

IMPLEMENTATION AND EVALUATION OF A PHYSICAL ACTIVITY INTERVENTION
FOR RURAL CHILDREN USING A COMMUNITY BASED PARTICIPATORY
RESEARCH APPROACH

by

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A DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Kinesiology
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2015

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ABSTRACT

Background: Physical inactivity is a leading cause of obesity in the United States, largely contributing to the increased risks of disease and premature death in this country. Effective physical activity interventions are needed for children since health behaviors track into adulthood and risk factors for diseases begin early in life. One approach that has been proven effective when devising interventions and research strategies is called Community Based Participatory Research (CBPR). **Objective:** The objective of this investigation was to determine if a CBPR intervention increased moderate-to-vigorous physical activity (MVPA) and decreased sedentary behavior in 10-11 year old children residing in a rural community in Alabama.

Methods: This investigation included: 1) Leading a group of children (n=12) through a Photovoice project; (2) Designing a physical activity video intervention guided by the themes that emerged during the Photovoice project, and that featured members of the community as educators; and (3) Implementing the 4-week video intervention and evaluating psychosocial constructs related to physical activity and determining if this led to concomitant improvements in physical activity behavior (Actigraph, wGT3X-BT, Pensacola, FL) pre-to-post intervention.

Results: Follow-up measurements of the psychosocial constructs were significantly higher compared to baseline measures for the intervention group ($p < 0.05$). Participants in the intervention group (n=18) had higher delta scores for skills ($t=2.45$, $p=0.020$) and knowledge ($t=4.71$, $p < 0.001$) with respect to the comparison group (n=19). Follow-up MVPA of the intervention group (30 ± 18.5 min) was significantly higher than the comparison group (18.2 ± 12.1

min) ($t=2.17$, $p=0.037$). Baseline MVPA did not differ between groups. There were no significant differences within or between groups for sedentary behavior. A regression model adjusting for known moderators was significant ($F=7.91$, $p<0.001$), and indicated that group (intervention vs. comparison) was a significant predictor of MVPA (Beta= 0.405, $p=0.019$).

Conclusion: Following the intervention, the intervention group's MVPA was 43% higher than the comparison group. MVPA remained relatively stable for the intervention group from pre-to-post, while a decreasing MVPA trend was evident in the comparison group. Physical activity interventions such as the one in this project may be an effective tool, favorably impacting physical activity levels of rural children in Alabama.

DEDICATION

To my husband, Ryan.

LIST OF ABBREVIATIONS AND SYMBOLS

a	Cronbach's Alpha
BMI	Body Mass Index
CBPR	Community Based Participatory Research
CDC	Centers for Disease Control and Prevention
IPAQ	International Physical Activity Questionnaire
METs	Metabolic equivalents
MPD	Minutes per day
MVPA	Moderate to Vigorous physical activity
PA	Physical Activity
PE	Physical Education
PI	Primary Investigator
SCT	Social Cognitive Theory
SES	Socioeconomic Status
SD	Standard Deviation
TTM	Transtheoretical Model
WHO	World Health Organization

ACKNOWLEDGMENTS

The completion of this dissertation would have been impossible without the support from a number of people. First and foremost, I would like to acknowledge my family for their constant encouragement during this four-year process. My husband, Ryan, has been loving, understanding, patient, and supportive. Without Ryan, I do not know how I would have been able to complete this project. I would like to thank my mom and dad for the endless support and encouragement they gave me along the way. Special thanks to my mom for the many times she cared for my son while I worked towards my degree, and for always having an attentive ear. Likewise, I want to thank my dad for instilling in me the desire to learn, the willingness to work hard, and the drive to pursue excellence. Special thanks to my sister, Kelly, for her willingness to assist others with her many talents. In my case, her assistance in helping me with the video editing of the intervention videos helped bring the intervention videos to life and helped me accomplish the vision I had for the videos. Thanks to my brother, Cliff, and sister-in-law, Mary Allison, for their friendship and always being great company when I needed it most. Last, but certainly not least, thanks to my energetic, bright-eyed son, Benjamin. He brings joy to me and my family, and he has been my inspiration for completing this challenging endeavor.

From my academic world, I would like to acknowledge Dr. John Higginbotham who has been a wonderful mentor to me over the years. He has a passion for rural health research and Community Based Participatory Research, and I was so fortunate that he took the time to instill in me that same passion. It was through his mentorship that I discovered how community-tailored interventions can help improve the overall health of communities. Serving as Dr.

Higginbotham's graduate assistant was a great privilege for me as I had endless opportunities to learn and to be challenged. Additionally, I would like to acknowledge Dr. Mark Richardson who was always willing to share with me his expertise and insight regarding physical activity research. Dr. Richardson also provided much encouragement to me through his enthusiasm for this project and for valuing my opinions. I would also like to thank Dr. Phillip Bishop, Dr. Kimberly Bissell, and Dr. Jonathan Wingo who served on my dissertation committee, and who gave me their time, support and their valuable input during the dissertation process.

Finally, I would like to thank all the members of the community who partnered with me and made this project possible. I would like to acknowledge Ms. Felicia Jones for her leadership and commitment to the Black Belt community, and thank Ms. Jones for introducing me to the Photovoice method. Thanks also to Ms. Lily Henderson for partnering with me during the Photovoice project and for her invaluable ideas concerning the community-based intervention videos. Special thanks to Principal Fred Young for his enthusiasm and support of the project, and for inviting me to partner with him and the staff at his school. I would like to thank Ms. Janice Jackson and Ms. Glenda Guyton for inviting me into their classrooms, and for being so eager to participate in the project. Also, special thanks to Ms. Shanda McGraw, the school nurse, who provided valuable insight and assistance regarding the implementation of the physical activity intervention. And finally, I would like to thank Ms. Teirdre Owens for partnering with me throughout this entire process. It was a joy to work alongside a member of the community with such enthusiasm, vision, and passion for her community.

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CHAPTER 1: INTRODUCTION

Physical inactivity among children is a national health concern, and it is especially high in the state of Alabama. According to the national guidelines published by the U.S. Department of Health and Human Services, children ages 6 to 17 should engage in 60 minutes or more of physical activity (PA) of moderate or vigorous intensity most days of the week,¹ but nationwide only 47% of children meet this guideline, and in Alabama only 43% of children meet it.² Moreover, studies have shown that medically underserved children who are of low socioeconomic status (SES), such as those residing in Alabama's rural Black Belt region, are even less physically active than children of higher SES.^{3,4}

The significant disparity between the amount of PA recommended for children and the actual PA engaged in by children, especially those who are medically underserved, is a problem that should continue to be addressed by researchers because there is ample evidence that regular PA has many health benefits. It has been estimated that those who participate in at least 7 hours of PA a week have a 40% lower risk of premature death compared to those who are active for less than 30 minutes a week.^{1,5,6} Also, studies have shown that PA contributes to lower rates of a number of chronic diseases and conditions including heart disease,⁷ type 2 diabetes,⁸⁻¹⁰ obesity,¹¹ certain cancers,^{12,13} hypertension,^{14,15} and osteoporosis¹⁶.

While children do not typically develop chronic diseases such as heart disease, type 2 diabetes, stroke, and osteoporosis, risk factors for these diseases begin early in life, and a child who is physically active will be less likely to develop these risk factors.^{1,17} Additionally, health behaviors have been shown to be consistent from childhood to adulthood,¹⁸ meaning that a physically active child will more likely become a physically active adult. Since behavioral

patterns are most formable during childhood,¹⁹ efforts should focus on implementing interventions designed to increase PA behavior in children, especially in medically underserved areas such as the Black Belt of Alabama, where PA levels in children are particularly low²⁰ and chronic disease rates are high.²¹

Numerous interventions for children have been designed and implemented over the past 2 decades in an effort to increase PA levels, but most have been unsuccessful at improving overall PA in children.²²⁻²⁴ One possible reason for this lack of success is the failure to include participant or community input when designing the PA intervention. Traditional PA interventions designed exclusively through the use of academic research without input from those being studied can be ineffective due to a lack of cultural awareness and understanding of the study's participants. Participant input should be obtained and utilized when designing PA interventions because such input can lead to more relevant and enjoyable interventions thereby increasing the likelihood of the effectiveness of the intervention on its participants. While previous research has either attempted to identify children's PA preferences using qualitative measures²⁵ or allowed students to choose PA activities from a list of pre-determined PA activities,²⁶ no study has included children and community members when designing a PA intervention.

One type of research that involves community and participant input and participation when devising research strategies or interventions is called Community Based Participatory Research (CBPR). The W.K. Kellogg Foundation Community Health Scholars Program defines CBPR as follows:

[CBPR] is a collaborative approach to research that equitably involves all partners in the research process and recognizes the unique strengths that each brings. CBPR begins with a research topic of importance to the community with the aim

of combining knowledge and action for social change to improve community health and eliminate health disparities.²⁷

While several previous PA interventions with no community input have been shown to be effective in suburban areas,²⁸⁻³⁰ these interventions may not necessarily be appropriate for a rural, underserved population. The use of the CBPR model is one way to ensure participant and community input when developing a PA intervention for a community. By using CBPR, a PA intervention is more likely to address unique needs of the particular participants. Specifically, a CBPR research method called Photovoice, a method where the participant uses photographs to capture aspects of the participant's environment and experiences,³¹ can provide researchers with valuable information about the participant's perceptions of PA and their current PA practices and preferences. The information can then be used in designing and implementing a PA intervention that hopefully will be effective for the participant group. Photovoice is potentially a powerful CBPR method that can be used with children since virtually anyone can be taught to use a camera, and children's photographs can help explain children's PA behaviors and experiences they would otherwise have difficulty articulating.

Therefore, the overarching goal of this investigation is to improve PA in rural children and concomitantly reduce future chronic disease rates in Alabama. In an effort to make progress toward this goal, we propose to do what no study has yet attempted, namely, to design, implement, and evaluate a children's PA intervention using CBPR. The specific aims of the investigation are twofold:

Specific Aim 1

Photovoice will be used in creating a culturally relevant, age appropriate, community-based intervention designed to improve the psychosocial constructs of self-efficacy, attitudes, beliefs,

knowledge, and skills as they relate to physical activity of 10 and 11 year-old children residing in the rural Black Belt region of Alabama.

Specific Aim 2

A quasi-experimental pre/post design will be implemented to evaluate: 1) the changes in the aforementioned psychosocial constructs of the participants; and 2) the changes in moderate-to-vigorous physical activity and sedentary behaviors of the participants.

If the above specific aims are met, and the intervention is effective, there should be a demonstrable improvement in the psychosocial constructs of physical activity of the participants which in turn will cause increases in moderate-to-vigorous physical activity and decreases in sedentary behavior. Ultimately, improving PA in children will result in a reduction of the risk factors for certain chronic diseases.

CHAPTER 2: LITERATURE REVIEW

Introduction

Physical inactivity is one of the leading causes of obesity in the United States, and it largely contributes to the increased risks of disease, premature death, and disability in this country.²³ It has been previously reported that if physical inactivity, along with other modifiable risk factors including unhealthy diet and tobacco use, could be eliminated, 80% of premature heart disease, 80% of premature stroke, 80% of type 2 diabetes, and 40% of cancer would be prevented. It has also been reported that increasing the level of physical activity (PA) in individuals helps reduce obesity, hypertension, and raised blood lipids.²³

Unfortunately, the state of Alabama ranks as one of the most physically inactive states in the country.³² Because physical inactivity, along with poor diet, is a major contributing factor to excessive weight gain,³³ it comes as no surprise that Alabama also ranks as a state with the highest obesity rates.³² An example of these high rates can be found in Alabama's rural Black Belt region, a region that stretches across central Alabama. Here, the percentages of Black Belt residents who are obese range from 39.2 to 47.9%, while the national percentages of residents who are obese is 35.7%.³⁴ Notably, 33.5% of Black Belt residents report that they engage in no leisure time physical activity, while the percentage of residents nationally reporting no leisure time physical activity is 21%.³²

When devising strategies to improve PA levels, a major focus should be on strategies that directly impact child activity behaviors as these behaviors have been shown to track into adulthood.¹⁸ More importantly, strategies should target children because significant evidence

suggests that risk factors for cardiovascular disease can develop at a young age thereby putting an individual at risk for cardiovascular and other disease-caused mortality at a much earlier time in their lives.¹⁷ Also, there is a current need for strategies that improve PA in children because today's children have been shown to be less active than children in previous generations.³⁵

Many PA interventions for children have been developed and implemented over the past 2 decades. Most of these interventions have taken place in the schools because the school is the institution which exercises the most influence on the majority of children during their first 2 decades of their life.³⁶ While previous interventions have their strengths, there are limitations to many of the interventions that have been used in the schools. For example, very few interventions have been designed particularly for low SES populations, such as the Black Belt population, where school resources are minimal. School-based interventions can be complicated and, unless there are a number of trained personnel available to administer the intervention, the intervention may not be feasible for a number of schools. Also, many of the interventions reported in the literature have been designed without input from the community. Designing an intervention using input from community members is a method that attempts to increase participation in the intervention by making the intervention more relevant and enjoyable to the participant.³⁷ While previous research has gained insight on PA preferences of children using qualitative methods, few studies have used insight from the community's children to create a PA intervention.

In developing new PA interventions for schools with limited resources, it is important that the intervention be simple enough so that any teacher, even those who teach in low SES areas, can incorporate the intervention into their classroom. Moreover, in an effort to increase overall participation in the interventions, more attention should be given to the input of the

community in designing the interventions. One approach is to design web-based interventions, using input from the community that can be used by any teacher in any classroom with access to the Internet. Web based interventions would be available to most schools, including low SES schools, since 97% of public schools nationwide have 1 or more computers in the classroom, and 93% of these computers have Internet access.³⁸ The importance of technology to promote physical activity behavior change has recently been recognized.^{19,39} Over the past decade, several studies have addressed the use of computers and web-based interventions to cause a change in behavior in both children and adults.⁴⁰⁻⁴² A major benefit of using a web-based PA intervention in schools is that the health information conveyed through the intervention can be overseen by a health expert, but the intervention itself can be designed by the community and delivered by the teacher. Other advantages to web-based PA interventions include the ability to reach any number of school students in classrooms with Internet access, and the ability of students to revisit the web-based material at their convenience at school, at the library, or at home.

Using Children's Input when Designing Physical Activity Interventions

While little has been done in the field of Exercise Science to engage the community in PA intervention development, using information gained from the community to direct interventions is not a new concept.⁴³ For example, Public Health studies have been using community-directed interventions, including those utilizing children's input, for over a decade.⁴³ Additionally, studies involving the community in intervention development have done so in an effort to promote social justice and equity in health, specifically with regard to low SES populations.^{43,44} The World Health Organization (WHO) views community involvement in intervention development as an important process that “enables people and communities to take

control over their health and its determinants”.⁴⁴ According to the WHO, health should not be promoted and enhanced through a top-down, expert driven approach, but rather should be based on community participation and insight.⁴⁴ This is because interventions incorporating the views of those being studied have been shown to improve the likelihood of success and sustainability.²⁶ Based on a review of the literature, it does not appear that any study has used community input and participation when developing a PA intervention for children. However, previous studies have explored children’s PA preferences and behaviors which is an important first step toward using community input and participation to develop PA interventions.

One similarity that can be found in previous studies exploring children’s PA preferences is that all of those studies included study participants who were of a low SES.^{25,26,45,46} Learning the PA preferences of children with lower SES may be beneficial as these children have been shown to be less active and more at risk for diseases associated with inactivity. A clearer understanding of PA beliefs and preferences for underserved populations could lead to better development of PA interventions, since past interventions without community input have shown limited success.³ However, a limitation of the previous studies looking at PA preferences is that they tended to employ small sample sizes. Hence, results may not be generalizable to other underserved populations. In fact, 2 studies examining the PA preferences of underserved children that included older children found opposite results. The older children in one study favored PA that was structured,⁴⁵ while the older children in a separate study preferred PA that was not structured.²⁵

The study that included older children who were found to prefer structured activity was one of the first of its kind to explore rural, low SES students’ (K-6th grade) PA experiences and preferences.⁴⁵ The purpose of this study by Fitzgerald et al. was to inform school officials

responsible for children's programs and policies of children's views regarding health issues with a goal of creating a healthier school environment.⁴⁵ Thirty-seven students communicated their views about PA and healthy diets through focus groups, drawings, and Photovoice, while also suggesting ways they thought could lead to improvement in health behaviors. Results indicated that younger children (K-2nd grade) preferred engaging in non-structured PA while older children (3rd-6th grades) preferred to engage in structured, competitive sports. One limitation of this study is that the researchers did not actually create an intervention based upon children's preferences and ideas for how to increase physical activity.

Underserved, older children (8-12 years) in a study by Curtis et al. were found to prefer PA that was not structured.²⁵ These children defined PA as structured activity that was "good for you", but was not as fun as unstructured activity which they defined as "play". The purpose of the Curtis et al. study was to determine what children, who were either in the high BMI focus group or the normal BMI focus group, considered to be PA and what factors determined their participation in such activities. A second aim of this study was to explore the barriers that children and their parents considered to be barriers to PA participation. Nine children (8-12 years) and 21 parents who were of a low SES were asked to discuss both their perceived barriers and their perceived facilitators that affected their participation in PA and sedentary activities after school. Additionally, students participated in Photovoice where they were given disposable cameras to photograph places where they were active or played. Later, the children were asked to describe their photographs and explain their meaning. Curtis et al. used a thorough coding technique when determining the PA themes that were preferred by the children and adults. Interviews and focus groups were audio recorded and then transcribed by a researcher. A content analysis was performed where common statements were coded and categorized.

Categories that evolved were then cross checked for credibility by 2 other researchers.²⁵ Parents recognized that children were more likely to engage in PA when they viewed it as fun, and were less likely to engage in PA if it lessened their self-esteem. Both parents and children stated similar barriers hindering PA participation. These included work commitments of the parents that deprived them of the time to drive or play with their children, cost of activities, long distances between destinations, and unsafe environments where the PA might take place.

Other studies determining PA preferences among lower SES children noted similar PA barriers described by both children and adults. Hesketh et al. found that barriers to PA reported by children included lack of playground equipment, unsafe roads, neighbors who complained of noise from children, and lack of money to engage in organized activities.²⁶ The barriers to PA reported by parents included increasing distances between schools and homes and distractions in the home such as televisions and computers.²⁶ The main objective of this study was to elicit the views of children and parents regarding social and environmental barriers to healthy eating, PA, and child obesity prevention. One hundred nineteen children (7-11 years) and 17 parents varying in SES participated in this qualitative study. Focus groups were used and discussions were directed using photo-based activities. For example, children were given a stack of photographs showing different activities and were instructed to rank the activities according to how physically demanding they were. Results indicated that most children were able to identify physically active pursuits as healthy, and could discuss the benefits of PA including fitness and fat reduction. When asked, they were able to identify which activities were the healthiest out of a group. For example, most children in fifth grade were able to identify cricket as being less physically active than other specified sports since cricket involves a lot standing rather than moving. However, results indicated that most children had difficulty finding sedentary activities

to be unhealthy. For example, most children indicated that sitting at a computer was healthy since it involved learning. While children were able to state which activities were the most physically involved, they still admitted having a preference for sedentary activities. A limitation of the study was that children did not state why they preferred sedentary behaviors over non-sedentary behaviors.²⁶

Veitch et al. investigated reasons why lower SES children were less physically active than higher SES children.⁴⁶ This study examined children's access to places in their neighborhood where they engaged in PA.⁴⁶ Two hundred twelve children participated in the study in which 39% of the children were from low SES areas, 42% of the children were from mid SES areas, and 19% of the children were from high SES areas. Children were instructed to map out where they engaged in PA. Specifically, children were given a map showing the surrounding areas from their school and they were instructed to mark where they lived, and where they have engaged in PA in the previous week. Results indicated that children living in low SES outer-urban neighborhoods had to travel greater distances to access local parks when compared to those in inner-urban, mid, and high SES areas. This finding may provide one reason why the lower SES children in this study were not as active as those who were of a higher SES.⁴⁶

A study by Wilson et al. did not explore PA preferences and barriers like the previous studies mentioned, but it did provide some insight regarding the PA preferences of lower SES children as the children were allowed to choose which PA they engaged in during a 4-week intervention designed to increase PA as measured by accelerometer.³ Specifically, children from a middle school (n=28, 11-14 years) enrolled in a 4-week after school 2 hour program where they generated a list of physical activities that they wanted to engage in the following week,

following which the entire group voted on the top 2 choices. The activities that were selected over the 4-week period included basketball, football, hip-hop dance, step dance, Double Dutch jump rope, and dodgeball. Children from another middle school (n=20, matched for race, gender, age, and proportion on free or reduced-price lunch) were selected as the control group, and they did not participate in the intervention. A two-way repeated measures ANOVA controlling for sex and body mass index showed that students in the intervention group had a greater increase in accelerometer estimates of time spent in moderate, moderate-to-vigorous, and vigorous PA from baseline to week 4 of the intervention compared to the control group (all $p < 0.02$).³ A limitation of the study was that the researchers did not attempt to analyze which components of the intervention were effective. The intervention was designed to increase intrinsic motivation and behavioral skills for PA but it is unclear which of these particular skills led to an improved PA behavior in adolescents.³

Web-Based Physical Activity Interventions

A web-based intervention designed to change behavior could be beneficial to any number of students, since the majority of classrooms in the United States, including those in underserved areas, now have access to the Internet.³⁸ Furthermore, the importance of using technology to promote a change in health-related behavior has been recognized.⁴⁷⁻⁵⁰ Over the past decade, several studies have discussed the use of computers and web-based interventions to cause a change in the PA of both children and adults.^{19,39,40} Internet-based interventions are beneficial because they eliminate the problem of requiring participants to travel to a specific location at a specific time. More importantly, an Internet-based intervention used in the school setting does not depend on the effectiveness of the teacher's ability to relay the pertinent health information, but rather the health information conveyed in the internet-based intervention can be developed

and overseen by a health expert. Based on a review of the literature, it appears that 3 studies have been conducted that involve using a web-based intervention in an attempt to improve PA behavior.^{19,39,40} While one study showed significant increases in PA behavior following the web-based intervention,³⁹ the two other studies did not report a significant improvement.^{19,40} A common limitation that was evident in all 3 studies was the failure of the researchers to ensure participant adherence in logging onto the online programs. Therefore, more research with higher participation adherence is warranted to determine whether web-based PA interventions are beneficial.

Barwais et al. found that a 4-week web-based intervention designed for sedentary adults improved light, moderate, and vigorous PA measured by an activity log (7-day recording log reporting light intensity PA) and questionnaire (International Physical Activity Questionnaire (IPAQ)).³⁹ Participants (22 men, 11 women, 27±4 years) who were sedentary (spending >7 hours per day sitting) were randomly assigned to the intervention group (n=18), or control group (n=15). The intervention group participated in a web-based program that included wearing an activity monitor. At the end of the day, those in the intervention group plugged their monitor into a computer via USB cable which then directed them to a website where they could see their PA charted and receive helpful information about their PA patterns. The control group did not participate in a web-based program nor did they receive an activity monitor to wear. The control group was directed to follow their normal, daily lifestyle patterns. Participants were asked to complete the activity log and the IPAQ questionnaire at baseline and at the end of the 4-week intervention. Paired sample t-tests were used to compare intervention and control groups at baseline and at the end of the 4-weeks. Results indicated a significant decrease in sedentary time from baseline to the end of the 4-weeks for the intervention group (p<0.001). The intervention

group also had a significant increase in time spent in light-intensity PA ($p < 0.001$). No significant differences were observed for the control group between pre and post measurements for sedentary time ($p = 0.55$) or for light intensity PA ($p = 0.24$). Results for the IPAQ differences between pre and post tests were significantly increased among the intervention group for all categories of PA: moderate intensity increased from pre (194 ± 225.3 MET-min/week) to post (649 ± 494.9 Met-min/week), $p < 0.001$; and vigorous intensity PA increased from pre (291 ± 495.8 MET-min/week) to post (733 ± 829.3 MET-min/week), $p < 0.001$. No significant changes for IPAQ differences occurred for the control group (all $p > 0.4$). Several limitations of the study include the small sample size, and the use of self-report to assess PA potentially causing a recall bias. Also, it is unclear whether the web-based program influenced the improved PA behavior in the intervention group or whether the improved PA behavior was mostly influenced by the use of an activity monitor.

Studies by Baranowski et al.¹⁹ and Kosma et al.⁴⁰ did not find a PA web-based intervention to be effective. However, a major limitation of these studies was the poor adherence to the web-based intervention in these studies. The study by Baranowski et al. consisted of an 8-week web-based intervention among 8-year old girls designed to improve diet and physical activity. This web-based intervention followed a 4-week summer day camp also designed to increase PA behavior. On average, less than half of the intervention group participated in the web-based component of the intervention. To be included in the study, participants had to be female, 8-years old, African American, and have a $\geq 50^{\text{th}}$ percentile for age and gender specific BMI based on the CDC growth charts.¹⁹ Girls were randomized to either the treatment group ($n = 19$) or control group ($n = 16$). The goal of the study was to increase participants' fruit and vegetable consumption while also increasing moderate to vigorous PA to 60 minutes per day.

PA was assessed using accelerometers (Computer Sciences and Applications) and an activity questionnaire. Following the 4-week camp, participants in the treatment group were instructed to visit a website on a weekly basis that provided ways to overcome PA and dietary barriers, allowed recording and review of previous week's goals, and encouraged participants to set new goals. Participants received weekly email and telephone call reminders to log-on to the website. Differences in PA from baseline to 12 weeks were compared among the treatment and control group using ANCOVA. Baseline values were set as a covariate. Results indicated no PA differences between groups ($p>0.1$). In addition to poor adherence to the online intervention, another limitation of the study was the lack of any assessments after the 4-week camp and before the online intervention so it is not known whether PA differences occurred after the summer camp.

A pilot study by Kosma et al. included 151 adults with disabilities who were randomly assigned to either a treatment or control group.⁴⁰ All participants completed a standardized leisure time PA questionnaire at baseline while the treatment group ($n=75$) participated in a 1-month intervention program that was delivered on the web. Based on a one-way ANCOVA, there were no statistically significant differences in leisure time PA scores between the treatment group and control groups at post-test. A limitation of this study is the absence of available information about the number of people who actually observed all web-based lesson plans.

Conclusion

It may well be that exploring PA preferences in children, especially those classified as underserved, could prove to be beneficial in creating appealing and relevant PA interventions for children therefore increasing the likelihood for sustainable improved PA behaviors. However, although a number of studies have reported on children's PA beliefs and preferences, there is a

lack of studies that have actually used community input and participation in creating PA interventions.

Web-based PA interventions have appealed to researchers because they can reach any number of participants with access to the Internet, they can be administered without the participants having to travel to a specific location at a specific time, the intervention's content and presentation is consistent and fixed, and, as highlighted in this literature review, it has been shown that web-based interventions can be effective at improving physical activity behavior. Also, the web-based intervention is ideal for including community input and participation in the design of the intervention. Unlike interventions that involve real-time presentations, a web-based intervention can utilize community members as actors and educators, and it can be developed at the convenience of the community participants. Moreover, a wide variety of known PA activities and location preferences of children in the community can be depicted in the intervention through the use of video clips. Because a web-based intervention can be designed using information obtained from community members, and because a web-based intervention enables community members to deliver the contents of the intervention, the web-based intervention will be the type of intervention chosen for this investigation.

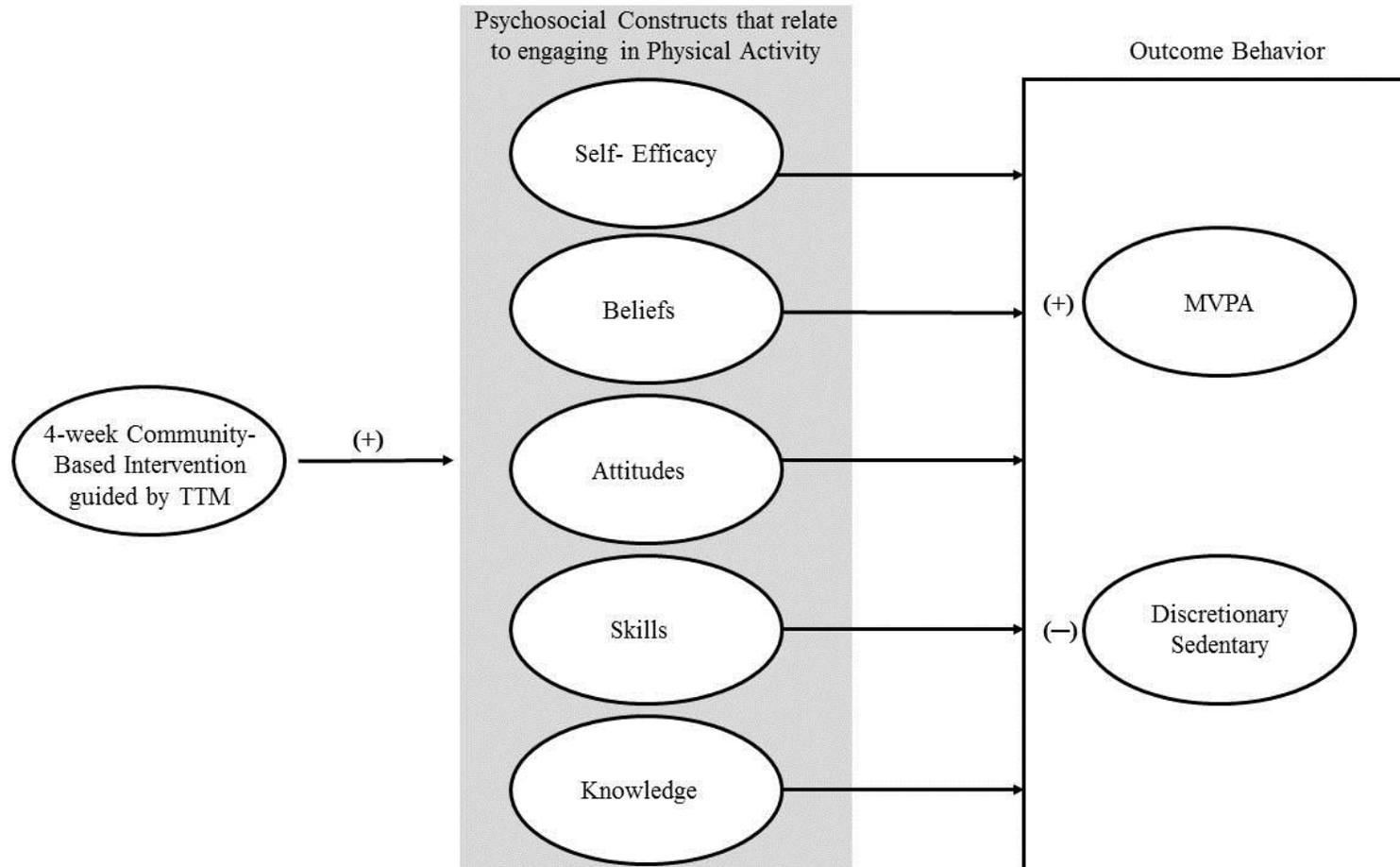
CHAPTER 3: SUMMARY AND RATIONALE FOR CONCEPTUAL MODEL

After reviewing the literature, no study has used both community input and participation in actually creating a PA intervention. Also, while PA practices and preferences were similar among children involved in one study, the practices and preferences of children in that study varied when compared to the practices and preferences of a different group of children in another study.^{25,45} That is not surprising since factors common to one group of children may differ from those of another group of children in such things as the participants' SES, the participants' age and education, and the availability of facilities promoting PA in particular communities such as gymnasiums, playgrounds, parks, and side-walks. Because PA preferences and practices may differ across communities, it is suggested that PA interventions should include community input and participation in designing an intervention so that it will be relevant to those who are the participants of the intervention.

Figure 3.1 displays the conceptual model of the PA intervention in this investigation. The intervention will be a web-based type intervention that will be designed using community input and participation and so it will be a CBPR intervention. The justification for this type of intervention was previously discussed in the literature review. The intervention will be guided by the Transtheoretical Model (TTM) of behavior change, and it will consist of a series of short (<15 min) video presentations conducted over a 4-week period. Whether the intervention will be successful will depend on whether it has an effect on the psychosocial constructs that impact PA. Each of these psychosocial constructs is included in the conceptual model of the PA intervention in this investigation, and is expected to produce change in the behavioral outcomes that the

intervention is attempting to achieve, namely, an increase in physically active behavior and a decrease in sedentary behavior.

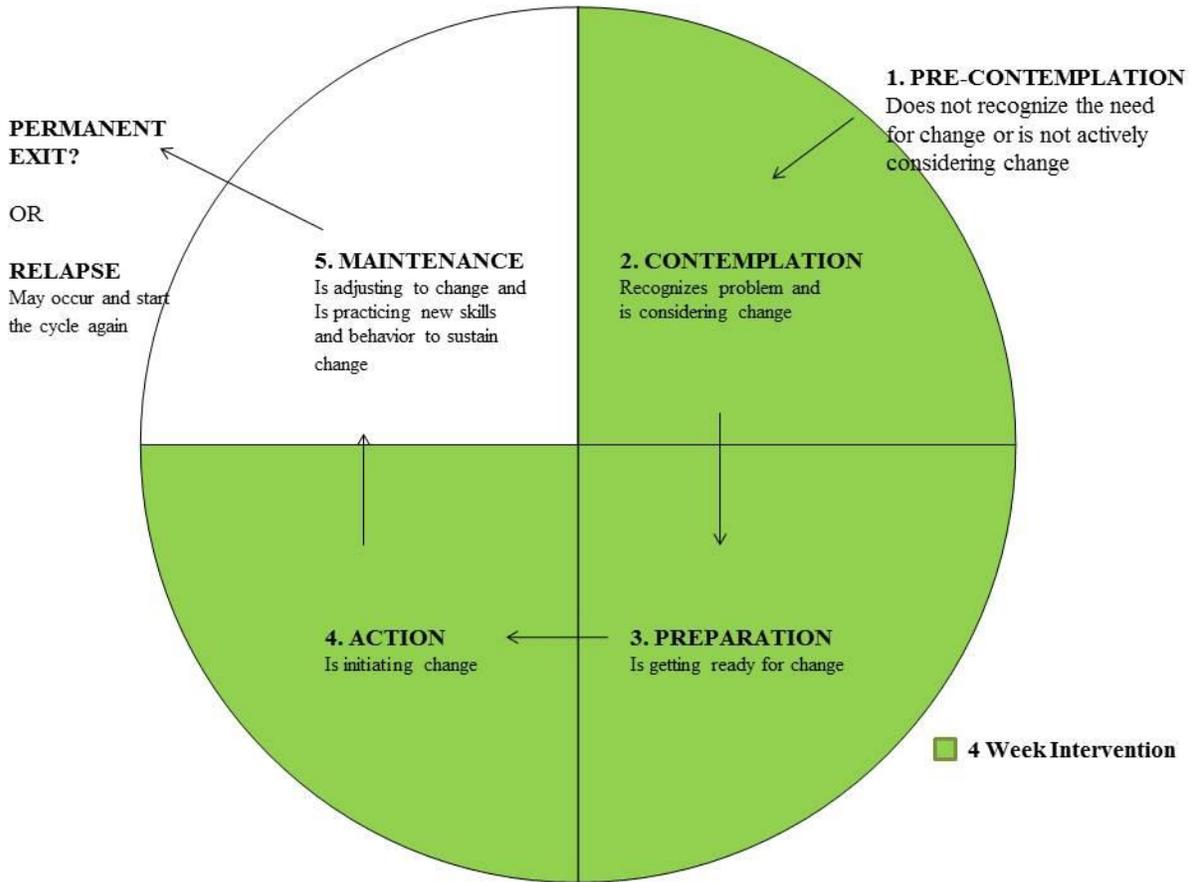
Figure 3.1. Conceptual Model of the Physical Activity Intervention



Community-Based Intervention Guided by TTM

The intervention in this investigation will be guided by the Transtheoretical Model (TTM) of behavior change (**Figure 3.2**), the dominant model of health behavior change.⁵¹⁻⁵³ According to the TTM, there are 5 stages of behavior change: Pre-contemplation (Stage 1: I currently do not engage in leisure time physical activity and I do not intend to start to do so in the next 6 months); contemplation (Stage 2, I currently do not engage in leisure time physical activity but I am thinking about becoming more physically active in the next 6 months); preparation (Stage 3, I currently engage in leisure time physical activity but not regularly); action (Stage 4, I currently engage regularly in leisure time PA but I have only begun to do so within the past 6 months); and maintenance (Stage 5, I currently exercise regularly and I have done so for longer than 6 months).^{51,54} The intervention in this investigation is designed to facilitate the participant's progress through 4 of the 5 TTM stages of behavior change by introducing cognitive and behavioral strategies, such as social support, goal setting, role modeling, and positive attitudes. Because this 4-week intervention has limited funding, the attainability of the maintenance stage is beyond the scope of this investigation.

Figure 3.2. Transtheoretical Model (TTM) of Behavior Change

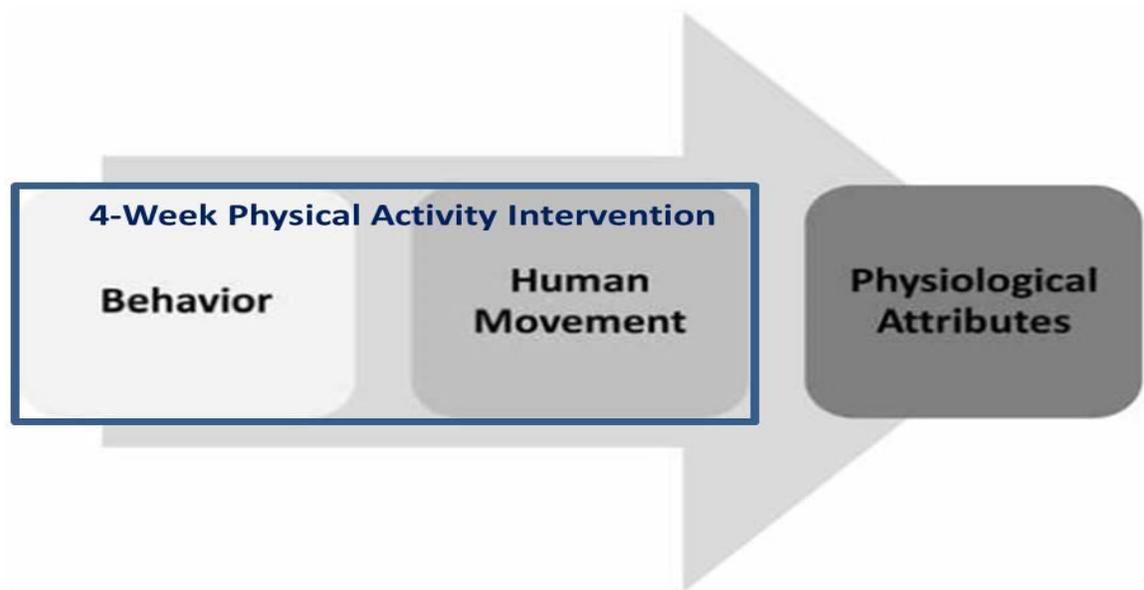


The TTM of behavior change posits that a permanent change in behavior can be assumed once an individual has practiced that behavior for at least 6 months.⁵¹ By taking follow-up measures during a variety of time points following a 4-week PA intervention, previous studies have shown how 4-week interventions can contribute to a potentially permanent behavior change.^{33,40,55-58} Follow-up assessments have taken place anywhere from 1 week following the intervention,^{55,57} up to 1 year following the intervention.³³ Studies that seek to determine changes in physiological parameters, such as BMI³³ or bone mineral density⁵⁹ tend to use a 1- to 2-year extended time period between intervention and follow-up based on previous

recommendations that a 1-year, and ideally 2-year post-intervention period is best when trying to detect physiological changes due to behavior change.⁶⁰ While physiological attributes do follow PA behavior modification, this investigation's purpose is only to determine the effects of a 4-week PA intervention on behavior change which is the first step to reducing morbidity and mortality. **Figure 3.3** outlines the behavior, PA, and physiological attributes relationship.

To ascertain whether the 4-week PA intervention in this investigation is effective in changing PA behavior that potentially could lead to a permanent change in behavior, the investigation was modeled after previous studies that assessed PA behavior at baseline and immediately following the 4- week intervention.^{3,33,56}

Figure 3.3. The Directional Relationship between the Behavior (Physical Activity) and Consequence (Physiological Attributes) of Human, Musculoskeletal Movement



Intervention of a short (<15 min) duration

When designing a physical activity intervention for children, one should keep in mind that previous studies have shown children to have an attention span of only 15 minutes.^{61,62} Additionally, one study has shown that children who are forced to engage in structured exercise may participate in less PA later in life.⁶³ Another study has shown that children are inherently active and when given the opportunity and encouragement they will participate in PA, though it is often intermittent and sporadic in nature.⁶⁴ Therefore, an intervention designed to increase PA in children should not be longer than 15 minutes in length, and should encourage intermittent free play that is enjoyable and entertaining to children. A short intervention is also conducive to a school setting since the intervention will not materially interfere with the academic schedule and school-day routine.

Intervention over a 4-Week Duration

The duration of the intervention has previously been found not to be a significant moderator of treatment effects or behavioral change, resulting in the conclusion by Wilfley and colleagues that the optimal duration of treatment contact for pediatric populations has yet to be established.⁴¹ Numerous studies have shown that an intervention performed over a 4-week period can modify the behaviors in both children and adults.^{3,42,55,65} A relatively short intervention period is beneficial in the school setting as teachers are more likely to permit a shorter, rather than a more time consuming, intervention in their classroom. Moreover, it has been shown that 4-week PA interventions have been effective in underserved populations where inactivity is higher than the general population.³

Cottrell et al. demonstrated how a 4-week PA intervention on children in a rural, underserved area could successfully improve PA behavior.⁴² The purpose of Cottrell's study was

to evaluate a 4-week intervention aimed at increasing family PA and improving parent education about diet and activity for rural kindergarten students. A randomized, controlled trial design was implemented to assess a PA intervention's impact using both parental reports of child diet and physical activity and pedometer step records over a 4-week period. Four rural counties were randomly chosen from 10 counties located in West Virginia. Children randomly assigned to the treatment group received 2 pedometers, 1 for their use and 1 for the participating parent, together with a daily step log to record each participant's steps. Children randomly assigned to the control group received only 1 pedometer and a step log. Information packets were given to families in the control group that contained general PA and diet guidelines while the treatment-group families received specific information on ways to increase exercise, particularly the steps they took each day. Also, children in the treatment group with BMIs greater than or equal to the 85th percentile received specific information on ways to reduce caloric intake. Results showed that children in the treatment group recorded more steps by the end of the program period, were more active, and had consumed fewer sweets than the control group (all $p < 0.05$).⁴²

A similar 4-week PA intervention that was also shown to be effective in underserved children was described in a study by Wilson et al.³ The intervention was implemented 3 days a week for 2 hours after school. Trained staff provided oversight and structure for the PA elements of the program. The components of the program included a homework–snack component, a PA component that included activities that the students selected and performed after school, and a motivational component where participants learned behavioral skills and motivational strategies to increase their PA. The intervention group showed greater increases in accelerometer estimates of time spent in moderate PA, moderate-to-vigorous PA, and vigorous PA from baseline to week 4 when compared to the control group ($p < .02$ for all). Intervention

participants also showed greater increases than the control group in PA motivation ($p < 0.01$) and positive self-concept ($p < 0.05$) for PA.

Another effective 4-week PA intervention for an underserved population was conducted on adults residing in Glasgow, United Kingdom.⁵⁵ The purpose of this study was to compare rates of stair climbing in a high and low socioeconomic area, and to assess the efficacy of a stair climbing intervention in each area. Prior to the intervention, ascending stair/escalator choices ($n = 20,315$) were observed in an underground train station in a high socioeconomic area and an underground train station in a low socioeconomic area for 2 months. Pedestrians at the high socioeconomic station were around twice as likely to climb the stairs as those at the low socioeconomic station (odds ratio = 1.91, 95% confidence interval = 1.70–2.15). The 4-week intervention involved installing posters encouraging the stair choice. Follow-up observations were collected 1 week after poster removal. Across sites, the rate of stair climbing was higher during the intervention relative to baseline (OR = 1.48, CI = 1.34–1.63) and remained elevated at follow-up (OR = 1.24, CI = 1.11–1.39). Absolute increase in stair climbing was similar at both stations (high, +4.7%; low, +4.5%), indicating equivalent poster effects in each area. This study concluded that while pedestrians in lower socioeconomic areas were less likely to climb stairs than pedestrians in high socioeconomic areas, a stair climbing intervention was equally effective in both areas.

Four week PA interventions have also been shown to be effective for obese and less active children.³³ The main objective of a 4-week intervention by Martin et al. was to modify health behaviors using group dynamics strategies.³³ Fifteen children consisting of 7 boys and 8 girls, with a mean age of 10.5 years, having a BMI greater than or equal to the 95th percentile for their age and sex, were used in the study. The 15 children's physiological and psychological

outcomes were assessed throughout a 4-week intervention and at 3-, 6-, and 12-month follow-up periods. Social influences including family support were used to affect changes in the PA and diet of the children. Other important aspects of the intervention included weekly family-based educational sessions and post-intervention group support. While follow-up data has yet to be published, current findings revealed that participants perceived the intervention as helpful (e.g. in making healthier food choices, being more active, and feeling more confident and self-aware).⁶⁶

A 4-week intervention that only showed a modification of PA behavior in those children who were the least active was a study conducted by Oliver et al.⁶⁵ The purposes of this study were to design and implement a 4-week elementary school curriculum unit, based around pedometer walking, and quantify, using pedometry, the physical activity levels of children prior to, and during, the unit implementation.⁶⁵ Results showed that more than half of the participants were achieving 15,000 steps daily, and children were significantly more active on weekdays than weekends ($p=0.0001$). Boys were more active than girls at baseline ($p=0.01$) and during intervention weekdays ($p=0.03$). Differences between baseline and intervention weekdays were non-significant for the complete sample; however, significant increases in step counts were observed when the children with low activity levels, especially females, were examined separately.

Based on the above studies examining the effectiveness of a 4-week intervention on PA behavior change, it appears that a 4-week period is sufficient time to change PA behavior. Hence, the intervention in this investigation will take place over a 4-week duration.

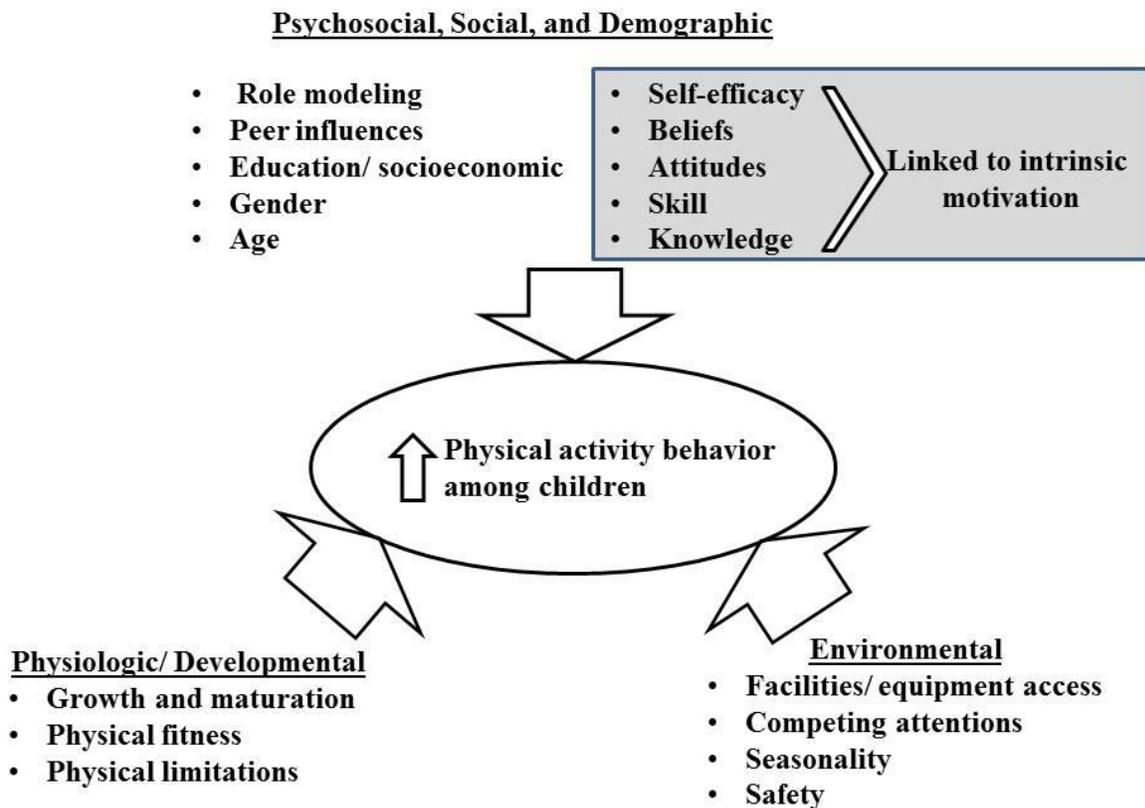
Psychosocial Constructs to be integrated in an Intervention

The 5 psychosocial constructs (**Figure 3.4**) that have the potential to be modified by an intervention and have an impact on behavior are self-efficacy, attitudes, beliefs, knowledge, and

skills.⁶⁷ During the 4-week web-based PA intervention, techniques that address these factors will be incorporated throughout. These techniques are discussed in detail in Chapter 4.

Self-efficacy is defined as the confidence an individual has to change or maintain a certain action or behavior.⁶⁸ Perceived self-efficacy implies that not only does an individual intend to become more physically active, but that he or she believes they have the capability to do so. Self-efficacy has been shown to positively correlate with PA behavior and has been used to predict weekly PA participation among adolescents.⁶⁹

Figure 3.4. Constructs that have been shown to Correlate with Engagement in Physical Activity



The intervention will also focus on developing positive beliefs and knowledge about health behaviors. Health beliefs refer to both the perceived/learned benefits in adopting a behavior and the perceived/learned barriers that could hinder the behavior.⁶⁷ Examples of perceived/learned barriers that might hinder a child's good health behavior include lack of interest, unfavorable weather, or lack of access to equipment or facilities.⁶⁷ The intervention will strategically address each of these perceived barriers so children will be more inclined to participate in PA. PA knowledge refers to the awareness and understanding of PA benefits. Some examples of how the intervention will improve knowledge of the participants include teaching participants how many minutes of physical activity they should achieve each day to receive health benefits, teaching participants how to differentiate between the various PA intensity levels, (light, moderate, vigorous), and teaching the participants about the positive physiological adaptations that result with PA (improved cardiorespiratory, muscle, and bone health).

Attitudes and skills, the 2 remaining factors that influence PA behavior, will also be addressed. In general, children have been shown to participate in PA that they find enjoyable.^{3,67} A previous study by Theodorakis et al. demonstrated how positive attitudes toward PA positively correlate with PA behavior.³⁷ Hence, it is important that the intervention will show activities that the participant enjoys. Also, children are more likely to participate in PA if they have the skills needed to participate in such activities. The intervention will be designed so that the participant can easily perform the activity using the skills that the participant possesses.

Physically Active Behavior or Sedentary Behavior

The conceptual model (**Figure 3.1**) in this investigation depicts that the outcome of this investigation is physically active behavior, meaning any increase in human movement. An increase in human movement leads to an increase in energy expenditure and, depending on the

intensity and frequency of the physical activities performed, an improved level of physical fitness over time. While the model is intended to show how human movement can be increased after an intervention, it is not intended to show how physiological attributes will be affected. While PA is a complex and multidimensional behavior that interacts with other health related physiological aspects, including energy expenditure and physical fitness, at the most basic level, an individual is either engaging in PA or is sedentary.⁷⁰ Examples of PA include sports, exercise, household chores, and non-motorized transportation. It is important to note that while exercise is very similar to PA and is often mistakenly used as a synonymous term with physical activity, it should not be used interchangeably with PA. As indicated above, exercise is an example of PA since it is a type of PA that individuals participate in during their leisure time. The term “exercise” differs from the definition of PA in that exercise is “planned, structured, and consists of repetitive bodily movements done to improve or maintain 1 or more components of physical fitness”.⁷¹

Sedentary behavior should also be considered when assessing human movement. Sedentary behavior has previously been defined as engaging in activities that do not increase energy expenditure substantially above the resting level.⁷² Sedentary behavior can be categorized as nondiscretionary or discretionary.⁷⁰ Nondiscretionary sedentary pursuits include activities such as sitting during school hours or while in a car riding, whereas discretionary sedentary activities include sitting while watching television, reading, playing video games, or computer use during non-school-related hours. It is important to note that sedentary behavior is independent of moderate-to-vigorous physical activity behaviors, since individuals can simultaneously participate in moderate-to-vigorous PAs yet have high sedentary time.³⁹ Therefore, when designing a PA intervention, the intervention should be designed to specifically

increase moderate-to-vigorous PA time while simultaneously decreasing discretionary sedentary time, since having low moderate-to-vigorous PA levels and high sedentary levels are both individual risk factors to chronic diseases.³⁹ The PA intervention in this investigation was designed in an attempt to meet this goal.

CHAPTER 4: METHODS

Overview

The primary goal of this mixed methods investigation was to improve PA through the implementation of a 4-week, community-based PA intervention using CBPR methods. Specifically, the design process of the intervention involved using input (photographs/Photovoice) from underserved children residing in the Black Belt, recruiting community volunteers to be the actors and educators in the intervention videos, and testing the hypothesis that PA levels (measured by ActiGraph accelerometer wGT3X-BT, Pensacola, FL) will increase immediately following the PA intervention, while sedentary behavior will decrease. This quasi-experimental project was designed as a prospective PA intervention that involved 2 groups (intervention and comparison) of fifth graders (10-11 years) at a middle school located in the Black Belt during the fall semester of 2014. PA levels were examined prior to and immediately following the intervention.

Human Participants

Site Selection

Photovoice. A community resource center that hosted a government-funded summer and after-school program for children living in government-funded housing volunteered to partner in this project. The site was ideal as it hosted a large percentage of children who would attend the school where the PA intervention would be implemented, and it was within walking distance from the school and many of the participants' homes. Attendance was typically high for many of the center's programs. Additionally, a community resource center hosting an

after school/summer program was well suited to accommodate a Photovoice project as such a project requires a significant amount of time that otherwise might not have been available in a school setting.

Physical Activity Intervention. Two fifth grade classes at a middle school in the Black Belt participated in the PA intervention investigation. The school volunteered to participate after hearing about the project through the staff workers at the after-school program that hosted the Photovoice project. Having the intervention take place in a structured setting, such as a school, was necessary because teachers, the principal, and the support staff were needed to assist participants in adhering to the project's protocol (i.e. attending the video sessions, wearing the accelerometers, and completing the surveys).

Characteristics of Photovoice Participants

A total of 12 participants consisting of 3 females and 9 males, ages 9 to 13 years old, were recruited at a government-funded after-school program to participate in the Photovoice project. All participants were African American, and 100% were on free or discounted-priced lunch. Pre-adolescent children were selected for the project because they are more willing than older children to respond favorably to a PA intervention¹⁹ and so the intervention was designed for them. Also, previous studies have indicated that behavioral change may be easier to obtain among children than among teenagers or adults.¹⁹ Moreover, it has been reported that the selected age group would be old enough to use a camera and mature enough to communicate in a focus group.²⁵

Sample Size for Physical Activity Intervention

The sample size needed for the PA intervention was determined by using GPower V.3.0.10 Software. Sample size was determined for an independent sample t-test analysis and a

multiple regression analysis. Power was set at 0.8 and the alpha level was set at 0 .05. The effect size of 1.28 was calculated using a mean difference of 30.28 ± 8.8 minutes based on previous findings by Wilson et al.³ It was determined that a minimum sample of 22 participants (n=11 for each group, intervention and comparison) would be necessary to achieve 0.8 level of power.

This investigation satisfied this requirement by using 2 fifth grade classes at a middle school in the Black Belt. The hope was that the fifth graders who were involved in this intervention will continue the learned PA behaviors well beyond the time period of the study. Furthermore, this intervention was designed for pre-adolescent children in an effort to combat the previously-reported PA percentage decline of 1.8-2.7% per year in boys, and 2.6% to 7.4% per year in girls.⁶⁷ The 2 fifth grade classes that participated in this investigation were chosen by the participation school's principal. Group assignments were randomly assigned by a coin toss. The total number of participants in the comparison class was 19 (n=19) and the total in the intervention class was 18 (n=18). Two participants in the comparison class failed to turn in their accelerometers at the conclusion of the investigation which decreased the comparison sample to n=17, still an adequate sample based on the sample size calculations above. Therefore, the sample size achieved sufficient power allowing for differences in the dependent variables to be detected if they do indeed exist.

Using Participant Input when Designing Physical Activity Intervention

The intervention design process described below included photographs obtained from the Photovoice project, and videos designed by local community volunteers who served as actors and educators.

Photovoice Methods

Prior to the beginning the Photovoice project, ethical approval of the study methods was obtained by the Non-Medical Institutional Review Board at The University of Alabama to ensure that the methods conform to the University's policies and procedures regarding scientific research using human subjects. Consent and assent forms were sent home with potential participant children (**Appendix 1**). Informed consent was obtained from the participants' parents and assent was obtained from the children for all those who participated in the project. Photo releases signed by parents of the participants were also obtained. Fourteen consent forms were distributed and 12 were returned.

Equipment. Twenty Vivitar Vivi Cam 46 point shoot digital cameras, with 8-GB memory cards, and camera batteries were issued to participants. Instead of obtaining disposable cameras, digital cameras were purchased because they were reasonably priced (\$25.36 including camera, memory card, and batteries), they permitted the participants to take a large number of easily-processed data photographs, and the participants were allowed to keep the cameras after the project was completed as an incentive to participate and follow directions. Additionally, participants were given draw-string backpacks to carry their cameras.

The Photovoice Process. This project followed the Photovoice methods described by Wang et al.³¹ The participants received a Photovoice training session, they documented their PA experiences through photography over a 3-day period, and they participated in a photo discussion session using a modified version of the SHOWeD technique.⁷³

Prior to the start of the project, the primary investigator (PI) met with the director of the after-school/summer program and a member of the teaching staff, both of whom would join the PI as facilitators of the Photovoice project. During this meeting, the methods and purpose of the

Photovoice project were discussed. The 2 community members were enthusiastic about becoming partners and facilitators of the project and they offered helpful advice both on scheduling and on strategies for working with the children.

Over the course of the Photovoice project, the children and facilitators met together on 5 separate occasions over a 15-day period. While a review by Catalani et al. of previous Photovoice projects reported that most facilitators met with participants at least 2 times, more meetings were needed for this project because the participants were children and they needed additional assistance in evaluating their photos.⁷⁴ At the first meeting, the PI, with the assistance of the other 2 facilitators, introduced Photovoice to the children and permission packets were distributed. Also, an important goal of the first meeting was to establish rapport and trust between the potential participants and the PI.

Training Session. Five days after the initial meeting, a Photovoice training session was held for the 12 participants who returned their completed permission packets. Topics that were discussed included the Photovoice process, the project's goals, picture taking guidelines, and camera rules. Ethical issues associated with using a camera were also discussed. Taking appropriate photographs of "positive things" was emphasized, and taking offensive photographs was prohibited. It was also explained that only those involved in the Photovoice project could be included in the photos. That meant that the participants would have to ask others to use the camera to take photographs of the participant when the participant wanted to be in the photograph. Another topic discussed was the need to consider personal safety when taking photographs (e.g. participants were instructed not to photograph people, things, or events that would jeopardize their safety or to take photographs in unsafe areas). Specifically, participants were instructed to take photographs that showed the activities they engage in such as games or

sports they like to play and the places where they are active. Examples of photographs taken from previous Photovoice projects were shown to the participants so that they would have a better understanding of their assignment. The children were also told that they would be asked to discuss 2 or 3 of their photos in a focus group, and that the photos they selected would be printed for them to keep. Three main camera rules were also explained: (1) The child was to keep the camera in the draw-string bag on their backs when not in use; (2) The child was to let only trusted people take their photograph and (3) The child was not to delete any pictures. The participants then received their digital cameras, basic instructions on how to use them, and tips for taking successful photographs, i.e. holding the camera steady to avoid blurry pictures. The participants then tried out their cameras by taking pictures of each other. The training session lasted 40 minutes.

Photo-discussion session/ Participatory Analysis. Two days following the training session and the distribution of the cameras, participants were given the opportunity to meet with a facilitator to discuss the photographs they had taken to date, and at that time they could inform the facilitator which photographs they would like to discuss during the focus group, or they could wait and select their photographs the following day. On the third day, the cameras were picked up for processing and data transfer. At this time, a facilitator met with each participant to discuss which photos he or she wanted to share during the focus group. The participant's SD card was inserted into a laptop computer and participants selected 2 photographs and completed a worksheet about both. The questions on the worksheet were a modification of the SHOWeD method⁷³ and were as follows: (1) "What do you see in this photograph?"; (2) "What is happening in the photograph?" and (3) "How does this relate to PA?" Facilitators helped participants understand the questions on the worksheet when asked.

Six days after the cameras were picked up for processing, 2 separate focus groups were conducted wherein each participant received their printed photos with their completed worksheet (**Illustration 4.1**) and each was asked to contribute to the participatory analysis. The 2 focus groups consisted of 6 participants as previous research indicated that smaller focus groups tended to be more successful when children were the participants.⁷⁵ This participatory analysis involved 3 steps: (1) Selecting the photographs that most accurately reflected the participant's physical activities; (2) Contextualizing the photographs by providing a verbal description and (3) Codifying the photographs by identifying the themes that emerged. Step 1 took place 6 days previously when participants selected the 2 or 3 photographs they wanted to share with the focus group, and steps 2 and 3 were accomplished collectively during the focus group. Each focus group was facilitated by the PI and the 2 after-school program members.

Illus 4.1. Example of Photovoice Worksheet Incorporating SHOWeD Method

Camera# 11

Photovoice Activity



What do you see in this photograph?

I see open space where sometimes we go to play and where the car pool is parked we play kickball, base ball, and foot ball.

What is happening in the photograph?

The wind is blowing through the trees. No one is out now cause they love basket- ball. we play kick ball, free tag, foot ball, base ball, and tag. we have to ask an adult. we make us base.

How does this relate to physical activity?

These are all activities w do.

Selecting and Contextualizing. The focus group began with a review by the PI of the project objectives and the meeting agenda. Participants participated in a “show and tell” activity during which each participant discussed their 2 selected photographs and answered the 3 questions derived from the SHOWeD method that was previously discussed. The worksheets that the participants completed 6 days prior minimized the shyness barrier that often arises when children are asked to speak in front of a group. If the child preferred, he or she was allowed to read verbatim from their SHOWeD worksheet they previously completed when answering the focus group questions.

Codifying. As participants were sharing their photographs, they were also encouraged to think about reoccurring patterns or themes. When participants identified a pattern or theme, it was written on the chalkboard. A pattern or theme could be a similar PA that many of the participants engaged in and photographed, or a PA barrier that came up during the discussion that many had experienced. At the conclusion of each focus group, the PI asked a participant to read aloud all the patterns or themes that the group had identified to ensure there was a group consensus regarding the list. The PI then gave participants the opportunity to modify or clarify the patterns or themes that were listed. The 2 community facilitators assisted the participants in identifying the patterns and themes, and they also helped encourage conversation among the participants. Once the 2 focus groups were finished, all participants were brought back together in 1 group and all patterns and themes were reviewed one last time to ensure there was a group consensus on the final list.

At the conclusion of the project, a music video displaying all the selected photos, including quotes from the SHOWeD worksheet, was shown to the participants as a way of disseminating the results of the project to them. Several data sources were triangulated to

confirm the themes that emerged from the focus group discussions. Data sources used to cross-check results included written transcripts from the audio recording of the focus group discussions, the participant photographs, and participants' written reflections from the work sheet.

Design of the Video Intervention

Theoretical Framework. The video intervention was guided by the Transtheoretical Model (TTM) of behavior change.⁷⁶ TTM hypothesizes that individuals engage in regular PA by advancing through 5 stages, namely precontemplation (being inactive and not planning to change), contemplation (being inactive but open to change), preparation (engaging in irregular activity but intending to become more active), action (being active for less than 6 months), and maintenance (engaging in regular activity for more than 6 months).⁴⁰ Specifically, the intervention introduced cognitive and behavioral strategies, such as social support, goal setting, role modeling, and positive attitudes to facilitate one's progress through the 5 TTM stages of behavior change.⁴⁰ In addition, the intervention sought to improve PA behavior outcomes by improving the psychosocial constructs that relate to engaging in PA: self-efficacy, knowledge, attitudes, beliefs, and skills.⁶⁷ **Table 4.1** depicts how both the TTM of behavior change and psychosocial constructs were incorporated into the design of the community-based PA intervention.

Table 4.1. Overview of the Intervention Videos and how the Transtheoretical Model (TTM) of Behavior Change and Psychosocial Constructs were Incorporated in the Intervention

TTM stage focus	Psychosocial Constructs of Physical Activity included in Videos			
	Self-Efficacy	Attitudes/ Beliefs	Knowledge	Skills
Week 1: Let's Get Started TTM Stage: Contemplation/ Overcoming Precontemplation	-Make a commitment to being more physically active	-Conclude that physical activity should be enjoyable for everyone - Identify barriers of physical activity	-Identify the amount of PA children need to achieve health benefits	-Make PA goals using the SMART strategy -List examples of PA daily cues and how to make PA more enjoyable - List strategies for overcoming barriers
Week 2: How are you doing? TTM Stage: Preparation	-Understand that everyone can meet the recommended PA guidelines	-Believe that being active is self-rewarding and beneficial to health	-Describe the benefits of physical activity -Define aerobic activity and state how many minutes of aerobic activity one should engage in daily	-List examples of aerobic activities at varying intensities - Describe positive self-talk
Week 3: Keep it going TTM Stage: Action	-Take ownership in selecting a variety of PA activities in which to participate	-Believe that PA can help one's self-esteem	-Define bone-strengthening activity and state how many minutes of bone-strengthening activity participants should engage in daily	-List examples of bone-strengthening activities at varying intensities -Generate coping strategies for making effective PA behavior changes ³
Week 4: Commitment TTM Stage: Action/ (setting foundation for Maintenance)	-Make a long term commitment to an active lifestyle	-Believe that PA is fun to do with friends and family	-Define muscle-strengthening activity and the amount of muscle-strengthening activity participants need	-List examples of muscle-strengthening activities at varying intensities

The 2008 Physical Activity Guidelines for Americans served as the source for the PA educational content in the videos.¹ A list of content goals (**Table 4.2**) was derived from this source and became the content outline for the drafting of the video scripts. Other goals sought to be achieved during the development of the videos were: (1) to include the input and participation of several community-partners in an effort to improve the cultural relevance and effectiveness of the videos; (2) to make videos that were conducive to a school environment and engaging to an audience of children; (3) to make videos that took into account the places and settings in which PA occurred among participants while highlighting other available facilities that were conducive to PA; and, (4) to make videos that could be adapted or modified for broader use.

Table 4.2. Content Goals for Physical Activity Video Intervention Based on the 2008 Physical Activity Guidelines for Americans

Content Goals for the PA Video Intervention based on the 2008 Physical Activity Guidelines for Americans
(1) Sought to increase participants' progression toward achieving 60 minutes of moderate to vigorous exercise every day.
(2) Highlighted other key points such as persons who are inactive should gradually increase their activity and the 60 minutes do not have to be achieved all at once but can be broken up into short increments at a time.
(3) Highlighted the importance of physical activity in decreasing the risk of obesity and obesity related diseases.
(4) Highlighted the importance of physical activity in improving health conditions other than obesity such as cardiorespiratory fitness, bone health, and muscular strength, while including specific examples of how to achieve these health benefits. Other health benefits of physical activity were also mentioned including reduced rates of cancer and improved mental health.
(5) Taught behavioral strategies such as individualized goal setting, using activity reminder cues, activity tracking, problem solving around a barrier to activity change, and positive self-talk.

Inter-related components of Intervention. The community-based PA video intervention was composed of several inter-related components. Each of these components is described below.

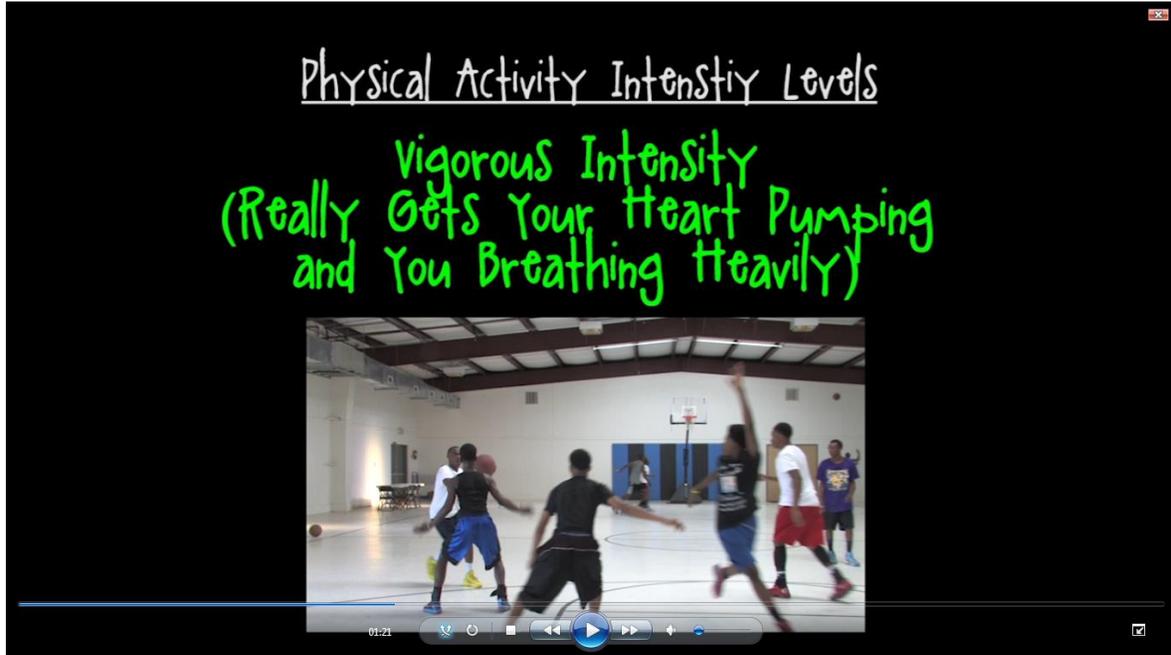
1. CBPR component. The CBPR process involves community and academic partners working together to design and implement effective interventions. During the design of the intervention, the PI worked with 2 key partners in the community. One partner was the program director of a summer program in the community, and the other was a youth program coordinator for the community where the intervention would take place. Nine key principles of CBPR have been identified that lead to successful partnerships and interventions.⁷⁷ During the design of the video intervention, all CBPR principles were adhered to and are outlined in **Table 4.3**. One principle in particular that was followed that should be highlighted here is Principle 3: “CBPR facilitates collaborative, equitable involvement of all partners in all phases of the research.” A number of community partners were actively involved during all phases of this investigation. During the intervention design phase of the project, the 2 community partners suggested that the intervention be a series of videos, they recruited all video actor participants who themselves were community members, they distributed and collected the consent and release forms, they helped identify physical activities that could be demonstrated in the videos, they provided the equipment for the actors to perform those activities, they helped direct the actors during the filming of the intervention, and 1 community partner volunteered to be an actor in the video. The community actors who participated in the videos included a coach/school teacher, a local nurse, and local high school athletes. After reviewing the literature, it is believed that the video intervention developed during this investigation is the first PA intervention in which content was delivered by community members rather than researchers or externally-

trained personnel. **Illustration 4.2** is a scene from an intervention video showing community actor/educator volunteers. Additionally, results from the Photovoice project were used in designing the PA video intervention. The physical activities that were depicted in the photographs and discussed during the Photovoice focus group guided the decisions on which physical activities to include in the intervention. Actual participant Photovoice photographs were also included in the intervention videos to illustrate various types and intensities of PA. **Illustration 4.3** shows an example of how Photovoice images were used in the intervention videos.

Table 4.3. The Intervention’s Adherence to the 9 CBPR Principles

CBPR core principles	Intervention Adherence
(1) Acknowledges community as a unit of identity	<ul style="list-style-type: none"> - Community was identified as those residing in Aliceville - Two community partners informed the PI about the characteristics of the children attending the school who would participate in the intervention
(2) Builds on strength and resources within the community	<ul style="list-style-type: none"> - Community members served as the actors and educators in the video intervention - Majority of filming took place within the community at locations where PA could occur
(3) Facilitates a collaborative, equitable partnership in all phases of research involving an empowering and power-sharing process that attends to social inequalities	<ul style="list-style-type: none"> - The 2 community partners suggested that the intervention be a series of videos, recruited all video actor participants, distributed and collected permission forms, helped identify physical activities to be included in videos, provided PA equipment for the actors, helped direct the actors during filming, and one community partner volunteered to be an actor in the video
(4) Fosters co-learning and capacity building among all partners	<ul style="list-style-type: none"> - The community partners taught the PI about the culture of the community and the PI shared PA knowledge
(5) Integrates and achieves a balance between knowledge generation and intervention for the mutual benefit of all partners	<ul style="list-style-type: none"> -Community Members were empowered by participating in the design of the PA intervention - This intervention can serve as a pilot intervention for future interventions seeking to increase PA in Black Belt Communities
(6) Focuses on the local relevance of public health problems and on ecological perspectives that attend to the multiple determinants of health	<ul style="list-style-type: none"> - This intervention sought to improve the PA behavior of children. Poor PA is a risk factor for obesity, and obesity and obesity related diseases are highly prevalent in Black Belt communities
(7) Involves systems developing using a cyclical and iterative process	<ul style="list-style-type: none"> - During video filming, scenes would be repeated until the community partners, PI, and actors were satisfied with the take
(8) Disseminates results to all partners and involves them in the wider dissemination of results	<ul style="list-style-type: none"> - The intervention videos were shown to the community partners after editing for their approval - Once data analysis from the intervention is complete, the community partners and PI will decided how results will be disseminated to the community
(9) Involves a long-term process and commitment to sustainability	<ul style="list-style-type: none"> - Similar community-based interventions will be replicated in Black Belt communities.

Illus 4.2. Scene from an Intervention Video Showing Local High School Actor Volunteers



Illus 4.3. Scene from an Intervention Video Showing a Photovoice Photograph taken by a Participant



2. Peer influences/ Role modeling. The principal narrator in the videos was a star college athlete who formerly played basketball at Stanford University, and who is currently serving as an assistant basketball coach at the University of Alabama. Also, as mentioned previously, local high school athletes were depicted in the videos. Previous studies have shown PA and self-efficacy improvements among participants when interventions are delivered by a peer or role model, because these peer or role models facilitate attention, retention, and motivation of the participants.^{78,79} Under Social Cognitive Theory principles, individuals tend to learn behaviors by observing and imitating others, and children especially are likely to imitate peers or role models.⁸⁰

3. Checking for Understanding. At the end of each video, questions appeared in the video that were designed to check the participant's understanding of the content that had been presented. The facilitator paused the video to allow the participants a brief time to discuss the questions. After participants volunteered their answers, the video was resumed and the correct answers and explanations appeared in the video. Review questions also appeared at the beginning of successive videos that were shown on Monday of each of the 4 weeks to help ensure retention of information learned.

4. Technology/ Professionalism of the video. In an effort to make the videos appealing to children, the videos included attractive graphics, numerous transitions, and energetic music throughout. To ensure high quality videos, a canon HD Professional Video Recorder XL H1A (Canon, U.S.A.) was used for filming, and Adobe Premiere Pro CC (Adobe Systems Incorporated, San Jose, CA), a professional video editing software application, was used for editing.

5. Duration of videos/ repetition. It has been suggested that a child's attention span is a mere 10-15 min.⁶² Hence, all videos were designed to be less than 10 minutes long. Videos ranged from 2:43 minutes to 8:11 minutes long with a mean time of 5:07(±2) minutes.

Setting, Recruitment procedures, and Participants. Prior to filming the PA intervention videos, all video actor participants submitted a video release and authorization form. It was not necessary to obtain Institutional Review Board informed consent because the volunteer actors were not measured, and it was not necessary for them to undergo ethics training as they were not investigators for this project. If a video participant was under the age of 18, a signature of a parent or legal guardian was also obtained on the release and authorization form. Video actor volunteers were recruited by community members partnering with the PI, and the majority of those recruited were participants in a summer program at the resource center in the Black Belt region of Alabama. The videos were shot at 3 locations, namely, the resource center, a local public park, and at the University of Alabama (scenes with the former college athlete only). It was important to include in the videos those places and settings that were familiar and accessible to the participants so that the videos would be perceived as being more relevant and applicable to them.

Logistics, Design Strategies, and Timeline

Logistics. When creating a PA video intervention that uses a number of community members as the educators and actors, it is necessary to plan in detail the shooting of the video so that the filming is done as efficiently and as orderly as possible. Video content outlines (**Table 4.1**) were written first followed by detailed scripts for all the videos (**Appendix 2**). The scripts used a standard screenplay format⁸¹ which served as a guide during editing. To save time, when filming occurred, rather than filming the video scenes in chronological or

sequential order, a common filming technique was used wherein the actor would film all of their lines and scenes in one take. Later, the videos were edited to place the scenes in proper order.

Design Strategy: Volunteer Choice. To make the filming process more comfortable for the volunteers, they were given the choice to be filmed by themselves or with a friend, or they could choose only to have their voice recorded. Also, the volunteers were given choices about which scenes they would appear in. Specifically, before a volunteer committed to being filmed, they were allowed to first read through the script on the teleprompters the PI had available. If the volunteer needed further information about the content in the script, the PI would educate the volunteer on the topic and answer any questions about it. The volunteer was encouraged to explain the content in their own words during filming and to include personal examples that might apply. For example, the community volunteer who defined PA in Video 1 also talked about his favorite physical activities even though those activities were not included in the script on the teleprompter. Alternatively, the volunteer could read the teleprompter verbatim if that was their preference.

Timeline. The filming took place over 3 days and consisted of 10 hours of filming time. Video editing took approximately 50 hours. The community-based PA intervention consisted of 8 videos that were from 2 to 8 minutes in length. The videos were shown twice a week on a Monday and Friday over a successive 4 week period at the beginning of the participants' physical education period. Topics for each week were based on a previous 4-week PA intervention⁴⁰ that essentially followed the TTM of behavior change. The topics were "Let's get started", "How are you doing", "Keep it going", and "Commitment and Confidence"(Table 4.1).

Evaluation Methods. It was observed that all participants appeared to be engaged during the videos as they looked excited while watching the videos, they gave correct answers to the review questions, and no disciplinary issues arose. Also, the video volunteers appeared to be empowered by their roles in the videos based on their eagerness to watch the videos and their interest in the outcomes of the project. One video volunteer even came during an intervention day to see the participants' reactions to the videos.

Physical Activity Intervention

See **Appendix 3** for a detailed time table of the investigation. An information packet including consent and assent forms (**Appendix 1**), and instructions on how to wear the accelerometer (**Appendix 4**), was sent home with children. Informed consent was obtained from the participants' parents and assent was obtained from the children for all those who participated in the project. Since this investigation sought to generalize the results to healthy children, parents were instructed on the informed consent form (**Appendix 1**) to identify any health conditions limiting their child's physical activity participation. Depending on the severity of the health condition, some children may not have been eligible to participate in the study. However, after reviewing the returned information packets it was determined that all children were eligible to participate. Five parents included health conditions on the returned informed consent form. Conditions included were asthma, diabetes, and 1 parent indicated her child had a heart defibrillator and was concerned that the accelerometer would interfere. All conditions were cleared by the school nurse or a pediatrician. Notes were sent home to these parents informing them that their child had been cleared for participation in the study if they so choose.

A day before (8 days before for the comparison group) the 4-week, community-based PA intervention, the PI collected several measurements from children in both the comparison and

intervention groups that served as baseline data (see **Appendix 5** for assessment schedule).

Height (cm) and weight (kg) were measured by the school nurse using a standard balance beam height and weight scale (Healthometer, model 402EXP).

Weight was measured first. Participants removed shoes and stood on the scale looking straight ahead with body weight evenly distributed between both feet.⁸² Weight was recorded to the nearest 1 kg. Height was then assessed. Participants stood straight with weight evenly distributed between feet and the head positioned in the Frankfort Horizontal Plane. Arms hung freely by the trunk while the palms faced the thighs.⁸² Height was recorded to the nearest 0.5 centimeter. Height and weight were measured behind a screen so the participant's privacy was protected. BMI was calculated from the participant's weight and height using a standard calculator. The formula used to calculate BMI was $\text{weight (kg)/height (m)}^2$.⁸³

Six days before and 5 days following the intervention, PA behavior was assessed in the intervention group over 6 days (see **Appendix 5** for assessment schedule). Because the number of accelerometers were limited, PA was assessed in the comparison group exactly 1 week prior (Wednesday) to the intervention group for both pre- and post- assessments. On the Wednesday before and after the 4-week intervention, participants in the intervention group received the accelerometer to wear and they were instructed to also wear the accelerometer on Thursday, Friday, Saturday, Sunday, and to school on Monday (see outline of instructions in **Appendix 1**). The PI verbally instructed the participants on how to wear the accelerometer. Written instructions on how the accelerometer should be worn was also included in the initial information packet for parents (see **Appendix 4**). The comparison group was also instructed to wear the accelerometer on Wednesday, Thursday, Friday, Saturday, Sunday, and Monday. The

comparison group was told that the study that they were being asked to participate in was to examine PA levels in children.

Participants were instructed to wear the accelerometer, which was to be attached to a furnished belt, around their waist. They could wear the belt underneath or on top of their clothing (but the school principal instructed the belt had to be worn under their uniform shirt), and it should be tight enough so that the accelerometer does not move on the belt when they are active. Participants were instructed to put the belt on in the morning right after they get out of bed or after taking a morning bath or shower. Participants were told not to submerge the belt in water (swimming, bathing, etc.), and to take it off immediately before the participant goes to bed. Finally, participants were instructed not to let anyone else wear the belt. If a child forgot their belt, guardians of the children were contacted by phone by the child or homeroom teacher. In addition, the classroom teacher checked for belts each morning as children entered the classroom and reminded students daily to wear their PA devices.

At the end of the PA period assessment, the PI returned to the classroom to remove and collect the accelerometers. The data file from the accelerometers were later uploaded to an encrypted, limited access, password protected computer database. Once accelerometers were collected, the participants completed a survey consisting of 31 multiple-choice questions that addressed the psychosocial constructs of interest (**Appendix 6**). Two questions on the survey asked about the participant's involvement in school sports, and whether anything (such as an illness) prevented the participant from being physically active the previous week while they wore the accelerometer (see **Appendix 6**). The survey administrator read aloud the directions that advised the participants that they should answer the questions as honestly as they could, that they could skip over any question they did not want to answer, and that they could ask questions when

something was unclear to them. The survey administrator then read each of the questions and answer choices as students completed the survey. To make the survey age appropriate, emoticons were included by the answer choices to assist the participant in understanding the answers. The survey took approximately 20 minutes to complete (**Appendix 6**).

The Tuesday following the baseline assessment served as the first day of the 4-week community-based intervention. The 4-week, community-based PA video intervention sessions occurred every Monday and Friday (except the first intervention day occurred on Tuesday because of a time constraint collecting baseline data) for 4 weeks during school hours. The intervention took place in an adjacent room to the gymnasium at the beginning of the class's Physical Education (PE) period. During this time, the comparison class attended PE. The first 15 minutes of PE consisted of sitting on the bleachers for roll call and receiving the day's instructions, therefore, it is assumed that the intervention group did not miss important activity time. Once the intervention video was over, the class then resumed activities with the other class in PE. The decision on when the intervention occurred was decided by the school principal. The 4-week community-based video intervention encompassing the Photovoice results was designed 1½ months prior to the intervention and was described in detail previously in this section. High adherence to the 4-week web based intervention was achieved since the intervention was shown during school hours as a class activity. In order to measure adherence to the intervention, class attendance was taken each day before the intervention was shown. Students who were absent made up the missed videos on the next intervention day. One hundred percent of the class watched all 8 of the intervention videos.

On the Wednesday immediately following the intervention, the PI returned to the classroom to once again distribute the accelerometers to the students. Participants were

instructed as previously to wear the accelerometer for the remainder of the day on Wednesday, all day Thursday through Sunday, and to school on Monday. On Monday, the PI returned to the classroom and collected the accelerometers. On the previous Wednesday, the comparison group was given the accelerometers to wear until the PI returned the following Monday to collect the accelerometers.

Measures

Physical Activity Measure

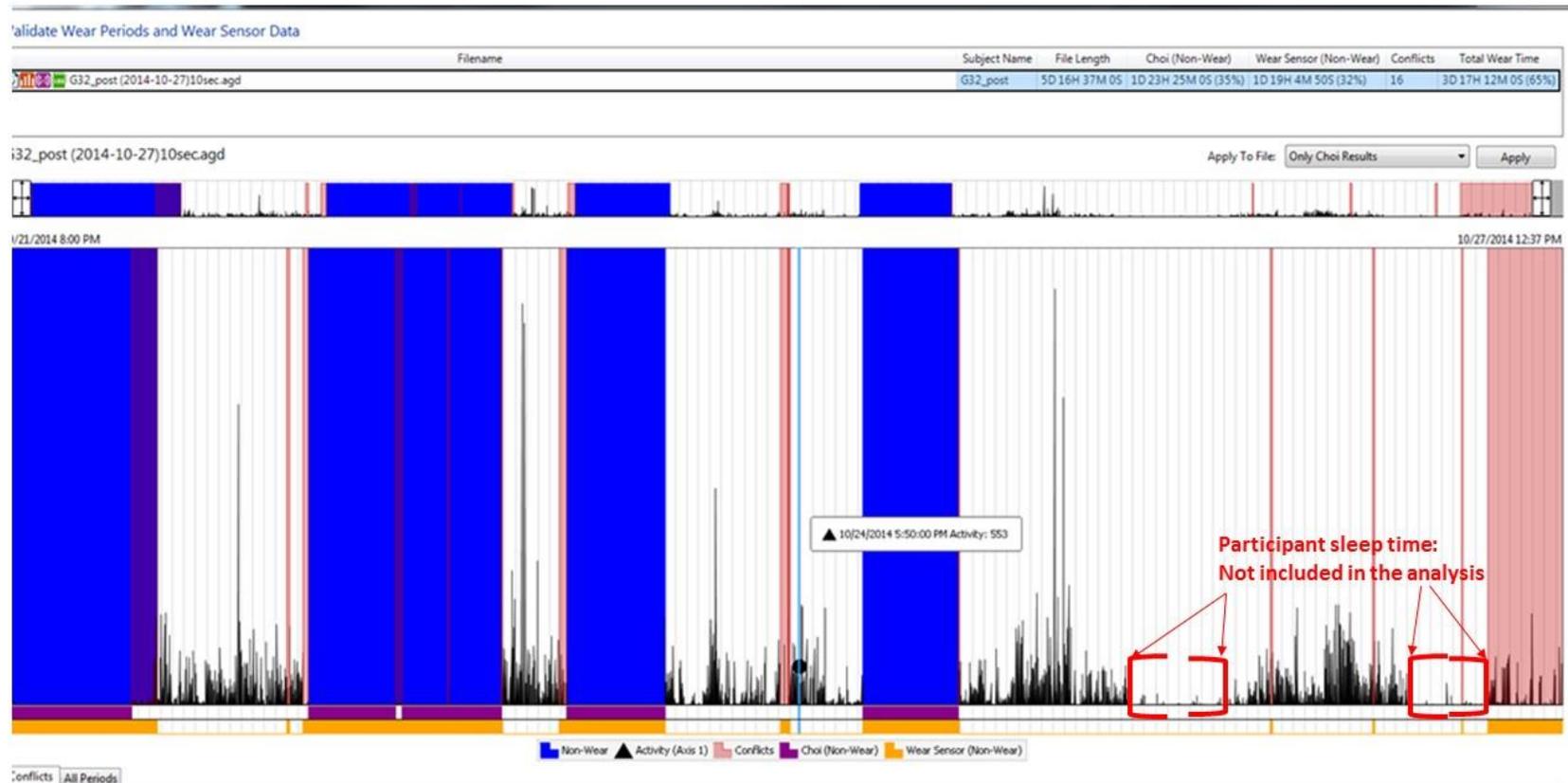
Accelerometers are currently considered the criterion method for measuring free living activity and correlate adequately to activity related energy expenditures.²⁴ The accelerometer (ActiGraph wGT3X-BT, Pensacola, Florida) measures accelerations produced by body movement. Accelerometers use piezoelectric transducers and microprocessors that convert recorded accelerations to a quantifiable digital signal referred to as “counts per minute”.³⁵ Before accelerometers were given to participants, each device was initialized using the Actilife v6.11.4 (Pensacola, FL) software. The sampling rate of the device was set to the recommended setting of 30 HZ⁸⁴ along with the start and end recording date. While an ID number was on the back of each device, the ID number was also entered into the device electronically during initialization so data could later be downloaded anonymously.

The data available from the device consists of a raw data file and a file consisting of raw data converted to activity minutes were saved for each participant. The raw data conversion to a count was dependent on the PI’s defined interval of time that was set, also referred to as the epoch. Because younger children engage in PA in frequent bursts of short durations, a recommended 10-sec epoch was used for the conversion process.^{85,86} Also, while the accelerometer had the capability to record counts for 3 axes, 1 axis measuring vertical movement was selected for conversion purposes as this is the number of axis used in the majority of

accelerometer calibration studies.^{87,88} While it seems that setting the accelerometer setting to the triaxial mode would capture more of the child participant's PA, studies indicate that there are no differences in capturing PA measures when using triaxial or uniaxial settings. Most calibration studies used uniaxial modes simply because this was the only mode available at the time of the study.⁸⁷ Therefore, for comparison purposes only the recommended axis was used in this investigation.

Daily time in the data was classified into accelerometer wear and non-wear intervals. Only accelerometer wear time would be included in the analysis. The wear time criteria set forth by Choi et al. was used for this investigation which included: The minimum length for consecutive 0 counts to be considered a nonwear time interval was 90 minutes; The minimum length of up/down-stream time window for consecutive zero counts required before and after the artifactual movement interval to be considered a nonwear time interval was 30 minutes; and the maximum length of time interval allowed for the artifactual nonzero counts during a nonwear time interval was 2 minutes.⁸⁹ While the wear time algorithm by Choi et al. was automatically applied using the Actilife Software, the PI cross-checked each file manually to ensure no spurious output by the monitor was included as a wear time (as such spurious counts can occur even while the monitor is stationary on a desk).⁸⁴ Additionally, while participants were instructed to wear the monitor only during wake time, it was evident that some participants wore the monitors during sleep. For these participants, wear time graphs were observed and based on previous day wear times, it was estimated when participants went to sleep and this time was not included in the analyses. An example of these charts and non-wear sleep times is displayed in **Illustration 4.4.**

Illus 4.4. Wear-time Graph Showing the Detection of Sleep-time



Sleep-times were estimated based on previous wear days and were not included in the analysis.

For data recording purposes, a “day” followed previous study recommendations of using the 70/80 rule, where a day was defined as the period during which at least 70% of the study population had recorded accelerometer data, and 80% of that observed period constituted a minimal day for inclusion in data analysis.⁸⁵ **Appendix 7** displays the wear time for each participant. To be included in the primary outcome of average minutes of MVPA or sedentary behavior per day, each day had to meet the 70/80 criteria. If individual days did not meet the above criteria, these days were not included in the overall average calculation of MVPA minutes and sedentary minutes per day. Validating a wear day was critical for not underestimating the time spent in MVPA or sedentary behavior. **Table 4.4** shows the comparison of non-validated wear time values compared to wear time validated values. As evidenced by this table, including only wear time validated days can more accurately depict the physical activity levels of an individual.

Table 4.4. Comparison of Non-validated and Validated Times

Group		N	Minimum	Maximum	Mean	Std. Deviation	
Intervention	Valid MVPA pre	18	9.87	63.27	28.46	13.49	
	Invalid MVPA Pre	18	8.27	44.37	24.86	9.12	
	Valid MVPA post	18	8.50	78.50	29.99	18.48	
	Invalid MVPA Post	18	8.50	58.94	23.91	14.32	
	Valid Sedentary pre	18	324.90	622.80	469.25	69.52	
	Invalid Sedentary pre	18	251.28	536.37	451.85	82.59	
	Valid Sedentary post	18	249.50	637.08	483.56	100.05	
	Invalid Sedentary post	18	251.28	536.37	451.85	82.59	
	Comparison	Valid MVPA pre	16	9.25	77.20	23.36	17.66
		Invalid MVPA Pre	17	7.00	77.20	19.97	17.81
		Valid MVPA post	16	6.30	43.10	18.20	12.07
		Invalid MVPA Post	17	5.83	35.37	15.52	9.21
Valid Sedentary pre		16	374.08	633.33	506.39	84.41	
Invalid Sedentary pre		17	253.63	539.10	416.67	87.64	
Valid Sedentary post	17	407.70	689.80	523.55	97.83		
Invalid Sedentary post	17	364.56	645.33	469.87	84.57		

MVPA, moderate to vigorous physical activity

For this investigation, physical activity was recorded as the average amount of minutes spent in each activity category during a day. The count ranges for each activity category were as follows: sedentary (1 metabolic equivalent (MET) (5.7 mL/kg/min): 0-100), light (>1-<4 METs:101-3580), moderate (4-<6 METs: 3581-6129), vigorous (≥ 6 METs: 6130- ∞).⁸⁸ To determine these levels, Mattocks et al. measured oxygen consumption while children (12 years old) performed various activities which included walking, running, playing catch, playing hopscotch, and coloring.⁸⁸ While children performed these activities, PA was also measured with an ActiGraph accelerometer. MET values were then determined by examining the relationship between the accelerometer counts and oxygen consumption using an average body weight of 29.8 kg.⁸⁸

Compliance/ Adherence. Participant compliance in wearing the accelerometer was critical for obtaining accurate PA measurements. One compliance strategy that was used was having the classroom teacher remind her students each day to wear the accelerometers during the PA assessment time. Additionally, parents of the participants were contacted when participants forgot their accelerometers either by the participant, the teacher, or the principal. In order to decrease the likelihood of misplaced accelerometers, incentives were offered, if participants returned their accelerometer after each wear period, they received an Alabama football poster and an Alabama t-shirt, respectively.

Survey Measures

Psychosocial Constructs Survey Instrument. Psychosocial data were collected using a 5-point Likert-type scale or a 10-point percentage scale (see **Appendix 6**). Questions relating to the same psychosocial factor were grouped together in categories. All ordinal values in a category were summed creating a scale, thereby treating the combination of psychosocial determinant variables as a continuous variable.

Self-efficacy. Self-efficacy is defined as an individual's confidence that he or she can change or maintain a certain action or behavior.⁶⁸ Perceived self-efficacy in relation to PA and this investigation means that an individual not only intends to become more physically active, but that he or she actually believes they have the capability to do so. Self-efficacy has been shown to positively correlate with PA behavior, and may also predict weekly PA participation of children although results among studies are conflicting.⁶⁹ In this investigation, a modified version of McAuley's Self-Efficacy Scale was used for the participating children.⁹⁰ McAuley's Self-Efficacy scale consists of 9 questions asking participants how confident they are that they can do 10, 30, and 60 minutes of light, moderate, and vigorous intensity activity over 5 or more days of the week. Participants respond to each item using a 10-point scale ranging from 0% (not at all confident) to 100% (completely confident).⁹⁰ In this investigation, the number of questions were reduced to 3 that questioned participants about their confidence in engaging in physical activities in various intensities for a duration of 60 minutes. The number of questions were reduced because other constructs were being measured in the survey at the same time and care had to be taken to ensure that the survey was not too long or too time consuming, and here the PI was only interested in the participants' confidence in meeting the 60-minute recommended guideline. Accumulative sums were calculated from all item responses and individuals scores ranged from 0-300 with a higher score indicative of greater self-efficacy.

Beliefs. Beliefs about PA behavior include both the perceived/learned benefits in adopting a physically active lifestyle and the perceived/learned barriers that could hinder a physically active lifestyle.⁶⁷ Examples of perceived/learned benefits that can bolster a child's tendency to engage in PA include the participant's belief that PA improves self-esteem, that PA is good for their health, and that PA is fun to do with friends. Examples of perceived/learned

barriers that can hinder a child's tendency to engage in PA include lack of interest, unfavorable weather, lack of access to appropriate facilities, or lack of appropriate equipment.⁶⁷ Nine questions that assessed the participants' beliefs about PA were borrowed from the PACE Adolescent Psychosocial Scale by Norman et al.⁹¹ Norman et al. categorized belief questions into either "pro" or "con" questions, and questions were used to ascertain what participants perceived as positive and negative aspects of participating in PA. The Adolescent Psychosocial Scale pro and con questions had a reliability coefficient of 0.74 (0.51, 0.86) and 0.86 (0.74, 0.92), respectively.⁹¹

Attitudes. Attitudes about PA, either positive or negative, were also addressed in the survey. In general, children have been shown to participate in PA when they find PA enjoyable.^{3,67} A previous study by Theodorakis et al. demonstrated how favorable attitudes toward PA positively correlate with PA behavior.³⁷ Similar to the self-efficacy component, the number of questions relating to the attitudes component were limited to 3, and these 3 questions were borrowed from the PACE Adolescent Psychosocial Scale. Two questions came from PACE items that were designed to reveal feelings people may have when making a behavior change (Reliability coefficient= 0.75(.53-.87), and the third question came from the PACE's single item measure that was designed to reveal a participant's level of enjoyment of PA (Reliability coefficient= 0.43 (.15-.65)).⁹¹

Skills. Skills, another important construct in assessing the potential for PA behavior in children, are sometime referred to in the literature as change strategies, or self-efficacy behavioral skills.^{3,91} Children are likely to become more physically active when they have the behavioral skills to be physically active. Examples of behavioral skills that were assessed in the survey were whether participants tracked the amount of their PA, whether they

had coping strategies for dealing with PA barriers, and whether they set PA goals. Six questions included in the survey came from PACE items that were designed to reveal behavioral skills that helped or would help participants change their PA (Reliability coefficient= 0.75(.53-.87)).⁹¹

Knowledge. The participants' knowledge about PA was the final construct accessed. Seven factual questions about PA were included in the survey. The information used to formulate the questions came from the 2008 Physical Activity Guidelines for Americans.¹ A study by Hui et al. reported that those who have moderate to high PA levels also have higher PA knowledge scores than those reporting low physical activity ($P < 0.01$).⁹² Therefore, improved knowledge of PA, and having an awareness and understanding of its benefits, may have a positive impact on one's decision to improve their PA levels.

Testing Schedule

A detailed table of the assessment schedule is included in **Appendix 5**. Participants had their physical activity behavior assessed on 2 different occasions: Wednesday through Monday during baseline, and Wednesday through Monday in the week immediately following the 4-week intervention. While participants were instructed to wear the accelerometer on Monday, only Wednesday through Sunday data was included in the analyses. Using Wednesday and Monday as accelerometer distribution days allowed for PA to be recorded for 5 full days (within the range of the 4-9 monitoring day recommendation)⁸⁵ on Thursday through Sunday. Wednesday was included as a wear day since accelerometers were on participants by 9:45 AM that day, still allowing for an entire day of data collection. Wearing an accelerometer for several days as opposed to 1 day allowed for a more accurate representation of an individual's habitual PA behavior.⁸⁵ Additionally, implementation of a protocol involving both a weekday and a weekend day is necessary as PA behavior patterns have shown to differ between the 2 time periods.^{65,67}

Overview of Study Methods Table

See **Table 4.5** and **Table 4.6** for an overview of the Photovoice and intervention methods.

Table 4.5. Overview of Photovoice Methods

Meeting 1	<ul style="list-style-type: none">• Photovoice introduction• Informed consent/assent information packets distributed	Plus 5 days
Meeting 2	<ul style="list-style-type: none">• Photovoice training session held for participants who agreed to participate in the study• Cameras issued to participants	Plus 2 days
Meeting 3	<ul style="list-style-type: none">• Participants met with a facilitator to discuss the pictures they had obtained so far	Plus 1 day
Meeting 4	<ul style="list-style-type: none">• Participants met with a facilitator to discuss the pictures they had obtained and selected 2 photographs to discuss in upcoming focus group• Cameras collected for processing	Plus 6 days
Meeting 5	<ul style="list-style-type: none">• Photovoice Focus Groups	

Table 4.6. Overview of Intervention Methods

	1	2	3	4	5	6	7	8	
I N T E R V E N T I O N		Baseline Measures: -Psych Constructs -MVPA -Sedentary Behavior -BMI	Intervention -Community-based videos (ranging from 2:43-8:11 min) on Monday and Friday for 4 weeks				Follow-up Measures: -Psych Constructs -MVPA -Sedentary Behavior		
C O M P A R I S O N		Baseline Measures: -Psych Constructs -MVPA -Sedentary Behavior -BMI				Follow-up Measures: -Psych Constructs -MVPA -Sedentary Behavior			

MVPA, Moderate-to-vigorous physical activity

Statistical Analysis Plans

Psychosocial Construct Analysis

Descriptive statistics were calculated for all psychosocial outcomes to ensure all statistical assumptions were met. Normality was determined by dividing the skewness score by the standard error of skewness and the kurtosis score by the standard error of kurtosis. If these calculations were within the 95% confidence interval (1.96), the variable was considered normally distributed.⁹³ The internal consistency of the psychosocial constructs was assessed using Cronbach's alpha. A Cronbach's alpha of ≥ 0.60 signified acceptable internal consistency.⁹⁴ Paired-samples t-tests were used to assess differences between the pre-survey and post-survey data within groups. Wilcoxon-signed ranks tests were used to assess differences between pre-survey and post-survey data that were not normally distributed. Independent-samples t-tests or Mann-Whitney U-tests were used to determine differences between psychosocial constructs at baseline and at follow-up between the intervention and comparison group. These same analyses were used to compare delta mean scores (post-pre) (or median scores, as appropriate) between groups.

Stepwise multiple linear regression models were used to determine which psychosocial constructs predicted follow-up PA and sedentary behavior. The models are presented below where X_1, X_2, \dots are the follow-up psychosocial construct scores (knowledge, beliefs, self-efficacy, attitudes, and skills), and f_1, f_2, \dots are gender, BMI, sport participation, baseline behavior, and group (intervention vs. comparison).

$$\text{follow-up MVPA} = \beta_1 X_1 + \beta_2 X_2 + \dots : \beta_{f1} X_{f1} + \beta_{f2} X_{f2} + \dots$$

$$\text{follow-up sedentary} = \beta_1 X_1 + \beta_2 X_2 + \dots : \beta_{f1} X_{f1} + \beta_{f2} X_{f2} + \beta_{f3} X_{f3} + \dots$$

Gender²⁵, BMI²⁵, sport participation⁹⁵, baseline behavior, and group (intervention vs. control) were included in the model as these variables influence PA behavior. Before running the regression analyses, Pearson product-moment correlations were utilized to determine whether collinearity existed between the psychosocial variables. Spearman's Rho correlations were used when testing collinearity of self-efficacy and attitudes as these distributions were non-normal. All correlation coefficients were less than 0.7 indicating no collinearity between psychosocial predictors.⁹⁶

Physical Activity Behavior Analysis

Physical activity outcomes of primary interest included average MVPA minutes per day (mpd), and average sedentary mpd. Because PA behavior has been shown to vary among weekend and weekdays,⁹⁷ secondary outcomes of interest included average MVPA and sedentary minutes per weekday and weekend day. Descriptive statistics such as mean, median and standard deviation were calculated for all PA outcomes of interest to ensure all statistical assumptions were met. Skewness and kurtosis were used to assess normality of the continuous outcomes of interest, and were cross checked with the Komogorov-Smirnov test, a normality test appropriate for small samples ($n < 300$).⁹³

Paired-samples t-tests were used to assess differences between MVPA and sedentary behavior within groups. Independent-samples t-tests were used to determine if differences existed in MVPA and sedentary outcomes at baseline and at follow-up between the intervention and comparison group. Independent-samples t-tests were used to determine if there were differences between groups when comparing PA and sedentary behavior delta scores (post-pre).

A multiple linear regression using the "enter method" was then used to determine if the intervention was effective after adjusting for known PA moderators (gender, sport participation,

BMI),^{25,95} and baseline PA. Pearson product-moment correlations, chi square matrices, and one-way ANOVAs were used prior to the regression analysis to test for collinearity between predictor variables. Below is the regression model equation that was tested. The models are presented below where X_I is group (intervention vs. comparison), and f_1, f_2, \dots are gender, BMI, sport participation, and baseline behavior.

$$\text{follow-up MVPA} = \beta_1 X_I + \beta_{f1} X_{f1} + \beta_{f2} X_{f2} + \beta_{f3} X_{f3} + \dots$$

$$\text{follow-up sedentary} = \beta_1 X_I + \beta_{f1} X_{f1} + \beta_{f2} X_{f2} + \beta_{f3} X_{f3} + \dots$$

All analyses were performed using SPSS version 22.0.0.0, and the a priori significance level was set to alpha <0.05. Continuous variables were expressed as mean \pm standard deviation or median and interquartile range as appropriate.

CHAPTER 5: RESULTS

Photovoice Project Results

Photovoice Themes

Below is a brief overview of the themes that emerged from the Photovoice focus groups that provided valuable information that was then used in designing the PA intervention for children in this Black Belt community.

Whether a child engaged in PA depended largely on the “convenience” factor. For example, the amount of walking that a participant engaged in each day depended on where the participant lived. Three of the apartment complexes that housed a number of the participants were within walking distance to the school and the resource center, while 2 were not. All of the children who lived in the 3 apartment complexes close to the school and the resource center said that they walked to school every day (**Illustration 5.1**). Depending on which of the 3 apartment complexes the participant lived, the time to walk to school would take between 8 to 15 minutes. After school, many of the boys would then walk a half-mile to the resource center. Some participants, however, stated they had to ride the bus to the resource center after school because their parents would not permit them to walk.

Illus 5.1. Photovoice Photograph of Child Walking to School



“I’m walking in the woods. I can walk on this path to get to school from my apartment.” Source: Child Photovoice participant, age 12

Instead of participating in structured activities or organized team sports, participants for the most part engaged in non-structured activities. While team sports including football, basketball, softball, baseball, and track were available at the Middle School where the participants attended, participants under the age of 11 were too young to participate on a school sports team and those old enough to participate were not interested. According to one of the adult facilitators, a local park offered a recreational baseball team, but some expense was required that the participants could not afford, and parents’ work schedules also prevented

children's participation. The most popular activities that participants engaged in were walking, dancing with friends (mainly girls), shooting basketball or playing volleyball at the resource center, playing with a pet, or playing games such as foosball or ping pong at church. Many participants had photographs of them performing household chores, as most had some chore responsibilities each day lasting 5-10 minutes.

The children's photographs revealed there were facilities for PA such as gymnasiums at the school and the resource center, a park, play areas at apartment complexes, and sidewalks. However, children lacked recreational equipment such as balls, bats, gloves, goals, or jump ropes to use at the facility. While the local park included a large playground area and numerous baseball fields, most agreed that you needed to have a bike or car to access it since it was 2 to 3 miles away, and most did not have transportation to reach it. Of the 5 apartment complexes where the children lived, it was noted from personal observation that 3 had a recreational area, but they were very small and sparsely equipped. For example, one apartment complex had only one slide and a gymnasium dome for climbing. Participants agreed that most engaged in non-structured sport activities during PE or in the gymnasium at the after-school program, but once at home, most PA involved no equipment and simply consisted of walking, dancing, playing with a pet, or doing household chores.

Several of the photographs led to a discussion of barriers that hinder PA. One participant stated that instead of playing basketball games that require a moderate to vigorous level of intensity, most basketball playing at the resource center or during physical education class consisted only of shooting the basketball (light intensity) because of the large number of people on the court (**Illustration 5.2**). Other barriers that were discussed included living too far away to

walk to the school and resource center, lacking transportation to the park, lacking an authority figure to supervise organized play, and having no sports or recreational equipment at home.

Illus 5.2: Photovoice Photograph of Boy Shooting Basketball



“Me and my friends are shooting ball. Sometimes we just shoot around. We don’t play games much because there are too many people or the big kids take up the court.” Source: Child Photovoice participant, age 12

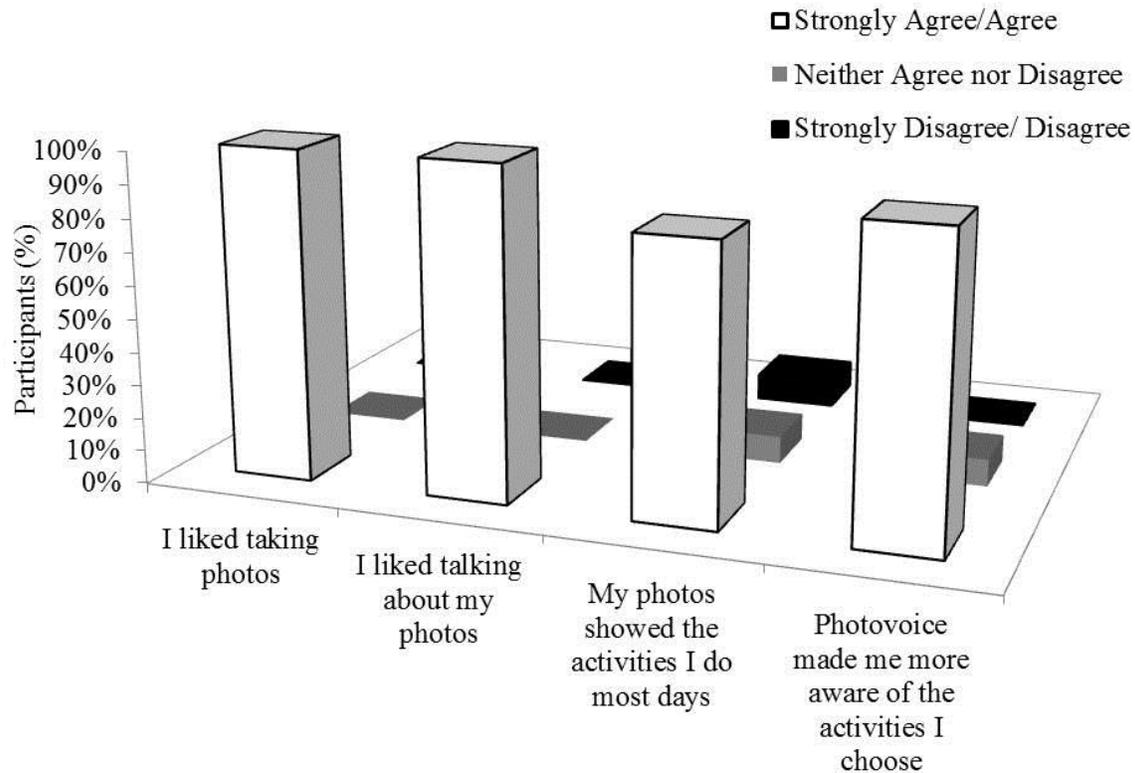
Another piece of information that was garnered from the photographs was that many of the participants did not have a clear understanding of the meaning of “physical activity”. For example, some participants included in their activity photographs depictions of them watching TV, playing dominos, and sleeping. Several students took pictures of their personal items, such as their phone or their t-shirt because they thought PA could be the positive feelings they have toward their favorite belongings. While the facilitators assisted participants in choosing

appropriate pictures to discuss during the focus groups, the facilitators did not talk about the meaning of PA because one of the goals of the ensuing PA intervention would be to increase the PA knowledge among the participants.

Photovoice Evaluation

Following the focus group, participants were given a survey that asked about their Photovoice experience. Results from the survey are displayed in **Figure 5.1**. All participants enjoyed taking the photographs and talking about them, and everyone stated that they were glad they participated in the project. Seventy-five percent of the participants stated that they would like to be included in a future Photovoice project. The number of pictures obtained from a participant ranged from 2 to 70, with a mean of 20 pictures per participant. Other positive experiences reported were that the project boosted self-esteem, the project enabled participants to learn how to use a camera, and the project was fun. There were 2 negative comments. One participant reported that he or she did not like the fact that they could not take videos even though the cameras had the capability, and one complained that participants were not allowed to delete photos.

Figure 5.1: Participant Responses to the Physical Activity Photovoice Project



Community-Based Physical Activity Intervention

Characteristics of Physical Activity Intervention Participants

As a convenience sample, 2 fifth grade classes (10-11 years, n=39; Intervention, n=20; Comparison, n=19) were recruited at a school in a community situated in the rural Black Belt region of Alabama to participate in the investigation. The sample consisted of 49% girls and 51% boys, all African American, and 99% of whom were on free or reduced-priced lunch. Participant demographics and baseline characteristics are displayed in **Table 5.1**.

Table 5.1. Baseline Characteristics of Participants

Group		Mean	Std. Deviation	Percentage
Intervention n=20	Weight (kg)	49.55	11.49	
	Height (cm)	150.57	6.89	
	BMI (kg/m ²)	21.74	4.86	
	% African American			100%
	% Male			45%
	% Female			55%
	% Participants on Sport Teams			20%
Comparison n=19	Weight (kg)	54.08	12.40	
	Height (cm)	154.02	4.35	
	BMI (kg/m ²)	22.74	4.90	
	% African American			100%
	% Male			58%
	% Female			42%
	% Participants on Sport Teams			48%

Psychosocial Constructs of Physical Activity Intervention

Among the continuous psychosocial variables, skills, attitudes, and knowledge scores were normally distributed while self-efficacy and belief scores were non-normal. Self-efficacy ($\alpha=0.63$), skills ($\alpha=0.65$), and knowledge ($\alpha=0.64$) had acceptable internal consistency ($\alpha \geq 0.60$),⁹⁴ while beliefs (0.57) and attitudes (0.48) fell just short of achieving acceptable consistency.

Table 5.2 shows the results from the paired samples t-tests for the intervention group and the comparison group. Since self-efficacy and beliefs were not normally distributed, Wilcoxon-signed ranks tests were used for these analyses. All psychosocial determinants of PA (self-efficacy, knowledge, beliefs, attitudes, and skills) improved for the intervention group (all $p < 0.05$). Beliefs ($p=0.007$) and attitudes ($p=0.043$) scores increased for the comparison group.

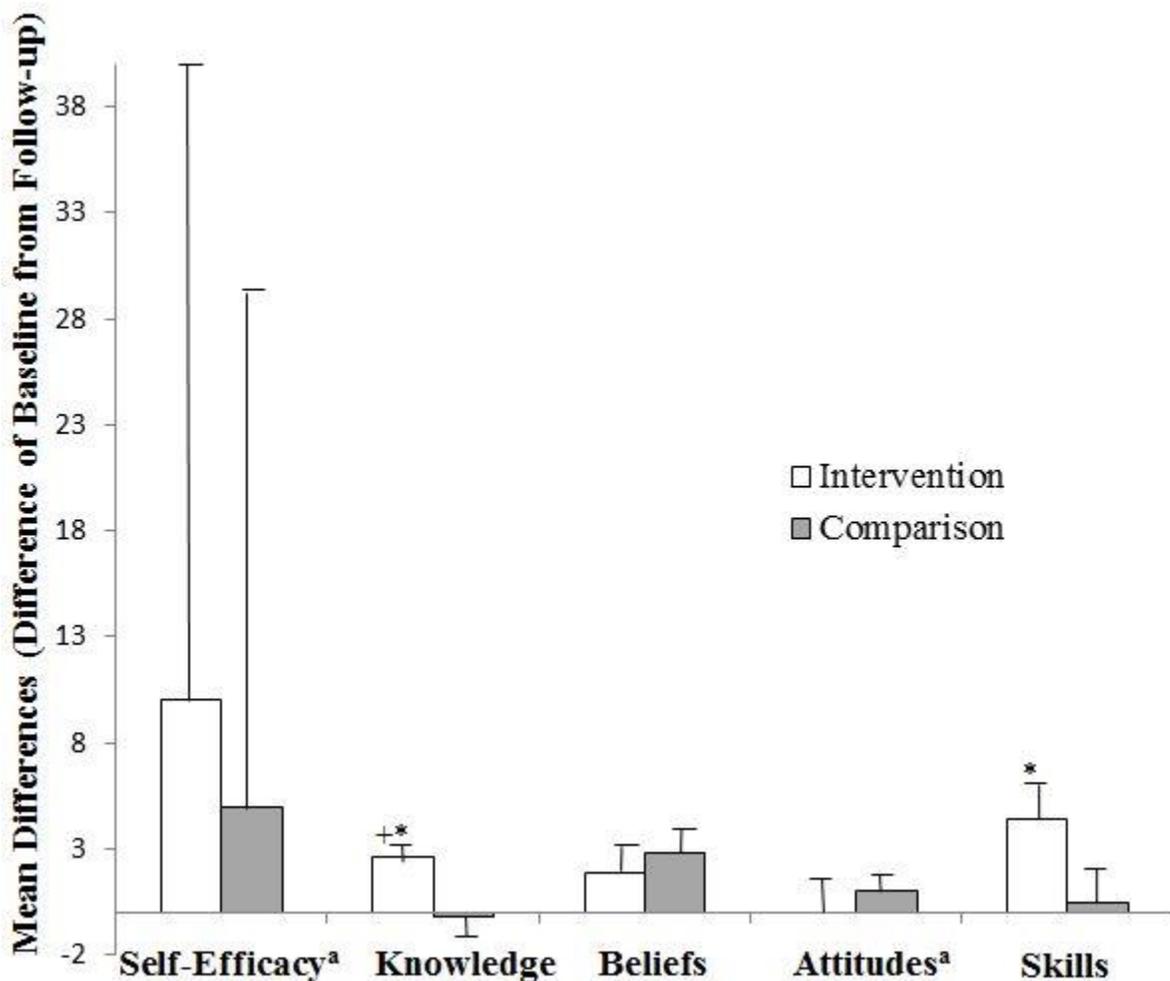
Table 5.2. Psychosocial Measures at Baseline and Immediately Following the 4-week Intervention

	Baseline	Follow-up	P-value
Intervention Group			
Self-Efficacy	270.0 (250.0, 290.0)	290.0 (270.0, 300.0)	0.028
Knowledge	2.6 (0.96)	5.3 (1.8)	<0.001
Beliefs	36.5 (33.0, 39.8)	38.0 (35.0, 41.0)	0.047
Attitudes	12.1 (2.2)	13.1 (1.8)	0.035
Skills	18.2 (5.6)	22.6 (4.0)	0.002
Comparison Group			
Self-Efficacy	265.0 (227.5, 272.5)	270 (250.0, 290.0)	0.431
Knowledge	3.2 (1.3)	3.0 (1.2)	0.692
Beliefs	37.0 (34.8, 37.3)	38.0 (36.0, 40.0)	0.007
Attitudes	11.0 (2.1)	12.0 (2.5)	0.043
Skills	21.5 (4.2)	22.0 (4.7)	0.649

Either a paired-samples t-test or Wilcoxon signed ranks test was used to compare baseline and follow-up scores within groups. All psychosocial constructs improved within the intervention group at follow-up ($p < 0.05$). Beliefs ($p = 0.007$) and attitudes ($p = 0.043$) were significantly higher within the comparison group at follow-up. Values are reported as means (standard deviation) or medians (25th percentile, 75th percentile).

Figure 5.2 compares the psychosocial delta scores (baseline values subtracted from follow-up values) between groups. Skills and knowledge delta values were significantly higher for the intervention group when compared to the comparison group ($p < 0.05$). No other delta score comparisons were significant.

Figure 5.2. Psychosocial Delta Score Comparisons Between Groups



Either an independent-samples t-test or Mann-Whitney U-test was used to compare delta scores between groups. Δ Knowledge ($p < 0.001$) and Δ skills ($p = 0.028$) values were significantly higher in the intervention group. Values are means + standard deviation. ^aMann-Whitney U-tests were used to compare non-normally distributed variables; values are medians +75th percentile; +* $p < 0.001$; * $p < 0.05$.

Before performing regression analyses to determine which psychosocial constructs predicted PA or sedentary behavior, collinearity between psychosocial constructs and known moderators was assessed with groups pooled. To determine if a significant correlation between BMI (or Δ BMI) and the psychosocial constructs was present, a Pearson's Correlation (or Spearman's Rho Test for non-parametric analyses) was used. In all analyses, BMI did not significantly correlate with any of the psychosocial constructs. To determine if psychosocial constructs were significantly different among sexes, an independent t-test was used for all variables of interest (or a Mann-Whitney U test for non-normally distributed variables). Psychosocial constructs did not significantly differ between sexes.

To determine if collinearity existed between psychosocial constructs, Pearson's Correlation (or Spearman's Rho Test for non-parametric analyses) were used. All correlation coefficients were <0.7 , thereby indicating no collinearity between psychosocial constructs.⁹⁶

The ANOVA results from the stepwise multiple regressions were not significant, thereby indicating that none of the psychosocial constructs were significant predictors of MVPA follow-up, Δ MVPA, sedentary behavior follow-up, and Δ sedentary behavior, given the sample size.

Physical Activity Levels

All physical activity outcomes of interest were normally distributed. Descriptive statistics for the PA and sedentary behavior variables are shown in **Table 5.3**. No significant differences in MVPA and sedentary behaviors were evident at baseline between groups (all comparisons had p values >0.05). Following the intervention, the intervention group (30.0 ± 18.5 minutes per day (mpd)) had significantly higher MVPA mpd than the comparison group (18.2 ± 12.1 mpd) ($t=2.17(32)$, $p=0.037$). Groups were not different with regard to sedentary

behavior (all $p > 0.05$), MVPA minutes per weekday ($t = 1.77(33)$, $p = 0.086$), and MVPA minutes per weekend day ($t = 1.22(15)$, $p = 0.241$). A mean difference in delta scores (post-pre) of 6.7 ± 4.5 MVPA mpd between the intervention group ($\Delta 1.5 \pm 3.3$ mpd) and comparison group ($\Delta -5.2 \pm 3.0$ mpd) was not significant ($t = 1.50(32)$, $p = 0.143$), nor was the mean difference in delta scores of -4.5 ± 28.1 sedentary mpd between the intervention group

($\Delta = 14.3 \pm 86.7$ mpd) and comparison group ($\Delta = 18.8 \pm 75.6$ mpd) ($t = -0.160(32)$, $p = 0.874$).

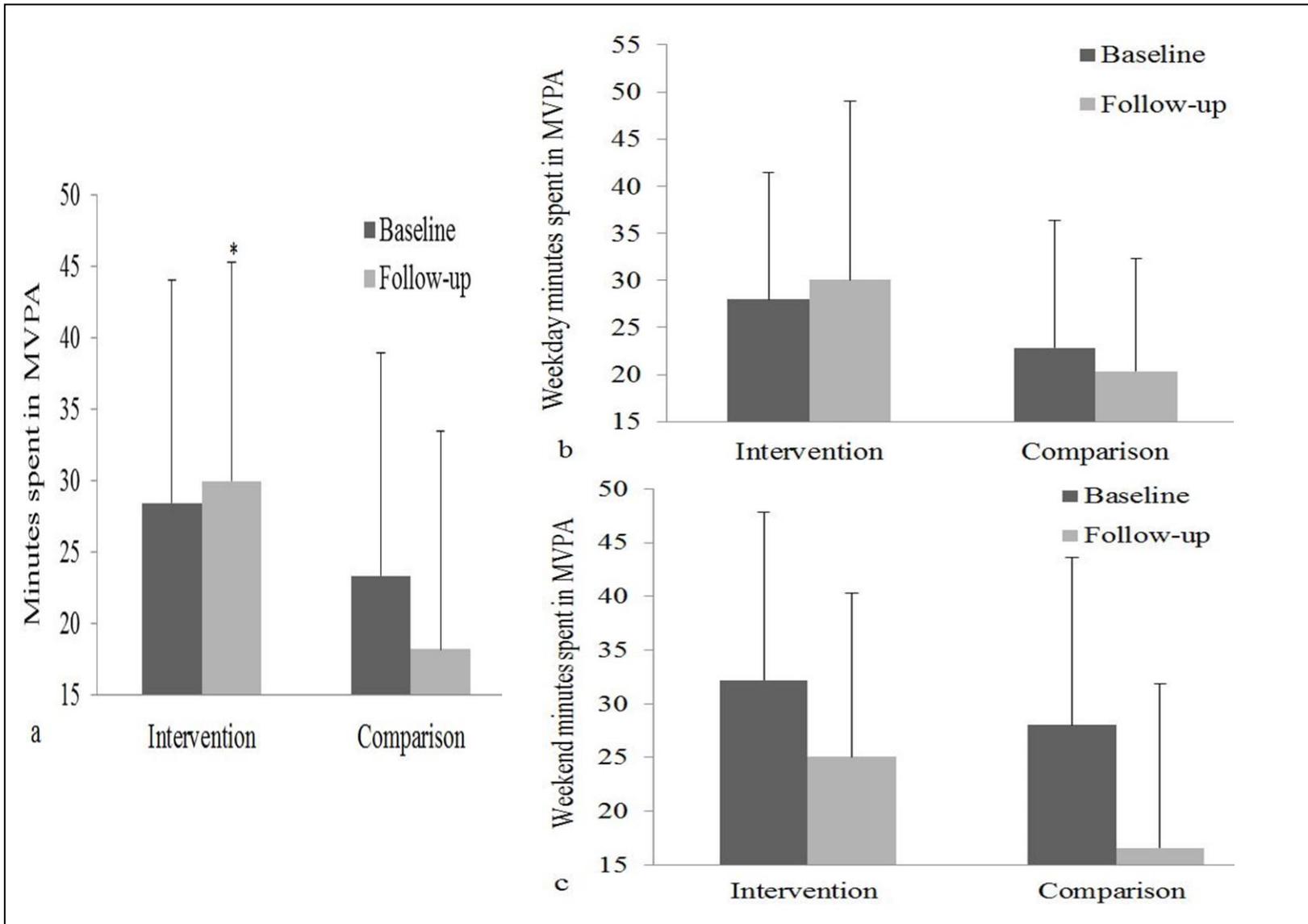
Results of the PA behavior and sedentary changes are displayed in **Figure 5.3** and **Figure 5.4**.

Table 5.3. Physical Activity and Sedentary Behavior Descriptive Statistics

Group		Minimum (mpd)	Maximum (mpd)	Mean (mpd)	Std. Deviation (mpd)
Intervention	MVPA baseline	9.87	63.17	28.46	13.49
	MVPA follow-up	8.50	78.50	29.99	18.48
	Sedentary baseline	324.90	622.80	469.25	69.52
	Sedentary follow-up	249.50	637.08	483.56	100.05
Comparison	MVPA baseline	9.25	77.20	23.36	17.66
	MVPA follow-up	6.30	43.10	18.20	12.07
	Sedentary baseline	374.08	633.33	506.39	84.41
	Sedentary follow-up	407.70	689.80	523.55	97.83

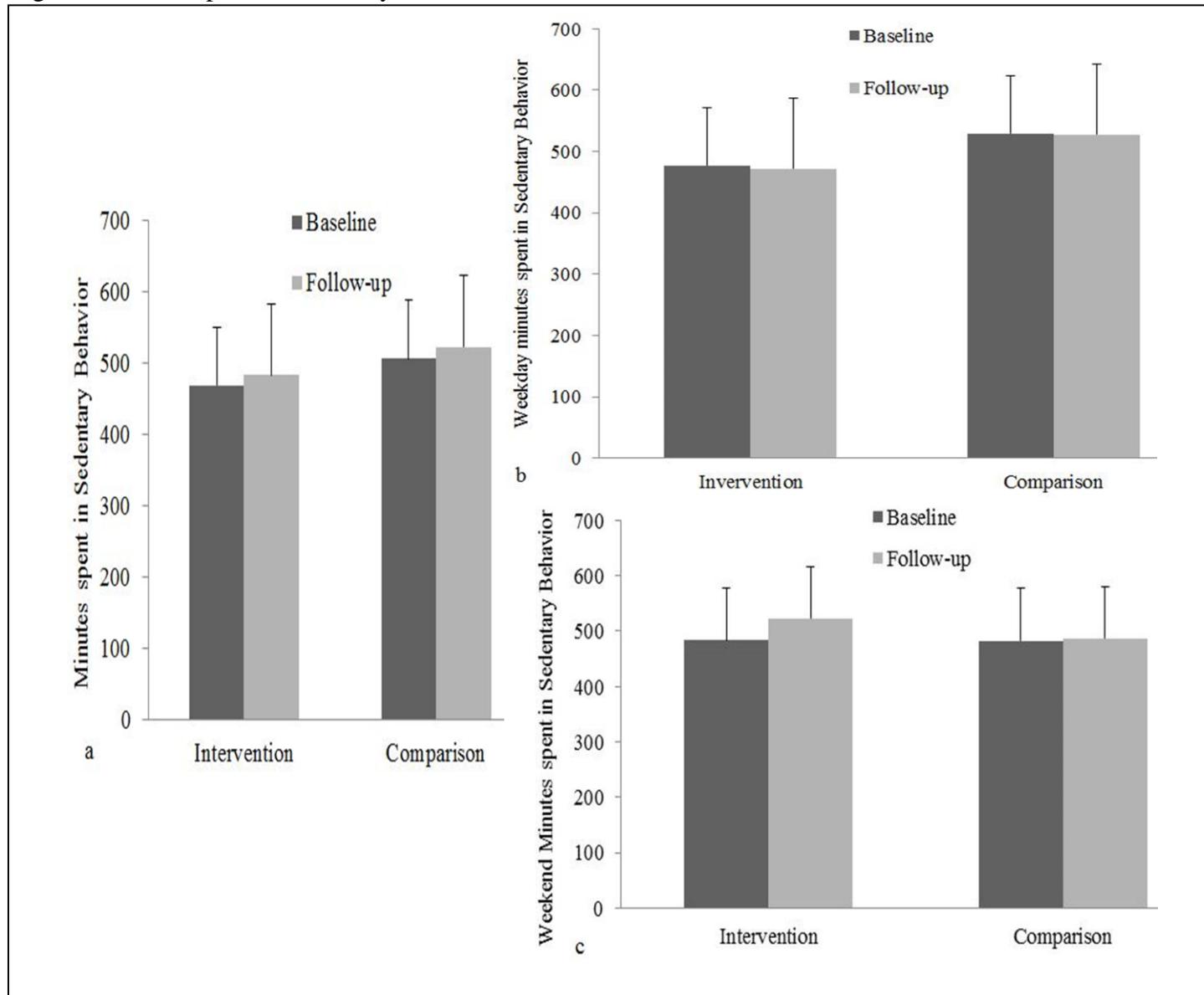
MVPA, moderate to vigorous physical activity

Figure 5.3. Time spent in Moderate to Vigorous Physical Activity (MVPA)



a.* p=0.037, intervention follow-up vs. comparison follow-up

Figure 5.4. Time spent in Sedentary Behavior



A multiple regression, using the 'enter method', was used to adjust for previously known moderators that influence PA behavior (gender, sport participation, BMI),^{25,95} and was also used to adjust for baseline behavior. A collinearity threat did not exist between any of the predictor variables that were included in the regression model except between sport participation and group (intervention/ comparison), baseline MVPA and BMI, and baseline MVPA and gender. Chi-square tests for proportions indicated differences in sport participation between the intervention (11% participated in sports) and comparison group (47% participated in sports) ($\chi^2=5.816(1)$, $p=0.016$). A Pearson Correlation analysis resulted in $r= -0.30$ ($p=0.044$) for baseline MVPA and BMI. An independent t-test indicated that males (32.8 mpd) had significantly higher baseline MVPA than females (19.3 mpd) ($t=2.78(32)$, $p=0.009$). While the above variables were significantly related to one another, collinearity did not interfere with the results of the final regression model as evidenced by small changes between the zero-order and partial correlations outlined in the coefficients table of the multiple regression.⁹⁸

The ANOVA results from the multiple regression analysis indicated that the overall regression model used to predict MVPA mpd was significant ($F= 7.91(5)$, $p<0.001$). The coefficient of determination, R^2 , was 0.59 indicating that 59% of the variance in MVPA mpd was explained by the model. Only 2 predictors, baseline MVPA (Beta= 0.405, $p=0.019$) and group (Beta= -0.387, $p=0.014$), were significant predictors of follow-up MVPA mpd for the given sample. However, all moderators were included in the final model since these moderators are well accepted as significant predictors of MVPA. The regression equation derived from this model is displayed below.

Follow-up MVPA = 42.45 - 12.73 [*group (0, intervention; 1, comparison)*] + 0.43 (*baseline MVPA*) - 7.66 [*participation in sports (0, yes; 1, no)*] - 4.44 [*gender (0, male; 1, female)*] - 0.71(*BMI*)

When using stepwise multiple regression to determine which variables predicted sedentary mpd, no significant predictors were added to the model.

CHAPTER 6: DISCUSSION

The physical activity intervention designed using CBPR methods was successful as evidenced by the intervention group's MVPA being significantly higher than the comparison group's MVPA immediately following the 4-week intervention. Although the intervention group's MVPA remained stable pre-to-post intervention, it did not decrease as the comparison's group did. Because most PA interventions have failed to influence MVPA behavior in children,^{22,23} it is believed that the success of the intervention described in this project can be attributed in large part to the use of CBPR methods during the intervention's design and implementation. Specifically, the Photovoice project that has been described herein demonstrated how Photovoice helped communicate the PA experiences, preferences, and resources of participants to the researcher. That information was then used by the researcher to develop a culturally relevant PA intervention, namely, PA educational videos, that were found to be appealing to the participants. Also, by including Photovoice photographs in the intervention videos, and by featuring members of the community in the videos, the videos attracted the attention of the participants and kept them engaged as evidenced by the researcher's observation and the participants' correct responses to review questions at the end of the videos. As a result, the intervention led to improvements in the participants' psychosocial constructs as they relate to physical activity, which in turn led to favorable MVPA behavior.

This mixed methods investigation had a number of aims. The first aim of the investigation was to create a community-based intervention that utilized Photovoice. The second aim of the investigation was to evaluate whether the intervention changed the psychosocial

constructs relating to PA of the participants. The third aim of the investigation was to ascertain whether the intervention caused a change in MVPA and sedentary behaviors of the participants. Each of these aims along with their related outcomes will be discussed below.

Photovoice Project

While this project followed the fundamental Photovoice techniques outlined by Wang et al.,³¹ several alterations were made because, unlike the Wang study, this project centered on PA rather than a community's strength and concerns, and this project involved children rather than adults. Because the project's purpose was to ascertain relevant PA themes in a community, the traditional questions from the SHOWeD technique⁷³ (What do you See here? What's really Happening here? How does this relate to Our lives? Why does this problem, concern, or strength Exist? And what can we Do about it?) were changed to the 3 questions previously mentioned, namely, "What do you see in this photograph?," "What is happening in the photograph?," and "How does this relate to PA?"

Another key difference between this project and previous Photovoice projects was the duration. In a review by Catalani et al., it was reported that the median duration of Photovoice projects is 3 months, with projects ranging from 2 weeks to 2 years.⁷⁴ The Photovoice project described in this paper was 2 weeks in duration, as measured from the initial meeting to the last. Photovoice participants only took photographs for 3 days. Although the time period for taking photographs may seem brief when compared to previous Photovoice projects, both the researcher and community partners thought the time period was sufficient in light of the purpose of the project. Most of the previous Photovoice projects reported in the literature sought to document the needs and assets of a community.^{43,44,75} It is understandable that those projects required more time for the participants to reflect upon and determine their community's needs and more time

for the participants to arrange a visit to the community venue they wished to photograph. A longer time period was not necessary for the Photovoice project described here because the assignment was easily understandable and the pictures were those of the participants themselves and their locations of daily activity. Moreover, the participants' activities did not vary significantly from day to day as all participants came to school each day, then attended the after-school program. Even with a period of 3 days to take their photographs, participants took many photographs that were redundant. It was decided that 3 days was adequate for obtaining a good representation of the PA behaviors of each participant through photographs, while at the same time lessening the chances of the participants losing their cameras.

An additional modification was made to the traditional adult Photovoice protocol by giving participants time to meet with a facilitator prior to the focus group to discuss their photographs. This additional meeting was conducted based on the recommendation by Strack et al. who stated that children needed individual attention when interpreting their photographs.⁷⁵ Strack et al. also mentioned that child participants often have trouble articulating their thoughts during a focus group⁷⁵, so the worksheets completed prior to the focus group in the current investigation, together with the option of reading the worksheets during the focus group, were utilized to overcome this barrier.

The themes that emerged from this investigation were similar to those reported in a study by Curtis et al.²⁵ In the Curtis et al. Photovoice study, 9 children (age range 8-12 years old) of low SES preferred engaging in non-structured physical activities rather than structured physical activities because non-structured activities were seen as more affordable and more fun because participants could do them with friends of their choice. It is not surprising that most PA depicted

by the participants in the current investigation were non-structured activities that could be performed with friends without any sports or recreational equipment.

However, when compared to the findings of similar Photovoice projects in other underserved communities, one finding in the current Photovoice project stood out. The photographs taken by the participants in this project showed that in this particular community there were available facilities that could help promote PA such as the availability of gymnasiums at the school and resource center, a park, sidewalks, and some apartment play areas. Seeing those areas in the photographs led to a better design of the PA intervention. Needs assessments in neighboring counties had shown poor access to facilities promoting PA so the discovery that facilities did exist in this particular county helped in designing a PA intervention that was both relevant to the participants and tailored to the strengths of the community. While it may be acceptable to use a similar PA intervention across communities, using the same intervention in every community is not advisable because each community is unique in terms of its facilities, resources, geographical layout, and social milieu.

Photovoice Conclusions

This investigation demonstrates how Photovoice can be a useful tool in communicating the PA experiences, preferences, and resources of participants to researchers interested in implementing community-based PA interventions. Actual photographs obtained from such a project can also be incorporated into PA interventions that are based on a video presentation thereby increasing the cultural relevance and relatability of the intervention. The more relevant and relatable a PA intervention is, the more likely it is that the subjects of the intervention will be affected by it.

The principal reason for the success of this Photovoice project was its adherence to the recommendations outlined by Strack et al. regarding child Photovoice projects.⁷⁵ Following modifications suggested for children's Photovoice projects, each participant met individually with a facilitator to discuss their photographs prior to meeting in a focus group, and the focus groups were kept small to encourage more discussion.

This investigation also developed new, unique methodological approaches which included: 1) giving the participants digital cameras so that they could take unlimited photographs; 2) showing examples of Photovoice photographs during the training session so that participants had a clearer understanding of what they were to do; 3) having each participant fill out a SHOWeD worksheet that they could rely on during discussions in the focus group; and 4) showing the participants a video of the groups' photographs following the focus group so they could see the results of their efforts. Although the training session in the current Photovoice project included a time for participants to practice taking pictures with their cameras, the quality of the pictures could possibly have been improved if a separate and subsequent training session had been conducted on taking photographs. If participants had been allowed a day to practice taking photographs and thereafter a training session had been held in which the quality of the photographs was examined and feedback given, then perhaps the quality of the photographs would have been better. Future child Photovoice projects should perhaps include two Photovoice training sessions instead of one.

In summary, this investigation accomplished its aim of teaching a group of rural children from the Black Belt region of Alabama how to use Photovoice to communicate their daily PA experiences to researchers, their peers, and community leaders. While participants reported that the project improved their self-esteem, was empowering, and was fun, this project ultimately

gave researchers insight into the PA patterns and preferences of the participants. This led to the design of a PA intervention that was appealing and relevant to children in that community.

Physical Activity Intervention

Psychosocial Constructs

Designing community-based interventions that positively affect the psychosocial constructs of PA is a matter of public health importance. Such interventions can advance the efforts to increase the number of young people who meet health-related PA guidelines. The second aim of this investigation was to determine whether a community-based video intervention increased the psychosocial constructs as they related to PA. All follow-up measurements of the psychosocial constructs (self-efficacy, knowledge, beliefs, attitudes, and skills) were higher than baseline measures, so the community-based video intervention was effective. That said, some psychosocial constructs (beliefs and attitudes) also increased from baseline in the comparison group, so some factor other than the community-based video intervention, also may have had an effect.

When comparing psychosocial constructs between the intervention and comparison group, participants in the intervention group showed greater increases in skills and knowledge with respect to PA. Differences in the other psychosocial constructs (self-efficacy, attitudes, and beliefs) that resulted from the intervention were not different between the groups. A similar study by Parcel et al. also reported a significant increase in PA skills among fourth graders and increases in PA knowledge among third and fourth graders following a yearlong intervention tailored to influence PA psychosocial constructs.⁹⁹ Similar to the results seen in the current investigation, Parcel et al. reported significant improvements in self-efficacy among fourth graders (but not among third graders).⁹⁹ The 4-week intervention in the current investigation is

unique from the previous interventions since previous interventions reporting significant changes in self efficacy were much longer in duration. Other examples include a 3-year study by Edmundson et al.¹⁰⁰ and a 2-year study by Stone et al.¹⁰¹ which both reported improvements in self-efficacy. Conversely, a 4-week, student-based intervention for 10-12 year-old rural children by Wilson et al.³ found no significant changes in self-efficacy. However, the study by Wilson et al. did report significant changes in the intervention group's motivation ($p < 0.01$) and self-concept as they relate to PA ($p < 0.05$).³⁵

The precise reasons for the discrepancies among studies are uncertain, but we speculate the following. One difference between the current investigation and that of Wilson et al. was that in the present investigation, skills improved in the intervention group, whereas skills were unaffected in the Wilson et al. study. Perhaps the difference can be attributed to the fact that while the interventions in both investigations both taught behavioral skills such as self-monitoring, goal setting, and coping strategies for dealing with PA barriers, the current investigation used familiar community members and high school students in the videos to teach these skills, whereas the Wilson et al. study used graduate students from outside the community. Using familiar role models in the videos may have made the information more appealing and relevant to the participants leading them to adopt new behavioral skills with regard to PA.

Reports in previous studies of changes in beliefs as they relate to PA following an intervention have been mixed.¹⁰² Pinto et al.¹⁰³ reported higher belief scores after 6 weeks of an intervention, while Castro et al.¹⁰⁴ reported lower belief scores in both the intervention and comparison groups. In the present investigation, because beliefs scores improved similarly for both the intervention group and the comparison group, it cannot be concluded that the intervention positively influenced participants' beliefs. The finding that belief scores

significantly improved at follow-up within the comparison group was likely spurious because there was low internal consistency of the survey questions comprising of the belief construct ($\alpha=0.57$). Cronbach's alpha coefficient was below 0.6,⁹⁴ so the questions that were intended to represent the belief construct failed to closely relate to one another, and therefore, failed to accurately represent the belief construct.¹⁰⁵ Despite this limitation, other studies¹⁰⁶⁻¹⁰⁸ consistent with the present investigation have also found no changes in beliefs following an intervention in an experimental group relative to a comparison group. Although positive attitudes regarding PA have been shown to positively correlate with increased PA behavior,³⁷ no intervention to date has been successful at changing attitudes.^{109,110} In the present investigation, similar to beliefs, both the comparison group and the intervention group had improvements in attitudes at follow-up so it cannot be concluded that the intervention positively influenced attitudes. However, also similar to beliefs, the internal consistency for attitudes was low ($\alpha=0.48$),^{94,105} signifying that the questions comprising this construct were not representative of attitudes. For the present investigation, belief and attitude outcomes may have been different if an acceptable Cronbach's alpha (≥ 0.60)⁹⁴ had been achieved.

Similar with the present investigation, reports of changes in psychosocial constructs related to PA following an intervention have been inconsistent. Inconsistent results may be due in part to the variety of survey measuring tools utilized. For example, when measuring self-efficacy as it relates to physical activity in children, Edmundson et al.¹⁰⁰ and Stone¹⁰¹ used the Health Behavior Questioner,⁹⁹ Wilson et al.³ used the Self-Efficacy for Exercise Behavior Scale,¹¹¹ Reynolds⁶⁹ used the Stanford Adolescent Heart Health Program questionnaire,¹¹² and Robbins et al.¹¹³ used McAuley's Self-Efficacy Scale.⁹⁰ Inconsistent results may also stem from a participants' lack of ability to accurately answer survey questions about self-efficacy, attitudes,

and beliefs at baseline as some of the questions related to these constructs may include unfamiliar terms (e.g. “positive self-talk”, “benefits of physical activity”, “vigorous activity”) that are then discussed more thoroughly in the intervention. Skills and knowledge questions, on the other hand, are more straight-forward and do not consist of terms whose understanding may require prior knowledge, which could alter survey scores. Future studies should focus on producing one reliable and valid psychosocial PA survey instrument that can be uniformly used by all researchers.

The present investigation sought to determine if a community-based video intervention was successful in changing psychosocial constructs that are believed to be important for PA behavior change. To make this determination, this investigation first specified and discussed the constructs that were targeted in the intervention, it determined if the intervention was successful at changing these constructs, and it evaluated whether the constructs predicted a change in behavior. While PA interventions that are tailored to impact theoretical psychosocial constructs have increased in recent years, a review by Lewis reported that only one study has examined which of the psychosocial constructs serve as predictors of improved PA behavior change in children.¹⁰² Cook et al.¹¹⁴ found that self-efficacy survey scores predicted increases in MVPA measured by a PA recall questionnaire (regression coefficient= 33.76, 95% CI: 13.88-53.43) in 12-17 year old children. The present investigation differed from the Cook et al. study in that it measured 10-11 year-old children, and used accelerometers instead of a questionnaire to measure PA levels. However, none of the psychosocial constructs in this investigation were significant predictors of the changes in MVPA or sedentary time following the intervention. This finding may be due, in part, to the small changes in, and large variability in MVPA and sedentary behavior, for the given sample size.

In conclusion, this investigation demonstrated that a community-based video intervention successfully influenced theoretically based psychosocial measures for increasing PA in underserved, rural children.

Physical Activity Behavior

Following the intervention, the intervention group's MVPA was 39% higher than the comparison group. However, it should be appreciated that at baseline, the intervention group's MVPA was 18% higher than the comparison group. After adjusting for possible moderators (sex, BMI, sport participation, and baseline MVPA), group (intervention vs. control) was a significant predictor of follow-up MVPA. The intervention group's mean MVPA mpd remained relatively stable across time, while a decreasing MVPA trend was evident in the comparison group. While many factors can affect MVPA, one possible explanation for the decreasing trend in the comparison group's MVPA is that ambient temperatures decreased between pre and post measures. The baseline measurements of the intervention and comparison groups were taken in early September when the mean ambient temperature was 26.7 °C, while the follow-up measurements were taken in October, when the mean ambient temperature was 16.7 °C. A previous study by Duncan et al. focused on the effects ambient temperature had on children's PA behavior, and found a significant decrease in PA behavior when outdoor ambient temperature decreased 10 °C, as observed in the present study.¹¹⁵ Other studies that have examined the effects of weather on children's activity patterns also have found that children's MVPA decreases with decreasing temperatures.¹¹⁶⁻¹¹⁸ In the current investigation, because the intervention group's MVPA remained stable despite a 10 °C drop in ambient temperature, it is reasonable to surmise that the intervention offset the typical declines in MVPA associated with decreasing mean ambient temperatures. Future interventions of this type should assess whether

such interventions are effective in offsetting declines in MVPA with greater decreases in ambient temperature and/or decreases in temperature spread out over a longer period of time. Notably, Belanger et al.¹¹⁹ suggested that percentage declines of MVPA often associated with adolescence is in part due to declines in temperature. Their 5-year study, physical activity was lower during cold months and higher during warm months, but the increases during warm months did not compensate for decreases during cold months; consequently, yearly activity decreased 7%.¹¹⁹ Future interventions are needed to effectively address steady declines in PA associated with temperature decreases accompanying season change.

While previous studies that have examined the effects of ambient temperature on children's PA have noted a correlation between a decrease in temperature and a decrease in PA, there is a need to examine whether, and to what extent, children's MVPA might decrease because of higher ambient temperature. This particular question has been examined in older adults,¹²⁰ but no study has addressed whether high ambient temperatures adversely affect PA levels in children. Ideally, it would be beneficial to know the optimal range of ambient temperatures for maximum MVPA in children, and the specific deviations from this range that would need to occur before one would expect to see significant declines in PA. Such knowledge would assist researchers in better understanding the effects ambient temperature has on the interventions they implement. Also, it would aid comparisons of the same intervention used in studies conducted during different seasons and/or in different climates.

Although the intervention described therein had a favorable effect on the intervention group's MVPA, sedentary behavior did not improve. Sedentary behavior is an important component to consider because like MVPA, sedentary behavior has been shown to be an independent risk factor for obesity, chronic diseases such as cardiovascular disease, type 2

diabetes, some cancers, and all-cause mortality.^{72,121-123} Furthermore, a study by Healy et al. showed that adults who meet the national MVPA guidelines can still suffer the detrimental health effects associated with sedentary behavior if they have high amounts of sedentary time during the day.¹²⁴ Thus, it is important to consider why sedentary behavior was not affected by the intervention in this investigation so that adaptations to interventions can be made in future studies. Three possible reasons why a change in sedentary behavior was not detected in this investigation are offered below.

First, it is possible that a change in sedentary behavior was not detected because there is large variability in sedentary behavior, making it very difficult to detect within and between group differences in sedentary outcomes.^{125,126} To detect significant changes in sedentary behavior in future studies, larger sample sizes are needed which in turn will increase the study's statistical power. It is difficult to calculate the exact sample size needed to detect sedentary behavior changes because to date no study has reported significant changes in sedentary behavior of children, measured by accelerometer, following an intervention. However, a study by Keadle et al. measuring sedentary behavior of adults following an intervention detected within-subject differences using 10-15 subjects per group, but concluded that the null differences observed between groups occurred due to the study being underpowered.¹²⁵ Because the current study included 20 participants, perhaps it could be argued that statistical power was sufficient. However, variability in activity patterns have been shown to differ significantly between adults and children.¹²⁷ Therefore, inferences regarding sufficient statistical power as it relates to adult groups may not apply to groups of children.

A possible second reason for the lack of change in sedentary behavior following the intervention is that a possible intervention effect may have been masked by biologic factors that

were not accounted for in the investigation. One biologic factor that has been suggested to influence sedentary behavior is the participant's inherited genetic traits. To date, only one study has addressed the heritability of sedentary behavior in children. Results from this investigation showed that genetic traits were not predictive of the variance in sedentary time among 9-12 year-old twins and that environmental factors were the significant predictors of sedentary time in this group.¹²⁸ However, other studies of adolescents¹²⁹ and adults¹³⁰ have reported that genetic traits, rather than environmental factors, were stronger predictors of sedentary behavior. Hence, a participant's age might be the relevant determinant when considering whether genetic traits or environmental factors are most predictive of sedentary behavior.

The second biologic factor that has been suggested to influence sedentary behavior stems from a debatable hypothesis put forward by Rowland called the "activity stat" hypothesis.¹³¹ According to this hypothesis, there is an inherent activity regulatory center within the central nervous system that regulates one's daily energy expenditure through PA. After a bout of PA, one's biologic response that stems from this activity regulatory center is to resort to sedentary behavior to compensate for the energy previously lost. Similar to other known biologic control centers (e.g. those that regulate pH, core body temperature, and osmolarity) that constantly function to maintain homeostasis amidst external stimuli, an activity regulatory center is necessary to maintain energy homeostasis so that an adequate supply of energy will always be available for the body's physiological function.¹³¹ A study that showed no differences in children's energy expenditure despite differences in structured physical activity time at school,¹³² and a study that showed increased energy expenditures every day in adults who consumed an extra 1000 kcal/day for 8 weeks support this hypothesis.¹³³ The time scale over which

compensation may occur following a PA bout has not been determined, nor has the magnitude of the physical activity dose that may trigger compensation.¹³⁴

Because no changes in sedentary behavior occurred during the present investigation, one could argue that participants remained sedentary in order to compensate for the energy lost performing MVPA. If the “activity stat” hypothesis holds true, interventions are needed to specifically target sedentary behavior since many intrinsic biological controls can be influenced by behavior, peer influences, and environmental conditions.¹³¹ Such interventions should take place more regularly (daily as opposed to a few days a week) and specifically target sedentary behavior (emphasizing standing rather than sitting) rather than just focusing on improving MVPA.

Finally, the third, and perhaps most valid reason why changes in sedentary behavior were not detected following the intervention is that MVPA and sedentary behavior are 2 separate behaviors, and thus are not concomitantly related. The current intervention incorporated strategies to improve MPVA, but it did not do the same for sedentary behavior. Future interventions seeking to improve both MVPA and sedentary behavior should incorporate specific strategies for improving both MVPA and sedentary behavior concurrently. For example, the intervention in this investigation taught participants that they should engage in 60 minutes of MVPA every day. While such an intervention was designed to improve the participant’s MVPA behavior, it did not encourage the participant to be less sedentary. Future interventions that seek to decrease sedentary behavior should specifically inform participants of the amount of sedentary minutes they should avoid on a daily basis, and it should teach specific strategies that combat sedentary behavior such as standing rather than sitting.

While it might be reasonable to assume that separate interventions are needed to target both sedentary and MVPA behavior, literature supporting this notion is lacking as most PA intervention studies in children have only examined how MVPA is affected by PA interventions, and not how both MVPA and sedentary behavior are affected. However, a recent study by Kozey-Keadle et al.¹³⁵ examined how both MVPA and sedentary behaviors were affected by an intervention, and investigators found that adults participating in a PA intervention significantly increased their MVPA [mean (95% confidence interval)=28.6(22.0-35.2) min], but their sedentary behavior did not change [0.48(-2.2 to 3.1)%].¹³⁵ More importantly, Kozey-Keadle et al. found that those who participated in both a PA intervention and a separate intervention designed to reduce sedentary time significantly increased their MVPA [39.2(23.2- 46.1) min] while also significantly decreasing their sedentary behavior [-4.8(-0.8 to-7.9%)].¹³⁵ Therefore, interventions targeting both sedentary and MVPA behavior in children are warranted since such interventions have been shown to be effective in adults and may prove beneficial to children.

Strengths and Limitations

The strengths of this research include developing a theoretical framework that incorporated CBPR methods, obtaining objective measures of sedentary and PA behaviors, and utilizing a comparison group. Its limitations included: 1) limiting the intervention to only strategies that improve psychosocial constructs of PA when other factors (i.e. parental and peer influence, and equipment access)⁶⁷ have also been shown to influence PA behaviors; 2) assessing a small sample that may have resulted in insufficient power to detect differences in sedentary behavior within and between groups; and 3) obtaining PA outcomes that are not necessarily comparable across differing studies as uniform standards of practice have not been established on how to collect and analyze accelerometer data.^{126,136}

Cross-contamination of the investigation groups could have been a limitation since both the intervention group and comparison group attended the same school. While participants in both groups could have interacted—which could have influenced the investigation’s outcomes—dissemination of the intervention was controlled to the extent possible by providing the intervention in person rather than online, thereby making it more difficult for members of the comparison group to have access to the intervention.

One might argue that the short duration of the investigation was also a limitation since health behaviors are not considered to be sustainable until they are consistent for at least 6 months.⁵¹ While it is true that results from a 4- week intervention are too short to conclude whether learned behaviors were also sustainable, the purpose of this investigation was to determine if psychosocial constructs relating to PA could be improved by a community-based intervention that would also result in an increase in MVPA and a decrease in sedentary behavior. The results from this investigation suggest that a community-based PA video intervention can indeed positively influence psychosocial constructs leading to favorable MVPA behavior. However, supplemental strategies targeting decreases in sedentary behavior need to be incorporated so that such an intervention will also lead to a decrease in sedentary behavior. Because this pilot investigation was the first of its kind to determine if a community-based video intervention can positively influence PA and sedentary behavior among low SES children living in the Black Belt region of Alabama, it was important to first examine if behaviors could indeed be altered. The next step is to ascertain whether additional modifications can be made to the intervention that will lead to short-term decreases in sedentary behavior. Thereafter, studies should be conducted to ascertain whether the intervention results in a sustained change in behaviors over time.

Conclusion

This investigation was the first to evaluate a PA intervention designed using CBPR methods. Following the intervention, all psychosocial constructs relating to PA were significantly improved in the intervention group, and mean differences (post-pre) in knowledge and skills were significantly higher in the intervention group versus the comparison group. At follow-up, MVPA of the intervention group was higher than that of the comparison group, signifying that the community-based intervention. Because there were no differences in sedentary behavior among participants following the intervention, future studies should investigate interventions designed to specifically decrease sedentary behavior. In conclusion, this investigation is significant because it demonstrates how a community-based PA intervention can favorably impact MVPA behavior among low SES, rural children who are at high risk for obesity and obesity related diseases. Similar PA interventions incorporating CBPR should be replicated in elementary, middle, or high schools in an effort to improve PA in children and reduce the risk for certain chronic diseases.

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APPENDIX 1

Office for Research

Institutional Review Board for the
Protection of Human Subjects

THE UNIVERSITY OF
ALABAMA
R E S E A R C H

May 22, 2014

Kara Hamilton
Department of Kinesiology
College of Education
Box 870312

Re: IRB#: 14-OR-193 "Using Photovoice to Create a Physical Activity Intervention (Part 1)"

Dear Ms. Hamilton:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies

Your application will expire on May 21, 2015. If your research will continue beyond this date, complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, complete the Modification of an Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, complete the appropriate portions of the IRB Request for Study Closure Form.

Please use reproductions of the IRB approved stamped consent forms to obtain consent from your participants.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,



358 Rose Administration Building
Box 870127
Tuscaloosa, Alabama 35487-0127
(205) 348-8461
FAX (205) 348-7189
TOLL FREE (877) 820-3066

Title of Research: Using Photovoice to Create a Physical Activity Intervention (Part 1)

Investigator(s): Kara Hamilton

IRB Approval #:

OSP #:

Your child is being asked to be in a research study. This study is called **Using Photovoice to Create a Physical Activity Intervention (Part 1)**. This study is being done by Kara Hamilton, a PhD student at the University of Alabama.

What is the purpose of this study—what is it trying to learn?

The purpose of this study is to describe how children can use Photovoice to help make a future physical activity program. Photovoice is a communication process where children collect photographs of their lived experiences and then tell a focus group what their photographs mean.

What are the procedures of this study—what will my child be asked to do?

Your child will be asked to be part of a 30 minute Photovoice training session during class time at the Park Cameron Resource Center this summer. During the training, your child will be given a camera and told how to use it, and how to instruct others to use it, so that the child can obtain pictures that show the child engaged in various physical activities. Your child will be told to obtain photos over the next five days that show the child engaged in the games/sports/ activities that the child likes to do and that show the places where he or she is active. Children will be told not to take pictures of other people. Once the film is developed, your child will be a part of a class focus group. Each child in the focus group will pick three of their pictures to talk about. Your child will be given a copy of their photos to keep and one copy will be given to the researcher. The researcher will use your child's photos to help create future physical activity interventions for children in Black Belt Communities. To ensure confidentiality, your child's name will not be linked to the photos he or she takes.

Why is this study important—what good will the results do?

This study is important because we think your child's pictures can help researchers understand the types of activities children in the community enjoy. This will help researchers create relevant physical activity interventions for children. Relevant physical activity interventions will make children more active which is good for their health. Ultimately, increasing physical activity levels in children will help to reduce the risk of obesity and obesity related diseases.

Why has my child been asked to be in this study?

Your child is being asked to be in this research study because he/she is in 5th grade and attends the Park Cameron Resource Center summer program. Your child's class was randomly selected from the other classes to participate in this study.

How many other people will be in this study?

One 5th grade class at the summer program, approximately 20 students, will be asked to participate in this study.

Will being in this study cost us anything?

There is no cost for participating in this research study.

What are the risks (dangers or harms) to my child for participating in this study?

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CONSENT FORM APPROVED: 5/22/14
EXPIRATION DATE: 5/21/2015

There is minimal risk in your child participating in this research study. Your child's data will remain confidential and there will be no way to trace your child's information back to him/her. Your child will only be instructed to obtain pictures of physical activities they currently engage in so none of the activities will put your child at further risk compared to what they already experience on a day to day basis. If your child is not comfortable talking in front of other class members, they may be stressed about having to talk about their photographs during the focus group meeting. If this is the case, your child may choose not to participate at any time without consequence.

What are the benefits (good things) that may happen if my child is in this study?

By being in this study, your child will learn basic photography skills. This study will also help researchers understand the types of physical activities children like. This will help researchers make an effective future physical activity intervention.

How will my child's confidentiality be protected?

Your child's photographs will be stored on a password-protected computer, and stored on a secure server at The University of Alabama. The name of your child will not be disclosed with the pictures they obtain. Children's photos may be used in future physical activity videos for children and/or research publications/presentations only if you give written permission.

What are the alternatives to being in this study? Does my child have other choices?

The alternative to being in this study is not to participate. Your child will still have the opportunity to participate in the Photovoice program with the rest of his or her class; however, he/she will not have his/her photos used for the research study.

What are my child's rights as a participant in this study?

Taking part in this study is voluntary. You or your child can refuse to be in it at all. There will be no effect on your or your child's relations with the elementary school or the University of Alabama.

The University of Alabama Institutional Review Board ("the IRB") is the committee that protects the rights of people in research studies. The IRB may review study records from time to time to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Who do I call if I have questions or problems?

If you have questions, concerns, or complaints about the study, please contact Kara Hamilton at 205.348.9640 or email her at khamilton1@cchs.ua.edu. If you have questions about your child's rights as a person in a research study, call Ms. Tanta Myles, the Research Compliance Officer of the University, at 205-348-8461 or toll-free at 1-877-820-3066.

You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at http://osp.ua.edu/site/PRCO_Welcome.html or email the Research Compliance office at participantoutreach@bama.ua.edu.

After your child participates, you are encouraged to assist your child in completing the survey for research participants that is online at the outreach website, or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

UNIVERSITY OF ALABAMA IRB
CONSENT FORM APPROVED: 5/22/14
EXPIRATION DATE: 5/21/2015

2

**I have read this consent form and I have had a chance to ask questions. I agree to have my child take part in the research study.
I will receive a copy of this consent form to keep.**

Child's Name

Grade

Signature of Parent

Date

Signature of Investigator

Date

UNIVERSITY OF ALABAMA IRB
CONSENT FORM APPROVED: 5/22/14 ³
EXPIRATION DATE: 5/21/2015

Child Assent Form

Directions: Please have your child fill out the below assent statement.

I, _____ understand that my parent(s)/guardian have/has given permission for me to take part in the “**Using PhotoVoice to Create a Physical Activity Intervention (Part 1)**” study. In this study, I will first learn how to use a camera and teach others how to use a camera. Then, I will collect pictures that show me doing the games/sports/ activities that I like to do and that show the places where I am active. Next, I will describe some of my pictures to a focus group. I am taking part in this study because I want to. I have been told that I can stop at any time I want to and nothing will happen to me if I want to stop.

Signature of Child

Date

UA IRB Approved Document
Approval date: 5/22/14
Expiration date: 5/21/2015

Photo Release Form

I hereby give permission for my son/daughter's photographs they obtain during the Photovoice project to be used for informational or educational purposes. This includes possibly using my child's photographs in future instructional physical activity videos for children who reside in Black Belt communities and/or research publications/presentations. I understand that the name of my child will not be disclosed with the pictures they obtain.

Parent signature: _____

Date: _____

UNIVERSITY OF ALABAMA IRB
CONSENT FORM APPROVED: 5/22/14
EXPIRATION DATE: 5/21/2015

Office for Research
Institutional Review Board for the
Protection of Human Subjects

August 28, 2014



Kara Hamilton, MEd
Graduate Research Assistant
Institute for Rural Health Research
College of Community Health Sciences
The University of Alabama
Box 870327

Re: IRB # 14-OR-237 (Revision) "Using Photovoice to Create a Physical Activity Intervention (Part 2)"

Dear Ms. Hamilton:

The University of Alabama Institutional Review Board has reviewed the revision to your previously approved expedited protocol. The board has approved the change in your protocol.

Please remember that your approval period expires one year from the date of your original approval, June 20, 2014, not the date of this revision approval.

Should you need to submit any further correspondence regarding this proposal, please include the assigned IRB application number. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants.

Good luck with your research.

Sincerely,

(
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Office for Research Compliance



358 Rose Administration Building
Box 870127
Tuscaloosa, Alabama 35487-0127
(205) 348-8461
FAX (205) 348-7189
TOLL FREE (877) 820-3066

Title of Research: Using Photovoice to Create a Physical Activity Intervention (Part 2)

Investigator(s): Kara Hamilton

IRB Approval #:

OSP #:

Your child is being asked to be in a research study. This study is called **Using Photovoice to Create a Physical Activity Intervention (Part 2)**. This study is being done by Kara Hamilton, a PhD student at the University of Alabama.

What is the purpose of this study—what is it trying to learn?

The purpose of this study is to determine if a web-based physical activity intervention can positively improve physical activity levels among middle school-aged children.

What are the procedures of this study—what will my child be asked to do?

Your child will be asked to participate in a 4-week physical activity intervention that will take place during the school day at Aliceville Middle School. The intervention involves watching a 5 to 10 minute video two days a week for 4 weeks about physical activity. On two occasions, your child will also be asked to wear an activity monitor, a device worn around the hip like a belt that records your child's movement. Your child will be asked to wear the activity monitor for six days during the week prior to the intervention, and for six days during the week after the intervention. Your child will be instructed to put the activity monitor on in the morning right after he or she gets out of bed or after taking a morning bath or shower and to take it off immediately before he or she goes to bed. Your child will be told not to submerge the activity monitor in water (swimming, bathing, etc.).

At the beginning and at the end of the study, we would like to document the following information on your child:

- Age, race, sex, height and weight.
- Your child's attitudes and beliefs about physical activity measured by a questionnaire
- Your child's physical activity measured by an activity monitor

We will not use your child's name or any other identifying information.

Why is this study important—what good will the results do?

This study is important because we believe through the use of the physical activity intervention a significant move toward reducing sedentary behaviors among children in the rural Alabama Black Belt can be made while empowering children to distinguish between a non-active and active lifestyle. Ultimately, increasing physical activity levels in children will contribute to reduced risk of obesity and obesity-related diseases.

Why has my child been asked to be in this study?

Your child is being asked to be in this research study because he/she is a student who attends Aliceville Middle School which volunteered to participate in this physical activity intervention.

How many other people will be in this study?

Two classes at the after school program, approximately 40 students, will be asked to participate in this study. The classes will be randomly assigned as the comparison group or the intervention group. If your child's class is selected

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CONSENT FORM APPROVED: 8-28-14
EXPIRATION DATE: 6-19-15

as the comparison group, he or she will watch the physical activity videos following the 4-week study rather than during the 4-week study.

Will being in this study cost us anything?

There is no cost for participating in this research study.

What are the risks (dangers or harms) to my child for participating in this study?

There is little to no risk in your child participating in this research study. Your child's data will remain confidential and there will be no way to trace your child's information back to him/her. While your child will learn about various types of physical activities in the web-based videos, none of the activities put your child at further risk beyond those risks they already experience during their regular physical education class.

What are the benefits (good things) that may happen if my child is in this study?

By participating in the 4- week physical activity intervention, your child may become more physically active which is good for your child's health. This study will also assist researchers in gaining new insight into children's perceptions of physical activity and help researchers design and implement effective future physical activity interventions.

How will my child's confidentiality be protected?

Your child's data will be stored on a password-protected computer and stored on a secured server at The University of Alabama. The name of your child will not be disclosed with any of their data.

What are the alternatives to being in this study? Does my child have other choices?

The alternative to being in this study is not to participate. If your child does not participate, he or she will attend another class when the intervention activities take place.

What are my child's rights as a participant in this study?

Taking part in this study is voluntary, and you or your child can refuse to participate . There will be no effect on your or your child's relations with Aliceville Middle School or the University of Alabama if you decide not to participate.

The University of Alabama Institutional Review Board ("the IRB") is the committee that protects the rights of people in research studies. The IRB may review study records from time to time to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Who do I call if I have questions or problems?

If you have questions, concerns, or complaints about the study, please contact Kara Hamilton at 205.348.9640 or email her at khamilton1@cchs.ua.edu. If you have questions about your child's rights as a person in a research study, call Ms. Tanta Myles, the Research Compliance Officer of the University, at 205-348-8461 or toll-free at 1-877-820-3066.

You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at http://osp.ua.edu/site/PRCO_Welcome.html or email the Research Compliance office at participantoutreach@bama.ua.edu.

After your child participates, you are encouraged to assist your child in completing the survey for research participants that is online at the outreach website, or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

**I have read this consent form and I have had a chance to ask questions. I agree to have my child take part in the research study.
I will receive a copy of this consent form to keep.**

Child's Name

Grade

Signature of Parent

Date

Signature of Investigator

Date

Please list any known health conditions of your child that limits their physical activity participation. Depending on the severity of the health condition, some children may not be eligible to participate in this study.

Child Assent Form

Directions: Please have your child fill out the below assent statement.

I, _____ understand that my parent(s)/guardian have/has given permission for me to take part in the “**Using Photovoice to Create a Physical Activity Intervention (Part 2)**” study. In this study, I will watch a series of videos about physical activity over a four week period while at Aliceville Middle School. Also, at two different times during the study, I will wear an activity belt for 6 days. I will put the belt on when I wake up and will take the belt off before I go to bed. I am taking part in this study because I want to. I have been told that I can stop at any time and nothing will happen to me if I want to stop.

Signature of Child

Date

UA IRB Approved Document
Approval date: 8-28-14
Expiration date: 6-19-15

APPENDIX 2

VIDEO 1

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 1, Day 1: Let's Get Started.

EXT. PARK CAMERON RESOURCE CENTER- DAY

TIM, Physical Activity Expert, wearing sunglasses and athletic attire.

TIM

What's up guys! My name is Tim and over the next weeks, I'm gonna teach you why physical activity is important and how you can become more physically active. But first, what is 'physical activity'? Let's ask one of your community members who happens to know...

DISSOLVE TO:

EXT. BASEBALL FIELD- DAY

COACH WILLIE THOMAS, former coach at Aliceville high school

COACH

Hi ya'll. Coach Thomas here. Physical activity is any body movement that works

your muscles and requires more energy than resting. Walking, running, dancing, and doing household chores are a few examples of physical activity. Personally, my favorite physical activities are: (list a few). Here are some of the favorite physical activities kids in your community shared...

DISSOLVE TO:

SNAP SHOTS OF 4 PICTURES (each picture takes up entire screen, include music) (12 Jihad pic, 3 Alex bike pic, 17 Lia dance pic, 5 Destiny jump rope pic)

DISSOLVE TO:

EXT. PARK CAMERON RESOURCE CENTER- DAY

TIM

So there you have it! Now let's see if you got all of that. Watch these next clips and try to pick out the physical activity you see...

DISSOLVE TO:

TITLE AT TOP: TIM (O.S)

Pick which activity is a PHYSICAL ACTIVITY

Sleeping

Biking

(Physical activity is when you use your energy and move your muscles. When you bike, you are moving your legs so this is physical activity. Sleeping is not physical activity because you are not moving your body when you are sleeping).

Typing on the Computer

Walking

(Walking is physical activity because you are moving your legs. When you are using the computer, you are not moving much so this is not physical activity)

Playing Tag

Playing Dominoes

(Playing tag is physical activity because you are running and dodging. You don't move much when you play dominoes so this is not considered a physical activity)

Playing basketball

Reading a book

(Bball is a physical activity because your body is moving a lot when you shoot, dribble, run, and pass. While reading is a good activity since it makes you smarter, this is not a physical activity because your body is not moving).

Dancing

Singing in the choir

(Dancing is a physical activity because your body is moving to the beat. When you are singing in a choir, your body is not moving so this is not a physical activity).

TIM

To help stay healthy,

you need at least 60 minutes of physical activity every day. But you don't have to get them in one goal.

Dissolve to

COOL KID 1, high school boy

(COOL KID 1 making a bball hoop with a #10 jersey)

TIM (O.S)

They can be broken up into bits. 10 minutes here (add minutes after #10)

Dissolve to

COOL KID 2 and COOL KID 3, high school girls

(COOL KID 2 and COOL KID 3 walking outside by 15mph sign)

TIM (O.S)

... 15 minutes there...

DISSOLVE TO

CLOCK WITH SECONDS HAND MOVING TO 60

TIM (O.S)

Just make sure it all adds up to the 60 minutes you need every day.

DISSOLVE TO

EXT. PARK CAMERON RESOURCE CENTER- DAY

TIM

So make a commitment to yourself today to be more physically active! To help make sure you are on your way to becoming more physically active, let's set a goal using the SMART strategy. Never heard of it? Well, let's again turn it over to one of your community members...

DISSOLVE TO

INT. Class room (double screen, on one side, smart goals image)
MS. Owens, Aliceville program director

Volunteer

Hi everyone, my name is _____ and here is how to make a SMART Goal. SMART stands for Specific, Measurable, Attainable, Relevant, and Time Based. An example of a bad goal is "I'm going to try to be more physically active." It's a bad goal because it's not specific, it's not measureable, and it's not time bound. At the end of the day, there is no way to determine if you were successful. A good goal is "I will walk for 20 minutes every day after school for 1 week". This is a good goal because it is easy to measure. Its Specific, we are talking about walking for 20min after school. It's measureable, at the end of the day you either did or didn't walk 20 min after school. It's attainable in that you have the time and ability to walk 20 min. It's relevant to the overall commitment of becoming more physically active. And its time bound, you will walk every day for 7 days in a row. When making your goal, be as specific as possible. Back to you Tim!

DISSOLVE TO

EXT. PARK CAMERON RESOURCE CENTER- DAY

TIM

That's it for today guys.

Teachers, to review, pause this video after the following questions to check for understanding. Until next time!

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top)1. TIM (O.S) **What is physical activity?** (10 second delay. (Show split screen of Coach Thomas saying definition and type out words on other half of screen). Physical activity is any body movement that works your muscles and requires more energy than resting.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top)2. TIM (O.S) **How many minutes of physical activity should you perform daily?** (10 second delay. (Show split screen of Coach Thomas answering). Physical activity is any body movement that works your muscles and requires more energy than resting. To help stay healthy, you need at least 60 minutes of physical activity every day.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top)3. TIM (O.S) **True or False. You do not have to get your 60 minute goal all at once but can break the minutes into bits at a time.** (10 second delay. True.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top)3. TIM (O.S) **What does SMART stand for when making a SMART goal?** (10 second delay. Specific, Measurable, Attainable, Relevant, Time-bond

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top)3. TIM (O.S) **Lastly, Make a SMART physical activity goal and share it with someone sitting next to you. Have a few students share their goals to the entire class.**

FADE OUT

VIDEO 2

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 1, Day 2: Let's Get Started.

"I Like to Move it Move it" 20 second clip of Madagascar, show 4 photos of kids Photovoice photos (2 Lazerick bball, 3 Alex dog, 2 Destiny sweeping, 14 Jada dancing).

INT. PARK CAMERON RESOURCE CENTER CLASSROOM

TIM, Physical Activity Expert

TIM

Tim here. Today we will be talking about the importance of enjoying physical activity, how you can make physical activity more enjoyable, barriers to physical activity, and some daily cues that can help remind you to be more physically active. Let's ask some of the high schoolers why it's important to enjoy physical activity.

DISSOLVE TO:

INT. PARK CAMORON GYM

TIM

First of all? What physical activities do you all enjoy doing?

COOL KID 1, COOL KID 2, high school students at Aliceville

COOL KID 1 and COOL KID 2

(Answers Tim's question)

TIM

Why do you all think it is important to enjoy physical activity?

COOL KID 1

Because if it's something I don't like doing, for example, I don't like doing (activity) then I'm going to get bored or Frustrated.

COOL KID 2

Yeah, and if it's something that I don't like, I'm not gonna do it and I won't make that 60 minute physical activity goal everyone is supposed to reach. I might just sit around instead.

(SHOW 15 second clip of MOVE IT MOVE IT)

TIM

How can you make physical activity more enjoyable?

DISSOLVE TO:

(SHOW clip of high schoolers jumping rope) TIM (O.S) "To make physical activities more fun, do them with friends rather than by yourself".

(SHOW clip of high schooler cleaning) TIM (O.S) "Doing chores are a great way to be active and it helps your parents out too. To make chores more fun, try listening to music while you do them".

(SHOW clip of people playing bball and volleyball) TIM (O.S) "When you have free time at school or during your after school program, don't just sit around because everyone else is playing basketball and you don't like basketball. If you do not like playing basketball, pick another physical activity, like volleyball, you can do instead".

(SHOW clip of kid biking) TIM (O.S) "When you are at home, it's easy to just sit around and watch TV. Sitting around for long periods of time is not good for your health. Instead, participate in an activity you enjoy at home such as going on a walk or run or riding your bike. To make these activities even more fun, listen to music or get your friends or family members to go with you."

DISSOLVE TO

TITLE SLIDE: BARRIERS TO PHYSICAL ACTIVITY

INT. PARK CAMERON RESOURCE CENTER CLASSROOM

TIM, Physical Activity Expert

TIM

A physical activity barrier is any obstacle that makes it more difficult for you to achieve your goal of 60 minutes of physical activity per day. For example, girls...

DISSOLVE TO

GOOFY CARTOON OF GETTING PICKED ON

TIM (O.S)

A lot of you all like playing basketball but not with boys because you are afraid they will run you over. This would be a barrier to physical activity because the fear of being run over is keeping you from playing basketball and adding to your 60 minutes of activity a day.

DISSOLVE TO

(Slide with owens pic on one side and below question on the other)

TIM (O.S)

Why talk about barriers anyway? Well, the point is to find ways to get around the things that get in the way of being physically active. For example, what are some ways you could overcome the barrier of being run over by bigger kids playing basketball?

Answer:

TIM (O.S)

1. You could do another physical activity like volleyball, walking, kickball, jump rope, or freeze tag.

2. You could ask an adult for another basketball and you and your friends could play basketball on the other half of the court.

3. You could do the ultimate challenge and take all those big boys on in basketball... (owens basketball clip)

(TIM

Another barrier you all face is that you all like to sometimes play outside in the grassy area next to the gym, but a lot of times you don't because you all do not have equipment and there is no adult outside. Not having equipment or adult supervision is a barrier because it is keeping you from being physically active outside. To overcome this barrier, all you need to do is ask one of the adults to pump up the ball you need and to ask them to supervise you and your friends while you play outside. Some barriers like this one are easy to overcome. All you need remember is to JUST ASK.)

TIM

And now here are other barriers kids in your community shared and how we can overcome them...

DISSOLVE TO

AUDIO Volunteer voice. (Music: techno)

Volunteer (OS)

No equipment or facilities that promotes physical activity.

But guys, think about it. We have great facilities in Aliceville where we can be active. To name a few, we have the gym at Park Cameron (#11 photovoice pic), sidewalks (#17 photovoice pic), the school play ground and field, play grounds at our apartment complexes (#17 photovoice pic), and a park. So it's not a matter of not having the facilities, you just gotta remember that we have them!

Another common barrier is lack of time. You may go to school, then have homework tutoring after school, then go home and eat dinner, and then have to get ready for bed soon after. Remember though physical activity doesn't have to take large blocks of time. Getting in a quick bike ride, walking to school, or doing some jumping jacks during TV commercials are all great ways to overcome the time barrier.

Sometimes you all sit around and are not active because that's what your friends or family members are doing. When this happens, your friends and family are physical activity barriers because they are keeping you from being active. Overcome this by being the leader in your family or among your friends. Be creative and think of fun activities you all can do together. When you have free time at school or after school, put a basketball, kickball, or baseball game together, challenge your friends to a jump rope competition

or make up a dance. When you are at home, invite your family to go on a walk or play tag outside.

DISSOLVE TO

TIM

A lot of times we aren't physically active during the day simply because we forget about how important physical activity is. In the next video, we will discuss why physical activity is so important. In the meantime, what is a physical activity cue? A physical activity cue is something that reminds us to be physically active during the day. What are some physically activity cues you can use to make your more physically active during the day?

DISSOLVE TO

TIM (O.S)

How about setting your cell phone alarm every hour when doing homework after school to remind you to go be active for a few minutes?

(COOL kid reading a book and then alarm goes off and goes walking)

Sitting your head phones out by your shoes so in the morning you will remember to take them with you and go on a walk and listen to music at some point during the day.

(COOL kid putting on shoes and grabbing their head phones as they leave the house in the morning)

Writing an activity down in your homework planner notebook so you will remember to do that activity just like you remember to do your homework.

(show notebook with homework assignments and activity listed)

TIM

That's it for today guys.

Teachers, to review, pause this video after the following questions to check for understanding. Until next time!

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) (O.S) 1. Physical activity is for everyone. How can you make physical activity more enjoyable? (Tim reads answer... (O.S) To make physical activity more enjoyable, do them with friends, listen to music, and pick activities that you find fun)

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) (O.S) 2. What's an example of a physical activity cue you can use to remind you to be physically active during the day? ((O.S) Some examples are setting your cell phone alarm to remind you to be active, putting your head phones by your shoes, or writing an activity in your homework planner. What are some other's you came up with?)

TIM

One last thing before I go. I want you to try out physical activity cue before I see you next time. It can be one we discussed or you can come up with your own. Also, how is your SMART goal going? Good luck!

FADE OUT

VIDEO 3

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 2, Day 1: How are you doing?

Review from last week: What was your physical activity SMART goal you made last week? Did you keep it?

What was your physical activity cue from last week? Did you try it?

BLACK SCREEN) (type cursor types out at top)1. What is physical activity? (10 second delay. (Show split screen of Coach Thomas saying definition and type out words on other half of screen). Physical activity is any body movement that works your muscles and requires more energy than resting.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top)2. How many minutes of physical activity should you perform daily? (10 second delay. (Show split screen of Tim answering). To help stay healthy, you need at least 60 minutes of physical activity every day.

(SLIDE: The Truth about Physical Activity in our Country)
(Educating the student body 50 second video)

(BLACK SLIDE: Why should we be Physically active?)

(YOU TUBE 1:20 video)

TIM

I hope from today's video, you see that physical activity is self rewarding and is good for your health. Next time you are debating on whether you should sit around on the couch or get up and be active, I hope you think about all of the benefits of physical activity.

Show slide covered in selfies of Photovoice pics... (3, 4, 5, 7, 9, 11, 14, 17)

TIM (OS)

Most importantly, physical activity is for everyone and everyone can meet the recommended guidelines of getting 60 minutes of physical activity every day.

TIM

That's it for today guys.

Teachers, to review, pause this video after the following questions to check for understanding. Until next time!

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) 1. (O.S) True or false. A lack of physical inactivity increases your risk of heart disease, diabetes, osteoporosis, anxiety and depression and other diseases.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) (O.S) 2. Why is it good to be physically active?

- A. Makes your body healthier
- B. Makes your mind healthier and you can do better in school
- C. It can make you look better
- D. It can make you feel good
- E. It can help you live longer
- F. It can give you more confidence
- G. It can help you sleep better
- H. It can give you more energy
- I. All the above

FADE OUT

VIDEO 4

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 2, Day 2: How are you doing?

TIM

There are different categories of physical activities you should engage in. One type is called aerobic activities. What does that mean? Well, aerobics, also referred to as cardio, is any activity that gets you breathing harder and your heart beating faster for a continuous amount of time. Aerobic activity could be walking briskly, running hard, riding a bicycle, or dancing with your friends.

TIM (O.S)

For substantial health benefits, your 60 minutes a day should be either moderate (such as brisk walking) or vigorous intensity (such as jogging) aerobic physical activity. Intensity is simply how hard your body is working during aerobic activity. But how do you know if you are doing a light, moderate, or vigorous physical activity?

TIM (O.S)

For most people, daily physical activity such as shopping or light housework doesn't increase your heart rate that much. That makes these activities light intensity.

TIM (O.S)

Things such as walking briskly, and leisurely riding a bike increase your heart rate some making these moderate intensity activities.

TIM (O.S)

Vigorous intensity activities include such workouts as running, playing basketball, or jump rope. These activities really get your heart pumping and you breathing heavily.

TIM (with COOL KIDS) (OUTSIDE)

Here is a simple way to find out your level of intensity. It's called the talk test. Right now we are walking slowly- a light intensity activity. Now as you can hear, I can still speak normally but in a few minutes when I increase my pace, I've raised my heart rate and even broken a sweat. This is the moderate intensity level. I'm able to talk fairly normally but if I tried to sing at this level, I couldn't. This should be the same for you if you were doing activities of moderate effort such as walking briskly or dancing. Now let's really pick up the pace...

TIM

(A few minutes later) Ok, now we are jogging, now as you can tell now, I'm not able to say more than a few words without pausing for a breath. I'm breathing hard and fast and my heart rate has increased quite a bit. This is vigorous activity intensity.

TIM

Vigorous activities include jogging, jumping rope, playing basketball, or playing freeze tag. You should try to include vigorous-intensity physical activity at least 3 days a week. However, if you haven't been very active lately, slowly work your way up to the more vigorous intensity activities. It is important for your safety and your health to feel comfortable doing activities of moderate effort before upping the intensity.

TIM

Remember though that the 60 minute a day guideline is all about doing the appropriate types and amounts of activities that are also right for your fitness level. What counts in your aerobic activities is simply getting active because some activity is better than none. I'm Tim asking you to get active, healthy, and happy.

TIM

That's it for today guys.

Teachers, to review, pause this video after the following questions to check for understanding. Until next time!

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) 1. TIM (O.S) What is aerobic activity?

A. also referred to as cardio, is any activity that gets you breathing harder and your heart beating faster for a continuous amount of time.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) 2. TIM (O.S) What is an example of a vigorous physical activity?

- A. Walking slowly
- B. Sweeping
- C. Playing Basketball

3. TIM (OS) For substantial health benefits, your 60 minutes of physical activity should be performed at what intensity?

- A. Light
- B. Moderate
- C. Vigorous
- D. Moderate or Vigorous

FADE OUT

VIDEO 5

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 3, Day 1: Keep it going

BLACK SCREEN) (type cursor types out at top)1. What is physical activity? (10 second delay. (Show split screen of Coach Thomas saying definition and type out words on other half of screen). Physical activity is any body movement that works your muscles and requires more energy than resting.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top)2. How many minutes of physical activity should you perform daily? (10 second delay. (Show split screen of Tim answering). To help stay healthy, you need at least 60 minutes of physical activity every day.

(BLACK SCREEN) (type cursor types out at top)3. True or False. You do not have to get your 60 minute goal all at once but can break the minutes into bits at a time. (10 second delay. True.

(BLACK SCREEN) (type cursor types out at top)4. Why is it good to be physically active?

- A. Makes your body healthier
- B. Makes your mind healthier and you can do better in school
- C. It can make you look better
- D. It can make you feel good
- E. It can help you live longer
- F. It can give you more confidence
- G. It can help you sleep better
- H. It can give you more energy
- I. All the above

5. What is aerobic activity?

A. also referred to as cardio, is any activity that gets you breathing harder and your heart beating faster for a continuous amount of time.

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) 6. What is an example of a vigorous physical activity?

- A. Walking slowly
- B. Sweeping
- C. Playing Basketball

6. For substantial health benefits, your 60 minutes of physical activity should be performed at what intensity?

- A. Light
- B. Moderate
- C. Vigorous
- D. Moderate or Vigorous

TIM

Hey guys. Today we will talk about the importance of taking ownership in selecting a variety of physical activity to participate in. We will also talk about positive self talk and coping strategies that help you to be more physically active and how physical activity can help your self esteem.

COOL KID 1 (OS)

Today is my tomorrow.

COOL KID 2 (OS)

It's up to me to shape it,

COOL KID 3 (OS)

To take control and seize every opportunity.

COOL KID 4 (OS)

The power is in the choices I make each day.

COOL KID 5 (OS)

I am physically active, I live well.

COOL KID 1-5 (OS)

I shape me.

DISSOLVE TO

You are the only one who controls how physically active you are.

Take **ownership** of your health. Choose activity.

(snap shots of bunches of activities)

Live well.

DISSOLVE TO

TIM

Before we move on to positive self talk, did you all notice all of the various activities from that last clip? Keep in mind that when taking ownership of your physical activities, you should try out different kinds of physical activity so that you have more options to choose from when you want to do something active. And remember, to receive the previous health benefits we talked about, such as decreasing your risk for heart disease and diabetes, try to pick activities of moderate to vigorous intensity, like walking briskly, playing basketball, or hip hop dancing, where your heart rate increases and you breath more heavily.

Practice Postive Self Talk

(24 seconds YouTube pep talk from Kid President)

Volunteer

Hi everyone, _____ here from the Park Cameron Resource Center and today I'm gonna teach you about practicing positive self-talk. Kinda like in the video you just saw, positive self-talk is giving yourself a pep talk, except self-talking isn't said out loud. It's the talking you do in your own head about yourself. Often self-talk happens so automatically we aren't even aware of it. But, you can use self-talk as a way to encourage and motivate yourself to be more physically active. It all starts with replacing negative self-talk with positive self-talk. For example, in the past let's say you always told yourself you were too busy or maybe you were even too lazy to be physical activity. Positive self-talking would instead be "I wasn't able to fit physical activity into my schedule, but I can reexamine some priorities". What about, "I've never been physically active before"? Postive self-talk replaces that thought with "Being

physically active gives me the opportunity to learn something new". Positive self-talk allows you to see the glass as half full rather than half empty. Back to you Tim!

Coping strategies that help you to be more physically active

TIM

Being able to cope means that you are able to overcome something hard. Studies show that it is hard for kids like you to be physically active and to reach that 60 min physical activity goal everyday. Let's ask some kids in your community how they overcome this challenge.

TIM (with high schoolers)

What positive things do you do to reach your daily physical activity goal of 60 minutes everyday?

COOL KID 1

Play on a school sports team.

COOL KID 2

Go on a walk after dinner every night

COOL KID 3

I take breaks during homework and will walk my dog.

TIM

How do you manage to overcome challenges in changing your physical activity habits?

COOL KID 1

Hang out with other kids who are active

COOL KID 2

Realize that physical activity isn't hard to do. You basically just do activities where you are moving rather than sitting around.

TIM

We have also previously talked about other ways we can cope by making goals and reminding ourselves with cues.

DISSOLVE TO

Physical activity helps your self esteem.

(Self esteem video 1:20)

TIM

So, how do you feel about yourself? The truth is, when you are physically active on a regular basis, you may feel better about your appearance and yourself, which will also boost your confidence. Also, studies show that physical activity releases various brain chemicals that may leave you feeling happier and more relaxed.

TIM

That's it for today guys.

Teachers, to review, pause this video after the following questions to check for understanding. Until next time!

DISSOLVE TO

(BLACK SCREEN) (type cursor types out at top) TIM OS 1. What are some strategies that can help you to be more physically active? (10 second delay. (Show split screen of Tim answering).

- A. Positive Self Talk
- B. Use coping strategies
- C. All the above

FADE OUT

VIDEO 6

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 3, Day 2: Keep it Going

TIM

As part of your 60 minutes of daily physical activity, you should include bone-strengthening physical activity on at least 3 days of the week. Bone-strengthening activities make your bones stronger. Bone strengthening activities, like jumping, are important because these activities produce a force on the bones that promotes bone growth and strength. Here are some examples of bone-strengthening activities you can participate in at least 3 days a week...

10 SEC BONE CARTOON

TRANS

COOL KID 1 HOP SCOTCH

10 SEC BONE CARTOON

TRANS

COOL KID 2 HOPPING, SKIPPING, JUMPING

10 SEC CARTOON TRANS

COOL KID 3 JUMPING ROPE (VARIOUS TYPES)

10 SEC CARTOON TRANS

COOL KID 4 HIP HOP

10 SEC CARTOON TRANS

SPORTS such as gymnastics, basketball,

Volleyball

DISSOLVE TO

TIM

When selecting bone strengthening activities, remember to include some that are of moderate and vigorous intensities, since these activities have shown to give you the health benefits we have previously talked about, like decreasing your risk for heart disease and diabetes. Examples of bone strengthening activities at moderate and vigorous intensities could be jumping rope and playing basketball since these activities cause an increased heart rate and heavy breathing.

TIM

That's it for today guys.

Teachers, to review, pause this video after the following questions to check for understanding. Until next time!

(BLACK SCREEN) (type cursor types out at top) TIM OS 1. Which of the following is an example of a bone strengthening activity?

(10 second delay. (Show split screen of Tim answering).

- A. Jump rope
- B. Riding a bike
- C. Walking

FADE OUT

VIDEO 7

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 3, Day 2: Keep it Going

TIM

As part of your 60 minutes of daily physical activity, you should include muscle-strengthening physical activity on at least 3 days of the week. Muscle-strengthening activities makes you stronger and can help you improve in your sports or activities. They can also help you maintain a healthy weight. Here are some examples of muscle-strengthening activities you can participate in at least 3 days a week. Notice from these clips that you are about to see, even if you do not own traditional lifting weights in your house, you can use other household items in your house, such as a broom stick, to receive the same muscle- strengthening benefit...

COOL KID 1 tug of war

COOL KID 2 pushups (modified or reg)

COOL KID 3 (tree or rope climbing)

COOL KID 4 sit-ups with ball toss

Swinging on playground equipment

Dance moves supporting body weight

Riding your bike (especially up a hill)

Bench press and pull-ups with broom stick

DISSOLVE TO

TIM

When selecting muscle strengthening activities, remember to include some that are of moderate and vigorous intensities, since these activities have been shown to give you the health benefits we have previously talked about, like decreasing your risk for heart disease and diabetes. An example of a muscle strengthening activity at a moderate or vigorous intensity could be riding your bike, especially up a hill, since riding your bike causes an increased heart rate and heavy breathing.

TIM

That's it for today guys.

Teachers, to review, pause this video after the following questions to check for understanding. Until next time!

(BLACK SCREEN) (type cursor types out at top) TIM OS 1. Which of the following is an example of a muscle strengthening activity?

(10 second delay. (Show split screen of Tim answering).

- A. walking
- B. tug of war
- C. playing dominoes

FADE OUT

VIDEO 8

FADE IN:

(clapping music)

WHITE SCREEN. PROJECT SHAPE (top and center). Spin in and sound affect when slammed down: Shaping Health using Activity Photovoice and E-video (vertical). (Fade in) Supported in part by (bounce in) (Project UNITED LOGO)

STATIC SCREEN FADE IN

BLACK SCREEN. (In white) Week 4, Day 2: Commitment

TIM

Hi guys! Tim here. We have reached the end of our Physical Activity video series. Hope you now understand how important physical activity should be in your life and hope you are ready to make a long term commitment to an active lifestyle. Don't forget that physical activity should be fun and is for everyone. When achieving your 60 minutes of physical activity every day, try to include activities that are of moderate and vigorous intensity since these types of activities have many health benefits. To end our series, we will finish with a review of some things you learned these last few weeks.

DISSOLVE TO

(Music in background: Ellie Goulding, Anything Could Happen)

Slide: Rural area heart disease 'hot spots' news paper clip

Slide: Where we live determines our health

Slide: Our Pickens County Reality

Slide: 36% are obese

Slide: 33% are physically inactive

Slide: Let's turn this around

Slide: Physical Health Benefits

Slide: (4 chris 2) BUILD stronger muscles and bones

Slide: (PICTURE) DECREASE the risk of chronic disease

Slide: (9) MAINTAIN a healthy body weight

Slide: 2 Mental Health Benefits

Slide: (17 relax pic) improve stress management

Slide: (12) FOSTER creativity and imagination

Slide: (3) GAIN self confidence

Slide: (PICTURE from you tube video) ENHANCE overall well-being and happiness

Slide: 3 SOCIAL HEALTH BENEFITS

Slide: (17) MEET new friends

Slide: (3 dog pics) PARTICIPATE in outdoor activity play

Slide: (Picture) INCREASE quality time with family and friends

SLIDE: (Over news article) PICKENS COUNTY Healthiest Place to Live

SLIDE: HOW WE GET THERE

SLIDE: STARTS WITH YOU. Commit to an active lifestyle.

SLIDE: Walk, cycle, hike, climb, swim, run, dance, play,

SLIDE: WHAT WE CAN DO

SLIDE: Share, collaborate, partner, encourage, communicate, learn, invest

DISSOLVE TO

TIM

That's it for today guys.

Teachers, to review, pause this video
after the following questions to check
for understanding. Until next time!

FADE OUT

APPENDIX 3

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	Parent Info Pack/ Consent/Assent		CG Accel				
Week 2	CG Accel CG: BMI, survey		IG Accel				
Week 3	IG Accel IG: BMI, survey	Video 1			Video 2		
Week 4	Video 3				Video 4		
Week 5	Video 5				Video 6		
Week 6	Video 7		CG Accel				
					Video 8		
Week 7	CG Accel CG: survey		IG Accel				
Week 8	IG Accel IG: survey						

APPENDIX 4



How to Wear the Activity Meter

This small activity meter records general movement and allows us to get a better idea of your overall activity level. We will not be able to tell what kind of specific activity is happening. At first, the belt may feel slightly awkward, but after a few hours, you will probably get used to it and not notice it as much. It is **very** important that you wear the meter properly. If it is not worn properly, the meter will not work properly. Please follow these instructions carefully.

- Wear the meter attached to the belt around your waist, just above your **right** hipbone. You can wear it either underneath or on top of your clothing.
- Wear the meter so that the star sticker is facing up.



- Wear the meter **snug** against your body. If you have to, you can adjust the belt by pulling the end of the strap to make it tighter. Or, to loosen the belt, push more of the strap through the loop. **Wear the belt tight enough so that the meter does not move when you are being active.**
- Please **put it on first thing in the morning**- either after you get out of bed or just after you shower or take a bath in the morning.
- Do not submerge the meter in water (swimming, bathing, etc.)
- Keep activity meter on all day (unless swimming or in the water).
- At night, **take it off right before you go to bed. You should be wearing the meter for at least 12 hours each day.**
- Do not let anyone else wear it.

There is not 'ON' or 'OFF' switch that you need to worry about turning on or off every day. The activity meter runs on a battery and is programmed to run continuously without you needing to turn it on. Please do not try to open the activity meter.

APPENDIX 5

	Baseline/ Pre-Test				Baseline/ Pre-test								Week 1 Intervention							Week 2 Intervention						
	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
Psyc Survey					C							I														
Body Weight					C							I														
Height					C							I														
BMI					C							I														
Physical Activity	C	C	C	C	C			I	I	I	I	I														
5-8 min Community- Based Video														I			I				I				I	

	Week 3 Intervention							Week 4 Intervention							Post Intervention										
	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M		
Psyc Survey																	C								I
Body Weight																									
Height																									
BMI																									
Physical Activity															C	C	C	C	C	C		I	I	I	I
Video Intervention		I								I							I								

APPENDIX 6

Confidence Survey

Directions: Please answer the questions about **HOW CONFIDENT** you are that you can do the activities. Circle a number (0-100%) for each question. The word “confident” refers to your belief that you can do something well. Use the descriptions above the question to help you answer. There are no right or wrong answers, and you may skip over any question that you do not want to answer.

+	<p>Light Intensity</p> <p>You are moving around, but your heart rate and breathing do not increase very much. You probably will not be sweating doing these activities unless the weather is really hot. You would be able to talk easily through the activity.</p>	
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1. How confident are you that you can complete **60 MINUTES** of walking at a **LIGHT INTENSITY** level on **FIVE OR MORE** days of the week? _____



<p>Moderate Intensity</p>	<p>Your breathing and heart rate increase. You may start to sweat, your legs might feel a little bit tired and you may feel out of breath. You may also find it hard to talk during the activity.</p>	
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2. How confident are you that you can complete **60 MINUTES** of biking and/or slow jogging at a **MODERATE INTENSITY** level on **FIVE OR MORE** days of the week? _____



<p>Vigorous Intensity</p>	<p>Your heart beats very fast, your breathing is fast and you start sweating. You may feel exhausted and out of breath. Your legs would probably feel heavy. It would be very hard to talk during the activity.</p>	
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3. At school you may be enrolled in PE classes and/or be in before/after school activities (football, basketball, etc.) that are of a vigorous intensity. How confident are you that you can complete **60 MINUTES** of physical education and/or school activities at a **VIGOROUS INTENSITY** level **FIVE OR MORE** days of the school week? _____



Please circle an answer to the below questions about physical activity. Answer as honestly as you can. There are no right or wrong answers, and you may skip over any question that you do not want to answer.

Sport Participation

1. Are you currently on a sport's team at school or out of school? _____

1 Yes

2 No

2. If yes, please list the sport(s) you currently play using the space below.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Beliefs

3. I think about the benefits I will get from being physically active. _____

- 1 Never
- 2 Almost Never
- 3 Sometimes
- 4 Often
- 5 Many Times

4. Physical activity would help me stay fit. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

5. There is too much I would have to learn to do physical activity. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

6. I would feel embarrassed if people saw me doing physical activity. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

7. I would feel better about myself if I did physical activity. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

8. I do not like the way physical activity and exercise makes me feel. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

9. I would have fun doing physical activity or playing sports with my friends. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

10. I would have more energy if I did physical activity. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

11. Physical activity takes time away from being with my friends. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

Attitudes

12. I enjoy physical activity. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

13. I try to think more about the benefits of physical activity and less about
the hassles of being active. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

14. I say positive things to myself about physical activity. _____

- 1  Strongly disagree
- 2  Disagree
- 3  Neither Agree nor Disagree
- 4  Agree
- 5  Strongly Agree

Skills

15. I keep track of how much physical activity I do. _____

- 1 Never
- 2 Almost Never
- 3 Sometimes
- 4 Often
- 5 Many Times

16. I find ways to get around the things that get in the way of being physically active. _____

- 1 Never
- 2 Almost Never
- 3 Sometimes
- 4 Often
- 5 Many Times

17. I put reminders around my home to be physically active. _____

- 1 Never
- 2 Almost Never
- 3 Sometimes
- 4 Often
- 5 Many Times

18. I try different kinds of physical activity so that I have more options to
choose from. _____

- 1 Never
- 2 Almost Never
- 3 Sometimes
- 4 Often
- 5 Many Times

19. I set goals to do physical activity.

- 1 Never
- 2 Almost Never
- 3 Sometimes
- 4 Often
- 5 Many Times

20. I do things to make physical activity more enjoyable.

- 1 Never
- 2 Almost Never
- 3 Sometimes
- 4 Often
- 5 Many Times

Knowledge

21. How many minutes of physical activity should you perform every day? _____

- 1 At least 20 min
- 2 At least 30 min
- 3 At least 40 min
- 4 At least 50 min
- 5 At least 60 min
- 6 I don't know

22. You **have** to get your physical activity minute goal all at once and **cannot** break the minutes into bits at a time. _____

- 1 True
- 2 False
- 3 I don't know

23. People who are not physically active increase their risk of obesity, heart disease, diabetes, osteoporosis, anxiety and depression, and other diseases. _____

- 1 True
- 2 False
- 3 I don't know

24. What is aerobic activity? _____

- 1 Any activity that gets you breathing harder and heart beating faster for a continuous amount of time
- 2 An activity that makes your muscles stronger
- 3 An activity that makes your bones stronger
- 4 I don't know

25. What is an example of a vigorous physical activity? _____

- 1 Walking slowly
- 2 Sweeping
- 3 Playing basketball
- 4 I don't know

26. Which of the following is an example of a bone strengthening activity? _____

- 1 Jump rope
- 2 Riding a bike
- 3 Walking
- 4 I don't know

27. Which of the following is an example of a muscle strengthening activity? _____

- 1 Walking
- 2 Playing tug of war
- 3 Playing dominoes
- 4 I don't know

28. Were you sick last week, or did anything prevent you from doing your normal physical activities?

- 1 Yes
- 2 No

If yes, what prevented you? _____

APPENDIX 7

