

Design, Fielding, and Analysis of School-Based Surveys on Health Behaviors in the Williamsburg-James City County School Division

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Executive Summary

In 2005 the School Health Initiative Program (SHIP) was established to combat obesity in the Williamsburg-James City County (WJCC) School Division. The program is a collaborative effort between the Williamsburg Community Health Foundation and the WJCC School Division.

Since its inception, the progress of the various SHIP components has been assessed every two years through distribution of surveys to students, staff, and parents. The next round of survey dissemination was due fall 2010, and the Schroeder Center at the College of William & Mary was tasked with revision and fielding of the student survey as well as oversight of a student research group placed in charge of revision and fielding of the parent survey. This research team was to conduct a preliminary assessment of the results of the parent survey; this assessment is discussed in this report.

It was found that there were several unnecessary questions in the previous parent surveys. These questions were removed and were replaced with questions that more directly dealt with what SHIP wanted to measure – their progress in terms of healthy messaging to students and to parents through students. Additionally, a mixed-mode implementation strategy was used, resulting in an increase in survey responses from previous parent surveys.

SHIP messaging is getting through to students and parents, particularly those families that SHIP is most concerned about. More children are talking to their parents about the benefits of healthy eating and physical activity, and, as a result, they are more likely to engage in these behaviors

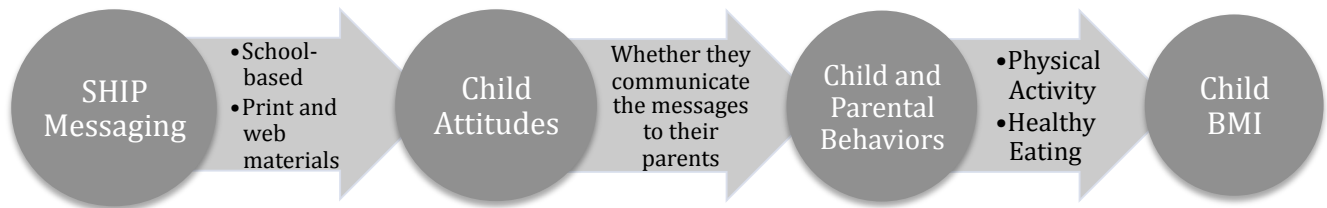
Knowledge of SHIP components is also important. According to online survey results, parents know most about the after school clubs, cafeteria food programs, and the print, web, and school-based health promotions. Low-income and minority populations in our preliminary sample believe the SHIP programs have more of an impact than the average member of the population.

Ultimately, the link to childhood obesity must be studied over time, but this analysis shows that short-term behaviors can be affected. Parental involvement is highly influential in affecting these changes in behaviors, as this report demonstrates.

Introduction

The School Health Initiative Program (SHIP) was implemented in the Williamsburg-James City County School Division to address the growing national concern over childhood obesity. Prior to fall 2010, the progress of the program has been assessed through two surveys disseminated to students, staff, and parents. This fall a third round of surveys was distributed as part of the program's biennial assessment. The College of William & Mary was tasked with revision and fielding of the student and parent surveys; the Schroeder Center was placed in charge of the student survey and the parent survey, discussed in this report, was revised, fielded, and assessed by a student research team. The analytical framework through which the team approached the parent survey is shown in *Figure 1*.

Figure 1: Analytical Framework for Assessment of SHIP Messaging



This framework allowed the student research team to follow the path SHIP messages travel and to frame our analysis along this course. As a result of revision to the previous parent survey, data was collected that provided meaningful information about SHIP and the messages it provides students via school-based messaging as well as print, web, and other promotional materials. These messages are also intended to reach the parents so they can not only be a support system for the student, but to also influence their behaviors and encourage a healthy lifestyle in their lives so that would serve as a role model to their children. Ultimately, the goal is affect the child's BMI in order to lower the rate of children who are overweight or who are at risk of being overweight. The new data collected by the 2010 parent survey will be used to focus on the association between parental knowledge of SHIP and children's healthy behaviors as well as BMI scores. This report will outline the associated literature on the subject, the previous parent survey and the changes made as well as the impact of new implementation techniques, and some preliminary assessment of the survey results.

The Components of SHIP

The School Health Initiative Program (SHIP) was established in 2005 as a collaboration between the Williamsburg Community Health Foundation and the Williamsburg-James City County (WJCC) School Division, as well as several other partners in the community.¹ By promoting healthy eating habits and regular physical activity, SHIP seeks to improve the

¹ School Health Initiative Program [SHIP], 2010

health and wellness of the students and staff within the WJCC schools. The program consists of six primary components that serve varying functions, all working towards a healthier school system and ultimately a healthier community. These components are the SHIP-Child Nutrition Services (CNS) Partnership, KidLink Teams, Wellness Integration Programs, Challenge Clubs, Communications, and Staff Wellness.²

SHIP-Child Nutrition Services (CNS) Partnership

The SHIP-CNS Partnership is working towards increasing the amount of healthy food and drink options in the school cafeterias, in accordance with the National School Breakfast and Lunch Program guidelines. In addition to healthier food and drink options for students, teachers, and staff, CNS kitchen managers and staff are trained in healthy food preparation practices and healthy eating choices are promoted in the schools. The SHIP-CNS partnership also works to integrate nutrition information into the classrooms for the students.³

KidLink Teams

Modeled after the CDC's Coordinated School Health Model, KidLink Teams consist of students, teachers, staff, parents, members of the community, school nurses, and CNS staff. These collaborative teams allow for a more holistic view of the health and wellness activities that are occurring within the schools, and they are all able to provide a distinct perspective. They serve four primary roles: first, they organize and execute activities in the schools that encourage healthy behaviors. Second, they help to communicate SHIP initiatives between the schools and in the community. Third, they evaluate the "school environment, practices, and policies as they relate to wellness issues."⁴ Finally, the KidLink Teams strive to serve as role models to fellow students, teachers, staff, and family members.⁵

Wellness Integration Programs

This component of SHIP consists of Wellness Integration Specialists who train teachers how to integrate "physical activity and nutrition information and opportunities into the core curriculum."⁶ The specialists provide teachers with resources that are in line with the Virginia Standards of Learning and that can be easily incorporated into their daily lesson plans. Additionally, the specialists encourage healthy behaviors in the teachers with the hope that they will then serve as role models to the students. Finally, the specialists communicate with the families of students in order to create a link by which healthy eating and physical activity habits will travel, integrating these behaviors into the student's home environment in addition to the school environment.⁷

Challenge Clubs

² SHIP, 2010

³ SHIP, 2010

⁴ SHIP, 2010

⁵ SHIP, 2010

⁶ SHIP, 2010

⁷ SHIP, 2010

The Challenge Clubs allow students to meet once a week and, depending on the activity, either expand their knowledge of healthy eating or increase the amount of physical activity they participate in. These clubs include martial arts, basketball, soccer, dancing, yoga, cooking, among many others.⁸

Communications

SHIP communicates its healthy messages to students not only in the classrooms and in the school setting, but also via online website, print newsletter and other promotional materials, as well as through local newspapers and television stations. The goal is to provide alternative messaging to the unhealthy messages that children are so often exposed to.⁹

Staff Wellness

Finally, SHIP strives to improve the health and wellness of all within the school system, including the staff. The Staff Wellness Program, similar to the programs for the students, encourages healthy eating and physical activity habits. Wellness coordinators from the KidLink teams organize clubs and activities such as running clubs and weight loss challenges for the staff. As a result, a healthier staff serves as a positive example to the students, encouraging them to make similar healthy life decisions.¹⁰

Literature Review

The literature on this and similar subject areas is extensive. While there are many studies that may be referenced, this report will highlight just a few in order to provide a comprehensive overview of the supporting literature. The literature cited here focuses on the effect of parents and social connections on healthy behaviors in children. It will then turn to programs and studies that are similar to SHIP that have been implemented across the United States. Their associated outcomes in conjunction with the literature on parental and social connections with relation to healthy behavior serve as a solid foundation for SHIP.

Parent Involvement with Children's Health Promotion: The Minnesota Home Team

This study, published by *The American Journal of Public Health*, compared a school-based, curriculum driven health initiative, Hearty Heart and Friends, against a home-based health initiative, Home Team, which required parent involvement. The information imparted to students through the two initiatives was the same, but the Home Team course was packaged as a game, in which a parent or the entire family participates in with the student. The study was conducted over a 5 week period, consisting of 3rd grade, Caucasian, primarily middle-class students, and the ultimate goal of both programs was to change eating habits in order to reduce the amount of fat and sodium in a child's diet, and to

⁸ SHIP, 2010

⁹ SHIP, 2010

¹⁰ SHIP, 2010

change other behavior related to an unhealthy diet. Previous research conducted by the authors found that an exclusively school-based intervention only improves the child's knowledge, not their behavior, and that parental involvement is crucial to changing eating habits. The ensuing study confirmed the previous research, finding that the school-based program resulted in greater knowledge of healthy eating, habits, but this did not translate into healthy eating behaviors, whereas the home-based program saw a greater change in healthy eating behaviors. Ultimately, a hybrid program consisting of a school-based initiative that includes parental involvement would be ideal.¹¹

School-Based Obesity & Diabetes Initiative (SODI)

There are also several programs that are similar to SHIP. One such initiative is a collaboration between the Northridge Medical Center and the Los Angeles Unified School District. Their program, the School-Based Obesity & Diabetes Initiative (SODI), is working to reverse the spread of obesity and associated health related problems, diabetes in particular, targeting students and teachers in public schools, as well as parents of the students in the San Fernando Valley.¹² SODI began in 2006 in just a few schools, but has now quickly expanded to 32 schools, elementary to high school. Their wellness program encourages healthy eating and physical activity by "providing...walking groups and educational workshops for parents, on-site screenings and monitoring, teacher and staff fitness programs, and school-wide promotional campaigns encouraging healthy eating."¹³ Many of the approaches taken by SODI are similar to those taken by SHIP. Both school-based initiatives strive to affect more than just the students in the classrooms, aiming to affect the larger social network that will not only have effects on those within the network, but that will also result in a healthier overall community.¹⁴

D.C. School Nutrition Program Works to Stem the Obesity Trend

Similarly, the D.C. Healthy Families (DCHF) program and the D.C. Public School system have also teamed up to educate students on healthier eating habits and improved physical activity behaviors. Their program is based on Team Nutrition, an adolescent-targeted program designed by the United States Department of Agriculture.¹⁵ The objective of their program is to affect attitudes and behaviors in student-aged children who will then grow older into more informed, healthy consumers. When the program was initiated in 2002, graduate students were trained to be "responsible for lesson plan delivery, activity development, and classroom evaluation," but by 2005 teachers became responsible for teaching the curriculum in their classrooms.¹⁶ To date, the outcomes of this program have shown an increase in nutritional behaviors and knowledge, and the level of self-reported physical activity from pre- to post-lesson increased as well. These findings prove to be encouraging results for SHIP, given the similarities between the two initiatives.

The Spread of Obesity in a Large Social Network Over 32 Years

¹¹ Perry et al. 1988

¹² Northridge Hospital Medical Center, 2010

¹³ Northridge Hospital Medical Center, 2010

¹⁴ Northridge Hospital Medical Center, 2010

¹⁵ American Public Health Association (APHA), 2010

¹⁶ American Public Health Association (APHA), 2010

In a study published by the *New England Journal of Medicine*, the prevalence of obesity was tracked within and across social networks over the span of 32 years.¹⁷ This quantitative analysis was conducted on over 12,000 people between 1971 and 2003 as part of the Farmington Heart Study. The study was conducted due to prior research that showed that the increased prevalence of obesity was not attributable to just genetics and that it has affected all socioeconomic classes; therefore, in addition to a person's genes, their social environment must play a significant role in the rate of obesity. The social networks studied included the subject's family, friends, and neighbors. It was found that obesity and weight gain were seen to occur in groups of people up to "three degrees of separation."¹⁸ It was hypothesized that the rationale behind this was that it becomes socially acceptable to be overweight or obese if those in your social network are as well – and what closer social network is there than the family unit. This association was also found to be causal, and not a result of "selective formation of social ties among obese persons."¹⁹ Ultimately, this relationship can be used to help slow the spread of obesity, and might also be adapted to promote the spread of healthy behaviors among social networks. Despite one shortcoming of this study – that it focused only on people 21 years of age and older – its findings provide some rationale for the holistic approach SHIP employs: by targeting all social groups that come in contact with students there is bound to be some spillover effects (in both directions) in addition to the direct effects the SHIP programs have on the students.

The Role of the College of William & Mary

The Schroeder Center at the College of William & Mary was charged with the task of producing and disseminating the third survey meant to assess the progress of SHIP programming. The student survey was revised and disseminated by the Schroeder Center in fall 2010. The objective of the student survey is to determine the knowledge and behavior of students in the WJCC School Division in relation to healthy eating and physical activity habits, and to compare these results to those reported in previous student surveys. The 2010 survey was completed and disseminated to the schools in October; the surveys were then distributed to teachers who administered the survey during their classes. These were then collected and returned to the Schroeder Center for review.

Concurrently, a research team of William & Mary Masters in Public Policy students, as their capstone project, were tasked with revising and disseminating the corresponding parent survey. This survey intends to discern parental knowledge of SHIP and its components, as well as parental opinion of the impact of the various components of SHIP with regard to encouraging healthy habits in students, teachers, and staff. Additionally, the survey inquired about student-parent activities within the home environment. Fielding of the 2010 parent survey began in early November and will continue until January 2011. The William & Mary student research team has prepared this preliminary assessment of parental knowledge of SHIP, its impacts, and the effect of the home environment on student health.

¹⁷ Christakis & Fowler, 2007

¹⁸ Christakis & Fowler, 2007

¹⁹ Christakis & Fowler, 2007

Once the parent survey fielding is complete, a further and final analysis of both the student survey and the parent survey, as well as BMI data, will be completed by the Schroeder Center in Spring 2011.

Previous Surveys as a Foundation for Current Assessment

In 2006, SHIP, in coordination with Health Resources in Action (HRiA), developed and implemented process and outcome evaluations of its progress. As stated in a previously published report, the evaluations were intended to “provide a snapshot of SHIP’s activities, successes, challenges, and lessons learned during different periods of the initiative,” and “to assess the overall impact of the intervention, including whether significant changes have been made in SHIP’s outcomes of interest.”²⁰ One of the most important tools for measuring these possible changes was the survey instrument disseminated to students, parents, and staff to gauge changes in attitudes, self-reported behaviors, and perceived environmental messages around healthy eating and physical activity. The first of these surveys, intended as a baseline measurement, was conducted in the autumn of 2006, followed by a nearly identical survey in the autumn of 2008.

For comparability and reliability purposes, questions in the student, parent, and staff surveys were taken from previously used questionnaires employed by organizations such as the Center for Disease Control and Prevention’s (CDC) Youth Risk Behavior Survey (YRBS), California Healthy Kids survey, and the North Carolina Behavior Risk Factor Surveillance System (BRFSS) survey. Such survey construction is common and scholastically encouraged. Unfortunately, the resulting document did not provide the ideal results for measuring SHIP’s progress towards its short, intermediate, and long-term outcomes.

Before pointing out the limitations of HRiA’s parent survey, it would serve this report well to recognize its achievements. The most salient outcome that was measured by the 2006 and 2008 designs was the short-term goal of changing the “number of messages in the social and physical environment that support healthy eating/activity.” To track these changes, HRiA employed questions about how often parents were hearing or receiving messages from their child about healthy food choices and the benefits of physical activity. The reverse relationship was also measured; parents were asked how often they spoke to their children about the benefits of healthy behaviors.

The 2008 survey also attempted to measure SHIP’s stated outcome of changing attitudes towards healthy eating and physical activity, albeit in a vague manner. Parents were first asked if they would eat healthy foods more often if they were available at restaurants they frequent. Directly following this question was a pair of questions asking how enjoyable the respondent found healthy eating and physical activity.

²⁰ 2009 Survey Report

While not approaching this attitudinal outcome directly, the survey also included a series of yes/no questions to determine if the parent was “trying” to improve his or her daily health regimen. Only two of these questions dealt with inter-generational relationships. For reasons discussed below, this section was omitted from the 2010 survey design.

A third outcome the 2008 design attempted to measure was the health insurance status of the school division's students. As noted by the most recent HRiA report, in 2006 and 2008, one of SHIP's long-term objectives was an upward change in the identification, enrollment, and maintenance of uninsured students into a health insurance program. Parents were asked if all of their children under 18 had health insurance; over 96 percent responded “yes” in both surveys. Due to a shift in program focus, however, this question was also omitted from the 2010 version.

Assumedly, the previous surveys also attempted to measure the short-term outcomes of immediate changes to healthy behaviors, such as increased consumption of fruits and vegetables, and lay a base for measuring long-term outcomes, such as the development of sustainable healthy eating habits over time. To gauge this predicted improvement, HRiA's survey included nineteen questions about the parents' dietary and physical activity habits. Sample questions asked how often respondents had eaten breakfast within the past seven days; the survey also asked parents to report how much time they spent partaking in sedentary activities such as video game playing and television watching. It should be stressed that these first nineteen questions asked about the parents' dietary and physical activity behaviors independent of their child.

Short-term outcomes of children were measured through the parents, but only among a selected group of parents, those with a child from the age of five to ten. This subgroup was asked a series of questions similar to those used in that year's student survey. For example, they were required to report the number of different fruits and vegetables their child ate on an average day. In addition to these observational questions, parents of younger children were asked about interactions they had with their child, such as the frequency of “active leisure” time with their child, as well as their monitoring of portion sizes.

Limitations of the Previous Surveys

Since one of SHIP's objectives is to improve the health status of WJCC School Division families, the parent survey was adopted as a means of measuring the program's progress in this area. Similarly, the student and staff surveys served as measurements for their target populations. Due to the unreliability of reporting among younger students, parents with children from five to ten were asked about their child's behaviors. It is unclear why HRiA did not concern itself with the interaction behaviors of parents with older children.

Though SHIP is intended as a community changing initiative, its interventions are most focused on students. HRiA's survey, however, devoted very little attention to studying parents' observations of and interactions with their children. Other studies have shown no

apprehension to examining the self-reporting of both parents' and students' health habits.²¹ Hence, it is not necessary to limit the data collection to self-reporting of one's own habits. Rather, by examining both the reports of students and parents, one may come to a more robust study on the progress of SHIP's interventions with its most targeted population.

As noted above, the majority of SHIP components are employed on a student level. While a key aspect of the program is the mailing of health-related newsletters, specifically the SHIP-centric document "The Helm," to parents, the changing-minds model lends itself to focusing on students first. As the model predicts, programs such as the Wellness Integration Program, and the Challenge Clubs will introduce students to recommended diets and amounts of physical activity. Consequently, the children will be receptive to these messages, and convey them to their parents. Once the parents have heard these messages they will begin to encourage their children's pursuit of healthier lifestyles through wise meal preparation and regular engagement in exercise. Another expected outcome of this model is that parents will hear these healthy messages and will also begin to take better care of themselves by participating in vigorous physical activity and eating more nutritiously.

Although no inherent contradictions exist in the changing-minds model, it does not lend itself to a sizable portion of the 2008 HRiA survey, primarily on account of the lack of a control group. When SHIP began in 2005, all regions of the school division took part, affecting the ability to make meaningful intra-sample comparisons. For example, increases in the amount time students devote to physical activity may not be a result of SHIP at all, but rather a wider trend that is occurring on a larger-than-school-division level. Perhaps children have chosen to watch less television over the past four years because programming has become less geared towards youth. When one considers the measurement of parents' behaviors independent of their children, the capability of research to measure associations becomes even more muddled. While the parental interaction with SHIP exists, it is far from being as direct as that of their children. For this reason, it is very difficult to measure SHIP's effect on their behaviors by excluding their children from the equation.

The previous surveys' results would appear to support the idea that measuring parent's habits independent of their child was a poor method of measuring SHIP's outcomes. HRiA conducted statistical tests for every variable recorded from 2006 to 2008. Using SPSS, the HRiA evaluation team compared responses from 2008 to those from 2006, using Pearson's chi-square test for independence with alpha set at 0.05. The chi-square test assesses whether there is a significant association between two categorical variables ($p < .05$). A great number of significant associations, such as the relationship between income and frequency of eating fruits, in the analysis existed, meaning that researchers could say with 95 percent confidence that their results did not occur due to chance. On the other hand, when the association was used between variables and years, significance among parental results was nearly non-existent. This evidence suggests that the survey was effective in measuring connections between demographics and diet and exercise among parents, but

²¹ Gable & Lutz

that it was a poor tool for determining the progress of the school division changing parental behaviors. Furthermore, because of the extensive research already in place, it is easy to suggest that a statistically significant relationship exists between factors such as income, race, and gender and healthy eating. For this reason, it would appear that different behaviors warrant examination.

Comparing the yearly change among the few interaction outcomes, however, tells a different story; the association between year and frequency of hearing messages about the benefits of healthy eating and physical activity yielded the only statistically significant results. According to the chi-square test, researchers could say that the 2 percent increase reported was not a result of chance with 95 percent certainty. Thus, it would appear that the schools have seen some success in implementing their changing-minds model.²²

While many questions in the parent survey failed to produce meaningful data, other questions did not seem to produce any meaning at all. As noted above, HRiA used the Youth Behavioral Risk Survey as a template for the construction of its survey. Though the practice of using previously tested questions is the norm, it is unclear why some questions were included. For example, some questions in the parent survey were overly specific, such as, "During the PAST 7 DAYS, how many times did you eat carrots?" while asking how often they ate other vegetables. The 2008 survey also asked two questions about sedentary, "screen-time" behaviors: one question about the amount of television the parent watched and another that asked specifically how much of their average day was committed to video and computer game playing.²³ As valuable as specificity can be, it can also place an unnecessary burden on survey respondents, question misinterpretation, resulting in satisficing, or, worse, frustration accompanied by possible disposal of the survey.

Satisficing is an action of survey takers "giving minimally acceptable answers, rather than optimal answers."²⁴ As noted by Krosnick, respondents tend to satisfice when they encounter difficulty in retrieving information. This difficulty can occur if a person is asked to quantify a series of activities within one question. Clearly, this thinking was involved in the decision to segment behavioral questions. Nonetheless, the distinction between the benefits of carrots over other vegetables is unclear. Had the researchers been truly interested in this information, a better option may have been a matrix question concerning various vegetables of interest. Also, questions of such specificity may lead the participant to question the direction of the survey, and lose motivation to complete it.

HRiA's 2008 edition also allowed for satisficing in its limited measurement of parental attitudes towards healthy eating. Taking questions from the North Carolina Behavioral Risk

²² It should be noted that within the student survey, a large amount of variables witnessed statistically significant relationships between year and behavior. For example, similar messaging questions to the students about hearing of the benefits of physical activity and healthy eating from the school yielded a .5 level significance. Unlike the parent survey, student results yielded frequent statistically significant changes from year to year for behavioral questions, such as the rate of fast food consumption and the rate of juice consumption.

²³ Students were asked the same questions about themselves

²⁴ Krosnick, 2000

Factor Surveillance System Survey, previous researchers asked a series of yes/no questions that lent themselves to social desirability bias, and as a result, satisficing. Social desirability bias, as first outlined by Marlowe and Crowne, is the tendency for an individual to manage the impression they make and feign approval from survey interviewers.²⁵ Previous studies show that with respect to health surveys, respondents tend to provide socially desirable responses, creating a negative bias with respect to their self-reporting of food intake.²⁶ Yet, it is a similar upward bias that affects the validity of the 2008 study. Parents were asked attitudinal questions if they were “trying” to improve their health. Whereas other value-laden questions used multiple options to reduce the amount of bias, these questions were asked in a simple yes/no format. Exacerbating the validity was the simplistic content of the questions. For example, parents were asked if they were trying to increase their amount of physical activity. Not surprisingly, the affirmative was very high. Perhaps the most poorly formulated question in this section was the following: “Are you trying to be a role model to your children in making healthy food choices?” By adding the value-laden phrase “role model” to the question, respondents are primed to provide the socially desirable response. Clearly, it is difficult for a parent to admit that they do not try to set an example for their children, hence negative responses, as expected, were extremely low. On account of this bias, it is difficult to extract value from this question.

2010 Survey Changes to Better Assess SHIP’s Progress

If SHIP is truly interested in determining its progress towards its short-term objectives, it must concentrate its resources on improving student behaviors before improving those of parents. Evidence for this change in the survey model is supported by the 2008 findings. Parent and staff responses changed very little compared to the self-reporting of students, save for the questions regarding direct parent interactions with their children. That is not to say that a parent survey lacks value in a study of SHIP; as a close member of their social network, parents remain one of the most important actors in assuring children maintain a healthy lifestyle. It is for this reason that the new survey has shifted its focus away from measuring parent emulation and turned towards parent interactions with their child.

The first major change to the SHIP survey was the elimination of the first 19 questions. While these questions provided interesting information, that information was not linked with SHIP’s components closely enough to warrant remaining in the survey. This section was replaced with 14 questions requiring the parents to report about their youngest school-aged child’s dietary and physical activity behaviors. To provide the optimal degree of inter-survey comparison, these questions were mostly duplicated from the 2010 version of the student survey. For the most part, the replacements mirrored previously measured behaviors such as consumption of fruits and vegetables, with a few exceptions. For example, this survey combined a question involving the rate at which green salad was consumed with a question that measured the frequency of all vegetable consumption, rather than just green salad.

²⁵ Leite & Beretvas

²⁶ Herbert, et al

An addition not included in the 2008 survey involved the child's rate of eating the school cafeteria lunch and breakfast. The improvement of school meals is a key part of SHIP's expected outcomes; as such, the survey attempted to determine how often students were taking part in the program, as well as their reasons for refraining from purchase. Hence, the questions asking how many days students ate the school breakfast and lunch were each followed with questions asking: "On days that this child does not eat the school cafeteria [meal], which of the following is the MOST IMPORTANT reason?" For those respondents who participated in the online version of the survey, a text box allowed them to elaborate on the choice to forego the program. Because of the difficulty in recording this data on a paper survey, the latter mode of the parent questionnaire did not include this option.

Rather than wait for Body Mass Index scores tabulated by the schools, this survey asked parents to report the height, weight, and grade level of their youngest child. By doing this, the preliminary phase of the study can perform statistical analyses determining associations between behaviors and recommended BMI's.

The 2008 question about physical activity with the youngest child, which had previously been restricted to parents of five to ten year olds, was kept, but the language was changed to read: "How often do you or another adult family member engage in physical activities with this child? (Include activities such as family walks, hiking, bowling, playing a sport, etc.)." Additional interaction measurements were included, such as the frequency of an adult family member eating dinner with the child and how often the member of the household examines nutrition labels when shopping for groceries.

The interactions measured in 2008 between child and parent through healthy messaging also remained with adjustments. During pre-testing the inclusion of the phrase "receiving messages" tended to prime the test subjects to believe the question was asking about flyers or newsletters distributed from the school, rather than by word of mouth from the child. For this reason the questions were split in the following manner: parents were asked how often their child talked to them about healthy eating and the benefits of physical activity, but they were also asked how often the child brought home flyers or newsletters from the school that discussed these topics. This allowed for an obvious distinction between the two modes of communication.

SHIP messaging was further measured through parental knowledge of specific components. The school asked the research team to develop questions regarding how much parents are hearing about certain aspects of SHIP, as well as their perception of the program's impact. For the purpose of this survey, five components were chosen for measurement: after-school Challenge Clubs, the Wellness Integration Program, the Staff Wellness Program, efforts to make cafeteria food healthier and more appealing, and SHIP's overall messaging initiative. Using a four-point scale, parents were asked how much they have heard of these activities.²⁷ With a similar four-point scale, the following question asked the parents how much of an impact they felt their youngest child had received from

²⁷ Since the school had advised that parents may be familiar with the program, but not the component's official name, the question's subsections included short descriptions of each component.

these components. Finally, messaging was measured by asking respondents to rank their familiarity with the School Health Initiative Program.

The attitudes of school division parents towards childhood obesity and the role schools should play in promoting health and wellness was also measured. To gauge attitudes, parents were asked how important they felt certain behaviors (family meals, TV limits, recommended sleep, physical activity, and good eating habits) were in relation to their child's health. The survey then asked how important they thought these same behaviors were in relation to their child's school performance.

Asking how serious parents found the problem of obesity to be in both the nation and the WJCC School Division, the survey took a more direct path in attitudinal measurement. This path was explored in more depth by asking parents to evaluate how much of a cause of obesity they found each of the following to be: poor eating habits, too little physical activity, and heredity and genetics.

Another issue of importance to SHIP was the perceived role parents believed the schools should play in the fight against childhood obesity. To measure this, the research team added a question that listed five theoretical school initiatives that would require significant budgetary resources. The question asked the parents how important they felt each of the operations should be to the schools.²⁸

The final change to the survey came at the behest of the Williamsburg Community Health Foundation. Since SHIP attempts to fight obesity on a community level, administrators requested a survey question that would measure parent's views towards restaurant selection. With the use of a four-point likert scale of agreement, the final attitudinal question presented parents with four statements concerning restaurants making nutritional content available to customers and the likelihood of parents to go to those restaurants.

Fielding

Previous fielding for the parent survey was done strictly in the form of a paper questionnaire. As documented by HRiA, this method resulted in about 1800 responses, or approximately 26 percent of the division's households. While paper surveys have their advantages, complete reliance upon them for data collection would not serve this study well; the research team was working with a strict deadline to produce an analysis. Since all paper results would be coded by a third-party, analysis of the sample would not have been available until 2011.

Using a post-election study of Congressional districts in the 2006 mid-term elections as a guide, the research team undertook a mixed-mode survey approach to collect data. In that previous study, researchers employed identical online and paper surveys to determine if

²⁸ The operations included were: teacher training programs, student health and wellness programs, teacher health and wellness programs, student technology programs, and teacher salary improvement.

their polling research could field a sample representative of the population in Colorado and New Mexico districts. In general, the mode of the survey did not produce statistically significant differences in attitudes amongst respondents.²⁹ Differences did occur, however, in the make-up of each mode's sample. For example, those who filled out the online survey tended to be younger, more educated, and wealthier.³⁰ Since demographic differences are expected in online surveys, it would be foolish for SHIP to rely solely on the online version at this point in time. Thus, a mixed-mode of paper and Internet should capture a larger response rate.

To begin, all parents were sent an invitation letter in the mail for the survey, stressing the importance of their input in the future of the school's health initiatives. Included in the letter was a login code with a website address that would connect parents to the survey. As Atkeson noted, mailed postcards led to significantly higher response rates. A few days following the dissemination of the letters, parents received a reminder postcard with instruction on how to proceed to the survey URL.³¹ This use of postcards was responsible for nearly a 33 percent increase in responses.

Following the postcards, the research team witnessed their most productive reminder action. Through the assistance of the SHIP administrator, Denise Corbett, a reminder for the survey was placed on the school division website's home page with a direct link to the survey's "splash page." "Backpack letters" informing parents of the importance of SHIP's survey were also sent to all division households. Finally, the SHIP newsletter, "The Helm," highly publicized the online questionnaire. As a result of this extremely generous collaboration, the online survey garnered approximately 1,000 completed surveys and data from about 1,100 households.³²

Following three weeks of online fielding, paper surveys were sent to households in the district. A similar postcard with login code and contact information quickly followed this mailing. The research team also oversaw a phone bank to call over 2,000 households in the days leading up to the mailing, telling parents to be aware of the coming document and to encourage their participation in the survey. At the time of this report, the response rates for the paper survey were equally outstanding; over 1,000 parents had mailed their questionnaires back to the researchers, meaning the research team has surpassed the 2006 & 2008 response rates among parents. Since this data has yet to be analyzed, it is unclear whether the demographical differences in Atkeson will hold true for WJCC.

²⁹ Atkeson, et al., 2007

³⁰ Ibid. One aspect of this study that cannot be applied with great ease is its measurement of minorities in responding to online and paper surveys. Atkeson found that whites were slightly more likely to respond to the online survey than Hispanics; due to the racial make-up of this district, this was the only ethnicity reported in the results. WJCC School Division obviously has much different demography than these Congressional districts. For the purposes of this study, all assumptions of the relationship between race and mixed mode surveys are taken with great caution.

³¹ Originally, the researchers planned to employ 2 to 3 postcards encouraging parents to fill out the online survey. Unfortunately, due to a printing mistake, the team only sent one postcard.

³² Completed surveys are defined as those in which the subject answered at least one question on the last page of the survey.

In 2006 and 2008, HRiA made a Spanish language parent survey available upon request. Unfortunately, time and resource restrictions prevented the 2010 group from disseminating a similar document.

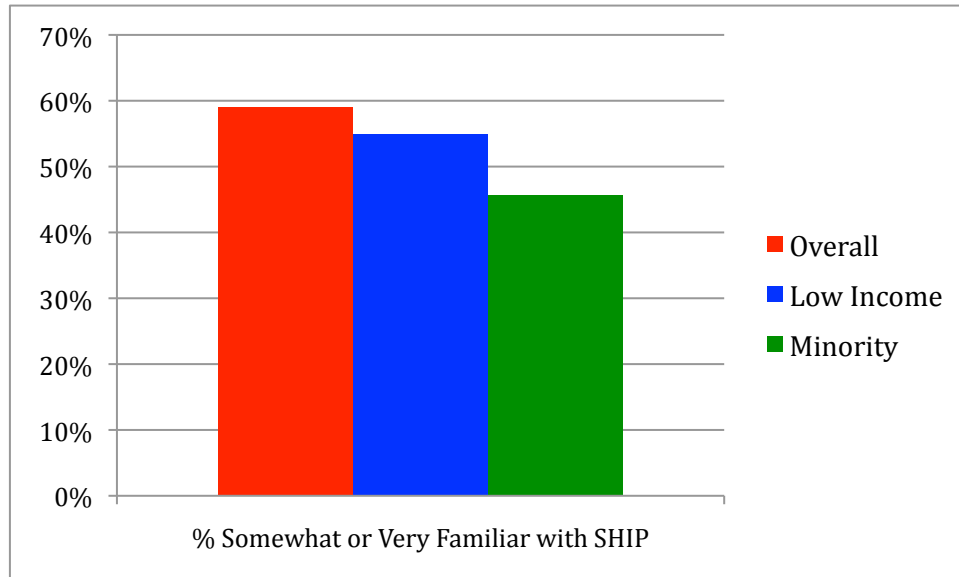
Fielding differences were not exclusive to the mode of the survey; efforts to increase response rates that were undertaken by HRiA would not have been the best practices for the 2010 edition. For example HRiA relied upon many social networking devices, such as local religious leaders mentioning the survey at church functions, which the researchers could not duplicate. More to the point, the types of attitudinal questions added concerning SHIP's specific components prevented the 2010 study from strictly adhering to HRiA's response efforts. For example, the previous group offered \$5 gift cards to Target stores as an incentive to complete the survey. In addition to budgetary considerations, inclusion of a similar incentive may have produced an upward bias amongst respondents, thus invalidating the analysis of SHIP's real impact as perceived by parents in the district.

Programmatic Question Responses and Subsequent Assessment

Knowledge of SHIP and SHIP Components

To the question, "How familiar are you with the School Health Initiative Program (SHIP)?", over 59 percent of respondents reported being "Somewhat Familiar" or "Very Familiar" with SHIP, while only 20 percent of respondents were not at all familiar. Additionally, low-income and minority respondents reported being less familiar with SHIP than respondents from the overall sample. 55 percent of low-income respondents reported being at least somewhat familiar with SHIP, while only 46 percent of minority respondents answered that they were "Somewhat Familiar" or "Very Familiar" with SHIP. This appears to be a branding issue however, given that, generally, low-income and minority respondents reported having heard more about and perceiving more of an impact from SHIP component programs than respondents from the overall sample.

Figure 2: Percentage of respondents who are "somewhat" or "very" familiar with SHIP, by subgroup

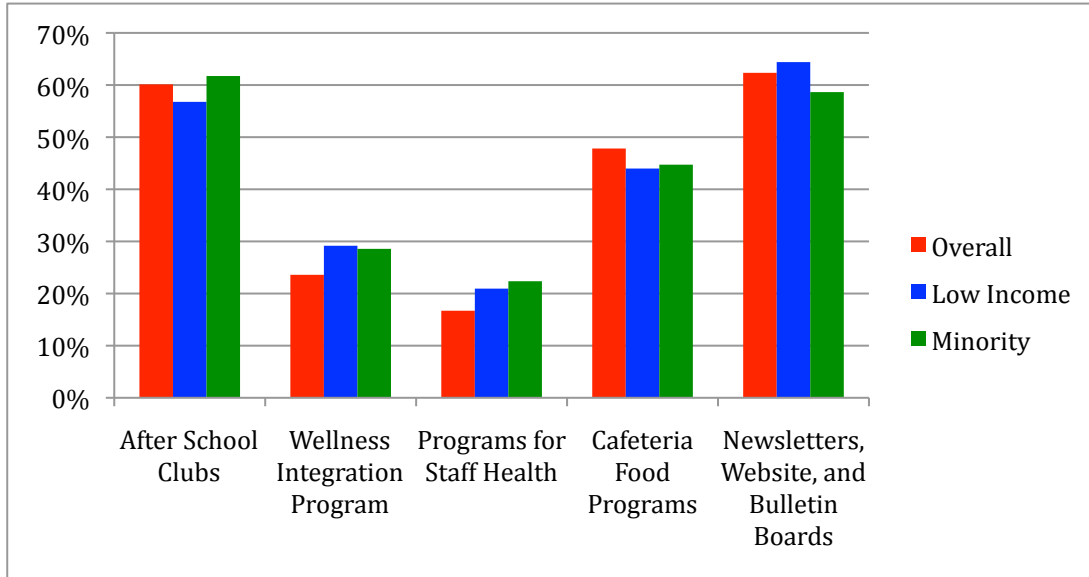


*Source: 2010 parent survey results

To the question, “How much have you heard about each of the following school programs?” parental respondents’ answers varied greatly between SHIP component programs, albeit in proportion to the expected amount of active parental involvement or exposure entailed by each program. Over 62 percent of respondents reported having heard “some” or “a great deal” about newsletters, websites, and bulletin boards that promote physical activity and healthy eating. Similarly, 48 percent of respondents reported having heard at least some about programs to make cafeteria food healthier and more appealing. Likewise, overall, 60 percent of respondents reported having heard “some” or “a great deal” about after school clubs, such as those for cooking, martial arts, soccer, yoga, and dance.

At the other end of the spectrum, parents had heard less about the in-class SHIP program components involving wellness integration and staff health. Only 17 percent of respondents reported having heard “some” or “a great deal” about programs for staff health, weight loss, yoga, and walking. Similarly, only 24 percent of respondents reported having heard at least some about wellness integration programs, described in the survey question as “programs to get students up and moving while learning.”

Figure 3: Percent of respondents who have heard “some” or “a great deal” about SHIP component programs, by subgroup



*Source: 2010 parent survey results

In regards to the two programs with lowest parental exposure, respondents from low-income and minority households generally reported having heard “some” or “a great deal” about SHIP components more often than non low-income or minority respondents. For instance, 29 percent of low income and minority households reported having heard at least some about wellness integration programs, a figure 5 percent above the sample average. Additionally, while only 17 percent of sample respondents reported having heard “some” or “a great deal” about programs for staff health, 21 percent of low-income respondents and 22 percent of minority respondents reported having heard at least some about staff wellness programs. For the remaining three SHIP programs, there were no statistically significant differences between subgroup percentages having heard “some” or “a great deal” about each relevant program component.

Table 1: Percent of respondents who have heard “some” or “a great deal” about SHIP component programs, by subgroup

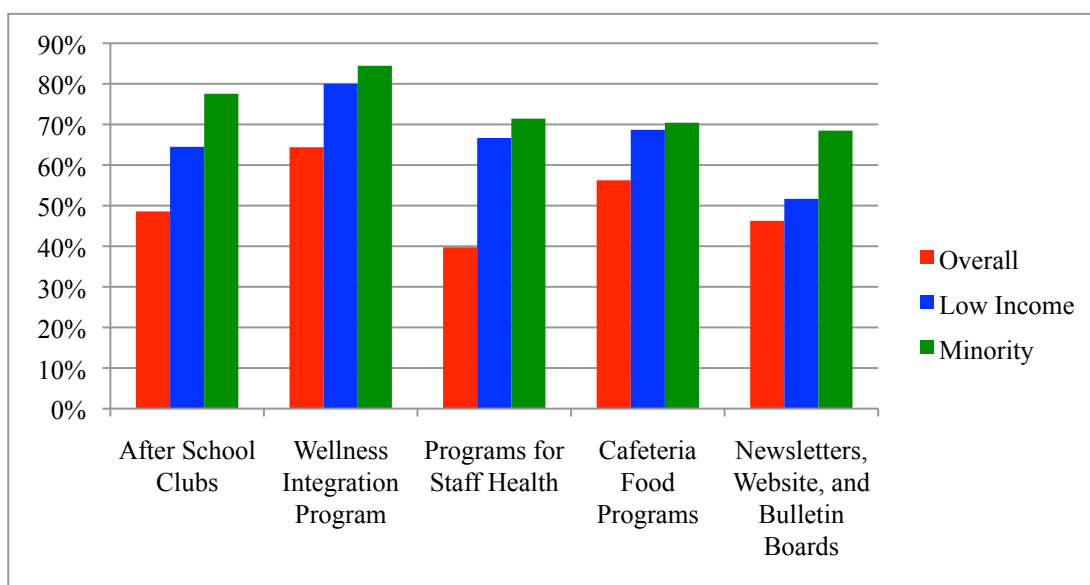
	How Much Have You Heard About...?		
	Overall	Low Income	Minority
After School Clubs	60%	57%	62%
Wellness Integration	24%	29%	29%
Programs for Staff Health	17%	21%	22%
Cafeteria Food Programs	48%	44%	45%
Newsletters	62%	64%	59%

*Source: 2010 parent survey results

Bold indicates statistically significant difference from non low-income or non-minority value at P<.05.

To the question, “How much of an impact have these programs had on your YOUNGEST CHILD currently enrolled in Williamsburg-James City County Schools?” respondents’ answers remained fairly consistent between program components, given that the respondent had heard at least some about the given component. Amongst respondents who had heard at least some about wellness integration programs, 64 percent viewed the programs as having “some impact” or “a major impact” on their youngest enrolled child. Similarly, 56 percent of respondents who had heard at least some about cafeteria food programs thought that the cafeteria programs had at least some impact on their child.

Figure 4: Percentage of respondents who view SHIP component programs as having “some impact” or “a major impact” on their youngest child, amongst respondents with at least some knowledge of component programs, by subgroup



*Source: 2010 parent survey results

The other three SHIP program components were viewed as having “some impact” or “a major impact” on respondents’ youngest child by less than 50 percent of the online survey respondents. Overall, 48 percent of respondents with a least some knowledge of after school club programs viewed these programs as having at least some impact on their child. Similarly, only 46 percent of knowledgeable respondents viewed newsletters as having “some impact” or “a major impact” on their youngest child, while only 40 percent of knowledgeable respondents viewed staff programs as making at least some impact.

With the exception of SHIP newsletter programs, for all SHIP component programs surveyed, a statistically significant greater proportion of low-income and minority respondents reported viewing the component as having at least some impact on their child, in comparison to non low-income and non-minority respondents. 64 percent of knowledgeable low-income and 78 percent of knowledgeable minority parental respondents viewed after school clubs as having “some impact” or “a major impact” on the health of their youngest child. Respectively, these figures are 80 percent and 84 percent for

wellness integration programs, 67 percent and 71 percent for staff health programs, 69 percent and 70 percent for cafeteria food programs, and 52 percent and 68 percent for newsletter programs. Low-income and minority respondents reported seeing greater impacts of SHIP programs on their youngest child than average sample respondents across all SHIP component programs. Additionally, minority respondents report a greater impact of all SHIP component programs than low-income respondents access all SHIP components, though this difference was greatest for after school clubs and newsletter programs.

Table 2: Percentage of respondents who view SHIP component programs as having “some impact” or “a major impact” on their youngest child, amongst respondents with at least some knowledge of component programs, by subgroup

	How Much of an Impact Have These Programs Had on Your Child?		
	Overall	Low Income	Minority
After School Clubs	49%	64%	78%
Wellness Integration Programs for Staff Health	64%	80%	84%
Cafeteria Food	40%	67%	71%
Programs	56%	69%	70%
Newsletters	46%	52%	68%

*Source: 2010 parent survey results

Bold indicates statistically significant difference from non low-income or non-minority value at P<.05.

Eating and Drinking Habits

In comparison to the national 2009 Youth Risk Behavior Surveillance (YRBS) summary, the youngest child of survey respondents eats fruits and vegetables less often than the national average³³. According to the 2009 YRBS, 22.3 percent of high school students in the United States eat fruits and vegetables at least five times per day.³⁴ In our survey, only 14.86 percent of respondent parents report that their youngest child eats fruits and vegetables at least five times daily. This figure falls to 12.57 percent amongst respondents from low-income households. Overall, 80.35 percent of respondents report that their youngest child eats fruit at least once a day; this figure falls to 60.17 percent amongst minority household respondents. Similarly, 85.04 percent of all respondents report that their youngest child eats vegetables at least once daily, though this figure falls to 79.58 percent amongst low-income households.

In comparison to the 2009 YRBS results, survey respondents report that their children drink soda less often than the national average. Nationally, 29.2 percent of high school students drank soda at least one per day in 2009.³⁵ Yet, only 13.22 percent of our survey respondents reported that their youngest child drank soda at least once per day. This figure is down from the 2008 figure ranging between 19.2-28.3 percent. Nevertheless, low-income and minority respondents reported significantly higher levels of soda consumption.

³³ Admittedly, for our purposes, this is an imperfect comparison, given the YRBS’s (2009) exclusive focus on high school students. However, we still believe it serves to provide a conceptual frame.

³⁴ CDC, 2009, p. 113

³⁵ CDC, 2009, p. 115

22.80 percent of low-income, and 19.08 percent of minority respondents reported that their youngest child drank soda at least once daily.

Table 3: Prevalence of eating behaviors amongst youngest children of parent survey respondents

Behavior	Overall	Low Income	Minority
Fruit at Least Once Daily	80.35%	78.24%	60.17%
Vegetables at Least Once Daily	85.04%	79.58%	85.06%
Fruits and Vegetables at Least Five Times Daily	14.86%	12.57%	16.67%
Soda at Least Once Daily	13.22%	22.80%	19.08%
Juice or Coffee Drinks at Least Once Daily	22.42%	31.22%	33.72%
Sports Drinks at Least Once Daily	11.39%	11.40%	15.43%
Dinner with Adult at Least 4 Times in Past 7 Days	91.30%	86.52%	90.87%
Breakfast at Least 4 Times in Past 7 Days	92.77%	90.10%	87.36%

*Source: 2010 parent survey results

Bold indicates statistically significant difference from non low-income or non-minority value at P<.05.

A significant difference also exists in juice drink consumption between children from the non low-income and non-minority households and those from low-income and minority households. Whereas 22.42 percent of overall respondents reported that their child drank a sweetened juice or coffee drink³⁶ at least once a day, 31.22 percent of low-income respondents reported that their youngest child drank a juice of coffee drink at least once a day. This figure increases further to 33.72 percent amongst minority households.

In comparison to 2008, there has been remarkable improvement in family eating behaviors regarding breakfast and dinner. In 2008, 61.5 percent of survey respondents reported that their child had eaten breakfast on at least five of the previous seven days. In our survey, 92.77 percent of online respondents reported that their child had eaten breakfast on at least four of the previous seven days, while 83.23 percent reported that their child had eaten breakfast on all seven of the previous seven days. Similarly, 91.30 percent of respondents reported that their youngest child had eaten dinner with an adult on at least four of the previous seven nights. This percentage only falls to a minimum of 86.52 percent amongst sample low-income households.

Conveyance of SHIP Messages from School into the Home Environment

³⁶ “Coffee drink” refers to sugary, coffee drinks such as the Frappachinno

In the following sections, we use the frequency of a child talking about healthy eating and the benefits of physical activity “often” as a proxy for the success of SHIP messaging, in terms of changing student attitudes on healthy behaviors. In this section we test for the marginal effect of successful messaging on behavioral changes, involving healthy eating and physical activity behaviors.

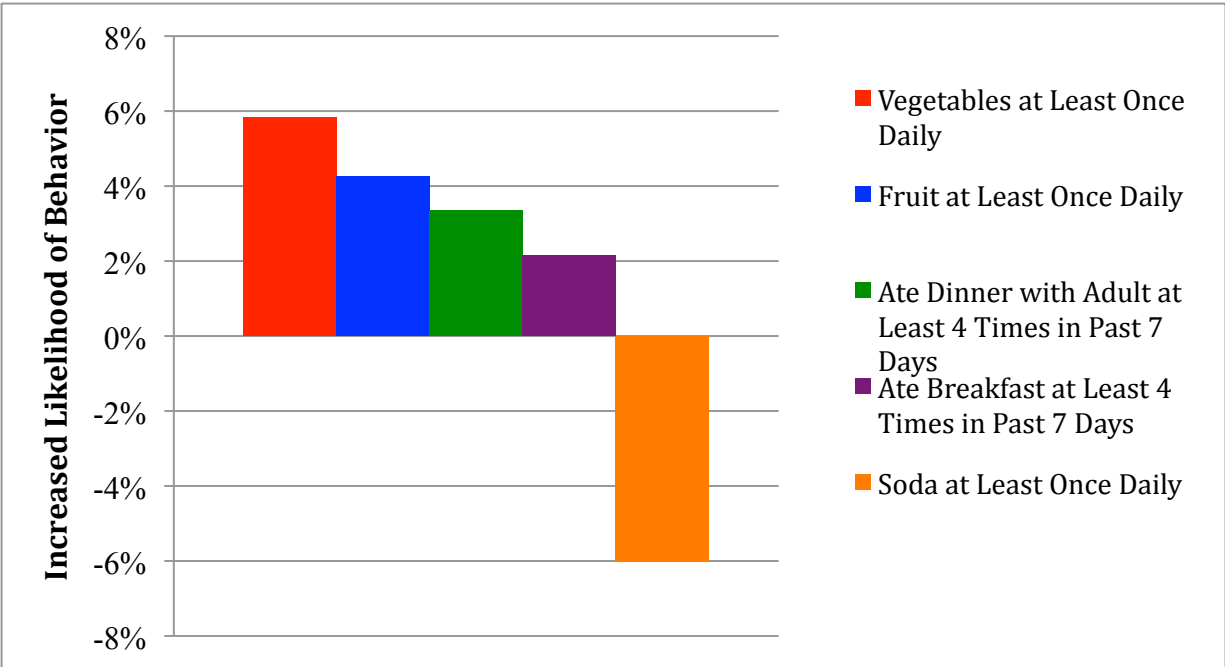
To determine the marginal effect of talking about healthy behaviors on the likelihood of engaging in those behaviors, we control for various demographic and individual characteristics. These include household income, race and ethnicity, the sex and grade of the child, the sex and age of the parent respondent, and the at risk or overweight status of the child.

There is substantial evidence that SHIP messaging helps to positively influence healthy eating choices. In our sample, talking about healthy eating “often” increases the likelihood that a child will eat fruit at least once per day by four percent. Similarly, talking about healthy eating “often” also increases the likelihood that a child will eat vegetables at least once per day by six percent.

Talking about healthy eating “often” has a greater marginal impact on the likelihood of eating fruit at least once daily amongst children from minority households than amongst children from non-minority households. Talking about healthy eating increases the probability that a child from a minority household will eat fruit at least once a day by 15 percent. By comparison, talking about healthy eating “often” increases the likelihood that a child from a non-minority household will eat fruit at least once a day by a statistically insignificant two percent. The effect of talking about healthy eating “often” on the likelihood that a child from a minority household eats vegetables at least once a day is similarly great in magnitude, around 10 percent.

In terms of income, the marginal effect of talking about healthy eating “often” on healthy food choices is statistically insignificant amongst low-income households. This statistical insignificance may be due, however, to a low sample size, since only 53 low-income households reported that their children talk about healthy eating. By contrast the marginal impact of talking about healthy eating “often” on healthy food choices amongst the children of middle-income respondents is genuinely insignificant in terms of eating fruit at least once per day, but significant in terms of eating vegetables at least once daily. A child from a middle income household who talks “often” about healthy eating is seven percent more likely to eat vegetables once daily than a child who does not talk “often” about healthy eating. Additionally, talking about healthy eating only increases the likelihood that a child from a high-income household will eat fruit at least once daily by six percent.

Figure 5: The marginal effect of talking about healthy eating “often” on healthy eating behaviors



*Source: 2010 parent survey results

Similarly, talking about healthy eating “often” is associated with a decreased likelihood of drinking at least one soda daily on the magnitude of six percent. Additionally, with regards to soda, talking about healthy eating “often” has significant effects on the behaviors of children from low-income and minority households. A child from a low-income household is 18 percent less likely to drink soda at least once daily if he or she talks about healthy eating “often”. Moreover, a child from a minority household is 13 percent less likely to drink soda at least once per day if he or she talks about healthy eating “often”.

Nevertheless, talking about healthy eating “often” does not significantly reduce the likelihood that a child will drink at least one juice or coffee drink or sports drink per day amongst the overall sample or the children of low-income respondents. It does, however, reduce that likelihood that a child from a minority household will drink a sugary juice or coffee drink at least once daily by 17 percent.

In our sample, talking about healthy eating is also statistically significantly associated with an increased likelihood of eating dinner with an adult at least four times over the previous seven days. In our overall sample, talking about healthy eating “often” is associated with an increased likelihood of eating dinner with an adult at least four times of the past seven days of 3 percent. However, this effect is insignificant amongst low-income and minority households.

Additionally, talking about healthy eating has a statistically significant effect on the likelihood of a child having eaten breakfast on at least four of the previous seven days on an order of magnitude of two percent. Again, this association is statistically insignificant amongst low-income households, though it is significant and equal to 10 percent amongst children from minority households.

In comparison to the national average given by the 2009 YRBS survey, the average student in our sample exercises at least 60 minutes per day more often than the national average³⁷. Nationally, according to the 2009 YRBS survey, 18.2 percent of high school students were physically active for at least 60 minutes on all seven days before the survey.³⁸ In our sample, 19.65% of parents reported their youngest child was physically active for at least 60 minutes on the average school day. Moreover, 19.17% of sampled students from low-income households in the WJCC school division engaged in at least 60 minutes of physical activity on an average school day. Alarming, however, only 14.2 percent of parents from minority households reported that their child engaged in physical activity for at least 60 minutes on an average school day, a figure statistically lower than that for non-minority sample households.

Compared to the national average, as found in the 2009 YRBS survey, fewer children in our online sample of WJCC school division students engaged in physical activity for at least 60 minutes on at least five of the seven days leading up to our survey. Nationally, 37.0 percent of high school students were physically active for at least 60 minutes on at least five days on the week before taking the YRBS survey.³⁹ In our overall online sample, this figure falls to 32.63 percent. Amongst low-income households, 30.37 percent of parents reported that their child engaged in at least 60 minutes of physical activity on at least five days during the week leading up to our survey. This figure falls again to 28.92 percent amongst minority households.

Our sample responses indicate a significant difference between the likelihood of a child engaging in physical activity with an adult at least once weekly between children from non low-income and non-minority households and those from low-income and minority households. In our sample, 67.02 percent of parent respondents reported engaging in physical activity with their child at least once weekly. This figure falls to 61.14 percent amongst low-income households, and further to 56.10 percent amongst minority households.

Table 4: Prevalence of physical activity behaviors amongst youngest children of online parent survey respondents

Behavior	Overall	Low Income	Minority
At Least 60 Minutes Physical Activity Daily	19.65%	19.17%	14.52%
60 Minutes Physical Activity on at Least 5 of Previous 7 Days	32.63%	30.37%	28.92%
Physical Activity with	67.02%	61.14%	56.10%

³⁷ Again, this national average is based on high school students and is used more as an illustrative point than as an exact figure for comparison.

³⁸ CDC, 2009

³⁹ CDC, 2009

Adult at least Once Weekly			
Over 2 Hours Screen Time Nightly	7.39%	12.44%	15.57%
Gets Enough Sleep	52.69%	53.88%	33.20%

*Source: 2010 parent survey results

Bold indicates statistically significant difference from non low-income or non-minority value at $P < .05$.

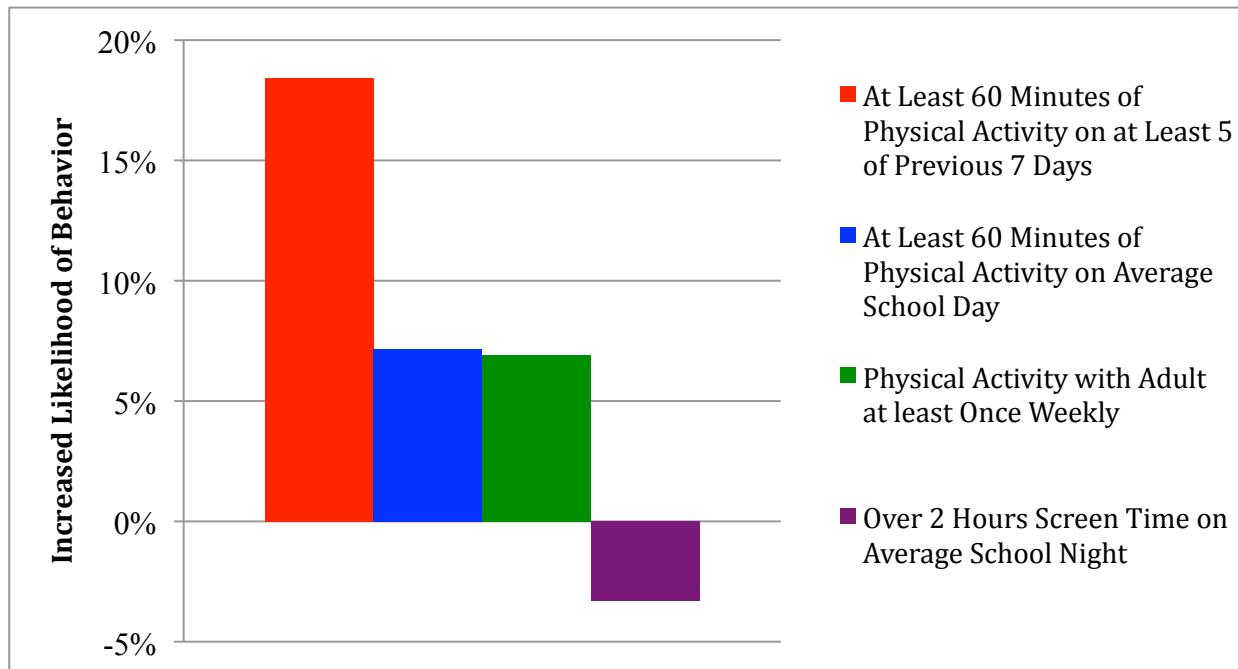
In our overall sample, 7.39 percent of parent respondents reported that their child engaged in over two hours of screen time on an average school night. This figure is much lower than that from 2008, when 19.6 percent of surveyed children watched over three hours of television on an average day. Nevertheless, children from both low-income and minority households were significantly more likely to engage in over two hours of screen time on an average school night than those from non low-income or non-minority households. Amongst low-income households, 12.44 percent of parent respondents reported that their child engaged in over two hours of screen time on an average school night. This figure increases further to 15.57 percent amongst minority household respondents.

Overall, 52.69 percent of survey respondents reported that their child got sufficient sleep on an average school night⁴⁰. This figure for low-income students, at 53.88 percent, is insignificantly different from that for non low-income students. Yet, students from minority households received significantly less sleep than those from non-minority households. We find that only 33.20 percent of minority respondents reported that their child received sufficient sleep on an average school night.

As with the case of healthy eating behaviors, there is substantial evidence that SHIP messaging on the benefits of physical activity positively impacts healthy physical activity behaviors amongst the children of our sampled parents. In our sample, talking about the benefits of physical activity “often” increases the likelihood that a child will engage in physical activity at least 60 minutes on an average school day by seven percent. Additionally, talking about the benefits of physical activity increases the likelihood that a child engaged in physical activity on at least five out of the seven days leading up to the survey by 18 percent. This marginal effect is only slightly less pronounced when parental interaction is taken into account. Talking about the benefits of physical activity “often” increases the likelihood that a child will engage in physical activity with a respondent adult by seven percent. This difference in magnitude, however, is to be expected, as exercise with an adult requires action on the part of the adult, in addition to that of the child.

Figure 11: The marginal effect of talking about the benefits of physical activity “often” on physical activity behaviors

⁴⁰ For our purposes, “sufficient sleep”, or “enough sleep”, is defined here as 10-11 hours of sleep per average school night for children in grades K-7, and as 8-9 hours of sleep per average school night for children in grades 8-12 (Gelfand, 2009).



*Source: 2010 parent survey results

In terms of household minority status, talking “often” about the benefits of physical activity is positively associated with an increased likelihood of having exercised on at least five of the seven days leading up to the survey and an increased likelihood of exercising with an adult at least once weekly. Additionally, these effects are statistically significant. A minority child is 18 percent more likely to exercise at least once a week if he or she talks “often” about the benefits of physical activity. Moreover, a child from a minority household is 17 percent more likely to engage in physical activity with an adult at least once a week if he or she talks “often” about the benefits of physical activity. Amongst minority students, the association between talking “often” about the benefits of physical activity and the likelihood of engaging in at least 60 minutes of physical activity daily is statistically insignificant due to low sample size.

In terms of household income, talking about the benefits of physical activity “often” does not seem to be significantly associated with an increased likelihood of engaging in healthy physical activity behaviors. This result is genuinely insignificant for the likelihood of engaging in at least 60 minutes of physical activity daily and on at least five out of seven days. However, it may be insignificant in regards to the likelihood of exercising with an adult once weekly due to low sample size.

Regarding other behaviors related to physical activity and wellness, talking about the benefits of physical activity is significantly associated with a decreased likelihood of engaging in over two hours of screen time on a school night, especially amongst students from minority and middle-income households. Amongst minority households, a student who talks about the benefits of physical activity “often” is three percent less likely amongst the overall sample and 12 percent less likely amongst minority households, to engage in

over two hours of screen time nightly. The association amongst low-income households is again insignificant, though possibly due to low sample size.

On the other hand, talking about the benefits of physical activity is not significantly associated with an increased likelihood of receiving sufficient sleep. The null result holds across all income- and race-based subsections of our sample. This null result is likely due to a lack of mental and social association between sleep and physical activity.

Marginal Impact of Messages on Being at Risk for Childhood Obesity

Preliminary results measuring the marginal effect of messaging on students' risk of being overweight or at risk of being overweight are inconclusive. Here, overweight is identified as having a BMI in the 95th percentile of one's age and sex classification group. Similarly, at risk of being overweight is defined as having a BMI in the 85th percentile of one's age and sex classification group⁴¹.

All evidence for the impact of healthy messaging on the prevalence of obesity points towards a statistically insignificant and inconsistent effect. Depending on the variable used, whether it is that a child talks "some" about the benefits of healthy eating and physical activity, that a child talks "often" about the benefits of healthy eating, or that a parent of "somewhat" or "very" familiar with SHIP, the direction of the association changes between a positive and negative sign. This is largely due to slight correlations between each of the explanatory variables and a child's obesity status. More health-conscious students are simultaneously more likely to talk "some" about the benefits of healthy behaviors and have lower BMI scores for their age and sex than less health conscious students. This biases the result for the effect of messaging in terms of talking "some" about healthy behaviors on the prevalence of obesity downward, or negatively. Similarly, SHIP familiarity is associated with talking "often" about healthy eating amongst children with relatively higher BMI scores. This association biases related results positively, or upward. Thus, little can be said about the effect of messaging on the prevalence of childhood obesity in a snapshot analysis. The relationship is best studied over time.

Additionally, it makes sense that, in the short run, SHIP messaging would be inconsistently and insignificantly related to the prevalence of childhood obesity. As depicted above in *Figure 1*, SHIP messaging works by first changing the health-related attitudes of children and their parents, as expressed through child-parent communication. These changes in attitudes then translate into concrete changes in healthy lifestyle behaviors as described immediately above. It is only after these behavioral changes that BMI and the prevalence of obesity can even be affected, a process that takes time and involves further intermediate steps.

⁴¹ For our purposes, we substituted grade for age beginning with an age of 5 years in kindergarten. While not as precise as age in months, this conversion allowed us to calculate at risk and overweight status according to sex specific BMI charts. We expect the figure to become marginally more inaccurate at higher grades, given the greater chance of grade repetition.

Concluding Remarks

This report has shown that not only is there substantial support for a school-based health initiative such as SHIP, other similar programs have seen extraordinary success. The surveys that are disseminated biennially are key to maintaining a database of knowledge on the current status of SHIP components. The redesigned 2010 parent survey, with the mixed-mode implementation strategy, resulted in an increased response rate from previous surveys, creating a significant baseline for future comparison.

Currently, SHIP messaging is effectively being translated into the desired attitudes and behaviors in students. More children are talking to their parents about the benefits of healthy eating and physical activity, and, as a result, children are more likely to engage in healthy eating and physical activity behaviors if they talk with their parents a lot about these practices.

According to online survey results, parents know most about the after school clubs, cafeteria food programs, and the print, web, and school-based health promotions that SHIP is attempting to inform students and parents of. Low-income and minority populations in our preliminary sample believe the SHIP programs have more of an impact than the average member of the population. Additionally, healthy behaviors in minorities are positively impacted as a result of SHIP initiatives.

Finally, the link to childhood obesity must be studied over time, but current analysis shows that short-term behaviors can be affected. Parental involvement is highly influential in affecting these changes in behaviors, as has been demonstrated by preliminary online survey results as well as supporting research.

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Appendix A
Referenced Survey Questions

Parent Survey Question	Source
Q1: How many children do you have currently enrolled in grades K-12 at Williamsburg-James City County Schools?	Question SHIP and William & Mary developed
Q2: What is the sex of this child?	Youth Risk Behavior Survey 2007, Q 2 adapted
Q3: What grade is this child in?	Youth Risk Behavior Survey 2007, Q 3 adapted
Q4: About how tall is this child without shoes?	Virginia Youth Survey 2009, Q 6 adapted
Q5: About how much does this child weigh in pounds?	Virginia Youth Survey 2009, Q 7 adapted
Q6: On average, during the PAST 7 DAYS, how many TIMES PER DAY did this child eat fruit?	Youth Risk Behavior Survey 2007, Q 73 adapted
Q7: On average, during the PAST 7 DAYS, how many TIMES PER DAY did this child eat vegetables or green salad? (Do not count potatoes.)	Youth Risk Behavior Survey 2007, Q 76, 74, 77 adapted
Q8: On average, during the PAST 7 DAYS, how many TIMES PER DAY did this child drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi or Sprite? (Do not count diet soda or diet pop.)	Youth Risk Behavior Survey 2007, Q 78 adapted
Q9: On average, during the PAST 7 DAYS, how many TIMES PER DAY did this child drink a can, bottle, or glass of a sweetened juice or coffee drink, such as fruit punch or Frappuccino?	Youth Risk Behavior Survey 2007, Q 72 adapted
Q10: On average, during the PAST 7 DAYS, how many TIMES PER DAYS did this child drink a can or bottle of a sports drink, such as Gatorade or Powerade?	Questions HRiA, SHIP, & HKC developed
Q11: During the PAST 7 DAYS, how many DAYS did this child eat breakfast?	California Healthy Kids 2005, Q A20 adapted
Q12: During the PAST WEEK, how many DAYS did this child eat the school cafeteria lunch?	Question SHIP and William & Mary developed
Q13: On days that this child does not eat the school cafeteria lunch, which of the following is the MOST IMPORTANT reason?	Question SHIP and William & Mary developed
Q14: During the PAST WEEK, how many DAYS did this child eat the school cafeteria breakfast?	Question SHIP and William & Mary developed

Q15: On days that this child does not eat the school cafeteria breakfast, which of the following is the MOST IMPORTANT reason?	Question SHIP and William & Mary developed
Q16: On an AVERAGE SCHOOL DAY, how many minutes is this child engaged in vigorous activity, play, or sports OUTSIDE OF SCHOOL?	Questions HRIA, SHIP, & HKC developed, adapted
Q17: During the PAST 7 DAYS, on how many days was this child engaged in vigorous activity, play, or sports for at least 60 minutes OUTSIDE OF SCHOOL?	Youth Risk Behavior Survey 2007, Q 80, adapted
Q18: On an AVERAGE SCHOOL NIGHT, do you limit the amount of time this child spends watching television or DVDs, playing video or cellphone games, or using a computer for non-school purposes? (Include activities such as Nintendo, Game Boy, Play Station, Xbox, computer games, and the internet)	Giammattei, Marshak, Wollitzer, and Pettitt, adapted
Q19: On an AVERAGE SCHOOL NIGHT, about how much total time does this child spend watching television or DVDs, playing video or cellphone games, or using a computer for non-school purposes? (Include activities such as Nintendo, Game Boy, Play Station, Xbox, computer games, and the internet)	Questions HRIA, SHIP, & HKC developed, adapted
Q20: How often do you or another adult family member engage in physical activities with this child? (Include activities such as family walks, hiking, bowling, playing a sport, etc.)	Questions HRIA, SHIP, & HKC developed, adapted
Q21: During the PAST 7 NIGHTS, how many times did you or another adult family member eat dinner with this child at home?	Gallup Poll 2004, adapted
Q22: When you shop for groceries, how frequently do you read the nutritional information (calorie, fat, cholesterol content, etc.) listed on the label?	Mandal 2010, adapted
Q23: On an AVERAGE SCHOOL NIGHT, about how many HOURS of sleep does this child get?	Children's Sleep Habits Questionnaire 2005, adapted
Q24: How frequently does this child talk to you about healthy eating?	Questions HRIA, SHIP, & HKC developed, adapted
Q25: How frequently does your child bring home flyers or other printed material from school about healthy eating?	Question SHIP and William & Mary developed

Q26: How frequently does this child talk to you about the benefits of physical activity?	Questions HRIA, SHIP, & HKC developed , adapted
Q27: How frequently does your child bring home flyers or other printed materials about the benefits of physical activity?	Question SHIP and William & Mary developed
Q28: How important do you think the following activities are to this child's health? (Family Meals, Limiting Amount of TV, Getting Enough Sleep, Physical Activity, Good Eating Habits)	Question SHIP and William & Mary developed
Q29: How important do you think the following activities are to this child's school performance? (Family Meals, Limiting Amount of TV, Getting Enough Sleep, Physical Activity, Good Eating Habits)	Question SHIP and William & Mary developed
Q30: How important do you think each of the following activities should be for Williamsburg – James City County Schools? (Teacher training programs, Student health and wellness programs, Teacher health and wellness programs, Student technology education programs, Teacher salary improvement)	Question SHIP and William & Mary developed
Q31: How would you describe the weight of your YOUNGEST CHILD currently enrolled in Williamsburg-James City County Schools?	Youth Risk Behavior Survey 2007, Q 65 adapted
Q32: How serious do you think the problem of obesity is among children in the United States?	Harvard School of Public Health, 2005 adapted
Q33: How serious do you think the problem of obesity is among children in Williamsburg-James City County Schools?	Harvard School of Public Health, 2005 adapted
Q34: How much do you think each of the following contributes to childhood obesity? (Poor eating habits, Too little physical activity, Heredity and genetics)	Harvard School of Public Health, Robert Wood Johnson Foundation, 2008 adapted
Q35: How much have you heard about each of the following school programs? (After school clubs for cooking, martial arts, soccer, yoga, dance, etc.; Programs to train teachers to get students ip and moving while learning; Staff programs to make cafeteria food healthier and more appealing; Newsletters, websites, bulletin boards, etc. that promote healyh eating and physical activity)	Question SHIP and William & Mary developed
Q36: How much of an impact have these	Question SHIP and William & Mary developed

<p>programs had on your youngest child currently enrolled in Williamsburg – James City County Schools? (After school clubs for cooking, martial arts, soccer, yoga, dance, etc.; Programs to train teachers to get students up and moving while learning; Staff programs to make cafeteria food healthier and more appealing; Newsletters, websites, bulletin boards, etc. that promote healthy eating and physical activity)</p>	
<p>Q37: How familiar are you with the School Health Initiative Program (SHIP)?</p>	<p>Question SHIP and William & Mary developed</p>
<p>Q38: Please indicate how strongly you agree or disagree with each of the following: Restaurants should highlight the entrees and side dishes that are low fat, low calorie, and nutritious; I am more likely to go to restaurants that provide nutrition information (fat, calories, sodium, fiber, etc.) about menu items; I am more likely to go to restaurants that highlight entrees/sides that are low fat, low calorie, and nutritious; I am more likely to order menu items that are labeled as low fat, low calorie, and nutritious</p>	<p>Question SHIP and William & Mary developed</p>
<p>Q39: What is your sex?</p>	<p>Youth Risk Behavior Survey 2007, Q 2</p>
<p>Q40: How old are you?</p>	<p>US Census adapted</p>
<p>Q41: What do you consider to be your racial or ethnic heritage?</p>	<p>US Census adapted</p>
<p>Q42: What best describes your family income for the year 2010 (before taxes)?</p>	<p>US Census adapted</p>