

Crunch Out Obesity: An Evaluation



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June 2016

I. Introduction

Rates of childhood obesity have increased substantially over the last two decades both in the United States and worldwide (Cunningham, Kramer, and Narayan 2014; Ebbeling, Pawlak, and Ludwig 2002; Ogden et al 2014). The increased prevalence of childhood obesity is troubling because of the predictive relationship between childhood obesity and future health complications such as heart disease, diabetes, respiratory illness, high blood pressure, sleep apnea, and some types of cancer (Pediatrics 2016). More than half of obese children and approximately 70% of obese adolescents will grow up to become obese adults (Dehghan, Akhtar-Danesh, and Merchant 2005; Serdula et al 1993).

The Center for Disease Control and Prevention defines obesity as having a Body Mass Index (BMI) measurement at or above the 95th percentile for children and teens of the same age and sex. However, there are several limitations to using BMI measurements to determine obesity given the imprecision of BMI, which does not distinguish between body fat, muscle mass, and skeletal mass. Nor do BMI measurements take into account activity level or weight and height changes that occur during growth between ages 5 through 17 (Ellin 2006; Kadaba 2007). Additionally, there is disagreement about the cut off points for BMI depending on age, gender, and race (Pediatrics 2016). Although studies have found evidence that those who are considered obese as children are more likely to become obese as adults, there is still much controversy within the medical community concerning whether or not excess BMI in childhood is actually associated with disease outcomes (Oliver 2006). Many studies which have set out to evaluate the relationship between childhood obesity and later health complications have been limited due to their small sample sizes and their inconclusive findings regarding the long term effects of childhood obesity (Steinberger 2001; Yoshinaga 1995). For these reasons, the framing of childhood obesity as an inexorable prognosis, in the media as well as in health initiatives (such as First Lady Michelle Obama's "Let's Move" campaign) is incorrect and simplistic.

When constructing intervention programs targeted at childhood obesity, it is important to consider the complexities of how energy is processed within the body, which causes substantial individual variation in regards to the success of such programs. The American Society for Nutrition has found exercise interventions to result in a variety of body weight responses, with some individuals losing significant amounts of weight and some actually gaining weight (which may be related to increases in hunger following exercise). Additionally, since obese individuals have relatively increased body fat, which has a lower metabolic rate than lean tissue, it is often more difficult for them to lose weight as compared to non-obese individuals (American Society for Nutrition 2016). These biological factors, which put some people at an advantage for succeeding in health intervention programs over others, are important to consider when educating people, particularly children, about health and exercise as success in losing weight is not solely the result of individual effort.

It is important when implementing any childhood health and fitness program to have an awareness and active confrontation with our culture's tendency to conflate health and

wellbeing with moral judgments concerning overweight and obese children and their parents (Halse 2009; Throsby 2011). Health initiatives must also be conscious and sympathetic to the fact that obesity is imbedded in a larger context of racial, gender, and socioeconomic inequality and oppression (Firth 2012). Low-income Black and Hispanic individuals disproportionately make up the obese population in the United States, which is often the result of increased working hours (thus, less time for being active) and decreased access to healthy foods (National Institute of Diabetes and Digestive Kidney Disease 2016). Many health initiatives participate in a discourse that, for adults, primarily emphasizes individual responsibility and, for children, also places blame on parents (particularly mothers) for being inattentive to their children or responsible for their poor eating habits. These discourses are problematic since they fail to acknowledge the socioeconomic conditions that contribute to these circumstance and also reproduce an emphasis on individualism and neoliberalism which may perpetuate ideological anxieties about changing gender roles (Gerbensky-Kerber 2011). Thus, health initiatives have a responsibility to account for social, economic and genetic factors that may limit access to healthy resources and the ability to successfully lose weight, in addition to focusing on individual responsibility. For example, access to healthy foods and safe exercise spaces that are necessary for a healthier lifestyle may not be readily available for all children.

Elementary school children are not immune to concerns about body image, weight loss, and dieting culture that are more often associated with adolescents. Children who are obese or overweight, in particular, are at a greater risk of having a poor body image, and low self-esteem due to social isolation and discrimination by their peers (Hesketh, Wake, and Waters 2004; Strauss 2000; Stunkard and Wadden 1992). Researchers report that even among young children there has been increased “body dissatisfaction, dieting practices, exercise to lose weight, preoccupation with food, binge, and strategies to increase muscles” (Holt and Ricciardelli, 2008, 233). Maloney et al (1990) found that among children in the third through sixth grade, 45% reported that they desired to be thinner and 37% reported that they had attempted to lose weight. These results are particularly concerning because many of these behaviors are related to eating disorder and chronic health problems later in life. In addition, the fear of obesity and the encouragement of restrictive eating can result in increased weight concerns (Gustafason-Larson and Terry 1992). Vander Wal and Thelen (2000) report that body image satisfaction in elementary school girls was partially caused by “teasing, [peers’] weight and shape concerns, perceptions of parental influence to lose or control weight, appearance comparison, sensitivity, [and] body mass index” (105).

Education Programs and Interventions

Crunch Out Obesity is one of many programs that seek to inform elementary school students about healthy habits and healthy living strategies. Schools across the nation are looking to improve the health of their students through programs designed to provide them with the knowledge and tools they need to create and sustain long-lasting healthy lifestyles. It has been suggested that school lunches in particular provide a powerful source of influence on the formation of students’ healthy eating habits, and they have been shown to be able to positively impact the health of socioeconomically

disadvantaged students (Haynes-Maslow and O'Hara 2015).

One such program is the Farm to School Connection program in schools in Davis, California, which was designed to help students develop healthy eating habits for the rest of their lives through the incorporation of local agriculture into the school environment. The main focus of the school in its attempt to incorporate agriculture sector into its environment is on school lunches, during which they offer a salad bar with fresh vegetables and fruit from regional growers as a meal option. The teachers at these schools also try to incorporate lesson plans on nutrition and gardening into their classrooms when time allows for doing so (Graham et al. 2004). This program works to include farmers and local food growing practices in the education process, which involves students at every point of their food preparation and provides them knowledge about where their food comes from, contributing to their understanding of healthy habits. The USDA provides grants such as the Farm to School Grant program and Team Nutrition Training Grants to help schools across the country develop similar programs ("Community Food Systems: Farm to School Grant Program," "Team Nutrition Training Grants"). The government also funds programs such as OHIO Smarter Lunchrooms, which works to support schools in providing healthy decision-making skills to students (OHIO Smarter Lunchrooms Movement). The programs at the Davis schools show how important school lunches can be for the development of healthy habits.

A similar program to increase student intake of fruits and vegetables was developed as part of a summer camp at a YMCA. The program, called "Nutritious and Delicious Garden," consisted of participation in garden-based activities, such as weeding and picking fruits and vegetables, a couple of times a week and educational activities once a week, such as using the produce to taste test and make snacks. Research on this program shows that students experienced an increase in fruit and vegetable intake, preferences for vegetables over other foods, and the amount children asked their parents for fruits and vegetables (Heim et al. 2009). Once again, the success of this intervention program indicates the importance of involving children in the processes of food preparation in order to foster an increased awareness of, and concern for, healthy eating and living.

Some programs have a greater focus on health education within the classroom rather than outside of it, such as the Fitwits program. This program uses cartoon personas based on foods and snacks to encourage healthy eating and lifestyle choices. Fitwits represent healthy choices, including nutritious foods and physical activity, while Nitwits represent unhealthy choices. Cards depicting foods are illustrated with either a Fitwit or a Nitwit, indicating to students whether or not eating this food would be a healthy choice. Certain foods were also given names, such as Elvis Pretzley or Mr. Leather, with a FitWit rating of how healthy the foods are. Researchers found that after participation in this program, students' knowledge about the definition of obesity, the sugar content in foods, and appropriate portion sizes had greatly increased (McGaffey et al., 2010). This program is similar to Crunch Out Obesity in that it takes place within the classroom and focuses specifically on raising awareness of obesity. This program appears to have had great success in teaching students the correct definition of obesity through the use of health vocabulary and the use of food personas while brief videos on healthy lifestyles appear to

have made a lasting impact on the students.

Several studies have shown that school-based interventions, particularly those that involve nutrition and physical activity instruction, have a positive effect on preventing childhood obesity (Katz et al. 2008), especially among low-income children (Hollar et al. 2009). The programs that have the most success are those that have some sort of family or community aspect (Wang et al. 2013), as can be seen in the Davis school programs, which involves both the schools and local farmers. However, according to Wang et al., evidence is only “moderate” for the success of intervention programs, so while many appear to be successful, intervention programs are not necessarily always successful, and depend on the context in which they occur.

II. Data and Methodology

Students in WGS 331 (Gender, Power, and Knowledge: Feminist Methodologies), a research methods class at Kenyon College under the supervision of Professor H. Abbie Eler, evaluated the Crunch Out Obesity program during Spring 2016. Our evaluation included a content analysis of student essays and student journals along with interviews of fourth and fifth grade students. We interviewed fourth graders in 10 classes in 6 elementary schools (Columbia, Dan Emmett, East, Pleasant Street, Twin Oaks, and Wiggin Street) and fifth graders in 8 classes in 4 elementary schools (Columbia, East, Twin Oaks, and Wiggin Street). Our sample size consisted of 151 fourth graders and 116 fifth graders for a total of 267 students.

Interviews were one-on-one and ranged from 10 to 15 minutes. All interviews were conducted during students’ P.E. classes. They included questions about students’ health habits, their food choices, their use of the exercise ball, understandings about health and obesity, and their opinions about the Crunch Out Obesity program. Researchers also administered a Body Appreciation and Body Image Scale to fourth graders to measure their perceptions of, and satisfaction with, their bodies. Interviews with fifth graders were less extensive and focused on program retention and opinions about the program. A copy of our interview questions for fourth and fifth graders and the Body Appreciation and Body Image are included in the Appendix.

III. Findings

Below we describe our findings in three categories: retention of the program, student understandings of health and their practice of healthy habits, and program impact on student behavior and learning outcomes.

a. Retention of the Program:

One of the major aims of this study was to assess the extent to which students have internalized the core principles of Crunch Out Obesity and 5-2-1-0 and continue to engage with aspects of both these programs. We found that for both 4th and 5th graders a

substantial number of students still practice the healthy habits that they learned in the program and continue using the exercise balls.

Use of the Exercise Ball

Overall, 75% of fourth graders reported still using their exercise balls at home (see Table 1). While the percentage of children still using their exercise balls is generally high across schools, only half of Pleasant Street students reported still using their exercise balls. This is likely due to the difficulty, discussed below, that many students at this school had in getting their exercise balls inflated. We found no difference in participation rates between boys and girls; both reported still using their exercise ball at high rates. In addition, 58.3% of fourth graders reported that someone else in their family uses the exercise ball. Students also report still doing the specific exercises they learned through Crunch Out Obesity on the exercise ball. In total 104 students still do the program exercises. This constitutes 92% of students who reported still using the ball at home.

Utilization of the exercise ball is lower among fifth graders, only 49% of fifth graders reported still using the exercise ball at home. Students at East and Twin Oaks were more likely to report using the exercise ball with 55% of students at East and 56% of students at Twin Oaks still using the ball. Throughout our interviews with fifth graders many students reported that they would like to use their exercise balls but that their balls had popped. Of those fifth graders who still use their exercise balls, 86% still do the exercises they learned through the Crunch Out Obesity program. We found that girls were more likely to report still using the exercise balls than boys. In the sample, 55% of girls but only 43% of boys reported that they still use their exercise ball. Fifth graders reported that their family members also use the exercise balls. In total, 36.2% of fifth graders noted that someone else in their family used the ball in addition to themselves.

Retention of Program Goals Among Fifth Graders

We asked fifth graders to report if there was anything from the program that they try to still do regularly (see Table 2). Overall, 75.2% of fifth graders (n = 88) reported that there was something that they learned from the program that they still incorporate into their daily activities. Of those students, 54.5% reported that they try to keep active and exercise; 28.4% said that they have modified their eating habits in some way (such as thinking about portion size, eating more fruits and vegetables); 13.6% still try to adhere to the 5-2-1-0 guidelines; and 6.8% report limiting their screen time. In addition, 9.1% of fifth graders reported that the program taught them to be concerned about their weight or to try to lose weight.

Fifth graders were also asked if they remembered hearing about 5-2-1-0 and if they could recite what 5-2-1-0 stands for (See Table 3). In total, 62% of fifth graders successfully recited to interviewers the principles of 5-2-1-0. Gender differences did exist in retention of 5-2-1-0 with more girls being able to recite the principles than boys (65% compared to 58%). Substantial differences existed between schools as well with fifth graders at

Columbia demonstrating the highest retention of 5-2-1-0 with 79% of students able to remember what each number stood for. Wiggin Street had the lowest retention rates with only 36% of fifth graders able to recall the parts of 5-2-1-0.

b. Healthy Habits and Conceptions of Health

Our interviews with fourth graders asked several questions about their understanding of concepts related to health and healthy living and whether or not they practiced the healthy habits that were stressed in the Crunch Out Obesity and 5-2-1-0 programs. We also administered a body image survey to students to measure their perceptions and satisfaction with their own body. We found that students often believed that a person's health is determined by how they look and the size and shape of the body. We also found that students did not have a strong understanding of the term "obesity". Students rarely talked about health in terms of illness or disease, but instead had a multi-faceted understanding of health that includes many of the principles articulated in the 5-2-1-0. In addition, we found that many students attach moralistic judgments to the term "unhealthy", viewing unhealthy people as lazy and lacking self-control. While we found that the girls in our study had, for the most part, positive perceptions of their body, the boys had more negative perceptions of their body.

Students' Health Habits

We asked fourth graders several questions to measure the extent to which they practice the principles articulated in the Crunch Out Obesity and 5-2-1-0 programs. Through questions such as "How much T.V do you watch?" and "How often do you play outside?", we hoped to gauge whether or not students were following the healthy habits that they had learned. Students reported high levels of physical activity (Table 4). Overall, nearly 67% of students reported that they play outside or exercise frequently with another 28% reporting that they play outside or exercise sometimes. Only 4.7% of students reported rarely getting any physical activity. Boys and girls reported different levels of physical activity, with boys more likely to report playing outside or exercising frequently than girls (72.2% compared to 60.9%). Differences in the level of physical activity were also apparent across schools. Twin Oaks had the greatest number of students reporting high levels of activity, with nearly 76% of students exercising or playing outside frequently. On the other end of the spectrum, Pleasant Street and Columbia had lower levels of reported activity. At Pleasant Street, 13.3% of students reported rarely getting any physical activity. At Columbia, only 58.1% of students reported frequently playing outside or exercising.

Students' self-reported eating habits demonstrate that students try to make good nutritional choices although they rarely consume the recommended five servings of fruits and vegetables. Most students report that they do not regularly drink soda or other sugary drinks (66.9%)(see Table 5). Again, these results vary greatly across schools. At Dan Emmett, only 18.8% of students reported regularly drinking soda or sugary drinks with dinner. Similarly, at Wiggin Street less than 20% of fourth graders reported drinking soda with meals. However, 51.5% of fourth graders at Twin Oaks and 41.7% of fourth

graders at East reported regularly drinking soda or other sugary drinks with their evening meal. The majority of students also reported eating at least one serving of fruits and vegetables every day (67.6%)(see Table 6). Pleasant Street and Columbia both had over 70% of students report eating fruits and vegetables daily. Overall, just less than a third of students reported that they do not eat fruits and vegetables on a daily basis. However, very few students eat more than one serving of fruits and vegetables each day; and only 2 students in the entire sample reported eating 5 servings of fruits and vegetables each day. This may underestimate the number of fruits and vegetables that students eat since many students did report eating “many” or “a lot” of fruits and vegetables. Only 28.8% of students reported eating three servings or more of fruits and vegetables daily.¹ More girls reported eating three or more servings of fruits and vegetables per day than boys (34.3% compared to 23.7%). Two schools had less than 20% of their students report eating three or more servings per day (Pleasant Street and Wiggin Street), while in three schools one-third or more of their fourth graders responded that they eat three servings or more per day (Columbia, Twin Oaks, Dan Emmett).

In addition, students reported being involved in the nutritional choices that their families make. 83.4% of students reported that they help their parents with the grocery shopping. Students also report that they help cook meals at home. The majority of students regularly help prepare meals (60%), with an addition 24% reporting that they sometimes help prepare meals (see Table 7). Only 16% reported that they never help with the cooking at home. Girls are more likely to help cook than boys, with 66.2% of girls indicating that they regularly help cook compared to 53.8% of boys.

Students report that limiting their screen time is difficult (see Table 8). Overall, only 24.7% of students reported 2 hours or less of screen time. Girls and boys equally struggled to limit their screen time to less than 2 hours. Across schools, students at Pleasant Street had the most success at limiting their screen time, with 43.8% of students reporting that they watched TV, played video games, or used a computer for 2 hours or less per day. Students at Columbia and Dan Emmett had the highest level of screen time, with 83.9% of students and Columbia and 81.3% at Dan Emmett reporting that they watch TV, play video games, or use a computer for more than 2 hours per day.

Understandings of Healthy and Unhealthy

We found that many students believe that a person’s level of health can be assessed by their physical appearance (see Tables 9a-9c). The majority of students sampled (61.7%) believe that you can at least sometimes tell if a person is healthy by just looking at them. Only 38.3% of students rejected the statement that you can tell a person is healthy just by looking at them. Those students who did not think that appearance corresponded with a person’s level of health reported that “some people could be healthy but overweight” and “they can have a bigger stomach and still be healthy”. An even higher percentage of students reported that an unhealthy person could be identified simply by their appearance.

¹ This includes students who answered “many” or “a lot” or “all the time” to the question of how often do they eat fruits and vegetables.

In the sample, 45.2% responded affirmatively to the question “Can you tell if a person is unhealthy just by looking at them?” and an additional 28.8% of students responded that you sometimes could tell if a person is unhealthy by their appearance. Many students responded that “if they’re fat” or “if they’re huge” you can know that someone is unhealthy. Only a few students reported that an unhealthy person may be underweight, with one student responding that someone who looks “really skinny” is unhealthy. However, when asked a more direct assessment of the relationship between appearance and weight (“Does a person’s size or weight tell you whether or not they are healthy?”) a sizable minority answered in the negative (47.5%). Still 52.5% of students answered that one could, or at least sometimes could, determine someone’s level of health from their weight. Students who responded “No” to this question reported: “I’m fat and I’m healthy”; “some people could have a disease”; and someone “could be fat and healthy, could be skinny and unhealthy”.

In addition, students were asked to describe to the interviewer what activities a healthy person and an unhealthy person engage in. Here, students displayed a multi-faceted conception of health with 67.6% of students reporting two or more different types of activities that a healthy person engages in (e.g. such as eating fruits and vegetables and exercising). Only 30.5% of students had a unidimensional understanding of health, listing only one type of activity. Students frequently used judgmental and negative language to describe those who are unhealthy. Overall, 53% of student responses were coded as negative in tone.² For example, 7.9% of students reported that unhealthy people were lazy and 11.9% responded that they were couch potatoes. Examples of these negative or judgmental answers from our interviews include: “He eats so much junk food he can barely walk”; “eats every single minute of the day”; “sits around all day, eats junk food, wants to be lazy”; and “is lazy like a couch potato”. Nearly 50% of students described an unhealthy person as someone who watches too much TV or spends too many hours playing video games. While 69% of students described an unhealthy person as someone who makes poor nutritional choices, most students reported unhealthy people as eating too much or eating junk food (31.8%). Only 2 students reported that not eating enough was also unhealthy behavior. Only 1 student reported that an unhealthy person was someone who is sick or ill frequently.

Few students could define what the word “obesity” means (see Figure 1). Many students did not want to answer this question, with 23% reporting that they did not know what the word meant and 18% requesting to skip this question. Of the remaining students, 57% offered an incorrect answer. Five percent of students defined obesity as being healthy or fit while 52% of students only gave a partially correct definition, defining obesity as fat, overweight, or someone who eats too much. Only 2% of students described obesity in medical terms, referring to having too much fat for a person’s height, body mass index, or the health problems associated with obesity. Similarly, students did not fully understand the program title, “Crunch Out Obesity” (see Figure 2). Many students reported that they did not know what the title meant or asked to skip the question (43%). Of the remaining

² An answer with a neutral tone would include a statement such as “not active, bad eating” while one with a negative tone would include “really lazy, only eat junk food.”

students, 5% believed the title refers to losing weight; 20% reported that it means eliminating obesity, although these students often did not have a complete understanding of that term; and 25% answered that it means getting healthy.

Body Image

Students were also given a battery of questions designed to measure their body image index (see Appendix). This index ranges from -9 (lowest) to 9 (highest), with higher scores demonstrating a more positive body image. The average score on the index was a 4.35 (st. dev = 3.00), with a low score of -4 (1.4% of students) and a high score of 9 (3.52% of students) (see Table 10). Girls had slightly higher average scores on the body image index than boys (4.64 compared to 4.08). However, when scores on this index are disaggregated according to school, boys display much lower perceptions of their bodies than girls in three schools. Boys at Columbia, East, and Pleasant Street have substantially lower scores on the body index scale than girls, with averages of 3, 3.4, and 2.4 respectively. Overall, 50% of boys scored a 4 or below on the index. In comparison, 50% of girls scored a 7 or below on the index, showing that girls are more likely to have positive views of their bodies than boys.

c. Program Impact and Goals

Student satisfaction with the program is high. The overwhelming majority of students reported that they liked the exercises that they learned in the program and they enjoyed using the exercise balls. Among fifth graders, 84.5% reported liking the exercises. Among fourth graders, 94% responded that they liked the exercises. Only 13.2% of fourth graders reported disliking something about the program. More fifth graders, 28%, reported that there was something that they disliked about the program, however many of these dislikes included that the program was too short. Fifth graders also disliked some of the healthy eating recommendations of 5-2-1-0.

The majority of fourth graders (68%) reported that they learned something from the program (Table 11). Almost a third of students reported that they learned healthy habits from the program; 25% indicated that they learned something about nutrition, food choices, and/or portion size; 23% learned how to use the exercise ball; and 18% learned the importance of healthy living and being fit. Students also reported that they have changed their behavior because of the program (Table 12). Overall, 66% of fourth graders reported that the program has impacted them. 26% of students increased their level of activity because of the program; 23% reported gaining strength; 14% make better nutritional choices and eat healthier because of the program; and 13% reported losing weight.

Students reported finding the program challenging (Table 13). Among fifth graders, 71.5% indicated that some part of the program was hard or challenging. For fourth graders, 72.2% reported that some part of the program was challenging. For the most part, fourth and fifth graders identified similar parts of the program as challenging or hard. Among those who found something challenging about the program, most identified

the exercises as the hardest part of the program; 40.4% of fourth graders and 48.2% of fifth graders found the exercises challenging. Students also found it difficult to eat healthier with 14.7% of fourth graders and 18.1% of fifth graders identifying some aspect of the nutrition component of the program challenging. Students also reported that the journal and the essay were difficult. Overall, 22% of fourth graders and 14.5% of fifth graders reported having a hard time remembering to keep track of their habits in their journal or difficulty writing the essay. In addition, 51% of fourth graders said they had trouble remembering what they had done the day before when they filled out their journals; 22% reported that they did not fill in their journal accurately. Limiting screen time was also a challenge for both fourth and fifth graders, with 9.2% of fourth graders and 10.8% of fifth graders reporting difficulties with this. Fifth graders also reported finding it difficult to adhere to 5-2-1-0 with 6% of students identifying this as the most challenging part of the program. Fourth graders did not mention 5-2-1-0 as a challenge. Some fourth graders, however, did mention that the most challenging part of the program was inflating the exercise ball; 5.5% of students had trouble with this.

A comparison of students' post and pre-test results reveal that many students experienced strength and endurance gains at the completion of the program. Student performance was recorded before and after the program for four specific exercises: abdominal curls, ball squats, pushups, and jumping jacks. Table 14 shows the percentage of children who saw an increase in the number of repetitions of these exercises that they could complete at the end of the program compared to the beginning. There is substantial variation across schools, but on average students could do more of each exercise following the program than they could complete at the beginning of the program. Across the four schools for which data was available, 58% of students reported increases in the number of abdominal curls they could complete, 66% saw gains in the number of ball squats, and 64% could do more push ups and jumping jacks at the end of the program compared to the beginning. The average amount of the increase for number of repetitions completed was 4.2 abdominal curls, 7.1 ball squats, 10.7 pushups, and 9.3 jumping jacks.

4. Program Recommendations

- Program language should focus on health and healthy habits for all children not just those who may be overweight or obese.

We recommend that program material sent home to families, such as the “Introductory Letter to Families” and the exercise flipbook make clear that the Crunch Out Obesity program is an important program for *all* students and not just those who are obese or overweight. The letter to parents would better serve the program if it described the program more in terms of instilling healthy habits in children rather than combating the obesity epidemic. Parents whose children are not obese may feel as if the program is not important or necessary for their families and children if the program is couched mainly in terms of fighting obesity. We suggest that the letter to families and exercise flipbook deemphasize the statistics on obesity and the obesity epidemic and instead stress the importance of learning healthy habits when young and continuing those habits beyond the Crunch Out Obesity program. For example, we do not feel that the sentence in the

introductory letter that states as follows: “The purpose of the program is to help fight the obesity epidemic right here in Knox County” is an accurate description of the aim of the program. The program’s goals are broader than simply decreasing incidences of childhood obesity and include encouraging children (and their families) to make lifestyle changes now that they will continue to practice into adulthood. Similarly, we would suggest that the page in the exercise flipbook entitled “What is obesity?” be rewritten (or replaced) to reflect the medical definition of obesity and list the health risks of childhood obesity. It should also stress that all children, no matter what their size and weight, could benefit from healthy eating and exercise. As it is written now, this page of the exercise flipbook may make obese and overweight children feel as if they are “unacceptable” and children of normal body weight feel that this program is not something that is relevant for their lives. Providing statistics on how much time children spend watching television or playing video games and how little time they spend exercising or statistics on the eating habits of children would express the extent of the health problem without focusing on body size and weight and would be more inclusive.

In addition, we suggest that more nutrition and cooking information be sent home to parents and families, especially since a majority of children reported helping cook at home. While students may want to make healthy food choices they are largely dependent on their parents to provide them with healthy foods. Educating parents about nutrition and providing families with healthy recipes may encourage students and their parents to eat more fruits and vegetables.

- Increase student knowledge about obesity, nutrition, and the health risks associated with excess weight.

Our interviews with fourth graders revealed that very few of them knew the medical definition of obesity. In addition, many students described people who are unhealthy in moralistic and judgmental language. Students in the Crunch Out Obesity program should receive more information about the definition of obesity and the health risks associated with being obese or overweight. We encourage our community partners to develop a short handout that could be distributed to P.E. teachers (and potentially students) with the definition of obesity provided by the Center for Disease Control and Prevention including a description of BMI, a list of health risks that are associated with obesity and excess weight, as well as a brief discussion that societal and genetic factors, along with individual effort, determine an individual’s weight.³ Based on our interviews, we are concerned that students often discussed obesity and weight in moralistic terms rather than medical terms. Ensuring that students are taught the medical definition, causes, and consequences of obesity may help mitigate some of the negative connotations that students associate with obese and unhealthy individuals. Students who are already

³ The Center for Disease Control and Prevention defines obesity as a BMI at or above the 95th percentile for children of the same age and sex. Overweight is defined as a BMI at or above the 85th percentile and below the 95th percentile for children of the same age and sex.

overweight or obese may feel less stigmatized, and perhaps less prone to bullying, if obesity is presented as a medical condition rather than the result of a moral failure.

In addition, P.E. teachers are given little guidance in the lessons plans for the program on what and how to discuss nutrition issues with their classes. While some students, especially those who participate in the Jump into Food and Fitness (JIFF) Program at Pleasant Street Elementary, had a more sophisticated understanding of nutrition, most students did not. In our interviews with students we encountered many misperceptions about what constitutes healthy eating and good nutrition. Partnering with Knox County Community Hospital to provide food and nutrition education to students in the program either in the form of information for P.E. teachers or classroom visits from nutritionists would help ensure that students are getting accurate and age-appropriate information about nutrition.

- Rethink the wording and recording of student journals

Many students struggled with filling out their journals. Many had trouble remembering what they had done the day before when filling out their journals, especially on Monday after the weekend. We recommend that the journals be posted online, if possible, so that students could fill them out at home at the end of the day. If this is not feasible, we recommend that students be given an index card at the beginning of each day that they could carry around and use to record what they do throughout the day. The information recorded on this card could then be used to assist them in filling out their journals the next day. One student we interviewed stated that this was the method she used to ensure that she was filling out her journal accurately. While we recognize that many students will forget to fill out the card or leave it at home, at least it may increase the accuracy of the journals somewhat.

In addition, we found the wording of some of the journal items emphasized negative habits rather than positive habits. For example, students are asked to record “How many sugary drinks (pop, energy or fruit drinks) did you drink?” and “How many times did you eat because you were bored?” Rather than asking students to record their bad habits it may be more fruitful to ask students how many times they chose to drink water or another healthier option. This will help give the students positive reinforcement for a healthy choice rather than a reminder of their unhealthy behavior. It may also encourage greater honesty in students’ recording of their habits. Students may not want to admit that they engaged in an unhealthy practice. The questions above could be rephrased to read: “How many times did you drink a glass of water or other healthy drink?” and “Did you only eat because you were hungry today?” Relatedly, many of the questions ask students to quantify behavior that is difficult to express numerically or that may be hard to remember. For example, a question such as “How many times did you think about portion size?” could be more useful reworded to ask “Did you think about portion size at meal time?” Asking students “how many minutes did you exercise?” also raises issues of validity as students in the fourth grade may not wear watches or have accurate perceptions of time. We would also recommend that the question “Did you eat dinner at the kitchen table?” be eliminated since it is not strictly related to health and fitness and

may make children who do not eat meals with their parents, or whose parents prefer to eat somewhere other than the kitchen table, feel as if they are doing something wrong or are unhealthy.

- Provide materials to students that are body positive and promote a healthy body image

Many students in our study scored low on the body appreciation and body image scale that was administered during the interviews. As discussed above, both boys and girls in our sample displayed poor body images. We would encourage those involved in implementing the Crunch Out Obesity program to keep in mind that students even as young as fourth grade are sensitive about their body, appearance, and weight. Teaching students some principles of body positivity and body appreciation may help them gain a more positive outlook towards their bodies. These principles include: bodies should be valued for what they can do rather than how they look; healthy bodies come in all different shapes and sizes; no specific body types or features are good or bad. Addressing students' poor body image before the teen years is crucial because negative body image is linked to a variety of harmful behaviors such as substance abuse, eating disorders, self-harm, and depression. Any programming, information or resources that the Crunch Out Obesity program could offer with a body positive focus would help reduce the likelihood of these behaviors. Such information is particularly important given that children are so often bombarded with negative messages about non-thin bodies in the media and our culture. For example, the "Resource Sheet" that is distributed to P.E. teachers could include links to websites that discuss body positivity and titles of children's books that deal with issues relating to body image and body appreciation that P.E. teachers could bring to class or make available to fourth grade teachers.⁴

- Ensure that all students can inflate the exercise balls

While the majority of students were able to inflate their exercise balls and use them at home, some students indicated that they were not able to or that getting the ball inflated was the hardest part of the program. These concerns were more prevalent at schools that serve low-income students such as Pleasant Street. While the individual P.E. teachers do provide opportunities to have their balls blown up at school, not all students are able to take advantage of these opportunities, especially those who ride the bus. We suggest that the United Way consider if there are alternative methods to distribute the balls that would guarantee that all students who qualify for a ball are able to use it.

⁴ Some suggestions for titles include: James Howe, *Brontorina*; Allia Zobel Nolan, *What I Like About Me*; Julianne Moore, *Freckleface Strawberry*; Judith Matz, *Amanda's Big Dream*.

Table 1: Do you still use the exercise ball at home?

4th Graders	
Columbia	71%
Dan Emmett	75%
East	75%
Pleasant Street	50%
Twin Oaks	82%
Wiggin Street	84%
Boys	76.6%
Girls	76.1%
All Schools	75%
5th Graders	
Columbia	48%
East	55%
Twin Oaks	56%
Wiggin Street	36%
Boys	43%
Girls	55%
All Schools	49%

Table 2: Do you still practice anything that you learned from the program? (5th Graders)

Still practice something	75.2%
<i>Keep Active and Exercise</i>	54.5%
<i>Nutrition and Eating Habits</i>	28.4%
<i>5-2-1-0</i>	13.6%
<i>Limit Screen Time</i>	6.8%
<i>Watch weight</i>	9.1%

Table 3: Can You Recite 5-2-1-0? (5th Graders)

Columbia	79%
East	61%
Wiggin Street	44%
Girls	65%
Boys	58%
All Schools	62%

Table 4: How often do you play outside or exercise?

	Frequently	Sometimes	Rarely
Columbia	58.1%	35.5%	6.5%
Dan Emmett	73.3%	20%	6.7%
East	62.5%	33.3%	4.2%
Pleasant St	60%	26.7%	13.3%
Twin Oaks	75.8%	24.2%	0%
Wiggin St	70%	26.7%	3.3%
Girls	60.9%	33.3%	5.8%
Boys	72.2%	24.1%	3.8%
All Schools	66.9%	28.4%	4.7%

Table 5: Percent students who usually drink soda or other sugary drinks with dinner

	Yes	No
Columbia	29%	71%
Dan Emmett	18.8%	81.2%
East	41.7%	58.3%
Pleasant St	31.3%	68.7%
Twin Oaks	51.5%	48.5%
Wiggin St	19.4%	80.6%
Girls	33.8%	66.2%
Boys	32.5%	67.5%
All Schools	33.1%	66.9%

Table 6: Students report eating fruits and vegetables daily

	Eats daily	Doesn't eat daily	Eats more than 3 daily
Columbia	71%	29%	39.3%
Dan Emmett	68.8%	31.3%	33.3%
East	58.3%	41.7%	26.1%
Pleasant St	75%	25%	18.8%
Twin Oaks	66.7%	33.3%	36.4%
Wiggin St	67.7%	32.3%	16.1%
Girls	69%	31%	34.3%
Boys	66.3%	33.7%	23.7%
All Schools	67.6%	32.4%	28.8%

Table 7: Do you help cook at home?

	Frequently	Sometimes	Never
Boys	53.8%	23.8%	22.5%
Girls	66.2%	23.9%	9.9%
All Students	60%	24%	16%

Table 8: How often do watch TV, play video games, or use the computer?

	2 hours or less	More than 2 hours
Columbia	16.1%	83.9%
Dan Emmett	18.8%	81.3%
East	25%	75%
Pleasant St	43.8%	56.2%
Twin Oaks	25%	75%
Wiggin St	25.8%	74.2%
Girls	23.9%	76.1%
Boys	25.3%	74.7%
All Schools	24.7%	75.3%

Table 9a: Can you tell if a person is healthy just by looking at them?

School	Yes	Sometimes	No
Columbia	23.3%	33.3%	43.3%
Dan Emmett	43.8%	12.5%	43.8%
East	37.5%	29.2%	33.3%
Pleasant St	43.8%	25%	31.3%
Twin Oaks	25%	31.3%	43.8%
Wiggin St	29%	38.7%	32.3%
Boys	34.6%	28.2%	37.2%
Girls	28.2%	32.4%	39.4%
All Schools	31.5%	30.2%	38.3%

Table 9b: Can you tell if a person is unhealthy just by looking at them?

School	Yes	Sometimes	No
Columbia	44.8%	24.1%	31%
Dan Emmett	56.3%	25%	18.8%
East	41.7%	37.5%	20.8%
Pleasant St	66.7%	13.3%	20%
Twin Oaks	34.4%	31.3%	34.4%
Wiggin St	43.3%	33.3%	23.3%
Boys	46.2%	25.6%	28.2%
Girls	44.1%	32.4%	23.5%
All Schools	45.2%	28.8%	26%

Table 9c: Does a person's size or weight tell you whether or not they are healthy?

School	Yes	Sometimes	No
Columbia	46.4%	10.7%	42.9%
Dan Emmett	25%	18.8%	56.3%
East	39.1%	13%	47.8%
Pleasant St	20%	20%	60%
Twin Oaks	18.5%	25.9%	55.6%
Wiggin St	36.7%	30%	33.3%
Boys	28.4%	20.3%	51.4%
Girls	36.9%	20%	43.1%
All Schools	32.4%	20.1%	47.5%

Table 10: Average body image index

School	Boys	Girls
Columbia	3	4.7
Dan Emmett	4.5	4.8
East	3.4	4.8
Pleasant St.	2.4	3.6
Twin Oaks	4.7	5
Wiggin St.	4.9	4.8
All Schools	4.1	4.6

Table 11: Did you learn anything from the program?

	Overall	Girls	Boys
Learned Something	68%	71%	67%
<i>Nutrition</i>	25%	54%	46%
<i>Healthy Habits</i>	32%	43%	57%
<i>Exercise Ball Specific</i>	23%	46%	54%
<i>Importance of Healthy Living</i>	18%	42%	58%

Table 12: Has Crunch Out Obesity Impacted You?

	Overall	Girls	Boys
Impacted Me	66%	62%	70%
<i>Lost Weight</i>	13%	62%	38%
<i>Increased Activity</i>	26%	50%	50%
<i>Better Nutrition</i>	14%	71%	29%
<i>Gained Strength</i>	23%	35%	65%
<i>Other</i>	29%	24%	76%

Table 13: What was the hardest or most challenging part of the program?

	Fourth Graders	Fifth Graders
Exercises	40.4%	48.2%
Nutrition	14.7%	18.1%
5-2-1-0	NA	6.0%
Limiting Screen Time	9.2%	10.8%
Journal, Essay	22%	14.5%
Inflating the Ball	5.5%	NA

Table 14: Pre and Post Test Comparisons

School	Exercise	Students with Increase	Average Increase
Columbia	Abdominal Curl	51.5%	3.94
	Ball Squat	45.6%	4.8
	Push Ups	54.5%	9.28
	Jumping Jacks	57.6%	6.58
East	Abdominal Curl	76.7%	4.39
	Ball Squat	79%	7.35
	Push Ups	83.7%	10.8
	Jumping Jacks	65.1%	8.3
Twin Oaks	Abdominal Curl	55%	5.39
	Ball Squat	60%	9.67
	Push Ups	36.7%	12.6
	Jumping Jacks	60%	12.6
Wiggin Street	Abdominal Curl	48.6%	3.06
	Ball Squat	80%	6.61
	Push Ups	80%	9.96
	Jumping Jacks	71.4%	9.68

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Appendix

A. Interview Questions for 4th Graders

I. Healthy Habit Questions

1. Does your family go out to eat more than once a week? More than three times a week?
2. Does your family cook meals at home?
3. How often do you play outside? With your family? With your friends?
- 3a. What sorts of activities do you like to do?
- 3b. Do you play on any sports teams?
4. Do you get lunch at the school cafeteria? What are your thoughts about the cafeteria food? Do you like it? Y N
- 4b. (For students who bring lunch from home). Do you pack your own lunch? What do you usually bring for lunch?
5. Do you help out cooking meals at home?
6. Do you go grocery shopping with your family?
7. What do you like to eat for dinner? What do you like to drink? What do you like to have for a snack?
8. How often do you eat fruits and vegetables?
9. How much time do you spend watching T.V., playing video games, or spending time on the computer?
10. Is there any celebrity or famous person that you admire or consider a role model? Why?

II. Conceptions of Health and Healthy

11. What does it mean to you to be healthy?
12. What does it mean if someone is obese?
13. What does a healthy person do?
14. What does an unhealthy person do?
15. Can you tell a person is healthy just by looking at them?
16. Can you tell a person is unhealthy just by looking at them?
17. Does a person's size and/or weight tell you whether or not they are healthy?

IV. Program-Related Questions

27. Do you still use your exercise ball at home? Does anyone else in your family use the exercise ball?
28. Did you like any of the exercises? Which ones? Why?
29. Are you still doing these exercises? How often? Do you plan to keep doing these?
30. What do you think was the purpose of the exercises? How have the exercises impacted you?
31. Why do you think your school participated in this program?
32. When you participated in "Crunch Out Obesity," what was the easiest part? What was the hardest part?
33. Was there anything you liked or disliked about the program?
34. Did you learn anything new from the program? What?

35. What does the phrase “Crunch Out Obesity” mean to you?
36. Did you have trouble remembering to fill in your journal or remembering how many times you did each healthy habit? Do you think you filled in your journal accurately?

B. Body Appreciation and Body Image Scale

How much do you agree with each statement:

17. I feel good about my body

Disagree Neutral Agree

18. No matter what my body looks like, I still like myself.

Disagree Neutral Agree

19. On the whole, I am satisfied with my body.

Disagree Neutral Agree

20. I pay attention to my body and what it needs.

Disagree Neutral Agree

21. I don't often think about my body shape or weight.

Disagree Neutral Agree

22. I often compare how I look with how other people look.

Disagree Neutral Agree

23. During the day, I think about how I look many times.

Disagree Neutral Agree

24. I often worry about whether the clothes I am wearing make me look good.

Disagree Neutral Agree

25. I often worry about how I look to other people.

Disagree Neutral Agree

C. Interview Questions for Fifth Graders

1. What do you remember about Crunch Out Obesity?
2. Do you remember 5-2-1-0?(Recites?)
3. Do you still use your exercise ball at home? Does anyone else in your family use the exercise ball?
4. Did you like any of the exercises? Which ones? Why?
5. Are you still doing these exercises? How often?
6. When you participated in “Crunch Out Obesity,” what was the easiest part? What was the hardest part?

7. Was there anything you liked or disliked about the program?
8. Is there anything that you learned from the program that you still do? What?
9. Did you have trouble remembering to fill in your journal or remembering how many times you did each healthy habit? Do you think you filled in your journal accurately?