Research Proposal

Problem Statement and Research Question

Do past family eating practices affect the current fruit and vegetable intake of college students? As college-aged adults leave the home to attend university, they become responsible for many aspects of their diet, including grocery shopping, meal planning, and meal preparation. Research has indicated that many college students have poor dietary habits, particularly a low intake of fruits and vegetables commonly reported as less than three total servings a day (1). Of additional interest, correlation of body mass index (BMI) with fruit and vegetable intake has been studied and has shown varied results (2). By collecting survey data on both past family eating practices and current fruit and vegetable intake, and subsequently investigating associations of these data with skin carotenoid levels, this study intends to:

● Investigate whether positive attitudes and practices in the childhood home regarding fruit and vegetables are associated with higher intake of fruits and vegetables during the college years;
● Determine if there is a correlation between BMI and current and past eating habits; and
● Examine how skin carotenoid status correlates to current and past eating habits of fruits and vegetables.

Background and Research Objectives

Extensive research has been conducted on childhood and family eating practices, the eating habits of college students, and the relationship between the two topics. Between 1977 and 2006, daily energy intake of children in the United States increased by 184 calories (3). Additionally, childhood consumption of Mexican food, pizza, and fast food has significantly increased (3). Although the availability of fruits and vegetables has been increasing since 1970, the average number of servings per day remains far below the recommended value (3).

As children mature into early adulthood and begin attending universities, concern remains about their dietary practices, particularly regarding the intake of fruits and vegetables. It has been shown that many college students eat well below the recommendations for fruits and vegetables, with one study including students at four California universities reporting an average intake of 2.35 servings of fruit per day and 1.87 servings of vegetables per day (4). Additionally, intake of fruits and vegetables in college students has been shown to decline the longer the student attends college (1). On average, college students prepare meals 6.6 times per week, eat fast food 1.3 times per week, and skip meals 2.4 times per week, indicating that meal preparation may not be a priority among the college demographic (5). Interestingly, some evidence indicates that students who live on campus consume a wider variety of fruits, vegetables, dairy products, and grains (6).

This research project will focus on the diets of college students, specifically fruit and vegetable intake, and how current intake may have been influenced by practices in the family home prior to college. Previous studies examining this subject have found that enjoyable eating
experiences in childhood are positively associated with a balanced diet, consumption of vegetables, and higher subjective diet-related quality of life scores in adulthood (7, 8). Family meal frequency during adolescence predicted higher intakes of fruits, vegetables, and key nutrients during young adulthood; in comparison to participants who never ate family meals, those who reported seven or more family meals per week in adolescence consumed approximately 0.7 additional servings of fruits and vegetables per day during young adulthood (9). A study from the University of South Florida in 2012 focused on the relationship between parenting style and the eating habits of college freshmen and found that many students believed that parenting styles encouraging children to make independent healthy choices had a positive effect on eating behaviors during the college years. However, bivariate correlations and multiple regression results indicated no long-lasting relationships between parenting styles and current eating behaviors within the study sample (10). Evidently, results on the subject are varied, indicating a need for further study in this area.

In addition to family meal time, there are several other family practices that may increase consumption of fruits and vegetables in young-adulthood, including exposure to gardening, fruit and vegetable availability, and learning meal preparation skills. One study found that eating homegrown produce is associated with higher intake of fruits and vegetables among preschool children (11). Furthermore, there is evidence that when fruits and vegetables are more readily available in the home, children and parents consume more (12). A study on cooking skills showed a positive correlation between vegetable intake and cooking skills for both genders, and a positive relationship between cooking skills and fruit intake among females (13).

The correlation between BMI and fruit and vegetable intake also deserves consideration. A 2008 study among nutrition students at a Canadian University showed a greater intake of leafy green vegetables among those with a lower BMI, but no difference in intake of orange/yellow vegetables, tomato/tomato products, potato/root vegetables, citrus fruits, melons, other fruits, or fruit juice among different BMI groups (2). Overall, studies of BMI in relation to fruit and vegetable intake have indicated that there is no significant difference in BMI or waist circumference among those that meet the recommendation for fruit and vegetable intake and those who do not (14). The survey data from this study will provide further information on this subject.

In this study, the participants’ skin carotenoid scores will be assessed to provide a biomarker of fruit and vegetable intake. Carotenoids will be measured using the BioPhotonic Scanner device, which uses resonance Raman spectroscopy to obtain skin carotenoid levels. This method of measurement has been determined to be a noninvasive, objective biomarker that accurately correlates with reported intake of fruits and vegetables (15,16).

This research study will focus on resolving the unanswered questions and unclear data regarding the association between past family eating practices and fruit and vegetable intake in the college years. Areas for further research on this association include the following past family eating practices: family participation in farmers’ markets, family homegrown fruit and vegetable intake, childhood participation in meal preparation, family meal time, and the availability of fruits
and vegetables in the home. An extensive amount of research has measured the aforementioned eating practices, but not enough research has been done to establish the link between these practices and young-adult eating habits. This study’s objective is to further examine the association between childhood and adult eating practices, and in turn, to discover ways to promote fruit and vegetable consumption in the United States. If this study determines an association between family eating practices and an increase in college student fruit and vegetable consumption, then it will emphasize the value of establishing positive family eating practices during childhood.

**Null Hypothesis:** Past family eating practices which promote fruit and vegetable intake have no affect on the fruit and vegetable consumption of general nutrition students.

**Alternative Hypothesis:** Past family eating practices which promote fruit and vegetable intake increase fruit and vegetable consumption of general nutrition students.

**Methodology**

The intended population of the study is college students enrolled in a basic nutrition course, with the sample of the study being students ages 18-26 enrolled in Nutrition 1020 at Utah State University. A computer-generated survey will be used to assess family eating practices including gardening, farmer’s market and community-supported agriculture (CSA) participation, frequency of family mealtimes, participation in meal preparation, and the availability of fruits and vegetables in the home. The survey will include a food frequency questionnaire (FFQ) and other questions about current attitudes toward fruit and vegetables. Self-reported height and weight will be collected from the survey and used to calculate BMI for each subject. The study participants will also have their skin carotenoid scores assessed using the BioPhotonic Scanner device. The skin carotenoid scores will be compared with results from the survey to determine if there are associations between the eating habits established in childhood and intake of fruits and vegetables during the college years. BMI will also be compared to past and current eating habits to determine if any correlation exists.

Data will be analyzed using SPSS version 22. Descriptive statistics and correlation coefficients will be used to determine if there is a relationship between past family eating practices, present fruit and vegetable intake of college students, and skin carotenoid scores.

**Expected Results**

It is expected the alternative hypothesis will be correct. A p-value less than or equal to 0.05 will be considered statistically significant. If the alternative hypothesis is correct, it will confirm a positive association between family eating practices that promote fruits and vegetables and young-adult consumption of fruit and vegetables. Scientific literature on this subject has repeatedly shown a positive association between frequent family meals and healthy habits in adulthood, and if the alternative hypothesis is correct from this study, it will provide more support for this. Additionally, if the alternative hypothesis is proven correct, it will show a positive association between other positive family eating practices and healthy habits in adulthood.
including family participation in farmer’s markets, family fruit and vegetable gardens, childhood participation in meal preparation, and the availability of fruits and vegetables in the home.

**Research Timeline**

| January          | 1. Design Qualtrics survey.  
|                  | 2. Conduct literature review.  
|                  | 3. Write proposal.  
|                  | 4. Obtain permission from Institutional Review Board. |
| February         | 1. Complete introduction and methods sections.  
|                  | 2. Attend 1020 classes to obtain skin carotenoid level scans.  
|                  | 3. Assess data from survey and skin carotenoid level scans to complete results section.  
|                  | 4. Complete abstract and conclusion. |
| March            | 1. Create poster.  
|                  | 2. Present research at Utah Academy of Nutrition and Dietetics Conference. |
References


14. Murashima M, Hoerr SL, Hughes SO, Kattelmann KK, Phillips BW. Maternal parenting behaviors during childhood relate to weight status and fruit and vegetable intake of