

Youth Wellness Promotion for Development of Positive Dietary and Physical Activity Behaviors

by

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B.S., Kansas State University, 2012  
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AN ABSTRACT OF A DISSERTATION

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Department of Food, Nutrition, Dietetics and Health  
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## **Abstract**

This dissertation examined the impact of wellness-promotion interventions on health-related behaviors in youth, including dietary intake and physical activity (PA) levels. Additionally, the impact of wellness-promotion interventions on health-promoting opportunities for youth in an out-of-school setting was investigated. In study 1 (Chapter 2), the feasibility and preliminary impact of a 12-week, home-based wellness coaching intervention for changes in behavioral, psychosocial, and biomedical outcomes in normal-weight female children was evaluated. The two intervention conditions included a general health education condition, and one that implemented skills-building components in the areas of PA and healthy eating. Results showed that both intervention conditions were feasible and well-accepted by participants. There were no changes in the behavioral outcomes of PA levels or fruit and vegetable (FV) consumption, but girls who received the skills-building coaching condition showed an increase in emotional quality of life and a reduction in body fat percentage. Findings suggested that a home-based wellness coaching intervention was feasible and was potentially effective for impacting psychosocial and biomedical outcomes in normal-weight female children. Study 2 (Chapter 3) examined the impact of Girl Scout leader wellness training on implementation of wellness-promoting practices and opportunities for girls during troop meetings. This study compared the effectiveness of in-person versus online leader wellness training, specifically assessing opportunities for wellness-promoting behaviors, including FV consumption and PA during meetings. Study results indicated that leaders who received the wellness training in person increased their implementation of wellness-promoting practices significantly more than those who received the wellness training in an online format. Analyses regarding dissemination revealed that adoption of wellness-training principles occurred in approximately 43% of troop

leaders, and that lower-income leaders were more interested in receiving the wellness training, as compared to higher-income leaders. Overall, results indicated that in-person wellness training was effective for improving wellness-promoting opportunities for girls, but a more cost-effective and further-reaching training method was needed for a larger public health impact. Therefore, study 3 (Chapter 4) evaluated the impact of online, video-based wellness training on Girl Scout leaders' wellness-promotion self-efficacy, intention, and knowledge. These factors are established determinants of behavior change, including offering opportunities in the areas of PA and FV consumption. Results showed that leaders who received the video-based wellness training had a significant increase in self-efficacy for overcoming barriers related to PA and FV practices, as well as increased self-efficacy for offering vegetables during troop meetings. Both groups showed increased intention for offering both fruit and vegetable opportunities during upcoming meetings. These results showed that online, video-based wellness training was effective for impacting determinants of behavior change in Girl Scout troop leaders, which may improve the wellness opportunities for girls during troop meetings. Overall, the findings from this dissertation collectively contribute to the existing literature by providing evidence regarding effective interventions for improving wellness-promoting opportunities and experiences for youth. If disseminated and implemented widely, evidence-based interventions and practices similar to those discussed within this dissertation may lead to improvements in health-related behaviors among youth, increased wellness-promoting opportunities, and ultimately have a positive impact on population health.

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## Table of Contents

List of Figures .....	xii
List of Tables .....	xiii
Acknowledgements .....	xiv
Dedication .....	xvi
Chapter 1 - Introduction .....	1
Overview .....	1
Home-Based Wellness Promotion .....	2
Wellness Promotion Through Girl Scout Leader Training .....	3
Online, Video-Based Leader Wellness Training .....	4
References .....	6
Chapter 2 - Wildcat Wellness Coaching Trial: Feasibility and Preliminary Impacts of a Home- Based Wellness Coaching Intervention on Normal-Weight Adolescent Girls .....	9
Introduction .....	10
Methods .....	14
Study Design .....	14
Participants .....	14
Recruitment and Randomization .....	14
Home-Based Wellness Coaching Intervention .....	15
Healthy Eating and Physical Activity (HEPA) Skills Condition .....	15
Health Education (HE) Condition .....	16
Primary Outcome Measures .....	17
Recruitment and Retention Feasibility .....	17
Intervention Delivery Feasibility and Acceptance .....	17
Health-Related Outcome Assessment Feasibility .....	18
Secondary Outcome Measures .....	18
Behavioral Outcomes .....	18
Physical Activity .....	18
Dietary Intake .....	19
Psychosocial Outcomes .....	19



Self-Efficacy for Health Behaviors.....	19
Quality of Life.....	20
Biomedical Outcomes.....	20
Anthropometrics .....	20
Blood Pressure .....	21
Statistical Analyses .....	21
Results.....	22
Recruitment and Retention Fidelity .....	22
Intervention Delivery Feasibility and Acceptability .....	22
Health-Related Outcome Assessment Feasibility .....	22
Behavioral Outcome: Physical Activity.....	23
Behavioral Outcome: Fruit and Vegetable Consumption.....	23
Psychosocial Outcome: Self-Efficacy.....	23
Psychosocial Outcome: Quality of Life .....	24
Biomedical Outcomes.....	24
Discussion.....	25
References.....	29
Chapter 3 - Wellness-Promoting Practices through Girl Scouts: A Pragmatic Superiority	
Randomized Controlled Trial with Additional Dissemination.....	38
Abstract.....	39
Background.....	41
Girl Scouts as a Wellness Promotion Setting .....	41
Rationale for Present Study .....	42
Phase I Hypotheses .....	44
Phase II Hypotheses .....	44
Methods .....	44
Overview.....	44
Phase I: Design .....	45
Phase I: Participants.....	45
Phase I: Wellness Training Intervention.....	46
Phase I: Outcome Measures.....	48

Phase I: Statistical Analyses .....	49
Phase II: Wellness Training Dissemination and Implementation .....	49
Phase II: Design .....	50
Phase II: Participants .....	50
Phase II: Outcome Measures .....	50
Phase II: Statistical Analyses .....	51
Results .....	52
Phase I: Wellness Training Intervention Findings .....	52
Phase I: Primary Outcome .....	52
Phase I: Secondary Outcomes .....	53
Phase II: Wellness Training Dissemination, Adoption and Implementation Findings .....	53
Discussion .....	55
Phase I .....	55
Phase II .....	57
Strengths and Limitations .....	59
Future Directions .....	59
Conclusions .....	60
References .....	61
<b>Chapter 4 - Impact of Online, Video-Based Wellness Training on Girl Scout Leaders' Wellness</b>	
Promotion Self-Efficacy, Intention, and Knowledge: A Pilot Randomized Controlled Trial 76	
Abstract .....	77
Introduction .....	79
Methods .....	81
Design .....	81
Participants and Recruitment .....	82
Intervention .....	82
Measures .....	83
Statistical Analyses .....	85
Results .....	86
PA Opportunity Self-Efficacy .....	86
PA Practices Barrier Self-Efficacy .....	86

Fruit Practices Self-Efficacy .....	86
Vegetable Practices Self-Efficacy.....	87
FV Practices Barrier Self-Efficacy .....	87
Intention for Offering PA.....	87
Intention for Offering Fruits and Vegetables .....	88
PA and FV Knowledge .....	88
Discussion.....	88
References.....	93
Chapter 5 - Conclusions.....	105
Appendix A - Weekly Coaching Schedule .....	108
Appendix B - Typical Troop Practices Questionnaire .....	111
Appendix C - Wellness Practice Implementation Questionnaire .....	116
Appendix D - Self-Efficacy, Intention, and Knowledge Questionnaire .....	118
Appendix E - Healthy Snacking Guidelines .....	126
Appendix F - Scheduling Template .....	128

## List of Figures

Figure 2.1 Change in Mean Steps Per Day .....	35
Figure 2.2 Change in Fruit and Vegetable Consumption .....	35
Figure 2.3 Changes in Quality of Life Domains.....	36
Figure 2.4 Changes in Mean Overall QOL.....	37
Figure 3.1 Phase I: Flow of Participants.....	72
Figure 3.2 Phase I: Change in Wellness Practice Implementation Score Between Intervention Groups Over Time .....	73
Figure 3.3 Phase I: Percentage of Troops Reporting Wellness-Promoting Responses .....	74
Figure 3.4 Phase II: Percentage of Troops Reporting Implementation of Wellness-Promoting Practices in 11 Wellness Categories .....	75
Figure 4.1 Mean PA Practices Self-Efficacy .....	101
Figure 4.2 Overall (Mean) PA Practices Barrier Self-Efficacy .....	102
Figure 4.3 Overall (Mean) Vegetable Practices Self-Efficacy .....	102
Figure 4.4 Overall (Mean) Self-Efficacy for Overcoming FV Barriers .....	103
Figure 4.5 Percentage of Leaders with Positive PA and FV Intentions.....	103
Figure 4.6 Mean PA and FV Knowledge Scores.....	104

## List of Tables

Table 2.1 Baseline Participant Characteristics.....	34
Table 2.2 Biomedical Outcomes at Baseline and Post-Intervention by Condition.....	34
Table 3.1 Phase I: Training Session Information.....	66
Table 3.2 Phase I: Baseline Troop Characteristics .....	68
Table 3.3 Phase I: Percentage of Leaders Reporting Wellness-Promoting Responses at Baseline .....	69
Table 3.4 Phase II: Troop Demographics .....	70
Table 3.5 Phase II: Percentage of Troops Reporting Wellness-Promoting Responses Across 2 Years in 3 Service Units .....	71
Table 4.1 Wellness Training Video Content and Associated Behavior Change Techniques .....	97
Table 4.2 Baseline Troop Characteristics .....	100

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## **Dedication**

This dissertation is dedicated to my son, Carter William Cull. When we received your diagnosis during the final year of my PhD program, my world stopped. Before you were even here, you taught me to be strong and brave, to focus on what really matters, and to have faith that would move mountains. Your impact is so much more than you realize. Someday, we will pull out this dissertation (and your dad's dissertation--which is also dedicated to you), and remember this time as being full of growth, life, and answered prayers. Thank you for fighting. Thank you for making it. My world is forever brighter because of you.



# Chapter 1 - Introduction

## Overview

The high rates of childhood overweight and obesity in the United States represent a large public health issue. Approximately one in three children are classified as overweight (BMI  $\geq 85^{\text{th}}$  percentile) or obese (BMI  $\geq 95^{\text{th}}$  percentile), based on age- and sex- specific growth charts (Ogden et al., 2014). When compared to normal-weight children, youth who are obese are more likely to have negative health outcomes, including high blood pressure, dyslipidemia, and type II diabetes (Ebbeling et al., 2002; Freedman et al., 1999; Schwimmer et al., 2003). Additionally, longitudinal studies show that obese youth are more likely to experience health detriments in adulthood, including cardiovascular disease, metabolic syndrome, psychiatric disease, and others (Kelsey et al., 2014). Since weight gain primarily represents a prolonged positive energy imbalance, behaviors related to energy intake and energy expenditure, such as physical activity levels and dietary intake, are critical in the prevention and treatment of weight-related issues. However, the majority of youth do not meet recommendations for key health-related behaviors, including participation in physical activity and consumption of fruits and vegetables. Less than 30% of youth meet recommendations (National Physical Activity Plan Alliance, 2016) for participating in at least 60 minutes of moderate-to-vigorous physical activity per day (Physical Activity Guidelines Advisory Committee, 2008), and only 40% and 7% meet recommendations for fruit and vegetable consumption, respectively (Kim et al., 2014). Both weight status and health-related behaviors have been shown to track from childhood into adulthood (Telama et al., 2009; te Velde et al., 2007), so interventions focusing on the development of positive health behaviors in youth represent a critical area of research. It is imperative that youth improve their physical activity and dietary intake patterns to put them on a trajectory for a healthy life. The

studies included in this dissertation focus on evaluating the impact of wellness-promoting interventions on health-related behaviors of youth, including dietary intake and physical activity levels, as well as the impact on opportunities for positive health behaviors in an out-of-school setting.

### **Home-Based Wellness Promotion**

Evidence suggests that wellness promotion and obesity prevention interventions should be delivered in settings where youth spend a majority of their time. Specifically, the home environment has been shown to have a strong influence on physical activity and dietary intake behaviors of youth (Spurrier et al., 2008). Children in the United States consume approximately two-thirds of their daily calories at home (Adair et al., 2005), and both the social and physical environment have influences on youth sedentary time and physical activity levels (Tandon et al., 2014). It has been shown that both sedentary and physical activity time at home are correlated with the amount of time spent in these behaviors for the entire day (Tandon et al., 2014). Additionally, much of the physical activity (43.6%) and sedentary time (46.4%) a child accumulates during the day occurs in the home environment. As such, modifications to behavior within the home environment have the potential to positively impact the physical activity and dietary consumption profiles of youth. Furthermore, it has been suggested that without impacting the home environment, obesity prevention programs may not be effective for sustained behavior change. When compared to center-based programs, health promotion interventions delivered within the home have unique benefits, including removing transportation barriers and offering a convenient location (Conwell et al., 2010). Additionally, skills and environmental change processes developed within the home setting may be beneficial for sustained, positive behavior change. However, there is a lack of research evaluating the impact of wellness-promoting

interventions delivered within the home setting, specifically when looking at the effects on youth behavior. In the first study (chapter 2) included in this dissertation, the feasibility and acceptability of a home-based wellness coaching intervention for normal-weight female children is assessed. Additionally, changes in behavioral, psychosocial, and biomedical outcomes are evaluated. This home-based intervention utilized two wellness-coaching conditions. The first was a general health education condition and the other condition implemented skills-building components and mastery experiences in the areas of healthy eating and physical activity. This study provides evidence for the feasibility and acceptability of a home-based wellness-coaching model for female children, as well as preliminary effectiveness for positive changes in behavioral, psychosocial, and biomedical outcomes.

### **Wellness Promotion Through Girl Scout Leader Training**

In addition to interventions delivered within the home environment, there has also been success in reaching and impacting youth in out-of-school settings. Girl Scouts is an out-of-school program uniquely positioned for wellness promotion efforts targeting young girls. This organization includes 2.6 million girls and adult volunteers in the United States, and has an existing focus on healthy behaviors and choices (Girl Scouts, 2017). During troop meetings, leaders choose their activities and snack choices. Previous research has shown that the typical troop meeting environment is not necessarily health promoting, as cookies and cakes outnumber fruits and vegetables, and girls are physically active for about two minutes during a typical two-hour long meeting (Ornelas et al., 2009). Interventions targeting troop leaders and the meeting environment have been successful in improving the availability of fruits and vegetables as snack choices, as well as increasing the physical activity levels of girls (Rosenkranz et al., 2010). Traditionally, the leader-targeted interventions have been delivered to the troop leader in a face-

to-face format. Although this intervention delivery method has been both feasible and effective, it may limit the potential for wide-scale dissemination. A leader wellness training delivered in an online format, which can be spread across a wide region and accessed from anywhere, may represent a delivery method capable of maximizing reach within the Girl Scout organization. Therefore, the second study in this dissertation (Chapter 3) compares the effectiveness of Girl Scout leader wellness training delivered using an in-person versus an online format. In this intervention, leaders went through a group-based wellness training, where they set specific goals for upcoming meetings and created a troop wellness policy. The training focused on implementing wellness-promoting practices in several key areas: opportunities for fruits and vegetables, offering water as a beverage choice, limiting sedentary time, opportunities for physical activity, and building connections among the girls. The leaders monitored their progress and had an individual wellness-training session as well. Leaders in the in-person group received training face-to-face with research staff, while those in the online group received the intervention through an online website. Results from this study showed that leaders who received the wellness training in the in-person delivery method significantly increased wellness-promoting opportunities for girls during their troop meetings. In comparison, leaders who received the intervention online did not significantly change their implementation of wellness-promoting practices. Overall, this study provides evidence for effectiveness of in-person leader wellness training for improvements in wellness-promoting opportunities for girls during troop meetings.

### **Online, Video-Based Leader Wellness Training**

In order for Girl Scout leader wellness training to have a large population health impact across a wide area, a more cost-effective and further-reaching delivery method is needed, as in-person training has limitations. One type of training method that may be feasible and effective is

online, video-based training. When compared to a standard website, which was used in the previous intervention (Chapter 3), video messages may be tailored to each leader and their specific needs and barriers. Evidence suggests that tailored training materials are more effective for health-related behavior change than generic forms of communication (Noar et al., 2007), and users report tailored content being more relevant (Kreuter et al., 1999; Kreuter & Wray, 2003). Therefore, the third study in the dissertation (Chapter 4) evaluates the impact of online, video-based wellness training for changes in Girl Scout leaders' wellness-promotion self-efficacy, intention, and knowledge. These factors are established determinants of behavior change, and have been shown to be important influences for offering opportunities in the areas of physical activity and healthy eating. In this intervention, leaders were randomized to either the control group, or the intervention group who received six weeks of weekly, tailored, online training videos. Each video focused on offering opportunities and overcoming associated barriers for either physical activity or healthy snacking during troop meetings. Results showed that leaders who received the training videos had an increase in self-efficacy for overcoming barriers related to implementing both physical activity and fruit and vegetable opportunities. Additionally, in the intervention group, there was a significant increase in self-efficacy for offering vegetables during troop meetings. This study provides evidence for effectiveness of an online, video-based training modality in Girl Scout troop leaders, which may potentially lead to improvements in the health- and wellness-promoting environment of Girl Scout troop meetings.

Overall, the studies included within this dissertation provide evidence for effective interventions and practices that, if implemented and disseminated widely, may have an impact on youth behaviors, health-promoting opportunities, and population health.

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**Chapter 2 - Wildcat Wellness Coaching Trial: Feasibility and  
Preliminary Impacts of a Home-Based Wellness Coaching  
Intervention on Normal-Weight Adolescent Girls**

Currently in preparation as Cull BJ, Rosenkranz SK, Dzewaltowski DA, Teeman CS, Knutson CK, Rosenkranz RR. Wildcat Wellness Coaching Trial: Feasibility and Preliminary Impacts of a Home-Based Wellness Coaching Intervention on Normal-Weight Adolescent Girls.

## **Introduction**

Currently, one in three children in the United States is classified as overweight or obese (Ogden et al., 2014). Being overweight or obese can lead to negative impacts on behavioral (Farhat et al., 2010), psychosocial (Luppino et al., 2010; Swallen et al., 2005; Trost et al., 2001), and biomedical outcomes (Daniels, 2006; Reilly & Kelly, 2011), both in the short-term and throughout life. The majority of youth in the United States, including normal-weight and overweight/obese children and adolescents, do not engage in recommended levels of health-promoting and obesity-preventing behaviors, including fruit and vegetable consumption and physical activity participation. Evidence shows that greater than 70% of youth do not meet the physical activity guidelines (National Physical Activity Plan Alliance, 2016) of at least 60 minutes of moderate-to-vigorous physical activity per day (Physical Activity Guidelines Advisory Committee, 2008), and that 60% and 93% do not meet recommendations for fruit and vegetable consumption, respectively (Kim et al., 2014). Since weight status and health behaviors have been shown to track from youth into adulthood (Telama, 2009; te Velde, 2007), interventions targeting development of health-promoting behaviors in youth represent a critical area of research. Primary obesity prevention may be most effective when targeting development of health-promoting behaviors, as well as prevention of excessive weight gain (Dehghen et al., 2005). In a primary prevention model, the incidence of overweight/obesity may be reduced through intervening on behaviors of youth to target a healthy weight trajectory throughout their developmental years (Kraawk et al., 2005). As such, interventions focusing on primary prevention of childhood obesity are warranted, and further research is needed to determine intervention effectiveness in a variety of settings and modalities.

Although both boys and girls may benefit from participation in an intervention meant to improve their health-promoting behaviors and prevent development of overweight/obesity, girls are particularly at risk. When compared to boys, girls have lower levels of overall physical activity, especially vigorous-intensity physical activity (Troost et al., 2002). Additionally, when compared to normal-weight girls, girls who are overweight or obese are more likely to use dysfunctional methods to try to control their weight (Neumark-Sztainer et al., 2002).

Health promotion and obesity prevention efforts have been studied across several settings in which youth spend their time. Evidence shows that the home environment is a critical setting for development of youth behaviors, and that it is a key determinant in their physical activity and dietary behaviors (Spurrier et al., 2008), due to the physical and social environments of the home (Tandon et al., 2014). Importantly, it has been suggested that childhood obesity prevention interventions may not be effective without targeting or impacting the home environment in which youth live. Accordingly, there have been several successful health-promotion and obesity prevention interventions delivered within the home setting. Stark et al. (2011) found that an obesity prevention intervention, including home-based, skill-building sessions was effective for reducing BMI in girls, when compared to the standard practice delivered in a clinic setting. A pilot study showed that instructor-led physical activity sessions delivered in a community-based setting versus a home setting both lead to improvements in mother/daughter exercise participation, muscular endurance and strength, and had positive impacts on blood pressure (Ransdell et al., 2003). The authors concluded that delivering a health-promoting intervention within the home represents a cost-effective way to impact mothers and their daughters for health-promoting behaviors and outcomes. Additionally, a meta-analysis showed that home-based interventions focusing on a combination of diet and physical activity may be effective for

changing behaviors, but there is a low strength of evidence that home-based interventions may impact weight (Showell, et al., 2013). These authors concluded that more research is needed to assess the potential for home-based, obesity prevention interventions, specifically those that include a focus on environmental influences within the home setting, such as access to both healthy foods and spaces to be active.

Obesity prevention efforts have been conducted using a variety of methods, and one that has shown promise is targeting behavior change through wellness coaching. Wellness coaching utilizes a client-centered approach, in which individuals work with wellness coaches to set goals, participate in activities meant to increase self-efficacy and overcome barriers, and gain a sense of intrinsic motivation for participation in health-promoting behaviors (Wolever et al., 2011). Throughout this process of self-evaluation, goal setting, and continual monitoring, sustainable behavior change may be achieved. A wellness coaching intervention has been shown to be effective for several health-related outcomes, including physical activity (Paineau et al., 2008), dietary intake, and childhood obesity (Nguyen et al., 2012). A previous study examined the impacts of 12 months of exercise, nutrition coaching, and behavior change counseling on overweight or obese youth (Rice et al., 2008). The authors found that this combined program was effective for reductions in BMI, and that there was a dose-response relationship between time the participants were compliant with the program and reduction in BMI. Since evidence shows that education alone is not sufficient for eliciting behavior change, a wellness-coaching model that includes skill-building components and opportunities for mastery experiences may be more effective for lasting change (Contento, 2007). Specifically, individuals may be able to increase their self-efficacy and self-regulation abilities, and learn how to effectively control or manage their environments, which are all considered important determinants of health-related behaviors.

Although wellness coaching can be delivered in a variety of settings, its feasibility and effectiveness when delivered in a home-based setting has not been fully elucidated. Since the home environment represents a critical influence in youth behavior, wellness coaching delivered in this setting may allow youth to overcome specific barriers and build skills in this environment for promotion of healthy behaviors. When the wellness coaching and associated activities are conducted within the home environment, an individual may be more fully equipped to improve and control their surroundings and health behaviors in that setting. There is a lack of research examining the feasibility and effectiveness of wellness coaching delivered in the home environment, specifically when evaluating the impact on young girls. Therefore, the purpose of this study was to evaluate the feasibility of a home-based, wellness coaching intervention on metrics related to recruitment, intervention delivery, and health-related outcome assessments. The secondary outcome is to evaluate the potential for change in behavioral, psychosocial, and biomedical outcomes in normal-weight female children. Two wellness coaching conditions were implemented, including a healthy eating and physical activity skills condition (HEPA skills), and a general health education condition (HE), which is meant to represent an active comparison group. For both intervention conditions, we hypothesized that recruitment and retention of participants would be successful, that wellness coaching conditions would be delivered as planned, and that both conditions would be well-received by families. This study will provide insight on the extent to which this type of home-based, wellness coaching model may be feasible and appropriate as a model for primary prevention of obesity through the development of positive dietary and physical activity changes in girls.

## **Methods**

### **Study Design**

This study was a two-arm, parallel randomized trial comparing two types of home-based wellness coaching conditions on feasibility outcomes related to recruitment, delivery of the intervention, and assessment of health-related outcomes. Additionally, secondary assessments were conducted on behavioral, psychosocial, and biomedical outcomes in normal-weight girls. The two intervention conditions included a HEPA skills condition, and an active comparison group of general HE. The intervention lasted for 12 weeks, and laboratory assessments occurred at baseline and post-intervention (3 months after baseline).

### **Participants**

Participants for this study were 24 girls between the ages of 8 and 13 years. All girls had a body mass index less than the 85<sup>th</sup> percentile, and therefore were classified as normal weight according to gender-specific, age-adjusted growth charts. All girls lived within 20 miles of Kansas State University in Manhattan, KS. Exclusion criteria required that the girls did not have any developmental delays or conditions that prevented them from participating in moderate-to-vigorous physical activity. Additionally, the girls were not taking weight-altering medications. Parental consent and child assent were obtained from all participants prior to enrollment and participation in the study. This project was approved by the Institutional Review Board at Kansas State University (IRB #7724).

### **Recruitment and Randomization**

Parents of girls were recruited using several low-cost methods, including posted flyers, emails, newspaper advertisements, and social media. After obtaining informed consent, girls were randomized to one of two conditions (1:1 allocation) using a randomization procedure in

SPSS. Research assistants collecting assessment data were blinded to group randomization over the course of the study. Due to the nature of the intervention, it was not possible to blind the girl or her parents to the intervention assignment.

### **Home-Based Wellness Coaching Intervention**

The full details of the wellness coaching intervention have been previously published (Cull et al., 2016). Briefly, for both intervention conditions, the girls were matched up, one-to-one, with a female, college-aged wellness coach who was enrolled in a health-related degree program at Kansas State University. The coach was trained in wellness coaching and ethics, and delivered 12 weekly one-on-one training sessions in the home of the participating girl. Each wellness coaching session lasted approximately one hour. The wellness training intervention was developed based on Social Cognitive Theory and Self-determination Theory, in which constructs of self-efficacy, autonomy, relatedness, and competence were targeted for successful behavior change. Materials for the wellness coaching intervention were adapted from Health in the Classroom (2015).

#### **Healthy Eating and Physical Activity (HEPA) Skills Condition**

In the HEPA skills coaching condition, wellness training sessions focused specifically on physical activity and healthy eating, including fruit and vegetable consumption. Coaches used evidence-based, behavior change techniques to target improvements in the girls' behaviors in these areas. Behavior change techniques were classified using Michie's taxonomy (2011). During each session, the girls were provided with information about physical activity and healthy eating (Michie's technique #1). The wellness coaches modeled or demonstrated healthy behaviors (Michie's technique #22), and the girls were able to gain mastery experiences through engagement in both physical activity and snack preparation during the coaching session.

Behavioral goal setting was used (Michie's technique #5), and the girls were engaged in action planning (Michie's technique #7) to decide on the activities performed each week. During each session, the girls prepared a healthy snack (>50% fruit and/or vegetable) with the wellness coach, and participated in a physical activity requiring at least 2000 steps. The girls set goals (Michie's technique #5) for their physical activity and healthy eating behaviors, and were able to choose the activities that they would participate in during the following week. In the HEPA skills condition, the goal was for the girls to build the skills necessary to engage in the health-promoting behaviors within the home environment, as well as assess their behavior and environment and make desired changes to reach their goals.

### **Health Education (HE) Condition**

In the HE coaching condition, representing a more didactic condition as well as an active comparison group, wellness coaching sessions focused on general health behaviors, including oral health, food safety, bullying, anti-smoking and eating disorders. During each week of wellness training sessions, the coach discussed the topic with the girl to provide information (Michie's technique #1) and completed associated activities, including drawing pictures, role playing (Michie's technique #39), and evaluating their home and social environment. A schedule of coaching session topics and associated activities for both conditions is included as Appendix A. In the HE condition, the girls were not engaged in developing skills needed to successfully change their dietary or physical activity behavior in the home environment, nor did they prepare healthy snacks or participate in physical activities with the wellness coach.



## **Primary Outcome Measures**

### **Recruitment and Retention Feasibility**

Recruitment and retention feasibility were assessed by determining the reach, or the number of participants successfully recruited from the local area and surrounding towns, as well as the percentage of participants who completed both the baseline and post-intervention assessments. We also assessed the number of participants recruited per semester, and the length of time it took to recruit our 24 participants.

### **Intervention Delivery Feasibility and Acceptance**

Intervention feasibility and acceptance were assessed in several ways. The number of coaching sessions delivered, as well as any adverse effects, were determined via coach self-report. Following each coaching session, the coaches completed a self-report log regarding the primary and secondary activities completed and whether the coaching session was delivered as planned. Coach reports were scored to determine fidelity of intervention delivery, on a scale of 0 to 2. Zero points were given if neither primary nor secondary activities were not completed (or if a session was not held), one point was given if the primary or secondary activities were completed, and two points were given if both the primary and secondary activities were completed. The maximum score for intervention delivery fidelity was 24. At post-intervention, parents completed a questionnaire regarding acceptance of the home-based wellness training intervention. Feasibility metrics allowed us to determine whether the intervention could be delivered weekly in the home, and whether parents and participants were accepting of the wellness coaching model.

### **Health-Related Outcome Assessment Feasibility**

Feasibility for the assessment of health outcomes was determined by assessing the number of participants who completed both the baseline and post-intervention laboratory assessments. This measure of assessment feasibility allowed us to determine whether it was feasible for participants to return to the laboratory following intervention, and whether these assessments could be completed within a specific timeframe. Additionally, we were able to assess whether the data collection process was acceptable to the girls and parents.

### **Secondary Outcome Measures**

Laboratory assessments for secondary outcome measures occurred at baseline and post-intervention. The participating girl and her parent attended an hour-long assessment at the Physical Activity and Nutrition Clinical Research Consortium at Kansas State University. Data collected during this visit included demographic and parent physical activity/dietary information via questionnaire; physical activity assessment over five days with accelerometry; typical dietary intake; self-efficacy regarding physical activity participation and consumption of fruits and vegetables; quality of life assessment; height; weight; waist circumference; DEXA scan for body composition; and blood pressure. We assessed changes in behavioral outcomes of physical activity and fruit and vegetable consumption, as well as change in psychosocial outcomes (self-efficacy and quality of life) and biomedical outcomes (BMI, waist circumference, body composition, blood pressure) from baseline to post-intervention.

#### **Behavioral Outcomes**

##### ***Physical Activity***

Over the course of five days at baseline and post-intervention, the participating girl wore an Actical accelerometer (Respironics Inc., Bend, OR, USA) on her non-dominant wrist. The

accelerometer was applied to the wrist with a nylon, locking band and was worn at all times during the five-day, data collection period. Physical activity data were collected in 15-second epochs, and information was collected regarding total steps per day, as well as time spent in sedentary, light, moderate, and vigorous physical activity. Actical software cut points were used (Puyau et al., 2004) for determination of time spent in each category, which were 0.01 kcal/min/kg (sedentary/light cut point), 0.04 kcal/min/kg (light/moderate cut point), and 0.10 kcal/min/kg (moderate/vigorous cut point).

### ***Dietary Intake***

A Childhood Dietary Questionnaire (Magarey et al., 2009) was completed at each assessment, in which girls reported their consumption of particular foods within the past 24 hours or seven days, depending on the food item and category. From this questionnaire, data were collected regarding servings of fruits and vegetables in the past 24 hours, the variety of different fruits and vegetables consumed in the past seven days, and the number of days in the past week that the child consumed fruits and vegetables.

### **Psychosocial Outcomes**

#### ***Self-Efficacy for Health Behaviors***

Self-efficacy for physical activity participation and fruit and vegetable consumption were each assessed via self-report. Participants were asked to report their confidence that they could participate in physical activity in a variety of situations, including when they are tired or when it is hot or cold outside. For each question, the girls rated their confidence on a three-point Likert scale, with responses ranging from “not at all sure” to “very sure”. When scoring the questionnaire, zero points were given for a response of “not at all sure”, and two points were given for “very sure”. Self-efficacy for both fruit and vegetable consumption were assessed using

the same three-point scale, and participants were asked about their confidence to consume graded amounts of servings per day, ranging from at “least one serving per day” to “at least three servings per day”.

### ***Quality of Life***

The PedsQL was used to assess quality of life in four core areas (physical, emotional, social, and school). This is a validated and reliable measure for youth between the ages of eight and twelve (Varni et al., 2001). The measure asked about various problems in each of these four areas, and how often the girl experienced each of them within the last month on a scale from “never” to “almost always”. For each core area, there were five to eight questions. Each response was scored in 25-point increments, according to previously published scoring procedures (Varni et al., 2006). Zero points were given for a response of “almost always”, and 100 points were given for a response of “never” having problems in these areas. A mean score was calculated for each of the four core area domains. The minimum mean score was a zero and the maximum mean score was 100.

### **Biomedical Outcomes**

#### ***Anthropometrics***

Height was measured with a portable stadiometer to the nearest 0.1cm and weight was assessed via a digital scale, measuring to the nearest 0.1kg. For both measurements, girls were asked to remove shoes and any outer clothing. Measurements were taken in duplicate, and a third measurement was obtained if the result differed by more than 0.5 cm or 0.5 kg. BMI was calculated as weight (kg) divided by height (m) squared. BMI percentiles and Z-scores were determined based on age and sex adjusted growth charts. Waist circumference was measured around the iliac crest using a non-elastic Gulick tape measure. The value was obtained at the end

of a normal exhalation and was recorded to the nearest 0.1 cm. To assess body composition, a total body dual energy x-ray absorptiometry (DEXA) scan was completed (GE Lunar Prodigy, Madison, WI, USA). From this process, bone mineral density, bone mineral content, lean tissue, fat tissue, and percent body fat were obtained from each participant.

### ***Blood Pressure***

After resting in a seated position for five minutes, blood pressure was measured with an automated blood pressure cuff (Omron Healthcare, model HEM-907SXL, Vernon Hills, IL, USA) applied to the upper left arm. Two measurements were taken, at least one minute apart, and a third measurement was obtained if the first and second measurements for either systolic or diastolic blood pressure differed by more than 5 mmHg.

### **Statistical Analyses**

Statistical analyses were performed with SPSS statistical software (Version 23.0, IBM SPSS). Descriptive statistics were used to compute metrics related to recruitment, intervention delivery feasibility, and health assessment feasibility. Data for behavioral, psychosocial, and biomedical outcomes were tested to determine whether they met parametric assumptions. For those variables not meeting assumptions (steps, sedentary time), an appropriate non-parametric analysis was used. Comparisons between intervention groups at baseline were analyzed using independent *t* tests or a Mann–Whitney *U* (non-parametric). Repeated measures ANOVA was used to assess change in outcome measures from baseline to post-intervention, and to assess differential changes between groups. Effect sizes were calculated to quantify the size of change for all participants, or for difference between groups for selected outcomes. For all tests, significance was set at  $p < 0.05$ .

## **Results**

Baseline participant characteristics are shown in table 2.1. Groups were not different ( $p>0.05$ ) at baseline for any of the behavioral, psychosocial, or biomedical outcomes.

### **Recruitment and Retention Fidelity**

We successfully recruited 24 normal-weight female children from Fall 2012 to Fall 2016 within Manhattan, KS and the surrounding area. The number of girls per semester ranged from one to five. There was not any dropout from baseline to post-intervention. In addition to the girls included in this study, we had 19 girls whose parent contacted us for potential participation, but then chose not to participate. Additionally, there were 42 girls who did not meet the weight criteria for this study (i.e., they were overweight or obese), and were enrolled into a separate arm of the trial.

### **Intervention Delivery Feasibility and Acceptability**

The intervention conditions were both delivered with good fidelity. The mean percentage of sessions delivered per girl was 93.75% (11.25 sessions). The range of sessions delivered was nine to twelve sessions. As described previously, fidelity of intervention delivery was scored on a three-point scale of 0 to 2, with a maximum score of 24 if all sessions were delivered. Mean intervention fidelity score was 21.4 for the HE condition and 21.3 for the HEPA skills condition. No adverse events were reported via coach self-report. Following the intervention, the parents completed a questionnaire regarding their views about the wellness coaching intervention, and results indicated that it was well accepted and appreciated.

### **Health-Related Outcome Assessment Feasibility**

All of our participants completed both the baseline and post-intervention assessment periods within the respective specified two-week timeframe. There was no participant dropout

during this time in the sample of normal-weight female children. However, one participant refused to wear the accelerometer at baseline, and a second participant refused to wear it at post-intervention. All other testing procedures were completed and well-tolerated by participants.

### **Behavioral Outcome: Physical Activity**

There were no changes, between or within groups, in mean daily steps (HE  $\Delta=3,581\pm4445$ , HEPA  $\Delta=470.4\pm5940$ ;  $p=0.16$ ), as shown in Figure 2.1. Mean daily steps for both conditions were  $18,435\pm6,399$  steps at baseline, and  $20,461\pm4,842$  at post-intervention, which was a small to moderate effect size for change in steps for both wellness-training conditions together ( $d=0.36$ ). When compared to the HEPA skills condition, there was a moderate to large effect for the HE group for increasing average steps per day ( $d=0.59$ ). There were no changes in minutes of sedentary time (HE  $\Delta=45.6\pm233$ , HEPA  $\Delta=9.7\pm87.2$ ;  $p=0.62$ ) or moderate to vigorous physical activity (HE  $\Delta=-27.0\pm 122.1$ , HEPA  $\Delta= -9.6\pm76.6$ ;  $p=0.68$ ), when comparing baseline to post-intervention.

### **Behavioral Outcome: Fruit and Vegetable Consumption**

There were no changes, between or within groups, in fruit and vegetable consumption behaviors, including daily combined servings ( $p=0.87$ ), variety of fruits and vegetables within the past week ( $p=0.27$ ), and days of fruit ( $p=0.33$ ) and vegetable ( $p=0.71$ ) consumption in the past week. Figure 2.2 shows combined servings of fruits and vegetables consumed in the past 24 hours at both baseline and post-intervention.

### **Psychosocial Outcome: Self-Efficacy**

There were no changes, between or within groups, in self-efficacy for physical activity participation (HE  $\Delta=0.5\pm1.9$ , HEPA  $\Delta=0.6\pm1.8$ ;  $p=0.91$ ) or fruit and vegetable consumption (HE  $\Delta=0.9\pm1.9$ , HEPA  $\Delta= 0.7\pm2.7$ ;  $p=0.78$ ). At baseline, mean self-efficacy for physical activity was

6.4 out of a maximum score of 10, and at post-intervention, mean self-efficacy was 6.9. Baseline FV consumption self-efficacy was 8.4 out of 12, and at post-intervention, FV consumption self-efficacy was 9.2.

### **Psychosocial Outcome: Quality of Life**

Quality of life changes in the four domains are shown in Figure 2.3. A higher score on the QOL questionnaire indicated a lower occurrence of problems in the girl's physical, emotional, social, or school settings, and therefore an increase in score indicated an improvement in quality of life within that domain.

There were no changes, between or within groups, in mean physical ( $p=0.68$ ), social ( $p=0.47$ ), or school ( $p=0.55$ ) quality of life domains. From baseline to post-intervention, girls in the HEPA skills condition reported an increase in mean emotional quality of life, when compared to the health education group (HE  $\Delta=-6.7\pm 16.7$ , HEPA  $\Delta=5.8\pm 12.0$ ;  $p=0.047$ ), which represented a large effect for the HEPA skills condition ( $d=0.87$ ).

When compared to baseline, there were no changes in mean overall quality of life (HE  $\Delta=-0.90\pm 11.94$ , HEPA  $\Delta=3.7\pm 6.3$ ;  $p=0.25$ ). At baseline, the mean overall quality of life score was  $84.5\pm 10.6$ , and at post-intervention, the mean overall quality of life score was  $85.9\pm 9.31$ . When compared to the health education condition, there was a small to moderate effect for the HEPA skills group ( $d=0.29$ ). Changes in mean overall quality of life are shown in Figure 2.4.

### **Biomedical Outcomes**

Biomedical outcomes at baseline and post-intervention are shown in Table 2.2. There were no changes, between or within groups in BMI percentage ( $p=0.80$ ) or BMI Z-Score ( $p=0.99$ ). From baseline to post-intervention, there was a significant increase in waist circumference for all girls ( $p=0.03$ ), with no differences between groups. There was a significant



main effect of time for a reduction in body fat percentage for all girls ( $p=0.01$ ), which was driven by the reduction seen in the HEPA skills condition ( $p=0.02$ ). Body fat percentage did not change significantly from baseline to post-intervention in the HE condition ( $p=0.32$ ). There was a significant reduction in systolic blood pressure in the HE condition ( $p=0.03$ ), with no change exhibited in the HEPA skills condition.

## **Discussion**

The primary purpose of this study was to evaluate the feasibility of a 12-week, home-based wellness coaching intervention for normal-weight female children. Secondarily, we were interested in assessing preliminary change in behavioral, psychosocial, and biomedical outcomes. The intervention was delivered with fidelity, both in terms of coaching sessions delivered, and the percentage of coaching material successfully delivered during each coaching session. Additionally, the intervention was well accepted by participating families. Finally, there was no participant drop-out, and health-related outcome assessments were completed as planned. The coaching sessions were scheduled based on the family's availability, which likely made the coaching sessions convenient for the participants. Preliminary assessments of change in behavioral outcomes showed no significant differences over time or between wellness coaching conditions. However, effect size calculations showed potential for an effect on physical activity behaviors, specifically when analyzing mean steps per day. This effect on daily steps was greatest for girls in the HE condition. When compared to the HE condition, there was a significant increase in emotional quality of life, as well as a reduction in body fat percentage, in the HEPA skills condition.

There were no significant changes in behavioral outcomes, including average steps per day, nor overall physical activity levels of the participating girls. It has been recommended that

girls obtain at least 12,000 steps per day (Colley et al., 2012), and at both baseline and post-intervention, the recruited cohort of normal-weight female children exceeded this amount. However, there was a small to moderate effect for both wellness coaching conditions, and a large effect for girls who received the HE condition. It is a positive finding that we did not see a decline in physical activity levels over the course of the intervention, since activity levels have been shown to decrease with time in this age group. At both baseline and post-intervention, girls did not meet recommended intake levels for fruits and vegetables. Although the HEPA skills condition targeted several determinants of fruit and vegetable consumption, there may have been other important influences that were not effectively impacted. Specifically, a previously published review indicated that availability and accessibility of fruits and vegetables is an important determinant of consumption in youth (Blanchette & Brug, 2005). Although the girls were coached on how to ask for fruits and vegetables from their parents, we did not assess whether the availability and accessibility changed within the home environment. Additionally, although this was a home-based intervention, parents were not actively involved in the wellness coaching session. Of particular importance, parents were not coached on how to act as role models for fruit and vegetable consumption, which is another strong determinant of youth consumption behaviors (Cullen et al., 2000; Gibson et al., 1998).

On average, girls in the HEPA skills condition reported a significant increase in emotional quality of life, which is a subscale of the PedsQL measure. Evidence shows that a minimally clinical important difference occurs when the mean overall quality of life score changes by at least 4.4 points (Varni et al., 2003; Varni et al., 2007). Average quality of life increased in the HEPA skills condition by 3.7 points, which approaches the level of clinical significance. Additionally, the cut-point for being considered at-risk for youth is 69.7. Based on

these values, the girls in our sample were well above the cutoff for being considered at risk for quality of life issues, as the mean score was 84.5 and 85.9 points at baseline and post-intervention, respectively.

Wellness coaches for this intervention were college-aged females enrolled in a health-related degree program, including human nutrition and kinesiology. Having college students serve as wellness coaches for the intervention represents a sustainable mechanism, as coaches may participate through course credits, professional experiences, or internships. This may represent an advantage and a low-cost coaching alternative, when compared to previous wellness-coaching studies.

Given that our sample included healthy, normal-weight, female children, we would not have expected to see large changes in biomedical outcomes. However, with the age group that we studied, we could typically expect to see increases in BMI and waist circumference. Our findings showed a reduction in body fat percentage for the HEPA skills condition and a reduction in systolic blood pressure for the HE condition. Future research should assess the impacts of home-based wellness coaching in a more at-risk or diseased sample to determine whether biomedical changes are larger or more numerous.

Results from this study showed that a home-based wellness coaching intervention is feasible and accepted for use in normal-weight female children. Since this was a small feasibility study, it was not powered to detect differences in behavioral, psychosocial, or biomedical outcomes. Additionally, this intervention was not developed to impact the social determinants or structural factors that influence obesity. Future research should include a more fully powered study to further elucidate the impacts of home-based wellness coaching in this population. The proposed wellness coaching intervention, specifically the HEPA skills condition, may be

effective for impacting psychosocial and biomedical outcomes of normal-weight female children. If found to be efficacious for changing behavioral, psychosocial, and biomedical outcomes, a home-based wellness coaching model may be implemented within the wider health system. Due to the personal and financial costs of childhood overweight and obesity, early intervention is needed. Wellness coaching within the home environment may be a novel and effective approach for lasting behavior change, health promotion, and obesity prevention.

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**Table 2.1 Baseline Participant Characteristics**

Participant Characteristic	HE Condition	HEPA Skills Condition
Age at Baseline (years)	10.6±1.5	10.7±1.4
Average Steps Per Day	17,203.0±5,036.0	19,666.8±7,545.3
Average Daily Sedentary Time (min)	776.8±251.2	667.7±100.7
Average Daily MVPA (min)	171.1±105.8	219.7±91.0
Daily FV consumption (servings)	2.7±2.4	3.6±2.6
BMI Percentile (%)	51.8±25.1	58.4±31.1
Systolic Blood Pressure (mmHg)	99.8±7.3	97.9±8.7
Waist Circumference (cm)	66.3±4.1	67.5±6.5

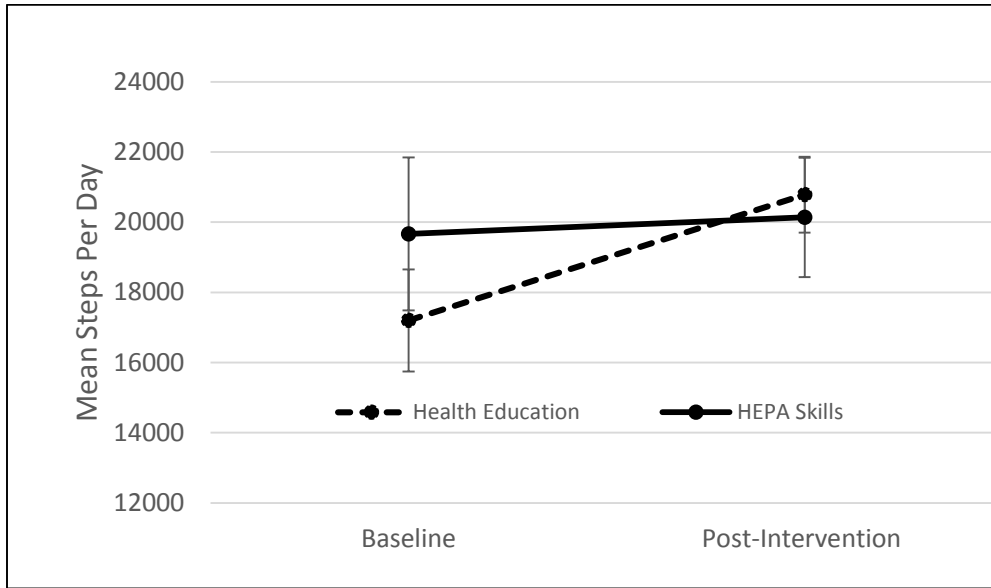
**Table 2.2 Biomedical Outcomes at Baseline and Post-Intervention by Condition**

Outcome Variable	HE Baseline Mean±SD	HE Post Mean±SD	HEPA Baseline Mean±SD	HEPA Post Mean±SD
BMI Percentile	51.8±25.1	51.3±23.4	58.4±31.1	57.2±30.4
BMI Z Score	0.04±0.7	0.02±0.7	0.21±0.9	0.18±0.9
Waist Circumference* (cm)	66.3±4.1	67.0±5.0	67.5±6.5	68.5±5.7
Body Fat Percentage*	24.1±7.0	25.0±6.2	24.2±6.3	22.3±6.4 <sup>^</sup>
Bone Mineral Density (g/cm <sup>2</sup> )	0.91±0.07	0.93±0.07	0.94±0.12	0.94±0.07
Systolic Blood Pressure (mmHg)	99.8±7.3	94.8±5.7 <sup>^</sup>	97.9±8.7	97.1±8.8
Diastolic Blood Pressure (mmHg)	60.7±6.3	58.7±4.9	60.7±10.0	59.7±7.2

\*Significant difference from baseline to post-intervention across both conditions

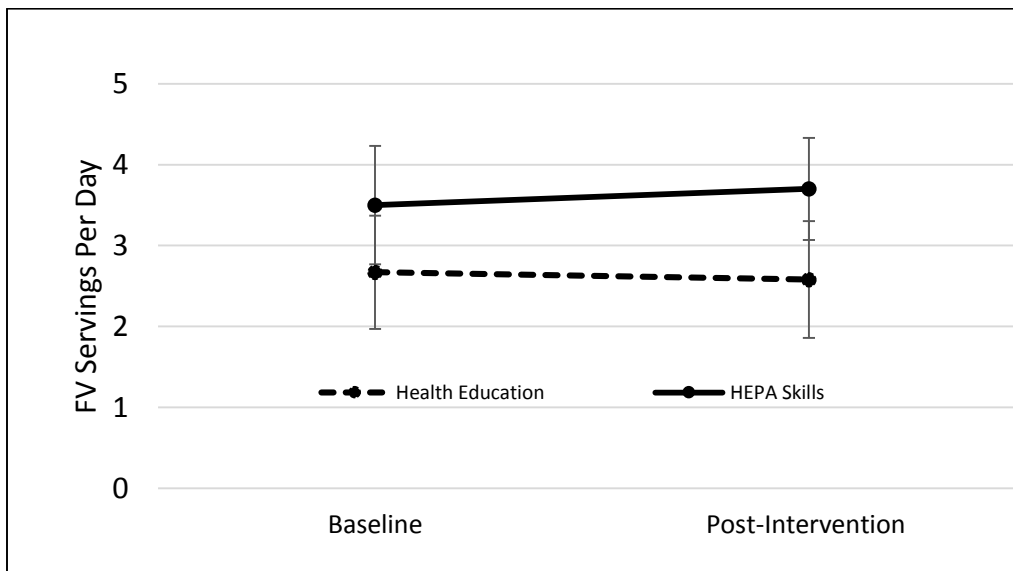
<sup>^</sup>Significantly different than baseline within condition

**Figure 2.1 Change in Mean Steps Per Day**



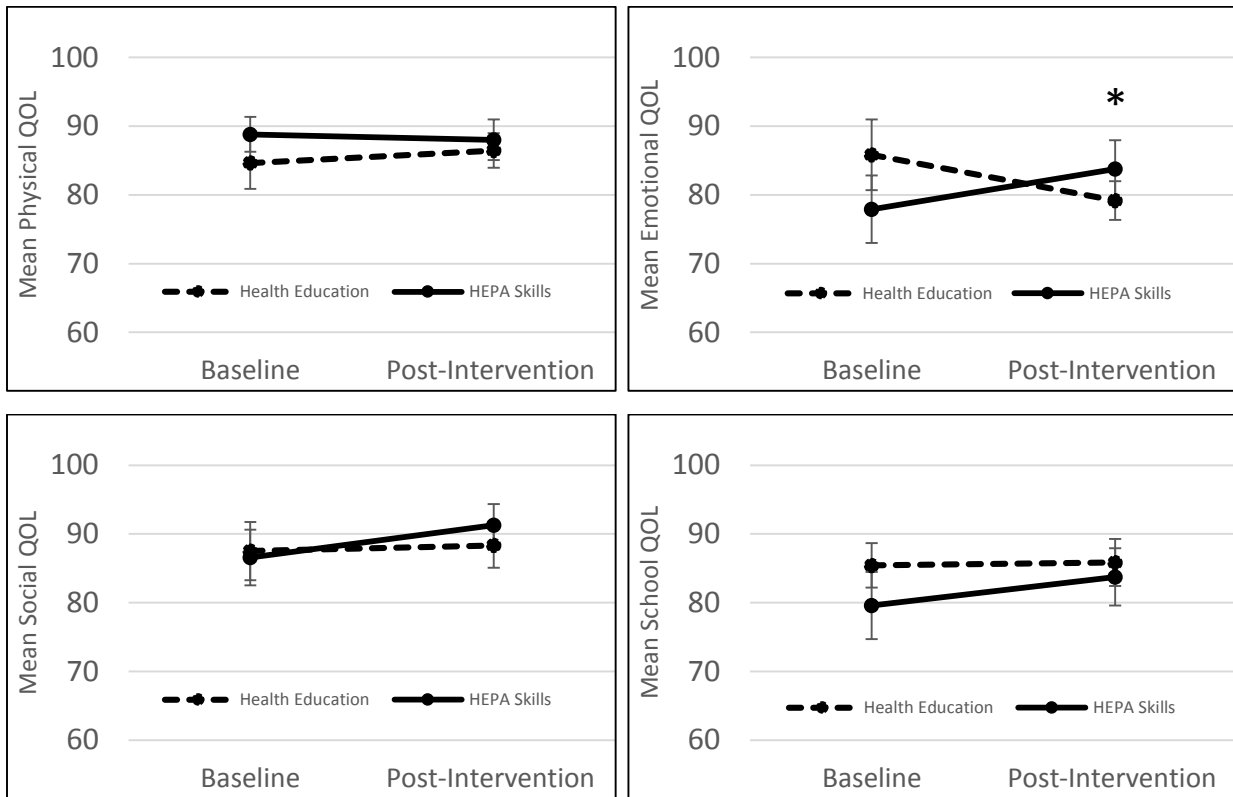
There were no changes, between or within groups, in mean daily steps (HE  $\Delta=3,581\pm4445$ , HEPA  $\Delta=470.4\pm5940$ ;  $p=0.16$ ). Error bars indicate SEM.

**Figure 2.2 Change in Fruit and Vegetable Consumption**



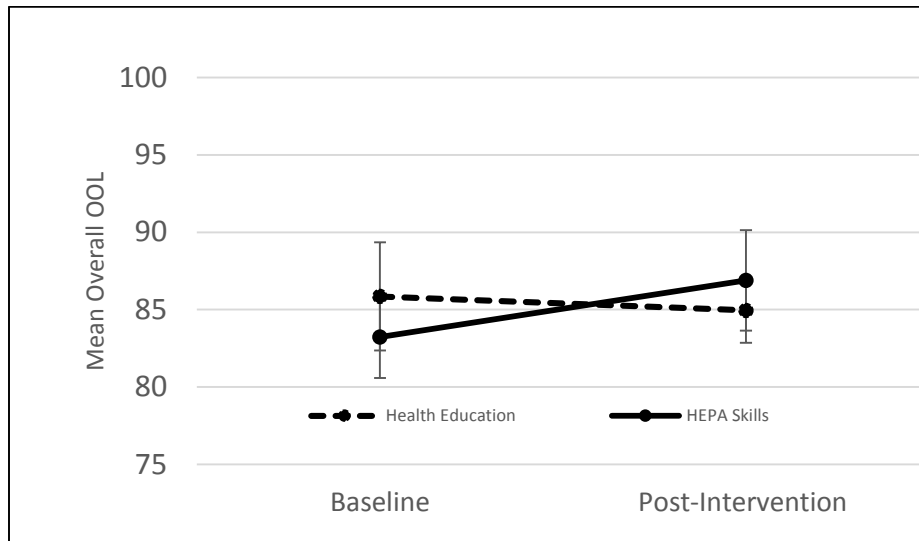
There were no changes, between or within groups, in FV servings per day (HE  $\Delta=-0.1\pm2.6$ , HEPA  $\Delta=0.1\pm2.4$ ;  $p=0.87$ ). Error bars indicate SEM.

**Figure 2.3 Changes in Quality of Life Domains**



There were no changes, between or within groups, in mean physical ( $p=0.68$ ), social ( $p=0.47$ ), or school ( $p=0.55$ ) quality of life domains. \*From baseline to post-intervention, girls in the HEPA skills condition reported an increase in mean emotional quality of life, when compared to the health education group (HE  $\Delta=-6.7\pm 16.7$ , HEPA  $\Delta=5.8\pm 12.0$ ;  $p=0.047$ ). Error bars indicate SEM.

**Figure 2.4 Changes in Mean Overall QOL**



There were no changes, between or within groups, in mean overall quality of life (HE  $\Delta = -0.90 \pm 11.94$ , HEPA  $\Delta = 3.7 \pm 6.3$ ;  $p = 0.25$ ). Error bars indicate SEM.

**Chapter 3 - Wellness-Promoting Practices through Girl Scouts: A  
Pragmatic Superiority Randomized Controlled Trial with  
Additional Dissemination**

Currently under review as Cull BJ, Dzewaltowski DA, Guagliano JM, Rosenkranz SK, Knutson CK, Rosenkranz RR. Wellness-Promoting Practices through Girl Scouts: A Pragmatic Superiority Randomized Controlled Trial with Additional Dissemination. *BMC Public Health*.

## Abstract

**Background:** Implementation of wellness-promoting practices in Girl Scouts, such as inclusion of physical activity (PA) and healthy eating (HE) opportunities, has been shown to improve following leader wellness training. This two-phase project sought to evaluate the effectiveness of two leader wellness-training delivery methods, in-person and online, for implementation of wellness-promoting practices during troop meetings, followed by dissemination of wellness training across the wider geographical area.

**Methods:** Phase I of this project was a pragmatic superiority randomized controlled trial in which 18 Girl Scouts troop leaders were matched and randomized to either in-person (n=9) or online (n=9) wellness-training delivery conditions. At baseline (January-February), leaders completed the Wellness Practice Implementation Questionnaire (assessing PA opportunity; sedentary breaks; electronic device usage; leader promotion of PA and HE; availability of fruits, vegetables, water, fruit juice, sweets, salty snacks, and sugar-sweetened beverages; max score=11). Troop leaders attended two training sessions (first in groups, second individually), either in-person or online, wherein leaders set troop-specific wellness implementation goals, self-monitored progress, and received guidance to assist with successful implementation. Following the training sessions (April-May), leaders completed the questionnaire again. During Phase II, research assistants delivered in-person group training to leaders in seven geographic areas in Northeast Kansas. Leaders (n=113) completed the Typical Troop Practices Questionnaire, and indicated whether they were interested in further training.

**Results:** During phase I, there was a significant interaction between intervention condition and time, whereby the in-person group increased their Wellness Practice Implementation score more than the online group (in-person =  $2.1 \pm 1.8$ ; online =  $0.2 \pm 1.2$ ;  $p=0.022$ ), adjusting for leader socioeconomic status and troop level. Phase II results showed that adoption of wellness training across the region occurred in 42.7% of leaders, with lower-income leaders being more interested in further training than higher-income leaders ( $p=0.03$ ). Further, implementation rates were greater than 50% in 8 of the 11 wellness categories.

**Conclusions:** In-person training was superior to online training for improvements in wellness-promoting practices during troop meetings. Wellness training was well received by leaders across the wider region. Future research should investigate how to disseminate leader wellness training most effectively for a cost-effective and larger-reaching public health impact.



## **Background**

The prevalence of childhood overweight and obesity remains a major public health concern. One in three children and adolescents aged 2 to 19 in the United States is considered overweight or obese (body mass index [BMI] for age  $\geq$ 85th percentile), with approximately 17% of those classified as obese (BMI for age  $\geq$ 95th percentile) [1]. Obesity is a multi-factorial issue, influenced greatly by lifestyle behaviors such as physical activity and dietary intake.

Youth are consistently reported to have deficits in the areas of physical activity participation and fruit and vegetable consumption. It has been estimated that 96% of girls aged 9–13 years fail to consume the recommended amounts of fruits (at least 1 ½ cups per day) and vegetables (2 cups per day) [2]. Additionally, many children do not meet the recommendation for physical activity [3,4,5], which is 60 minutes or more of moderate-to-vigorous physical activity (MVPA) per day [6]. Lifestyle behaviors have been shown to track from childhood into adulthood [7,8], so intervening in youth is especially important to help young people develop healthful behaviors that may be carried with them for years into the future. When compared to boys, girls represent an especially at-risk group, as they are less likely to meet physical activity guidelines [3].

### **Girl Scouts as a Wellness Promotion Setting**

Girl Scouts may represent an ideal intervention setting to promote healthy behaviors in young girls. The Girl Scouts of the USA is a not-for-profit national organization and represents the largest member of the World Association of Girl Guides and Girls Scouts (WAGGGS). There is the potential for a large public health reach when working with this organization, as WAGGGS reports a membership of 10 million girls and adults in 145 countries [9]. The organization recognizes that promoting healthy choices and healthy living are necessary for the

foundation girls need to become strong leaders. Since there is variety in the meeting activities, and many troops offer snacks, there is the potential for the meeting to provide regular opportunities for MVPA and healthy eating. With wellness-promoting opportunities in these areas, this setting could contribute to a reduction of overweight and obesity, as well as the promotion of healthy lifestyle behaviors.

Several intervention studies have utilized Girl Scouts settings to facilitate health behavior change among the girls attending [10,11,12,13,14]. Interventions delivered through scouting programs have effectively boosted children's fruit and vegetable consumption in previous studies [15,16,17]. Our team's previous observational study examined the physical activity of girls attending Girl Scouts troop meetings, and found that girls were achieving only two minutes of MVPA, and were sedentary for over 90 minutes of their troop meetings, which had an average length of 123 minutes [18]. Furthermore, troop leaders were found to frequently discourage physical activity. In another of our previous studies [17], intervention troop leaders were asked to implement an educational curriculum, including a small set of wellness-promoting practices and policies, and to be role models for healthful behaviors. When compared to the control group, intervention troops had greater availability of fruits and vegetables and fewer exposures to candy, cakes, and cookies for their snack following the intervention period [17]. Additionally, girls in the intervention troops spent a greater percentage of time in MVPA, and less time in sedentary behavior, as compared to girls in the control troops.

### **Rationale for Present Study**

Due to the presence of modifiable factors within troop meetings, and the potential to improve them with leader-targeted intervention, there appears to be an evidence-based

intervention opportunity focused on how to train leaders most effectively to implement wellness-promoting practices within their troop meetings.

The way in which Girl Scouts leader training is delivered may impact the effectiveness and potential reach for larger dissemination. Both an in-person delivery and online platform have their respective strengths and limitations as a format to provide wellness training, and the differential impact should be studied so that resources and training time can be spent appropriately and most effectively. Online delivery may reach a wider audience, allow for a larger public health impact [19], and reduce the gap between research and practice, provided online training and education is effective [20]. Online learning shows promise, as Johnson et al. [21] found no difference in learning outcomes for students taking an online versus face-to-face graduate course, and concluded that both methods may be effective training platforms. Similarly, a review found that online learning was not less effective than face-to-face learning for the teaching of clinical skill and practices [22]. In contrast, a meta-analysis found that students (primarily undergraduate and above) performed better in online settings than in a face-to-face instructional model [23]. While the question of online versus in-person learning has been assessed in different settings, there is no published literature examining the differential impact of online and in-person training of volunteer Girl Scouts leaders.

There are also unanswered questions regarding successful dissemination and implementation in this setting. While the evidence suggests that improvements can be made in the environment of Girl Scouts meetings through wellness-promoting interventions, additional work is needed in the areas of dissemination and implementation science to better connect evidence-based practices with a public health impact in real-world settings. The RE-AIM framework [24] can be used to evaluate the reach, efficacy/effectiveness, adoption,

implementation, and maintenance of a wellness promotion intervention, which are important elements to consider in the translation of research to a standard practice.

Therefore, Phase I of the present study sought to evaluate the effectiveness of two formats of Girl Scouts leader wellness training delivery (in-person or online) on implementation of evidence-based wellness practices, including opportunities for physical activity and healthy snacking during meetings. Phase II assessed the feasibility of delivering the wellness training across a larger region, as well as the adoption and implementation of wellness-promoting practices by troop leaders within their meetings.

### **Phase I Hypotheses**

We hypothesized that both in-person and online leader wellness training would lead to improvements in implementation of wellness-promoting practices during troop meetings.

### **Phase II Hypotheses**

We hypothesized that leader wellness training would be well accepted and feasible across the larger geographical area of Northeast Kansas, and that adoption and implementation of wellness-promoting practices would occur in greater than 50% of leaders.

## **Methods**

### **Overview**

This project was conducted in two phases, over the course of two years. Phase I was a pragmatic superiority randomized controlled trial, comparing in-person and online leader wellness training delivery methods on wellness-promoting practices during troop meetings. Phase II was a serial cross sectional study assessing the feasibility of wellness training, as well as the adoption and implementation of wellness-promoting practices across the wider geographical

region. These studies were approved by the Institutional Review Board at Kansas State University (IRB # 7387).

### **Phase I: Design**

A pragmatic randomized controlled trial was conducted where a cohort of Girl Scouts troop leaders (n=18) was assessed at baseline, matched and randomized to one of the wellness training conditions (in-person or online training), and reassessed at three months post-intervention. Troops were matched based on the age group and grade level of the girls, the day of the week they met, and the number of girls in the troop. One troop in the pair was randomized to the in-person training delivery condition, while the other troop was randomized to the online delivery condition. The randomization process was carried out by the primary investigator, and SPSS was used for the computer-generated randomization process. Allocation concealment was used, such that the research assistants enrolling participants and conducting the research were not aware of treatment allocation in advance. Following randomization, troop leaders were provided with their intervention group allocation.

### **Phase I: Participants**

Participants were Girl Scouts leaders from two low-income counties in Northeast Kansas. Inclusion criteria required that: the troop had at least five girls who regularly attended troop meetings; meetings were held at least twice per month; the troop met within 120 miles of Kansas State University in Manhattan, KS.

Initial contact and recruitment of troop leaders occurred at the monthly service unit meetings. Service units consist of the Girl Scout troop leaders within a defined area or region. Research assistants attended these meetings in the two pre-selected counties (three total meetings) to present the project overview and recruit potential leaders for participation. At the

baseline service unit meetings, a leader from each troop completed the Typical Troop Practices Questionnaire (Appendix B) regarding their troop demographics and typical characteristics of their meetings. At the end of the questionnaire, leaders indicated whether or not they were interested in participating in further research. Interested troop leaders provided consent, and their troop was then matched with a similar troop within their county. Figure 3.1 shows the flow of participants in Phase I of the study.

### **Phase I: Wellness Training Intervention**

The wellness training intervention was developed, in part, by using components of the self-determination theory [25]. This theory posits that motivation is a key component of human behavior, and that this motivation is influenced by one's autonomy, competence, and relatedness. A goal of the wellness training intervention was to promote growth in each of these areas through a continuous quality improvement process, with the target outcome being an increase in wellness-promoting opportunities for girls during troop meetings. Throughout the training intervention, leaders developed skills and received resources necessary to develop and implement a wellness policy tailored to their troop. The training materials were adapted from our team's previous work with afterschool programs [26] and schools [27], in which skills and efficacy for healthy physical activity and dietary behaviors were targeted in adults and youth.

Troop leaders in both intervention groups attended two wellness training sessions (approximately 30-45 minutes each), which included one group training followed by an individual training. For the group training session, leaders in the in-person delivery group troop attended the training session that was held in their county. The online group did not physically attend these sessions, but received the same information and training materials through a website

and online learning platform (Qualtrics system), which was dedicated to their intervention delivery.

Group Training During the group training, leaders developed tailored wellness policies and set goals for their troop meetings in five key wellness areas: 1) physical activity opportunities, 2) limiting sedentary time, 3) offering fruits and vegetables as snack choices, 4) making water available as the beverage choice, and 5) opportunities for building social, non-digital connections among their girls. For each of the five key wellness areas, leaders had autonomy in their choices, and could choose a “gold”, “silver”, or “bronze” level goal, or they had the option to create their own goal within each category. Leaders received printed feedback from the baseline assessment, in which they were able to see their troop’s wellness opportunities, as well as a comparison to other troops in their council regarding physical activity opportunities, sedentary time, and healthy snack availability. In order to build relatedness and competence, the leaders participated in group conversation and troubleshooting regarding the barriers to implementation, and successes in each of the wellness opportunity areas (discussion boards were set up for the online group). The leaders shared ideas with one another and were able to connect about their experiences. After leaders set their goals, they were given resources and tips for working towards meeting their implementation goals. Leaders were encouraged to self-monitor their progress throughout the upcoming meetings. At the end of the training, leaders received handouts and contact information for research staff, and were encouraged to contact them with questions or concerns regarding goal implementation. Table 3.1 provides further information about the training sessions.

Individual Training Approximately one month after the group wellness training session, the leaders had an individual leader training session that was part of the continuous quality improvement process. For those in the in-person group, a research assistant attended a troop meeting and met with the leader to identify areas where they had made progress and where they could still improve to meet their troop's goals. Online group leaders provided information about their meeting activities and leader practices through email, and research staff worked with them individually on these same issues. Leaders were asked to self-monitor their progress, with the goal being an increase in self-regulation skills and competence for making positive changes as they worked through barriers and identified solutions to use in future meetings. Both groups of leaders were provided specific feedback and were given additional resources and suggestions about activities to incorporate into their meetings.

### **Phase I: Outcome Measures**

The primary outcome for Phase I was implementation of wellness practices, as assessed through the leader-reported wellness promotion opportunities of the troop meetings. This information was collected via the Wellness Practice Implementation Questionnaire (Appendix C) at the conclusion of a troop meeting that occurred at baseline and at post-intervention. A meeting that was intended to be representative of a typical meeting was assessed at each time point. The questionnaire asked about specific troop meeting activities and practices during that meeting, as well as the leader's promotion of healthy behaviors. Leaders completed the questionnaire and 11 of the items pertained to the wellness promotion opportunities of the meeting. Each item was presented in a yes/no format, where a wellness-promoting response was scored as a 1 and a wellness-demoting response was scored as a 0. Thus, the maximum Wellness Practice Implementation score was 11, while the minimum score was a 0. The 11 items pertained to the



presence or absence of the following items during the meeting: PA opportunity; sedentary breaks; leader promotion of PA; leader promotion of healthy eating; availability of fruits; availability of vegetables; availability of water; use of electronic devices; availability of fruit juice; availability of sweets or salty snacks; and availability of sugar-sweetened beverages. In-person group troop leaders completed this questionnaire in paper form and gave it to the research assistant at their meeting, while those in the online group completed the questionnaire via Qualtrics (online survey site).

### **Phase I: Statistical Analyses**

SPSS for Windows (Version 23.0) and SAS software were used for statistical analyses. Intervention groups were compared at baseline using independent t-tests. A generalized linear mixed model in SAS was used to analyze differential change between in-person and online in wellness promotion opportunities over the course of the intervention. The model was used to test for an interaction between intervention group and time, as well as main effects, using leader socioeconomic status and troop grade level as covariates. An ANOVA was used to test for condition by time differences in the 11 wellness categories, with subsequent paired t-tests to check for differences in wellness promotion opportunities within the 11 wellness categories between the time points for each condition.

### **Phase II: Wellness Training Dissemination and Implementation**

Phase II of the research project assessed the potential for wellness training dissemination and implementation of wellness-promoting practices across the wider region. One year later, after the completion of the wellness training intervention, research assistants once again attended service unit meetings in Northeast Kansas. At these meetings, an in-person, group wellness

training was delivered to leaders in attendance. Research assistants visited a total of seven service units, including the three that were visited during Phase I of the project.

### **Phase II: Design**

Phase II was a serial cross-sectional study. Rates of adoption and implementation were assessed for leaders in the seven service units, and a serial, cross-sectional view of change in implementation rates was determined for the three service units visited during both Phase I and Phase II.

### **Phase II: Participants**

Participants for Phase II were troop leaders in the seven service units that were visited. Out of 180 registered troop leaders, 113 attended the meetings in their area and received the wellness training. Since three service units were visited during both Phase I and Phase II, there were some leaders (n=18) who attended and were assessed during both years.

### **Phase II: Outcome Measures**

Leaders in Phase II completed the Typical Troop Practices Questionnaire to assess troop demographics and wellness promotion opportunities. This was the same questionnaire that leaders completed at the service unit meeting during Phase I of the project and was meant to provide an overview of each troop's regular practices; it assessed physical activity opportunities, typical snack and beverage options, the use of electronic devices, opportunities for building social connections, and the leader's perception of the importance of improving the wellness promotion opportunities of their troop meetings. The questions were asked on a 4-point Likert scale, with possible responses ranging from "rarely or never" offered during a typical meeting to offered "every meeting." A positive response was indicated by a response of at least "some of the time" for physical activity, water as a beverage choice, fruit availability, vegetable

availability, and promotion of healthy eating and physical activity. A response of “rarely or never” was considered a wellness-promoting response in the areas of prolonged sedentary time, sweet and salty snacks, sugar sweetened beverages, and fruit juice. At the end of the questionnaire, leaders indicated whether or not they would be interested in participating further in wellness-promotion training.

Adoption occurs when an organization or individual commits to incorporating the evidence-based practices into their setting [28], and therefore, adoption was determined to have occurred in our study if the troop leader indicated that they were interested in receiving further wellness-promoting training via the Typical Troop Practices Questionnaire. Implementation occurs when evidence-based practices are integrated into particular setting [28], and therefore, implementation was determined to have occurred in our study if the troop leader indicated a wellness-promoting response in the various wellness categories during the initial training session.

## **Phase II: Statistical Analyses**

Chi-squared analyses were used to test for differences in the characteristics of leaders who adopted the wellness training materials versus those who were not interested in adoption. Descriptive statistics were used to calculate troop means, as well as percentages of leaders reporting wellness-promoting responses. Additionally, chi-squared tests were used to determine differences between years for percentages of leaders reporting implementation of wellness-promoting practices within the three service units visited at both time points. For all tests, significance was set at  $p < 0.05$ .

## **Results**

### **Phase I: Wellness Training Intervention Findings**

Phase I baseline troop characteristics are shown in Table 3.2. Nine leaders participated in the in-person training, while six leaders participated in the online training (three leaders dropped out following randomization, but prior to intervention delivery). There were no differences in the number of girls, meeting length, cumulative Wellness Practice Implementation score, or other troop demographics or leader characteristics between the two intervention conditions at baseline.

At each assessment period, the implementation of wellness practices during the troop meeting was analyzed. Table 3.3 shows the percentage of leaders who reported a wellness-promoting response in each of the 11 wellness categories at baseline, with no differences ( $p>0.05$ ) between groups. Based on this information, the categories with the lowest percentage of health promoting responses were fruit availability, vegetable availability, sweets and salty snack availability, and verbal promotion of physical activity. These categories with the lowest proportion of wellness promoting responses were consistent between the in-person and online groups.

### **Phase I: Primary Outcome**

The primary outcome for Phase I was implementation of wellness practices, specifically the changes that occurred in implementation over the course of the study. When using a generalized linear mixed model adjusted for troop grade level and free/reduced lunch status, there was a significant interaction between intervention group and time ( $p=0.022$ ). Figure 3.2 shows the change in Wellness Practice Implementation score from baseline to post-intervention for both of the delivery method groups. In addition to the significant interaction between intervention group and time, there was a significant main effect of time ( $p=0.011$ ). The in-person

delivery group exhibited a significant increase in Wellness Practice Implementation score from baseline to post-intervention ( $2.1 \pm 1.8$ ;  $p=0.019$ ), while the change was not significant in the online group ( $0.2 \pm 1.2$ ;  $p=0.741$ ). The test for main effect of intervention group was not significant ( $p=0.46$ ).

### **Phase I: Secondary Outcomes**

Secondary analyses were conducted to determine the categories in which improvement occurred following intervention. When analyzing each of the 11 wellness categories separately, there were no differences between groups in change over time ( $p>0.05$ ). When looking at only leaders in the in-person delivery group, there was a significant reduction in the availability of sweets or salty snacks ( $p=0.03$ ), with other categories showing non-significant changes. Figure 3.3 shows change in the percentage of leaders indicating a wellness-promoting response in each of the 11 categories for both the in-person and online delivery groups. The proportion of categories of Wellness Practice Implementation scores that increased in the in-person delivery group was 10 out of 11, while the online group showed increases in 5 out of 11 categories. Chi-squared analyses indicated that there were not significant differences ( $p=0.06$ ) between groups with regard to proportions of categories that changed in a positive direction. Following intervention, the categories with the lowest percentage of wellness promoting responses were fruit availability, vegetable availability, verbal promotion of healthy eating, and verbal promotion of physical activity.

### **Phase II: Wellness Training Dissemination, Adoption and Implementation Findings**

A total of 113 Girl Scouts leaders from 7 service units were trained during Phase II of the project. The smallest service unit had 4 leaders in attendance, while the largest included 35 leaders. There were a total of 180 registered leaders in the service units that were reached.

Therefore, approximately 63% of potential leaders attended the wellness practice implementation training. Of the 113 leaders trained, 85 leaders (75%) completed the Typical Troop Practices Questionnaire, and 48 leaders (56% of leaders who completed the questionnaire) indicated that they would be interested in participating further in wellness-promotion projects, thus adopting the wellness training intervention components, for their Girl Scouts troop. Baseline troop demographics are shown in Table 3.4. Troop leaders who were interested in further training differed in socioeconomic status (as assessed through eligibility for free/reduced lunch), when compared to the uninterested group ( $\chi^2=6.99, p=0.030$ ).

Implementation of wellness-promoting practices was assessed during Phase II in the 85 leaders who completed the Typical Troop Practices Questionnaire. Figure 4 shows the percentage of leaders reporting a wellness-promoting response in the 11 wellness categories. Greater than 50% of troop leaders reported implementation of wellness-promoting practices in 8 of the 11 categories during year 2. Implementation of wellness-promoting practices was lowest for availability of sweets and salty snacks and highest for offering water as a beverage choice.

Three of the service units were visited during both Phase I and Phase II of the project, thus providing a serial, cross-sectional view of the wellness environment. These three service units were analyzed to compare wellness practice implementation across the two years. Table 3.5 shows the percentage of troops who indicated implementation of a wellness-promoting response in each of the categories over the two years. A significantly greater percentage of leaders reported opportunities for fruit consumption ( $p=0.039$ ) and vegetable consumption ( $p=0.036$ ) during year 2, as compared to year 1.

## Discussion

### Phase I

The purpose of Phase I was to determine the differential impact of in-person and online wellness training on implementation of wellness practices during Girl Scouts troop meetings. Our hypothesis for Phase I was supported, in that in-person and online leader wellness training led to improvements in implementation of wellness practices during troop meetings. When all troops were analyzed together, Wellness Practice Implementation scores improved from pre- to post-intervention. Additionally, we found a significantly larger effect for leaders who were trained in-person, when compared to those trained online, showing that in-person training was superior to online training for eliciting changes in health-promoting opportunities for girls.

These findings are in contrast to the meta-analysis showing that students learning in an online environment performed better than those receiving the instruction in a face-to-face format for graduate and professional students [23]. This same study found that learning effects were smaller when the content and organization of activities (i.e., group work, independent work, discussion, etc.) was identical between the conditions. Effects were also greater for online students who spent a greater amount of time with the class materials. In the present study, it is possible that negligible effects were found for the online group because they did not access and engage with the materials as fully as the in-person group. A review study examining online versus face-to-face learning in a variety of settings [29] concluded that there are benefits and obstacles regarding an online instructional model. Although there is the potential to reach a geographically diverse audience in a flexible and cost-effective way, there are certain technical skills required, and oftentimes users feel a lack of interpersonal interaction. These may have

been conditions that led to the lack of change in wellness practice implementation for the online group. Additionally, it is possible that training sessions were less impactful when delivered online versus in-person, the group context and relatedness were not fostered as well in the online group, and online leaders did not adopt the core principles and practices promoted in the training, among other possible reasons. The online training sessions may not have successfully targeted behavior change constructs in the way that the in-person training did, although these mediators of behavior change were not explicitly studied in this present project. Future research should assess engagement of the online troop leaders, since they are considered change agents and implementers of the training components [20].

Our findings are consistent with previous research showing improvements in the wellness environment of Girl Scouts troop meetings following leader-targeted intervention. Rosenkranz and colleagues [17] implemented a wellness-promotion curriculum and a set of wellness policies for offering physical activity and healthy snacks in intervention troops, and found increases in both of these areas at the post-intervention period. Our present study was similar in that our troops set wellness policies, but there was a greater deal of autonomy and leader choice in setting specific goals, when compared to the previous study. Cullen and colleagues [16] studied the impact of four weeks of a nutrition education program, delivered in Girl Scouts, on fruit and vegetable intake of participating girls. They found that girls in the intervention troop increased their consumption following the education program, but that levels returned to baseline at the three-month follow-up assessment period. Although we did not assess youth fruit and vegetable consumption in our study, our observations were that youth did indeed consume the snacks that were provided during the meeting. This is consistent with our previous research showing that girls consumed more fruits and vegetables when they were offered as snack choices during troop



meetings [17]. As such, fruit and vegetable consumption could be assumed to be higher during the meeting on the days in which they were offered, but further research using rigorous methodology should investigate this further. An overarching goal of the present study was to translate and extend our effective, evidence-based practices [17] into the Girl Scouts organization to study implementation and dissemination as it would happen in a real-world setting, which was achieved.

## **Phase II**

Phase II assessed the feasibility of our approach to further dissemination of wellness training, as well as adoption and implementation of wellness practices across the wider region. The Phase II hypotheses were also supported. As evidenced by strong attendance and completion of group leader trainings, the current model of wellness training was well accepted and apparently feasible across the larger geographical area of Northeast Kansas. Adoption of the wellness training and interest in applying the principles to troop meetings occurred in 56% of the troop leaders who went through the training during phase II of the project. Additionally, the majority (>50%) of troop leaders reported implementation of health-promoting practices in 8 of the 11 wellness categories. A meta-analysis [30] found that implementation rates are positively related to program success, and that positive outcomes can be seen with implementation rates of greater than 60%, which were found in 6 of the 11 wellness categories during Phase II.

The serial cross-sectional view of the service units over the two years showed relatively stable implementation rates of wellness practices for many of the areas, with exceptions for fruit and vegetable availability, which showed a higher percentage of wellness-promoting responses during the second year. Since there is relatively high turnover in Girl Scouts leaders, the same set of leaders may not have completed the surveys for both years, and

therefore should not be considered as change across years within leaders. The high leader turnover in Girl Scouts represents an important component to consider when striving to make organizational change. Lasting change will require more than changing individual leaders' behaviors, since they may leave the organization, but a true change in the direction of wellness promotion will require the core concepts to become embedded into the training system and organizational structure of Girl Scouts. This notion is consistent with recommendations for wellness promotion in schools, which call for coordinated efforts between school policies, supportive classroom environments, health education curriculum, family involvement, and professional development [31]. In this way, impacting the system requires investment at the institutional level and broad support across domains within the organization.

Data from Phase II showed that leaders interested in further training were more likely to be from low-income households, compared with leaders who were not interested. The socioeconomic status of troop leaders may be important when planning future interventions or assessing the potential public health impact. It is possible that these leaders, or some leaders within the council, were being underserved by council administrators, and were not receiving the same level of troop leader training as higher-income areas. This was particularly a problem for the more rural areas of the council. It is promising that low-income troop leaders were most interested in wellness-promotion projects, as evidence shows that low-income individuals are more at risk for unhealthy behaviors, as compared to their higher income counterparts [32]. The public health impact of this type of intervention could be increased by reaching those who are in most need of improvement.

## **Strengths and Limitations**

A strength of our study was that the intervention targeted theoretical constructs (autonomy, competence, relatedness) shown to be important for eliciting behavior change. Although our intervention was not developed to test specifically the self-determination theory [25], we based many of the training components on constructs included in this theory. Logistically, the group training session length seemed to be appropriate (30-45 minutes) and could be included as part of the service unit meeting activities in the future, should it become a part of the larger organization's practices. A limitation of this study was that the primary outcome relied on the troop leaders' self-reports of the meeting activities and leader behaviors. Additionally, only one troop meeting was assessed at each time point (baseline and post-intervention). It is possible that leaders may have changed their behavior due to being assessed, or may have given responses that do not accurately reflect their typical meeting practices. Since the project was conducted in low-income counties in Kansas, we cannot generalize the results to higher-income groups or those who reside in areas inherently different from our target geographical area.

## **Future Directions**

Future work should assess how to disseminate leader wellness training most effectively, as well as ways to integrate the training successfully into the larger Girl Scouts organization. Research should specifically address ways to enhance the online wellness training delivery, possibly through a more tailored and individualized online approach, as this may represent a more cost-effective and larger reaching medium for large-scale dissemination within the organization.

## **Conclusions**

In conclusion, a combination of group-based and individual-based Girl Scouts leader wellness training improved the implementation of wellness-promoting practices, with in-person training shown to be superior to online training in Phase I. Additionally, leader wellness training appeared to be feasible, with implementation and adoption occurring in the majority of leaders participating in the wellness training during Phase II. Additional research, including objective assessment of troop meeting practices, is needed to determine the most effective way to train Girl Scouts troop leaders on implementation of wellness-promoting practices and the potential impact on youth health behaviors. Future work should investigate how to disseminate leader training most effectively for a cost-effective and larger-reaching public health impact.

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**Table 3.1 Phase I: Training Session Information**

Training Session Content	Delivery Format	How Behavior Change was Targeted
Wellness Presentation: Overview of Recommendations for Youth and Existing Gaps	In-Person Group: Face to Face; Received handout with PowerPoint slides during in-person presentation Online Group: PowerPoint presentation uploaded to Canvas website	Standards for physical activity and fruit and vegetable consumption were identified; Leaders gained awareness about the current gaps for youth in meeting recommendations <b>Michie’s Behavior Change Techniques:</b> <ul style="list-style-type: none"> <li>• <b>Provide Information about behavior in general (technique #1) and to the individual (technique #2)</b></li> <li>• <b>Provide normative information about others’ behavior (technique #4)</b></li> </ul>
Troop Report Card/Printed Feedback	In-Person Group: Received report card in hard copy Online Group: Received an email with the attachment of their report card	Leaders were able to compare their troops to others and identify areas where they could improve their troop meeting wellness opportunities <b>Michie’s Behavior Change Techniques:</b> <ul style="list-style-type: none"> <li>• <b>Provide feedback on performance (technique #19)</b></li> <li>• <b>Facilitate social comparison (technique #28)</b></li> </ul>
Development of Troop Wellness Policy	In-person Group: Set goals during the in-person training Online Group: Asked to set goals during their online training	Leaders increased competence and maintained autonomy through the goal setting practices. The policies were self-tailored to their troop and dynamics, and realistic goals were set. Leaders were encouraged to set small

		<p>goals at first, and progress to larger goals over time</p> <p><b>Michie’s Behavior Change Techniques:</b></p> <ul style="list-style-type: none"> <li>• <b>Goal setting (behavior) (technique #5)</b></li> <li>• <b>Action planning (technique #7)</b></li> <li>• <b>Set graded tasks (technique #9)</b></li> </ul>
<p>Resources and Tips for Implementation</p>	<p>In-Person: Discussion happened in a face-to-face format</p> <p>Online Group: Discussion boards were set up with threads created by research staff to mirror the content discussed during the in-person training</p>	<p>Leaders gained barriers self-efficacy, as they worked through solutions to problems that they expected to face with policy implementation. Relatedness was fostered as leaders discussed strategies and ideas with one another and made connections regarding their shared experiences</p> <p><b>Michie’s Behavior Change Techniques:</b></p> <ul style="list-style-type: none"> <li>• <b>Barrier identification/problem solving (technique #8)</b></li> <li>• <b>Focus on past success (technique #18)</b></li> <li>• <b>Plan social support (technique #29)</b></li> <li>• <b>Identification as a role model (technique #30)</b></li> </ul>

**Table 3.2 Phase I: Baseline Troop Characteristics**

	In-person Group (Mean ± SD)	Online Group (Mean ± SD)	<i>p</i> -value
Number of Girls	11.8 ± 3.8	10.5 ± 4.2	0.554
Meeting Length (minutes)	80 ± 16.8	80 ± 12.2	1.00
Wellness Practice Implementation Score (Max score of 11)	6.1 ± 1.8	6.3 ± 2.1	0.830
County location			
Wyandotte	5	3	0.832
Shawnee	4	3	
Troop Level			
Daisy	1	1	0.949
Brownie	5	3	
Junior	3	2	
Leader socioeconomic status			
Low-income	3	2	0.690
Not low-income	5	4	
Unreported	1	0	

**Table 3.3 Phase I: Percentage of Leaders Reporting Wellness-Promoting Responses at Baseline**

<b>Wellness Category</b>	<b>In-person Group</b>	<b>Online Group</b>	<b><i>p</i>-value</b>
Use of electronic devices	77.8%	83.3%	0.792
Fruit availability	33.3%	16.7%	0.475
Vegetable availability	11.1%	0%	0.398
Sweets or salty snack availability	33.3%	33.3%	1.00
SSB availability	66.7%	83.3%	0.475
Fruit juice availability	100.0%	83.3%	0.475
Water availability	66.7%	100%	0.114
Promotion of healthy eating	44.4%	66.7%	0.398
Physical activity opportunity	66.7%	66.7%	1.00
Sedentary Breaks	55.6%	66.7%	0.667
Promotion of physical activity	33.3%	33.3%	1.00

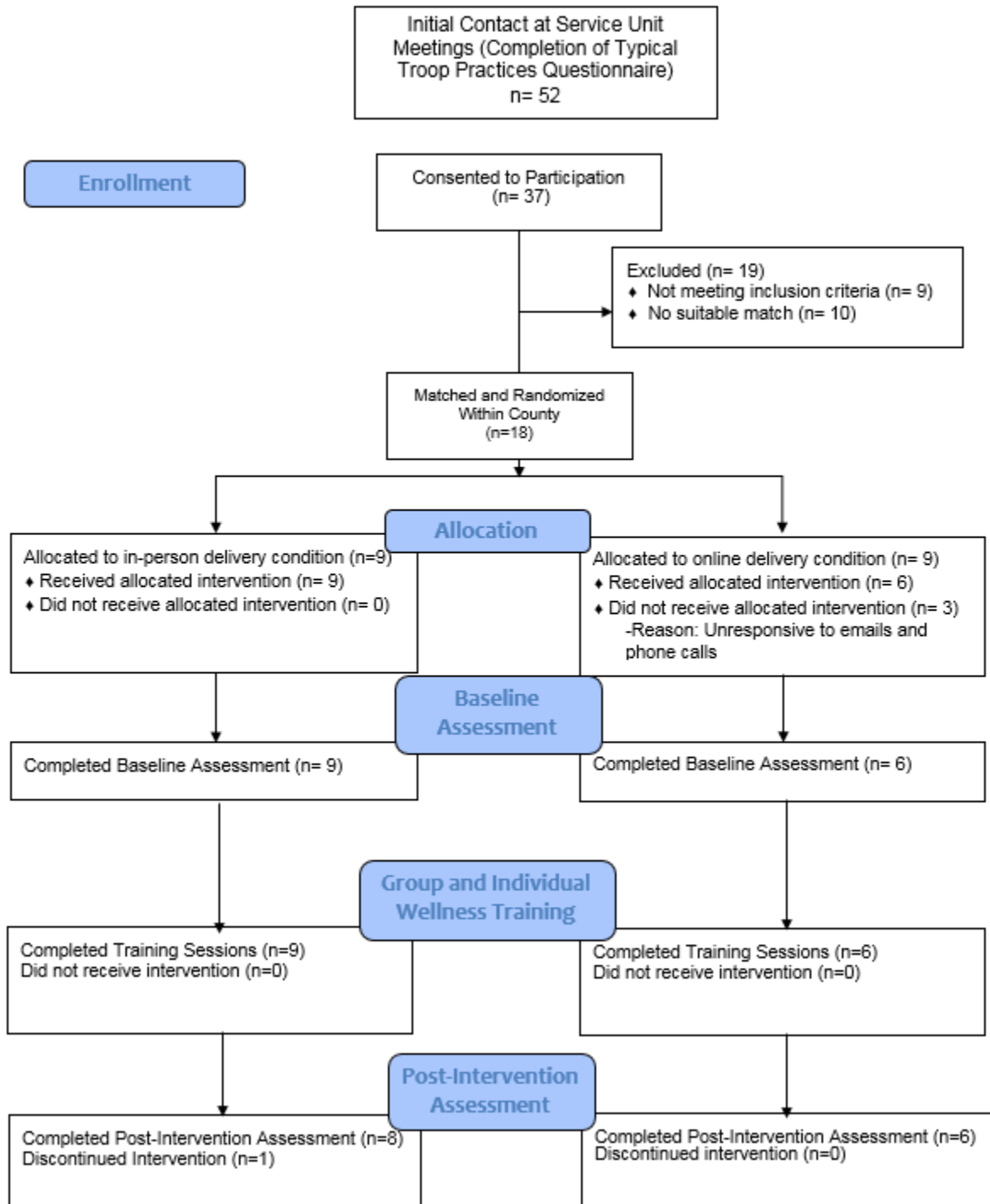
**Table 3.4 Phase II: Troop Demographics**

	Interested in Further Training	Uninterested in Further Training	<i>p</i> -value
Troop Level			
Daisy	6	7	0.106
Brownie	19	7	
Junior	16	13	
Cadette	7	7	
Senior	0	3	
Leader socioeconomic status			
Low-income	17	4	0.030
Not low-income	24	27	
Unreported	7	6	
Fruit Availability			
Rarely or never	15	9	0.542
At least sometimes	32	26	
Vegetable Availability			
Rarely or never	25	15	0.354
At least sometimes	22	20	
Physical Activity Opportunity			
Rarely or never	4	4	0.698
At least sometimes	44	33	

**Table 3.5 Phase II: Percentage of Troops Reporting Wellness-Promoting Responses Across 2 Years in 3 Service Units**

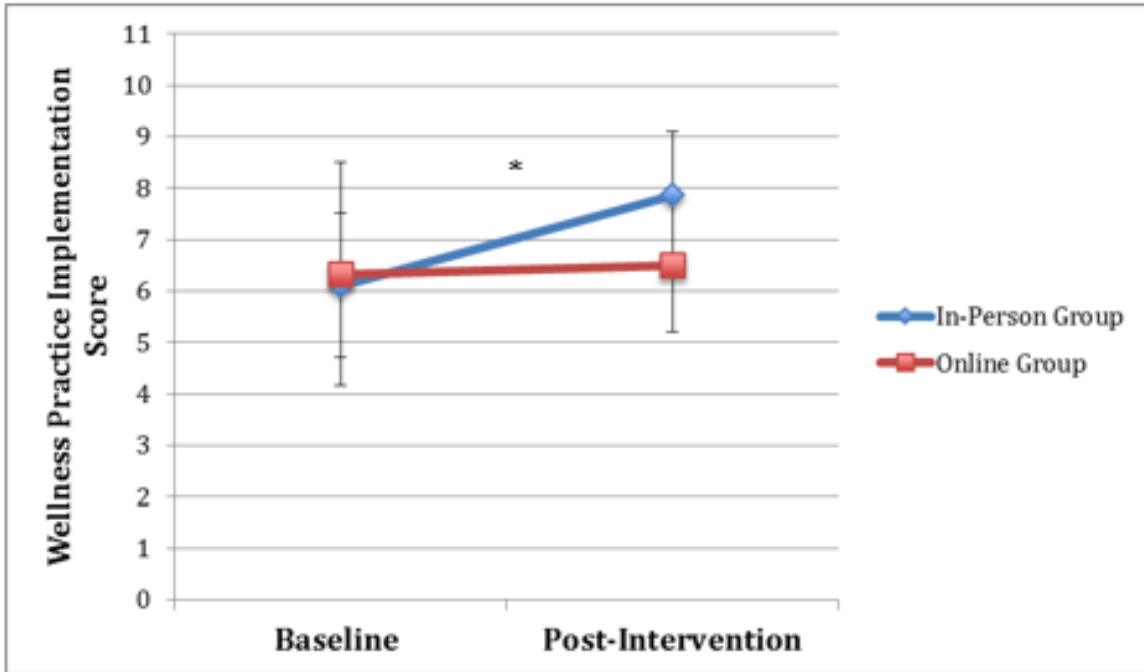
	Year 1 (N=52)	Year 2 (N=48)	<i>p</i> -value
Physical Activity Opportunities (at least sometimes)	86.5%	85.4%	0.871
Prolonged Sedentary Time (rarely or never)	19.2%	31.3%	0.166
Water as Beverage Choice (at least sometimes)	98.1%	89.6%	0.074
Use of Electronic Devices (Rarely or never)	82.7%	87.2%	0.529
Fruit as Snack Choice (at least sometimes)	53.8%	73.9%	0.039
Vegetable as Snack Choice (at least sometimes)	36.5%	57.8%	0.036
Sweet/Salty Snacks (Rarely or never)	31.3%	29.2%	0.811
Sugar Sweetened Beverages (Rarely or never)	50.0%	60.4%	0.296
Fruit Juice (Rarely or never)	45.1%	47.8%	0.788
Promotion of Healthy Eating (at least sometimes)	86.5%	78.7%	0.303
Promotion of Physical Activity (at least sometimes)	84.6%	87.5%	0.678

**Figure 3.1 Phase I: Flow of Participants**



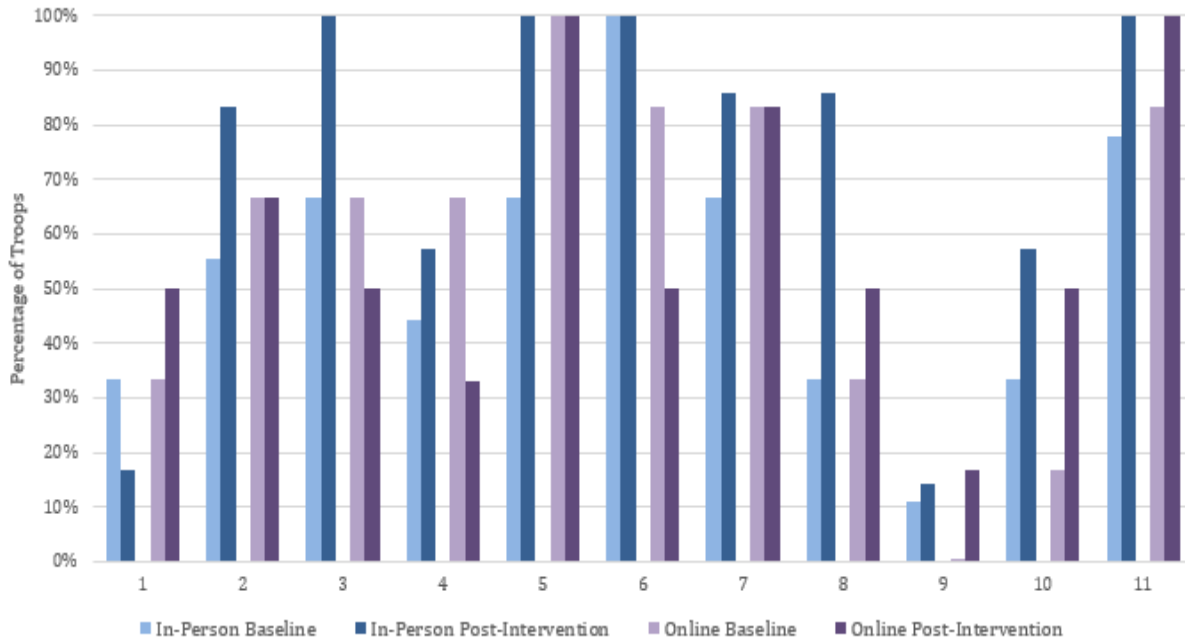


**Figure 3.2 Phase I: Change in Wellness Practice Implementation Score Between Intervention Groups Over Time**



\* There was a significant interaction between intervention condition and time ( $p=0.022$ ), whereby the in-person group exhibited an increase in Wellness Practice Implementation score, while the control group did not significantly change from baseline to post-intervention (in-person =  $2.1 \pm 1.8$ ; online =  $0.2 \pm 1.2$ ;  $p=0.022$ ). The main effect of time was significant ( $p=0.011$ ). Error bars show 95% confidence intervals. Model is adjusted for troop (age) level and free/reduced lunch status.

**Figure 3.3 Phase I: Percentage of Troops Reporting Wellness-Promoting Responses**



1=Promotion of Physical Activity

2= Sedentary Breaks

3=Physical Activity Opportunity

4=Promotion of Healthy Eating

5=Water Availability

6= Fruit Juice Availability

7= Sugar-sweetened Beverage Availability

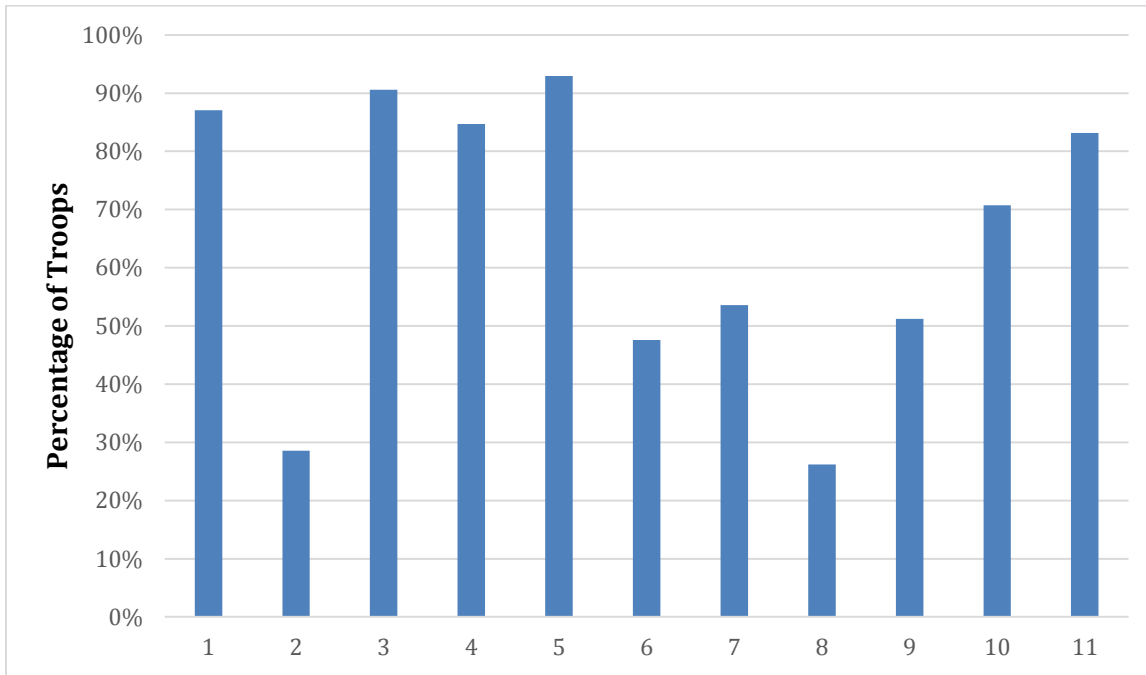
8= Sweets or Salty Snacks

9=Vegetable Availability

10= Fruit Availability

11=Use of electronic Devices

**Figure 3.4 Phase II: Percentage of Troops Reporting Implementation of Wellness-Promoting Practices in 11 Wellness Categories**



1=Promotion of Physical Activity

2= Sedentary Breaks

3=Physical Activity Opportunity

4=Promotion of Healthy Eating

5=Water Availability

6= Fruit Juice Availability

7= Sugar-sweetened Beverage Availability

8= Sweets or Salty Snacks

9=Vegetable Availability

10=Fruit Availability

11=Use of electronic Devices

**Chapter 4 - Impact of Online, Video-Based Wellness Training on  
Girl Scout Leaders' Wellness Promotion Self-Efficacy, Intention,  
and Knowledge: A Pilot Randomized Controlled Trial**

Currently under review as Cull BJ, Rosenkranz SK, Rosenkranz RR. Impact of Online, Video-Based Wellness Training on Girl Scout Leaders' Wellness Promotion Self-Efficacy, Intention, and Knowledge: A Pilot Randomized Controlled Trial. *Health Education and Behavior*.

## Abstract

**BACKGROUND:** Implementation of wellness-promoting practices, such as increasing opportunities for physical activity (PA) and fruits and vegetables (FV) can be improved in Girl Scouts (GS) through leader wellness training. An online training method may increase the reach and potential impact of training. This study evaluated the effectiveness of tailored, online, video-based training on leaders' self-efficacy, intention, and knowledge regarding PA and FV practices during troop meetings.

**METHODS:** Thirty GS leaders were randomly assigned to control (CON;  $n=16$ ) or intervention (INT;  $n=14$ ) conditions. INT leaders received six weekly, online training videos on implementation of PA and FV practices during troop meetings. Training videos addressed leader-identified improvement areas and strategies to overcome barriers. Leaders set goals for upcoming meetings, and self-monitored progress. Questionnaires were completed at baseline and post-intervention on leaders' task and barrier self-efficacy, intention, and knowledge regarding PA and FV practices during troop meetings.

**RESULTS:** From baseline to post-intervention, INT leaders improved their mean scores for PA practices barrier self-efficacy (CON= $-4.8\pm 21.5\%$ , INT= $16.5\pm 24.1\%$ ;  $p=0.036$ ), vegetable practices self-efficacy (CON= $-3.5\pm 28.9\%$ , INT= $10.3\pm 13.3\%$ ;  $p=0.049$ ), and FV practices barrier self-efficacy (CON= $1.6\pm 28.7\%$ , INT= $12.4\pm 4.6\%$ ;  $p=0.030$ ), when compared to CON. Both groups increased their intention for offering fruits ( $p=0.021$ ) and vegetables ( $p=0.023$ ), with no differences between groups. There were no changes ( $p>0.05$ ) in PA or FV knowledge.

**CONCLUSIONS:** Six weeks of tailored, online, video-based training increased GS leaders' self-efficacy for overcoming PA and FV practices barriers, as well as for offering vegetables.

Future research should assess whether PA and FV practices during troop meetings improve following video-based training.

## Introduction

Most youth do not regularly engage in recommended levels of wellness-promoting behaviors, such as participating in physical activity (PA) and consuming adequate amounts of fruits and vegetables (FV). It has been estimated that only 26% of boys and 17% of girls, aged 6-19y, meet PA recommendations (National Physical Activity Plan Alliance, 2016), which specify at least 60 minutes of moderate-to-vigorous PA per day (PAGAC, 2008), and rates of activity decline with age (Kann et al., 2014). Additionally, 60% of youth do not consume the recommended amount of fruits, and 93% do not consume an adequate amount of vegetables (Kim et al., 2014). Both PA behaviors and FV consumption patterns established in youth are shown to carry into adulthood (Telama, 2009; te Velde, 2007), so intervening in youth to target development of healthful behaviors represents an important research area.

Interventions meant to improve wellness behaviors should be delivered in settings where youth spend a majority of their time, including homes, schools, after-school programs, and community-based settings. Research suggests that interventions delivered in these settings have the potential to positively impact youth (Physical Activity Guidelines for Americans Midcourse Report, 2012). One community-based setting that has been studied for wellness promotion is Girl Scouts (GS) of America. Reaching more than 2.5 million girls and adult volunteers, this organization is a viable channel to impact a large, diverse group of girls in an out-of-school setting (GirlScouts.org). GS leaders can offer opportunities for PA and healthy snacking during their meetings, and they may choose to work toward badges and awards that include wellness-promoting components. Previous research has shown positive outcomes in wellness practice implementation during troop meetings following leader-targeted interventions, specifically in the areas of PA opportunities and healthy snacking.

A previous GS intervention, based on Social Cognitive Theory (Bandura, 1989), included an educational curriculum and implementation of wellness-promoting policies during troop meetings (Rosenkranz et al., 2010). This intervention increased PA levels of girls during the meeting, as well as improved the availability of FV offered as snack choices. A recent study compared the effectiveness of two GS leader wellness training delivery methods, in-person versus online (Cull et al., Under Review). In this intervention, troop leaders created wellness policies for their troops in five wellness-promoting areas. Troop leaders set goals for upcoming meetings, received resources for successful wellness practice implementation, and monitored their progress. This intervention used components of Social Cognitive Theory (Bandura, 1989) and Theory of Planned Behavior (Ajzen, 1991) to target leaders' self-efficacy and intention for providing wellness-promoting opportunities, as well as to increase knowledge and awareness of these behaviors in youth. Leaders either received the intervention in a face-to-face format, or through a website dedicated to intervention delivery. The researchers found that in-person training was more effective than online training (text-based modules and online discussion board) for implementation of wellness-promoting opportunities during troop meetings. However, they concluded that there was a need for further research evaluating online delivery methods, as this may represent a more cost-effective and further-reaching platform for dissemination and implementation of wellness-promoting practices in GS.

One type of delivery method that may be feasible and effective for use in GS is online, video-based training. Online, video-based leader wellness training may offer a novel, sustainable, cost-effective, and scalable way to help maximize the reach and dissemination of training for implementation of wellness-promoting opportunities within the GS organization. When compared to a standard website, video messages delivered online may be tailored to each



troop leader and their specific needs, and thus may increase the acceptability and effectiveness of this training method.

The purpose of this pilot study was to evaluate the effectiveness of six weeks of tailored, online wellness-training videos on determinants of wellness-promotion practices in GS leaders. These determinants include self-efficacy and intention for offering PA opportunities and FV as snack choices, as well as leaders' knowledge in the area of PA and FV consumption in youth. We hypothesized that leaders in the intervention condition would increase self-efficacy, intention, and knowledge from baseline to post-intervention, when compared to leaders in the control group.

## **Methods**

### **Design**

This pilot study was a randomized controlled trial that assessed the effectiveness of online, video-based wellness training on GS troop leaders' self-efficacy and intention regarding PA- and FV-promotion practices for their girls during troop meetings, as well as their knowledge about these wellness behaviors in youth. Leaders in the intervention group received six weeks of weekly, tailored wellness training videos, while those in the no-intervention control group received usual care, in that they had access and were directed to existing, publicly available, wellness-promotion resources. Leaders' wellness promotion self-efficacy, intention, and knowledge were assessed at baseline and following the six-week intervention period. All participants provided written consent, and this study was approved by the Institutional Review Board at Kansas State University.

## **Participants and Recruitment**

Participants for this project were thirty GS troop leaders from seven counties within the Northeast Kansas and Northwest Missouri GS council. Participants were recruited for participation in the project at their monthly leader meetings, one meeting per county, which research assistants attended. At these meetings, leaders received a wellness-promotion practices implementation training, completed a questionnaire regarding their troop demographics and usual meeting practices, and indicated whether they would be interested in participating in a wellness-promotion project. Follow-up with research assistants was conducted via email to ensure leaders had access to Internet and that they consented to randomization and enrollment in the study. A total of 113 leaders attended the meetings, out of 180 registered leaders. Fifty-two leaders indicated that they were interested in participating in the project, and 30 leaders were reached via email and consented to randomization and enrollment.

Block randomization was used, with county serving as the blocking factor to ensure an equal randomization of troop leaders within each county. Leaders within each county were randomized to either the intervention or control group (1:1 allocation) using an online randomization program. Sixteen troop leaders were assigned to the control group and 14 leaders were assigned to the intervention group.

## **Intervention**

Participants in the intervention group received weekly, tailored training videos over the course of six weeks. These videos were uploaded to a video-streaming website, and leaders received an email with their specific video link each week. Each video focused on implementation of either PA or healthy snacking (offering FV) during the troop meeting, and leaders received three videos on each topic, in alternating order. Each video featured a research

assistant reading a tailored script, and lasted three to five minutes. Various theoretically-informed behavior change techniques were included in each video, and the videos were meant to build upon one another. The training video content and evidence-based techniques for behavior change are described in Table 4.1. Videos were created individually for each leader, and addressed specific concerns that leaders had identified as barriers during their baseline assessment. Materials were created to facilitate implementation of wellness-promoting practices during troop meetings. For example, a Healthy Snacking Guidelines document (Appendix E) was developed for troop leaders to give to the parents to improve the quality of snacks provided by participating girls. Additionally, meeting schedule templates (Appendix F) were created to give leaders a framework for incorporating wellness-promoting practices into their relatively limited meeting.

## **Measures**

Informed by Social Cognitive Theory and Theory of Planned Behavior, outcome measures were created for the leaders' behavior-related psychosocial factors of self-efficacy and intention for offering PA and FV consumption opportunities, as well as leaders' knowledge regarding PA and FV consumption in youth. The same questionnaires were completed at baseline and post-intervention. The questionnaires and scoring procedures are available as Appendix D. Leaders completed these self-report measures via an online questionnaire housed in the university's online learning management system.

The self-efficacy measures were created using Bandura's "Guide for Constructing Self-Efficacy Scales" (Bandura, 2006). For all self-efficacy questionnaires, leaders were asked to report their level of confidence for offering specific opportunities for their girls during the troop meeting. For each question, in 10-point increments, they rated their degree of confidence on a

scale of 0 (cannot do at all) to 100 (highly certain can do). A mean self-efficacy score was computed for each measure.

PA opportunity self-efficacy was assessed via five questions. Leaders were asked to rate their confidence for offering PA in increments including, “offer at least a few minutes of physical activity” to “offer 30 minutes or more of physical activity”. Cronbach’s Alpha was 0.846.

PA practices barrier self-efficacy was assessed via eight questions. Leaders were asked to rate their level of confidence in offering PA opportunities for their girls when faced with various barriers. These commonly-cited barriers were determined via prior focus groups with troop leaders. Barriers included issues such as “when you are running short on time” or “when you don’t have a lot of room”. Cronbach’s Alpha was 0.879.

Self-efficacy for fruit practices and vegetable practices were each assessed via four questions. Possible responses for both fruit practices and vegetable practices ranged from “offer at least one serving of fruit/vegetable at some meetings” to “offer 2 or more servings of fruit/vegetable at all meetings”. Cronbach’s Alpha was 0.908 (fruit practices self-efficacy) and 0.909 (vegetable practices self-efficacy).

FV practices barrier self-efficacy was assessed via seven questions. Possible barriers, informed by prior focus groups, included “when the parents typically bring the snacks”, and “if you don’t have any kitchen facilities”. Cronbach’s Alpha was 0.903.

Intention for offering a PA opportunity, fruits, and vegetables, were each assessed via two questions using a Likert scale, and were modified from those used in previous work (Rhodes & Matheson, 2005). In the first question, leaders were asked whether they intended to offer these opportunities at upcoming troop meetings. Possible responses included “strongly disagree”,

“disagree”, “neither agree nor disagree”, “agree”, and “strongly agree.” The second question asked whether they planned to offer these opportunities, using the same Likert scale. Cronbach’s Alpha values were 0.970 (PA practices intention), 0.986 (fruit practices intention), and 0.970 (vegetable practices intention).

Knowledge regarding PA consumption and FV consumption in youth were assessed via four questions each. The leaders were asked about knowledge of recommendations in each area, the percentage of youth who were meeting recommendations, and benefits from engaging in these health behaviors. Each question was scored as incorrect (0 points) or correct (1 point), for a maximum score of four on each of the two measures.

### **Statistical Analyses**

Data analyses were performed using SPSS statistical software (Version 23.0, IBM SPSS). Demographics of the troop and leader were compared at baseline using a Chi-squared test for categorical variables. Prior to calculating a summary score for each questionnaire, Cronbach’s alpha was used to assess the degree of internal consistency between the items on each questionnaire. A Cronbach’s alpha of 0.70 was considered acceptable reliability, as is recommended for preliminary social and behavioral research (Nunnally, 1978). Summary scores from the questionnaire were calculated, where appropriate. Repeated measures ANOVA was used to assess change over time between groups on outcome measures where parametric assumptions were met, which included PA self-efficacy and PA barrier self-efficacy. Non-parametric alternatives were used in cases where parametric assumptions were not met, which included all other outcome measures. For all tests, significance was set at  $p < 0.05$ . Fisher’s LSD approach was used to protect for multiple comparisons. Pairwise comparisons on individual

questions within a questionnaire were performed if the overall test indicated a significant difference between groups on the overall questionnaire score.

## **Results**

Baseline troop characteristics are shown in Table 4.2. There were no differences ( $p > 0.05$ ) between groups at baseline for the studied characteristics.

### **PA Opportunity Self-Efficacy**

At baseline, the highest mean self-efficacy was for offering at least a few minutes of PA (96.3±9.3% confidence), and the lowest was for offering at least 30 minutes of PA (34.3±31.5% confidence). Figure 4.1 shows the mean percentage of confidence for each of the PA categories. There were no differences, between or within groups, for changes in leader-reported total mean self-efficacy for offering PA opportunities for girls during troop meetings, from pre- to post-intervention (CON=2.2±18.1%, INT=7.6±17.9%;  $p=0.48$ ).

### **PA Practices Barrier Self-Efficacy**

There was a significant group-by-time interaction for PA practices barrier self-efficacy, whereby leaders in the intervention group reported higher self-efficacy to overcome PA barriers following the training intervention, when compared to control leaders (CON=-4.8±21.5%, INT=16.5±24.1%;  $p=0.036$ ), as shown in Figure 4.2. When compared to leaders in the control group, intervention leaders reported greater improvements in self-efficacy to overcome barriers related to shortage of time ( $p=0.021$ ) and when the girls seemed too tired for PA ( $p=0.026$ ).

### **Fruit Practices Self-Efficacy**

There were no differences, between or within groups, for changes in leader-reported mean self-efficacy for offering fruit as a snack choice (CON=-4.6±28.0%, INT=7.3±11.0%;  $p=0.115$ ).

### **Vegetable Practices Self-Efficacy**

When compared to the control group, leaders in the intervention group increased their self-efficacy for offering vegetables as a snack (CON=-3.5±28.9%, INT=10.3±13.3%;  $p=0.049$ ), as shown in Figure 4.3. Leaders in the intervention group specifically reported a greater increase in self-efficacy for offering at least one serving of vegetable at all meetings, when compared to control leaders ( $p=0.042$ ).

### **FV Practices Barrier Self-Efficacy**

Leaders in the intervention group reported a greater increase in self-efficacy to overcome barriers associated with offering FV as snack choices during the troop meeting, when compared to the control group (CON=1.6±28.7%, INT=12.4±4.6%;  $p=0.030$ ), as shown in Figure 4.4. Leaders in the intervention group specifically reported increased self-efficacy for overcoming the barriers related to limited money ( $p=0.027$ ) and limited time for preparation ( $p=0.041$ ).

### **Intention for Offering PA**

At baseline, 100% of leaders reported that they “agree” or “strongly agree” that they were intending to offer enough PA to meet troop goals during upcoming meetings. 100% of control leaders and 93% of intervention leaders reported that they had a plan to offer PA at their upcoming meetings.

There were no changes ( $p>0.05$ ), between or within groups, in intention for offering PA opportunities during upcoming troop meetings. At post-intervention, the level of intention to offer PA remained at 100% of troop leaders, including those in both the intervention and control groups.

## **Intention for Offering Fruits and Vegetables**

At baseline, the majority of troop leaders reported that they were intending to offer fruits and vegetables as snack choices, and had a plan to offer fruits and vegetables. From baseline to post-intervention, there was a significant increase in intention for offering fruits ( $p=0.021$ ) and vegetables ( $p=0.023$ ) during upcoming meetings, with no difference between groups. Intention for implementing wellness practices is shown in Figure 4.5.

## **PA and FV Knowledge**

At baseline, leaders did not differ in their PA or FV knowledge. There were no changes, between or within groups, for PA knowledge (CON= $-0.38\pm 1.19$ , INT= $0.30\pm 1.06$ ;  $p=0.61$ ) nor FV knowledge (CON= $0.0\pm 0.81$ , INT= $0.10\pm 0.57$ ;  $p=1.00$ ). At post-intervention, the intervention group had significantly higher scores for PA knowledge than the control group ( $p=0.04$ ). These outcomes are shown in Figure 4.6.

## **Discussion**

The purpose of this pilot study was to evaluate the effectiveness of six weeks of tailored, online wellness-training videos on determinants of wellness-promotion practices in GS leaders. We hypothesized that leaders in the intervention group would increase their wellness-promotion self-efficacy, intention, and knowledge, and our hypothesis was partially supported. When compared to the control group, we found that leaders in the intervention group increased their PA practices barrier self-efficacy, vegetable practices self-efficacy, and FV practices barrier self-efficacy. Both groups increased their intention for offering fruits and vegetables during upcoming meetings. However, there were no changes in PA or FV knowledge following the video training intervention.



Self-efficacy has been shown to be positively associated with health behavior change, as well as offering healthier opportunities for youth. The construct of self-efficacy relates to people's beliefs about their capabilities for successfully functioning in an event or situation (Bandura, 1986). Specifically, self-efficacy has been shown to be a predictor for PA behaviors (Rovniak et al., 2002; Sharma et al., 2005) and a mediator between interventions and subsequent PA outcomes. A meta-analysis indicated that interventions most successful at increasing self-efficacy included elements of action planning, instruction, and reinforcement toward the desired behavior (Williams & French, 2011). Interventions including self-monitoring, feedback, and setting behavioral goals increase self-efficacy for dietary behaviors more than interventions that do not include these behavior change techniques (Prestwich et al., 2014). Evidence shows that caregiver self-efficacy to promote healthy behaviors is associated with youth sedentary time, water consumption, and FV intake (Campbell et al., 2010), thus showing that increasing self-efficacy of those in a position to offer healthy opportunities for youth is important. Additionally, teacher self-efficacy for offering PA is associated with implementation of these practices in a physical education classroom (Pan et al., 2013). Our wellness training videos employed techniques to increase leaders' self-efficacy for offering PA and FV consumption opportunities, as well as overcoming associated barriers during troop meetings, and it appears that the video training intervention was effective for eliciting improvements in these areas.

In the Theory of Planned Behavior, intention is the most proximal determinant of one's behavior (Ajzen, 1985), and has been shown to predict approximately 30% of the variance of future action (Armitage & Connor, 2001). The current study results indicated increases in intention for offering healthy snacking opportunities in both groups. Intention is positively correlated with PA behaviors in adults (Troost et al., 2002), and has been shown to be a significant

predictor for consumption of fruits (Brug et al., 2006) and vegetables (Kellar & Abraham, 2005) in adults. However, there is an established gap between intention and behavior, and a meta-analysis has shown a positive association between behavioral intention and human behavior across a range of activities, with a correlation of only 0.53 (Sheeran, 2002). Logically then, intention may be considered necessary, but not sufficient for changes in one's health behaviors (Rhodes & de Bruijn, 2013). Although increases in intention may not fully translate into a behavior change for all leaders, it is positive that the current study showed improvements in this area for increases in FV consumption opportunities during troop meetings for both groups.

There were no changes in knowledge for either PA or FV over the course of the intervention. There may have been a ceiling effect, where the leaders already scored relatively high on the knowledge questionnaire at baseline. As such, we would be less likely to see significant improvements in their scores. Knowledge of standards or target behaviors is important for health behavior change, but research does not consistently support the idea that increasing one's knowledge leads to improvements in health behaviors (Kahan et al., 2014). However, evidence has shown that adults' knowledge of recommendations or standards is associated with being more supportive of PA for youth (Sawyer et al., 2014).

Our wellness training videos were specifically tailored to each troop leader. Tailored communication is defined as "any combination of strategies and information intended to reach one specific person, based on communication that is uniquely individualized to that person, related to the outcome of interest, and derived from an individual assessment" (Kreuter et al., 2000). There is evidence to suggest that tailored messages appear more relevant to the user (Kreuter et al., 1999; Kreuter & Wray, 2003). A meta-analysis found that tailored messages were more effective for eliciting health behavior change than generic forms of communication.

Additionally, interventions with more than one contact with participants were more effective than a single, tailored message. Interventions that included tailoring based on theoretical concepts, including self-efficacy and social support, were more effective than those not based on theory (Noar et al., 2007). Our tailored, online wellness training videos incorporated these components shown to be important for health behavior change.

A strength of our study was that we recruited and studied participants across seven counties in a Midwestern GS council, including both rural and urban troops. The video messages were individualized and tailored to each troop leader, and targeted theoretical constructs that have been shown to be important in eliciting health behavior change. The wellness training videos appeared to be well accepted and feasible for use in the GS organization. Since the training videos were uploaded to a video-streaming website, leaders could access the content from anywhere. Streaming capability increases the potential for widespread dissemination, including reaching those leaders who may be in isolated or otherwise hard-to-reach areas. Being a pilot study, there were some limitations as well. The primary outcomes of this study relied on leader self-report, and it is therefore possible that responses do not accurately reflect the true characteristics of the leaders. Individually tailoring video message for each troop leader required considerable time, and may not be scalable for a larger population. However, future research may study the effectiveness of tailoring the messages to a specific group and their needs, rather than each person individually. Additionally, future research should determine whether or not changes occur in PA opportunities or FV availability during meetings, and whether these changes are associated with leader psychosocial factors.

There is a need to develop and evaluate the effectiveness of interventions and tailored training methods capable of reaching those hard-to-reach leaders in important settings. Online,

video-based training has been shown to be effective for impacting the determinants of wellness behaviors, potentially leading to more wellness-promoting environments for youth. If implemented across the organization and other similar organizations, it is possible for online, video-based wellness training to impact behaviors of youth and potentially improve overall health.

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**Table 4.1 Wellness Training Video Content and Associated Behavior Change Techniques**

Training Video Content	How Behavior Change was Targeted
<p>Recommendations for health behavior (either PA or Healthy Snacking) identified</p>	<p>Leaders gained awareness and knowledge about the current recommendations for youth PA and FV consumption, and where gaps currently existed in meeting these goals.</p> <p><b>Michie’s Behavior Change Techniques:</b></p> <ul style="list-style-type: none"> <li>• <b>Provide Information about behavior in general (technique #1)</b></li> <li>• <b>Provide normative information about others’ behavior (technique #4)</b></li> </ul>
<p>Benefits of incorporating wellness practice, including both immediate and long-term outcomes</p>	<p>Outcome expectations and expectancies were explored, in that leaders were able to think about and discuss the importance of incorporating the wellness practices, including how it could improve the meeting, as well as the girls’ health behaviors.</p> <p><b>Michie’s Behavior Change Technique:</b></p> <ul style="list-style-type: none"> <li>• <b>Provide information about the behavior specific to the individual (technique #2)</b></li> </ul>
<p>Discussion of leader-specified barrier to wellness practice, and solutions for overcoming it</p>	<p>Leaders gained self-efficacy and barrier self-efficacy as they were presented with solutions to their most important barriers, and were asked to brainstorm other approaches to</p>

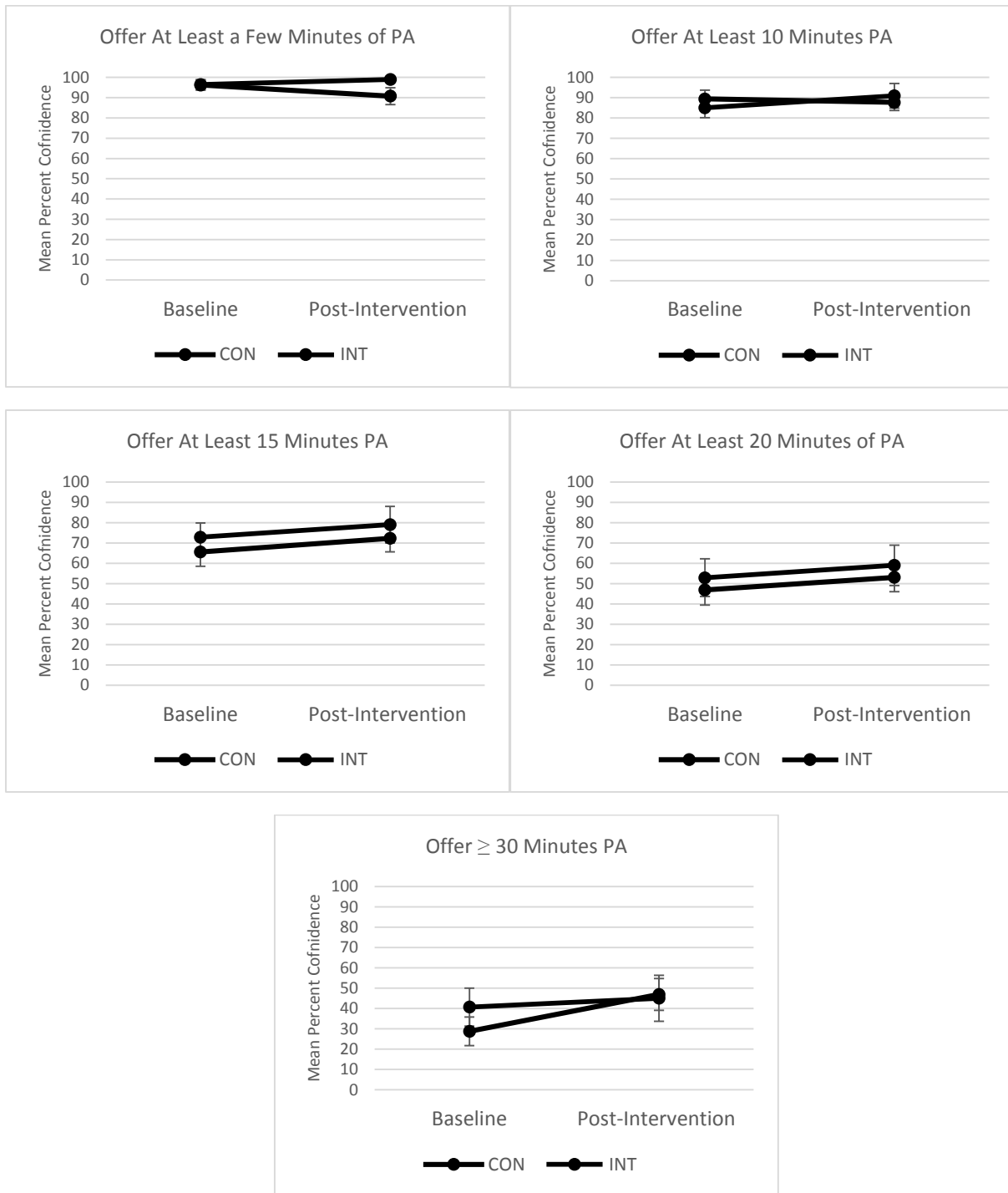
	<p>overcoming the issues.</p> <p><b>Michie’s Behavior Change Technique:</b></p> <ul style="list-style-type: none"> <li>• <b>Barrier identification/problem solving (technique #8)</b></li> </ul>
<p>Links to videos and pictures depicting other troops’ activities and ideas to overcome the same barrier</p>	<p>Role modeling and vicarious learning were used, as leaders could see similar people overcoming barriers and incorporating either PA or healthy snacks into their meetings.</p> <p><b>Michie’s Behavior Change Technique:</b></p> <ul style="list-style-type: none"> <li>• <b>Provide instruction on performing behavior (technique #21)</b></li> <li>• <b>Model/demonstrate behavior (technique #22)</b></li> </ul>
<p>Reflection on troop’s usual practice and where improvement can be made</p>	<p>A continuous quality improvement cycle was used, where troop leaders evaluated their current state, identified goals for improvement, and re-evaluated themselves at a future date to determine where progress was made, and could still be made.</p> <p><b>Michie’s Behavior Change Technique:</b></p> <ul style="list-style-type: none"> <li>• <b>Review of behavioral goals (technique #10)</b></li> <li>• <b>Feedback on performance (technique</b></li> </ul>

	<b>#19)</b>
Specific goal setting for upcoming troop meeting	<p>Leaders set specific, attainable goals for upcoming meetings. Successful goal setting and achievement increases self-efficacy for a behavior. When leaders created a schedule for their upcoming meeting, they developed intention through their planning and preparation for offering specific, healthy opportunities.</p> <p><b>Michie’s Behavior Change Technique:</b></p> <ul style="list-style-type: none"> <li>• <b>Goal setting (behavior) (technique #5)</b></li> <li>• <b>Action planning (technique #7)</b></li> <li>• <b>Set graded tasks (technique #9)</b></li> <li>• <b>Time management (technique #38)</b></li> </ul>
Encouragement for troop leader	<p>Leaders were provided positive reinforcement and encouragement for making healthy changes in their meetings, which fosters a sense of community and support.</p> <p><b>Michie’s Behavior Change Technique:</b></p> <ul style="list-style-type: none"> <li>• <b>Rewards contingent on effort or progress toward behavior (technique #12)</b></li> <li>• <b>Social support (technique #29)</b></li> </ul>

**Table 4.2 Baseline Troop Characteristics**

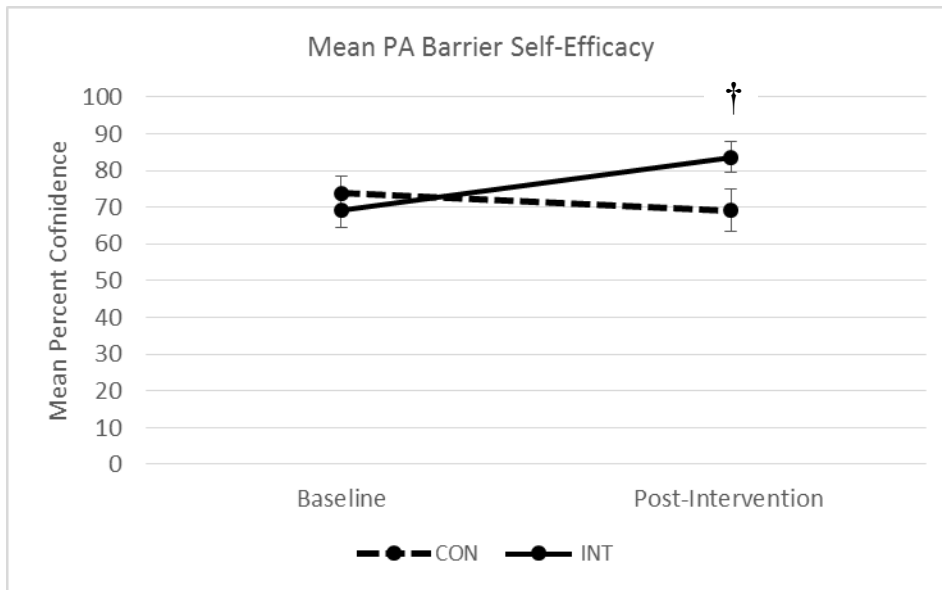
	Control (n=16)	Intervention (n=14)
<b>Troop Level</b>		
Daisy (K–1 <sup>st</sup> Grade)	2 (12.5%)	0 (0%)
Brownie (2 <sup>nd</sup> –3 <sup>rd</sup> Grade)	9 (56.3%)	5 (35.7%)
Junior (4 <sup>th</sup> –5 <sup>th</sup> Grade)	3 (18.8%)	5 (35.7%)
Cadette (6 <sup>th</sup> –8 <sup>th</sup> Grade)	2 (12.5%)	3 (21.4%)
<b>Leader SES</b>		
Low-income (free/reduced lunch status)	8 (43.8%)	6 (42.9%)
Not low-income	7 (50.0%)	6 (42.9%)
Unreported	1 (6.3%)	2 (14.3%)
<b>Fruit Availability During Meetings</b>		
Rarely or Never	4 (25%)	5 (35.7%)
At Least Sometimes	12 (75%)	9 (64.3%)
<b>Vegetable Availability During Meetings</b>		
Rarely or Never	11 (68.8%)	5 (35.7%)
At Least Sometimes	5 (31.3%)	9 (64.3%)
<b>Physical Activity Opportunity During Meetings</b>		
Rarely or Never	2 (12.5%)	1 (7.1%)
At Least Sometimes	14 (87.5%)	13 (92.9%)

**Figure 4.1 Mean PA Practices Self-Efficacy**



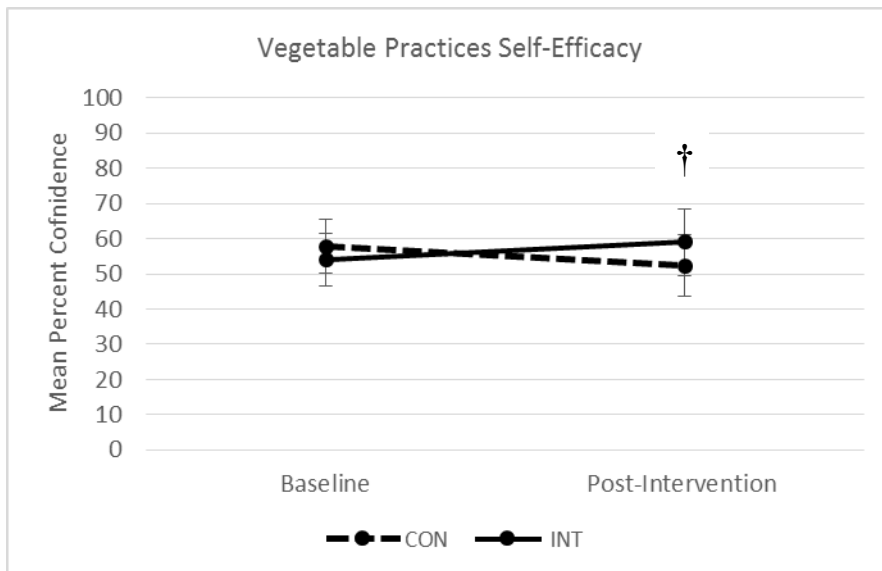
From baseline to post-intervention, there were no changes ( $p > 0.05$ ), between or within groups in self-efficacy to offer various levels of PA opportunities. Error bars indicate SEM.

**Figure 4.2 Overall (Mean) PA Practices Barrier Self-Efficacy**



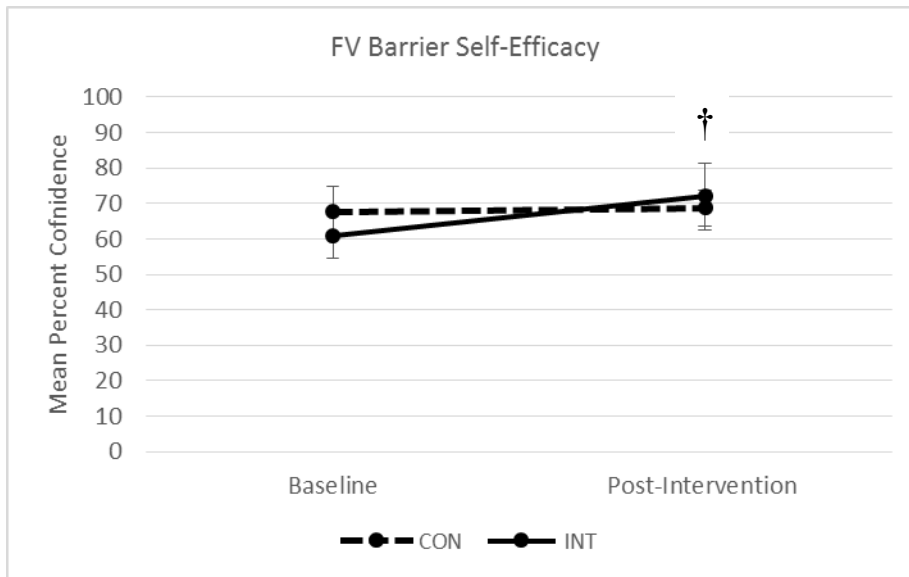
From baseline to baseline to post-intervention, when compared to CON, INT leaders increased their PA barrier self-efficacy (CON=-4.8±21.5%, INT=16.5±24.1%;  $p=0.036$ ). Error bars indicate SEM. † Change from baseline to post-intervention was different between groups

**Figure 4.3 Overall (Mean) Vegetable Practices Self-Efficacy**



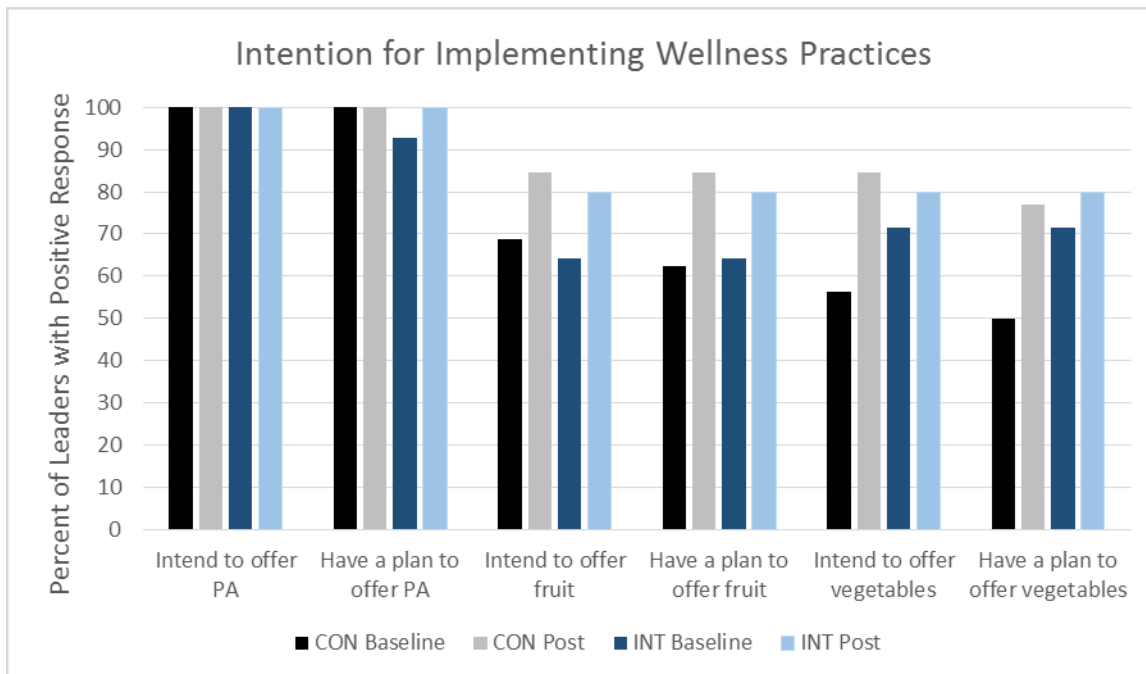
From baseline to post-intervention, INT leaders increased their mean vegetable availability self-efficacy, when compared to CON leaders (CON=-3.5±28.9%, INT=10.3±13.3%;  $p=0.049$ ). Error bars indicate SEM. † Change from baseline to post-intervention was different between groups

**Figure 4.4 Overall (Mean) Self-Efficacy for Overcoming FV Barriers**



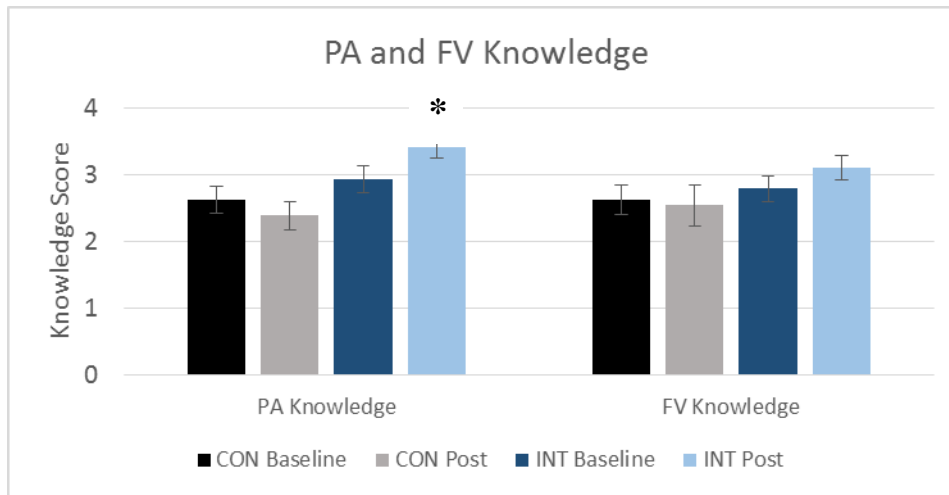
From baseline to baseline to post-intervention, when compared to CON, INT leaders increased their FV barrier self-efficacy (CON=1.6±28.7%, INT=12.4±4.6%;  $p=0.030$ ). Error bars indicate SEM. † Change from baseline to post-intervention was different between groups

**Figure 4.5 Percentage of Leaders with Positive PA and FV Intentions**



Intention for offering fruits ( $p=0.021$ ) and vegetables ( $p=0.023$ ) increased from baseline to post-intervention, with no differences between groups.

**Figure 4.6 Mean PA and FV Knowledge Scores**



There were no changes ( $p>0.05$ ) in PA or FV knowledge. Error bars indicate SEM. \*Score for PA knowledge is significantly higher at post-intervention for INT when compared to CON.



## Chapter 5 - Conclusions

The studies included within this dissertation make a contribution to the existing literature in the area of youth wellness promotion. Given the high rates of childhood overweight and obesity, and low participation rates in health-promoting behaviors in youth, the studies in this document were developed to address these issues and provide evidence for effective interventions and practices. Two settings in which youth participate were targeted for positive wellness-promoting opportunities. The interventions were delivered with the social ecological model in mind, and various levels were targeted throughout each study. In the first study (chapter 2), results showed that a 12-week, home-based wellness coaching intervention was feasible and acceptable for normal-weight female children. Additionally, results indicated positive changes in both psychosocial and biomedical outcomes within this sample of young girls. Furthermore, effect size calculations showed moderate to large impacts on physical activity behaviors following the intervention period. In this home-based wellness coaching intervention, the individual-level factors of the girls, such as their knowledge and skills, were the primary target of the intervention. Indirectly, both interpersonal factors (interactions with family members) and organizational factors (the home environment) were also likely impacted. Future research should include fully powered studies to elucidate the impact of home-based wellness coaching on health-related behaviors of both normal-weight and overweight/obese girls, as well as the potential for the intervention model to serve as a primary or secondary obesity prevention program.

In addition to evaluating a wellness-promotion intervention delivered within the home setting, this dissertation also includes studies focusing on improving opportunities for youth in an out-of-school setting, Girl Scout troop meetings. The second study in this dissertation (chapter 3)

compared the effectiveness of Girl Scout leader wellness training delivered using two different delivery methods, and found that in-person training was superior to online training for improvements in wellness-promoting opportunities for girls during troop meetings. In this intervention, the organizational level of the social ecological model was directly targeted. The leaders within the Girl Scouts organization were the primary intervention target. Indirectly, there were likely effects on the interpersonal level factors (interactions with the girls), as well as the individual-level influences of the girls (skills-building and mastery experiences through participation in troop activities). The results from this study are consistent with previous research showing improvements in snack quality and physical activity levels of girls following leader-targeted intervention delivered in a face-to-face format. There were several limitations to the online delivery platform: barriers to engaging troop leaders; less interactive training components when compared to the in-person delivery method; and possibly a lower sense of social support amongst the leaders in the online group. Since an online delivery platform represents a cost-effective and far-reaching platform for wellness training delivery within Girl Scouts, the effectiveness and the best practices for implementation of this platform should be more fully elucidated. Therefore, the final study (chapter 4) in this dissertation evaluated the impact of Girl Scout leader wellness training delivered in an online, video-based format. Leaders received 12 weeks of weekly, tailored video messages focusing on implementation of either physical activity or opportunities for fruit and vegetable consumption during troop meetings. Much like Study 2, the organizational level of the social ecological model was the primary intervention target, with indirect effects on the interpersonal- and individual-level factors of the girls. Results were positive, indicating that when delivered in this way, the training lead to increased leader self-efficacy for overcoming barriers related to offering physical activity and fruits and vegetables, as

well as increased leader self-efficacy for offering vegetables as a snack choice at meetings.

Future research should assess whether online, video-based training leads to improvements in wellness-promoting opportunities for girls during troop meetings. Additionally, metrics related to dissemination and implementation across varied and diverse groups should be assessed.

Collectively, these studies all provide evidence for interventions and practices that may be effective for improving youth behaviors, health-promoting opportunities, and population health. Childhood obesity is a complex issue, with multiple underlying factors and influences. Intervention approaches that target not only individual-level factors, but also the environments and settings in which youth live and interact, may be effective for the prevention and treatment of the underlying energy imbalance issues and behaviors associated with childhood obesity. Research should continue to focus on developing and delivering wellness-promotion interventions where youth spend their time, such as those included within this dissertation. If evidence-based interventions and practices are disseminated and implemented widely, there may be a positive impact on youth health behaviors and an improvement in overall health, well-being, and quality of life.

## Appendix A - Weekly Coaching Schedule

	Health Education (HE)		Healthful Eating & Physical Activity Skills (HEPA)	
	<i>Primary Activities</i>	<i>Secondary Activities</i>	<i>Primary Activities</i>	<i>Secondary Activities</i>
<b>Week 1</b>	-Ice Breaker -SMART goal setting for school or health	-Create a picture representing goal	-Ice breaker -Walk & talk (client $\geq$ 2000 steps) -Prepare “ants on a log recipe” (or another F&V, using good food safety practices)	-SMART goal setting
<b>Week 2</b>	-Discussion and demonstration of good table manners, etiquette, place setting	-Family meal role-playing with or without a snack	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, $\geq$ taste, 200-250kcal)
<b>Week 3</b>	-Discussion of breakfast; -Demonstration of basic food safety	-Draw or create representation of a healthy breakfast	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)
<b>Week 4</b>	-Discussion of sweets, sugary drinks, dental health -Demonstration of brushing, flossing, swish & swallow	-Mouth and teeth quiz	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)
<b>Week 5</b>	-Discussion of physical fitness; inventory home opportunities for physical activity	-Revisit SMART goal(s) from week 1, draw motivational picture or poster to reinforce goal(s)	-Choice of fun physical activity (client $\geq$ 2000 steps)	-Revisit SMART goal(s) from week 1; Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)

<b>Week 6</b>	-Discussion of bullying; tell or show stories of how other kids deal with bullies	-Role play both sides of bullying, maybe use action figures, dolls, or play-dough actors, etc.	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)
<b>Week 7</b>	-Discussion of healthy snacking; demonstration of portion sizes	-Take inventory of foods available and accessible at home, categorize according to traffic-light: go-slow-whoa	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)
<b>Week 8</b>	-Discussion of smoking; tell or show stories of how other kids deal with peers to remain smoke-free	-Role play peer pressure for smoking, use action figures, dolls, or play-dough actors	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)
<b>Week 9</b>	-Discussion of internet/online dos and don'ts, online bully prevention and safety; tell or show stories of kids who were mistreated through internet	-Revisit SMART goal(s) from week 1, draw motivational picture or poster to reinforce goal(s) - Play online or surf internet sites to identify advertising, data mining, etc.	-Choice of fun physical activity (client $\geq$ 2000 steps)	-Revisit SMART goal(s) from week 1; Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)
<b>Week 10</b>	- Discussion of self-esteem and body image; role play ways to deal with others who make us feel bad about our selves	- Mirror mirror project, or make a list with client of all the things she is good at doing, what she likes about herself, friends and family who believe in her, and a separate list of what she wants to work on to feel better about herself.	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)

<b>Week 11</b>	- Discussion of eating disorders, including anorexia, bulimia, compulsive overeating (keep focus on healthful eating and physical activity); role play ways to express concern for a friend who is showing signs of dysfunctional eating or activity	- Use glamour magazines to look at how women are pictured and discuss how images are manipulated (optional- watch Dove video)	-Choice of fun physical activity (client $\geq$ 2000 steps)	- Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal)
<b>Week 12</b>	-Discussion of all previous health topics; role reversal of client teaching what they have learned over past weeks for each topic	-Revisit SMART goal(s) from previous weeks, set new goal for next 12 weeks, draw motivational picture or poster to reinforce goal(s) -Praise successes and trouble-shoot failures -Talk about how to maintain what has been learned	-Discussion of all previous physical activities and snack recipes; Client can talk about likes, dislikes, which ones they'll try to keep doing in the future	-Revisit SMART goal(s) from previous weeks, set new goal for next 12 weeks; Prepare chosen fruit & vegetable snack recipe (>50% fruits &/or vegetables, >taste, 200-250kcal) -Choice of fun physical activity (client $\geq$ 2000 steps)

## Appendix B - Typical Troop Practices Questionnaire

Date: \_\_\_\_\_ City and County of Troop Meetings: \_\_\_\_\_

This questionnaire is meant to assess the physical activity and nutrition practices of your typical Girl Scouts troop meeting. Completing this questionnaire is voluntary.

Instructions: Please read each statement or question carefully and check the response that best fits your typical Girl Scouts troop meeting.

### Section 1: Basic Information

1. Which age group of troops do you lead? (check all that apply)		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Daisies (K-1 <sup>st</sup> )	Brownies (2 <sup>nd</sup> -3 <sup>rd</sup> )	Juniors (4 <sup>th</sup> -5 <sup>th</sup> )
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cadettes (6 <sup>th</sup> -8 <sup>th</sup> )	Seniors (9 <sup>th</sup> -10 <sup>th</sup> )	Ambassadors (11 <sup>th</sup> -12 <sup>th</sup> )

2. Where are your troop meetings usually held?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School	Leader's Home	Community Center Or Little House	Church	Other: _____

3. How often does your troop have meetings?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Once a month	Twice a month	Every Week	Other: _____

4. What is the typical duration of troop meetings?	<input type="text"/>	Hour(s)	<input type="text"/>	Minutes
--	----------------------	---------	----------------------	---------

5. How many girls are currently enrolled in your troop?	<input type="text"/>
---	----------------------

6. How many girls regularly attend meetings?	<input type="text"/>
--	----------------------

7. On which day does your troop usually meet?

8. Does your child qualify for free or reduced price school lunch?

Yes

No

Prefer not to answer

I do not have a child in school

9. How often are television or other electronic media (smartphones, iPads, or similar devices) used during troop meetings?

Rarely or never

Some of the time

Most of the time

Every meeting

## Section 2: Foods and nutrition

1. How often is fruit (not including juice) offered as a snack choice at troop meetings?

Rarely or never

Some of the time

Most of the time

Every meeting

2. How often are vegetables (not including French fries, tater tots or hash browns) offered as a snack choice at troop meetings?

Rarely or never

Some of the time

Most of the time

Every meeting

3. How often are sweets or salty foods (cookies, cakes, muffins, chips, etc.) offered as a snack choice at troop meetings?

Rarely or never

Some of the time

Most of the time

Every meeting

4. How often are drinks with sugar added (soda, sweet tea, fruit punch, sports drinks) offered as a drink choice at troop meetings?

Rarely or never

Some of the time

Most of the time

Every meeting

5. How often is 100% fruit juice offered as a drink choice at troop meetings?

Rarely or never

Some of the time

Most of the time

Every meeting



6. How often is drinking water easily visible and available for self-serve as a beverage choice at troop meetings?

- Rarely or never       Some of the time       Most of the time       Every meeting

7. At troop meetings, soda vending machines and other vending machines are located:

- In entrance or front of building       In public areas, but not entrance       Out of sight of girls       No vending machines on site

8. How often do you (personally) consume the same snack and beverages as the girls at the troop meeting?

- Rarely or never       Some of the time       Most of the time       Every meeting

9. How often is food used to encourage positive behavior (used as a reward) at troop meetings?

- Rarely or never       Some of the time       Most of the time       Every meeting

10. How often do you (personally) eat or drink items like sweets, sodas and fast food at troop meetings?

- Rarely or never       Some of the time       Most of the time       Every meeting

11. How often do you talk with girls in the troop about trying or enjoying healthy foods?

- Rarely or never       Some of the time       Most of the time       Every meeting

12. A written recommendation on bringing or providing food and snack choices for troop meetings:

- Does not exist       Exists informally, but is not written       Is written, but not always followed       Is written, available and followed

13. On a typical day, how many servings of fruit do you (personally) eat?

- One       Two       Three       Four or more

14. On a typical day, how many servings of vegetables do you (personally) eat?

- One       Two       Three       Four or more

### Section 3: Physical activity, active play, sport, and exercise

1. How often is physical activity offered at troop meetings?

Rarely or never       Some of the time       Most of the time       Every meeting

2. If physical activity is offered, how many minutes (in total) do the girls spend engaged in these activities at troop meetings?

Less than 10 minutes       10-20 minutes       21-30 minutes       Greater than 30 minutes       N/A; we do not offer physical activities

3. How often is outdoor active play provided for all children at troop meetings?

Rarely or never       Some of the time       Most of the time       Every meeting

4. How often are the girls seated for more than 30 minutes at a time during troop meetings?

Rarely or never       Some of the time       Most of the time       Every meeting

5. During physical activities at troop meetings, how do you usually participate?

Supervise Only       Sometimes encourage children to be active       Sometimes encourage children to be active and join girls in play       Often encourage children to be active and join girls in play       N/A

6. How often do you talk with girls in the troop about trying or enjoying physical activity?

Rarely or never       Some of the time       Most of the time       Every meeting

7. A written recommendation on physical activity during troop meetings:

Does not exist       Exists informally, but is not written       Is written, but not always followed       Is written, available and followed

8. Over the past 7 days, on how many days did you (personally) get at least 30 minutes of moderate-to-vigorous physical activity—the kind that increases your breathing and gets your heart beating faster?

Zero       One       Two       Three       Four       Five       Six       Seven

9. On a typical week, how many days do you (personally) get at least 30 minutes of moderate-to-vigorous physical activity—the kind that increases your breathing and gets your heart beating faster?

- Zero     One     Two     Three     Four     Five     Six     Seven

10. On a scale of 1 to 9, how would you rank the importance of improving the health environment of Girl Scouts troop meetings?

(1—Not at all important, 9—Extremely important)?

- One     Two     Three     Four     Five     Six     Seven     Eight     Nine

11. If the Girl Scouts council were to offer free trainings, materials, and resources to troop leaders toward Girl Scout wellness opportunities, how would you rank your level of interest? (1—Not at all interested, 9—Extremely interested)?

- One     Two     Three     Four     Five     Six     Seven     Eight     Nine

**Thank you for your participation!**

We are interested in helping develop wellness guidelines for Girl Scouts troop leaders to promote health in girls. We are looking for leaders who are interested in participating in this process with us. Please indicate below if your troop is willing to work with us more closely in this process. Please note that marking “Yes” does not commit you, but we will contact you to provide more information.

- Yes, I am interested in being involved and/or learning more about the development of wellness guidelines for Girl Scouts**

Email Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

- No, I am not interested in participating further**

## Appendix C - Wellness Practice Implementation Questionnaire

Instructions: Please complete this questionnaire based on the most recent troop meeting you had that was representative of a typical troop meeting.

**1. Was television or other electronic media (smartphones, iPads or similar devices) used during the meeting?**

Yes

No

**2. Was fruit (not including juice) offered as a snack choice at the meeting?**

Yes

No

**3. Were vegetables offered as a snack choice at the meeting?**

Yes

No

**4. Were sweets or salty foods (cookies, cakes, muffins, chips, etc.) offered as a snack choice at the meeting?**

Yes

No

**5. Were sodas, sweet tea, fruit punch or sports drinks offered as a drink choice at the meeting?**

Yes

No

**6. Was 100% fruit juice offered as a drink choice at the meeting?**

Yes

No

**7. Was drinking water easily visible and available for self-serve as a drink choice at the troop meeting?**

Yes

No

**8. Did you talk to the girls about trying or enjoying healthy foods?**

Yes

No

**9. Was physical activity offered at the meeting?**

Yes

No

**10. Did the girls remain seated for more than 30 minutes at a time during the meeting?**

Yes

No

**11. Did you talk to the girls about trying or enjoying physical activity?**

Yes

No

Calculate overall score, ranging from 0 to 11, based on 1 point for “yes” on items #2,3,7,8,9, and 11 and 1 point for “no” on items #1,4,5,6, and 10

# Appendix D - Self-Efficacy, Intention, and Knowledge Questionnaire

## Practice Rating

To familiarize yourself with the rating form, please complete this practice item first. If you were asked to lift objects of different weights **right now**, how certain are you that you can lift each of the weights described below?

*Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:*

0	10	20	30	40	50	60	70	80	90	100
Cannot					Moderately				Highly certain	
do at all					can do				can do	

Confidence  
(0-100)

### Physical Strength

Lift a 10 pound object	_____
Lift a 50 pound object	_____
Lift a 100 pound object	_____
Lift a 200 pound object	_____
Lift a 300 pound object	_____

## Physical Activity Confidence

Please rate how certain you are that you can offer the following physical activity opportunities during a typical upcoming troop meeting (excluding special events and celebrations).

Rate your level of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	
									Confidence (0-100)	

Offer at least a few minutes of physical activity \_\_\_\_\_

Offer at least 10 minutes of physical activity \_\_\_\_\_

Offer at least 15 minutes of physical activity \_\_\_\_\_

Offer at least 20 minutes of physical activity \_\_\_\_\_

Offer 30 minutes or more of physical activity \_\_\_\_\_

## Fruit and Vegetable Availability Confidence

Please rate how certain you are that you can offer the following fruit and vegetable opportunities for snack time during a typical upcoming troop meeting (excluding special events and celebrations).

Rate your level of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
					Moderately can do			Highly certain can do		
Cannot do at all										

Confidence  
(0-100)

Offer at least 1 serving of **fruit** at some meetings (greater than 0% of meetings, but less than 50% of meetings) \_\_\_\_\_

Offer at least 1 serving of **fruit** at least every other meeting (50% or more of meetings) \_\_\_\_\_

Offer at least 1 serving of **fruit** at ALL meetings (100% of meetings) \_\_\_\_\_

Offer 2 or more servings of **fruit** at ALL meetings (100% of meetings) \_\_\_\_\_

Offer at least 1 serving of **vegetables** at some meetings (greater than 0% of meetings, but less than 50% of meetings) \_\_\_\_\_

Offer at least 1 serving of **vegetables** at least every other meeting (50% or more of meetings) \_\_\_\_\_

Offer at least 1 serving of **vegetables** at ALL meeting (100% of meetings) \_\_\_\_\_

Offer 2 or more servings of **vegetables** at ALL meetings (100% of meetings) \_\_\_\_\_



## Confidence with Barriers to Physical Activity Time

A number of situations are described below that can make it hard to offer physical activity opportunities during your troop meetings. For each blank, please rate how certain you are that you can offer physical activity opportunities for your girls during a troop meeting when faced with the following challenges.

Rate your level of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do				Highly certain can do	

Confidence  
(0-100)

**Example: When we have visitors**

**100 (highly certain can do)**

- |   |       |
|---|-------|
| When you are running short on time                  | _____ |
| When you have a lot of other activities planned     | _____ |
| When you don't have a lot of room                   | _____ |
| During bad weather                                  | _____ |
| When the girls seem tired                           | _____ |
| When you haven't planned out a physical activity    | _____ |
| When you can't think of any activities to do        | _____ |
| When you don't have any physical activity equipment | _____ |

**If you have any comments regarding barriers to physical activity, or if you have additional ones that weren't listed, please tell us below.**

---



---

## Confidence with Barriers to Fruit and Vegetable Availability

A number of situations are described below that can make it hard to offer fruits and vegetables as snack choices during your troop meetings. In each blank, please rate how certain you are that you can offer fruit and vegetable opportunities for your girls during a troop meeting when faced with the following challenges.

Rate your level of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot					Moderately				Highly certain	
do at all					can do				can do	

Confidence  
(0-100)

When you don't have a lot of money to spend \_\_\_\_\_

When you don't have a lot of time to prepare the snack \_\_\_\_\_

If the girls are picky about the snack options \_\_\_\_\_

If parents typically bring snacks \_\_\_\_\_

If you don't have kitchen facilities \_\_\_\_\_

If you can't think of any fruit or vegetable snack ideas \_\_\_\_\_

If you don't have any kitchen supplies to prepare the snack \_\_\_\_\_

**If you have any comments regarding barriers to providing fruits and vegetables, or if you have additional ones that weren't listed, please tell us below.**

---

---

## Physical Activity and Snacking Intention Survey

On the following items, please indicate your level of agreement with each statement about offering physical activity and fruits and vegetables during a typical upcoming troop meeting (excluding special events or celebrations) on the 1 to 5 scale.

**1=strongly disagree; 2= disagree; 3=neither agree or disagree; 4= agree 5=strongly agree**

I intend to offer enough **physical activity** to meet our troop goal during upcoming troop meetings

1      2      3      4      5

I am planning to offer enough **physical activity** to meet our troop goal during upcoming troop meetings

1      2      3      4      5

I intend to offer enough **fruits** to meet our troop goal during upcoming troop meetings

1      2      3      4      5

I am planning to offer enough **fruits** to meet our troop goal during upcoming troop meetings

1      2      3      4      5

I intend to offer enough **vegetables** to meet our troop goal during upcoming troop meetings

1      2      3      4      5

I am planning to offer enough **vegetables** to meet our troop goal during upcoming troop meetings

1      2      3      4      5

## Physical Activity and Fruit and Vegetable Knowledge Survey

For each of the following questions, please mark your response regarding physical activity and fruit and vegetable consumption for girls.

**How many minutes of physical activity should kids get every day?**

- A. 15 minutes
- B. 30 minutes
- C. 45 minutes
- D. At least 60 minutes

**What percentage of girls meet the recommendations for physical activity?**

- A. Less than 20%
- B. 25-40%
- C. 45-60%
- D. Greater than 75%

**Girls are typically more physically active than boys**

- A. True
- B. False

**Which of these is/are a potential benefit of being physically active (circle all correct answers)?**

- A. Better school performance
- B. Weight control
- C. Decreased risk of chronic disease
- D. Improved mood

**What is the recommendation for how many combined servings of fruits and vegetables kids should eat every day?**

- A. 2 servings
- B. 3 servings
- C. 4 servings
- D. 5 or more servings

**Approximately what percentage of youth meet the recommendations for fruit consumption?**

- A. Less than 20%
- B. 40%
- C. 60%
- D. 80%

**Approximately what percentage of youth meet the recommendations for vegetable consumption?**

- A. Less than 20%
- B. 40%
- C. 60%
- D. 80%

**Which of these is/are a benefit of consuming fruits and vegetables (circle all correct answers)?**

- A. Decreased risk of chronic disease
- B. Contain fiber, vitamins, and minerals
- C. Low in calories
- D. Quick, natural snack choice

## Appendix E - Healthy Snacking Guidelines



# Girl Scouts Snack Guide

**Girl Scout meetings can play an important role in creating healthy environments for young girls. Snacks are especially important for providing children with the key nutrients to support growth and optimal learning. This year, our troop is participating in a program with Kansas State University that aims to promote health and wellness in the Girl Scouts. As a part of the program, our troop has developed a ‘Healthy Snack Policy’. We would love your support in creating healthy and positive meetings for the girls!**

### *What is a “Healthy Snack Policy”?*

A ‘Healthy Snack Policy’ encourages healthy snack choices for all of our girls. The goal of the policy is to create an environment that both allows and encourages the girls to lead healthy and active lifestyles. Our healthy snack policy is as follows:

**Any snacks, provided by either the Leader or Volunteers, should be healthful and include a fruit, vegetable, or both.**

**The preferred beverage for the troop meeting is water, rather than soda or other sugary drinks.**

### *What are some healthy snack ideas?*

Carrots, Celery, and low-fat ranch dip  
Fruit & Yogurt Parfaits  
Dried fruit and nut trail mix  
Corn & Black Bean Salsa with tortilla chips  
Ants on a Log (Celery sticks with peanut butter and raisins)  
Fruit Smoothies  
Fruit Salad  
Whole grain crackers, cheese, and apple slices  
Any fresh fruit, like bananas, berries, or watermelon!  
Any fresh vegetables, like cucumbers, peppers, or broccoli!

### *Other helpful ideas for saving time, and money!*

Bring fruits and vegetables whole so that the girls have the ability to prep their own snacks. Encourage your daughter to bring a water bottle filled with water for the meetings to avoid paying for plastic water bottles.

Let the girls be creative with their snacks... try taste-testing sessions, making pictures with their fruits or vegetables, or decorate a fruit pizza!

See this link for more healthy snack ideas... <https://www.pinterest.com/gswellness1/healthy-snack-ideas/>

## Appendix F - Scheduling Template

### SAMPLE GS MEETING TEMPLATES

#### One Hour Meeting Times

Activity	Duration of Activity
Walk & Talk Sharing Time	Prior to meeting start time
Opening Ceremony	~ 2 minutes
Discuss Troop Meeting Goals	5 minutes
Troop Related Activity	15 minutes
Physical Activity Break!	10 minutes
Troop Related Activity	10 minutes
Healthy Snack Preparation	10 minutes
Healthy Snack Eating & Sharing Time	5 minutes
Troop Closing Ceremony	~ 2 minutes
<b>Total Meeting Time</b>	<b>~ 1 hour</b>

Activity	Duration of Activity
Dance Party!	Prior to meeting start time
Opening Ceremony	~ 2 minutes
Discuss Troop Meeting Goals	5 minutes
Troop Related Activity	20 minutes
Physical Activity Break!	15 minutes
Healthy Snack Preparation	10 minutes
Healthy Snack Eating & Sharing Time	5 minutes
Troop Closing Ceremony	~ 2 minutes
<b>Total Meeting Time</b>	<b>~ 1 hour</b>

Activity	Duration of Activity
Opening Ceremony	~ 2 minutes
Discuss Troop Meeting Goals	5 minutes
Physical Activity for GS Activity (i.e. learn to Hike!)	25 minutes
Healthy Snack Eating & Sharing Time	15 minutes
Craft	15 minutes
Troop Closing Ceremony	~ 2 minutes
<b>Total Meeting Time</b>	<b>~ 1 hour</b>