College					0.595	-0.085	0.606	0.056	0.497	-0.012
					(1.141)	(1.124)	(1.133)	(1.126)	(1.163)	(1.140)
Don't know					-0.539	0.756	-0.592	0.745	-0.684	0.588
					(0.844)	(0.914)	(0.813)	(0.891)	(0.815)	(0.894)
Male Caregiver Educational Attainment										
< High School					0.271	0.061	0.374	0.091	0.367	0.146
					(0.541)	(0.793)	(0.584)	(0.780)	(0.589)	(0.734)
Some College					0.573	0.505	0.534	0.329	0.514	0.256
					(0.672)	(1.001)	(0.696)	(1.035)	(0.673)	(0.994)
College					0.843	0.040	0.702	-0.099	0.673	-0.057
					(0.987)	(0.875)	(0.967)	(0.894)	(1.003)	(0.893)
> College					0.461	0.805	0.322	0.639	0.346	0.405
					(0.763)	(0.669)	(0.748)	(0.674)	(0.762)	(0.655)
Don't know					**1.575**	-0.449	**1.584**	-0.571	**1.645**	-0.381
					(0.798) †	(0.683)	**(0.772)** †	(0.677)	**(0.771)** †	(0.644)
Weight & Dieting										
Overweight							-0.866	-0.962		
							(0.544)	(0.673)		
SM*Overweight							-0.352	-0.417		
							(0.441)	(0.242) *		
Dieting									**-1.256**	**-1.972**
									(0.559) †	**(0.686)** ‡
SM*Dieting									**-0.625**	-0.394
									(0.291) †	(0.257)
Constant	**7.698**	**8.060**	**5.878**	**6.256**	**5.809**	**8.355**	**6.018**	**8.421**	**6.200**	**9.296**
	(0.258) §	**(0.448)** §	**(0.455)** §	**(0.509)** §	**(0.991)** §	**(1.290)** §	**(1.009)** §	**(1.333)** §	**(1.024)** §	**(1.482)** §
Model Statistics										
R^2	0.041	0.023	0.063	0.054	0.071	0.066	0.076	0.075	0.085	0.083

Reference categories: Race/Ethnicity=White; Language Use=English-only; Female and Male Caregiver Educational Attainment=High school; Overweight= Underweight/Healthy Weight (perceived); and Dieting=Not currently trying to lose weight

All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Table 32: Regressions Predicting Junk Food Consumption from Social Media and Overweight Status or Dieting Behavior

	Model 1: Overweight b(SE)		Model 2: Dieting b(SE)	
	Male (n=2,442)	Female (n=2,378)	Male (n=2,444)	Female (n=2,378)
Social Media	**0.816 (0.185) §**	**0.438 (0.177) †**	N/A	**0.475 (0.178) ‡**
Overweight	**-1.348 (0.442) ‡**	**-2.035 (0.438) §**		
Dieting			N/A	**-2.930 (0.421) §**
Constant	**6.156 (1.027) §**	**8.814 (1.288) §**	N/A	**9.856 (1.408) §**
Model Statistics				
R^2	0.075	0.074	N/A	0.082

Notes: Analyses control for other media types, race/ethnicity, language use at home, and female and male caregiver educational attainment.
Reference categories: Overweight = underweight/right weight; Dieting=not trying to lose weight
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Fast Food

Table 33 shows the relationship between social media and fast food consumption. Among male participants, each additional hour of social media use was associated with a 0.559 increase in the number of times fast food was consumed ($p<.001$). Models 2 and 3 include other forms of media as well as potential confounders. When those variables were included the original relationship was lessened by almost 49%. Still, social media was significantly associated with frequency of fast food consumption ($b=0.287$, $p<.01$). Models 4 and 5 showed that the relationship was not dependent on self-perceived weight status or dieting behavior. Further analyses of independent effects of these factors on fast food consumption indicate that perceiving oneself as overweight was independently associated with a reduction of 0.526 in the number of times fast food was consumed (see Table 34). Moreover, trying to lose weight was marginally associated with reduced fast food consumption ($b=-0.392$, $p<.10$).

As can be seen in Table 33 Model 1, the regression predicting eating fast food consumption from social media use shows a small association between these two measures for females. Each additional hour of social media use was associated with an increase in the number

of times fast food was consumed (b=0.255, p<.001). As can be seen in Model 2, the inclusion of other forms of media use lead to a very large decrease (59%) in the association between social media use and fast food intake. The addition of control variables in Model 3 resulted in another drop attenuating the relationship. Models 4 and 5 show that the relationship between social media use and fast food consumption was not dependent on self-perceived weight status or dieting behavior. Follow-up analyses revealed self-perceived weight status was not associated with fast food consumption but trying to lose weight was independently associated with less fast food consumption (b=-0.728, p<.001) (see Table 34).

Table 33: Regression Models Predicting Fast Food Consumption From Social Media Use

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,443)	Female (n=2,377)	Male (n=2,443)	Female (n=2,377)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Media Types (hours)										
Social Media	**0.559 (0.107) §**	**0.255 (0.039) §**	**0.288 (0.090) ‡**	**0.105 (0.056) ***	**0.287 (0.084) ‡**	0.085 (0.058)	**0.374 (0.078) §**	**0.134 (0.056) †**	**0.342 (0.118) ‡**	0.145 (0.104)
TV			**0.184 (0.049) §**	**0.072 (0.029) †**	**0.182 (0.050) §**	**0.069 (0.029) †**	**0.186 (0.049) §**	**0.068 (0.029) †**	**0.185 (0.050) §**	**0.064 (0.029) †**
Gaming			0.033 (0.044)	**0.179 (0.049) §**	0.034 (0.042)	**0.170 (0.051) ‡**	0.034 (0.042)	**0.172 (0.051) ‡**	0.034 (0.042)	**0.171 (0.051) ‡**
Music			0.108 (0.069)	0.052 (0.074)	0.117 (0.074)	0.057 (0.073)	0.109 (0.074)	0.060 (0.074)	0.120 (0.075)	0.070 (0.070)
Internet			0.091 (0.065)	0.037 (0.052)	0.076 (0.061)	0.049 (0.052)	0.080 (0.059)	0.051 (0.051)	0.081 (0.063)	0.052 (0.051)
Race/Ethnicity										
Latino					**0.710 (0.358) †**	0.045 (0.453)	**0.7428 (0.323) †**	0.065 (0.460)	**0.725 (0.359) †**	0.126 (0.449)
Black					1.351 (0.785) *	1.076 (0.729)	1.295 (0.792)	1.071 (0.725)	1.312 (0.810)	1.033 (0.722)
Two or more					0.634 (0.567)	0.053 (0.353)	0.697 (0.545)	0.067 (0.351)	0.653 (0.581)	0.058 (0.339)
Other					0.379 (0.365)	0.047 (0.353)	0.416 (0.353)	0.066 (0.343)	0.356 (0.369)	0.059 (0.359)
Language Use										
Spanish only					-0.382 (0.372)	0.567 (0.616)	-0.375 (0.374)	0.598 (0.624)	-0.351 (0.383)	0.515 (0.606)
English & Spanish					-0.273 (0.479)	0.307 (0.324)	-0.251 (0.470)	0.331 (0.333)	-0.232 (0.468)	0.311 (0.323)
Other language					0.367 (0.644)	-0.158 (0.302)	0.417 (0.638)	-0.129 (0.305)	0.405 (0.632)	-0.130 (0.305)
Female Caregiver Educational Attainment										
< High School					-0.384 (0.382)	-0.157 (0.254)	-0.367 (0.371)	-0.144 (0.259)	-0.386 (0.375)	-0.122 (0.251)
Some College					-0.371 (0.445)	-0.192 (0.229)	-0.393 (0.440)	-0.156 (0.219)	-0.402 (0.451)	-0.172 (0.234)
College					-0.098 (0.324)	0.047 (0.272)	-0.084 (0.317)	0.049 (0.274)	-0.111 (0.318)	0.045 (0.274)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Male (n=2,443)	Female (n=2,377)	Male (n=2,443)	Female (n=2,377)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Female Caregiver Educational Attainment (continued)										
> College					-0.291	0.096	-0.284	0.122	-0.307	0.115
					(0.456)	(0.312)	(0.449)	(0.313)	(0.462)	(0.330)
Don't know					0.146	0.699	0.116	0.706	0.120	0.661
					(0.339)	(0.490)	(0.336)	(0.495)	(0.335)	(0.492)
Male Caregiver Educational Attainment										
< High School					-0.411	0.251	-0.369	0.253	-0.393	0.276
					(0.428)	(0.306)	(0.459)	(0.310)	(0.435)	(0.308)
Some College					-0.257	0.007	-0.302	-0.024	-0.269	-0.044
					(0.346)	(0.389)	(0.366)	(0.383)	(0.342)	(0.381)
College					**-0.681**	-0.397	**-0.742**	-0.421	**-0.710**	-0.416
					(0.287) †	(0.292)	**(0.273)** ‡	(0.292)	**(0.279)** †	(0.280)
> College					**-0.913**	-0.549	**-0.992**	-0.574	**-0.934**	-0.647
					(0.463) †	(0.487)	**(0.464)** †	(0.495)	**(0.463)** †	(0.492)
Don't know					-0.521	-0.275	-0.516	-0.298	-0.507	-0.255
					(0.394)	(0.454)	(0.393)	(0.456)	(0.391)	(0.455)
Weight & Dieting										
Overweight							-0.074	0.013		
							(0.263)	(0.212)		
SM*Overweight							-0.330	-0.117		
							(0.224)	(0.071)		
Dieting									-0.221	**-0.538**
									(0.264)	**(0.227)** †
SM*Dieting									-0.118	-0.078
									(0.209)	(0.113)
Constant	**2.103**	**1.850**	**1.045**	**1.262**	1.114	**0.995**	1.122	**0.950**	**1.182**	**1.253**
	(0.171) §	**(0.172)** §	**(0.244)** §	**(0.187)** §	(0.630) *	**(0.449)** †	(0.583) *	**(0.421)** †	**(0.594)** †	**(0.483)** ‡
Model Statistics										
R2	0.035	0.014	0.067	0.036	0.074	0.047	0.079	0.049	0.076	0.054

Reference categories: Race/Ethnicity=White; Language Use=English-only; Female and Male Caregiver Educational Attainment=High school; Overweight= Underweight/Healthy Weight (perceived); and Dieting=Not currently trying to lose weight
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Table 34: Regressions Predicting Fast Food Consumption from Social Media and Overweight Status or Dieting Behavior

	Model 1: Overweight b(SE)		Model 2: Dieting b(SE)	
	Male (n=2,443)	Female (n=2,378)	Male (n=2,443)	Female (n=2,378)
Social Media	**0.276 (0.084)** ‡	0.086 (0.058)	**0.283 (0.085)** ‡	0.095 (0.059)
Overweight	**-0.526 (0.161)** ‡	-0.288 (0.214)		
Dieting			-0.392 (0.201) *	**-0.728 (0.179)** §
Constant	**1.249 (0.632)** †	**1.060 (0.435)** †	1.266 (0.658) *	**1.364 (0.478)** ‡
Model Statistics				
R^2	0.077	0.048	0.076	0.054

Notes: Analyses control for other media types, race/ethnicity, language use at home, and female and male caregiver educational attainment.
Reference categories: Overweight = underweight/right weight; Dieting=not trying to lose weight
All significant vales ($p \leq .05$) are bolded; * $p \leq .10$; † $p \leq .05$; ‡ $p \leq .01$; § $p < .001$

Summary of Findings

The goal of Aim 3 was to understand how social media consumption uniquely influences eating behaviors. In addition to determining whether social media use was associated with eating behaviors, I assessed whether the effects were exacerbated for females, individuals who perceived themselves to be overweight, and individuals who were trying to lose weight.

Social Media: After controlling for other forms of media use and demographic characteristics, social media was associated with poor dietary behaviors. For males, social media use was associated with increased sugar-sweetened beverage, junk food, and fast food consumption. For females, social media was associated with less fruit and vegetable consumption and more junk food consumption. Social media was not associated with diet soda consumption for either males or females.

Gender: The effect of social media on eating behaviors was consistently moderated by gender. The effect of social media on fruit and vegetable consumption was different and worse for females. However, the effect of social media on sugar-sweetened beverages, junk food and

fast food consumption was different and worse for males. Thus, there may differential vulnerability to social media consumption.

Perceived Weight Status: Believing that you are overweight did not moderate any of the relationships between social media consumption and eating behaviors. However, it was independently associated with reduced consumption of fruit and vegetables, sugar-sweetened beverages, junk food and fast food for males and independently associated with less sugar-sweetened beverage and junk food consumption for females. These findings suggest that individuals may restrict overall caloric intake when they perceive themselves to be overweight. That is, they eat less of everything rather than eating more healthy items and fewer unhealthy items.

Weight Control Behaviors: There was weak evidence to suggest that dieting modifies the relationship between social media use and eating behaviors. Dieting was only found to moderate the relationship between social media use and junk food consumption for males. In this way dieting served to buffer or lessen the effect of social media use. However, when the independent effect of dieting was assessed it was associated with reduced sugar-sweetened beverage consumption for males and associated with reduced sugar-sweetened beverage, junk food, and fast food consumption for females. This suggests that dieting constrains eating behaviors.

CHAPTER 6: DISCUSSION

Overview of Findings

Adolescents spend almost nine hours a day engaging with media. As a result, they are confronted with large amounts of obesogenic content that shapes their understanding of what are normal and acceptable eating behaviors. Utilizing primary data collected from a sample of 4,838 low-income, racially and ethnically diverse middle school students in Los Angeles County, I studied the effects of different types of media use (i.e., social media, TV/movies/videos, gaming, music, Internet) on dietary patterns and weight outcomes. I assessed (1) whether those effects were mediated by health behaviors (i.e., snacking while consuming media, sleep duration, physical activity); and (2) whether it was possible to buffer the deleterious effects of media consumption on eating behaviors by associating with friends who are perceived to place importance on eating healthfully, are perceived to be dieters, or by having classmates who eat more healthfully, or by having classmates who are on average slim. I also examined social media specifically and assessed whether the effects on dietary behaviors were exacerbated for individuals who perceive themselves to be overweight or are trying to lose weight. In this way, I was able to gain a clearer picture of the social and environmental determinants of obesity risk in adolescents.

I found that there were gender differences in the amount of time youth spend using various types of media as well as in reported eating behaviors. My research showed that females spend about an hour more a day consuming media than males. It is noteworthy, however, that time estimates for both genders (14.68 hours) far exceeds what has previously been reported (9 hours).[19] In terms of specific media types, I found that females spend more time on an average

school day using social media, watching TV, listening to music, and using the Internet, whereas males spend a greater amount of time gaming. Furthermore, there were mixed findings regarding eating. Females consumed fewer fruits and vegetables and more junk food than do males, suggesting poorer eating behaviors. However, they also consumed fewer sugar-sweetened beverages and eat fast food less often than their male counterparts, suggesting more optimal behavior.

My first aim examined whether specific types of media use were associated with eating behaviors (i.e., fruit and vegetable, sugar-sweetened beverage, diet soda, junk food, and fast food) and weight status (i.e., BMI percentile) and whether those relationships were explained by individual-level health behaviors (i.e., snacking while consuming media, sleep duration, physical activity). There were two important findings associated with this aim. First, consumption of all types of media, except the Internet, was negatively associated with at least one eating behavior even after controlling for other forms of media, individual-level health behaviors, and sociodemographic characteristics. No media types were associated with BMI percentile. The second major finding was that the evidence was strongest for snacking while consuming media as a mediator of the relationship between media consumption and dietary behaviors /weight status. Specifically, snacking while consuming media consistently explained the relationship between multiple types of media (i.e., social media, TV/movies/videos, gaming) and all outcomes of interest for both males and females, whereas sleep duration and physical activity only explained the relationship in limited contexts (i.e., specific media types / specific eating outcomes / for males but not females). I found that sleep duration predominantly explained the relationship between music consumption and several poor dietary behaviors among male youth. Similarly, physical activity explained the relationship between certain media (i.e., social media,

gaming, music) and particular outcomes (i.e., fruit and vegetable consumption, sugar-sweetened beverage consumption), also only for males.

My second aim tested whether it is possible for friends and physical education classmates to buffer the deleterious effects of media consumption. There was little evidence to suggest that the relationships between cumulative media consumption (i.e., total time spent using media across multiple platforms) and eating behaviors were dependent on perceptions regarding friend behaviors or the actual behaviors or weight status of classmates. However these factors (i.e., perceptions/behaviors of friends/classmates) often had an independent relationship with eating outcomes. Generally, perceiving that friends behaved healthfully was associated with better dietary behaviors for both males and females. Conversely, poor dietary behaviors among classmates were sometimes associated with worse eating patterns among individuals (i.e., more junk food consumption for females, more fast food consumption for males). The one notable exception was for females where classmates' consumption of fruits and vegetables was associated with increased consumption of these healthy foods. Thus, friends/classmates can be protective when individuals "think" or know that their friends/classmates are engaging in healthful behaviors but can also be detrimental when the actual behaviors of classmates normalize and model unhealthy eating habits.

The third aim in my dissertation examined whether the social media was associated with eating behaviors and whether the effects of social media use were exacerbated for females, those who perceive themselves to be overweight, or those trying to lose weight. I hypothesized that overweight individuals might exhibit less restraint, and further posited that individuals who are dieting might perceive that they are deprived of "delicious" food. As a consequence of both factors, these individuals would be more sensitive to external cues to eat found in social media. I

found social media was associated with poor dietary behaviors. However, contrary to expectations, I found the effects of social media to be greater for males. Further, there was some evidence that dieting actually buffered the adverse consequences associated with social media consumption on specific eating behaviors among male students. That is, the effect of having more social media consumption on sugar-sweetened beverage and junk food consumption was different (and less) for those who reported they were trying to lose weight as compared to those who were not dieting. While weight status and dieting behavior did not consistently moderate the effect of social media use, I found these factors were often independently associated with less frequent consumption of both healthy and unhealthy foods. Taken together these findings suggest that weight-related concerns and weight control behaviors restrain consumption of discretionary calories that come from products like sugar-sweetened beverages, junk food and fast food.

What Does This All Mean?

Media matters! I have consistently demonstrated in this dissertation that media consumption is consequential to the diet of middle school students. This was a robust finding. Independent of health behaviors, friends, classmates, weight status, and dieting behaviors, media consumption was associated with poor eating outcomes. Although the effect sizes were not enormous, we must not ignore the fact that exposure to media results in greater consumption of sugar-sweetened beverages, junk food and fast food. The media gives youth a distorted view of reality in which people are stick thin, but can still eat as much as they want, do not gain weight, and do not have to face negative health consequences like obesity, high blood pressure, elevated cholesterol, and diabetes. In reality, people are not stick thin, they do gain weight as a result of overconsumption of calorie dense foods/beverages, and experience both physical and emotional

consequences of excess weight gain. The problem is greater than just the misrepresentation of what people can do. The media are actively manipulating youth to over consume products with poor nutritional value and that have a negative impact on obesity, a major risk factor for chronic disease. The production, manufacturing, and marketing of these products means that marketers rather than nutritionists or health providers tell youth how and what they should spend their money on, while implying that their purchases will make them happy, popular, (and likely) thin.

The findings regarding the association between media consumption and eating behaviors of this dissertation are consistent with what others have found. Many studies have observed associations between watching TV, [160-163] listening to music,[164] and gaming[165] and increased food intake. Additionally the findings are consistent with other fields of research that report other negative consequences of excessive media consumption. Convincing evidence exists to suggest associations between exposure to ideal-body images in the media and weight and body image outcomes, associations between exposure to violence in the media and antisocial outcomes, associations between exposure to sexual content in the media and permissive views towards sex, sexuality, and sexual behaviors, and associations between exposure to tobacco advertising and smoking uptake.[67] Thus, one must resist the urge to downplay the role of the media; there is genuine concern that it influences youth on an array of salient issues during this developmental period.

Champions in theory, partners in crime. Family, friends, and classmates are part of the social networks of youth. Social networks can be divided into three categories: primary networks (e.g., family, close friends), secondary networks (e.g., informal friends, social clubs), and tertiary networks (e.g., formal organizations, the media).[166] Understandably primary networks exert the most influence on youth. The role of family is beyond the scope of this dissertation, but I will

briefly mention that family plays a central role in the development of tastes, preferences and dietary behaviors of youth. Parents pass down their tastes and preferences to their children through their behaviors, resulting in significant similarities between parents and children.[167] During adolescence, parental influence declines and peers become more dominant.[167]

A slightly different picture emerges when friends/classmates are considered: my findings highlight that to the extent that individuals believed it was important to their friends to eat healthfully it was health promoting. Yet, the to the extent that classmates actually ate poorly it sometimes had a detrimental effect. In general, the findings were consistent with the broader research literature on peer effects on eating. Friends have been shown to be "partners in crime" in eating behaviors, often purchasing and sharing highly palatable foods like chips, cookies and sugar-sweetened beverages.[168,169]

There is ambiguity in the causal mechanism that explains why friends/classmates are so important. In Chapter 2 I discussed several possible explanations, including homophily, which suggests that youth choose friends who are like themselves (i.e., "birds of feather flock together").[126,129] An alternative explanation is modeling, where young people are responding to and emulating what their friends and classmates are doing.[126] Another explanation is, social contagion, which suggests norms are changing in terms of what appropriate eating behaviors are rather than a behavior spreading.[126,127,129] This dissertation does not allow me to determine which of these explanations is correct. However, I argue the classmate findings are the most helpful in understanding how this might work. Because classmates are more of a random draw, findings that show behaviors to be associated with classmates' behaviors cannot be due to selection issues. Thus, the most likely explanations are modeling or social contagion and not homophily. During adolescence there is significant importance placed on social acceptance[170] and it may be that

eating behaviors are a manifestation of youth conforming to prevailing social norms and trying to gain approval.

Snacking explains a lot. Going into this study I assumed the relationship between snacking and other eating behaviors could be rationalized by one of two potential explanations. Using microeconomic terms, I assumed snacking would either be a substitute or a complement to the consumption of other foods. For example, water is a substitute for soda and apples are a substitute for cookies. To illustrate what this would look like, imagine a person is only capable of consuming a maximum of 1000 calories per day. If that person consumes 500 calories from eating cookies while consuming media, then it means there are only 500 calories available for the rest of the day, as there would be no excess caloric intake. Snacking while consuming media would then replace the consumption of regular, more balanced meals. Conversely, a complement is when two things go together, such as cookies and milk. Therefore, if snacking while consuming media complements other dietary behaviors it would result in increased overall caloric intake. In this dissertation I found that more time spent engaging with social media, TV/movies/videos, and gaming was associated with higher frequency of snacking. As snacking increased, consumption of unhealthy foods also increased; however, snacking while consuming media potentially displaced consumption of fruits and vegetables. Thus, findings suggest both scenarios may simultaneously be true.

A biological explanation that focuses on hunger and satiety suggests that viewing conditions inhibit satiety cues resulting in increased consumption.[100,160] This may suggest that snacking during media consumption is not satisfying; if snacking during media consumption was truly satiating, I would have found snacking to be associated with less sugar-sweetened beverage and fast food consumption rather than more. However, other research argues that increased

consumption is a result of "mindless eating." When people eat while distracted, they may not pay attention to the quantity and quality of foods that are being consumed or may not realize they are eating at all.[10] Experiments have demonstrated there are medium to large effects on subsequent snacking due to diverting attention (i.e., watching TV, gaming) during eating.[171] Findings of this dissertation support this hypothesis.

Snacking is particularly problematic from the perspective of trying to curb the obesity epidemic. Increased snacking may result in less healthy foods being consumed because the majority of quick and easy convenience foods tend to be high in salt, sugar and fat. The food industry spends considerable time and resources developing, packaging and marketing foods that are irresistible. Food technicians research sugar, fat, and salt combinations to make foods and beverages most enjoyable, aiming for the perfect combination, known as the "bliss point".[172] Evidence suggests that the brain processes combinations of these ingredients similarly to that of drugs.[173] Thus, many of these foods have the potential to become incredibly addicting.

Sleep should matter more. Despite evidence backing the importance of sleep in shaping health behaviors and health outcomes, findings suggest that sleep duration only explained the relationship between media consumption and eating behaviors in limited contexts (i.e., specific media / males but not females). These were the most surprising set of findings in this dissertation. To date, the research on sleep has consistently demonstrated an inverse relationship between media consumption and sleep.[174,175] Access to and use of a media device has been shown to be adversely associated with a range of sleep outcomes including inadequate sleep quantity, poor sleep quality, and excessive daytime sleepiness.[176] Yet in this dissertation I found that for males the only type of media use associated with sleep deprivation was music consumption. The pattern of findings for females was more in line with what was expected. For females, gaming,

music, and the Internet were all associated with shorter sleep durations while TV/movies/videos were associated with more sleep, which was somewhat perplexing. However, a recent systematic review found that of all media devices, TVs were the least likely to demonstrate negative associations with sleep outcomes,[175] potentially due to the passive nature this medium.[177] One explanation for differences between my findings and the larger body of literature is that I focused on specific types of media content (e.g., social media, TV, gaming, music) rather than type of devise (e.g., computer, tablet, smartphone). A second reason for the discrepancy is that there may be a publication bias in which studies without significant findings are underrepresented in the literature.[175]

The findings regarding the relationship between sleep duration and eating behaviors were also surprising. Research has found increased food intake,[106-108] increased consumption of sweets,[109] increased consumption of high-fat foods,[112,113] increased consumption of carbohydrates,[109,112-114] increased consumption of sugar-sweetened beverages,[115] and lower fruit and/or vegetable intake[114-116] to be associated with insufficient sleep. Together these findings suggest that sleep deprivation increases the desire for highly palatable foods. Among males in my sample, more sleep was associated with increased fruit and vegetable consumption, decreased sugar-sweetened beverage consumption and decreased diet soda consumption. I did not find, however, a relationship between sleep duration and junk food consumption or fast food consumption. Additionally, for females, the only eating behavior associated with sleep was junk food consumption. It may be that youth in this sample were not sleep deprived enough. The National Sleep Foundation indicates that teens need between 8-10 hours of sleep per night.[178] However, The average number of hours of sleep among participants was 7.43, and only 10.10%

reported sleeping fewer than 6 hours. Thus, the range may be too small to detect differences or perhaps they are not sleep deprived enough to for negative consequences to manifest.

Given these unexpected findings it should be no surprise that there were limited indirect paths from media consumption to eating behaviors through sleep. I suspect there are a few other explanations. First, this sample was comprised of lower socioeconomic status youth. Despite the fact that media devices are ubiquitous,[30] there may be limitations to their use among specific populations. If, for example, youth have pay-as-you-go smartphones with limited available data they may not be able to consume similar amounts of media through mobile devises as compared to their peers with limitless data plans. Second, these were relatively young adolescents and perhaps I might have had different findings for older adolescents. This certainly is supported by the literature on drugs and alcohol where use of drugs and consumption of alcohol increases as adolescents get older.[179]

There are gender differences. Although the majority of analyses were not designed to test gender differences, when tested I found that males and females are differentially engaged with media and that there may be differential vulnerability to specific media consumption. Therefore, I think it is important to briefly discus what this may mean to the field of research in this area. The effect of social media consumption on dietary behaviors was greater for males than females. Messages directed at females about weight and diet are pernicious and begin at an early age. Furthermore, young girls are often given dolls that objectify women and reinforce the body ideal and they play with toy kitchens, easy bake ovens, and host tea parties, all things that serve to bolster a girl's relationship to food. Thus, females are programmed from an early age to be thinking about weight and diet. So while the media may be replete with obesogenic content, I speculate that girls may have built up resistance to those messages and cues to eat. Boys

conversely may be less sensitized to that content and hence more vulnerable to the marketing messages.

Limitations

There are a number of important limitations worth mentioning. Most importantly, this dissertation relies on cross-sectional data. As with all cross-sectional studies, it is not possible to determine causality.[180] Additionally, this dissertation primarily relies on self-reported data that may suffer from various types of bias including recall bias and social desirability.

There are also several noteworthy critiques regarding the eating behavior measures utilized in this dissertation. Rather than using a comprehensive measure of overall diet quality, I relied on one or two questions to capture broad food categories. These categories served as indicators of a healthful diet (i.e., fruit and vegetable consumption and limited intake of fat, sodium and sugar). However, it is often insufficient to measure food categories with only one or two questions. Moreover, because these questions required participants to retrospectively estimate consumption they were cognitively burdensome and questions like these have been found to result in biased estimates.[181] Measures such as the 24-hour dietary recall or food diary would have strengthened this study. At the very least, including a larger number of items to measure food categories would have improved estimates of consumption. Unfortunately, none of these options would have been feasible considering the constraints of a large-scale data collection effort in a public school setting. Moreover, they would not have been appropriate because dietary intake was not the primary interest of the study. Despite the aforementioned limitations, it should be noted there are benefits to the questions utilized. Many of the eating behavior questions were adopted from existing measures including the YRBS and California

Health Information Survey. Thus, findings can be compared to findings from nationally representative and state-based representative surveys.

Similarly, there are limitations with the measures of media consumption. Data were only collected regarding the average weekday (i.e., Monday through Friday), while no information was solicited about weekend media use. If weekend media use is qualitatively different, and higher than weekday use, then estimates may be biased downward. Conversely, the measure did not ask respondents to report on media multitasking so it is likely that estimates of media use are biased upwards. Data were not collected on exposure to content. Because of this, I am making an assumption that individuals are exposed to food-related content because of the prevalence of obesogenic content in old and new media. However, these data do not allow me to determine that empirically. Ideally, I would have been able to collect information on what media youth were using, what device they used to access that media type, and to what content they were exposed. I would be remiss if I did not also acknowledge the fact that this survey did not capture information on devise ownership and facilitators or barriers of use including parental restrictions around night-time use, availability of devises in the bedroom, access to wifi and other data plan issues.

There are also limitations with the measure of physical activity utilized in this study. The question asked participants to indicate how many days they were physically active for 60 minutes or more during the day. Regrettably, this measure fails to capture any person who is physically active for less than 60 minutes. This may be particularly consequential for this sample as observations of participants' physical education classes revealed students were only active on average for 38.7 minutes of their 56.6 minute classes due to the time it takes to dress/undress and take attendance.[182] An added concern is that the question does not ask about activity level;

therefore, all activity is treated as equal. Although having an estimated number of minutes per day and intensity of physical activity may have improved the physical activity measure, there would be new concerns regarding the accuracy of this type of self-reported data. Use of self-reported data could be improved by using devises such as pedometers, accelerometers, armbands, and/or heart rate monitors.[183] However, the question regarding physical activity did come from YRBS allowing the findings to be compared to other studies.

Finally, there may be concerns regarding the generalizability of the findings. The sample was not representative and participants were mostly lower-income Latino youth residing in medically underserved communities. Further, because the survey instrument was only available in English it could only completed by English-only or bilingual speakers. However, it appears that only a limited number of non-English speakers were excluded from this study (n=48). No additional information is available regarding those individuals who did not complete the survey due to non-consent or absenteeism. Each of these factors may limit the external validity of the findings.

Strengths

There are several important strengths of this dissertation. First, and most importantly, this dissertation utilizes data collected expressly to answer my research questions rather than relying on secondary data. Primary data collection is often undervalued and overlooked because it necessarily takes more time for data to become available. However, I was able to capitalize on a large-scale evaluation effort in which youth were being surveyed. I was involved in all aspects of the data collection from developing and testing survey items to designing the coding scheme and entering and validating these data. Further, a team of experienced data collectors employed

strategies so that students would maximize attention and effort when completing the questionnaire. Thus, I am able to examine this phenomenon using a unique, high-quality dataset and the findings contained herein are novel and "hot of the press."

Second, this dissertation utilizes a large sample with a high response rate of almost 5,000 racially and ethnically diverse middle school students from lower-income communities in Los Angeles County. This is an important strength as researchers often rely on samples of higher income White individuals, including youth, who are not particularly representative of the larger population.[184] The large proportion of Latinos in the sample is important as they are the largest ethnic minority group in the US.[185] Moreover, racial/ethnic minority youth also have high rates of obesity and are less likely to meet guidelines for physical activity and dietary intake than their White counterparts.[186] Another advantageous aspect of the sample is that middle school students are on the precipice of more adult roles and decision-making; they are establishing behaviors that will likely following them into and throughout adulthood. Thus, this sample of racially and ethnically diverse middle school students is an important group to study and intervene upon in order to improve health outcomes.

Third, this dissertation addresses important gaps in the literature. Researchers have previously proposed pathways that link media consumption, usually TV, with obesity. As part of this dissertation, I have tested those hypothesized pathways empirically. Furthermore, I have extended the analyses to cover the full range of media to which today's youth are exposed. In this way, I am able to assess what forms of media are associated with important outcomes. Likewise, I did not limit my assessment to obesity, but instead also looked at more proximal outcomes that may contribute to obesity throughout ones life. This is particularly important as

some argue that obesity is a result of a biochemistry problem rather than an energy imbalance.[187] That is, not all calories are the same and what is consumed is of consequence.

Last, I was able to explore relationships that are on the forefront of public health research on obesity and media intake. For example, my third aim specifically looked at how and for whom social media is associated with eating behaviors. Although TV and music typically dominate the media diet of youth, social media is becoming a dominant force. Substantial investments are being made to explore its relationship to health behaviors, overall health / wellness, and to explore whether social media can be used as a platform to administer health promotion interventions. Similarly, there is a growing awareness regarding the importance of sleep in shaping health behaviors and health outcomes. My first aim attempted to explicate how sleep is related to both media consumption and eating behaviors. These represent just two examples of how this dissertation is able to contribute to the knowledge base of emerging areas of research and practice.

Future Research

As this dissertation has shown - media consumption matters, though we cannot fully account for it given limitations in the measurement of media consumption. I tested three potential mechanisms that explain how media consumption is related to eating behaviors. There are most certainly additional factors that would help to elucidate the relationship. Future research could test psychosocial issues such as depression, social anxiety, loneliness and self-esteem as mediators. It may be that media use is protective, particularly when it offers opportunities for social interaction. If this hypothesis were true, feelings of depression, anxiety, and isolation may be alleviated because of media use and one would then expect corresponding improvements in

eating behaviors. Conversely, media consumption may serve to exacerbate negative emotions or feelings. In this case, it would be expected that negative affect would result in emotional eating. There may even be a feedback loop wherein emotional eating exacerbates negative emotions leading to additional media use as a way of escaping from life. Regardless of the direction of these relationships, they are likely to be different among males and females and other demographic characteristics.

Another important consideration not accounted for in this dissertation is exposure to advertising and marketing. Advertising and other forms of media have the ability to influence attitudes, beliefs and preferences about foods and food outlets. It is estimated that the food industry spends $11 billion dollars a year in advertising,[188] and much of that is spent targeting youth. Advertisers are marketing products that are high in sugar, fat, salt and are nutrient-poor.[189] As noted earlier, adolescents view on average 16.2 food and beverage ads per day across an array of TV channels and programs.[20] What this does not capture are the other forms of marketing that youth are exposed to through mobile phones, other mobile devices, instant messaging, video games, and virtual worlds throughout their daily lives. Although multiple factors influence eating behaviors, advertisements in particular contribute to preferences and consumption.[43] Black and Latino youth are especially vulnerable. They are targeted by marketers because of their high media usage and because research has shown they are "early adopters" and "heavy users" of digital media advertising.[190] Additionally, they are exposed to advertisements that promote foods that are less healthy than the foods promoted to White children and adolescents.[45,46] Advertising and marketing is clearly an important piece of the puzzle and this represents an area for future investigation.

I speculated earlier that some of my null findings may be due to the age and socioeconomic status of participants. Replicating this study with older adolescents would allow me to test that hypothesis empirically. I suspect that older adolescents may have different access to media devices for a variety of reasons including fewer parental restrictions and more disposable money to spend on devices or data plans. It is also possible that the media diet of older adolescents is different because of changing preferences or friend/peer/romantic relationships. Finally, there might be other differences between middle school and high school youth such as increased focus on romantic relationships, body image and more demands on time due to school and social/family responsibilities. These factors suggest that the findings of this study may differ for older adolescents and it warrants further investigation.

Ideally I would design and carry out a longitudinal study in which youth were followed from their transition into middle school until high school graduation. A longitudinal study would allow us to understand the trajectories of youth and would eliminate the limitations associated with cross sectional studies. Furthermore, it could be designed such that more comprehenive prospective data were collected through the use of media and food diaries to truly improve the robustness of the study.

Implications for public health research and practice

The findings from this study have important implications for public health practice. In Chapter 3, I presented a theoretical framework with origins in the social ecological model. The social ecological model says that there are multiple levels of influence and in order to change behavior one must not only intervene at the individual-level but also at other levels of influence including the interpersonal-level (i.e., social networks consisting of friends and family), the

community-level (i.e., media) and the societal-level (i.e., policy). The findings from this dissertation support that assertion.

There are ample opportunities to intervene directly with youth and intervene more broadly in the media environment. Multi-level interventions should be designed and implemented to address media use and media literacy, because it is an important source of health information for adolescents. Interventions should include content that addresses nutrition literacy, mindful eating to reduce mindless eating, and information about the importance of sleep quality and quantity. Furthermore, I would recommend also including information about body image, weight, and healthful weight control strategies to any intervention. These factors were identified as important in this dissertation, but did not identify people who were differentially at risk. Meaning, it isn't necessary to design separate interventions for those who are or are not overweight or those who are or are not dieting. Rather, these factors have independent effects but did not necessarily identify vulnerable groups. Interventions must also address social norms around eating. Thus, making them most effective when there are substantial components include classmates, friends and family members.

Youth live in an environment where they are using and are exposed to media constantly. We need to capitalize on this knowledge and integrate media into interventions to support better health behaviors. Opportunities exist to develop and launch apps and games that can be used by youth on their mobile devices to encourage better eating and more physical activity. Furthermore, social media can be used to create a network of young people who are supportive and encouraging of healthful lifestyles.

Lastly, health promotion interventions should not be done in isolation. Policy solutions should include limits on the marketing of energy-dense nutrient poor foods on traditional media, as well as other places where youth are exposed to integrated digital marketing for foods and beverages such as branded websites, online videos, advergaming, virtual worlds, cross promotions, mobile advertising and social media.

Conclusion

This dissertation aimed to elucidate how and why media consumption influences the eating behaviors of low-income, racially and ethnically diverse middle school students. I showed that media consumption is consequential for both males and females. I advanced and tested three mechanisms to explain the relationship: snacking while consuming media, sleep duration, and physical activity. Strong support emerged for snacking while consuming media as a complement to other unhealthful eating behaviors. There was relatively weak evidence for sleep duration and physical activity. Furthermore, I looked at contextual factors and showed that friend and classmate behaviors matter independent of media consumption. That is, one's social networks influence dietary behaviors. Finally, I examined social media and tried to understand if this type of media use was associated with poor dietary behaviors and if there was differential influence for people who thought they were overweight or people who were dieting. I found strong evidence to suggest social media is associated with poor dietary behaviors. Moreover, there was weak evidence to suggest dieting buffers the deleterious effects of social media on eating behaviors for males. But more importantly, weight-related concerns and weight control behaviors served to constrain consumption of excess discretionary calories that come from things like sugar-sweetened beverages, junk food and fast food. Despite any limitations in study designs and measurement described above, these findings substantiate the need to take a multi-level

approach and employ multiple strategies to support healthful eating behaviors among youth. We need to think holistically and comprehensively about how to improve the health and well-being of some of our most vulnerable youth.

In conclusion, understanding and addressing determinants of eating behaviors is of critical importance. In a complex society where youth are confronted with obesogenic content in media, peer influence, and other socio-ecological factors, it is no wonder that obesity among young people is a complex and difficult issue to address. It will not be until more multi-dimensional and well-informed public health efforts are implemented that any real change can be made in the eating behaviors and health outcomes of our youth. If this does not happen, it is unlikely that we will be able to halt or reverse the obesity epidemic among youth.

APPENDIX A

UCLA FIELDING SCHOOL OF PUBLIC HEALTH

Project SHAPE

First Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Last Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Date of Birth: ☐☐/☐☐/☐☐☐☐

M M D D Y Y Y Y

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

Grade Level: 6 7 8 (Please circle one)

Instructions:

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

Please circle one answer for each question.

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

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

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

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

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

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

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

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

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

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

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

10. During the past 7 days, how many times did you eat **sweets** (e.g. candy, ice cream, sweet rolls, doughnuts, cookies, brownies, pies, or cake)?
   a) I did not eat sweets during the past 7 days
   b) 1 to 3 times during the past 7 days
   c) 4 to 6 times during the past 7 days
   d) 1 time per day
   e) 2 times per day
   f) 3 times per day
   g) 4 or more times per day

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

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

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

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

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

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

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

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

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

15. The amount of **punch, sports drinks, sweetened fruit drinks or energy drinks** I drink each day is:

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

The next questions ask your opinions about eating.

16. How would you rate your eating habits?

a) Poor
b) Fair
c) Good
d) Excellent

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

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

The next questions ask about your Physical Education classes.

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

19. During an average PE class, how many minutes or hours do you spend actually exercising or playing sports?
    a) Less than 10 minutes
    b) 10 to 20 minutes
    c) 21 to 30 minutes
    d) 31 to 40 minutes
    e) 41 to 50 minutes
    f) 51 to 60 minutes
    g) More than 60 minutes
    h) I do not take PE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The next questions also ask about your physical activity.

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

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

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

You are halfway there!

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

	Never	Rarely	A few times	Often	Very Often
a) Self-conscious about my looks	☐	☐	☐	☐	☐
b) Lack of interest in physical activity	☐	☐	☐	☐	☐
c) Lack of self-discipline (will power)	☐	☐	☐	☐	☐
d) Lack of time	☐	☐	☐	☐	☐
e) Lack of energy	☐	☐	☐	☐	☐
f) I do not have anyone to do physical activity with me	☐	☐	☐	☐	☐
g) I do not enjoy physical activity	☐	☐	☐	☐	☐
h) Lack of equipment	☐	☐	☐	☐	☐
i) The weather is too bad	☐	☐	☐	☐	☐
j) Lack of skills	☐	☐	☐	☐	☐
k) I am too tired to exercise	☐	☐	☐	☐	☐
l) Lack of knowledge on how to do physical activities	☐	☐	☐	☐	☐
m) Lack of a convenient place to do physical activity	☐	☐	☐	☐	☐
n) I am too overweight	☐	☐	☐	☐	☐
o) Physical activity is boring	☐	☐	☐	☐	☐
p) My friends don't like to exercise	☐	☐	☐	☐	☐
q) I don't like to sweat	☐	☐	☐	☐	☐
r) Physical activity messes up my appearance (hair, clothes, make-up)	☐	☐	☐	☐	☐
s) I don't want to get too strong or muscular	☐	☐	☐	☐	☐
t) Homework	☐	☐	☐	☐	☐

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

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

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

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

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

The next questions are about body weight.

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

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

The next questions are about you.

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

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

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

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

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

The next questions are about your school environment.

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

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

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

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

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

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

The next questions are about sleep.

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

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

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

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

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

These last questions are about advertisements.

51. How **often** do you pay attention to ads when they appear?
    a) Never
    b) Rarely
    c) Sometimes
    d) Regularly
    e) Always

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

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

Turn over for last question.

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

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

	No time at all	Less than 1 Hour	1 Hour	2 Hours	3 Hours	4 Hours	5+ Hours
a) Listening to music on the radio or online (e.g. Spotify, Pandora, online radio)	☐	☐	☐	☐	☐	☐	☐
b) Playing online video games	☐	☐	☐	☐	☐	☐	☐
c) Playing video games (game consoles like Xbox, Playstation, or handheld devices like DS or 3DS or using phone or tablet app)	☐	☐	☐	☐	☐	☐	☐
d) Watching online videos (e.g. YouTube)	☐	☐	☐	☐	☐	☐	☐
e) Watching TV live	☐	☐	☐	☐	☐	☐	☐
f) Streaming or recorded TV shows or movies that have commercials (e.g. Hulu)	☐	☐	☐	☐	☐	☐	☐
g) Streaming TV shows or movies that have NO commercials (e.g. Netflix or Amazon Prime)	☐	☐	☐	☐	☐	☐	☐
h) Using social media sites (e.g. Snapchat, Facebook, Instagram, Twitter)	☐	☐	☐	☐	☐	☐	☐
i) Using the internet/visiting websites	☐	☐	☐	☐	☐	☐	☐

You are done. Thank you!!!

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