

HEALTH LITERACY INTERVENTION: MEASURING INFORMATION LITERACY
SKILLS RELATED TO OBESITY

by

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ABSTRACT

This was a study of the effectiveness of a health literacy intervention to empower parents to use an easy-to-read book to help their families live a healthier lifestyle. Parents ($n = 26$) received copies of a book called *What to Do When Your Child is Heavy* and completed a 45-minute program to go along with the book. The program consisted of a presentation of the book and an information literacy activity in the form of a bingo game with the help of the trainer. This allowed participants to practice using the book to answer health-related questions. After the bingo game, the parents were given a post-test with different scenarios to allow them to practice finding information in the book on their own. The outcome measures included information literacy skill accuracy and participant engagement. Data showed that accuracy on the bingo game was high. For information literacy skills, results indicated that accuracy was significantly higher than the hypothesized mean of 50%. This means that participants are capable of looking up information in the book to help them with diet and weight management for their family.

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CHAPTER I

INTRODUCTION

Overview

According to the National Assessment of Adult Literacy (Kutner, Greenberg, Jin, & Paulsen, 2006) 14% of adults in the total population score below the basic level of health literacy and 36% score below the intermediate level. These adults are not able to read and understand charts, tables, and simple instructions on prescription labels such as when to take a medication. Individuals with low health literacy self-reported poorer health outcomes on the National Assessment of Adult Literacy (Kunter et al., 2006). Health literacy is defined as “the degree to which individuals have the ability to obtain, process, and understand basic health information and services to make appropriate health decisions,” (U.S. Department of Health and Human Services, 2000, p. 3). One common health problem is weight. According to the National Health and Nutrition Examination Survey, 30.4% of children and adolescents were overweight or obese in 2009-2010, and this number increased to 31.8% in 2011-2012 (Ogden, Carroll, Kit, & Flegal, 2014). Studies have recently shown that poor health literacy plays a role in the rising rates of obesity in adults and their children (Chari, Warsh, Ketterer, Hossain, & Sharif, 2013; Lietchy, Saltzman, & MUSAAD, 2015). The purpose of the current study was to provide a brief health literacy intervention for parents on diet and weight management, and then measure the changes of information literacy skills in participants.

Many studies have examined the relationship between health literacy and obesity. Chari, Warsh, Ketterer, Hossain, and Sharif (2013) conducted a study to test the

association between child and parent health literacy and obesity. The odds of obesity in children decreased with higher parent literacy scores on the Newest Vital Sign (NVS) test. The NVS is a quick and easy health literacy screening formatted as medication and food label reading (Weiss et al., 2005). The results from this study indicated that there is a strong relationship between parental factors (e.g. health literacy) and obesity in adolescents. Health literacy is also related to exercise, which is a factor in obesity. In the STRONG kids study (Lietchy, et al., 2015) 76% of parents with adequate health literacy would consider increasing exercise/activity as a strategy to help their child lose weight as opposed to 42% of parents with low health literacy. Studies have established that literacy is significantly related to a number of diet and weight related behaviors that include: nutrition label reading (Allen, 2014; Weiss et al., 2005), exercise (Lietchy, et al., 2015; Rieckon, 2012), healthy eating (Kennett, 2014; Zoellner et al., 2011), and portion control (Chaudry, Connelly, Siek, & Welch, 2011; Huizinga et al., 2009). However, no studies have examined the effectiveness of a literacy intervention in changing any of these behaviors.

There are intervention materials available for health literacy related to weight. The book *What to Do When Your Child is Heavy* (Mayer & Villaire, 2015) is an easy to read book for parents of children who are overweight or obese. The book is well organized. Each topic asks a question and then answers the question in bullet points that are easy to read with no medical jargon. The publisher of the book states that it is written in third to fifth grade reading level (Institute for Healthcare Advancement, n.d.). It teaches numerous literacy skills that are relevant to weight outcomes. The book is

organized to make information easy to find by providing an index in alphabetical order with literacy skills (e.g. activities, BMI chart, food choices, etc.) that takes the reader to the page number of that topic. Some of the literacy skills include numeracy for height and weight charts, nutrition fact labels, and exercises. Height and weight charts show the normal height and weight for each age according to the child's gender. This allows the parent to know what a healthy weight is for their child. Portion control is a measure of how much food is eaten at once. Nutrition labels are pictured on foods to inform the consumer about the serving size, calories, fat, sodium, sugar, fiber, and protein contained. Exercise is an activity that requires physical effort, and there are three different kinds. This particular information plays a role in obesity and weight control.

The current health literacy intervention provided the *information literacy* skills needed – the ability to look things up in the book and apply the information (Hosp, Hosp, & Howell, 2007). The trainer's manual provided with the book outlines lesson plans for how to use the book, how to know what a heavy kid is, plan family meals, choose healthy foods, and live a healthy lifestyle. Each lesson provides information literacy activities (e.g. "Go to the section on food shopping and tell me what you should look for when buying fresh fruit"). These activities allowed the participants to practice finding information in the book. This information from the trainer's manual was modified to provide a more participative approach in the form of a bingo game. The training manual also provides an evaluation form as an outcome measure that assessed learner satisfaction with the book and presentation. The effectiveness of this curriculum had previously not been tested, but an outcome study conducted by Herman and Jackson (2010) for a similar

health literacy curriculum product, the book *What to Do When Your Child is Sick* (Mayer & Kuklierus, 2012), has been tested.

Studies of Information Literacy Interventions

Herman and Jackson (2010) trained over 9,000 parents who had their child enrolled in the Head Start Program. Parents were taught how to use a low literacy book about the health care needs of children, called *What to Do When Your Child Gets Sick* (Mayer & Kuklierus, 2012). The parents practiced how to use the book and then answered questions about common childhood medical problems. This study looked at three different outcome measures: attitudes, health knowledge, and behaviors. The parents' attitudes were measured before and after the intervention by looking at their confidence or anxiety in taking care of their children when they are sick. Most of the parents (90%) were very worried about their child being sick; after the intervention that decreased by one-third. Health knowledge was assessed before and after the intervention by giving parents different scenarios over common childhood illnesses (e.g. "What would you do if your child had a temperature of fever of 99.5° F?"). They responded by saying they would either look in the health book, call the doctor, or go to the ER. After the intervention, the parents who would look in a health book increased from 5% to 48%. This study also assessed parents' behaviors of what they do when their child is sick before and after the intervention. The number of doctor or clinic visits decreased by 42%, workdays missed by the primary caretaker decreased by 42%, and school days missed decreased by 29%. Herman and Jackson (2010) concluded that this study impacted

parents, and provided them a way to care for their child's health needs without the added expenses.

Bernstein, Crooks, Edwards, and Pigg (2017) also conducted the same intervention using the book *What to Do When Your Child Gets Sick*. As with other interventions with this curriculum (e.g., Cook, 2015), behaviors were measured with a follow-up survey three months later, 63% reported using the book at least once instead of calling the doctor, and 50% reported using the book at least once to avoid a visit to the ER. However, unlike previous studies, Bernstein et al. (2017) developed an outcome measure for the information literacy skills that were part of the training for the book – during the intervention, parents practiced using the book to find answers about children's health and the measurement tracked these skills. Bernstein et al. (2017) measured information literacy skill gains with a test developed and validated by the researchers: worksheets with a series of yes/no questions about a child's illness, accident, or injury that parents answered using their books. Parents also reported the page number on which they found their answers to avoid a guessing bias. This was used as a curriculum based measurement of information literacy skills – using the book to correctly answer questions about children's health (Hosp et al., 2007). The measurement had high internal consistency, $\alpha = .76$ (Kline, 1999). During training 100% of participants reached the goal of correctly answering at least 3 out of 4 questions correct and in the post-test, 73% of parents could independently answer at least 3 out of 4 questions correctly.

Study Purpose

The current study was an information literacy intervention, because during the intervention parents practiced locating information in the book to help them answer health-related questions. One way to measure progress for this type of intervention is to give an assessment of information literacy. In the current study, a curriculum based information literacy measure (CBM) was used to assess whether the parents had learned what they were taught during the intervention. To construct a CBM, it must follow two things: alignment and adequate sampling (Hosp et al., 2007). Alignment means that what is being assessed must follow along with what is being taught (i.e. health literacy). For adequate sampling, there must be enough items on the measure, and it has to be done in an adequate amount of time in order to see knowledge growth in the participants (Hosp et al., 2007). The CBM that was used in this study departs from an ideal CBM because a 45-minute session is not an adequate amount of time to see knowledge growth, and parents often lack the time and interest. The focus of this study was on teaching parents how to use the book to answer health-related questions.

The intended purpose of this study was to measure the change in the parents' information literacy skills. This study tested the effectiveness of a health literacy intervention for weight using the book and training manual from *What to Do When Your Child is Heavy* (Mayer & Villaire, 2015). The goal of the intervention was to empower families to use a book and help themselves. Parents from the community were recruited to receive the book and complete a class on how to look up information in the book in the form of a bingo game. Two outcomes were measured as illustrated in Figure 1:

information literacy skills and feedback/satisfaction. The goal of the study was to measure the changes in parents' information literacy skills and test the validity of the measurements.

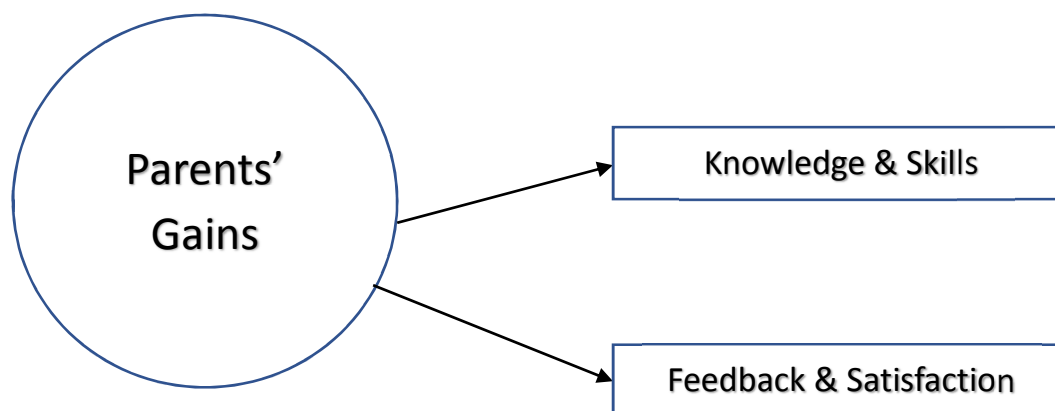


Figure 1. *Measurement Model for Parents' Gains*

Hypotheses

Hypothesis 1. As a measure of engagement, this study predicted that participants would answer the bingo questions and identify the page numbers with 100% accuracy, because these were all answered during training with the trainer's help.

Hypothesis 2. It was predicted that participants would perform better than by chance (> 50% correct) for each of the five post-test questions. Additionally, it was predicted that on the post-test, page numbers would be identified with 50% accuracy.

Hypothesis 3. It was predicted that participants would report having positive perceptions of the intervention and the book, both measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

CHAPTER II

METHODS

Participants

Families were recruited from the community in Dyer County, Tennessee through flyers advertising a family health literacy event via Facebook. A local church was used as the intervention site. The incentives included prizes for the bingo winners and a free health book for all participants. The typical minimum recommended sample size for Chronbach's alpha is 300 (Yurdugul, 2008). There were 26 participants across 3 sessions with approximately 8 participants in each session.

The participants were asked to report the following demographic information as shown in Table 1: gender, age, language, yes or no to primary care physician; yes or no to books on weight management; and parent's perceptions of their child's weight. The parents' ages ranged from 24 – 51 years old ($M = 37.15$, $SD = 8.62$). Participants were 12 fathers (46.2%) and 14 mothers (53.8%). The majority of parents in this study were Caucasians. Dyer County includes 83.1% Caucasians, 14.1% African Americans, 3.4% Hispanics, and 0.7% Asians. Parents had between 1 and 5 children with most indicating they had 1 child ($M = 1.85$, $SD = 1.05$). All of the participants used English as their primary language spoken at home. It was reported that all children had a primary care physician. However, only 9 of the parents had a book on weight management, nutrition, and/or exercise. The parents included in this study had children ages 1 – 18 ($M = 9.42$, $SD = 5.44$). According to parents' perceptions of their child's weight, 1 child was underweight, 32 children were average weight, and 5 children were overweight.

Although, this intervention was targeted towards overweight children, the book and intervention provided, can be used as a preventative tool for children who are not overweight.

Table 1.

Participant Descriptive Statistics

| Characteristic | <i>n</i> | % |
|------------------------|----------|-----|
| Gender | | |
| Male | 12 | 46 |
| Female | 14 | 53 |
| Age | | |
| 20 – 40 years | 17 | 65 |
| 41 – 60 years | 9 | 35 |
| Language | | |
| English | 26 | 100 |
| Number of Children | | |
| 1 – 2 | 19 | 35 |
| 3 – 5 | 7 | 27 |
| Primary Care Physician | | |
| Yes | 26 | 100 |
| No | 0 | 0 |
| Books on Weight | | |
| Yes | 9 | 35 |
| No | 17 | 65 |
| Parents' Perception | | |
| Underweight | 1 | 2 |
| Average | 32 | 84 |
| Overweight | 5 | 14 |

Materials

Books for parents. The book *What to Do When Your Child is Heavy* (Mayer & Villaire, 2015) was given to all the participants in the study. It is an easy-to-read book that provides information on exercise, eating the right food, portion control, how to read nutrition labels, etc. After taking three random samples from the book (i.e. Height and Weight Chart, Cook Healthy, and Friends) and putting them into the Readability Analyzer (Tyler, 2016) program using the Flesh-Kincaid Grade Level, the results indicated that the book is at grade levels: 2.13, 2.59, and 2.56. For each chapter, the following questions are answered in an easy-to-read bullet point format: (a) What is it; (b) Did you know; (c) What can I do; (d) When should I get help.

Training manual. The health literacy intervention was presented using the training manual that is provided by the book publisher as a guide on how to conduct the sessions. The manual provides learning objectives, a lesson, and a list of the materials needed for each segment of the intervention. Lesson one in the training manual included an overview of the book *What to Do When Your Child is Heavy* (Mayer & Villaire, 2015). This lesson was used to present the book to the parents. The other lessons in the training manual were adapted to fit the current study's presentation of the book and the bingo game. In chapter 3 of the training manual, called Training Skills and Techniques, it provides the trainer with information on how to understand the adult learner, communicate clearly, and show warmth and friendliness. In chapter 5, called Managing Unexpected Classroom Situations, it teaches the trainer how to deal with difficult people. A training rubric was developed as an assessment of chapters 3 and 5 in the training

manual. The trainer practiced until she could deliver the intervention proficiently (i.e., 13 out of 15 points on the rubric - See Appendix A). The trainer had to know the content of the book and how to conduct the intervention using the manual as a guide.

Test packets for parents. All participants received a test packet at the beginning of the session when they signed in. The test packet, provided in the appendix, included the following items: registration form (See Appendix B), bingo card (See Appendix C), post-test (See Appendix D), and evaluation form (See Appendix E). The registration form, bingo cards, and post-test measures were created for the current study, as none of them existed as assessments in the training manual. The evaluation form was used from the training manual.

The health literacy intervention consisted of parents using their books to answer questions. These questions were delivered in the form of a bingo game in order to make the session fun and interesting.

Measures of information literacy. The measures of information literacy (i.e., bingo game and post-test) consisted of questions that corresponded with the book *What To Do When Your Child is Heavy* (Mayer & Villaire, 2015). These questions were constructed as a curriculum-based measurement of information literacy based on a measure used and validated by Bernstein et al. (2017). For the bingo game, 12 questions (see Appendix F) were presented independently on a PowerPoint. These questions were written to sample 10 different topics (e.g. Exercise, Vitamins, Nutrition Facts Label, etc.) throughout the book. The parents had to use the book to answer the healthy living related questions, and record the page number containing the answer (i.e., “Sleep is important, it

helps our minds and bodies recharge. Roughly how many hours of sleep does a 12-18 year old need?”). Participants found the answer on their bingo card, and wrote down the page number it was found on. The trainer and participants helped each other find the answers. After they completed the bingo game, the parents answered the five post-test questions on a worksheet independently. According to the website Readability Analyzer (Tyler, 2016), these questions were at a 5th grade reading level.

Evaluation form. After the intervention was completed the participants were given an evaluation form to fill out (See Appendix E). This was based on the evaluation form from the publisher inside the training manual. It included statements that related to the usefulness of the intervention and book in the form of a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Some of the questions were: (a) I learned something from the class; (b) I am able to find things in the book that I want to know; (c) and I plan to use the book when I get home.

Procedure

The author of this thesis was the trainer in the three sessions. The trainer practiced delivering the intervention to a couple of friends and to the professor via video recording. The video recording was sent the professor, and he used an evaluation rubric (see Appendix A) to be sure the information was presented correctly. The evaluation rubric rated the trainer in areas such as preparation, tone and mood, timing and scheduling, questions, and accuracy and feedback. The trainer completed two practice sessions until she reached a score of proficient (i.e., 13 out of 15 points on the rubric). The trainer then

delivered the program in three different sessions with participants from the community at a local church.

Each session took no more than 45 minutes to complete. As parents came in the church, they signed in, gave their consent for research, and received parent packets (See Appendix B, C, D, and E). Once they sat down in groups, the registration form was immediately filled out then the intervention began. The intervention consisted of the following: (a) an introduction using a PowerPoint presentation (10 minutes); (b) practice using the book in the form of the bingo game (20 minutes); (c) post-test (10 minutes); and (d) evaluation form (5 minutes). The introduction included an overview of the book *What To Do When Your Child is Heavy* (Mayer & Villaire, 2015) and an explanation of how to use the book to look up information following the training manual's suggested introduction of the book. First, the trainer included how the A-Z index and table of contents could be used to find answers, then the trainer modeled how to use the book to answer a question (i.e. Concerning portion size, how many teaspoons of butter is about the size of one dice?). Institutional review board (IRB) approval was received prior to collecting data (See Appendix G).

Following the introduction, participants practiced answering questions with their books by playing the bingo game. They were placed in groups of three or more, so they could help each other find the answers. For the game, every participant had a bingo card from their packet. The bingo questions that were asked appeared in Appendix F. Each bingo question was displayed on its own slide/screen using a PowerPoint presentation, so the parents could easily remember what it was while they searched for answers. Whoever

found the answer first raised their hand, and told everyone how they found the answer. Then everyone marked the answer on his or her bingo cards. The game continued until at least 12 questions were answered. Parents *won* the bingo game by finding five correct answers in a row on their cards. The first two participants that yelled out *bingo*, received a prize (e.g., mason jar with gum, tic-tacs, chapstick, and hand sanitizer) and the game continued until all 12 content questions and 12-page number questions were answered. Cards were marked with participant numbers to measure accuracy during the practice sessions.

During the bingo game, the trainer went around to the different groups to help them find the answers to the bingo questions. This allowed the participants to practice using the book to look up information. Then, the parents completed a post-test measure using the book without receiving help from anyone else. Lastly, the parents filled out the evaluation form from their packet with questions related to the effectiveness of the class (See Appendix E).

CHAPTER III

RESULTS

Information Literacy Skills

Hypothesis 1. Summary data for accuracy during training appears in Table 2. The hypothesis for performance during training (with assistance from the trainer) was that parents would answer the bingo questions and identify the page numbers with 100% accuracy. A Pearson chi-square goodness of fit test was calculated to evaluate whether correct answers for bingo questions and page numbers for each of the 12 questions differed from 26 participants each. When examining bingo question accuracy, there was not a statistically significant difference between the observed frequencies and the distribution of 100% correct answers for all questions, $\chi^2(11) = 0.39, p > .05$. When examining the page number accuracy, there was also not a statistically significant difference between the observed frequencies and the distribution of 100% correct answers for all questions, $\chi^2(11) = 1.26, p > .05$.

Table 2.

Frequency of Correct Items on the Bingo Game

| | Frequency | % |
|-----------------------------|-----------|-----|
| Accuracy | | |
| 1) Kinds of Exercise | 25 | 96 |
| 2) Avocado Contains Vitamin | 25 | 96 |
| 3) Low Number of Calories | 24 | 92 |
| 4) Average Healthy Weight | 24 | 92 |
| 5) Carbohydrates Turn Into | 26 | 100 |

(Continued)

Table 2 (cont.)

| | Frequency | % |
|-----------------------------|-----------|-----|
| Accuracy | | |
| 6) Snack Within Meal Time | 26 | 100 |
| 7) How Many Hours of Sleep | 26 | 100 |
| 8) Sweet Potato Vitamins | 24 | 92 |
| 9) Vitamin D Found Through | 25 | 96 |
| 10) Body Makes Insulin | 25 | 96 |
| 11) Unhealthy Diets | 23 | 88 |
| 12) Cups of Fruit Per Day | 25 | 96 |
| Page Number | | |
| 1) Kinds of Exercise | 25 | 96 |
| 2) Avocado Contains Vitamin | 25 | 96 |
| 3) Low Number of Calories | 24 | 92 |
| 4) Average Healthy Weight | 24 | 88 |
| 5) Carbohydrates Turn Into | 26 | 100 |
| 6) Snacks Within Meal Time | 26 | 100 |
| 7) How Many Hours of Sleep | 26 | 100 |
| 8) Sweet Potato Vitamins | 26 | 100 |
| 9) Vitamin D Found Through | 25 | 96 |
| 10) Body Makes Insulin | 24 | 92 |
| 11) Type of Unhealthy Diets | 24 | 92 |
| 12) Cups of Fruit Per Day | 20 | 77 |

Note. Frequency is the number of correct answers for each question out of 26 participants.

Information Literacy Post-Test

Hypothesis 2. The hypothesis for the post-test was that participants would perform better than by chance (> 50% correct) for accuracy on each of the five post-test questions and also for reporting page numbers. A single sample t test was calculated to evaluate Hypothesis 2. The total percentage of correction for guessing was calculated by

taking the total number of correct responses for each item (i.e., 8) divided by the total number of choices for each item (i.e., 16), which equals 50%. The average percentage of guessing on each individual post-test item are as follows: (a) Question 1 – 67%; (b) Question 2 – 50%; (c) Question 3 – 50%; (d) Question 4 – 50%; (e) Question 5 – 25%. Question accuracy on the post-test ($M = 95.51$, $SD = 7.54$) was significantly higher than guessing (50%), $t(25) = 30.78$, $p < .01$. Page number accuracy on the post-test ($M = 94.55$, $SD = 7.43$) was significantly higher than guessing (50%), $t(25) = 30.57$, $p < .01$.

Item total correlations were calculated to the internal consistency validity of the post-test. Empty responses for either answers or page numbers were counted as not attempted rather than as incorrect. Table 3 displays the average accuracy on the post-test for both questions and the page number questions. Internal consistency was low, Cronbach's $\alpha = .31$. The minimum sample size for Cronbach's α was not met, so findings should be interpreted with caution.

Evaluation Forms

Hypothesis 3. The hypothesis for the evaluation form was that participants would report having positive perceptions of the intervention and the book, both measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Summary data for the ratings appear in Table 4. A Pearson chi square goodness of fit was used to evaluate Hypothesis 3. Ratings of 1 to 3 were collapsed into a single category in order to meet the minimum n requirement for the test. When examining the ratings of the participants' perceptions of the book, there was no statistically significant difference in ratings among

the give questions, $\chi^2(4) = 6.45, p > .05$. That is, participants responded with ratings of 4 to 5 to all questions.

Table 3.

Internal Consistency of Items on the Information Literacy Post-Test

| | <i>M</i> | <i>SD</i> | Corrected Item-Total Correlation | Cronbach's α If Item Deleted |
|------------------------------|----------|-----------|--|---|
| Accuracy | | | | |
| 1) Good and Bad Fats | 92% | 27 | .27 | .22 |
| 2) Amount of Fats | 92% | 27 | .13 | .28 |
| 3) Amount of Protein | 69% | 47 | -.04 | .40 |
| 4) Healthy Food as a Reward | 96% | 20 | .17 | .27 |
| 5) Talk with Child's Teacher | 77% | 43 | .16 | .26 |
| Page Number | | | | |
| 1) Good and Bad Fats | 96% | 20 | .17 | .27 |
| 2) Amount of Fats | 88% | 33 | .12 | .28 |
| 4) Healthy Food as a Reward | 88% | 33 | .38 | .14 |
| 5) Talk with Child's Teacher | 88% | 33 | -.11 | .39 |

Note. *M* is the average accuracy for each question out of 26 participants.

Table 4.

Frequency of Items on Evaluation Form

| | Rating 1 | Rating 2 | Rating 3 | Rating 4 | Rating 5 |
|---|----------|----------|----------|----------|----------|
| Questions | | | | | |
| 1) I like the book <i>What to Do For Heavy Kids</i> . | 0 | 2 | 1 | 4 | 19 |
| 2) This book will help me live a healthy lifestyle for my family. | 0 | 2 | 1 | 6 | 17 |
| 3) I learned something from the class. | 0 | 0 | 1 | 5 | 20 |
| 4) I am able to find things in the book that I want to know. | 1 | 1 | 0 | 2 | 22 |
| 5) I plan to use the book when I get home. | 1 | 1 | 3 | 5 | 16 |

Note. Rating 1 is *strongly disagree*, and rating 5 is *strongly agree*.

CHAPTER IV

DISCUSSION

Studies have established that information literacy is significantly related to a number of diet and weight related behaviors that include: nutrition label reading (Allen, 2014; Weiss et al., 2005), exercise (Lietchy et al., 2015; Rieckon, 2012), healthy eating (Kennett, 2014; Zoellner et al., 2011), and portion control (Chaudry et al., 2011; Huizinga et al., 2009). The goal of the current study was to examine the effectiveness of a health literacy intervention in changing information literacy skills related to these behaviors. The project was focused on helping low-literacy parents with healthy diets and weight management issues for their children by providing them with an easy to read book and training on how to use it.

Parents from ages 24 – 51 with children ages 1 – 18 were taught how to look up information in a book and then practiced using their books to answer questions in the form of a bingo game with help from the trainer and each other. The exact literacy levels of participants were not addressed. Performance during the bingo game was very high – all but 3 out of the 24 responses averaged over 90% correct. After the intervention, participants also showed that they were able to use the book to accurately answer questions on the post-test. Finally, parents were highly satisfied with the book and class. These findings should be interpreted cautiously, because low literacy parents of young children with weight problems were not the only ones recruited for this study.

Performance During Training

Hypothesis 1. The study first hypothesized that participants would answer bingo questions and page numbers with 100% accuracy. Accuracy during the training (i.e., bingo game) was high – 4.49% of the questions were missed. The Pearson chi square results did not show that this was a significant departure from all correct answers. The high accuracy could have been due to the help parents received from the trainer and each other, or it could have been due to the mixture of literacy levels of the parents. The 12 bingo questions included a variety of topics. Question 11 (i.e., These types of diets do not work and may be unhealthy for you.) was one that parents struggled with the most. This may be due to the length of the questionnaire, causing fatigue towards the end. However, there was a non-significant trend of lower accuracy towards the end of the program. All studies from the *what-to-do* interventions (Bernstein et al., 2017; Cook, 2014; Herman & Jackson, 2010) used similar questions in the form of worksheets instead of a game. In the study conducted by Herman and Jackson (2010), answers to the scenarios improved on the post-test items. This study showed similarly high accuracy data once the training was completed.

The way the training was presented in this study was modified from the original set up in the training manual. In the training manual (Mayer & Villaire, 2015), the class is presented with content from a topic, completes an activity about the topic, and then a summary of the lesson is presented. To complete one topic, it would take at least 20 minutes. A shift in this training was to engage parents by gamification of the 25-minute bingo game practice session. The bingo game allowed for a shorter, more engaging

training. Engagement can be seen in two outcomes. First, all parents who started the training completed the class. Second, performance during the bingo game was near 100% correct, which could indicate that the training format worked as intended.

Post-Test Performance

Hypothesis 2. Next, the study predicted that participants would perform better than by chance (> 50% correct) for each of the five post-test questions. Additionally, it was predicted that on the post-test, page numbers would be identified better than by chance (> 50% accuracy). As hypothesized, performance on the independently completed five post-test questions and page numbers, were performed better than by chance.

The current study was a pilot run to check the validity of the bingo and post-test measures that were created by the trainers. Item-total correlations were calculated to assess the internal-consistency validity of the measures. Cronbach's alpha did not surpass the highly reliable value of .70 (Kline, 1999) for neither bingo nor post-test questions. The most likely reason for the low value of coefficient alpha is that there were an insufficient number of participants. The target sample size was not reached for this statistic. Findings should be interpreted with caution; because of the low sample size the findings are inconclusive.

Program Evaluation

Hypothesis 3. Lastly, the study hypothesized that parents would report having positive perceptions of the intervention and the book. There were no significant differences among the evaluation ratings for any of the five questions. All questions evoked higher ratings toward strongly agree. Some of the participants that were recruited

for this study knew the trainer, so that might have biased the ratings that were reported on the evaluation. None of the items were rated low enough to warrant future revision of the program, but a conclusive answer would require testing a sample of participants not acquainted with the experimenter.

Limitations

One limitation of this study is that recruiting is difficult, especially, for the targeted demographic parents. One intervention site that was attempted was Head Start, but parents weren't required to attend, so they had to find time in their busy schedules to come. Not many people showed up, so the next place attempted was the Dyer County community. In Dyer County, it was easier to recruit families, because the trainer knew more people, but the community is not very ethnically diverse. The next limitation to this study is the demographics of the participants. Not everyone that participated in the training had overweight children at home or were participants of low literacy.

Next, the information literacy measures that were used can be given quickly and with immediate outcomes. This departs from the ideal CBM, because a 45-minute session is not enough time to see knowledge growth, but the focus of this study was on teaching parents how to look up information in a book. In the study conducted by Bernstein et al. (2017), a similar information literacy skills measure was used to see if participants could use the book to correctly answer questions about children's health.

Lastly, this study was unable to collect baseline data, due to the short amount of time allotted for the intervention. So, there was no way to tell if there was a change in information literacy skills, but the results indicated that the participants utilized these

skills throughout the program. In the original study, conducted by Herman and Jackson (2010), they continued to track the study after the intervention was completed to see if participants' behaviors changed. The dependent variables that were chosen for this study compromised the true effectiveness of this intervention. Follow-up data (e.g., self-report email or telephone survey) with behavior and weight change variables would need to be included to obtain the true effectiveness of this intervention.

Future Directions

While this study contributes to the research regarding the importance of utilizing information literacy skills in the weight management of families, as noted above, recruitment of the true target audience as well as tracking behaviors after the intervention should be included in future studies. In the future, researchers may consider additional incentives for parents to attend. To reach the target audience, researchers may consider going to the schools where these children attend to hand out flyers and information about the program to their parents. Researchers may also consider using more demographic questions in their study regarding literacy levels, like the REALM-SF, to see the differences in participant performance (Arozullah et al., 2007). Finally, to obtain a true measure of the effectiveness of the intervention, future researchers should consider using a measure to assess health-related behaviors that are addressed in the book *What to Do When Your Child is Heavy* (Mayer & Villaire, 2015).

Conclusions

Childhood obesity is a common problem that affects over 30% of children in the U.S. (Ogden et al., 2014) and it is in part related to the ability to understand printed

health information (Chari et al., 2013). The book and training have the potential to change parents' information literacy skills, which in turn could improve health outcomes and the lifestyles of heavy children. Parents could gain knowledge of what to do when their child is heavy and more importantly, gain information literacy skills that will help them answer their own questions. Thus, the ideal outcome of this study is an increase in self-reliance.

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APPENDICES

APPENDIX A

Training Rubric

| Criteria | Proficient 3 points | Marginal 2 point | Unacceptable 1 points |
|-----------------------|---|--|---|
| Preparation | Trainer has read the book from cover to cover several times and is very familiar with the content. Trainer has practiced finding information so they can do it quickly during the class. | Trainer is mostly prepared. Needs to read the book a few more times. Finds most but not all material quickly during class. | Trainer shows little organization and preparation; trainer obviously needs to read the book and practice looking up information. |
| Tone and Mood | Trainer establishes a comfortable environment where parents feel safe and willing to participate. Trainer shows appropriate facial expressions, tone of voice, and body language. | Trainer mostly establishes a comfortable environment where students feel safe and willing to participate. Trainer usually shows appropriate facial expressions, tone of voice, and body language. | Trainer fails to establish a comfortable environment where students feel safe and willing to participate. Trainer does not show appropriate facial expressions, tone of voice, and body language. |
| Timing and Schedule | Trainer stays on schedule (10 minutes) to ensure that all material in their lesson plan is covered. When behind, skips nonessential material (things parents can read themselves), focuses on hands-on activities and completes all four questions in the student activities. | Trainer mostly stays on schedule (10 minutes). When behind, skips some non-essential material, completes at least 3 of 4 questions in the student activities. | Trainer does not stay on schedule. Covers non-essential material and does not complete hands-on activities. |
| Questions | Trainers ask questions to keep students interested and participating. Questions are prepared in advance (take notes in your training manuals) and require students to apply the information they learned rather than merely repeating it. Trainer only selects volunteers. If no one answers, trainer rephrases and adds more information | Trainers usually ask questions to keep students interested and participating. Questions are prepared in advance (take notes in your training manuals) and require students to apply the information they learned rather than merely repeating it. Trainer only selects volunteers. If no one answers, trainer usually rephrases and adds more information. | Trainer fails to ask questions to keep students interested and participating. Questions are not prepared in advance. |
| Accuracy and Feedback | When evaluating a response, trainers focus on what is right about an answer rather than what is wrong Trainer excels at giving feedback that is not only useful and appropriate, but keeps other participants engaged. Trainer responds to questions positively while providing brief and focused answers. | Trainer occasionally gives feedback that is useful and appropriate. When evaluating a response, trainers usually focus on what is right about an answer rather than what is wrong. | Trainer fails to give feedback to participants and/or does so inappropriately. Evaluations of responses do not focus on what is right. |
| Overall Score | Proficient 13 or more | Marginal 8 or more | Unacceptable 0 or more |

APPENDIX B

Registration Form

Gender: F M

Age: _____

Is English the main language spoken at home? Yes No

If no, what is the main language spoken at home? _____

Do your children have a primary care physician? Yes No

Do you have any books on weight management/nutrition/exercise? Yes No

Please answer the following about each of your children:

| | Age | Weight | Height | Under-Weight | Average Weight | Over-Weight |
|---------|-------|--------|--------|-----------------------|-----------------------|-----------------------|
| Child 1 | _____ | _____ | _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Child 2 | _____ | _____ | _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Child 3 | _____ | _____ | _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Child 4 | _____ | _____ | _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Child 5 | _____ | _____ | _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Child 6 | _____ | _____ | _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

APPENDIX C

Bingo Card

Healthy Living

| | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------|
| Good _____ | 3 _____ | Vitamin E _____ | 8 _____ | 1 _____ |
| Vitamin A _____ | Bad _____ | Sunshine _____ | Vitamin D _____ | 1 ½ _____ |
| 2 _____ | Yes _____ | FREE SPACE | Fad Diets _____ | Fiber _____ |
| 40 _____ | 26-31 _____ | EpiPen _____ | Sodium _____ | Type 2 _____ |
| 9 _____ | Vitamin C _____ | Sugar _____ | T _____ | No _____ |

APPENDIX D

Post-Test

CHECK WHAT YOU KNOW

What to Do for Healthy Living

1. Read about good and bad fats in the nutrition section. Circle all the foods with good fats.
 - a. Pork
 - b. Salmon
 - c. Trout
 - d. Dairy Products
 - e. Almonds
 - f. Walnuts

Page # _____

2. This is the label for bag of chips. Find the amount of fat per serving. According to the book, is this a high amount of fat for one serving?
Yes _____ No _____ Page # _____

3. Look again at the label for the bag of chips. Find the amount of protein in a serving. Is this the amount of protein in the entire container?
Yes _____ No _____

4. Some people use food as a reward for their children. Should healthy food be used as a reward when they do well in school or have good behavior?
Yes _____ No _____ Page # _____

| Nutrition Facts | |
|-----------------------|----------------------|
| Serving Size 1 Bag | |
| Amount Per Serving | |
| Calories 120 | Calories from Fat 15 |
| % Daily Value* | |
| Total Fat 1.5g | 2% |
| Saturated Fat 0g | 0% |
| Trans Fat 0g | |
| Cholesterol 10mg | 3% |
| Sodium 190mg | 8% |
| Potassium 65mg | 2% |
| Total Carbohydrate 5g | 2% |
| Dietary Fiber 0g | 0% |
| Sugars 0g | |
| Protein 21g | 42% |

5. If your child is being teased at school, you should talk to your child's teacher. Circle what you should talk with their teacher about.
 - a. Bullies may harm your child.
 - b. Tell your child to play by themselves.
 - c. Tell your child to pay attention to bullies.
 - d. Talk about what can be done to stop the teasing.

Page # _____

APPENDIX E
Evaluation Form

Training Evaluation Form

Please circle your answer to each of the questions.

1. I like the book **What To Do For Heavy Kids**.

Strongly agree 5 4 3 2 1 strongly disagree

2. The book will help me have a healthy lifestyle for my family.

Strongly agree 5 4 3 2 1 strongly disagree

3. I learned something from the class.

Strongly agree 5 4 3 2 1 strongly disagree

4. I am able to find things in the book that I want to know.

Strongly agree 5 4 3 2 1 strongly disagree

5. I plan to use the book when I get home.

Strongly agree 5 4 3 2 1 strongly disagree

6. Comments:

APPENDIX F**Bingo Questions**

1. According to the Exercise section of the book, how many kinds of exercise are there? **3 [pg. 108]**
2. Avocado contains a high quantity of which vitamin? **E [pg. 46]**
3. Under “Nutrition Facts Label” we can learn nutrition service size. What does the book consider to be a low number of calories? **40 [pg. 74]**
4. When looking at the weight chart, how many pounds is the average healthy weight of a two-year-old girl? **26-31 [pg. 10]**
5. Carbohydrates, once in the body, eventually turn into _____? **Sugar [pg. 42]**
6. Snacks should not be allowed within how many hours of mealtime? **2 [pg. 98]**
7. Sleep is important, it helps our minds and bodies recharge. Roughly how many hours of sleep does a 12-18 year old need? **9 [pg. 117]**
8. Sweet Potatoes contain a high quantity of which vitamin? **A [pg. 44]**
9. Outside of food, Vitamin D can be found through _____? **Sunshine [pg. 46]**
10. When your body makes insulin, but not enough for what the body needs, this is what type of Diabetes? **Type 2 [pg. 166]**
11. These types of diets do not work and can be unhealthy for you. **Fad Diets [pg. 21]**
12. How many cups of fruit should your child eat per day? **1 ½ [pg. 34]**

APPENDIX G

IRB Approval

IRB
INSTITUTIONAL REVIEW BOARD
 Office of Research Compliance,
 010A Sam Ingram Building,
 2269 Middle Tennessee Blvd
 Murfreesboro, TN 37129



IRBN001 - EXPEDITED PROTOCOL APPROVAL NOTICE

Friday, September 01, 2017

Principal Investigator **Stuart E. Bernstein (Faculty)**
 Faculty Advisor **NONE**
 Co-Investigators **Catherine Crooks**
 Investigator Email(s) **stuart.bernstein@mtsu.edu; catherine.crooks@mtsu.edu**
 Department **Psychology**

Protocol Title **Healthy Raiders Reading Program**
 Protocol ID **16-2250 (Related to IRB 14-208)**

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the EXPEDITED mechanism under 45 CFR 46.110 and 21 CFR 56.110 within the category (7) *Research on individual or group characteristics or behavior*. A summary of the IRB action and other particulars in regard to this protocol application is tabulated as shown below:

| | |
|--------------------|--|
| IRB Action | APPROVED for one year |
| Date of expiration | 8/18/2018 |
| Participant Size | 100 (ONE HUNDRED) |
| Participant Pool | Low-literacy adults and English language learners (Adults) |
| Exceptions | (1) Alteration to informed consent from the standard template is permitted. (2) Students of PSY3070 and PSY4650 will be named by the PI using an addendum in order to include them as co-investigators. (3) Online intervention(s) proposed in the protocol are permitted. (4) The PI is allowed to collect identifiable data for sending the "free book." |
| Restrictions | 1. Approved for class projects - PSY3070 (Research Methods) and PSY4650 (EXL Health Psychology). 2. Mandatory informed consent from the research subjects. 3. Student co-investigators MUST complete CITI training. 4. This protocol is assigned to the PI listed in this notification; the protocol is not issued to the class and the PI cannot be changed. 5. Identifiable information must be destroyed after protocol completion or once the "free book" has been mailed which ever happens earlier. |
| Comments | The approval notice has been modified to an updated format (08.27.2017) |

This protocol can be continued for up to THREE years (8/18/2019) by obtaining a continuation approval prior to 8/18/2018. Refer to the following schedule to plan your annual project reports and be aware that you may not receive a separate reminder to complete your continuing reviews. Failure in obtaining an approval for continuation will automatically result in cancellation of this protocol. Moreover, the completion of this study MUST be notified to the Office of Compliance by filing a final report in order to close-out the protocol.

Continuing Review Schedule:

| Reporting Period | Requisition Deadline | IRB Comments |
|--------------------|----------------------|---|
| First year report | 7/18/2017 | A Continuing Review (CR) was conducted in accordance with Category 8 of Expedited Approval Categories. No deficiencies were found. The current investigators are S. Bernstein, C. Crooks, R. Clayton, M. Bleistein and M. Hackett. The protocol has been approved to continue for an additional year with the proposed amendment (09.01.2017) |
| Second year report | 7/18/2018 | TO BE COMPLETED |
| Final report | 7/18/2019 | TO BE COMPLETED |

Post-approval Protocol Amendments:

| Date | Amendment(s) | IRB Comments |
|------------|---|--|
| 10/21/16 | 1. Rebecca Clayton and Madison Curtis are added as new investigators. 2. A new book for parents is added: What to Do When Your Child is Heavy (Mayer & Villalre, 2015). 3. New tset packet/registration form are approved. | NONE |
| 10/24/16 | A total of 13 new Investigators are added: Deanna Bush, Derric Collins, Alexandra Duross, Andrew Green, Alyssa Gregory, Ciera Patrick, Mary Prince, Eile Rahimi, Sarah Sediri, Jordan Spencer, Elizabeth Vincion, Jessica Wiegand and Jeeun Yl. | NONE |
| 03/10/17 | 1. Student Investigators Kacole Harris, Tiesha Smith, Timarian Edwards and Rebecca Cuzzort are added to the protocol. 2. Request to permit the recruitment of 60 (SIXTY) participants from the MTSU Research Pool has been granted. | NONE |
| 05/17/17 | Approved to recruit participants from St. Thomas Medical Partners (Permission letter on file). | NONE |
| 06/27/17 | 1. Request to recruit participants from community church(es) is granted. NOTE - the churches may require advanced written permission in order to conduct the study. 2. Revised training in the form of a "Bingo Game" is approved. | Addendum originally sent on 05/23/2017 |
| 09/01/2017 | 1. Revision to the online training to reflect a game is approved. 2. St. Louise Clinic of St Thomas Rutherford Hospital is added as a new site for online training. | Approved during CR |

The investigator(s) indicated in this notification should read and abide by all of the post-approval conditions imposed with this approval. [Refer to the post-approval guidelines posted in the MTSU IRB's website.](#) Any unanticipated harms to participants or adverse events must be reported to

the Office of Compliance at (615) 494-8918 within 48 hours of the incident. Amendments to this protocol must be approved by the IRB. Inclusion of new researchers must also be approved by the Office of Compliance before they begin to work on the project.

All of the research-related records, which include signed consent forms, investigator information and other documents related to the study, must be retained by the PI or the faculty advisor (if the PI is a student) at the secure location mentioned in the protocol application. The data storage must be maintained for at least three (3) years after study completion. Subsequently, the researcher may destroy the data in a manner that maintains confidentiality and anonymity. IRB reserves the right to modify, change or cancel the terms of this letter without prior notice. Be advised that IRB also reserves the right to inspect or audit your records if needed.

Sincerely,

Institutional Review Board
Middle Tennessee State University

Quick Links:

[Click here](#) for a detailed list of the post-approval responsibilities.
More information on expedited procedures can be found [here](#).