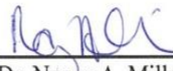


APPROVAL SHEET

Title of Dissertation: Predicting Parental Participation to Toddler Obesity Prevention Programs

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ABSTRACT

Title of Document: PREDICTING PARENTAL PARTICIPATION
TO TODDLER OBESITY PREVENTION
PROGRAMS.

Shariece Adiah Evans, PhD, 2020

Directed By: Director, UMBC School of Public Policy, Dr.
Nancy A. Miller

The prevention of obesity in the United States has become a serious public health concern, especially among children. In 2013, it was estimated that there were 23.9 million children in the U.S. ages 2 to 19 who were overweight or obese. Since children with overweight or obesity are at higher risk for becoming adults who are obese and may suffer from serious chronic disease, addressing the issue of preventing childhood obesity should be a top priority. One important barrier to overcome when trying to develop childhood obesity prevention programs is addressing parental participation in such programs. Childhood obesity prevention programs often deal with low parental participation to program protocols, which can lead to diminished program results. Exploring factors that predict parental participation will help to increase childhood obesity prevention program adherence levels, which in turn will lead to better program outcomes. This research explored factors that predict parental participation in a toddler obesity prevention program conducted in a rural area of Maryland and an urban area of Maryland. This research also looked at relationships

between intervention lesson content and parental participation. Although some intervention outcome effects had statistically significant relationships with level of parental participation and certain intervention lesson content, overall most results were not statistically significant. One variable contributed the most to predicting parental participation. The results helped shape the suggestions regarding future research in the area of toddler obesity prevention programs and parental participation. Successful program outcomes will ultimately lead to fewer adults who are obese, which in turn will reduce medical expenditures and medical costs associated with treating obesity and obesity-related chronic diseases.

PREDICTING PARENTAL PARTICIPATION TO TODDLER
OBESITY PREVENTION PROGRAMS

By

Shariece Adiah Evans

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, Baltimore County, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2020

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2020

Dedication

This dissertation is dedicated to my great grandmother Ida B. Wilkins. My husband Christian Andre Evans. My three children: Sydney Kristen Johnson, Robert TaVon Johnson, Jr., and Andrea Josephine Evans. Thank you all for being the driving force that helped me to complete this journey.

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Chapter 1: Introduction

Obesity is a significant public health issue in the United States. Obesity rates among children in the United States (U.S.) have more than doubled over the last 30 years, causing obesity to become a major epidemic among children (Go et al., 2014). In 2014, approximately 23.9 million children ages 2 to 19 were overweight or obese (Hales et al., 2016). Childhood obesity is determined by obtaining the height and the weight of the child. There are standardized BMI charts by age, one for girls and one for boys. (Hales et al., 2016). To determine if a child is overweight or obese, the BMI for age percentile chart is used. The BMI for age percentile chart is a chart that lists age ranges and BMI ranges for children. A child is considered obese if the BMI for their age is greater than 95 percent (Ogden & Flegal, 2010). A child is considered overweight if the BMI for their age is between 85 and 95 percent (Ogden & Flegal, 2010).

Children who are overweight and children with obesity are more likely to become adults who are obese and are very likely to have risk factors for cardiovascular disease, which could later develop into adult onset chronic diseases such as hypertension, diabetes, stroke, heart disease, asthma, and certain types of cancers (Go et al., 2014). Since children who are overweight and children with obesity are at high risk for becoming adults who are obese and will likely suffer from serious chronic disease, addressing the issue of preventing childhood obesity should be a top priority.

The current administration appears to agree that addressing childhood obesity should be a top priority. The Office of Disease Prevention and Health Promotion (ODPHP) has released the objectives for Healthy People 2030, an initiative that seeks to develop science-based national objectives to improve the health of all Americans (ODPHP, 2018). The final framework for Healthy People 2030 was approved by the Secretary of Health and Human Services (HHS) in June 2018 (ODPHP, 2018). The Healthy People 2030 Framework includes a vision statement, a mission statement, foundational principles, goals, and plans of action to improve the health of all Americans. Overweight and obesity are listed as one of the objectives of health conditions that Healthy People 2030 wants to address (ODPHP, 2018). Specifically, the Healthy People 2030 objective is to reduce the baseline proportion of children and adolescents ages 2 to 19 with obesity from 17.8 percent down to 15.5 percent (ODPHP, 2018).

Obesity not only increases an individual's risk for other diseases such as heart disease, stroke, type 2 diabetes, and certain types of cancer; but obesity costs the U.S. billions of dollars in obesity related medical costs every year (Hales et al., 2016). It is estimated that by 2030, the U.S. will be spending close to \$950 billion on obesity related medical costs if current trends with rising obesity rates continue (Hales et al., 2016). On June 18, 2013 the American Medical Association (AMA) recognized that obesity is a disease that requires a wide range of medical interventions in order to advance treatment and prevention of this disease (AMA, 2013).

Obesity weighs a significant burden on the state governments and the federal government. A study conducted by Finkelstein et al. found that in 2006, federal

Medicare spending for obesity averaged \$1,700 per beneficiary (Finkelstein et al., 2009). The Brookings Study, a study that looked at obesity-attributable Medicaid spending at the state level, found that about 5.2% to 10.2% of Medicaid spending went toward obesity-related expenditures. States that have the highest percentages of obesity-related Medicaid expenditures include Ohio, Michigan, and West Virginia (Harris & Werman, 2014).

Food choices contribute to obesity by consuming a majority of foods that are higher in calories and fat instead of consuming a majority of foods that are lower in fat such as vegetables and fruits (Epstein et al., 2001). Low levels of physical activity combined with high levels of sedentary behavior such as playing video games and increased hours of TV watching can also contribute to a child becoming overweight or obese (Sallis, 1993). Parental obesity is another very important contributing factor to childhood obesity (Johnson & Birch, 1994). Children who are born to parents who are obese are more likely to become children with obesity due to the combination of genetic as well as environmental factors (Johnson & Birch, 1994). Children of parents who are obese may be in a family environment that promotes excessive eating (Johnson & Birch, 1994).

Another factor contributing to childhood obesity is the eating habits and physical activity levels of the parent (Salmon et al., 2005). Parents who have poor eating habits serve as a role model or example for what their children eventually do while they are growing and when they become adults (Salmon et al., 2005). Children who have parents with poor eating habits combined with a sedentary lifestyle creates

an environment that makes it easier for the child to become obese (Salmon et al., 2005).

It is also believed that increased health disparities among children of certain race/ethnicities is another important contributing factor to childhood obesity (Wang, 2011). Individuals who are within certain race/ethnicity groups and fall within lower socioeconomic categories are more susceptible to obesity than others (Wang, 2011). For example, if an individual is African American or Hispanic, he or she is more likely to become overweight or obese than an individual who is White or Asian (Haas et al., 2003). The exact cause of why individuals of certain race/ethnicities and lower socioeconomic status are at greater risk is unknown, but data from surveys, such as NHANES, conducted by the CDC and the National Center for Health Statistics show differences in obesity prevalence across the aforementioned categories (Wang, 2011).

In order to address the childhood obesity epidemic, researchers as well as community partners of neighborhoods that have high rates of childhood obesity, have tried to develop obesity prevention programs to help reduce childhood obesity rates (Wofford, 2008). In 2008 Wofford conducted a systematic review of childhood obesity intervention and prevention research studies. A number of childhood obesity prevention programs have been developed and evaluated; however, there is no consensus among researchers as to what types of obesity prevention programs work best (Wofford, 2008). Most childhood obesity prevention programs are not effective in reducing rates of childhood obesity due to many barriers that program developers need to overcome in order to improve program success (Wofford, 2008).

Research studies have focused on developing intervention programs for children who are overweight and obese and identifying factors that contribute to the high rates of overweight and obesity among this population (Wofford, 2008). Intervention programs have adopted a heterogeneous approach where a multitude of program components are included in an attempt to ameliorate overweight and obesity among program participants (Wofford, 2008). Wofford's systematic review of childhood obesity prevention research found that among the top areas of interest are a focus on prevention as opposed to intervention, a focus on programs to target preschoolers, and a focus on the involvement of parents in childhood obesity prevention programs (Wofford, 2008).

Current research findings do not provide answers on how to prevent childhood overweight and obesity. By the time a child enters school, between the ages of 2 and 5, children are already at a high risk of becoming overweight and obese (Skouteris et al., 2010). During these formative years, children have been exposed to rules of eating in their culture, how much should be eaten, and what foods should be eaten (Skouteris et al., 2010). There is strong causal evidence that links early parenting and parent-child interactions to overweight and obesity (Skouteris et al., 2010). There is also research that shows evidence of the influence of caregivers on the development of dietary preferences and patterns (Skouteris et al., 2010).

A systematic review of childhood obesity interventions conducted by Skouteris et al. suggests that in order to effectively combat childhood obesity, prevention efforts for children should be done during the formative years of development, ages 4 years and under and prevention efforts should focus on parents

(Skouteris et al., 2010). Also, since parental beliefs, attitudes, perceptions, and behaviors can contribute to excessive weight gain, childhood obesity prevention programs should include a parent education and behavior change component (Zeller et al., 2007). Researchers recommend that examining additional parental variables that could be associated with reducing overweight and obesogenic behaviors among children is necessary to determine the best strategies to developing childhood obesity prevention programs (Skouteris et al., 2010).

One important barrier to overcome when trying to develop childhood obesity prevention programs is addressing program participation (Franca et al., 2013). As with any disease prevention program that targets a health behavior change, there are often challenges to program adherence. Even when incorporating relevant recommendations from previous research findings into the development of childhood obesity prevention programs, such as involving parents in the program (Zeller et al., 2007), there is often still an issue of program participation (Franca et al., 2013). Full participation in prevention programs is such an important issue that some institutes have been established to research the impact of adherence on health. The National Institutes of Health (NIH) Office of Behavioral and Social Sciences Research (OBSSR) sponsors an Adherence Research Network whose goal is to support and promote adherence in research funded by NIH (NIH OBSSR, 2018). Also, Cincinnati's Children's Hospital Medical Center has established a Center for Adherence and Self-Management that researches adherence issues to medical treatment and its impact on clinical care (Cincinnati Children's Center for Adherence and Self-Management, 2018). The goal of Cincinnati Children's Center for

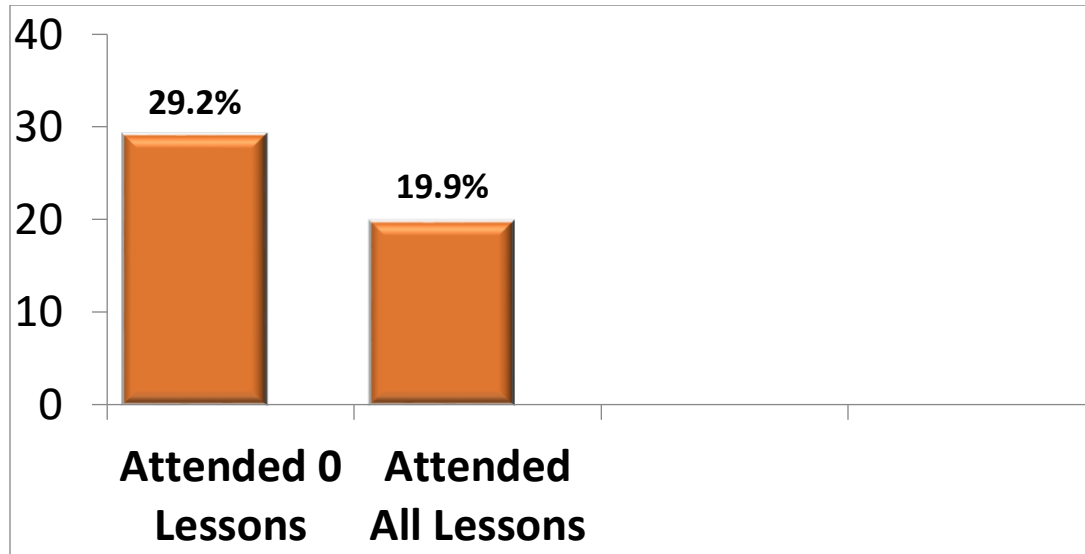
Adherence and Self-Management is to improve patient health outcomes by promoting adherence and lead adherence initiatives through the dissemination of evidence-based research methods (Cincinnati Children's Center for Adherence and Self-Management, 2018).

An example of the problem of parental participation can be seen in the Toddler Obesity Prevention Study (TOPS), a randomized control trial conducted at the University of Maryland School of Medicine (Black et al., 2013). TOPS program attempted to prevent childhood obesity. TOPS was a two-phase program designed to prevent toddlers from becoming overweight by focusing on the dietary, physical activity, and growth patterns of children participating in the Women, Infants & Children (WIC) Program. The TOPS program consisted of three program intervention components: a maternal intervention, a toddler parenting intervention, and an intervention on child safety. Data were collected from the mothers and the toddlers at baseline and later during follow up 6 months and 12 months after the program. Data variables collected for toddlers participating in the program included body composition, diet, and physical activity.

Program participation among the parents/caregivers in this program was very low.

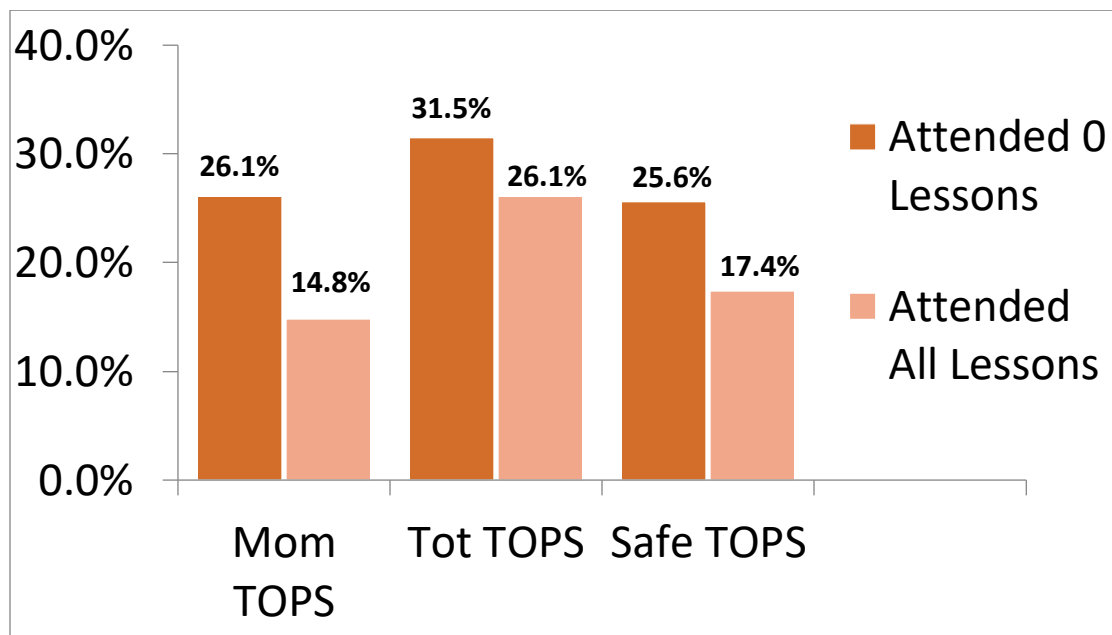
The figure below shows overall parental participation percentages for the TOPS program. Almost 30% of the recruited participants attended 0 meetings while only 20% of the participants attended all of the meetings (Figure 1.1).

Figure 1.1. TOPS Overall Program Parental Participation Percentages



When separating the participants by the intervention they were randomized to, the parental participation levels were not much better. Most of the intervention groups were at about 30% for attending 0 meetings and between 14.8% and 26.1% for attending all meetings (Figure 1.2).

Figure 1.2. TOPS Program Parental Participation by Intervention Type



If the issue of parental participation to childhood obesity prevention and intervention programs is not addressed, childhood obesity rates will continue to rise. Children with obesity will become adults with obesity who suffer from chronic diseases related to obesity, which will eventually have a catastrophic effect on the U.S. healthcare system.

Researchers use different theoretical models to attempt to explain human behavior, including adherence to health behavior change programs. The transtheoretical model (TTM) theorizes that an individual's health behavior change occurs by going through a process of six stages of change (Prochaska & Velicer, 1997). The stages of change are precontemplation, contemplation, preparation, action, maintenance and termination (Prochaska & Velicer, 1997). The initial research on the TTM focused on smoking cessation programs but the theory has been expanded to also apply to a range of health behaviors including eating disorders, obesity, and sedentary lifestyles (Prochaska & Velicer, 1997).

The TTM also posits that stage of change related variables can be good predictors of dropout in behavioral change programs (DiClemente et al., 1991). An individual who is in one of the lower stages of change may be more likely to terminate a health behavior intervention more quickly than those who are in a higher stage of change (Prochaska & Norcross, 2002).

The Health Belief Model (HBM) is a second theory of health behavior change used to explain an individual's behavior and adherence to health behavior change programs. The HBM was first developed by Public Health Service Investigators Drs. Godfrey Hochbaum, S. Kegels, Howard Leventhal, and Irwin Rosenstock in 1974

(Rosenstock, 1974). The theory was derived from the social psychological theories of Lewin, Becker, Tolman, Rotter, and other social psychologists (Maiman & Becker, 1974). The HBM was developed as a possible response to disease prevention problems dating back to the 1950s, specifically the issue of the public's failure to get screened for tuberculosis (Rosenstock, 1974). Researchers working for the Public Health Service continued to notice the public's failure to get screened for other preventable diseases such as rheumatic fever, polio, and influenza (Maiman & Becker, 1974). In the earliest stages of the HBM's development, there were three important theoretical components:

- 1) The individual's "readiness to take action" against a specific health condition was determined by their perceived "susceptibility" to the health condition and by their perception of the "severity" of the consequences of contracting the health condition (Rosenstock, 1974);
- 2) The individual's opinion of the feasibility of taking recommended actions needed to prevent the health condition (potential "benefits") compared with other "barriers", "costs", or "work" involved with following the recommended actions needed to prevent the health condition (Rosenstock, 1974); and
- 3) The individual's exposure to an external knowledge source stimulus or a personal knowledge source stimulus that triggers the appropriate, recommended behavior change or a "cue to action" against the health condition. (Maiman & Becker, 1974).

As time progressed and additional research was conducted, the constructs of the HBM expanded and became more clearly defined (Janz & Becker, 1984).

Currently, the HBM contains four primary components that predict if an individual will take action toward disease prevention (Glanz et al., 2008). The four primary constructs of the HBM are perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Stretcher & Rosenstock, 1997).

The HBM construct perceived susceptibility deals with an individual's perception of risk of developing a health condition or contracting a disease. When looking at serious or chronic illnesses, perceived susceptibility includes an individual's acceptance of the illness diagnosis, determinations of being re-diagnosed with an illness, and an individual's overall susceptibility to illness in general (Stretcher & Rosenstock, 1997). The construct of perceived severity deals with an individual's perceptions and feelings regarding contracting a disease. Perceived severity also deals with an individual's thoughts regarding the physical consequences (e.g., pain, death, disability) and social consequences (e.g., reduced work capacity, reduced social functioning with family and friends) of leaving an already contracted illness untreated (Stretcher & Rosenstock, 1997). The combination of perceived susceptibility and perceived severity is defined by some researchers as perceived threat (Stretcher & Rosenstock, 1997).

Perceived severity relates to an individual's perception about how serious contracting a specific disease really is and the serious impact the disease could have on them if no treatment is obtained (Glanz et al., 2008). Perceived severity relates to

an individual's perceptions of the potential social consequences a specific disease could have, such as impacts on family life or work life (Glanz et al., 2008).

The construct of perceived benefits relates to an individual's belief regarding the true impact that a recommended health behavior change will have on reducing their risk of getting the disease (Green & Kreuter, 2005). An individual must have the perception that there are actual benefits to acting on a recommended health behavior change that will actually reduce their risk of getting the disease before he or she will proceed with actually changing behavior (Glanz et al., 2008).

The construct of perceived barriers relates to an individual's belief regarding the physical and mental costs involved with not following a recommended health behavior change for a specific disease (Green & Kreuter, 2005). Individuals often consider their expected benefits with their expected barriers (Green & Kreuter, 2005). An individual does a cost-benefit analysis before committing to a recommended health behavior change for a disease (Glanz et al., 2008). If the benefits outweigh the costs of the recommended health behavior change, the individual is more likely to adhere to the recommended behavior change.

Many conceptual models for public health action focus on aspects of healthcare system infrastructure and aspects and delivery of clinical health services (Frieden, 2010). While this is helpful, it is important to consider the determinants of health when developing public health conceptual frameworks (Frieden, 2010). Factors such as poverty level, education level and socioeconomic status are often referred to as the social determinants of health which form society's foundation (Marmot, 2005). The Health Impact Pyramid (is an alternative conceptual public

health action framework that focuses on addressing socioeconomic factors of health as opposed to delivery of clinical health services and healthcare system infrastructure (Frieden, 2010). Also considered in the Health Impact Pyramid framework is the impact of improved life expectancy, improved living standards, and increased wealth (Frieden, 2010). Improved life expectancy and improved living standards can contribute to increased cardiovascular disease risk and increased risk at developing some cancers (Frieden & Henning, 2009).

The Health Impact Pyramid framework calls for health behavior change programs to contain program elements that address socioeconomic factors to have the greatest public health impact (Frieden, 2010). The higher the behavior change program is on the Health Impact Pyramid, the less impact it has on reaching large populations of people as opposed to smaller groups of individuals (Frieden, 2010). The base of the Health Impact Pyramid represents health behavior change programs that address socioeconomic factors that contribute to health. It is the largest portion of the pyramid (Frieden, 2010). The second tier of the pyramid, smaller than the base, represents health behavior change programs that address the individual's environment so that the healthy options are the default choice regardless of income, education, or other societal factors (Frieden, 2010). The third tier of the pyramid, smaller than the base and the second tier, represents health behavior change programs that do not have ongoing clinical care (Frieden, 2010). The fourth tier of the Health Impact Pyramid represents health behavior change programs that are ongoing and in a clinical setting (Frieden, 2010). The fifth and final tier of the Health Impact Pyramid represents health behavior change programs that work at improving health education in a clinical

or any other type of setting (Frieden, 2010). This tier is the smallest and impacts the smallest number of groups of individuals as compared to the base of the pyramid (Frieden, 2010). Research has also found that interventions that focus on health education often have the least impact and are not effective at changing health behaviors (Whitlock, 2002).

This research used the TTM and the HBM as the theoretical frameworks for exploring the relationship between measured outcome variables and parental participation in a toddler obesity prevention program. The literature review in Chapter 2 searched for both theoretical frameworks. Given the data collected in the previously discussed TOPS study, which includes measures from the TTM, the TTM is used in study analyses, as described in Chapter 3. Chapter 4 presents the data analysis findings, and Chapter 5 discusses the conclusions drawn after completing the research.

Chapter 2: Literature Review

Section 2.1: Introduction

Childhood obesity was recognized as a major health issue dating back to the mid-1970s. Research on group interventions were not yielding good results due to low program compliance rates and attempts to develop psychological characteristics of children with obesity were not successful (Becker et al., 1977). As a result, researchers started to look at the individual level to find answers to this growing health concern.

Researchers use different theoretical models to attempt to explain human behavior, including adherence to health behavior change programs. As discussed in Chapter 1, the transtheoretical model (TTM) theorizes that an individual's health behavior change occurs by going through a process of six stages of change (Prochaska & Velicer, 1997). The stages of change are precontemplation, contemplation, preparation, action, maintenance and termination (Prochaska & Velicer, 1997). The initial research on the TTM focused on smoking cessation programs but the theory has been expanded to also apply to a range of health behaviors including eating disorders, obesity, and sedentary lifestyles (Prochaska & Velicer, 1997).

The TTM also posits that stage of change related variables can be good predictors of dropout in behavioral change programs (DiClemente et al., 1991). An individual who is in one of the lower stages of change may be more likely to

terminate a health behavior intervention more quickly than those who are in a higher stage of change (Prochaska & Norcross, 2002).

Researchers have used the HBM as a theoretical framework to test the predictive value of its constructs on explaining individual health-related behaviors pertaining to health behavior change guidelines and programs. The HBM is often used by researchers to predict and explain how individuals will adhere to different types of health programs that are focused on preventing diseases (Rosenstock, 1974). The literature review focused on locating studies that also used the either the TTM or HBM as a theoretical or methodological framework.

The literature review for the proposed research study was conducted to examine if the TTM or HBC constructs have an effect on the parental adherence level to childhood obesity-related intervention programs. Parental adherence is operationally defined for this literature review as the number of program intervention sessions that parents attended. The following three research questions, drawn from the HBM, were the focus of this literature review:

- 1) Do higher levels of perceived susceptibility lead to increased parental adherence levels to childhood obesity-related intervention programs?
- 2) Do higher levels of perceived severity lead to increased parental adherence levels to childhood obesity-related intervention programs?
- 3) Do higher levels of perceived benefit lead to increased parental adherence levels to childhood obesity-related intervention programs?

Section 2.2: Article Inclusion Criteria

Prior to searching for articles, article inclusion criteria were developed (See Figure 2.1). Five overall areas of inclusion criteria were selected:

1. Reference Type
2. Research Intervention Type
3. Population
4. Outcomes of Intervention
5. Relationship of Caregiver to Child Participant

Figure 2.1. Inclusion Criteria

Research Study Inclusion Criterion	Specific Inclusion Criterion
Reference Type	<ul style="list-style-type: none">• Peer Reviewed Journal Article
Research Intervention Type	<ul style="list-style-type: none">• Obesity prevention/intervention• Review of literature for obesity related preventions/intervention
Population	<ul style="list-style-type: none">• Parents/Caregivers of toddlers ages 2 to 5• Parents/Caregivers of children ages 6 to 11• Parents/Caregivers of adolescents ages 12 to 19
Outcomes of Intervention	<ul style="list-style-type: none">• Increased physical activity• Improved healthy food choices• Decreased weight/BMI rates• Parental adherence• Increased parent knowledge
Relationship of Caregiver to Participant	<ul style="list-style-type: none">• Caregiver of toddler, child or adolescent can be any family member (mother, father, aunt, uncle, grandparent).

The reference type criteria only allowed peer reviewed journal articles to be selected for further inclusion in the systematic review. Researchers use the scientific method to test the components of the HBM or the TTM. For this reason, it was important to only include selected articles that were published in peer reviewed journals as opposed to articles or papers that were not peer reviewed. The research intervention type article inclusion category was limited to published articles that focused on

childhood obesity-related prevention or intervention programs and literature reviews that focused on childhood obesity-related prevention or intervention programs. The HBM and TTM apply to many different types of health behavior change programs, but this systematic review examines only childhood obesity health behavior change programs. The intervention outcomes category was limited to those related to increasing physical activity, improving healthy food choices, decreasing BMI/weight, measuring parental adherence, or increasing parent knowledge. The selected outcomes were used to hone in on interventions that measured outcomes that were closely related to activities most often associated with reductions in obesity. The final two inclusion categories centered around the intervention populations. Obesity interventions that included child participants aged two years to eleven years or adolescents aged twelve years to nineteen years were selected for further review. The obesity-related intervention or prevention program also had to include parents or caregivers of the child participant. The population parameters included in the inclusion criteria were selected because they related directly to the research questions of this systematic review.

Section 2.3: Literature Review Keyword Search

Electronic databases were used to search for selected articles. Two major databases were searched using the University of Maryland Baltimore County's library databases: Pub Med and the AOK Library databases which includes major journal databases such as Ebsco Host and Psych Info. Using the assistance of two reference librarians from the UMBC library, three keyword searches were developed to ensure

that all articles that focused on childhood obesity intervention and prevention programs involving parents were captured. The three keyword searches were used to capture as many relevant articles as possible. The first keyword search sought to find articles that focused on obesity prevention articles involving parents and used the HBM or the transtheoretical model as a theoretical framework. The second keyword search sought to find articles in the PubMed database that were not available in any of the AOK One Search databases. The third keyword search sought to find articles that focused on obesity prevention articles involving parents and used the HBM or the transtheoretical model as theoretical frameworks.

- 1) Keyword Search 1: AOK One Search Database: (obesity AND (prevent* OR intervent*) AND parent*) AND ("health belief model" **OR** "transtheoretical model")
- 2) Keyword Search 2: PubMed Database: (obesity AND (prevent* OR intervent*) AND parent*) AND ("health belief model" OR "transtheoretical model")
- 3) Keyword Search 3: AOK One Search Database: obesity AND (prevent* OR intervent*) AND parent*) AND ("health belief model" **AND** "transtheoretical model")

The three keyword searches were used to capture as many relevant articles as possible. The first keyword search sought to find articles that focused on obesity prevention articles involving parents and used the HBM or the transtheoretical model as a theoretical framework. The second keyword search sought to find articles in the PubMed database that were not available in any of the AOK One Search databases.

The third keyword search sought to find articles that focused on obesity prevention articles involving parents and used both the HBM and the transtheoretical model as theoretical frameworks.

Section 2.4: Article Data Extraction

Applying the inclusion criteria to narrow down the search results to the final selected yielded research articles with quantitative data collection methods. The article data extraction tool had five categories (See Figure 2.2):

- 1) Article characteristics
- 2) Research Study Characteristics
- 3) Sample Characteristics
- 4) Data Collection Characteristics
- 5) Results

The article characteristics category collected information on the selected article's title, author's name(s), year of publication, and the name of the journal the article was published. The research study characteristics category collected information on specific information about the article's research and intervention.

Figure 2.2. Data Extraction Form for Selected Articles

Data Abstraction/Coding Form: Quantitative Study #		
Article Characteristics	Title	
	Author Name(s)	
	Publication Year	
	Journal Name	
Research Study Characteristics	Randomized Control Trial	
	Length of Intervention	
	Intervention Targeted Health Behaviors	
	+Research Study Design/Methodology	
	Theoretical Framework Used (if any)	
	Intervention Outcome(s)	
Sample Characteristics	Sample Size	
	Target Race/Ethnicity	
	Age Range of Children	
Data Collection Characteristics	Outcome Measures	
	Statistical Analyses	
Results	Statistical Results Reported	
	Intervention Adherence (Mean Number of Sessions Attended by participants)	
	Intervention vs. Control Group	

Specific information such as whether the research was a randomized control trial, the length of the intervention or prevention program, the behaviors that the intervention or prevention program targeted, the research methodology, the theoretical framework used (if any), and the primary and secondary outcomes focused on by the intervention or prevention program. The sample characteristics category collected information on sample size, targeted race/ethnicity (if any), and the age range of the child participants. The data collection characteristics category collected information on the outcome measures used and the statistical analysis used to analyze the intervention or prevention program data. Lastly, the results category collected information on the significance of the statistical analyses reported, the number of sessions attended by participants, and the differences reported between the intervention and the control

groups. In the beginning of developing the inclusion criteria for selected articles, literature reviews, systematic reviews, and qualitative studies were not excluded. However, after developing the data extraction tool which directly feeds into the quality assessment determination, the decision to exclude non-quantitative articles was made. Excluding non-quantitative articles was necessary to maintain a uniform measure of quality assessment as well as a uniform measure of risk of bias.

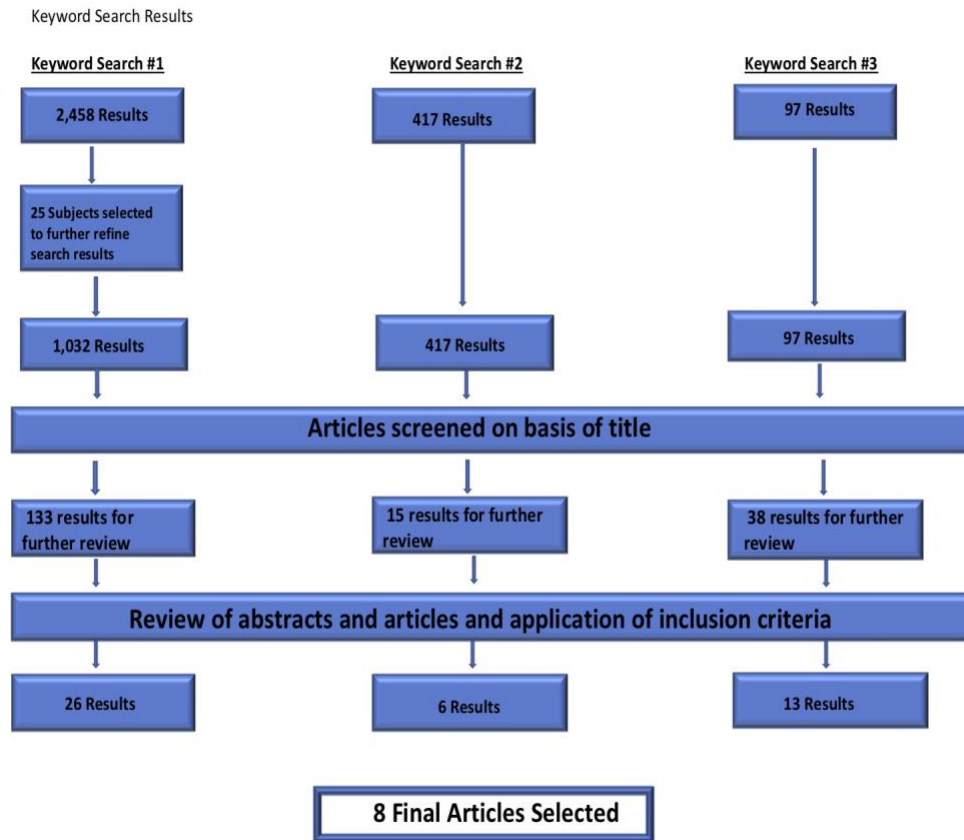
Section 2.5: Selection of Articles

The first keyword search produced 3,723 results. To narrow the results, the following subjects were selected from the subject drop down list: physical activity, health behavior, health promotion, obesity, descriptive statistics, questionnaires, exercise, health, diet, behavior modification, self-efficacy, nutrition, body mass index, children, physical fitness, randomized controlled trials, health education, health belief model, theory, qualitative research, prevention, adolescents, weight loss, systematic reviews (medical research), and behavior change. The subject selection narrowed the articles to 1,032 results. A review of each title to determine if the articles were childhood obesity interventions involving parents was done to further narrow the results. An article title review resulted in 138 articles selected for further abstract review. These 138 articles were exported to Zotero, a reference management software program. Five duplicates were removed using the duplicates function within the Zotero reference manager software. The remaining 133 articles were narrowed down to the final selected articles by reading the abstract or entire article while applying the inclusion criteria.

The second keyword search produced 10 results initially. After selecting the first article on the results list, the 'related articles' link was selected to see if that would yield additional articles. Clicking on the 'related articles' link produced 97 results. A review of each title to determine if the articles were childhood obesity interventions involving parents was done to further narrow the results. The title review resulted in 38 articles selected for further abstract review. The remaining 38 articles were narrowed down to the final selected articles by reading the abstract or entire article while applying the remaining inclusion criteria.

The third and final keyword search produced 417 results. An article title review of narrowed down the results list to 228 articles. The 228 results were then checked to determine if the research intervention type matched the inclusion criteria. The research intervention type review resulted in 15 articles selected for further abstract review. Two duplicates were removed using the duplicates function within the Zotero reference manager software. The remaining 13 articles were narrowed down to the final selected articles by reading the abstract or entire article while applying the remaining inclusion criteria. See Figure 2.3 for a diagram of how the final selected articles were obtained from each of the three keyword searches.

Figure 2.3. Keyword Search Results



Section 2.6: Overview of Selected Articles

The majority of the articles were excluded due to two article inclusion criteria: intervention outcomes and study population. Many research studies did have outcomes that focused on one areas listed in the inclusion criteria (increased physical activity, improved healthy food choices, decreased weight/BMI, parental adherence, or increased parent knowledge); however, not all of the studies included parents as participants and part of the study population. These two inclusion criteria

significantly narrowed down the number of articles that could be included in the final selection. Eight final articles were selected to include in this literature review. Below the articles are listed in alphabetical order:

- 1) Abdeyazdan, Z., Moshgdar, H., & Golshiri, P. (2017). Evaluating the Effect of Lifestyle Education Based on Health Belief Model for Mothers of Obese and Overweight School-age Children on Obesity-Related Behaviors. *Iranian Journal of Nursing & Midwifery Research*, 22(3), 248–252.
- 2) Becker, M. H., Maiman, L. A., Kirscht, J. P., Haefner, D. P., & Drachman, R. H. (1977). The Health belief Model and prediction of dietary compliance: A field experiment. *Journal of Health and Social Behavior*, 18(4), 348–366. <https://doi.org/10.2307/2955344>
- 3) Falbe, J., Cadiz, A. A., Tantoco, N. K., Thompson, H. R., & Madsen, K. A. (2015). Active and Healthy Families: A Randomized Controlled Trial of a Culturally Tailored Obesity Intervention for Latino Children. *Academic Pediatrics*, 15(4), 386–395. <https://doi.org/10.1016/j.acap.2015.02.004>
- 4) Kim, H. S., Park, J., Park, K., Lee, M.-N., & Ham, O. K. (2016). Parent Involvement Intervention in Developing Weight Management Skills for both Parents and Overweight/Obese Children. *Asian Nursing Research*, 10(1), 11–17. <https://doi.org/10.1016/j.anr.2015.07.006>
- 5) Ogu, L. C., Janakiram, J., Hoffman, H. J., McDonough, L., Valencia, A. P., Mackey, E. R., & Klein, C. J. (2014). Hispanic Overweight and Obese Children: Thirty Cases Managed With Standard WIC Counseling or Motivational Interviewing. *ICAN: Infant, Child & Adolescent Nutrition*, 6(1), 35.
- 6) Ransdell, L. B., Detling, N., Hildebrand, K., Lau, P., Moyer-Mileur, L., & Shultz, B. (2004). CAN PHYSICAL ACTIVITY INTERVENTIONS CHANGE PERCEIVED EXERCISE BENEFITS AND BARRIERS? *American Journal of Health Studies*, 19(4), 195–204.
- 7) Tu, A. W., Watts, A. W., Chanoine, J.-P., Panagiotopoulos, C., Geller, J., Brant, R., ... Mâsse, L. (2017). Does parental and adolescent participation in an e-health lifestyle modification intervention improve weight outcomes? *BMC Public Health*, 17(1). <https://doi.org/10.1186/s12889-017-4220-0>
- 8) Wilson, D. K., Alia, K. A., Kitzman-Ulrich, H., & Resnicow, K. (2014). A Pilot Study of the Effects of a Tailored Web-Based Intervention on Promoting Fruit and Vegetable Intake in African American Families. *CHILDHOOD OBESITY*, 10(1), 77–84.

The eight selected articles were published in eight different journals over a vast time period, 1977 to 2017. The age range of the child participants for the selected articles went from 19 months old to 17 years old. Five of the eight selected studies used a target race or ethnicity during sample collection. All of the interventions included parent-child pairs and collected data on both the parents and the children participating in the intervention. None of the interventions used the same methodology or measured the same outcomes, however, the two studies that used a theoretical framework used the HBM as the theoretical foundation for the intervention. All selected studies used quantitative data collection techniques.

Data collection methods were different across all studies, with the exception of obtaining BMI. Each study used a different outcome measure to collect data for study variables. Outcome measures included demographic questionnaires, a fruit and vegetable intake screening tool, an Exercise Benefits and Barriers Scale (EBBS), self-report measures of dietary intake, weight, and BMI, perceived benefit questionnaires, perceived severity questionnaires, perceived benefits questionnaires, perceived barriers questionnaires, a Lifestyle Behavior Checklist, and a Child-Parent Relationship Scale. Various methods of statistical analyses were used to analyze the data collected. The selected studies used t-tests, chi-square analysis, repeated measures ANOVA, regression analysis, Mann-Whitney tests, Wilcoxon-rank sums, Cochrane-Armitage test for trends, and z-scores. Five out of eight of the selected studies reported the intervention having statistically significant impacts on the outcomes measured. See Figures 2.6.1 through 2.6.8 for the results of each of the selected articles.

Figure 2.6.1. Data Extraction of Selected Articles: Article 1

Data Abstraction/Coding Form: Quantitative Study #1		
Article Characteristics	Title	Active and Healthy Families: A Randomized Controlled Trial of a Culturally Tailored Obesity Intervention for Latino Children
	Author Name(s)	Jennifer Falbe, ScD, MPH; Annabelle A. Cadiz, RD, MS; Nicole K. Tantoco, BA; Hannah R. Thompson, PhD, MPH; Kristine A. Madsen, MD, MPH
	Publication Year	2015
	Journal Name	Academic Pediatric Association
*Research Study Characteristics	+Random Assignment	Yes
	Length of Intervention	10 weeks; 5 sessions lasting 2 hours each
	Intervention Targeted Health Behaviors	Reduction in child BMI, change in parent weight
	+Research Study Design/Methodology	Unblinded, multi-site, parallel group randomized control trial
	Theoretical Framework Used (if any)	None mentioned
	Intervention Outcome(s)	Primary Outcome <ul style="list-style-type: none"> • Change in Child BMI Secondary Outcomes <ul style="list-style-type: none"> • Change in parent BMI • Change in parent weight • Change in blood pressure (parent and child) • Change in blood glucose (parent and child) • Change in insulin and insulin resistance (parent and child)
*Sample Characteristics	Sample Size	55 parent-child pairs
	+Target Race/Ethnicity	Yes—Spanish speaking Latinos
	Age Range of Children	5 years to 12 years
*Data Collection Characteristics	Outcome Measures	BMI (height and weight), Blood Pressure, Blood Glucose levels
	Statistical Analyses	Two Sample T-test (to detect significant differences in BMI) Multivariate Linear Regression
*Results	Statistical Results Reported	Active Healthy Families (AHF) program reduced BMI and triglycerides; no mention of results were statistically significant.
	+Intervention Adherence (Mean Number of Sessions Attended by participants)	3.5 out of 5 (Over half)
	Intervention vs. Control Group	Yes

Figure 2.6.2. Data Extraction of Selected Articles: Article 2

Data Abstraction/Coding Form: Quantitative Study #2		
Article Characteristics	Title	A Pilot Study of the Effects of a Tailored Web-Based Intervention on Promoting Fruit and Vegetable Intake in African American Families
	Author Name(s)	Dawn K. Wilson, PhD, Kassandra A. Alia, MA, Heather Kitzman-Ulrich, PhD, Ken Resnicow, PhD
	Publication Year	2014
	Journal Name	Childhood Obesity
*Research Study Characteristics	+Random Assignment	No
	Length of Intervention	1 week; Pre-test, 45 –60 minute Web Based Intervention; Follow up after 1 week
	Intervention Targeted Health Behaviors	Increase of fruit and vegetable intake of parents and adolescents
	+Research Study Design/Methodology	Quasi-experimental
	+Theoretical Framework Used (if any)	N/A
	Intervention Outcome(s)	Increase in fruit and vegetable intake of parents and adolescents
*Sample Characteristics	Sample Size	47 parent -adolescent pairs total; 41 parent – adolescent pairs completed follow-up
	+Target Race/Ethnicity	African Americans
	Age Range of Children	12 to 14 years old
*Data Collection Characteristics	Outcome Measures	Self-reported demographic info of parents and adolescents (by the parents) Baseline BMI measurements taken by a certified research assistant Self-report of fruit and vegetable (F&V) intake using a validated F&V screening tool
	Statistical Analyses	Paired Samples T-test
*Results	Statistical Results Reported	Significant increase in parents' self-report of daily fruit intake
	Intervention Adherence (Mean Number of Sessions Attended by participants)	NA – This intervention only consisted of 1 web-based session
	Intervention vs. Control Group	No

Figure 2.6.3. Data Extraction of Selected Articles: Article 3

Data Abstraction/Coding Form: Quantitative Study #3		
Article Characteristics	Title	Can Physical Activity Interventions Change Perceived Exercise Benefits and Barriers?
	Author Name(s)	Lynda B. Ransdell, PhD, Nicole Detling, PhD Candidate, Kathy Hildebrand, PhD, Patrick Lau, PhD, Laurie Moyer-Mileur, PhD, Barry Schultz, PhD
	Publication Year	2004
	Journal Name	American Journal of Health Studies
*Research Study Characteristics	+Random Assignment	Yes—participants randomly assigned to one of 2 intervention groups Home based intervention group or University based intervention group
	Length of Intervention	12 weeks
	Intervention Targeted Health Behaviors	Increased Physical Activity
	+Research Study Design/Methodology	Quasi-experimental Random assignment to one of two intervention groups
	+Theoretical Framework Used (if any)	No
	Intervention Outcome(s)	Increased Physical Activity Decreased Perceived Exercise Barriers Increased Perceived Exercise Benefits
*Sample Characteristics	Sample Size	20 mother daughter pairs
	+Target Race/Ethnicity	No
	Age Range of Children	Daughters ages 14 to 17 years old
*Data Collection Characteristics	Outcome Measures	Demographic and Health History Questionnaire Fitnessgram Physical Activity Questionnaire Exercise Benefits and Barriers Scale (EBBS)
	Statistical Analyses	2x2 repeated measures ANOVA
*Results	Statistical Results Reported	Home-based and University-based interventions significantly increased physical activity No increase in Perceived exercise benefits or reduction in perceived exercise barriers
	Intervention Adherence Reported (Mean Number of Sessions Attended by participants)	17 out of 20 mother-daughter pairs completed follow up questionnaires
	Intervention vs. Control Group	No

Figure 2.6.4. Data Extraction of Selected Articles: Article 4

Data Abstraction/Coding Form: Quantitative Study #4		
Article Characteristics	Title	Evaluating the Effect of Lifestyle Education Based on Health Belief Models for Mothers of Obese and Overweight School-age Children on Obesity-Related Behaviors
	Author Name(s)	Zahra Abdeyazdan, Hodayse Moshgdar, Parastoo Golshiri
	Publication Year	2017
	Journal Name	Iranian Journal of Nursing and Midwifery Research
*Research Study Characteristics	+Random Assignment	Yes
	Length of Intervention	4 months
	Intervention Targeted Health Behaviors	Decrease in obesity-related behaviors
	+Research Study Design/Methodology	Quasi-experimental
	+Theoretical Framework Used (if any)	Health Belief Model
	Intervention Outcome(s)	BMI Obesity-related behaviors
*Sample Characteristics	Sample Size	64 Mother-child pairs
	+Target Race/Ethnicity	Yes--study was done in Iran
	Age Range of Children	5 th and 6 th grade students (Numerical ages of students not reported)
*Data Collection Characteristics	Outcome Measures	Demographic Questionnaire Knowledge of perceived benefits, threats, and barriers questionnaire (used to measure obesity-related behaviors)
	Statistical Analyses	Mann-Whitney, Chi-Square, student's t-test, repeated measures ANOVA, and least significance difference tests
*Results	Statistical Results Reported	Yes, but no significant results were reported
	Intervention Adherence (Mean Number of Sessions Attended by participants)	57 mothers in control group were excluded from study due to absence of one or more educational sessions 29 mothers in intervention group were excluded from study due to absence of one or more educational sessions
	Intervention vs. Control Group	Yes

Figure 2.6.5. Data Extraction of Selected Articles: Article 5

Data Abstraction/Coding Form: Quantitative Study #5		
Article Characteristics	Title	The Health Belief Model and Prediction of Dietary Compliance: A Field Experiment
	Author Name(s)	Marshall H. Becker, Lois A. Maiman, John P. Kirscht, Don P. Haefner, Robert H. Drachman
	Publication Year	1977
	Journal Name	Journal of Health and Social Behavior
*Research Study Characteristics	+Random Assignment	Yes
	Length of Intervention	2 months
	Intervention Targeted Health Behaviors	Parent's adherence to program Decrease in child's weight
	+Research Study Design/Methodology	Quasi-experimental with random assignment to intervention or control group
	+Theoretical Framework Used (if any)	Health Belief Model
	Intervention Outcome(s)	Adherence to Program and Child's weight
*Sample Characteristics	Sample Size	113 parent-child pairs
	+Target Race/Ethnicity	No
	Age Range of Children	19 months to 17 years
*Data Collection Characteristics	Outcome Measure	Demographic questionnaires Health Motivation Questionnaire <ul style="list-style-type: none"> Concerns about child's health compared to other children Child get well w/o medical help Take/wait Special health practices index Concern about own health Chance keep child on diet Concern index Perceived Susceptibility Perceived Severity Perceived Benefits Perceived Barriers
	Statistical Analyses	T-tests, ANOVA
*Results	Statistical Results Reported	General Health Threat measures proved to be a significant predictor of parental adherence The HBM variables did predict weight change The fear arousal intervention found to have the most effect on parental adherence Perceived Severity variables that were predictors of parent adherence <ul style="list-style-type: none"> Worry about child being overweight and agreeing that being overweight could cause serious illness were substantially correlated with compliance Perceived Benefits variables that were predictors of parent adherence <ul style="list-style-type: none"> Those who believed diet-related actions such as losing weight and avoiding cholesterol were significantly better compliers for first two FUVs Perceived Barriers variables that were predictors of parent adherence <ul style="list-style-type: none"> Parents who felt more secure about the diet's safety were found to be better compliers Having fewer difficulties at home positively effects compliance during the first month, but declines as time goes on
	Intervention Adherence (Mean Number of Sessions Attended by participants)	51 parent-child pairs did not complete study and were excluded from analysis
	Intervention vs. Control Group	Yes

Figure 2.6.6. Data Extraction of Selected Articles: Article 6

Data Abstraction/Coding Form: Quantitative Study #6		
Article Characteristics	Title	Does Parental and Adolescent participation in an e-health lifestyle modification intervention improves weight outcomes?
	Author Name(s)	Andrew W. Tu, Allison W. Watts, Jean-Pierre Chanoine, Constadina Panagiotopoulos, Josie Geller, Rollin Brant, Susan I. Barr and Louise Masse
	Publication Year	2017
	Journal Name	BMC Public Health
*Research Study Characteristics	+Random Assignment	No
	Length of Intervention	8 months
	Intervention Targeted Health Behaviors	Decrease in BMI and waist circumference of adolescents
	+Research Study Design/Methodology	Quasi-experimental
	+Theoretical Framework Used (if any)	N/A
	Intervention Outcome(s)	Parental Adherence Reduced BMI Reduced waist circumference
*Sample Characteristics	Sample Size	159 adolescent-parent pairs
	+Target Race/Ethnicity	Yes--study was done in Iran
	Age Range of Children	11 to 16 years old
*Data Collection Characteristics	Outcome Measures	Participation rate BMI Demographic Questionnaire
	Statistical Analyses	Linear mixed models analysis, z scores,
*Results	Statistical Results Reported	No significant results reported Higher adolescent participation rate was associated with a decrease in BMI Parent participation not found to be related to adolescent participation and weight outcomes
	Intervention Adherence (Mean Number of Sessions Attended by participants)	Parents completed 23% of the online component of the intervention
	Intervention vs. Control Group	No

Figure 2.6.7. Data Extraction of Selected Articles: Article 7

Data Abstraction/Coding Form: Quantitative Study #7		
Article Characteristics	Title	Does Parental and Adolescent participation in an e-health lifestyle modification intervention improves weight outcomes?
	Author Name(s)	Hee Soon Kim, PhD, FAAN, Jiyoung Park, PhD, Kye-yeong Park, MSN, Myung-Nam Lee, PhD, Ok Kyung Ham, PhD
	Publication Year	2016
	Journal Name	Asian Nursing Research
*Research Study Characteristics	+Random Assignment	Yes
	Length of Intervention	5 weeks
	Intervention Targeted Health Behaviors	Increased Parent -Child relationship score Increased child dietary self-efficacy
	+Research Study Design/Methodology	RCT
	+Theoretical Framework Used (if any)	N/A
	Intervention Outcome(s)	Parental Adherence Reduced BMI Reduced waist circumference
*Sample Characteristics	Sample Size	42 parent-child pairs
	+Target Race/Ethnicity	Yes--Korean
	Age Range of Children	7 to 12 years old
*Data Collection Characteristics	Outcome Measures	Lifestyle Behavior Checklist Child-Parent Relationship Scale (CPRS) Dietary self-efficacy (child) Exercise frequency (child) BMI (child)
	Statistical Analyses	Mixed design ANOVA
*Results	Statistical Results Reported	Yes, higher CPRS scores and child dietary self-efficacy scores were found in the experimental group
	Intervention Adherence (Mean Number of Sessions Attended by participants)	
	Intervention vs. Control Group	Yes

Figure 2.6.8. Data Extraction of Selected Articles: Article 8

Data Abstraction/Coding Form: Quantitative Study #8		
Article Characteristics	Title	Hispanic Overweight and Obese Children: Thirty Cases Managed With Standard WIC Counseling or Motivational Interviewing
	Author Name(s)	Linda C. Ogu, MPH, Jayasri Janakiram, MS, RD, LD, Heather J. Hoffman, PhD, Libia McDonough, MA, LN, Ana P. Valencia, MS, Eleanor R. Mackey, PhD, and Catherine J. Klein, PhD, RD
	Publication Year	2013
	Journal Name	Infant, Child, and Adolescent Nutrition
*Research Study Characteristics	+Random Assignment	No
	Length of Intervention	6 months
	Intervention Targeted Health Behaviors	Change in WIC client health behaviors
	+Research Study Design/Methodology	Quasi-experimental/Case study
	+Theoretical Framework Used (if any)	N/A
	Intervention Outcome(s)	Decrease in BMI Increase in healthy dietary patterns
*Sample Characteristics	Sample Size	30 caregiver-child pairs
	+Target Race/Ethnicity	Yes—Hispanic/Latino
	Age Range of Children	2 to 4 years old
*Data Collection Characteristics	Outcome Measures	Demographic questionnaire Physical Activity questionnaire Dietary patterns questionnaire BMI (child)
	Statistical Analyses	Wilcoxon-rank sums, Cochran-Armitage test for trends, 2 sample t-test
*Results	Statistical Results Reported	Yes, statistically significant decline in child BMI for intervention group and increased vegetable intake for intervention group
	Intervention Adherence (Mean Number of Sessions Attended by participants)	3 total missed appointments for Motivational Interview Group 5 total missed appointments for Standard recipients Group
	Intervention vs. Control Group	Yes

This literature review of childhood obesity intervention that involve parents was conducted to figure out if transtheoretical frameworks such as the HBM (perceived susceptibility, perceived benefits, and perceived severity) would predict parental adherence to childhood obesity intervention or prevention programs. Unfortunately, the research questions of this literature review were unable to be answered. There is a gap in the literature regarding the exploration of the impact of perceived benefits, perceived severity, and perceived susceptibility on parental adherence. The Becker et al. study was the only selected study that looked at HBM constructs as related to adherence to the intervention. Becker et al. found that

constructs of the HBM were predictors of parental adherence. The Abdeyazdan et al. study found that constructs of the HBM were predictors of increased intervention behavior change outcomes but did not relate the HBM constructs to parental adherence.

Section 2.7: Quality Assessment Determination

Each selected article's quality assessment was scored. A scoring chart with seven components totaling ten points was developed to determine the quality assessment of the selected articles (See Figure 2.7).

Figure 2.7. Quality Assessment Determination

Quality Assessment Domains (Scoring)	
Quantitative Studies	Study Design/Methodology/Validity
	Randomized Experiment (2 points)
	Non-randomized Experiment (1 point)
	Use of Control Group (1 point)
	Clear Sampling Strategies (2 points)
	No Target Race/Ethnicity for Sample (1 point)
	Theoretical Model (1 point)
	Obesity Related Primary Outcome (1 point)
	Statistically Significant Results (1 point)
Total	10 points

Two points were given for studies that used random assignment. Obesity-related interventions are not randomized control trials, but some do involve random assignment. Also, not all obesity-related interventions use a control group, so an additional point was given to studies that included a control group. If the study had clear sampling strategies that were reported, two points were given. One point was given if the obesity-related intervention did not target a specific race or ethnicity, which would make the results more widely generalizable. One point was given if the

study used a behavior change health theory as a theoretical framework. One point was given if the intervention had a primary outcome(s) that was directly related to reducing obesity. Lastly, one point was given if the intervention found statistically significant results related to the intervention outcomes.

Section 2.8: Risk of Bias Determination

The selected articles' risk of bias was determined by looking at four bias categories: selection bias, performance bias, detection bias, and reporting bias (See Figure 2.8).

Figure 2.8. Risk of Bias Determination

Risk of Bias Determination (Scoring)	
Risk of Bias Domains	Selection Bias
	No Uniformly Applied Sample Inclusion/Exclusion Criteria (1 point)
	Performance Bias
	No Study Protocol Maintained (1 point)
	Detection Bias
	No Validated Outcome Measures Used (1 point)
	Reporting Bias
	Not All Pre-Specified Outcomes Reported (1 point)
Total	4 points

Selection bias was measured by determining if the study uniformly applied the sample inclusion or exclusion criteria. Performance bias was measured by determining if the study maintained the study protocol across the entire intervention. Detection bias was measured by determining if valid outcome measures were used. Reporting bias was measured by determining if all pre-specified outcomes were reported. The determination for each bias category was made by carefully reading each selected article in its entirety.

Section 2.9: Synthesis of Results of Selected Articles

Overall, the majority of the eight studies selected for this literature review had a high-quality assessment score that measured 5 or above (See Figure 2.9). Five out of 8 selected studies found the intervention involving parents yielded statistically significant results.

Figure 2.9. Synthesis of Results of Selected Articles

Title of Selected Article	Active and Healthy Families: A Randomized Controlled Trial of a Culturally Tailored Obesity Intervention for Latino Children	A Pilot Study of the Effects of a Tailored Web-Based Intervention on Promoting Fruit and Vegetable Intake in African American Families	Can Physical Activity Interventions Change Perceived Exercise Benefits and Barriers?	Evaluating the Effect of Lifestyle Education Based on Health Belief Models for Mothers of Obese and Overweight School-age Children on Obesity-Related Behaviors	The Health Belief Model and Prediction of Dietary Compliance: A Field Experiment	Does Parental and Adolescent participation in an e-health lifestyle modification intervention improves weight outcomes?	Parent Involvement Intervention in Developing Weight Management Skills for both Parents and Overweight/Obese Children	Hispanic Overweight and Obese Children: Thirty Cases Managed With Standard WIC Counseling or Motivational Interviewing
Strength of Evidence Total	6	4	7	7	8	5	7	6
Random Assignment	2	1	2	2	2	1	2	1
Control Group	1	0	0	1	1	0	1	1
Clear Sampling Strategies	2	2	2	2	2	2	2	2
No Target Race/Ethnicity	0	0	1	0	1	1	0	0
Theoretical Framework	0	0	0	1	1	0	0	0
Obesity-Related Outcomes	1	0	1	1	0	1	1	1
Statistically Significant Results	0	1	1	0	1	0	1	1
Risk of Bias Total	1	1	0	0	0	1	1	0
Selection Bias								
No Uniform Sample Inclusion Criteria	0	0	0	0	0	0	0	0
Performance Bias								
No Study Protocol Maintained	0	0	0	0	0	0	0	0
Detection Bias								
No Valid Outcome Measure Used	1	1	0	0	0	1	1	0
Reporting Bias								
Not All Pre-Specified Outcomes Reported	0	0	0	0	0	0	0	0

Studies that had a high-quality assessment score used random assignment and had statistically significant results. The two studies that used the HBM as a theoretical foundation had high quality assessment scores. One of the selected articles, research study #2, had a low strength score that measured 4. This was mainly due to the study not using random assignment, using a sample that targeted a specific race/ethnicity, and having an outcome that was not directly related to reducing obesity. Increase in fruit and vegetable intake can cause one's weight and BMI to decrease but it is not a direct outcome of increasing daily intake of fruits and vegetables.

Based on the risk of bias determination measurements, all eight selected articles had a low risk of bias. None of the selected studies demonstrated selection bias, performance bias, or reporting bias. All selected studies had uniform sample inclusion criteria, maintained study protocols throughout the intervention, and reported statistical results of all pre-specified outcomes whether they were significant or not significant. The most risk of bias for the eight selected studies was shown under the detection bias category. Only half (4 out of 8) of the selected studies used validated measures when collecting data. The other half used self-report measures, demographic questionnaires, and other non-validated surveys to collect data.

2.9.1: The Health Belief Model and Predicting Parental Adherence to Obesity-Related Behavior Change Guidelines and Obesity Related Education Programs

A study conducted by Becker et al. in 1977 evaluated the predictive value of the HBM's constructs to explain parental adherence to a diet for their children with obesity that was prescribed by a physician. In addition to evaluating the HBM's predictive qualities, Becker et al.'s study examined the effectiveness of fear-arousing

communications at increasing parental adherence. The study operationalized the HBM constructs by indexing questions in a survey given to participants at the beginning and at the end of the study. The survey questions measured each mother's general health motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Each mother was randomized into one of three groups: receiving a high fear message and booklet about obesity, a lower threat message and booklet about obesity, or the control group.

The Becker et al. 1977 study found that although the HBM constructs did not predict weight change in the children with obesity; the questions used to measure general health threat, perceived severity, perceived benefits, and perceived barriers were predictors of parental adherence to dietary compliance. Parents who felt that their child being overweight was indeed a threat to their children's health were found to be more adherent to the dietary guideline prescribed by physician. Parents who felt a greater sense of worry surrounding their child being overweight and agreed that being overweight could cause serious illness were correlated with having increased program compliance. Parents who felt that losing weight and reducing cholesterol (both achievable through following the prescribed dietary guidelines) were more likely to follow the prescribed dietary guidelines. Lastly, parents who felt more secure about the dietary guidelines safety and had fewer home difficulties were found to be more compliant with the dietary guidelines. This study shows results show the HBM's constructs ability to predict parental adherence to dietary guidelines prescribed by a physician for their children with obesity.

A recent study conducted in 2017 by Abdeyazdan et al. looked at the HBM and evaluated the effectiveness of an obesity-related behaviors lifestyle education program for mothers of obese and overweight elementary school-aged children. The methodology in this study differed from that of the Becker et al. study. Abdeyazdan et al. did not measure parental adherence to the lifestyle education program, but instead measured the effectiveness of the program to improve obesity-related behaviors by addressing perceived program barriers, perceived program threats, and perceived program benefits within the program education materials. Topics regarding high childhood obesity prevalence rates and health issues/negative health consequences associated with childhood obesity were discussed to address perceived threats. The importance of children maintaining a healthy weight were discussed to address perceived benefits. Challenges to maintaining a child's healthy weight were discussed to address perceived barriers. These challenges included television advertisements that highlight unhealthy snacks and unhealthy foods, high costs of sports classes and sports team memberships, reduced time and space for exercise at school, and the lack of healthy diet educational programs for parents and children. Parents were randomized into the intervention group that included lifestyle training for controlling children's obesity based on HBM constructs along with receiving educational pamphlets or into the control group that only received educational pamphlets.

Survey questions were used to evaluate parents' knowledge of and attitudes toward the HBM constructs (perceived threat, perceived benefits, and perceived barriers) that were presented in the education component of the program. The

researchers used higher scores on knowledge questions and higher scores on attitude questions as indicators of parents' ability to control their child's obesity-related behaviors. At the conclusion of this study, there were no significant differences found between the mean scores of children's obesity related behaviors of the intervention group and the control group before the intervention; however, there were significant differences in mean scores of the intervention group immediately following the intervention and two months after the intervention. Results from this study show that there is potential for increasing parents' knowledge of healthy behaviors by using HBM constructs as part of a lifestyle education training program aimed at helping parents control their child's obesity.

2.9.2: Using Various Strategies in Childhood Obesity Intervention Programs to Reduce Obesity-Related Behaviors

Childhood obesity is a disease that can have several contributing factors. Contributing factors such as lack of physical activity and having a diet high in sugar and fat but low in fruits and vegetables can contribute to a child becoming overweight or obese (The Obesity Society, 2014). Instead of looking at ways to directly reduce children's BMI rates, some researchers focus on how to address some of the contributing factors that lead to obesity, such as physical activity rates and intake of fruits and vegetables. Increasing physical activity levels and increasing the intake of fruits and vegetables alone cannot lower children's BMI rates, but figuring out strategies to help parents increase these behaviors in their children could help with determining strategies of increasing parent adherence in various types of obesity intervention programs.

Wilson et al. conducted a study that examined the effects of a web-based, parent focused intervention had on increasing the intake of fruits and vegetables in African American families. Forty-seven parent child pairs, all African American, were recruited to participate in the intervention. Parents were asked to take a pre-test that used self-reports to obtain measurements of the parent's autonomy in providing choices for their child, level of fruit and vegetable intake, level of social support, and level of communication with their child. The measurements obtained during the pre-test determined what type of message the parent would receive during the 45 to 60-minute online program. After the viewing the tailored-message online program, parents were asked to provide self-reports of daily fruit and vegetable intake for themselves and their adolescent. Follow up with participants was done one week after participating in the tailored online session.

Wilson et al. found a significant increase in fruit and vegetable intake when comparing pre-test and follow-up scores. The results suggest there is a potential for success in increasing fruit and vegetable intake among parents and their adolescents using a tailored, web-based intervention program. More research on the effects of this type of intervention on the sustainability of high levels of fruit and vegetable intake should be done.

In 2004, Ransdell et al. conducted a study that focused on increasing levels of physical activity based on levels of perceived exercise benefits and perceived exercise barriers. Twenty mother-daughter pairs were randomly assigned to one of two different intervention conditions: the university-based condition (UB) or the home-based condition (HB). The UB group participated in group physical activity classes

three days a week at a facility located on the campus of a large, southwestern university. The HB group attended two instructional sessions and received a packet of information that contained a calendar of recommended activities, pictures of stretches and strength training activities, and tips for overcoming exercise barriers.

Adherence levels for both intervention groups were relatively high. The HB group completed 70% of the recommended activities and the UB group attended 77% of the on-campus exercise sessions. After the twelve-week intervention, there was a significant increase in physical activity levels in both the HB and the UB intervention group. Mothers in both the UB and the HB group reported a significant decrease in exercise barriers. There was no decrease in exercise barriers for daughters in either intervention group; however, the results indicate the potential for the success of a program aimed at increasing physical activity for parents and adolescents when barriers to exercise are addressed.

2.9.3: Importance of Including Parents and Increasing Adherence in Childhood Obesity Prevention/Intervention Programs

Research studies conducted on childhood obesity prevention programs have made suggestions to improve the outcomes of the programs on children with obesity. One of the suggestions was to focus on the involvement of parents in childhood obesity prevention programs (Wofford, 2008). Some researchers have conducted studies to examine if parent participation in various types of childhood obesity prevention programs positively impacts program outcomes for their children.

Andrew Tu and colleagues published a study in 2017 that looked at the impact of parental participation on an adolescent e-health lifestyle intervention (Tu et al,

2017). The goal of this research study was to evaluate whether parental adherence as well as adherence of the adolescent participants to an e-health intervention would yield changes in the adolescents' BMI and waist circumference. The intervention lasted for a total of eight months. Adolescents were asked to check in to the website weekly to view videos that encouraged healthy eating, increased physical activity, and reduced screen time. Parents were asked to check in to a different website weekly to view topics similar to those given to their adolescents and also view ways to support their adolescent's challenge for the week. At the end of the intervention, only 23% of the parents who participated completed the online portion of the intervention. Researchers performed multivariate analyses and found that the parent adherence rate was significantly associated with the adolescent participation rate. A ten percent increase in parental adherence was associated with a 6.1 percent increase in the adolescent adherence rate. Although there was no relationship found between parent participation and the adolescents' weight outcomes, the researchers concluded that improving adherence to the e-health lifestyle interventions could lead to a positive effect in the reduction of weight in obese/overweight adolescents.

A second research study found the opposite effect of parent involvement in a weight behavior change intervention program. In 2016 Kim et al. conducted a study that examined whether parent involvement in a weight management program designed for both parents and children would have a positive impact on their child's dietary self-efficacy, which could lead to a reduction in their child's weight. Parent and child pairs were randomized into an experimental group and a control group. Parents in the experimental group received weekly newsletters via e-mail and text

messages for a duration of five weeks while children in the experimental group received nutrition education and exercise classes. Parent outcomes were measured using two questionnaires: The Lifestyle Behaviour Checklist and the Child-Parent Relationship Scale (CPRS). The outcomes for children were measured using a combination of a diet self-efficacy questionnaire and obesity related measurements including BMI and exercise frequency.

At the conclusion of the five-week intervention, there was a significant increase in CPRS scores of parents in the intervention group and a significant increase in dietary self-efficacy scores of children in the intervention group, but no significant decrease in children's BMI. Although there was no significant decrease in the children's BMI, the results support that parent involvement can have a positive impact on the dietary self-efficacy of children even if it does not significantly reduce the children's BMI. Kim et al. recommend conducting further research to examine whether parent involvement can have positive impacts on intervention outcomes with interventions that run longer lengths of time.

In 2015 Falbe et al. conducted a study that sought to determine the impact of the family on a culturally sensitive, child obesity intervention program focused on reducing children's BMI measurements. A randomized control trial method was used for the intervention, which was delivered during group medical appointments. Fifty-five parent child pairs were randomized into the experimental group, the Active Healthy Families (AHF) group, or the control group. The intervention length was ten weeks. The experimental group participated in bi-weekly, two hour long, group education sessions taught by a registered dietician or physician. The group sessions

covered topics aimed at reducing obesity related behaviors and ranged from parenting tips and healthy eating to stress brought on by the immigration process.

The average number of sessions attended by participants in the experimental group was 3.5 sessions. Most experimental group participants attended over half the group sessions. At the conclusion of the ten-week intervention, the children in the experimental group reported decreased BMI rates compared to children in the control group. Children in the treatment group also had reduced triglyceride levels compared to children in the control group. These results indicate the potential for success for obesity intervention program that involve parents.

The seven selected articles were published in seven different journals over an extended time period, 1977 to 2017. The age range of the child participants for the selected articles went from 19 months old to 17 years old. Five of the seven selected studies used a target race or ethnicity during sample collection. All of the interventions included parent-child pairs and collected data on both the parents and the children participating in the intervention. None of the interventions used the same methodology or measured the same outcomes, however, the two studies that used a theoretical framework used the HBM as the theoretical foundation for the intervention. All selected studies used quantitative data collection techniques.

Data collection methods were different across all studies, with the exception of obtaining BMI. Each study used a different outcome measure to collect data for study variables. Outcome measures included demographic questionnaires, a fruit and vegetable intake screening tool, an Exercise Benefits and Barriers Scale (EBBS), self-report measures of dietary intake, weight, and BMI, perceived benefit questionnaires,

perceived severity questionnaires, perceived benefits questionnaires, perceived barriers questionnaires, a Lifestyle Behavior Checklist, and a Child-Parent Relationship Scale. Various methods of statistical analyses were used to analyze the data collected. The selected studies used t-tests, chi-square analysis, repeated measures ANOVA, regression analysis, Mann-Whitney tests, Wilcoxon-rank sums, Cochrane-Armitage test for trends, and z-scores. Five out of seven of the selected studies reported the intervention having statistically significant impacts on the outcomes measured.

Overall, the selected studies for the literature review found that involving parents in childhood obesity related intervention or prevention programs can lead to statistically significant results such as increased healthy dietary intake and increased physical activity. Involving parents can also lead to a decrease in BMI and weight measurements of children and parents who actively participate in the intervention or prevention program.

This literature review of childhood obesity intervention that involve parents was conducted to figure out if perceived susceptibility, perceived benefits, and perceived severity would predict parental adherence to childhood obesity intervention or prevention programs. Unfortunately, the research questions of this literature review were unable to be answered. There is a gap in the literature regarding the exploration of the impact of perceived benefits, perceived severity, and perceived susceptibility on parental adherence. The Becker et al. study was the only selected study that looked at HBM constructs as related to adherence to the intervention. Becker et al. found that constructs of the HBM were predictors of parental adherence.

The Abdeyazdan et al. study found that constructs of the HBM were predictors of increased intervention behavior change outcomes but did not relate the HBM constructs to parental adherence.

Since childhood obesity intervention and prevention programs measure different outcomes and have different methodology, it is important to note that comparing the same type of intervention program is extremely difficult. Across all the articles reviewed for final selection, there were no studies that had the same outcomes or used the same outcome measures. That is a limitation that will always be present childhood obesity intervention study literature review research.

The gap in the literature and the inability to directly answer the research questions at the beginning of this literature review confirms that further research needs to be done on the transtheoretical model (e.g. HBM) constructs as they relate to parental adherence to childhood obesity intervention and prevention programs. In order for health interventions or health prevention programs involving children to have a more significant impact, parental adherence should be increased. This literature review has found that involving parents can lead to statistically significant outcomes for childhood obesity intervention and prevention programs. Combining the knowledge that parent participation in childhood obesity intervention and prevention programs leads to better outcomes with future research of using HBM constructs to predict parental adherence may help researchers discover better ways to design successful parent-involved childhood obesity prevention and intervention programs. Childhood obesity programs with high parental adherence will ultimately lead to better program outcomes and a reduction of childhood obesity rates.

Chapter 3: Methods

Section 3.1: Research Questions

Participation research has incorporated the use of health behavior models to predict various health behaviors especially when examining health prevention and intervention programs. The Transtheoretical Model (TTM) is the model of health behavior change used for the foundation of the theoretical framework for this research. As previously discussed, the TTM has six constructs that attempt to explain and identify the stages of change an individual goes through in order to make a successful health behavior change (Prochaska et al.,1992). The six stages of change of the TTM are precontemplation, contemplation, preparation, action, maintenance, and termination (Prochaska & Norcross, 2002).

The purpose of this research study is to determine if the stage of change of the caregiver identified by the baseline questionnaire will be able to predict parental participation to the TOPS program. Parental participation is operationally defined for this study as the number of program intervention sessions that parents attended.

There are three major research questions that this study addressed:

- 1) Are parents who are in the contemplation stage of change or higher (as identified by the baseline questionnaire) more likely to attend more prevention program meetings than those who have not reached the contemplation stage of change?

- a. Are parents participating in the Mom TOPS intervention group, who are identified as in the contemplation stage of change or higher at baseline, more likely to have higher attendance rates (attend more meetings) than those in the pre-contemplation stage of change at baseline.
 - b. Are parents participating in the Safe TOPS intervention group, who are identified as in the preparation stage of change or higher at baseline, more likely to have higher attendance rates (attend more meetings) than those in the pre-contemplation stage of change at baseline.
- 2) Is there a minimum number of intervention program meetings that parents must attend before an intervention effect or behavior change is observed?
- a. Is there a minimum number of intervention program meetings that Mom TOPS parents must attend before an intervention effect is observed?
 - b. Is there a minimum number of intervention program meetings that Safe TOPS parents must attend before an intervention effect is observed?
- 3) Is there an association of course content areas and intervention outcome changes among caregivers?
- a. Are there Mom TOPS course content areas that are more associated with parental behavior change (increased intervention outcome effects)?

- b. Are there Safe TOPS course content areas that are more associated with parental behavior change (increased intervention outcome effects)?

Section 3.2: Research Design and Methodology

Data for this exploratory research study came from the Toddler Obesity Prevention Study (TOPS), a two-phase program designed to prevent toddlers from becoming overweight by focusing on the dietary, physical activity, and growth patterns of children participating in the Women, Infants & Children (WIC) Program. Research has shown that dietary and physical activity established in the earlier years of life can impact later on in life (Nixon et al., 2012). The development of healthy dietary as well as physical activity habits within the first few years of life make it an ideal time to establish healthy behaviors to avoid becoming overweight in the future (Nixon et al., 2012).

There were three main objectives of TOPS. The first was to teach parents goal setting techniques that encourage healthy mealtime behaviors and routines for their toddlers. Another main objective of TOPS was to teach parents how to keep track of the progress of the goals that were set. The last main objective was to teach parents how to identify barriers and other things that could prevent them from achieving the goals that were set. A TOPS mentor, trained in motivational interviewing, was used to teach parents how to achieve the main TOPS program objectives.

The TOPS program was a randomized control trial that consisted of one obesity-related intervention component, one parenting-related intervention

component, and one safety-related intervention component. The first program component was a maternal intervention that focused on the diet and physical activity of the mothers enrolled in the program. The second intervention component was a toddler parenting intervention that focused on proper approaches to feeding, parenting, limit setting, and development strategies such as educational play. The third intervention component was focused on child safety. The goal of the obesity-related intervention and the parenting-related intervention was to alter the behavior of the mother/caregiver so that there would be a positive impact on the toddler's growth and development which would lead to preventing the toddlers from becoming overweight children. Parents randomized into the diet and physical activity (Mom TOPS) intervention group had five lessons over the course of the intervention with lesson topics that included healthy snacking and healthy drinking, fruits and vegetables, balanced diet, healthy lifestyle, and trimming the fat from foods. Parents randomized into the parenting (Tot TOPS) intervention group had five lessons over the course of the intervention with lesson topics that included having a special relationship with your child, preventing problems and discipline, encouraging positive behavior and mealtime behaviors, and encouraging healthy habits for a lifetime. Parents randomized into the safety (Safe TOPS) intervention group had five lessons over the course of the intervention with lesson topics that included car seat safety, poison prevention, fire safety, and fall prevention. The Safe TOPS intervention group served as a type of control group. Participants in the Safe TOPS group did not receive any nutrition or physical activity material focused on changing health behaviors related to reducing obesity and an overweight BMI (Wang et al.,

2018). They were exposed to the same number of sessions and program related activities as participants in Mom and Tot TOPS.

The interventions were implemented over a time period of 3 months and over 8 group sessions. Participants were recruited from WIC clinics and the University of Maryland Pediatrics at the Harbor. Phase 1 of the TOPS program was done in Anne Arundel County, Maryland and phase 2 was done in the Baltimore City, Maryland area. The purpose of having two phases in two different areas was to allow for comparisons between urban and suburban populations. A total of 277 mother-child pairs were enrolled in the TOPS program. Data were collected from the mothers and the toddlers at baseline and later during follow up six months and twelve months after the program.

Data collection for the TOPS program has already occurred, this research study focused on the analyses of the collected data, focusing on the previously discussed research questions. As described below, the research study used regression analysis to examine the demographic variables (e.g., education level, income level, etc.) that most closely predicted parental participation to the toddler obesity prevention program. Statistical analyses were also conducted to test if the tenets of the TTM predict increased parental participation to the toddler obesity program.

Section 3.3: Data Analysis Methods and Theoretical Framework Justification

The TTM is foundational theory from which the research questions were framed. As previously noted, the TTM purports that stage of change related variables can be good predictors of dropout in behavioral change programs (DiClemente et al.,

1991). Individuals who are in the pre-contemplation stage are more likely to terminate a health behavioral intervention more quickly or not complete a behavioral intervention program (Prochaska & Norcross, 2002). Individuals who are in the contemplation stage are more likely to engage and continue with a health behavioral intervention program (Prochaska & Norcross, 2002). Individuals in the preparation stage are aware that a health problem exists and are most likely to take action toward making a positive health behavior in the next month (Prochaska & Norcross, 2002).

For research aim 1 – Were caregivers who were in the contemplation stage of change or higher (as identified by the baseline questionnaire) more likely to attend more prevention program meetings than those who have not reached the contemplation stage of change – a chi-square analysis was run to determine if there was a relationship between the baseline stage of change score and the parental participation. Due to the small sample size, parental participation was changed into a categorical variable with three categories: Low, Medium and High. Low parental participation represented 0 to 2 intervention meetings attended. Medium parental participation represented 3 to 5 intervention meetings attended. High parental participation represented 6 to 8 intervention meetings attended. It was hypothesized that individuals who were in the contemplation stage or higher at baseline had higher parental participation levels than those who were in the pre-contemplation stage at baseline. The parents in the Mom TOPS intervention group were analyzed separately from the parents in the Safe TOPS intervention group. Baseline stage of change scores for the Mom TOPS and Safe TOPS intervention groups were obtained by using data from the Physical Activity and Nutrition self-efficacy and stages of change

questionnaire and the Child Safety self-efficacy and stages of change questionnaire. Additional variables were added to the analyses from the Parenting self-efficacy and stages of change questionnaire, to see if an effect between stage of change at baseline and parental participation level existed when parenting stages of change variables were also considered. A stage of change variable was created by recoding the two questions for each intervention outcome activity. For example, caregivers could be at a contemplation level for increased physical activity, but at an action level for reading food labels. Instructions and syntax for coding stage of change variables were provided with the data set by the staff of the University of Maryland School of Medicine's Division of Growth and Nutrition.

For research aim 2 – Was there a minimum number of intervention program meetings that parents had to attend before an intervention effect or behavior change was observed, comparisons among parental participation and increases in physical activity and nutrition intervention outcomes and child safety outcomes were analyzed. Intervention outcomes were increases in positive health behaviors or decreases in negative health behaviors. The parents in the Mom TOPS intervention group were analyzed separately from the parents in the Safe TOPS intervention group. A chi-square analysis was run to determine if there was a relationship between increases (or decreases for some negative health behavior questions) in each intervention outcome measured for the parents in the Mom TOPS and Safe TOPS intervention groups and the minimum number of meetings attended. The Mom TOPS intervention parent outcomes measured were:

- Have two or more servings of vegetables a day on most days?
- Have two or more servings of fruit a day on most days?

- Drink no more than one can of soda most days?
- Drink two or more glasses of water per day on most days?
- Eat no more than one sugary snack most days?
- Eat no more than one salty or greasy snack most days?
- Read labels on your food packages?
- Workout 30 minutes or more on most days?
- Engage in moderate physical activity 30 minutes or more on most days?
- Number of sodas consumed
- Number of servings of fruit consumed
- Number of days per week you eat fast food?

The Safe TOPS intervention outcomes that will be measured were:

- How ready are you to get a car seat?
- How ready are you to have your toddler sit in a car seat every time he/she is in the car?
- How ready are you to secure cleaning supplies in cabinets with child proof latches?
- How ready are you to have a smoke alarm on each floor of your house?
- How ready are you to test all of your smoke alarms every 6 months?
- How ready are you to use gates for stairs?

For research aim 3 – is there an association of course content areas and parental change – a chi-square analysis was run to determine if there were intervention meeting content areas more associated with a more positive intervention effect. The parents in the Mom TOPS intervention group were analyzed separately from the parents in the Safe TOPS intervention group. The same intervention outcomes used in research aim 2 were also used in the analysis for this research aim.

In addition to the aforementioned research questions, I examined if there was an additional influence of closely related demographic variables and if those variables were closely related to higher levels of parental participation to toddler obesity prevention programs. The demographic variables that were tested as significant predictors of parental participation in this regression model included caregiver

race/ethnicity (Q26 on Mom Demographic Questionnaire), highest grade in school (Q30), marital status (Q31), household income (Q76), employment status (Q77), and hours of work per week (Q78).

All statistical analyses were run using the Statistical Package for the Social Sciences (SPSS). Results of the chi-square and multi-variate analyses were reported in APA format with significance levels, if applicable, at 0.05. Due to the small sample size, marginally significant findings are also noted in the text ($p < .10$)

Chapter 4: Findings

Section 4.1: Participant Demographics

The TOPS program had a total of 277 that were randomized into one of the 3 intervention groups. Ninety-four (94) participants were randomized into the Mom TOPS intervention group, ninety-two participants (92) were randomized into the Tot TOPS intervention group, and ninety-one (91) participants were randomized into the Safe TOPS group. The average age of the caregivers who participated in the intervention was 26.8 years old. Body Mass Index (BMI) level for each randomized caregiver was collected at baseline. The majority of the caregivers who were randomized into a treatment group were considered overweight (22%) or obese (50.9%). Participants were recruited from a WIC program located in Baltimore City and a WIC program in Anne Arundel county, a suburban/county region of Maryland. Over sixty percent (60.3) of the participants randomized into a treatment group were recruited from a Baltimore City WIC program while about forty percent (39.7%) were recruited from a suburban/county WIC program. The education level of the caregivers randomized into a treatment group was also recorded. Approximately twenty percent (19.1%) of the caregivers had some high school and the remaining eighty percent (80.9%) had a high school or higher level of education. Over sixty-eight percent (66.8%) of the caregivers randomized into a treatment group were living at or below the poverty line and over sixty percent (60.0%) were unemployed (See tables 1 to 7 for demographic statistics).

Table 1. Age of Caregiver Demographic Information

Participant Demographics Age of Caregiver		
Minimum	Maximum	Average
18 years	46 years	26.8 years

Table 2. BMI at Baseline Demographic Information

Participant Demographics BMI Level at Baseline	
Normal	75 (27.1%)
Overweight	61 (22.0%)
Obese	141 (50.9%)
Total	277 (100%)

Table 3. Participant Demographic Information

Baseline Participant Demographics		
City/County Residence		
Baltimore City	County	Total
167 (60.3%)	110 (39.7%)	277 (100%)
Caregiver High School Education		
Some High School	High School Graduate or Higher	Total
167 (60.3%)	110 (39.7%)	277 (100%)
Living At Or Below Poverty Line		
Below Poverty Line	Above Poverty Line	Total
185 (66.8)	85 (30.7%)	277 (100%)
Caregiver Employment Status		
Unemployed	Employed	Total
165 (59.6%)	110 (39.7%)	275 (99.3%)

Table 4. Intervention Type Information

Intervention Participation Demographics Intervention Type		
Intervention Type	Frequency	Percentage
Mom TOPS	94	33.9%
Tot TOPS	92	33.2%
Safe TOPS	91	32.9%
TOTAL	277	100%

Table 5. Total Lessons Attended Information

Intervention Participation Demographics Percentage of Total # of Lessons Attended by TOPS Participants		
Total # of Lessons	Frequency	Percentage
0	81	29.2%
1	19	6.9%
2	17	6.1%
3	11	4.0%
4	8	2.9%
5	21	7.6%
6	28	10.1%
7	37	13.4%
8	55	19.9%
TOTAL	277	100%

Table 6. Total Number of Lessons Attended by Randomization Group

Total Number of Lessons Attended by Randomization Group				
	Randomization Group			
	Safe Tops	Mom Tops	Tot Tops	
Total # of Lessons				TOTAL
0	26	27	28	81
1	5	8	6	19
2	7	7	3	17
3	4	2	5	11
4	3	4	1	8
5	7	8	6	21
6	8	10	10	28
7	15	15	7	37
8	16	13	26	55
TOTAL	91	94	92	277

Table 7. Percentage of Total Lessons Attended by Randomization Group

Percentage of Lessons Attended by Randomization Group			
Total # of Lessons	Randomization Group		
	Safe Tops	Mom Tops	Tot Tops
0	28.6%	28.7%	30.4%
1	5.5%	8.5%	6.5%
2	7.7%	7.4%	3.3%
3	4.4%	2.1%	5.4%
4	3.3%	4.3%	1.1%
5	7.7%	8.5%	6.5%
6	8.8%	10.6%	10.9%
7	16.5%	16.0%	7.6%
8	17.6%	13.8%	28.3%
TOTAL	100%	100%	100%

4.2: General Information of Participants Relating to Intervention Participation

Overall participation in program intervention meetings was low. Almost 30% of participants attended zero (0) program intervention meetings. Approximately 20% of participants attended all eight (8) program intervention meetings. (See table D5 for percentages of total number of meetings attended).

4.3: Research Aim #1 Findings

The first research aim focused on examining whether caregivers who are in the action stage of change or higher (as identified by the baseline questionnaire) were more likely to attend more prevention program meetings than those who have not reached the action stage of change – a chi-square analysis was run to determine if there is a relationship between the baseline stage of change score and the level parental participation. Parental participation was recoded into a categorical variable with two categories: Low and High.

Stage of change for each participant was measured separately for several different activities. Chi-square analyses were performed to examine if there was a relationship between stage of change of parents in the Mom TOPS intervention group and parental participation level. Results for each analysis for each variable are reported in table 8 and table 9.

As discussed in Chapter 3, I intended to analyze the stage-of-change at the contemplation stage or higher. As the majority of participants were at the action stage, particularly for activities related to their children, cell counts were too small to use contemplation as the cut point. Cell counts were also too small for using the preparation stage; therefore, I used the action stage as the cutoff point. I had also intended to analyze the level of participation as low, medium or high, but due to small cell counts, this was recategorized to low or high. For results reported below, only relationships that show a significance level of .05 have p-values listed. Relationships that are marginally significant are discussed in the text as well.

Table 8. Mom TOPS Randomization Group Chi-Square Results for Relationship Between Baseline Stage of Change and Parental Participation Level

Stage of Change Outcome Variable	Action Stage of Change or Higher	Level of Parental Participation				Missing		χ^2
		Low		High				
		n	%	n	%	n	%	
Eating 2+ Vegetable Servings	Yes	30	42.3%	41	57.7%	2	2.1%	2.514 ^a
	No	13	61.9%	8	38.1%			
Eating 2+ Fruit Servings	Yes	35	44.4%	39	52.7%	2	2.1%	0.047 ^a
	No	8	54.5%	10	55.6%			
Eating no more than one salty or greasy snack	Yes	24	42.1%	33	57.9%	4	4.3%	0.746 ^a
	No	17	51.5%	16	48.5%			
Consuming no more than one sugary snack	Yes	25	43.9%	32	56.1%	6	6.4%	0.166 ^a
	No	15	48.4%	16	51.6%			
Choosing small or medium fast food	Yes	34	45.3%	41	54.7%	6	6.4%	0.212 ^a
	No	5	38.5%	8	61.5%			
Drinking more than two glasses of water	Yes	35	45.5%	42	54.5%	2	2.1%	0.313 ^a
	No	8	53.3%	7	46.7%			
Consuming no more than one soda	Yes	28	48.3%	30	51.7%	5	5.3%	0.327 ^a
	No	13	41.9%	18	58.1%			
Reading labels on food packages	Yes	26	44.1%	33	55.9%	2	2.1%	0.472 ^a
	No	17	51.5%	16	48.5%			
Engaging in moderate physical activity	Yes	39	48.1%	42	51.9%	2	2.1%	0.540 ^a
	No	4	36.4%	7	63.6%			
Working out thirty minutes of more	Yes	22	47.8%	24	52.2%	2	2.1%	0.044 ^a
	No	21	45.7%	25	54.3%			
Eating with toddler most days	Yes	42	46.7%	48	53.3%	2	2.1%	0.009 _{lr}
	No	1	50.0%	1	50.0%			
Giving child fruits and vegetables everyday	Yes	42	49.4%	43	50.6%	2	2.1%	3.583 _{lr}
	No	1	14.3%	6	85.7%			
Avoiding using food as a reward	Yes	35	50.7%	34	49.3%	3	3.2%	1.380 ^a
	No	8	36.4%	14	63.6%			
Avoiding bribing or forcing child to eat	Yes	40	47.6%	44	52.4%	2	2.1%	0.304 _{lr}
	No	3	37.5%	5	62.5%			
Child seeing the caregiver eat fruits and vegetables everyday	Yes	35	48.6%	37	51.4%	3	3.2%	0.255 ^a
	No	8	42.1%	11	57.9%			
Engaging in physical activity with child most days	Yes	42	48.3%	45	51.7%	2	2.1%	1.639 _{lr}
	No	1	20.0%	4	80.0%			
Using encouragement instead of criticism with your toddler	Yes	40	44.9%	49	55.1%	2	2.1%	4.679 _{lr} **
	No	3	100.0 %	0	0.0%			
Playing or reading with child everyday	Yes	43	46.7%	49	53.3%	2	2.1%	N/A*
	No	--	--	--	--			
Keeping a daily routine for the child most days	Yes	40	48.2%	43	51.8%	2	2.1%	0.736 _{lr}
	No	3	33.3%	6	66.7%			
Making rules and following through	Yes	42	48.3%	45	51.7%	2	2.1%	1.639 _{lr}
	No	1	20.0%	4	80.0%			
Child sitting in a car seat	Yes	43	48.3%	46	51.7%	4	4.3%	1.310 _{lr}
	No	0	0.0%	1	100.0%			

*--No statistics computed because no one reported being in a stage below precontemplation for this variable.

**-- Statistically significant association between variables

a—Pearson chi-square reported; no cell count assumptions violated

lr—Likelihood ratio reported; cell count assumptions violated

Table 9. Safe TOPS Randomization Group Chi-Square Results for Relationship Between Baseline Stage of Change and Parental Participation Level

Stage of Change Outcome Variable	Action Stage of Change or Higher	Level of Parental Participation				Missing		χ^2
		Low		High				
		n	%	n	%	n	%	
Eating 2+ Vegetable Servings	Yes	27	40.9%	39	59.1%	3	3.3%	3.425 ^a
	No	14	63.6%	8	36.4%			
Eating 2+ Fruit Servings	Yes	33	45.8%	39	54.2%	2	2.2%	0.008 ^a
	No	8	47.1%	9	52.9%			
Eating no more than one salty or greasy snack	Yes	23	37.7%	38	62.3%	5	5.5%	6.542 ^{a**}
	No	17	68.0%	8	32.0%			
Consuming no more than one sugary snack	Yes	25	52.1%	23	47.9%	5	5.5%	1.356 ^a
	No	15	39.5%	23	60.5%			
Choosing small or medium fast food	Yes	31	44.3%	39	55.7%	5	5.5%	0.749 ^a
	No	9	56.3%	7	43.8%			
Drinking more than two glasses of water	Yes	35	44.3%	44	55.7%	2	2.2%	0.879 _{lr}
	No	6	60.0%	4	40.0%			
Consuming no more than one soda	Yes	30	47.6%	33	52.4%	5	5.5%	0.000 ^a
	No	11	47.8%	12	52.2%			
Reading labels on food packages	Yes	27	41.5%	38	55.9%	3	3.3%	2.551 ^a
	No	14	60.9%	9	48.5%			
Engaging in moderate physical activity	Yes	37	46.3%	43	53.8%	2	2.2%	0.011 _{lr}
	No	4	44.4%	5	55.6%			
Working out thirty minutes of more	Yes	16	41.0%	23	59.0%	3	3.3%	0.554 ^a
	No	23	49.0%	25	51.0%			
Eating with toddler most days	Yes	40	45.5%	48	54.5%	2	2.2%	1.563 _{lr}
	No	1	100.0 %	0	0.0%			
Giving child fruits and vegetables everyday	Yes	40	47.1%	45	52.9%	2	2.2%	0.790 _{lr}
	No	1	25.0%	3	75.0%			
Avoiding using food as a reward	Yes	32	48.5%	34	51.5%	3	3.3%	0.381 ^a
	No	9	40.9%	13	59.1%			
Avoiding bribing or forcing child to eat	Yes	32	48.5%	34	51.5%	2	2.2%	0.381 ^a
	No	9	40.9%	13	59.1%			
Child seeing the caregiver eat fruits and vegetables everyday	Yes	35	45.5%	42	54.5%	4	4.4%	0.752 _{lr}
	No	6	60.0%	4	40.0%			
Engaging in physical activity with child most days	Yes	39	45.3%	47	54.7%	2	2.2%	0.534 _{lr}
	No	2	66.7%	1	33.3%			
Using encouragement instead of criticism with your toddler	Yes	41	46.6%	47	53.4%	3	3.3%	N/A*
	No	--	--	--	--			
Playing or reading with child everyday	Yes	40	46.0%	47	54.0%	2	2.2%	0.013 _{lr}
	No	1	50.0%	1	50.0%			
Keeping a daily routine for the child most days	Yes	37	48.7%	39	51.3%	3	3.3%	0.981 ^a
	No	4	33.3%	8	66.7%			
Making rules and following through	Yes	40	46.0%	47	54.0%	3	3.3%	1.541 _{lr}
	No	1	100.0 %	0	0.0%			
Child sitting in a car seat	Yes	39	46.4%	45	53.6%	5	5.5%	0.010 _{lr}
	No	1	50.0%	1	50.0%			

*--No statistics computed because no one reported being in a stage below contemplation (precontemplation) for this variable.

**-- Statistically significant association between variables

4.3.1: Analyses for Stage of Change for 2+ Vegetable Servings Variable

There was a marginally significant association between the level of parental participation within the Mom TOPS intervention group and eating more than two vegetable servings. For participants in the Safe TOPS randomization group, the relationship between the stage of change variable for eating more than two vegetable servings and level of parental participation approached significance. This indicates that the participant's stage of change for eating more than two vegetable servings variable has a minimal impact on the level of parental participation.

4.3.2: Analyses for Stage of Change for No More Than One Salty or Greasy Snack Variable

There was no significant association between the level of parental participation within the Mom TOPS intervention group and this activity. There was a significant association between the level of parental participation and eating no more than one salty or greasy snack within the Safe TOPS intervention group, $\chi^2 (1, n = 86) = 6.542, p = 0.011$. This indicates that for those in the Safe TOPS intervention group, the participant's stage of change for eating no more than one salty or greasy snack has an association with the level of parental participation.

4.3.3: Analyses for Stage of Change for Engaging in Moderate Physical Activity Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for engaging in moderate physical activity. This indicates

that the participant's stage of change for engaging in moderate physical activity does not have an impact on the level parental participation.

4.3.4: Analyses for Stage of Change for 2+ Fruit Servings Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for eating more than two fruit servings. This indicates that the participant's stage of change for eating more than two fruit servings does not have an impact on the level parental participation.

4.3.5: Analyses for Stage of Change for Choosing Small or Medium Fast Food Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for choosing small or medium fast food. This indicates that the participant's stage of change for choosing small or medium fast food does not have an impact on the level parental participation.

4.3.6: Analyses for Stage of Change for Reading Labels on Food Packages Variable

There was no significant association between the level of parental participation within the Mom TOPS intervention group and the stage of change variable for reading labels on food packages. For participants in the Safe TOPS randomization on group, the relationship between the stage of change variable and level of parental participation approached significance. This indicates that the participant's stage of change for reading labels on food packages has a minimal

impact on the level parental participation for participants in the Safe TOPS intervention group.

4.3.7: Analyses for Stage of Change for Working Out Thirty Minutes or More Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for working out thirty minutes or more. This indicates that the participant's stage of change for working out thirty minutes or more does not have an impact on the level parental participation.

4.3.8: Analyses for Stage of Change for Drinking 2+ Glasses of Water Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for drinking more than two glasses of water. This indicates that the participant's stage of change for drinking more than two glasses of water does not have an impact on the level parental participation.

4.3.9: Analyses for Stage of Change for No More Than One Soda Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for consuming no more than one soda. This indicates that the participant's stage of change for consuming no more than one soda does not have an impact on the level parental participation.

4.3.10: Analyses for Stage of Change for Playing or Reading with Child Everyday Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for playing or reading with their child every day. This indicates that the participant's stage of change for playing or reading with their child every day does not have an impact on the level parental participation.

4.3.11: Analyses for Stage of Change for Avoiding Bribing or Forcing Child to Eat Variable

There was no significant association between the level of parental participation and the stage of change variable for avoiding bribing or forcing their child to eat within the Mom TOPS or the Safe TOPS randomization groups. This indicates that the participant's stage of change for avoiding bribing or forcing their child to eat does not have an impact on the level parental participation.

4.3.12: Analyses for Stage of Change for Keeping A Daily Routine for Child Most Days Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for keeping a daily routine for their child most days. This indicates that the participant's stage of change for keeping a daily routine for their child most does not have an impact on the level parental participation.

4.3.13: Analyses for Stage of Change for Eating with Toddler Most Days Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for eating with their toddler most days. This indicates that the participant's stage of change for eating with their toddler most days does not have an impact on the level parental participation.

4.3.14: Analyses for Stage of Change for Using Encouragement Instead of Criticism with Toddler Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for using encouragement instead of criticism with your toddler. This indicates that the participant's stage of change for using encouragement instead of criticism with your toddler does not have an impact on the level parental participation.

4.3.15: Analyses for Stage of Change for Child Seeing Caregiver Eat Fruits and Vegetables Everyday Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for the child seeing their caregiver eat fruits and vegetables every day. This indicates that the participant's stage of change for the child seeing their caregiver eat fruits and vegetables every day does not have an impact on the level parental participation.

Subsection 4.3.16: Stage of Change for Avoiding Using Food as A Reward Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for avoiding using food as a reward. This indicates that the participant's stage of change for avoiding using food as a reward does not have an impact on the level parental participation.

4.3.17: Stage of Change for Making Rules and Following Through Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for making rules and following through. This indicates that the participant's stage of change for making rules and following through does not have an impact on the level parental participation.

4.3.18: Stage of Change for Engaging in Physical Activity with Child Most Days Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for engaging in physical activity with your child most days. This indicates that the participant's stage of change for engaging in physical activity with their child most days does not have an impact on the level parental participation.

4.3.19: Stage of Change for Giving Child Fruits and Vegetables Everyday Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the

stage of change variable for giving their child fruits and vegetables every day. This indicates that the participant's stage of change for giving their child fruits and vegetables every day does not have an impact on the level parental participation.

Subsection 4.3.20: Stage of Change for Child Sitting in A Car Seat Variable

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for making sure their child sits in a car seat. This indicates that the participant's stage of change for making sure their child sits in a car seat does not have an impact on the level parental participation.

4.3.21: Stage of Change for Consuming No More Than One Sugary Snack

There was no significant association between the level of parental participation within the Mom TOPS or the Safe TOPS randomization groups and the stage of change variable for consuming no more than one sugary snack. This indicates that the participant's stage of change for consuming no more than one sugary snack does not have an impact on the level parental participation.

4.3.22: Additional Stage of Change Analyses Performed

As previously discussed, the first round of stage of change analyses performed focused on parents in both the Mom TOPS and the Safe TOPS intervention groups who were in the contemplation stage or higher at baseline. This yielded low cell counts for the analyses performed to see if there was a relationship between parents who were in the precontemplation or the contemplation stage of change and level of parental participation. A second round of analyses were performed focused on

parents who were in the precontemplation, contemplation, or the preparation stage of change at baseline and if these parents attended more intervention meetings.

Analyses of the relationship between parents who were in either the precontemplation, contemplation, or the preparation stage and level of parental participation did not yield any significant results although cell counts for the analyses of the relationships between these did increase. Results for the relationship between parents in the action stage of change or higher and the relationship between level of parental participation are reported. Tables 10 and 11 show the distribution of the change of change for each activity at baseline for participants in the Mom TOPS and Safe TOPS intervention groups.

Table 10. Mom TOPS Randomization Total Number of Participants by Stage of Change

Stage of Change Outcome Variable	Stage of Change									
	Precontemplation		Contemplation		Preparation		Action		Maintenance	
	n	%	n	%	n	%	n	%	n	%
Eating 2+ Vegetable Servings	3	3.3%	10	10.9%	8	8.7%	17	18.5%	54	58.7%
Eating 2+ Fruit Servings	3	3.3%	8	8.7%	7	7.6%	18	19.6%	56	60.9%
Eating no more than one salty or greasy snack	12	13.3%	15	16.7%	6	6.7%	13	14.4%	44	48.9%
Consuming no more than one sugary snack	5	5.7%	13	14.8%	13	14.8%	15	17.0%	42	47.7%
Choosing small or medium fast food	7	8.0%	2	2.3%	4	4.5%	14	15.9%	61	69.3%
Drinking more than two glasses of water	2	2.2%	3	3.3%	10	10.9%	16	17.4%	61	66.3%
Consuming no more than one soda	13	14.6%	13	14.6%	5	5.6%	11	12.4%	47	52.8%
Reading labels on food packages	12	13.0%	12	13.0%	9	9.8%	23	25.0%	36	39.1%
Engaging in moderate physical activity	2	2.2%	6	6.5%	3	3.3%	18	19.6%	63	68.5%
Working out thirty minutes of more	10	10.9%	20	21.7%	16	17.4%	25	27.2%	21	22.8%
Eating with toddler most days	0	0.0%	2	2.2%	0	0.0%	4	4.3%	86	93.5%
Giving child fruits and vegetables everyday	0	0.0%	3	3.3%	4	4.3%	10	10.9%	75	81.5%
Avoiding using food as a reward	3	3.3%	7	7.7%	12	13.2%	69		91.3%	
Avoiding bribing or forcing child to eat	1	1.1%	4	4.3%	3	3.3%	84		91.3%	
Child seeing the caregiver eat fruits and vegetables everyday	1	1.1%	7	7.7%	11	12.1%	14	15.4%	58	63.7%
Engaging in physical activity with child most days	1	1.1%	4	4.3%	0	0.0%	17	18.5%	70	76.1%
Using encouragement instead of criticism with your toddler	1	1.1%	1	1.1%	1	1.1%	9	9.8%	80	87.0%
Playing or reading with child everyday	0	0.0%	0	0.0%	0	0.0%	8	8.7%	84	91.3%
Keeping a daily routine for the child most days	2	2.2%	3	3.3%	4	4.3%	14	15.2%	69	75.0%
Making rules and following through	0	0.0%	2	2.2%	3	3.3%	18	19.6%	69	75.0%
Child sitting in a car seat	0	0.0%	1	1.1%	0	0.0%	8	8.9%	81	90.0%

Table 11. Safe TOPS Randomization Total Number of Participants by Stage of Change

Stage of Change Outcome Variable	Stage of Change									
	Precontemplation		Contemplation		Preparation		Action		Maintenance	
	n	%	n	%	n	%	n	%	n	%
Eating 2+ Vegetable Servings	1	1.1%	10	11.4%	11	12.5%	16	18.2%	50	56.8%
Eating 2+ Fruit Servings	1	1.1%	6	6.7%	10	11.2%	16	18.0%	56	62.9%
Eating no more than one salty or greasy snack	8	9.3%	7	8.1%	10	11.6%	14	16.3%	47	54.7%
Consuming no more than one sugary snack	9	10.5%	11	12.8%	18	20.9%	10	11.6%	38	44.2%
Choosing small or medium fast food	7	8.1%	3	3.5%	6	7.0%	9	10.5%	61	70.9%
Drinking more than two glasses of water	2	2.2%	2	2.2%	6	6.7%	16	18.0%	63	70.8%
Consuming no more than one soda	8	9.3%	7	8.1%	8	9.3%	13	15.1%	50	58.1%
Reading labels on food packages	9	10.2%	11	12.5%	3	3.4%	21	23.9%	44	50.0%
Engaging in moderate physical activity	0	0.0%	4	4.5%	5	5.6%	18	20.2%	63	69.7%
Working out thirty minutes of more	12	13.6%	16	18.2%	21	23.9%	18	20.5%	21	23.9%
Eating with toddler most days	0	0.0%	0	0.0%	1	1.1%	9	10.1%	79	88.8%
Giving child fruits and vegetables everyday	0	0.0%	2	2.2%	2	2.2%	9	10.1%	76	85.4%
Avoiding using food as a reward	3	3.3%	4	4.5%	15	17.0%	66		72.5%	
Avoiding bribing or forcing child to eat	2	2.2%	4	4.5%	5	5.6%	78		87.6%	
Child seeing the caregiver eat fruits and vegetables everyday	1	1.1%	4	4.6%	5	5.7%	13	14.9%	64	73.6%
Engaging in physical activity with child most days	0	0.0%	1	1.1%	2	2.2%	16	18.0%	70	78.7%
Using encouragement instead of criticism with your toddler	0	0.0%	0	0.0%	0	0.0%	7	8.0%	81	92.0%
Playing or reading with child everyday	0	0.0%	0	0.0%	2	2.2%	11	12.4%	76	85.4%
Keeping a daily routine for the child most days	1	1.1%	3	3.4%	8	9.1%	15	17.0%	61	69.3%
Making rules and following through	0	0.0%	1	1.1%	0	0.0%	21	23.9%	66	72.5%
Child sitting in a car seat	0	0.0%	0	0.0%	2	2.3%	2	2.3%	82	95.3%

4.4: Research Aim #2 Findings

The second research aim focused on whether there is an association between the minimum number of intervention program meetings caregivers must attend before an intervention effect or behavior change is observed. The intervention included a total of five in-person lessons and three goal-setting telephone sessions. Intervention effect outcomes are defined as increases in positive health behaviors or decreases in negative health behaviors.

Intervention effect outcomes were measured separately for several different activities. Chi-square analyses were performed to examine if there was a minimum number of total lessons attended for parents who experienced change in behavior from baseline to the Time 2 intervention effect outcome measurement (questionnaire given about 6 months after baseline). Due to the small number of participants who filled out the questionnaire about 12 months after baseline, the intervention effect outcome was calculated using baseline and Time 2 data.

Parents in the Mom TOPS group and parents in the Safe TOPS group were analyzed separately. For the first set of outcome variables analyzed, recoded outcome variables were created. The outcome variable was coded as 'Yes' if the participant had an increase in effect for this variable from baseline to Time 2. Outcome effect increase was determined by identifying which participants moved from '0' (No I don't do this) to '1' (Yes I have been doing this for a long time), moved from '0' to '2' (Yes I've started doing this recently), or moved from '1' to '2' between baseline to Time 2. If the difference between Time 2 and baseline was greater than zero, the recoded variable was labeled as 'Yes'. If the difference between Time 2 and baseline

was not greater than zero, the recoded variable was labeled as ‘No’. Below is a list of the correctly named variables that were coded using the aforementioned procedures:

1. Eat no more than one sugary snack most days;
2. Read labels on food packages;
3. Have two or more servings of vegetables a day on most days;
4. Have two or more servings of fruit a day on most days;
5. Drink no more than one can of soda on most days;
6. Drink two or more glasses of water per day on most days;
7. Eat no more than one salty or greasy snack most days;
8. Workout 30 minutes or more on most days;
9. Engage in moderate physical activity thirty minutes or more on most days;
10. Number of servings of fruit consumed per day on most days;
11. How ready are you to get a car seat;
12. How ready are you to have your toddler sit in a car seat every time he/she is in the car;
13. How ready are you to secure cleaning supplies in cabinets with child proof latches;
14. How ready are you to have a smoke alarm on each floor of your house;
15. How ready are you to test all of your smoke alarms every 6 months;
16. How ready are you to use gates for stairs?

For the second set of outcome variables analyzed recoded outcome variables were created. Outcome effect decrease was determined first by identifying which participants had a decrease in the outcome effect between baseline and Time 2 by obtaining the difference between Time 2 and baseline. Next, by determining if that difference was less than the amount that was reported for the variable for Time 2. If the difference between Time 2 and baseline was less than what was reported for the variable for Time 2 (a positive number), the outcome effect decrease recoded variable was code as ‘Yes’. The outcome effect decrease variable was coded as ‘No’ if the participant did not have a decrease in the outcome effect for the variable between baseline and Time 2 (0 or a negative number).

Below is a list of the variables that were coded using the aforementioned procedures:

1. Number of sodas consumed;
2. Number of days per week you eat fast food

Results for each analysis for each variable are reported in table 12 and table

13. The intervention effect outcomes that were child-focused activities had too few responses from participants at baseline and 6 months after the intervention to conduct an analysis. Outcomes were missing for between 80% and 99% of respondents. Due to the small number of participant responses, an intervention outcome decrease/increase could not be calculated and are not reported below.

Table 12. Mom TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Parental Participation Level

Intervention Outcome Variable	Intervention Effect Outcome Increase/Decrease	Level of Parental Participation						χ^2
		Low		x		High		
		n	%	n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	3	20.0%	2	13.3%	10	66.7%	4.269
	No	14	29.2%	9	18.8%	25	52.1%	
Increase for number of servings of fruit per day on most days	Yes	3	60.0%	1	20.0%	1	20.0%	1.717
	No	7	18.4%	7	18.4%	24	63.2%	
Increase for eating no more than one greasy/salty snack	Yes	6	35.3%	3	17.6%	8	47.1%	1.147
	No	10	22.2%	8	17.8%	27	60.0%	
Increase for ready to eat no more than one sugary snack	Yes	4	26.7%	3	20.0%	8	53.3%	0.095
	No	12	25.5%	8	17.0%	27	57.4%	
Decrease for days per week you eat fast food	Yes	5	26.3%	4	21.1%	10	52.6%	0.241
	No	12	27.3%	7	15.9%	25	56.8%	
Increase for drinking no more than one soda per day	Yes	5	29.4%	3	17.6%	9	52.9%	0.728
	No	8	34.8%	2	8.7%	13	56.5%	
Decrease for number of sodas consumed per day	Yes	0	0.0%	0	0.0%	2	100.0%	1.632
	No	3	37.5%	0	0.0%	5	62.5%	
Increase for drinking 2+ glasses of water most days	Yes	3	27.3%	1	9.1%	7	63.6%	0.778
	No	14	26.9%	10	19.2%	28	53.8%	
Increase for reading labels on food packages	Yes	1	9.1%	3	27.3%	7	63.6%	2.826
	No	16	30.8%	8	15.4%	28	53.8%	
Increase for moderate physical activity 30 minutes or more	Yes	2	18.2%	2	18.2%	7	63.6%	0.578
	No	15	28.8%	9	17.3%	28	58.8%	
Increase for working out 30 minutes or more most days	Yes	4	26.7%	2	13.3%	9	60.0%	0.329
	No	13	27.7%	9	19.1%	25	53.2%	
Increase for ready to have toddler sit in car seat	Yes	0	0.0%	0	0.0%	1	100.0%	3.819
	No	0	0.0%	2	100.0 %	0	0.0%	
Increase for ready to secure cleaning supplies in cabinet	Yes	0	0.0%	0	0.0%	1	100.0%	2.209
	No	3	42.9%	2	28.6%	2	28.6%	
Increase for ready to use gates for stairs	Yes	0	0.0%	1	50.0%	1	50.0%	2.092
	No	6	26.1%	3	13.0%	14	60.9%	
Increase for have smoke alarms on each floor of house	Yes	0	0.0%	0	0.0%	0	0.0%	N/A*
	No	0	0.0%	0	0.0%	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	1	33.3%	0	0.0%	2	66.7%	1.632
	No	4	33.3 %	3	25.0 %	5	0.0%	

*No statistics computed due to lack of participant responses for the variable.

Table 13. Safe TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Parental Participation Level

Intervention Outcome Variable	Intervention Effect Outcome Increase/Decrease	Level of Parental Participation						χ^2
		Low		Medium		High		
		n	%	n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	3	30.0%	0	0.0%	7	70.0%	3.394
	No	13	27.7%	8	17.0%	26	55.3%	
Increase for number of servings of fruit per day on most days	Yes	2	20.6%	1	10.0%	7	70.0%	1.475
	No	12	34.3%	6	17.1%	17	48.6%	
Increase for eating no more than one greasy/salty snack	Yes	5	33.3%	1	6.7%	9	60.0%	0.796
	No	11	26.8%	6	14.6%	24	58.5%	
Increase for ready to eat no more than one sugary snack	Yes	5	29.4%	2	11.8%	10	58.8%	0.111
	No	11	27.5%	6	15.0%	23	57.5%	
Decrease for days per week you eat fast food	Yes	4	25.0%	1	6.3%	11	68.8%	1.800
	No	12	30.0%	7	17.5%	21	52.5%	
Increase for drinking no more than one soda per day	Yes	4	28.6%	2	14.3%	8	57.1%	0.218
	No	10	33.3%	3	10.0%	7	56.7%	
Decrease for number of sodas consumed per day	Yes	0	0.0%	0	0.0%	0	0.0%	N/A*
	No	0	0.0%	0	0.0%	0	0.0%	
Increase for drinking 2+ glasses of water most days	Yes	2	26.8%	0	0.0%	5	71.4%	2.334
	No	14	28.0%	8	16.8%	28	56.0%	
Increase for reading labels on food packages	Yes	2	33.3%	1	16.7%	3	50.0%	0.170
	No	14	27.5%	7	13.7%	30	58.8%	
Increase for moderate physical activity 30 minutes or more	Yes	3	33.3%	1	11.1%	5	55.6%	0.197
	No	13	26.5%	7	14.3%	29	59.2%	
Increase for working out 30 minutes or more most days	Yes	6	37.5%	3	18.8%	7	43.8%	1.811
	No	10	24.4%	5	12.2%	26	63.4%	
Increase for ready to have toddler sit in car seat	Yes	1	50.0%	0	0.0%	1	50.0%	N/A*
	No	0	0.0%	0	0.0%	0	0.0%	
Increase for ready to secure cleaning supplies in cabinet	Yes	0	0.0%	0	0.0%	0	0.0%	N/A*
	No	1	33.3%	1	33.3%	1	33.3%	
Increase for ready to use gates for stairs	Yes	0	0.0%	0	0.0%	0	0.0%	N/A*
	No	7	38.9%	2	11.1%	9	50.0%	
Increase for have smoke alarms on each floor of house	Yes	0	0.0%	0	0.0%	1	100.0%	2.773
	No	1	100.0%	0	0.0%	0	0.0%	
Increase for ready to test smoke alarms every 6 months	Yes	0	0.0%	0	0.0%	1	100.0%	1.498
	No	3	33.3%	2	22.2%	4	44.4%	

4.4.1: Intervention Effect Outcome for Eating No More Than One Sugary Snack

Most Days Variable

A recoded variable for increase in outcome for eating no more than one sugary snack most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for eating no more than one sugary snack most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for eating no more than one sugary snack most days.

4.4.2: Intervention Effect Outcome for Reading Labels on Your Food Packages

Variable

A recoded variable for increase in outcome for reading labels on your food packages was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for reading labels on your food packages and level of parental participation within the Safe TOPS randomization group. There was a marginally significant association between the intervention outcome effect and level of parental participation for the Mom TOPS randomization group. This indicates there is a minimal relationship between the minimum number of meetings a Safe TOPS randomization group parents

need to attend and the intervention outcome effect for reading labels on food packages.

4.4.3: Intervention Effect Outcome for Having Two or More Servings of Vegetables Per Day on Most Days Variable

A recoded variable for increase in outcome for having two or more servings of vegetables per day on most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for having two or more servings of vegetables per day on most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for having two or more servings of vegetables per day on most days.

4.4.4: Intervention Effect Outcome for Having Two or More Servings of Fruit Per Day on Most Days Variable

A recoded variable for increase in outcome for having two or more servings of fruit per day on most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was a marginally significant association between the intervention effect outcome for having two or more servings of fruit per day on most days and level of parental participation within the Mom TOPS randomization group. There was no

significant association between the intervention effect outcome and level of parental participation for participants in the Safe TOPS randomization group. This indicates there is a minimal association with the relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for having two or more servings of fruit per day on most days for participants in the Mom TOPS randomization group.

4.4.5: Intervention Effect Outcome for Drinking No More Than One Soda Per Day on Most Days Variable

A recoded variable for increase in outcome for drinking no more than one can of soda per day on most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for drinking no more than one can of soda per day most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for drinking no more than one can of soda per day most days.

4.4.6: Intervention Effect Outcome for Drinking Two or More Glasses of Water Per Day on Most Days Variable

A recoded variable for increase in outcome for drinking two or more glasses of water per day on most days was created for this analysis. Chi-square analysis was

run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for drinking two or more glasses of water per day on most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for drinking two or more glasses of water per day on most days.

4.4.7: Intervention Effect Outcome for Eating No More Than One Salty or Greasy Snack Per Day on Most Days Variable

A recoded variable for increase in outcome for eating no more than one salty or greasy snack per day on most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for eating no more than one salty or greasy snack per day on most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for eating no more than one salty or greasy snack per day on most days.

4.4.8: Intervention Effect Outcome for Working Out for Thirty Minutes or More Per Day on Most Days Variable

A recoded variable for increase in outcome for working out for thirty minutes or more per day on most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for working out for thirty minutes or more per day on most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for working out for thirty minutes or more per day on most days.

4.4.9: Intervention Effect Outcome for Engaging in Moderate Physical Activity for Thirty Minutes or More Per Day on Most Days

A recoded variable for increase in outcome for engaging in moderate physical activity for thirty minutes or more per day on most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for engaging in moderate physical activity for thirty minutes or more per day on most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum

number of meetings a parent needs to attend and the intervention outcome effect for engaging in moderate physical activity for thirty minutes or more per day on most days.

4.4.10: Intervention Effect Outcome for Number of Servings of Fruit Consumed Per Day on Most Days Variable

A recoded variable for increase in outcome for the number of servings of fruit consumed per day on most days was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for number of servings of fruit consumed per day on most days and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for the number of servings of fruit consumed per day on most days.

4.4.11: Intervention Effect Outcome for Number of Sodas Consumed Variable

A recoded variable for decrease in outcome for number of sodas consumed was created for this analysis. Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this variable. Eighteen Safe TOPS participants reported the number of sodas consumed at baseline and nine Safe TOPS participants reported the number of sodas consumed 6 months after baseline. The participants who responded did not show a

decrease or change in the reported number of sodas consumed between baseline and Time 2.

Chi-square analysis was run for the Mom TOPS intervention group to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation. There was no significant association between the intervention effect outcome for number of sodas consumed and level of parental participation within the Mom TOPS randomization group. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome effect for decreased number of sodas consumed.

4.4.12: Intervention Effect Outcome for Number of Days Per Week You Eat Fast Food Variable

A recoded variable for decrease in outcome for number of days per week you eat fast food was created for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the level of parental participation.

There was no significant association between the intervention effect outcome for number of days per week you eat fast food and level of parental participation within the Mom TOPS or Safe TOPS randomization groups. This indicates there is no relationship between the minimum number of meetings a parent needs to attend and the intervention outcome for decrease in the number of days per week you eat fast food.

4.5: Research Aim #3 Findings

The third research aim focused on whether there is an association between the content for each intervention meeting and intervention outcome increase/decrease. There was a total of five meetings with intervention content. The parents in the Mom TOPS intervention group and the Safe TOPS intervention group were analyzed separately. Chi-square analyses were performed to examine if there was a relationship between intervention outcome increase/decrease and lesson content for each randomization group (Safe TOPS or Mom TOPS). Results for each analysis for each variable are reported in table 14 through table 23.

4.5.1: Intervention Effect Outcome for Eating No More Than One Sugary Snack Most Days Variable

The recoded variable for increase in outcome for eating no more than one sugary snack most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.1.1: Intervention Effect Outcome for Eating No More Than One Sugary Snack Most Days – Lesson 1 Content

There was no significant association between the intervention effect outcome for eating no more than one sugary snack on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for eating no more than one sugary snack on most days for those

randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

Table 14. Safe TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 1 Content

Intervention Outcome Variable	Lesson 1 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	8	19.5%	33	80.5%	0.413
	No	2	12.5%	14	87.5%	
Increase for number of servings of fruit per day on most days	Yes	8	25.8%	23	74.2%	0.787
	No	2	14.3%	12	85.7%	
Increase for eating 2+ servings of vegetables per day	Yes	8	19.5%	33	80.5%	1.555
	No	1	6.7%	14	93.3%	
Increase for eating no more than one greasy/salty snack	Yes	10	24.4%	31	75.6%	0.436
	No	5	33.3%	10	66.7%	
Increase for ready to eat no more than one sugary snack	Yes	11	26.8%	30	73.2%	0.611
	No	6	37.5%	10	62.5%	
Decrease for days per week you eat fast food	Yes	9	22.5%	31	77.5%	2.423
	No	7	43.8%	9	56.3%	
Increase for drinking no more than one soda per day	Yes	9	29.0%	22	71.0%	0.369
	No	5	38.5%	8	61.5%	
Decrease for number of sodas consumed per day	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for drinking 2+ glasses of water most days	Yes	5	12.2%	36	87.8%	0.001
	No	2	12.5%	14	87.5%	
Increase for reading labels on food packages	Yes	3	7.3%	38	92.7%	1.453
	No	3	18.8%	13	81.3%	
Increase for moderate physical activity 30 minutes or more	Yes	5	11.9%	37	88.1%	1.406
	No	4	25.0%	12	75.0%	
Increase for working out 30 minutes or more most days	Yes	10	24.4%	31	75.6%	0.948
	No	6	37.5%	10	62.5%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	1	100.0%	
Increase for ready to have toddler sit in car seat	Yes	1	100.0%	--	--	N/A*
	No	1	0.0%	--	--	
Increase for ready to secure cleaning supplies in cabinet	Yes	--	--	2	100.0%	N/A*
	No	--	--	1	100.0%	
Increase for ready to use gates for stairs	Yes	--	--	11	100.0%	N/A*
	No	--	--	7	100.0%	
Increase for have smoke alarms on each floor of house	Yes	1	100.0%	0	0.0%	2.773
	No	0	0.0%	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	1	12.5%	7	87.5%	0.473
	No	0	0.0%	2	100.0%	

*No statistics computed due to lack of participant responses for the variable.

Table 15. Mom TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 1 Content

Intervention Outcome Variable	Lesson 1 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	11	23.9%	35	76.1%	0.001
	No	4	23.5%	13	76.5%	
Increase for number of servings of fruit per day on most days	Yes	3	9.1%	30	90.9%	0.798
	No	2	20.0%	8	80.0%	
Increase for eating 2+ servings of vegetables per day	Yes	12	26.1%	34	73.9%	0.043
	No	4	23.5%	13	76.5%	
Increase for eating no more than one greasy/salty snack	Yes	12	26.7%	33	73.3%	0.046
	No	5	29.4%	12	70.6%	
Increase for ready to eat no more than one sugary snack	Yes	11	23.9%	35	76.1%	0.008
	No	4	25.0%	12	75.0%	
Decrease for days per week you eat fast food	Yes	12	26.1%	34	73.9%	1.298
	No	7	41.2%	10	58.8%	
Increase for drinking no more than one soda per day	Yes	12	40.0%	18	60.0%	0.305
	No	5	50.0%	5	50.0%	
Decrease for number of sodas consumed per day	Yes	2	28.6%	5	71.4%	1.632
	No	0	0.0%	3	100.0%	
Increase for drinking 2+ glasses of water most days	Yes	10	21.7%	36	78.3%	2.576
	No	1	5.9%	16	94.1%	
Increase for reading labels on food packages	Yes	9	19.6%	37	80.4%	0.560
	No	2	11.8%	15	88.2%	
Increase for moderate physical activity 30 minutes or more	Yes	9	19.6%	37	80.4%	0.560
	No	2	11.8%	15	88.2%	
Increase for working out 30 minutes or more most days	Yes	11	24.4%	34	75.6%	0.006
	No	4	23.5%	13	76.5%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for ready to have toddler sit in car seat	Yes	1	50.0%	1	50.0%	1.046
	No	0	0.0%	1	100.0%	
Increase for ready to secure cleaning supplies in cabinet	Yes	1	20.0%	4	80.0%	1.024
	No	0	0.0%	3	100.0%	
Increase for ready to use gates for stairs	Yes	1	5.0%	19	95.0%	0.994
	No	1	20.0%	4	80.0%	
Increase for have smoke alarms on each floor of house	Yes	--	--	1	100.0%	N/A*
	No	--	--	--	--	
Increase for ready to test smoke alarms every 6 months	Yes	1	10.0%	9	90.0%	1.780
	No	2	40.0%	3	60.0%	

4.5.1.2: Intervention Effect Outcome for Eating No More Than One Sugary Snack

Most Days – Lesson 2 Content

There was no significant association between the intervention effect outcome for eating no more than one sugary snack on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for eating no more than one sugary snack on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.1.3: Intervention Effect Outcome for Eating No More Than One Sugary Snack

Most Days – Lesson 3 Content

There was no significant association between the intervention effect outcome for eating no more than one sugary snack on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for eating no more than one sugary snack on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.1.4: Intervention Effect Outcome for Eating No More Than One Sugary Snack

Most Days – Lesson 4 Content

There was no significant association between the intervention effect outcome for eating no more than one sugary snack on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention

outcome effect for eating no more than one sugary snack on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.1.5: Intervention Effect Outcome for Eating No More Than One Sugary Snack Most Days – Lesson 5 Content

There was no significant association between the intervention effect outcome for eating no more than one sugary snack on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for eating no more than one sugary snack on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.2: Intervention Effect for Reading Labels on Food Packages

The recoded variable for increase in outcome for reading labels on food packages was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable the intervention effect outcome and the specific content of each of the five lessons.

4.5.2.1: Intervention Effect for Reading Labels on Food Packages—Lesson 1 Content

There was no significant association between the intervention effect outcome for reading labels on food packages and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for reading labels on food packages for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.2.2: Intervention Effect for Reading Labels on Food Packages—Lesson 2 Content

There was no significant association between the intervention effect outcome for reading labels on food packages and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for reading labels on food packages for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.2.3: Intervention Effect for Reading Labels on Food Packages—Lesson 3 Content

There was no significant association between the intervention effect outcome for reading labels on food packages and lesson 3 content within the Safe TOPS randomization group. There was a significant association between the intervention effect outcome for reading labels on food packages and lesson 3 content within the Mom TOPS randomization group, $\chi^2(1, n = 63) = 4.206, p = 0.040$. This indicates there is a relationship between lesson 3 content and the intervention outcome effect for reading labels on food packages for those randomized in the Mom TOPS group, but not for those randomized in the Safe TOPS group.

4.5.2.4: Intervention Effect for Reading Labels on Food Packages—Lesson 4 Content

There was no significant association between the intervention effect outcome for reading labels on food packages and lesson 4 content within the Safe TOPS randomization group. There was a significant association between the intervention effect outcome for reading labels on food packages and lesson 4 content within the Mom TOPS randomization group, $\chi^2(1, n = 63) = 4.662, p = 0.031$. This indicates

there is a relationship between lesson 4 content and the intervention outcome effect for reading labels on food packages for those randomized in the Mom TOPS group, but not for those randomized in the Safe TOPS group.

Table 16. Safe TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 2 Content

Intervention Outcome Variable	Lesson 2 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	7	17.5%	33	82.5%	0.000
	No	3	17.6%	14	82.4%	
Increase for number of servings of fruit per day on most days	Yes	8	26.7%	22	73.3%	1.098
	No	2	13.3%	13	86.7%	
Increase for eating 2+ servings of vegetables per day	Yes	7	17.5%	33	82.5%	0.221
	No	2	12.5%	14	87.5%	
Increase for eating no more than one greasy/salty snack	Yes	10	25.0%	30	75.0%	0.223
	No	5	31.3%	11	68.8%	
Increase for ready to eat no more than one sugary snack	Yes	12	30.0%	28	70.0%	0.002
	No	5	29.4%	12	70.6%	
Decrease for days per week you eat fast food	Yes	12	30.8%	27	69.2%	0.311
	No	4	23.5%	13	76.5%	
Increase for drinking no more than one soda per day	Yes	10	33.3%	20	66.7%	0.101
	No	4	28.6%	10	71.4%	
Decrease for number of sodas consumed per day	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for drinking 2+ glasses of water most days	Yes	6	15.0%	34	85.0%	1.040
	No	1	5.9%	16	94.1%	
Increase for reading labels on food packages	Yes	4	10.0%	36	90.0%	0.039
	No	2	11.8%	15	88.2%	
Increase for moderate physical activity 30 minutes or more	Yes	6	14.6%	35	85.4%	0.082
	No	3	17.6%	14	82.4%	
Increase for working out 30 minutes or more most days	Yes	11	27.5%	29	72.5%	0.021
	No	5	29.4%	12	70.6%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	1	100.0%	
Increase for ready to have toddler sit in car seat	Yes	1	100.0%	--	--	N/A*
	No	1	100.0%	--	--	
Increase for ready to secure cleaning supplies in cabinet	Yes	--	--	2	100.0%	N/A*
	No	--	--	1	100.0%	
Increase for ready to use gates for stairs	Yes	--	--	11	100.0%	N/A*
	No	--	--	7	100.0%	
Increase for have smoke alarms on each floor of house	Yes	1	100.0%	0	0.0%	2.773
	No	0	0.0%	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	1	14.3%	6	85.7%	0.760
	No	0	0.0%	3	100.0%	

*No statistics computed due to lack of participant responses for the variable

4.5.2.5: Intervention Effect for Reading Labels on Food Packages—Lesson 5 Content

There was no significant association between the intervention effect outcome for reading labels on food packages and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for reading labels on food packages for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.3: Intervention Effect for Having Two or More Servings of Vegetables Per Day on Most Days

The recoded variable for increase in outcome for having two or more servings of vegetables per day on most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.3.1: Intervention Effect for Having Two or More Servings of Vegetables Per Day on Most Days—Lesson 1 Content

There was no significant association between the intervention effect outcome for having two or more servings of vegetables per day on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for having two or more servings of vegetables per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

Table 17. Mom TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 2 Content

Intervention Outcome Variable	Lesson 2 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	11	26.2%	31	73.8%	0.404
	No	4	19.0%	17	81.0%	
Increase for number of servings of fruit per day on most days	Yes	2	7.1%	26	92.9%	1.490
	No	3	20.0%	12	80.0%	
Increase for eating 2+ servings of vegetables per day	Yes	12	28.6%	30	71.4%	0.693
	No	4	19.0%	17	81.0%	
Increase for eating no more than one greasy/salty snack	Yes	10	23.8%	32	76.2%	0.832
	No	7	35.0%	13	65.0%	
Increase for ready to eat no more than one sugary snack	Yes	9	21.4%	33	78.6%	0.530
	No	6	30.0%	14	70.0%	
Decrease for days per week you eat fast food	Yes	14	33.3%	28	66.7%	0.618
	No	5	23.8%	16	76.2%	
Increase for drinking no more than one soda per day	Yes	11	44.0%	14	56.0%	0.062
	No	6	40.0%	9	60.0%	
Decrease for number of sodas consumed per day	Yes	2	28.6%	5	71.4%	1.632
	No	0	0.0%	3	100.0%	
Increase for drinking 2+ glasses of water most days	Yes	6	14.3%	36	85.7%	0.849
	No	5	23.8%	16	76.2%	
Increase for reading labels on food packages	Yes	7	16.7%	35	83.3%	0.054
	No	4	19.0%	17	81.0%	
Increase for moderate physical activity 30 minutes or more	Yes	8	19.0%	35	81.0%	0.226
	No	3	14.3%	18	85.7%	
Increase for working out 30 minutes or more most days	Yes	11	26.8%	30	73.2%	0.472
	No	4	19.0%	17	81.0%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for ready to have toddler sit in car seat	Yes	1	50.0%	1	50.0%	1.046
	No	0	0.0%	1	100.0%	
Increase for ready to secure cleaning supplies in cabinet	Yes	1	20.0%	4	80.0%	1.024*
	No	0	0.0%	3	100.0%	
Increase for ready to use gates for stairs	Yes	2	10.5%	17	89.5%	1.152
	No	0	0.0%	6	100.0%	
Increase for have smoke alarms on each floor of house	Yes	--	--	1	100.0%	N/A*
	No	--	0.0%	--	--	
Increase for ready to test smoke alarms every 6 months	Yes	3	27.3%	8	72.7%	2.121
	No	0	0.0%	4	100.0%	

*No statistics computed due to lack of participant responses for the variable.

4.5.3.2: Intervention Effect for Having Two or More Servings of Vegetables Per Day on Most Days—Lesson 2 Content

There was no significant association between the intervention effect outcome for having two or more servings of vegetables per day on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for having two or more servings of vegetables per days on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.3.3: Intervention Effect for Having Two or More Servings of Vegetables Per Day on Most Days—Lesson 3 Content

There was no significant association between the intervention effect outcome for having two or more servings of vegetables per day on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for having two or more servings of vegetables per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.3.4: Intervention Effect for Having Two or More Servings of Vegetables Per Day on Most Days—Lesson 4 Content

There was no significant association between the intervention effect outcome for having two or more servings of vegetables per day on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization

group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for having two or more servings of vegetables per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.3.5: Intervention Effect for Having Two or More Servings of Vegetables Per Day on Most Days—Lesson 5 Content

There was no significant association between the intervention effect outcome for having two or more servings of vegetables per day on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for having two or more servings of vegetables per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.4: Intervention Effect for Having Two or More Servings of Fruit Per Day on Most Days

The recoded variable for increase in outcome for having two or more servings of fruit per day on most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

Table 18. Safe TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 3 Content

Intervention Outcome Variable	Lesson 3 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	7	18.4%	31	81.6%	0.062
	No	3	15.8%	16	84.2%	
Increase for number of servings of fruit per day on most days	Yes	7	25.9%	20	74.1%	0.550
	No	3	16.7%	15	83.3%	
Increase for eating 2+ servings of vegetables per day	Yes	7	18.9%	30	81.1%	0.695
	No	2	10.5%	17	89.5%	
Increase for eating no more than one greasy/salty snack	Yes	9	23.7%	29	76.3%	0.567
	No	6	33.3%	12	66.7%	
Increase for ready to eat no more than one sugary snack	Yes	12	31.6%	26	68.4%	0.170
	No	5	26.3%	14	73.7%	
Decrease for days per week you eat fast food	Yes	12	32.4%	25	67.6%	0.823
	No	4	21.1%	15	78.9%	
Increase for drinking no more than one soda per day	Yes	8	29.6%	19	70.4%	0.153
	No	6	35.3%	11	64.7%	
Decrease for number of sodas consumed per day	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for drinking 2+ glasses of water most days	Yes	6	15.8%	32	84.2%	1.479
	No	1	5.3%	18	94.7%	
Increase for reading labels on food packages	Yes	4	10.8%	33	89.2%	0.009
	No	2	10.0%	18	90.0%	
Increase for moderate physical activity 30 minutes or more	Yes	5	13.2%	33	86.8%	0.454
	No	4	20.0%	16	80.0%	
Increase for working out 30 minutes or more most days	Yes	11	28.9%	27	71.1%	0.044
	No	5	26.3%	14	73.7%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	1	100.0%	
Increase for ready to have toddler sit in car seat	Yes	1	100.0%	--	--	N/A*
	No	1	100.0%	--	--	
Increase for ready to secure cleaning supplies in cabinet	Yes	--	--	2	100.0%	N/A*
	No	--	--	1	100.0%	
Increase for ready to use gates for stairs	Yes	--	--	9	100.0%	N/A*
	No	--	--	9	100.0%	
Increase for have smoke alarms on each floor of house	Yes	1	100.0%	0	0.0%	2.773
	No	0	0.0%	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	1	14.3%	6	85.7%	0.760
	No	0	0.0%	3	100.0%	

*No statistics computed due to lack of participant responses for the variable.

Table 19. Mom TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 3 Content

Intervention Outcome Variable	Lesson 3 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	11	26.2%	31	73.8%	0.404
	No	4	19.0%	17	81.0%	
Increase for number of servings of fruit per day on most days	Yes	2	6.5%	29	93.5%	2.585
	No	3	25.0%	9	75.0%	
Increase for eating 2+ servings of vegetables per day	Yes	10	23.8%	32	76.2%	0.165
	No	6	28.6%	15	71.4%	
Increase for eating no more than one greasy/salty snack	Yes	10	23.8%	32	76.2%	0.832
	No	7	35.0%	13	65.0%	
Increase for ready to eat no more than one sugary snack	Yes	10	23.8%	32	76.2%	0.010
	No	5	25.0%	15	75.0%	
Decrease for days per week you eat fast food	Yes	11	26.2%	31	73.8%	0.924
	No	8	38.1%	13	61.9%	
Increase for drinking no more than one soda per day	Yes	10	41.7%	14	58.3%	0.017
	No	7	43.8%	9	56.3%	
Decrease for number of sodas consumed per day	Yes	1	16.7%	5	83.3%	0.103
	No	1	25.0%	3	75.0%	
Increase for drinking 2+ glasses of water most days	Yes	7	16.7%	35	83.3%	0.054
	No	4	19.0%	17	81.0%	
Increase for reading labels on food packages	Yes	10	23.8%	32	76.2%	4.206**
	No	1	4.8%	20	95.2%	
Increase for moderate physical activity 30 minutes or more	Yes	9	21.4%	33	78.6%	1.499
	No	2	9.5%	19	90.5%	
Increase for working out 30 minutes or more most days	Yes	9	22.0%	32	78.0%	0.326
	No	6	28.6%	15	71.4%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for ready to have toddler sit in car seat	Yes	1	50.0%	1	50.0%	1.046
	No	0	0.0%	1	100.0%	
Increase for ready to secure cleaning supplies in cabinet	Yes	1	25.0%	3	75.0%	1.530
	No	0	0.0%	4	100.0%	
Increase for ready to use gates for stairs	Yes	1	5.9%	16	94.1%	0.304
	No	1	12.5%	7	87.5%	
Increase for have smoke alarms on each floor of house	Yes	--	--	1	100.0%	N/A*
	No	--	--	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	2	22.2%	7	77.8%	0.071
	No	1	16.7%	5	83.3%	

*No statistics computed due to lack of participant responses for the variable.

** Statistically significant association between variables

4.5.4.1: Intervention Effect for Having Two or More Servings of Fruit Per Day on
Most Days – Lesson 1 Content

There was no significant association between the intervention effect outcome for having two or more servings of fruit per day on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for having two or more servings of fruit per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.4.2: Intervention Effect for Having Two or More Servings of Fruit Per Day on
Most Days – Lesson 2 Content

There was no significant association between the intervention effect outcome for having two or more servings of fruit per day on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for having two or more servings of fruit per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.4.3: Intervention Effect for Having Two or More Servings of Fruit Per Day on
Most Days – Lesson 3 Content

There was no significant association between the intervention effect outcome for having two or more servings of fruit per day on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group.

This indicates there is no relationship between lesson 3 content and the intervention outcome effect for having two or more servings of fruit per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.4.4: Intervention Effect for Having Two or More Servings of Fruit Per Day on Most Days – Lesson 4 Content

There was no significant association between the intervention effect outcome for having two or more servings of fruit per day on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for having two or more servings of fruit per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.4.5: Intervention Effect for Having Two or More Servings of Fruit Per Day on Most Days – Lesson 5 Content

There was no significant association between the intervention effect outcome for having two or more servings of fruit per day on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for having two or more servings of fruit per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.5: Intervention Effect Outcome for Drinking No More Than One Soda Per Day on Most Days

The recoded variable for increase in outcome for drinking no more than one soda per day on most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.5.1: Intervention Effect Outcome for Drinking No More Than One Soda Per Day on Most Days—Lesson 1 Content

There was no significant association between the intervention effect outcome for drinking no more than one soda per day on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for drinking no more than one soda per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.5.2: Intervention Effect Outcome for Drinking No More Than One Soda Per Day on Most Days—Lesson 2 Content

There was no significant association between the intervention effect outcome for drinking no more than one soda per day on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for drinking no more than one soda per day on most days for those

randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

Table 20. Safe TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 4 Content

Intervention Outcome Variable	Lesson 4 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	7	18.9%	30	81.1%	0.141
	No	3	15.0%	17	85.0%	
Increase for number of servings of fruit per day on most days	Yes	7	24.1%	22	75.9%	0.177
	No	3	18.8%	13	81.3%	
Increase for eating 2+ servings of vegetables per day	Yes	7	18.9%	30	81.1%	0.695
	No	2	10.5%	17	89.5%	
Increase for eating no more than one greasy/salty snack	Yes	10	27.8%	26	72.2%	0.051
	No	5	25.0%	15	75.0%	
Increase for ready to eat no more than one sugary snack	Yes	11	29.7%	26	70.3%	0.000
	No	6	30.0%	14	70.0%	
Decrease for days per week you eat fast food	Yes	12	32.4%	25	67.6%	0.823
	No	4	21.1%	15	78.9%	
Increase for drinking no more than one soda per day	Yes	8	28.6%	20	71.4%	0.370
	No	6	37.5%	10	62.5%	
Decrease for number of sodas consumed per day	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for drinking 2+ glasses of water most days	Yes	5	13.5%	32	86.5%	0.153
	No	2	10.0%	18	90.0%	
Increase for reading labels on food packages	Yes	3	8.1%	34	91.9%	0.628
	No	3	15.0%	17	85.0%	
Increase for moderate physical activity 30 minutes or more	Yes	5	13.2%	33	86.8%	0.454
	No	4	20.0%	16	80.0%	
Increase for working out 30 minutes or more most days	Yes	9	24.3%	28	75.7%	0.720
	No	7	35.0%	13	65.0%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	1	100.0%	
Increase for ready to have toddler sit in car seat	Yes	1	100.0%	--	--	N/A*
	No	1	100.0%	--	--	
Increase for ready to secure cleaning supplies in cabinet	Yes	--	--	2	100.0%	N/A*
	No	--	--	1	100.0%	
Increase for ready to use gates for stairs	Yes	--	--	11	100.0%	N/A*
	No	--	--	7	100.0%	
Increase for have smoke alarms on each floor of house	Yes	1	100.0%	0	0.0%	2.773
	No	0	0.0%	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	0	0.0%	7	100.0%	2.683
	No	1	33.3%	2	66.7%	

*No statistics computed due to lack of participant responses for the variable.

Table 21. Mom TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 4 Content

Intervention Outcome Variable	Lesson 4 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	10	24.4%	31	75.6%	0.022
	No	5	22.7%	17	77.3%	
Increase for number of servings of fruit per day on most days	Yes	3	9.7%	28	90.3%	0.387
	No	2	16.7%	10	83.3%	
Increase for eating 2+ servings of vegetables per day	Yes	8	19.5%	33	80.5%	2.085
	No	8	36.4%	14	63.6%	
Increase for eating no more than one greasy/salty snack	Yes	8	19.5%	33	80.5%	3.681
	No	9	42.9%	12	57.1%	
Increase for ready to eat no more than one sugary snack	Yes	10	24.4%	31	75.6%	0.003
	No	5	23.8%	16	76.2%	
Decrease for days per week you eat fast food	Yes	12	29.3%	29	70.7%	0.044
	No	7	31.8%	15	68.2%	
Increase for drinking no more than one soda per day	Yes	9	39.1%	14	60.9%	0.251
	No	8	47.1%	9	52.9%	
Decrease for number of sodas consumed per day	Yes	2	28.6%	5	71.4%	1.632
	No	0	0.0%	3	100.0%	
Increase for drinking 2+ glasses of water most days	Yes	9	22.0%	32	78.0%	1.792
	No	2	9.1%	20	90.9%	
Increase for reading labels on food packages	Yes	10	24.4%	31	75.6%	4.662**
	No	1	4.5%	21	95.5%	
Increase for moderate physical activity 30 minutes or more	Yes	10	24.4%	31	75.6%	4.662**
	No	1	4.5%	21	95.5%	
Increase for working out 30 minutes or more most days	Yes	9	22.5%	31	77.5%	0.174
	No	6	27.3%	16	72.7%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for ready to have toddler sit in car seat	Yes	1	33.3%	2	66.7%	N/A*
	No	--	--	--	--	
Increase for ready to secure cleaning supplies in cabinet	Yes	1	20.0%	4	80.0%	1.024
	No	0	0.0%	3	100.0%	
Increase for ready to use gates for stairs	Yes	1	6.7%	14	93.3%	0.089
	No	1	10.0%	9	90.0%	
Increase for have smoke alarms on each floor of house	Yes	--	--	1	100.0%	N/A*
	No	--	--	--	--	
Increase for ready to test smoke alarms every 6 months	Yes	2	28.6%	5	71.4%	0.608
	No	1	12.5%	7	87.5%	

*No statistics computed due to lack of participant responses for the variable.

** Statistically significant association between variables

4.5.5.3: Intervention Effect Outcome for Drinking No More Than One Soda Per Day on Most Days—Lesson 3 Content

There was no significant association between the intervention effect outcome for drinking no more than one soda per day on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for drinking no more than one soda per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.5.4: Intervention Effect Outcome for Drinking No More Than One Soda Per Day on Most Days—Lesson 4 Content

There was no significant association between the intervention effect outcome for drinking no more than one soda per day on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for drinking no more than one soda per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.5.5: Intervention Effect Outcome for Drinking No More Than One Soda Per Day on Most Days—Lesson 5 Content

There was no significant association between the intervention effect outcome for drinking no more than one soda per day on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This

indicates there is no relationship between lesson 5 content and the intervention outcome effect for drinking no more than one soda per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.6: Intervention Effect Outcome for Drinking Two or More Glasses of Water Per Day on Most Days

The recoded variable for increase in outcome for drinking two or more glasses of water per day on most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.6.1: Intervention Effect Outcome for Drinking Two or More Glasses of Water Per Day on Most Days—Lesson 1 Content

There was no significant association between the intervention effect outcome for drinking two or more glasses of water per day on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for drinking two or more glasses of water per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

Table 22. Safe TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 5 Content

Intervention Outcome Variable	Lesson 5 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	7	18.4%	31	81.6%	0.062
	No	3	15.8%	16	84.2%	
Increase for number of servings of fruit per day on most days	Yes	7	25.0%	21	75.0%	0.339
	No	3	17.6%	14	82.4%	
Increase for eating 2+ servings of vegetables per day	Yes	7	18.4%	31	81.6%	0.511
	No	2	11.1%	16	88.9%	
Increase for eating no more than one greasy/salty snack	Yes	9	23.7%	29	76.3%	0.567
	No	6	33.3%	12	66.7%	
Increase for ready to eat no more than one sugary snack	Yes	11	28.9%	27	71.1%	0.042
	No	6	31.6%	13	68.4%	
Decrease for days per week you eat fast food	Yes	11	29.7%	26	70.3%	0.072
	No	5	26.3%	14	73.7%	
Increase for drinking no more than one soda per day	Yes	10	34.5%	19	65.5%	0.283
	No	4	26.7%	11	73.3%	
Decrease for number of sodas consumed per day	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for drinking 2+ glasses of water most days	Yes	5	13.5%	33	86.8%	0.083
	No	2	10.5%	17	89.5%	
Increase for reading labels on food packages	Yes	3	7.9%	35	92.1%	0.796
	No	3	15.8%	16	84.2%	
Increase for moderate physical activity 30 minutes or more	Yes	5	12.8%	34	87.2%	0.635
	No	4	21.1%	15	78.9%	
Increase for working out 30 minutes or more most days	Yes	9	23.7%	29	76.3%	1.061
	No	7	36.8%	12	63.2%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	1	100.0%	
Increase for ready to have toddler sit in car seat	Yes	1	100.0%	--	--	N/A*
	No	1	100.0%	--	--	
Increase for ready to secure cleaning supplies in cabinet	Yes	--	--	2	100.0%	N/A*
	No	--	--	1	100.0%	
Increase for ready to use gates for stairs	Yes	--	--	10	100.0%	N/A*
	No	--	--	8	100.0%	
Increase for have smoke alarms on each floor of house	Yes	1	100.0%	--	0.0%	N/A*
	No	0	0.0%	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	1	14.3%	6	85.7%	0.760
	No	0	0.0%	3	100.0%	

*No statistics computed due to lack of participant responses for the variable.

4.5.6.2: Intervention Effect Outcome for Drinking Two or More Glasses of Water Per

Day on Most Days—Lesson 2 Content

There was no significant association between the intervention effect outcome for drinking two or more glasses of water per day on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group.

This indicates there is no relationship between lesson 2 content and the intervention outcome effect for drinking two or more glasses of water per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.6.3: Intervention Effect Outcome for Drinking Two or More Glasses of Water Per Day on Most Days—Lesson 3 Content

There was no significant association between the intervention effect outcome for drinking two or more glasses of water per day on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for drinking two or more glasses of water per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.6.4: Intervention Effect Outcome for Drinking Two or More Glasses of Water Per Day on Most Days—Lesson 4 Content

There was no significant association between the intervention effect outcome for drinking two or more glasses of water per day on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for drinking two or more glasses of water per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

Table 23. Mom TOPS Randomization Group Chi-Square Results for Relationship Between Intervention Effect Outcome Increase/Decrease and Lesson 5 Content

Intervention Outcome Variable	Lesson 5 Content	Intervention Effect Outcome Increase/Decrease				χ^2
		Yes		No		
		n	%	n	%	
Increase for eating 2+ servings of fruit per day	Yes	10	27.0%	27	73.0%	0.520
	No	5	19.2%	21	80.8%	
Increase for number of servings of fruit per day on most days	Yes	1	3.7%	26	96.3%	4.363**
	No	4	25.0%	12	75.0%	
Increase for eating 2+ servings of vegetables per day	Yes	10	27.0%	27	73.0%	0.127
	No	6	23.1%	20	76.9%	
Increase for eating no more than one greasy/salty snack	Yes	9	24.3%	28	75.7%	0.438
	No	8	32.0%	17	68.0%	
Increase for ready to eat no more than one sugary snack	Yes	9	24.3%	28	75.7%	0.001
	No	6	24.0%	19	76.0%	
Decrease for days per week you eat fast food	Yes	12	32.4%	25	67.6%	0.222
	No	7	26.9%	19	73.1%	
Increase for drinking no more than one soda per day	Yes	8	36.4%	14	63.6%	0.754
	No	9	50.0%	9	50.0%	
Decrease for number of sodas consumed per day	Yes	2	28.6%	5	71.4%	1.632
	No	0	0.0%	3	100.0%	
Increase for drinking 2+ glasses of water most days	Yes	8	21.6%	29	78.4%	1.122
	No	3	11.5%	23	88.5%	
Increase for reading labels on food packages	Yes	7	18.9%	30	81.1%	0.134
	No	4	15.4%	22	84.6%	
Increase for moderate physical activity 30 minutes or more	Yes	7	18.9%	30	81.1%	0.134
	No	4	15.4%	22	84.6%	
Increase for working out 30 minutes or more most days	Yes	10	27.8%	26	72.2%	0.612
	No	5	19.2%	21	80.8%	
Increase for how ready are you to get a car seat	Yes	--	--	--	--	N/A*
	No	--	--	--	--	
Increase for ready to have toddler sit in car seat	Yes	1	50.0%	1	50.0%	1.046
	No	0	0.0%	1	100.0%	
Increase for ready to secure cleaning supplies in cabinet	Yes	1	33.3%	2	66.7%	2.209
	No	0	0.0%	5	100.0%	
Increase for ready to use gates for stairs	Yes	2	13.3%	13	86.7%	2.158
	No	0	0.0%	10	100.0%	
Increase for have smoke alarms on each floor of house	Yes	--	--	--	--	N/A*
	No	--	--	1	100.0%	
Increase for ready to test smoke alarms every 6 months	Yes	2	33.3%	4	66.7%	1.095
	No	1	11.1%	8	88.9%	

*No statistics computed due to lack of participant responses for the variable.

** Statistically significant association between variables

4.5.6.5: Intervention Effect Outcome for Drinking Two or More Glasses of Water Per Day on Most Days—Lesson 5 Content

There was no significant association between the intervention effect outcome for drinking two or more glasses of water per day on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for drinking two or more glasses of water per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.7: Intervention Effect Outcome for Eating No More Than One Salty or Greasy Snack Most Days

The recoded variable for increase in outcome for eating no more than one salty or greasy snack most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.7.1: Intervention Effect Outcome for Eating No More Than One Salty or Greasy Snack Most Days—Lesson 1 Content

There was no significant association between the intervention effect outcome for eating no more than one salty or greasy snack on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for eating no more than one salty or greasy snack on most days for

those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.7.2: Intervention Effect Outcome for Eating No More Than One Salty or Greasy Snack Most Days—Lesson 2 Content

There was no significant association between the intervention effect outcome for eating no more than one salty or greasy snack on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for eating no more than one salty or greasy snack most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.7.3: Intervention Effect Outcome for Eating No More Than One Salty or Greasy Snack Most Days—Lesson 3 Content

There was no significant association between the intervention effect outcome for eating no more than one salty or greasy snack on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for eating no more than one salty or greasy snack most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.7.4: Intervention Effect Outcome for Eating No More Than One Salty or Greasy Snack Most Days—Lesson 4 Content

There was no significant association between the intervention effect outcome for eating no more than one salty or greasy snack on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for eating no more than one salty or greasy snack most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.7.5: Intervention Effect Outcome for Eating No More Than One Salty or Greasy Snack Most Days—Lesson 5 Content

There was no significant association between the intervention effect outcome for eating no more than one salty or greasy snack on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for eating no more than one salty or greasy snack most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.8: Intervention Effect Outcome for Working Out for Thirty Minutes or More on Most Days

The recoded variable for increase in outcome for working out for thirty minutes or more on most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome the specific content of each of the five lessons.

4.5.8.1: Intervention Effect Outcome for Working Out for Thirty Minutes or More on Most Days—Lesson 1 Content

There was no significant association between the intervention effect outcome for working out for thirty minutes or more on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for working out for thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.8.2: Intervention Effect Outcome for Working Out for Thirty Minutes or More on Most Days—Lesson 2 Content

There was no significant association between the intervention effect outcome for working out for thirty minutes or more on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for working out for thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.8.3: Intervention Effect Outcome for Working Out for Thirty Minutes or More on Most Days—Lesson 3 Content

There was no significant association between the intervention effect outcome for working out for thirty minutes or more on most days and lesson 3 content within

the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for working out for thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.8.4: Intervention Effect Outcome for Working Out for Thirty Minutes or More on Most Days—Lesson 4 Content

There was no significant association between the intervention effect outcome for working out thirty minutes or more on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for working out thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.8.5: Intervention Effect Outcome for Working Out for Thirty Minutes or More on Most Days—Lesson 5 Content

There was no significant association between the intervention effect outcome for working out thirty minutes or more on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for working out thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.9: Intervention Effect for Engaging in Moderate Physical Activity 30 Minutes or More Per Day on Most Days

The recoded variable for increase in outcome for engaging in moderate physical activity thirty minutes or more on most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.9.1: Intervention Effect for Engaging in Moderate Physical Activity 30 Minutes or More Per Day on Most Days—Lesson 1 Content

There was no significant association between the intervention effect outcome for engaging in moderate physical activity thirty minutes or more on most days and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for engaging in moderate physical activity thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.9.2: Intervention Effect for Engaging in Moderate Physical Activity 30 Minutes or More Per Day on Most Days—Lesson 2 Content

There was no significant association between the intervention effect outcome for engaging in moderate physical activity thirty minutes or more on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for engaging in moderate physical activity thirty

minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.9.3: Intervention Effect for Engaging in Moderate Physical Activity 30 Minutes or More Per Day on Most Days—Lesson 3 Content

There was no significant association between the intervention effect outcome for engaging in moderate physical activity thirty minutes or more on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for engaging in moderate physical activity thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.9.4: Intervention Effect for Engaging in Moderate Physical Activity 30 Minutes or More Per Day on Most Days—Lesson 4 Content

There was no significant association between the intervention effect outcome for engaging in moderate physical activity thirty minutes or more on most days and lesson 4 content within the Safe TOPS randomization group. There was a significant association between the intervention effect outcome for engaging in moderate physical activity thirty minutes or more on most days and lesson 4 content within the Mom TOPS randomization group, $\chi^2(1, n = 63) = 4.662, p = 0.031$. This indicates there is a relationship between lesson 4 content and the intervention outcome effect for engaging in moderate physical activity thirty minutes or more on most days for

those randomized in the Mom TOPS group, but not for those randomized in the Safe TOPS group.

4.5.9.5: Intervention Effect for Engaging in Moderate Physical Activity 30 Minutes or More Per Day on Most Days—Lesson 5 Content

There was no significant association between the intervention effect outcome for engaging in moderate physical activity thirty minutes or more on most days and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for engaging in moderate physical activity thirty minutes or more on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.10: Intervention Effect for Number of Servings of Fruit Consumed Per Day on Most Days

The recoded variable for decrease in outcome for number of servings of fruit consumed per day on most days was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.10.1: Intervention Effect for Number of Servings of Fruit Consumed Per Day on Most Days—Lesson 1 Content

There was no significant association between the intervention effect outcome for number of servings of fruit consumed per day on most days and lesson 1 content

within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect number of servings of fruit consumed per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.10.2: Intervention Effect for Number of Servings of Fruit Consumed Per Day on Most Days—Lesson 2 Content

There was no significant association between the intervention effect outcome for number of servings of fruit consumed per day on most days and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect number of servings of fruit consumed per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.10.3: Intervention Effect for Number of Servings of Fruit Consumed Per Day on Most Days—Lesson 3 Content

There was no significant association between the intervention effect outcome for number of servings of fruit consumed per day on most days and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect number of servings of fruit consumed per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.10.4: Intervention Effect for Number of Servings of Fruit Consumed Per Day on Most Days—Lesson 4 Content

There was no significant association between the intervention effect outcome for number of servings of fruit consumed per day on most days and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect number of servings of fruit consumed per day on most days for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.10.5: Intervention Effect for Number of Servings of Fruit Consumed Per Day on Most Days—Lesson 5 Content

There was no significant association between the intervention effect outcome for number of servings of fruit consumed per day on most days and lesson 5 content within the Safe TOPS randomization group. There was a significant association between the intervention effect outcome for number of servings of fruit consumed per day on most days and lesson 5 content within the Mom TOPS randomization group, $\chi^2(1, n = 43) = 4.363, p = 0.037$. This indicates there is a relationship between lesson 5 content and the intervention outcome effect for engaging in moderate physical activity thirty minutes or more on most days for those randomized in the Mom TOPS group, but not for those randomized in the Safe TOPS group.

4.5.11: Intervention Effect for How Ready Are You to Get A Car Seat

The recoded variable for decrease in outcome for how ready are you to get a car seat was used for this analysis. Chi-square analysis was run to determine if there

was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.11.1: Intervention Effect for How Ready Are You to Get A Car Seat –Lesson 1
Content

Chi-square analysis could not be run for the Safe TOPS intervention group or the Mom TOPS intervention group due to lack of participant responses available in each category for this variable

4.5.11.2: Intervention Effect for How Ready Are You to Get A Car Seat –Lesson 2
Content

Chi-square analysis could not be run for the Safe TOPS intervention group or the Mom TOPS intervention group due to lack of participant responses available in each category for this variable.

4.5.11.3: Intervention Effect for How Ready Are You to Get A Car Seat –Lesson 3
Content

Chi-square analysis could not be run for the Safe TOPS intervention group or the Mom TOPS intervention group due to lack of participant responses available in each category for this variable.

4.5.11.4: Intervention Effect for How Ready Are You to Get A Car Seat –Lesson 4
Content

Chi-square analysis could not be run for the Safe TOPS intervention group or the Mom TOPS intervention group due to lack of participant responses available in each category for this variable.

4.5.11.5: Intervention Effect for How Ready Are You to Get A Car Seat –Lesson 5
Content

Chi-square analysis could not be run for the Safe TOPS intervention group or the Mom TOPS intervention group due to lack of participant responses available in each category for this variable.

4.5.12: Intervention Effect for How Ready Are You to Have Toddler Sit in A Car
Seat Every Time He/She Is in A Car

The recoded variable for increase in outcome for how ready are you to have your toddler sit in a car seat every time he/she is in a car was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each lesson.

4.5.12.1: Intervention Effect for How Ready Are You to Have Toddler Sit in A Car
Seat Every Time He/She Is in A Car—Lesson 1 Content

Chi-square analysis could not be run for the Safe TOPS intervention group or the Mom TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable.

4.5.12.2: Intervention Effect for How Ready Are You to Have Toddler Sit in A Car
Seat Every Time He/She Is in A Car—Lesson 2 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention

outcome variable. There was no significant association between the intervention effect outcome how ready are you to have your toddler sit in a car seat every time he/she is in a car and lesson 2 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for how ready are you to have your toddler sit in a car seat every time he/she is in a car for those randomized in the Mom TOPS group.

4.5.12.3: Intervention Effect for How Ready Are You to Have Toddler Sit in A Car Seat Every Time He/She Is in A Car—Lesson 3 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to have your toddler sit in a car seat every time he/she is in a car and lesson 3 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for how ready are you to have your toddler sit in a car seat every time he/she is in a car for those randomized in the Mom TOPS group.

4.5.12.4: Intervention Effect for How Ready Are You to Have Toddler Sit in A Car Seat Every Time He/She Is in A Car—Lesson 4 Content

Chi-square analysis could not be run for the Safe TOPS intervention group or the Mom TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable.

4.5.12.5: Intervention Effect for How Ready Are You to Have Toddler Sit in A Car Seat Every Time He/She Is in A Car—Lesson 5 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to have your toddler sit in a car seat every time he/she is in a car and lesson 5 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for how ready are you to have your toddler sit in a car seat every time he/she is in a car for those randomized in the Mom TOPS group.

4.5.13: Intervention Effect for How Ready Are You to Secure Cleaning Supplies in Cabinets with Child Proof Latches

The recoded variable for increase in outcome for how ready are you to secure cleaning supplies in cabinets with child proof latches was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.13.1: Intervention Effect for How Ready Are You to Secure Cleaning Supplies in Cabinets with Child Proof Latches—Lesson 1 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to secure cleaning supplies in cabinets with child

proof latches and lesson 1 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for how ready are you to secure cleaning supplies in cabinets with child proof latches for those randomized in the Mom TOPS group.

4.5.13.2: Intervention Effect for How Ready Are You to Secure Cleaning Supplies in Cabinets with Child Proof Latches—Lesson 2 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to secure cleaning supplies in cabinets with child proof latches and lesson 2 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for how ready are you to secure cleaning supplies in cabinets with child proof latches for those randomized in the Mom TOPS group.

4.5.13.3: Intervention Effect for How Ready Are You to Secure Cleaning Supplies in Cabinets with Child Proof Latches—Lesson 3 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to secure cleaning supplies in cabinets with child proof latches and lesson 3 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention

outcome effect for how ready are you to secure cleaning supplies in cabinets with child proof latches for those randomized in the Mom TOPS group.

4.5.13.4: Intervention Effect for How Ready Are You to Secure Cleaning Supplies in Cabinets with Child Proof Latches—Lesson 4 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to secure cleaning supplies in cabinets with child proof latches and lesson 4 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for how ready are you to secure cleaning supplies in cabinets with child proof latches for those randomized in the Mom TOPS group.

4.5.13.5: Intervention Effect for How Ready Are You to Secure Cleaning Supplies in Cabinets with Child Proof Latches—Lesson 5 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to secure cleaning supplies in cabinets with child proof latches and lesson 5 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for how ready are you to secure cleaning supplies in cabinets with child proof latches for those randomized in the Mom TOPS group.

4.5.14: Intervention Effect for How Ready Are You to Have Smoke Alarms on Every Floor of Your Home

The recoded variable for increase in outcome for how ready are you to have smoke alarms on every floor of your house was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.14.1: Intervention Effect for How Ready Are You to Have Smoke Alarms on Every Floor of Your Home—Lesson 1 Content

Chi-square analysis could not be run for the Mom TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to have smoke alarms on every floor of your house and lesson 1 content within the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for how ready are you to have smoke alarms on every floor of your house for those randomized in the Safe TOPS group.

4.5.14.2: Intervention Effect for How Ready Are You to Have Smoke Alarms on Every Floor of Your Home—Lesson 2 Content

Chi-square analysis could not be run for the Mom TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to have smoke alarms on every floor of your house

and lesson 2 content within the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for how ready are you to have smoke alarms on every floor of your house for those randomized in the Safe TOPS group.

4.5.14.3: Intervention Effect for How Ready Are You to Have Smoke Alarms on Every Floor of Your Home—Lesson 3 Content

Chi-square analysis could not be run for the Mom TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to have smoke alarms on every floor of your house and lesson 3 content within the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for how ready are you to have smoke alarms on every floor of your house for those randomized in the Safe TOPS group.

4.5.14.4: Intervention Effect for How Ready Are You to Have Smoke Alarms on Every Floor of Your Home—Lesson 4 Content

Chi-square analysis could not be run for the Mom TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to have smoke alarms on every floor of your house and lesson 4 content within the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for

how ready are you to have smoke alarms on every floor of your house for those randomized in the Safe TOPS group.

4.5.14.5: Intervention Effect for How Ready Are You to Have Smoke Alarms on Every Floor of Your Home—Lesson 5 Content

Chi-square analysis could not be run for the Mom TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to have smoke alarms on every floor of your house and lesson 5 content within the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for how ready are you to have smoke alarms on every floor of your house for those randomized in the Safe TOPS group.

4.5.15: Intervention Effect for How Ready Are You to Test Smoke Alarms in Your Home Every Six Months

The recoded variable for increase in outcome for how ready are you to test smoke alarms in your home every six months was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.15.1: Intervention Effect for How Ready Are You to Test Smoke Alarms in Your Home Every Six Months—Lesson 1 Content

There was no significant association between the intervention effect outcome how ready are you to test smoke alarms in your home every six months and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for how ready are you to test smoke alarms in your home every six months for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.15.2: Intervention Effect for How Ready Are You to Test Smoke Alarms in Your Home Every Six Months—Lesson 2 Content

There was no significant association between the intervention effect outcome how ready are you to test smoke alarms in your home every six months and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for how ready are you to test smoke alarms in your home every six months for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.15.3: Intervention Effect for How Ready Are You to Test Smoke Alarms in Your Home Every Six Months—Lesson 3 Content

There was no significant association between the intervention effect outcome how ready are you to test smoke alarms in your home every six months and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization

group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for how ready are you to test smoke alarms in your home every six months for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.15.4: Intervention Effect for How Ready Are You to Test Smoke Alarms in Your Home Every Six Months—Lesson 4 Content

There was no significant association between the intervention effect outcome how ready are you to test smoke alarms in your home every six months and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for how ready are you to test smoke alarms in your home every six months for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.15.5: Intervention Effect for How Ready Are You to Test Smoke Alarms in Your Home Every Six Months—Lesson 5 Content

There was no significant association between the intervention effect outcome how ready are you to test smoke alarms in your home every six months and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for how ready are you to test smoke alarms in your home every six months for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.16: Intervention Effect for How Ready Are You to Use Gates for Stairs

The recoded variable for increase in outcome for how ready are you to use gates for stairs was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.16.1: Intervention Effect for How Ready Are You to Use Gates for Stairs— Lesson 1 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to use gates for stairs and lesson 1 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for how ready are you to use gates for stairs for those randomized in the Mom TOPS group.

4.5.16.2: Intervention Effect for How Ready Are You to Use Gates for Stairs— Lesson 2 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to use gates for stairs and lesson 2 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for how ready are you to use gates for stairs for those randomized in the Mom TOPS group.

4.5.16.3: Intervention Effect for How Ready Are You to Use Gates for Stairs—

Lesson 3 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to use gates for stairs and lesson 3 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for how ready are you to use gates for stairs for those randomized in the Mom TOPS group.

4.5.16.4: Intervention Effect for How Ready Are You to Use Gates for Stairs—

Lesson 4 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to use gates for stairs and lesson 4 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for how ready are you to use gates for stairs for those randomized in the Mom TOPS group.

4.5.16.5: Intervention Effect for How Ready Are You to Use Gates for Stairs—

Lesson 5 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this intervention outcome variable. There was no significant association between the intervention effect outcome how ready are you to use gates for stairs and lesson 5 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for how ready are you to use gates for stairs for those randomized in the Mom TOPS group.

4.5.17: Intervention Effect for Number of Sodas Consumed

The recoded variable for decrease in outcome for number of sodas consumed was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.17.1: Intervention Effect for Number of Sodas Consumed—Lesson 1 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this variable. There was no significant association between the intervention effect outcome for number of sodas consumed and lesson 1 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 1 content and the intervention outcome effect for number of sodas consumed for those randomized in the Mom TOPS group.

4.5.17.2: Intervention Effect for Number of Sodas Consumed—Lesson 2 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this variable. There was no significant association between the intervention effect outcome for number of sodas consumed and lesson 2 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for number of sodas consumed for those randomized in the Mom TOPS group.

Subsection 4.5.17.3: Intervention Effect for Number of Sodas Consumed—Lesson 3 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this variable. There was no significant association between the intervention effect outcome for number of sodas consumed and lesson 3 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for number of sodas consumed for those randomized in the Mom TOPS group.

4.5.17.4: Intervention Effect for Number of Sodas Consumed—Lesson 4 Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this variable. There was no significant association between the intervention effect outcome for number of sodas consumed and lesson 4 content within the Mom TOPS randomization group.

This indicates there is no relationship between lesson 4 content and the intervention outcome effect for number of sodas consumed for those randomized in the Mom TOPS group.

4.5.17.5: Intervention Effect for Number of Sodas Consumed—Lesson 5

Content

Chi-square analysis could not be run for the Safe TOPS intervention group due to lack of participant responses available in each category for this variable. There was no significant association between the intervention effect outcome for number of sodas consumed and lesson 5 content within the Mom TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for number of sodas consumed for those randomized in the Mom TOPS group.

4.5.18: Intervention Effect for Number of Days Per Week You Eat Fast Food

The recoded variable for decrease in outcome for number of days per week you eat fast food was used for this analysis. Chi-square analysis was run to determine if there was a relationship between the recoded variable that identified an intervention effect outcome and the specific content of each of the five lessons.

4.5.18.1: Intervention Effect for Number of Days Per Week You Eat Fast Food—

Lesson 1 Content

There was no significant association between the intervention effect outcome for number of days you eat fast food and lesson 1 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is

no relationship between lesson 1 content and the intervention outcome effect for number of days per week you eat fast food for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.18.2: Intervention Effect for Number of Days Per Week You Eat Fast Food—
Lesson 2 Content

There was no significant association between the intervention effect outcome for number of days you eat fast food and lesson 2 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 2 content and the intervention outcome effect for number of days per week you eat fast food for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.18.3: Intervention Effect for Number of Days Per Week You Eat Fast Food—
Lesson 3 Content

There was no significant association between the intervention effect outcome for number of days you eat fast food and lesson 3 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 3 content and the intervention outcome effect for number of days per week you eat fast food for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.18.4: Intervention Effect for Number of Days Per Week You Eat Fast Food—

Lesson 4 Content

There was no significant association between the intervention effect outcome for number of days you eat fast food and lesson 4 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 4 content and the intervention outcome effect for number of days per week you eat fast food for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.5.18.5: Intervention Effect for Number of Days Per Week You Eat Fast Food—

Lesson 5 Content

There was no significant association between the intervention effect outcome for number of days you eat fast food and lesson 5 content within the Mom TOPS randomization group or the Safe TOPS randomization group. This indicates there is no relationship between lesson 5 content and the intervention outcome effect for number of days per week you eat fast food for those randomized in the Mom TOPS group and for those randomized in the Safe TOPS group.

4.6: Research Aim #3 Data Analyses –Part 2 –Regression Model

The second part of research aim #3 focused on if there were demographic variables that were closely related to higher levels of parental participation to toddler obesity prevention programs. This was done by creating a linear regression model that determined which demographic variables were significant predictors of higher

levels of parental participation. The demographic variables that were tested as significant predictors of parental participation in this regression model included caregiver race/ethnicity (Q26 on Mom Demographic Questionnaire), highest grade in school (Q30), marital status (Q31), household income (Q76), employment status (Q77), and hours of work per week (Q78).

A stepwise linear regression model was run to determine which demographic variables predicted higher levels of parental participation. Preliminary analyses were conducted to ensure no violation of any assumptions (normality, linearity, multicollinearity, and homoscedasticity). One variable (Highest Grade in School/pcdm251) out of all the demographic variables included in the model was determined to be the strongest predictor of higher levels of parental participation. Using the variable ‘Highest Grade in School’ in the model explained 20.1% of the total variance in level of parental participation, $F(1, 275) = 11.626$, $p < 0.001$. Results for each analysis for each variable are reported in table 24.

Table 24. Research Aim #3 Part 2 -- Regression Results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.201 ^a	.041	.037	3.176

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	117.257	1	117.257	11.626	.001 ^b
Residual	2773.574	275	10.086		
Total	2890.830	276			

a. Dependent Variable: total_lessons

b. Predictors: (Constant), pcdm251

Chapter 5: Conclusions

Section 5.1: Summary of Research

The prevalence of obesity among children in the United States has more than doubled over the last 30 years. This important public health issue has now become a major epidemic as researchers work to find ways to prevent childhood obesity. In 2014, approximately 23.9 million children ages 2 to 19 had overweight or obesity (Centers for Disease Control and Prevention (CDC), 2016). Children with overweight or obesity are more likely to become adults with obesity even if an individual has been suffering from overweight or obesity as young as 2 years old (CDC, 2016). Children with overweight or obesity and are also more likely to have risk factors for cardiovascular disease which could later develop into adult onset chronic diseases such as hypertension, diabetes, stroke, heart disease, asthma, and certain types of cancers (Go et al., 2014). Since children who are overweight and children with obesity are at high risk for becoming adults that will suffer from obesity and serious chronic disease, addressing the issue of preventing childhood obesity should be a top priority.

Incidence of obesity in young children ages 5 to 14 is also increasing. According to research done by Cunningham et al. in 2014, about 12.4 percent of children already have obesity when they enter Kindergarten (Cunningham et al., 2014). About fifteen percent of children are already overweight by the time they enter Kindergarten (Cunningham et al., 2014). Approximately thirty-five percent of

children who are obese or overweight when they enter Kindergarten were also large at birth and during their toddler years (Cunningham et al., 2014).

Lowering the incidence rates of obese and overweight children entering Kindergarten is important. If this is not addressed these children are more likely to suffer from serious chronic diseases that are brought on by being overweight or obese. Intervention and prevention programs aimed at lowering the incidence of children being overweight or obese when they enter Kindergarten is one way to address this public health issue. In 2011, The University of Maryland School of Medicine's Division of Growth and Nutrition developed a Toddler Obesity Prevention Program. The intervention, Tips on Parenting Study (TOPS), was a program designed to prevent toddlers from becoming overweight by focusing on the dietary, physical activity, and growth patterns of children participating in the Women, Infants & Children (WIC) Program. The intervention was a two-phase program. The interventions and program components were implemented over a time period of 3 months and over 8 group sessions.

One important barrier to overcome when trying to develop childhood obesity prevention programs is addressing parental participation in such programs. Even when incorporating relevant recommendations from previous research findings into the development of childhood obesity prevention programs, there is often an issue of program adherence. Childhood obesity prevention programs often deal with parental adherence to program protocols, which can lead to diminished program results.

Exploring factors that predict parental adherence will help to increase childhood

obesity prevention program adherence levels, which in turn will lead to better program outcomes.

The purpose of this research was to determine if an individual's stage of change identified at baseline is able to predict the level of parental participation in the TOPS program. The three major research questions addressed in this study were:

1. Are parents who identify themselves as being in the contemplation stage of change or higher more likely to higher parental participation levels than those parents who have not reached the contemplation stage of change?
2. Do parents need to attend a minimum number of intervention program meetings before showing an intervention outcome effect increase/decrease?
3. Does an association exist between intervention outcome effect increase/decrease and lesson content?

This chapter presents a summary of the research methodology, a summary of the findings and conclusions, policy implications of the research, and recommendations for future research. Also included in this chapter are the limitations of the research, the issues encountered and solutions during the data analysis phase.

Section 5.2: Summary of Research Aim 1 Findings and Conclusions

The first research aim examined if the stage of change of the caregiver determined at baseline was associated with higher levels of parental participation. It

was hypothesized that caregivers who had not reached the action stage of change would have higher levels of parental participation. Stage of change for several different intervention outcome activities were examined. The Mom TOPS intervention group and the Safe TOPS intervention group were analyzed separately.

The original plan was to run a Chi-square analysis to determine if there was a relationship between parental participation and stage of change, using the contemplation stage of change as a cutoff point. After running the Chi-square analysis using the contemplation stage of change as the cutoff point, it was discovered that several of the analyses had cell count violations. The cutoff point for the stage of change was changed to the action stage of change to address the cell count violation issue. Although this cutoff point is different from the one in the proposed data analysis plan, it was determined the most important to address the cell count violations by changing the stage of change cutoff point.

Out of the twenty-one intervention outcome activities analyzed for the Mom TOPS and Safe TOPS intervention group caregivers, only one yielded a statistically significant result. There was a significant relationship between the stage of change activity for eating no more than one salty or greasy snack and level of parental participation for caregivers in the Safe TOPS intervention group.

Overall, there was no relationship found to exist between stage of change and level of parental participation. One of the analyses for the intervention outcome activities did yield a significant association with parental participation level; however, since the number of intervention outcome activities that had an association with parental participation was small, it was determined that the significant association

found was likely due to simply running multiple chi-square analyses on similar variables.

Although there was no significant relationship found between caregivers who are in the action stage of change or higher and level of parental participation, the explanation for this could have to do with the way the caregiver's stage of change for each behavior was determined. According to Greene et al. (1999), the best way to measure an individual's stage of change is to define the target behavior and develop specific criteria for effective action (Greene et al., 1999). Using a two-question algorithm to determine an individual's stage of change adds a measure of individual confidence (the individual's own perception of their readiness to change) to determining the stage of change (Greene et al., 1999). When individual confidence is used instead of a formalized way of operationalizing the health behavior stage of change, then the individual's perception could lead to a misrepresentation of their true stage of change (Greene et al., 1999). The stage of change for the intervention outcomes in the TOPS study was determined by coding the responses from two questions and re-categorizing the responses from the two questions into a specific stage of change. For example, to determine the caregiver's stage of change for each behavior participants were asked the following questions: a) Do you currently participate in the behavior? and b) How ready are you to participate in the behavior? The two-question algorithm for determining the individual's stage of change could have resulted in an incorrect determination of the stage of change for each behavior, therefore leading to the data not showing a relationship between stage of change and level of parental participation.

Section 5.3: Summary of Research Aim 2 Findings and Conclusions

The second research aim examined if there was a minimum number of intervention program meetings that caregivers needed to attend to see a positive intervention outcome behavior change. There were sixteen different intervention outcome activities examined for this analysis. Caregivers in the Mom TOPS intervention group and the Safe TOPS intervention group were analyzed separately. The original plan was to run a Chi-square analysis on the intervention effect outcomes measured from baseline to six months and intervention effect outcomes measured from six months after baseline to twelve months after baseline. The number of participant responses for intervention effect outcomes significantly decreased at twelve months after baseline. It was decided to use responses from participants for intervention effect outcomes between baseline and six months after baseline to preserve as many responses as possible for the analyses.

Overall, there was no statistically significant relationship found to exist between the minimum number of meeting attendance and any of the intervention effect outcomes. Out of the sixteen intervention outcome effects analyzed for Mom TOPS and Safe TOPS intervention group caregivers, none yielded a significant result. A number of the child-focused intervention outcome effects did not have enough responses to analyze.

Based on the tenets of the Transtheoretical Model (TTM), the data analysis results for the second research aim could have been anticipated. Since the original plan of comparing intervention outcomes across three time periods (baseline, six

months after baseline, and twelve months after baseline) was changed to comparing two outcomes across two time periods, the insignificant results could have shown participants regressing back to certain behaviors at six months after baseline. Oftentimes there is not a linear progression through each stage of change (Prochaska & Norcross, 2002). For many behavior changes, relapse to a lower or previously reached stage of change is normal and expected (Prochaska & Norcross, 2002). It is therefore reasonable to expect statistically insignificant results when looking at intervention outcome behaviors and minimum meeting attendance when most participants could have regressed back to previous behavior habits that were present at baseline.

Section 5.4: Summary of Research Aim 3 Findings and Conclusions

The third research aim examined if there was an association between intervention meeting content and any intervention outcome effects. There were eighteen different intervention outcome effects examined for this analysis. Caregivers in the Mom TOPS and Safe TOPS intervention groups were analyzed separately.

Out of the eighteen intervention outcome effects analyzed for the Mom TOPS and the Safe TOPS intervention group caregivers there were two statistically significant results. There was a significant relationship for the reading labels on food packages intervention outcome and the content presented in lesson four among the Mom TOPS intervention caregivers. There was also a significant relationship for the engaging in moderate physical activity thirty minutes or more intervention outcome

and the content presented in lesson five among the Mom TOPS intervention caregivers.

Overall, there were minimal significant relationships found to exist between intervention meeting content and intervention outcome effect. Two of the analyses for some of the intervention outcome effects did yield a significant association with certain intervention meeting content; however, since the number of intervention outcome effects that had an association with intervention meeting content was small, it was determined that the significant associations found were likely due to simply running multiple chi-square analyses on similar variables.

The third research aim did not use a theoretical framework as a foundation for its development. The Chi-square and regression analyses run to examine the third research aim were exploratory. The intention of this exploratory analyses was to use the information to guide the development of future toddler obesity prevention programs. Although the analyses run for the third research aim did not yield significant results, it highlighted the impact that missing data can have on interpreting the true impact of an intervention program. Although the data did not show a significant relationship between intervention outcome increase/decrease and lesson content, there was valuable information given to participants during each lesson. I strongly believe the lesson content given to participants did have a positive impact, however, the true impact could not be shown through quantitative data analyses. A more appropriate measure of the true impact of the program could have been demonstrated through qualitative research methods. Qualitative research methods could include focus groups and one-on-one interviews with selected participants from

the Mom TOPS, the Tot TOPS, and the Safe TOPS intervention groups, exploring their perceptions of meeting content.

Section 5.5: Research Study Limitations/Lessons Learned

Overall the TTM did not serve as an informative and predictive behavior change model for this particular toddler obesity intervention program. Research studies that use a two-question algorithm to determine an individual's stage of change are not an effective way to determine the true stage of change for a particular behavior (Greene et al., 1999). The stage of change for the intervention outcomes in the TOPS study was determined by coding the responses from two questions and re-categorizing the responses from the two questions into a specific stage of change. The best way to determine an individual's true stage of change is by using a quantitative behavior change measure that more concretely defines an individual's stage of change (Green et al., 1999). Since TOPS did not have quantitative behavior change measures to concretely define the participants stage of change, the TTM was not an effective predictive behavior change model to use for this research. In addition to the issue of using a two-question algorithm for determining stage of change, research suggests that the TTM is not useful in predicting actual health behavior change (Park et al., 2014). Park et al. suggest that the TTM is better at predicting an individual's intention to change a behavior, rather than predicting an individual's actual behavior change action (Park et al., 2014). In addition to the research conducted by Park et al., a systematic review conducted by Mastellos et al. found that the TTM stages of change

yields inconsistent results for nutrition and physical activity weight modification health programs (Mastellos et al., 2014).

Although theoretical frameworks provide structure for developing and researching public health interventions, there is no one correct theoretical framework for obesity prevention (Gibbs et al., 2011). Obesity prevention theoretical frameworks are best determined by the components of the intervention and the population that is being researched (Gibbs et al., 2011). This was confirmed while performing the systematic review for gaps in the research for my dissertation topic. After combing through several thousand articles I selected a final eight articles that were most relevant to my dissertation topic. Out of those eight articles, two articles used the Health Belief Model as the theoretical framework for the childhood obesity program involving parents, while the remaining six articles did not mention any theoretical framework as a foundation for developing childhood obesity programs involving parents. While there are a number of commonly used theoretical frameworks for various types of childhood obesity intervention programs, trying to use one theoretical framework to address such the very complex issue of obesity can be a waste of resources (Baronowski et al., 2003). Researchers should consider using theoretical frameworks that incorporate more than one behavioral change theory to address the complexity of obesity interventions (Brug et al., 2005). Interventions that focus on individuals should incorporate a behavior change model theoretical framework (Gibbs et al., 2011). Interventions that focus on populations and addressing the obesogenic environment should incorporate a socioenvironmental theoretical framework (Gibbs et al., 2011). The World Health Organization suggests

addressing the complex issue of obesity with an equally complex approach (Gibbs et al., 2008). Interventions that focus on childhood obesity prevention should use the Health Promoting Schools framework (HPS) that is based on health promotion theory and has a socioenvironmental framework (Gibbs et al., 2008). The HPS framework recognizes the link between health and education (World Health Organization, 1997). The HPS framework also takes an eco-holistic approach using schools to create environments that encourage and create opportunities for healthy behavior change among children (World Health Organization, 1998). Research has shown the HPS to be effective at improving nutrition, physical activity, which are the key determinants of overweight and obesity (Langford et al., 2014). A systematic review of childhood obesity interventions also found that behavior change programs that involved schools to implement interventions had a higher success rate (Langford et al., 2015). Based on this information, the HPS framework that can be applied to daycares and pre-school settings would have been a more appropriate theoretical framework for examining TOPS and other similar programs.

There were several limitations encountered during this research. Small sample size contributed to a number of data analysis limitations in this research. The number of participants that participated in the intervention program was two hundred seventy-seven. Analyses run for the research aims in this study involved examining the participants by their randomized intervention group. Analyzing participants by randomization group further reduced the sample size available for data analysis. Smaller sample size not only reduces the power of the statistical analyses if

significant results are found, but also makes it difficult to detect differences among groups of participants (Gravetter & Forzano, 2019).

The outcome measures used for this research were mostly nominal level or categorical level variables. Nominal level and categorical level variables limit the types of analyses that can be used to examine and compare relationships between variables (Gravette & Forzano, 2019). When the outcome variable is nominal or categorical and the input variable is also nominal or categorical, the data analyses is limited to non-parametric tests, such as chi-square analyses (Campbell & Swinscow, 2009). The limitations on the type of analyses that could be performed since the outcome measures were mostly nominal or categorical level variables limited what relationships among variables could be examined and analyzed.

Another limitation of this research was the amount of missing data due to participants not answering questions at six months after baseline and twelve months after baseline. Missing data further reduces the sample size of observable participants that can be analyzed adequately and reduces the statistical power of the results of the data analyses (O'Rourke & Thomas, 2003). In order to get an accurate comparison of outcome behavior changes over time, responses to the behavior change outcome questions for each participant need to be compared at baseline along with the responses after baseline. There are some data analysis techniques that can be used to handle missing data, but those techniques would not have been useful to examine the variables in each of the research aims due to the large amount of missing data and the small sample size.

There are a number of contributing factors that could be responsible for the high amount of missing data for some of the outcome measures. In general, research has shown that inner-city, less-educated populations are harder to reach for follow up and this can have adverse effects on response rates to health intervention programs (Havas et al., 1997). Difficulty with locating participants for all of the follow up sessions, 6 months after baseline and 12 months after baseline, could have contributed to high amounts of missing data. Researchers have found that low-income WIC participants have low retention rates in health intervention trials (Di Noia et al., 2019). Researchers suggest improving incentives among this population (low-income WIC participants) to modestly increase rates of interest in health intervention program retention and completion among participants (Di Noia et al., 2019). More research is needed to determine which strategies work best for increasing retention rates for health intervention programs that use WIC participants (De Noia et al., 2019).

Another contributing factor to missing data could have been lack of understanding of the questions among participants. Participants in TOPS had less formal education than the U.S. population on average (U.S. Department of Education, 2018). Researchers suggest using other strategies such as DVD presentations, flipchart pictures, and brief sentences to maximize participants' understanding of health intervention materials (Chang et al., 2009).

The use of self-report measures for some of the intervention behavior outcome measures served as a limitation in this research. The baseline questionnaire had questions that asked participants to report the number of fruit servings eaten daily, the

number of vegetable servings eaten daily, and to report other health-related behaviors. An individual's self-report responses to health behavior questions are often influenced by two factors: difficulty recalling precise details about the health behavior activity being questioned and an individual's desire to look socially desirable to researchers (Ferrari et al., 2020; Dyrstad et al., 2014). It is possible that participants reported more favorable answers to the health-related behavior questions because they did not want to look unfavorable to researchers (Dyrstad et al., 2014). If participants reported more favorable answers to the baseline health-related behavior questions and the baseline stage of change questions, data analyses comparing the behavior change between baseline and six months after baseline would be compromised.

Section 5.6: Policy Implications

Subsection 1 The main goal of this research is to work toward creating stage-specific communication and health education materials for parents in obesity prevention programs by informing researchers of the correlation results between stages of change and number of prevention meetings attended by parent participants and the minimum number of meetings attended by parent participants who showed positive health behavior change.

Another goal this research is to use the results to contribute to the body of research knowledge that is used to develop strategies to prevent children from becoming overweight and obese. Identifying ways to address participation problems to childhood obesity prevention/intervention programs could lead to a higher success

rate for health behavior change programs whose aim is to reduce BMI and reduce obesity related activities in children. Identifying ways to address participation problems to childhood obesity prevention/intervention programs could contribute to the body of research focused on reducing childhood obesity, which in turn could reduce the number of children with obesity who become adults with obesity who also suffer from chronic diseases brought on by obesity, such as heart disease and diabetes. Millions of dollars each year are spent on nutrition programs and obesity research that target adolescent and school age children.

The TOPS program was not designed solely to test the TTM stages of change. The program focused on increasing parent knowledge in nutrition, physical activity, parenting and safety in order to aid in preventing toddlers from becoming obese. In terms of developing programs that could add to the body of research used to implement policy change, it is important that the theoretical framework used to evaluate the effectiveness of the program closely matches the purpose of the behavior change program (Gibbs et al., 2011). The results of this research show the importance of making sure the theoretical framework of the research matches the health behavior change program focus in order to contribute to future policy implementation.

The TOPS program had several follow-up outcome measures with missing answers from participants. This highlights the issue of the difficulty of conducting research on WIC participants (Di Noia et al., 2019). WIC program participants are seen as an ideal population to recruit for health behavior change programs because participants have to show up in-person for WIC appointments and often perceive health behavior change program information as helpful (Di Noia, et al., 2019).

Although the WIC participant population is accessible, there are high attrition and low retention rates which in turn reduces the statistical power of the study and increases the costs of implementing the program (Di Noia et al., 2019). Even though WIC participants are accessible and easily recruited as participants to health behavior change programs, more research needs to be done to figure out how to increase retention rates among this population of participants. While the TOPS program used a highly accessible population, there were not multiple qualitative components in the program outcome measures that focused solely on reasons why participants did not complete all meetings, why participants did not answer all survey questions, if participants understood all program lessons, and if participants found that attending the program lessons was a good use of their time. This lack of qualitative component in the TOPS program outcome measures was a missed opportunity at being able to contribute important information that may help to increase retention rates among the WIC participant population in the future. An added qualitative component to the TOPS program that may have added important information and adjusted policies on how to improve retention rates and lower attrition rates among the WIC participant population.

The TOPS program focused on providing health education for caregivers of toddlers participating in the program (Black et al., 2013). The intent on increasing health knowledge among parents in the areas of nutrition, physical activity, parenting, and safety was for caregivers to use this knowledge in everyday activities which in turn could lead to preventing obesity (Black et al., 2013). If one were to apply the Health Impact Pyramid framework to the focus of the TOPS program, the cost of

developing and implementing this type of program to address childhood obesity would not be a cost-effective way to do so. According to the Health Impact Pyramid framework the most cost-effective health behavior change program will be one that addresses socioeconomic factors of health because it is most likely to have the greatest impact in terms of numbers of individuals and proposed effectiveness (Frieden, 2010). While the TOPS program may be a program able to target a specific and small group of individuals, according to the Health Impact Pyramid framework it is not a cost-effective way to address public health behavior change among a large group of individuals (Frieden, 2010). The TOPS program is also in the category of health behavior change programs that is most likely to be the least effective at changing behavior and therefore not a cost-effective solution to addressing childhood obesity (Whitlock et al., 2002).

The results of this research study could, in the long run, help contribute to the body of research that builds a foundation for changing the way future childhood obesity prevention programs are implemented and funded.

Section 5.7: Recommendations for Future Research

This research examined if a participant's stage of change identified at baseline would predict the level of parental participation in a toddler obesity intervention program. If participants do not actually participate or attend intervention lessons, a positive change in health behaviors cannot be expected. When trying to prevent obesity in children, it is important to develop obesity intervention programs that involve the parents or caregivers of the children. Future research should focus on

using a validated approach to determine a parent's or caregiver's perception of health risk. Using a validated approach to determine perception of health risk could help with identifying which aspects of the intervention would be most helpful to the parent. For example, if a parent does not perceive that there is an issue with their child being obese, intervention materials could be developed that aim at increasing knowledge of obesity-related health problems that could occur in the future.

If researching the TTM stage of change as a predictor of behavior change, it is recommended that an operationalized way to determine the individual's stage of change for a particular behavior is developed. For example, if determining an individual's stage of change for weekly moderate to vigorous physical activity stage of change could be operationalized in the following ways:

- 10 minutes of weekly physical activity = precontemplation stage of change;
- 30 minutes of weekly physical activity = contemplation stage of change;
- 60 minutes of weekly physical activity = preparation stage of change;
- 90 minutes of weekly physical activity = action stage of change;
- 120 minutes of weekly physical activity = maintenance stage of change.

Using an operationalized way to determine an individual's stage of change may yield more accurate results instead of using a two-question algorithm that uses the participant's self-efficacy as part of the stage of change determination. In addition to operationalizing an individual's stage of change, it is also recommended to find a way to measure overall stage of change for activity categories. The TOPS program included stage of change outcome measures for nutrition and physical activity,

parenting knowledge, and child safety knowledge. Figuring out a way to measure the stage of change for overall nutrition activities, overall exercise/increased movement activities, safety knowledge activities, and parenting knowledge activities could be a helpful way to predict health behavior change of program participants.

Nominal and categorical level variables are helpful in some research studies but can limit the types of analyses options available for variables in the research. This in turn limits the amount of relationships between variables that can be compared and examined (Campbell & Swinscow, 2009). It is recommended that future research studies consider using more outcome variables that are interval level or ratio level so more options for higher levels of data analyses can be available.

Bridging the information and knowledge gap could lead to a change in the parent's or caregiver's health risk perception, which in turn could lead to increased parental participation. In addition, using a mixed method approach by incorporating a qualitative component to the intervention may be helpful. Gaining a more complete understanding of other factors that could affect intervention program participation will help with improving how the intervention program activities are delivered to participants.

Using a different health behavior change theory to develop a health behavior change program aimed at preventing childhood obesity is recommended. Since there is research that has pointed out inconsistent results of using the TTM as a theoretical framework as the foundation of a behavior change program, using a different and more effective theoretical framework should be considered in future research. One recommended theoretical framework consideration is to use the Health Impact

Pyramid as a theoretical framework for the development of a behavior change program aimed at preventing obesity in children. The Health Impact Pyramid framework suggests developing a health behavior change program that addresses socioeconomic factors in order to have a greater impact on a greater number of people (Frieden, 2010). The TOPS program was a program that sought to increase a parent's knowledge in nutrition, physical activity, and parenting. According to the Health Impact Pyramid framework, programs like TOPS are helpful, but may not be as effective as other types of interventions that address socioeconomic factors of health. Another recommended theoretical framework consideration is to use the HPS framework that utilizes schools to develop and implement health behavior change programs. Research has shown that using the HPS framework has increased fruit and vegetable intake among children as well as increased levels of physical activity (Langford et al., 2015).

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