



# A Descriptive Study: Males' and Females' Involvement in Physical Activity and Eating Behaviors

Myia L. Graves<sup>1</sup>, Laura A. Nabors<sup>2</sup>, Amy L. Bernard<sup>2</sup>, Rebecca A. Vidourek<sup>2</sup>

<sup>1</sup>Assistant Professor, Kinesiology and Health Studies, Southeastern Louisiana University, Office: KHS 104, United States.

<sup>2</sup>Associate Professor, Health Promotion and Education, University of Cincinnati, Teachers-Dyer Complex, United States.

## Article Details

Article Type: Research Article

Received date: 17<sup>th</sup> February, 2020

Accepted date: 30<sup>th</sup> March, 2020

Published date: 01<sup>st</sup> April, 2020

\***Corresponding Author:** Myia L. Graves, Assistant Professor, Kinesiology and Health Studies, Southeastern Louisiana University, Office: KHS 104, United States. E-mail: [myia.graves@selu.edu](mailto:myia.graves@selu.edu)

**Citation:** Graves, M.L., Nabors, L.A., Bernard, A.L., Vidourek, R.A. (2020). A Descriptive Study: Males' and Females' Involvement in Physical Activity and Eating Behaviors. J Pub Health Issue Pract 4(1):161. doi: <https://doi.org/10.33790/jphip1100161>.

**Copyright:** ©2020, This is an open-access article distributed under the terms of the Creative Commons Attribution License 4.0, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract

It is important to determine differences in child and adolescent males' and females' eating and physical activity preferences to determine the design of interventions. The purpose of this study, which involved a secondary data analysis, was to evaluate gender differences among eating behaviors and physical activity involvement. There were a total of 157 males and females in this study. The participants completed a survey to assess eating behaviors and involvement in physical activity. To examine the data from the surveys, the Statistical Package for the Social Sciences (SPSS) Version 23.0 was used to compare and determine physical activity involvement and eating behaviors. Results of the study revealed more similarities than differences in gender among eating behaviors and physical activity involvement. Females endorsed consumption of salty/savory foods more than males. Males endorsed participation in more sports teams than females. Future research should continue to explore the types of eating behaviors and physical activity involvement through qualitative research and gender sensitive questionnaires.

**Keywords:** Eating Behaviors, Physical Activity Involvement, Adolescents, Child

## Introduction

The percentage of obese children and adolescents in the United States has more than tripled since the 1970's [1]. Approximately, one in every five children and adolescents in the United States are obese [2]. This rise in child and adolescent obesity has been linked with too many calories consumed and too few calories expended [3]. Dietary habits of children and adolescents have been a focus of study and interventions due to the increasing rates of children who are obese [2]. Similarly, involvement in physical activity has been important to study, because a lack of involvement in physical activity is associated with being overweight and being less physically fit [4]. Interventions are needed to improve both males' and females' healthy eating and involvement in physical activity. More research is needed to understand gender differences in males' and females' eating and activity behaviors so that clinicians and researchers can determine whether interventions should be similar or should be tailored to the different needs of boys and girls.

## Importance of Physical Activity

Physical inactivity and unhealthy dietary behaviors are significant  
J Pub Health Issue Pract  
Volume 4. 2020. 161

predictors of illness and disability and represent strong threats to public health across the lifespan [2, 5]. The United States Department of Health and Human Services recommends that children ages 6 to 17 engage in 60 minutes or more of physical activity every day [5]. However, only 21% of children and adolescents engage in 60 or more minutes of moderate to vigorous physical activity on at least five days per week [6]. Low physical activity levels are concerning due to the known health benefits of engaging in regular physical activity [4]. These benefits include lowered risk of becoming obese, getting cardiovascular disease, and developing diabetes [5].

## Gender Differences in Physical Activity

Several studies have suggested that males and females have differing levels of involvement in physical activity [7]. Consistently, males are more likely to engage in physical activity and report greater perceptions of competence, interest, and enjoyment compared with females [8]. For example, a study showed that 49% of males met the physical activity guidelines compared with 35% of females [9]. Males aged 6 to 11 years engaged in 20 more daily minutes of moderate to vigorous physical activity than females in the same age group [9]. A longitudinal study of children and adolescents showed that males had higher overall moderate to vigorous physical activity in nearly all grade levels [10]. Males, on average, engaged in 11% more moderate to vigorous physical activity than females [10]. The reasons that females are less physically active than males are not clear; but, biological influences, such as lower intentions for engaging in activity, lower self-confidence, lower perceived behavioral control, less social support, and less enjoyment of physical activity and sports are likely determinants of differing levels of involvement in physical activity [11]. As a result, it is important to study gender differences related to physical activity so that viable interventions are being created and improved to fit the needs of the children and address their specific needs for improved nutrition and involvement in physical activity.

## Importance of a Healthy Diet

Childhood and adolescence are critical periods for the adoption of healthy behaviors because it establishes healthy dietary habits that may continue in to adulthood [12]. There are many benefits of having a healthy diet [13]. For instance, healthy eating can help children consume proper nutrients, achieve or maintain healthy body weight, and lower risks for developing health conditions [13, 14]. Consuming proper

nutrients is important for proper growth and development among children and adolescents [13, 14]. Research has demonstrated that when children are asked their preferences, many of children's top choices are foods high in fat, sugar, and calories [15]. Yet, there are many healthier food options that children also prefer such as grapes, strawberries, and low-fat milk [15]. Food preferences have been linked to gender, but much of the research regarding food preference and gender has used adult participants [16-18]. Therefore, studies such as this one add important information on children.

### **Gender Differences and Eating Fruits, Vegetables, Sweets, Salty/Savory Foods**

A few studies have demonstrated the relationship between food preferences and gender among children and adolescents. For example, a study showed that there was a significant difference between child and adolescent males' and females' preference of sweets and vegetables [17]. Caine-Bish and Scheule [17] concluded that females preferred eating sweets and vegetables more than males. In another study with adolescents, Wansink, Cheney, and Chan [19] discovered that females were more likely to prefer sweets such as candy and chocolate compared to males. Wansink et al. [19] found that females were more likely to eat vegetables compared to males. Similarly, Cooke and Wardle [20] reported that four- to eleven-year-old girls scored higher in preference for vegetables than boys. Males may report less fruit and vegetable consumption and more negative attitudes about eating healthy compared to females [21]. It is imperative to explore gender differences in engagement in healthy eating behaviors to improve the design of obesity prevention programs [22]. This author's literature search did not reveal studies indicating differences in consumption of salty/savory foods, such as chips and French fries. This information will be explored in the current study.

### **Study Purpose**

The purpose of this study was to identify whether food preferences and physical activity involvement differ for children and adolescent males and females. The primary objectives included: (1) to assess eating behaviors of males, (2) to assess eating behaviors of females, (3) to assess physical activity involvement of males, (4) to assess physical activity involvement of females, (5) to compare males' and females' eating behaviors, and (6) to compare males' and females' involvement in physical activity. The following research questions were examined in this study: (1) Is there a gender difference in vegetable consumption? (2) Is there a gender difference for consumption of sweets (e.g., cookies, cake, doughnuts)? (3) Is there a gender difference in fruit consumption? (4) Is there a gender difference in consumption of salty/savory foods (e.g., chips and fries)? and (5) Is there a gender difference in involvement in physical activity? It was hypothesized that females would have a higher intake of vegetables than males, females would have a higher consumption of sweets than males, and females would have higher consumption of fruits than males [17, 19-21]. This author also examined differences in males' and females' reports of salty/savory foods, which will add information to the literature. No priori hypotheses were developed for consumption of salty/savory foods. It was also hypothesized that males would have a higher level of physical activity involvement than females [9, 10].

## **Methods**

### **Participants**

The present study is a secondary analysis of baseline data on eating behaviors and physical activity involvement. Participants in this study were children and adolescents from various after-school programs near a city in a Midwestern region of the United States. The investigator, Dr. Laura Nabors, recruited students to participate in the survey at the after-school programs. Only children and adolescents that were enrolled in the after-school programs could attempt the survey. Parent permission and child assent were obtained for participation.

The participants completed surveys as a group in classrooms during after-school program hours. The investigator was present during the survey administration to provide assistance with understanding questions, if needed. Explanation, distribution, and completion of the survey took approximately 30 minutes. A sample of 157 participants completed the survey. This study was approved as non-human subjects research by a university-based institutional review board and the approval letter is presented in Appendix A.

### **Instrumentation**

A survey was used to collect data for this study (see Appendix B). The survey was designed to discover child perceptions of eating behaviors and involvement in physical activity. The survey was used in previous research studies [23-25] and was adapted from Dr. Amy Bernard's work, based on her expertise in nutrition. Dr. Bernard shared her research with Dr. Nabors in 2013 [25]. The survey was comprised of four sections: (1) demographic information, (2) healthy eating behaviors, (3) physical activity behaviors, and (4) knowledge regarding physical activity and nutrition. For the purposes of this study, sections one through three were used.

Section one assessed demographic information. The three questions in this section assessed age, ethnicity, and gender. Age was an open-ended question. Ethnicity had the following options: "White," "Black/African American," "Hispanic," "Asian," "Indian," and "Other". The gender question included two options, "Boy" or "Girl".

Section two assessed closed-ended questions about healthy eating behaviors. Each question had images or photos related to the question to provide examples of foods and physical activities. Participants responded to the multiple questions by circling the letter that corresponded with their answer choice. This author used the following questions in study analyses. One question assessed how many times the respondents ate French fries or chips yesterday. Following the question, a picture of French fries was provided. A description "chips are potato chips, tortilla chips, Cheetos, corn chips, or other snack chips" was included to provide examples of different types of chips. If the participant consumed French fries or chips yesterday, they responded to the question by selecting, "No, I didn't eat any French fries or chips yesterday," "Yes, I ate French fries or chips 1 time yesterday," "Yes, I ate French fries or chips 2 times yesterday," and "Yes, I ate French fries or chips 3 or more times yesterday." The second question this author used asked about the amount of vegetables consumed yesterday. The response choices were "No, I didn't eat any vegetables yesterday," "Yes, I ate vegetables 1 time yesterday," "Yes, I ate vegetables 2 times yesterday," and "Yes, I ate vegetables 3 or more times yesterday." The third question asked about the amount of fruit consumed yesterday. The response choices were "No, I didn't eat any fruit yesterday," "Yes, I ate fruit 1 time yesterday," "Yes, I ate fruit 2 times yesterday," and "Yes, I ate fruit 3 or more times yesterday." Another question assessed if the participants ate sweet rolls, doughnuts, cookies, brownies, pies, or cake yesterday. The response choices were "No, I didn't eat any of the foods listed above," "Yes, I ate one of these foods 1 time yesterday," "Yes, I ate one of these foods 2 times yesterday," and "Yes, I ate one of these foods 3 or more times yesterday."

Section three assessed physical activity behaviors. All of the questions in this section were close-ended. The author used several of these questions in study analyses. One question sought to determine if the participant had engaged in an exercise or sport that increased the heart rate for at least 20 minutes yesterday. Examples of physical, such as basketball, jogging, swimming, tennis, and bicycling, were provided following the question. The response choices for this question were "yes" or "no." Another question required documentation of how many times the participant had engaged in exercise or physical activity that increased heart rate and resulted in higher breathing for at least 20 minutes over the past seven days. The question has seven options indicating how many days they had participated

in physical activity or exercise: “0 days,” “1 day,” “2 days,” “3 days,” “4 days,” “5 days,” “6 days,” and “7 days.” Participants could only choose one of the seven options. The third physical activity question this author used asked how many days the participant engaged in physical education class at school. The response options were “0 days,” “1 day,” “2 days,” “3 days,” “4 days,” and “5 days”. The final question concerned involvement in sports teams and the respondent documents recall the number of teams he or she has participated on during the past 12 months. The four responses included: “0 teams,” “1 team,” “2 teams,” and “3 teams or more.”

### Procedure

This study is a secondary data analysis. Data were entered into Statistical Package for the Social Sciences (SPSS) Version 23.0 in a password protected computer.

### Data Analyses

Data from the surveys were analyzed using the (SPSS) Version 23.0. Descriptive information about study participants were presented using percentages and frequencies to describe categorical variables (e.g., gender, ethnicity) and measures of central tendency (e.g., means, standard deviations) were used to describe numerical variables (e.g., age). Information about vegetable consumption, fruit consumption, sweets consumption, salty/savory food consumption, and physical activity involvement were presented using descriptive statistics (e.g., percentages). Chi-square tests were used to determine

differences in males’ and females’ responses for answers about eating. Questions assessing level of involvement in physical activity were examined using chi-square analyses and independent samples t-tests.

### Results

The total number of students who attempted to complete the survey were 157. Three participants were missing data and were removed from study analyses. The final sample included 154 or 98.1% of participants who returned completed surveys. The gender of the 154 respondents was almost evenly divided (48.7% males [ $n = 75$ ]; 51.3% females [ $n = 79$ ]). Children had a mean and age of 10.02 years with a standard deviation of 4.21. Participants identified themselves as being a member of the following ethnic groups: Caucasian ( $n = 55$ , 35.3%), African American ( $n = 83$ , 53.2%), Hispanic/Latina ( $n = 4$ , 2.6%), Biracial ( $n = 11$ , 7.1%), and other ( $n = 3$ , 1.9%).

Table 1 provides the males’ and females’ percentages of fruits, vegetables, sweets, and salty/savory food consumption. For example, males and females reported no servings, one serving, two servings, or three or more servings. Males reported no fruit servings ( $n = 25$ , 35.2%), one serving of fruit ( $n = 20$ , 28.2%), two servings of fruit ( $n = 16$ , 22.5%), and three or more servings of fruit ( $n = 10$ , 14.1%) yesterday. Females reported no fruit servings ( $n = 24$ , 32.4%), one serving of fruit ( $n = 26$ , 35.1%), two servings of fruit ( $n = 15$ , 20.3%), and three or more servings of fruit ( $n = 9$ , 12.2%) (See Table 1).

Food Item	No servings		1 time		2 times		3 times	
	n, % M	n, % F	n, % M	n, % F	n, % M	n, % F	n, % M	n, % F
Fruits	25, 35.2%	24, 32.4%	20, 28.2%	26, 35.1%	16, 22.5%	15, 20.3%	10, 14.1%	9, 12.2%
Vegetables	25, 34.7%	25, 33.3%	24, 33.3%	27, 36.0%	11, 15.3%	14, 18.7%	12, 16.7%	9, 12.0%
S/S	33, 46.5%	21, 28.8%	22, 31.0%	37, 50.7%	7, 9.9%	13, 17.8%	9, 12.7%	2, 2.7%
Sweets	30, 42.3%	27, 37.0%	16, 22.5%	27, 37.0%	13, 18.3%	10, 13.7%	12, 16.9%	9, 12.3%

Notes. M=Males. F=Females. S/S= Salty/Savory.

Table 1 Percentage of Male sand Females Reporting Fruit, Vegetable, Salty/Savory, and Sweets Intake

The results in Tables 2 and 3 are the males’ and females’ percentages of physical activity involvement. In Table 2, the percentage of males and females that participated in exercise or physical activity over the past week is reported. For instance, males ( $n = 4$ , 6.5%) and females ( $n = 10$ , 15.2%) reported participating in exercise or physical activity

on no days over the past week. Table 3 shows the number of sports teams that males and females participated in over the past 12 months. Males ( $n = 16$ , 25.8%) and females ( $n = 3$ , 47%) endorsed playing on no sports teams (See Table 3).

Number of days exercised	n, % of Males	n, % of Females
0	4, 6.5%	10, 15.2%
1	5, 8.1%	8, 12.1%
2	17, 27.4%	13, 19.7%
3	8, 12.9%	10, 15.2%
4	4, 6.5%	8, 12.1%
5	5, 8.1%	6, 9.1%
6	1, 1.6%	1, 1.5%
7	18, 29.0%	10, 15.2%

Table 2 Percentages of Males and Females Endorsing Number of Days Exercised

Number of Sports Teams	n, % of Males	n, % of Females
0	16, 25.8%	31, 47.0%
1	13, 21.0%	20, 30.3%
2	20, 32.3%	5, 7.6%
3	13, 21.0%	10, 15.2%

Table 3 Percentages of Males and Females Endorsing Playing on Sports Teams

## Eating Behaviors

Table 4 provides the children's and adolescents' ratings of foods for males and females. Chi-square analyses were used to compare differences in females' and males' food responses. To do this, food responses were recoded into "yes" (consumed the food) and "no" (did not consume the food). There was a significant difference among

the consumption of salty/savory food between males and females ( $p = .028$ ). Females ( $n = 52, 71.2\%$ ) had a higher response rate for consuming French fries and chips compared with males ( $n = 38, 53.57\%$ ). The other comparisons did not yield significant differences between males and females (see Table 4).

Category	Question	X <sup>2</sup>	p	Males n, %	Females n, %
Salty/Savory Food	Yesterday, did you eat French fries or chips?	4.82	.028	38, 53.57%	52, 71.2%
Vegetables	Yesterday, did you eat any vegetables?	ns	ns	47, 65.3%	50, 66.7%
Fruits	Yesterday, did you eat fruit?	ns	ns	46, 64.8%	50, 67.6%
Sweets	Yesterday, did you eat sweet rolls, doughnuts, cookies, brownies, pies, or cake?	ns	ns	41, 57.7%	46, 63.0%

Note. ns = not statistically significant.

Table. 4 Gender Differences: Eating Behaviors

## Physical Activity

Tables 5 and Table 6 provide the children's and adolescents' ratings of involvement in physical activity. Chi-square analyses, shown in Table 5, were used to compare females' and males' responses about

physical activity questions that had categorical choices, "yes" or "no." There were no significant differences between males' and females' involvement in organized physical activity and participation in exercise or sport (see Table 5).

Question	X <sup>2</sup>	p	Males n, %	Females n, %
Do you take part in any other organized physical activities?	ns	ns	36, 63.2%	44, 64.7%
Yesterday, did you exercise or participate in sports activities that made your heart beat fast and made you breathe hard for at least 20 minutes?	ns	ns	56, 77.78%	52, 70.3%

Note. ns = not statistically significant.

Table. 5 Gender Differences: Physical Activity

Question	t	p	Males M (SD), n	Females M (SD), n
On how many of the past 7 days did you exercise or take part in physical activity?	ns	ns	3.81 (2.41), 62	3.06 (2.27), 66
Last week, on how many days did you go to physical education?	ns	ns	3.81 (2.41), 62	3.06 (2.27), 66
During the past 12 months, on how many sports teams did you play?	2.989	.003	1.48 (1.10), 62	.91 (1.08), 66

Notes. ns = not statistically significant. SD = Standard deviation.

Table. 6 Gender Differences: Long-Term Physical Activity

## Discussion

It was hypothesized that females would have a higher intake of vegetables than males, females would have a higher intake of sweets than males, and females would have a higher intake of fruits than males. Though no a priori hypothesis was determined for gender differences in eating salty/savory foods, gender differences in consumption of these types of foods was also evaluated. Findings revealed that there were no differences between males' and females' consumption of fruits, vegetables, and sweets. However, females had a higher intake of salty/savory foods than males. Study outcomes were inconsistent with several studies that suggested females preferred eating sweets, vegetables, and fruits more than males [17, 19].

As mentioned, results did indicate a difference in reported consumption of salty/savory foods between males and females. Females reported consuming higher levels of salty/savory foods compared to males. Although there is an abundance of literature discussing consumption of sweet treats [17], the current study shows that girls may be consuming more salty/savory foods compared to males. Teaching children about the nutrition value and calories of salty/savory foods (e.g., chips) may add value to nutrition programs.

Gender differences were expected for physical activity involvement. It was hypothesized that males would have a higher level of physical

activity involvement than females. With the exception of males reporting a higher involvement on sports teams compared to females, significant differences were not reported for participation in organized physical activity, exercise or sport team involvement, and for participation in physical activity or physical education over the past week. Study findings were inconsistent with relevant literature suggesting that males would engage in more physical activity than females [9, 10]. This could have occurred because children in after-school programs, irrespective of gender of the child, may have more opportunities to engage in physical activity. They are involved in activity as a result of being enrolled in after-school programs, where both males and females are involved in recreational activities.

The descriptive data in Tables 1, 2, and 3 provided additional information about males' and females' eating behaviors and physical activity involvement. Inspection of consumption of fruits and vegetables in Table 1 shows that consumption of fruits and vegetables decreased as the number of servings per day increased (see Table 1). Based on the responses, males and females for this study may not be meeting the suggested dietary guidelines for adolescents and children (e.g., two cups of fruits and vegetables per day) [14]. Salty/savory foods were consumed by many of the males and females, which lends support to the idea that programs need to teach about these foods. Frequency of sweets consumption also decreased as reports of the

number of servings per day increased. However, it appeared that the children were still consuming a fair amount of sweets. Calorie dense foods should only consist of 10% or less of the recommended calorie intake per day (e.g., 100 calories out of 1000) [14]. Many of the children were above recommendations and they could potentially benefit from health education in this area.

In regards to Table 2, inspection of days exercised over the past week shows males and females participated in physical activity at different rates. Over half of the males and females participated in exercise or physical activity on five or fewer days (see Table 2). Inspection of Table 3 indicated males participated in more sports teams than females. However, a total of 53.1% of females participated in at least one sports team (see Table 3). Physical activity or exercise is recommended for 60 minutes or more every day for children and adolescents [5]. The descriptive data demonstrated that children were engaging in physical activity and this is a strength future school-based programming can build from. However, not all children reported engaging in daily exercise, and it may be beneficial for health education programming to continue to address involvement in exercise.

### Limitations

There were several limitations in this study. As mentioned, the participants of the study were from various after-school programs, which may have impacted responses. Previous studies included a sample of participants from school during regular hours, instead of only after hours at the after-school program like the present study. After-school program participants may have more exposure to nutrition-related information and more opportunity to engage in physical activity than children and adolescents who do not. Moreover, the children's report of their involvement in sport, exercise, and eating behaviors may not be accurate. Assessment of parent report of child eating or use of food diaries may yield more accurate information in future studies. Asking more detailed questions about the food children consumed, such as learning about portion size, may have provided information that would differentiate males' and females' eating behaviors. Learning about how long they played sports or engaged in physical activity also may have differentiated males' and females' responses. Diaries to gauge daily involvement in everyday activities, like walking to school, may have provided additional information that could enhance study findings. However, this was a secondary data analysis, which limited the nature of inquiry. Perhaps in the future, qualitative methods could be used to gain a deeper understanding of involvement in everyday activities like walking and playing with friends and learning about the level of exercise involved in these "everyday" activities.

The difference in participants of after-school programs compared to those that just attend school during regular hours may be a contributing factor of the results revealed in the current study. Males and females who attended the after-school programs may be getting more exposure to nutrition-related information and nutritious snacks, which may have impacted study findings. Thus, future research is warranted to understand gender differences among eating behaviors. However, this paper adds new information on gender differences in consumption of salty/savory foods.

### Implications for Health Educators

The gender differences among physical activity and eating behaviors in this study can inform future investigation. The author recommends conducting qualitative research to uncover more information about gender differences. Conducting a qualitative study that utilizes multiple methods (e.g., interview, focus group, observation, diary) with children and adolescents may allow males and females to fully express their eating behaviors and physical activity involvement. Additionally, redesigning questionnaires to develop items that account for different patterns among males and females may be beneficial to the understanding of potential differences. A gender sensitive

questionnaire can further explore eating behaviors for males and females. Additionally, the same type of questionnaire may provide more insight into physical activity involvement among males and females. The results of future studies may lead to the development of programs that are more effective in educating children and adolescents about healthy eating and physical activity.

### Conclusion

Findings of this study add to the growing body of literature on physical activity and healthy eating behaviors for young children and adolescents. Results indicated that females and males had more similarities than differences in terms of physical activity and eating behaviors. Study findings contradicted results of several previous studies [9, 10, 17, 19]. Although few differences were uncovered, this author believes this area of study remains important, in order to develop programming that works for children and adolescents. It may be that females and males respond better to different types of programming or need to learn different things to improve their healthy eating and involvement in exercise. Future research should continue to explore the types of eating behaviors and physical activity involvement through qualitative research and gender sensitive questionnaires. Gaining a better understanding of males' and females' eating behaviors, physical activity involvement, and their learning needs in these areas may result in developing and implementing new programs that are specialized for either males or females.

**Conflicts of interest/Competing interests:** Authors report no conflict or competing interest.

### References

1. Fryar, C. D., Carroll, M. D., & Ogden, C. L. (2014). Prevalence of overweight and obesity among children and adolescents: United states, 1963–1965 through 2011–2012. Atlanta, GA: National Center for Health Statistics.
2. Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2017). Prevalence of obesity among adults and youth: United states, 2015–2016. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.
3. Hill, J. O., Wyatt, H. R., & Peters, J. C. (2012). Energy balance and obesity. *Circulation*, 126(1), 126–132. doi:10.1161/CIRCULATIONAHA.111.087213
4. Katzmarzyk, P. T., Denstel, K. D., Beals, K., Bolling, C., Wright, C., Crouter, S. E., & Stanish, H. I. (2016). Results from the United States of America's 2016 report card on physical activity for children and youth. *Journal of Physical Activity and Health*, 13(11 Suppl 2), S307–S313.
5. Piercy, K. L., Troiano, R. P., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D. A., & Olson, R. D. (2018). The Physical Activity Guidelines for Americans. *Journal of the American Medical Association*, 320(19), 2020–2028. doi:10.1001/jama.2018.14854
6. Janssen, I., & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, 7(1), 40–40. doi:10.1186/1479-5868-7-40
7. Van, K. D. H., Paw, M. J., Twisk, J. W., & Van, W. M. (2007). A brief review on correlates of physical activity and sedentariness in youth. *Medicine and Science in Sports and Exercise*, 39(8), 1241–1250. doi:10.1249/mss.0b013e318059bf35
8. Sterdt, E., Liersch, S., & Walter, U. (2014). Correlates of physical activity of children and adolescents: A systematic review of reviews. *Health Education Journal*, 73(1), 72–89.
9. Troiano, R. P., Berrigan, D., Dodd, K. W., Mâsse, L. C., Tilert, T., & McDowell, M. (2008). Physical activity in the united states measured by accelerometer. *Medicine and Science in Sports and Exercise*, 40(1), 181–188. doi:10.1249/mss.0b013e31815a51b3

10. Trost, S. G., Pate, R. R., Sallis, J. F., Freedson, P. S., Taylor, W. C., Dowda, M., & Sirard, J. (2002). Age and gender differences in objectively measured physical activity in youth. *Medicine & Science in Sports & Exercise*, 34(2), 350-355. doi:10.1097/00005768-200202000-00025
11. Crespo, N. C., Corder, K., Marshall, S., Norman, G. J., Patrick, K., Sallis, J. F., & Elder, J. P. (2013). An examination of multilevel factors that may explain gender differences in children's physical activity. *Journal of Physical Activity and Health*, 10(7), 982-992.
12. Caine-Bish, N., & Scheule, B. (2007). Food preferences of school age children and adolescents in an ohio school district. *Journal of Child Nutrition & Management*, 31(2), 30-45.
13. US Department of Health and Human Services. (2017). Dietary guidelines for Americans 2015-2020. Skyhorse Publishing Inc.
14. Dietary Guidelines Advisory Committee. (2015). Scientific report of the 2015 dietary guidelines advisory committee. Washington (DC): US Department of Agriculture and US Department of Health and Human Services.
15. Guthrie, J. F., Lin, B. H., Reed, J., & Stewart, H. (2005). Understanding economic and behavioral influences on fruit and vegetable choices. *Amber Waves (United States Department of Agriculture)*, 3(2), 36-41.
16. Westenhoefer, J. (2005). Age and gender dependent profile of food choice. *Forum of Nutrition*, 57, 44-51. doi:10.1159/000083753
17. Caine-Bish, N. L., & Scheule, B. (2009). Gender differences in food preferences of school-aged children and adolescents. *Journal of School Health*, 79(11), 532-540. doi:10.1111/j.1746-1561.2009.0044
18. Skinner, J. D., Carruth, B. R., Bounds, W., & Ziegler, P. J. (2002). Children's food preferences: A longitudinal analysis. *Journal of the American Dietetic Association*, 102(11), 1638-1647. doi:10.1016/S0002-8223(02)90349-4
19. Wansink, B., Cheney, M. M., & Chan, N. (2003). Exploring comfort food preferences across age and gender. *Physiology & Behavior*, 79(4-5), 739-747. doi:10.1016/S0031-9384(03)00203-8
20. Cooke, L. J., & Wardle, J. (2005). Age and gender differences in children's food preferences. *British Journal of Nutrition*, 93(5), 741-746. doi:10.1079/BJN2005138
21. Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., & Lim, C. (2018). Youth risk behavior surveillance—United States, 2017. *Morbidity and Mortality Weekly Report. Surveillance Summaries*, 67(8), 1-114. doi:10.15585/mmwr.ss6708a1
22. Sabiston, C. M., & Crocker, P. R. (2008). Examining an integrative model of physical activity and healthy eating self-perceptions and behaviors among adolescents. *Journal of Adolescent Health*, 42(1), 64-72. doi:10.1016/j.jadohealth.2007.08.005
23. Dia, C-L, Nabors, L. A., King, K. A., Vidourek, R. A., Chen, C-C, Hoang, N., & Mastro, K. G. (2014). Evaluation of an afterschool children's healthy eating and exercise program. *International Journal of Child Health and Nutrition*, 3(4), 156-162.
24. Nabors, L., Burbage, M., Woodson, K., & Swoboda, C. (2015). Implementation of an after-school obesity prevention program: Helping young children toward improved health. *Issues in Comprehensive Pediatric Nursing*, 38(1), 22-38. doi:10.3109/01460862.2014
25. Nabors, L., Burbage, M., Pangallo, J., Bernard, A., Gardocki, S., Strong, A., Shelton, P., & Jones, D. (2013). Delivery and evaluation of a pilot obesity prevention project for urban appalachian children. *Open Journal of Pediatrics*, 3, 300-305. <http://dx.doi.org/10.4236/ojped.2013.34054>

## Journal of Public Health Issues and Practices

### Study 2: Appendix-A

#### Institutional Review Board-Federalwide Assurance #00003152 University of Cincinnati

Date: 9/19/2018

From: UCIRB

To: Principal Invesugator: Myia Graves  
Study ID:2018-6273

Re: Study Title:Physical activity and healthy eating behavioral differences among adolescents and older children

The Institutional Review Board (IRB) acknowledges receipt of the above referenced proposal. It was determined that this proposal doesnot meet the regulatory criteria for research involving human subjects (see below). No human subjects-analysis of existing dataset with no individual identifiers to assess children's eating and exercise activities. On going IRB oversight is not required.

#### Please note the following requirements:

##### Statement regarding International conference on Harmonization and Good clinical Practices.

The Institutional Review Board is duly constituted (fulfilling FDA requirements for diversity), has written procedures for initial and continuing review of clinical trials; prepares written minutes of convened meeungs and retains records pertaining to the review and approval process; all in compliance with requirements defined in 21 CFR Parts 50, 56 and 312 Code of Federal Regulauons.This institution is in compliance with the ICH GCP as adopted by FDA/DHHS.

Thank you for your cooperation during the review process.

**45 CFR § 46.102(d):** Research means asystematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.

**45 CFR § 46.102(f):** Human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains:

1. data through intervention or interaction with the individual, or
2. identifiable private information.

**Intervention** includes both physical procedures by which data are gathered (for example, venipuncture) and manipulations of the subject orthe subject's environment that are performed for research purposes.

**Interaction** includes communication or interpersonal contact between investigator and subject.

**Private information** includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information which has been provided for specific purposes by an individual and which the individual can reasonably expect will not be made public (for example,a medical record). Private information must be individually identifiable (i.e.,the identity of the subject is or may readily be ascertained by the investigator or associated with the informauon) in order for obtaining the information to constitute research involving human subjects.

**FDA regulations** apply when ever an individual is or becomes a participant in research, either as a recipient of a FDA-regulated product or as a control, and as directed by are search protocol and not by medical practice. FDA-regulated activities involve individuals, specimens, or data, as patients or healthy controls, in any of the following:

- a. any use of a drug or biologic, other than the use of an approved drug or biologic in the course of medical practice
- b. any use of adevice (medical or other devices, approved or investigational) to test the safety or effectiveness of the device
- c. any use of dietary supplements to cure, treat, or prevent a disease or bear a nutrient content claim or other health claim
- d. the collection of data or other results from individuals that will be submitted to, or held for inspection by, the FDA as part of an applica tion for a research or marketing permit (including foods, infant formulas, food and color addibves, drugs for human use, medical devices for human use, biological products for human use, and electronic products.)
- e. activities where specimens (of any type) from individuals, regardless of whether specimens are identifiable, are used to test the safety or effectiveness of any device (medical or other devices, approved or investigational) and the information is being submitted to, or held for inspection by, the FDA.

## Journal of Public Health Issues and Practices

### Study 2: Appendix-B

#### Demographics

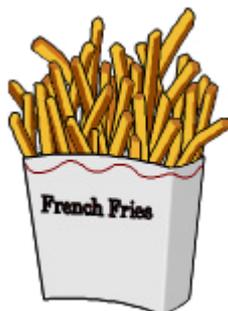
Age: \_\_\_\_\_

Gender: Female or Male

Race: African American, Caucasian, Asian, Mixed Race, Hispanic, Other \_\_\_\_\_

1. Yesterday, did you eat French fries or chips?

Chips are potato chips, tortilla chips, cheetos, corn chips, or other snack chips.

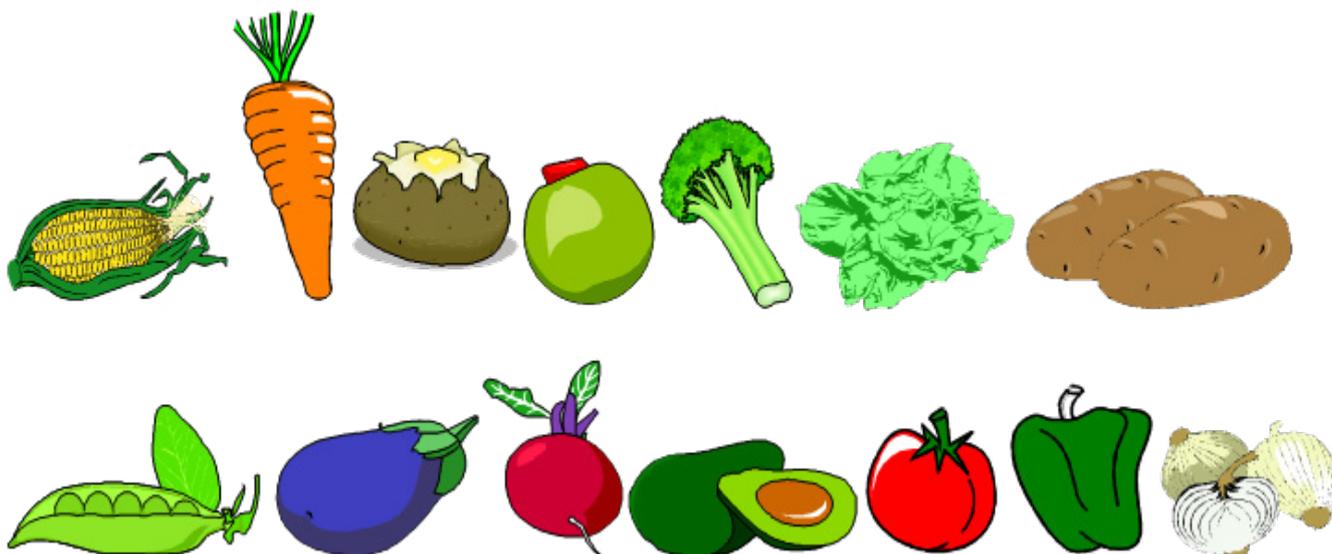


- No, I didn't eat any French fries or chips yesterday.
- Yes, I ate French fries or chips **1 time** yesterday.
- Yes, I ate French fries or chips **2 times** yesterday.
- Yes, I ate French fries or chips **3 or more times** yesterday

2. Yesterday, did you eat any vegetables?

Vegetables are salads; boiled, baked and mashed potatoes; and all cooked and uncooked vegetables.

Do not count French fries or chips.



- No, I didn't eat any vegetables yesterday.
- Yes, I ate vegetables **1 time** yesterday.
- Yes, I ate vegetables **2 times** yesterday.
- Yes, I ate vegetables **3 or more times** yesterday.

3. Yesterday, did you eat beans such as pinto beans, baked beans, kidney beans, refried beans, or pork and beans?

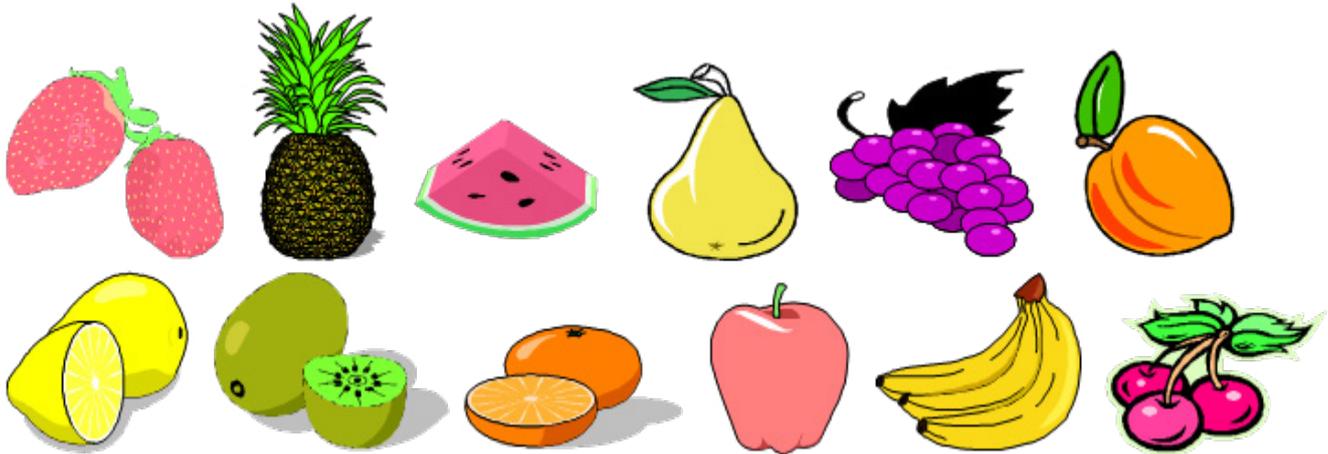
Do not count green beans.



- a. No, I didn't eat any beans yesterday.
- b. Yes, I ate beans **1 time** yesterday.
- c. Yes, I ate beans **2 times** yesterday.
- d. Yes, I ate beans **3 or more times** yesterday.

**4. Yesterday, did you eat fruit?**

**Do not count fruit juice.**



- a. No, I didn't eat any fruit yesterday.
- b. Yes, I ate fruit **1 time** yesterday.
- c. Yes, I ate fruit **2 times** yesterday.
- a. Yes, I ate fruit **3 or more times** yesterday.

**5. Yesterday, did you drink fruit juice?**

**Fruit juice is a drink, which is 100% juice, like orange juice, apple juice, or grape juice.**

**Do not count punch, kool-aid, sports drinks, and other fruit-flavored drinks.**



- a. No, I didn't drink any fruit juice yesterday.
- b. Yes, I drank fruit juice **1 time** yesterday.
- c. Yes, I drank fruit juice **2 times** yesterday.
- d. Yes, I drank fruit juice **3 or more times** yesterday.

**6. Yesterday, did you eat sweet rolls, doughnuts, cookies, brownies, pies, or cake?**



- a. No, I didn't eat any of the foods listed above yesterday.
- b. Yes, I ate one of these foods **1 time** yesterday.
- c. Yes, I ate one of these foods **2 times** yesterday.
- d. Yes, I ate one of these foods **3 or more times** yesterday.

7. Yesterday, did you exercise or participate in sports activities that made your heart beat fast and made you breathe hard for at least 20 minutes. (For example: basketball, jogging, skating, fast dancing, swimming laps, tennis, fast bicycling, or aerobics)?



- a. YES
- b. NO

8. On how many of the past 7 days did you exercise or take part in physical activity that made your heart beat fast and made you breathe hard for at least 20 minutes? (For example: basketball, soccer, running or jogging, fast dancing, swimming laps, tennis, fast bicycling, or similar aerobic activities)



- a. 0 days
- b. 1 day
- c. 2 days
- d. 3 days
- e. 4 days
- f. 5 days
- g. 6 days
- h. 7 days

9. Last week, on how many days did you go to physical education (PE) or gym classes?

- a. 0 days
- b. 1 day
- c. 2 days
- d. 3 days
- e. 4 days
- f. 5 days

10. During the past 12 months, on how many sports teams did you play?

Sports teams are baseball teams, soccer teams, swim teams, basketball teams or football teams.

- a. 0 teams
- b. 1 team
- c. 2 teams
- d. 3 or more teams

11. Do you currently take part in any other organized physical activities or take lessons, such as martial arts, dance, gymnastics, or tennis?



- a. Yes
- b. No

**12. Do you ever read the nutrition labels on food packages?**

- a. Almost always or always
- b. Sometimes
- c. Almost never or never

**13. From which food group should you eat the most servings each day?**

**Choose only one group.**

- a. breads, cereals, rice, pasta
- b. dairy products (milk, cheese)
- c. fats, oils, sweets
- d. fruits
- e. meats, fish, poultry, beans, eggs, nuts
- f. vegetables
- g. don't know

**14. From which food group should you eat the fewest servings each day? Choose only one group.**

- a. breads, cereals, rice, pasta
- b. dairy products (milk, cheese)
- c. fats, oils, sweets
- d. fruits
- e. meats, fish, poultry, beans, eggs, nuts
- f. vegetables
- g. don't know

**15. How many total servings of fruits and vegetables should you eat each day?**

- a. At least 2
- b. At least 5
- c. At least 8
- d. At least 10
- e. I don't know