An Intervention to Increase Staff Promotion of Healthy Eating and Physical Activity in Out-Of-School-Time-Programs

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AN INTERVENTION TO INCREASE STAFF PROMOTION OF HEALTHY EATING AND PHYSICAL ACTIVITY IN OUT-OF-SCHOOL-TIME-PROGRAMS

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DEDICATION

To my wife, Amy: What a ride? You are my rock, upon which I have depended throughout this process. Thank you for the sacrifices that you have made and putting up with my crazy. I love you!
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Dr. Beets: You have provided me with so many opportunities to peer behind the curtain of quality research. I appreciate all of the feedback and encouragement. I am indebted to you.

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To the Beets Research Group: Thank you for your dedication, hard work, kind words, and passion to make children more healthy. This work would not have been completed without you.
ABSTRACT

Frontline-staff are critical to achieving standards related to child physical activity and nutrition (PAaN) in out-of-school-time-programs (OSTP). Recent standards call upon staff to demonstrate behaviors related to PAaN. Currently, no instrument exists to measure these behaviors. Further, while there have been several studies to increase children’s PAaN in OSTPs, no studies have targeted staff behaviors and then measured the associated changes in staff behaviors. Therefore, this research project encompasses four studies.

The first study fills the gap between policy mandates and staff behaviors by describing the development of the System for Observing Staff Promotion of Activity and Nutrition (SOSPAN) in OSTP. SOSPAN items were aligned with existing OSTP policies. Reliability and validity data of SOSPAN were collected across 8 OSTP: 4 summer day camps and 4 afterschool programs. Validity of SOSPAN staff behaviors/management of PA was established using the percent of children active measured concurrently via direct observation. A total of 6,437 scans were performed. Inter-rater percent agreement ranged from 74-99% across PAaN behaviors. Children’s activity was associated with staff facilitative behaviors/management, such as playing with the children and providing two or more activities for children to choose, while prohibitive behaviors/management, such as waiting-in-line were related to increased sedentary behavior. Staff nutrition behaviors were observed in less than 0.6% of scans. SOSPAN was found to be a reliable and valid tool to assess staff behaviors/management of PAaN in OSTPs.

The purpose of the second study was to evaluate a comprehensive intervention designed to support staff and program leaders in the implementation of the YMCA of USA Healthy Eating and Physical Activity (HEPA) Standards for their afterschool programs (ASP, 3-6pm). Utilizing a pre (Fall 2011) and post (Spring 2012) assessment no
control-group design, four large-scale YMCA ASPs serving approximately 500 children were included in this study. Professional development training founded in the 5Ms (i.e. Mission, Model, Manage, Monitor, Maximize) and LET US Play principles (i.e. lines, elimination, team size, uninvolved staff/kids, and space, equipment and rules), on-site booster training sessions, workshops, and ongoing technical support was provided for staff and program leaders from January to May 2012. The main outcome measure was the System for Observing Staff Promotion of Activity and Nutrition (SOSPAN). Multilevel mixed effects linear (i.e., staff behaviors expressed as a percentage of the number of scans observed) and logistic regression was used to examine changes in staff behaviors. A total of 5328 SOSPAN scans were completed over the two measurement periods. Of the 20 staff behaviors identified in HEPA Standards and measured in this study, 17 increased or decreased in the appropriate direction. For example, staff engaged in physical activity with children increased from 26.6% to 37% and staff eating unhealthy foods decreased from 42.1% to 4.5%. Comprehensive professional development training and ongoing technical assistance can have a sizable impact on key staff behaviors identified by HEPA Standards for ASPs. Similarly the YMCA of USA adopted Healthy Eating and Physical Activity (HEPA) Standards for summer-day-camps (SDCs).

The purpose of the third study was to evaluate a comprehensive intervention designed to support staff and program leaders in the implementation of the YMCA of USA Healthy Eating and Physical Activity (HEPA) Standards for their SDCs. Four large-scale YMCA summer-day-camps serving ~800 children per week participated in this no control group pre/post pilot study. Professional development training founded in the 5Ms (Mission, Model, Manage, Monitor, Maximize) and LET US Play principles (lines, elimination, team size, uninvolved staff/kids, and space, equipment and rules) were delivered to staff. Outcomes were staff promotion behaviors and child activity assessed with established systematic observation instruments. Twelve of 17 HEPA staff behaviors changed in the appropriate direction from baseline to post-assessment. The percentage of girls and boys observed in moderate-to-vigorous-physical-activity increased from 15.3% to 18.3% and 17.9% to 21.2% whereas sedentary behavior decreased from 66.8%
to 59.8% and 62.3% to 53.6%, respectively. Evidence suggests that the professional development training designed to assist SDCs to meet the HEPA Standards can lead to important changes in staff behaviors and children’s physical activity.

The fourth study was conducted to provide feedback to the YMCA ASPs attempting to implement physical activity standards. Factors affecting implementation of standards were examined via semi-structured and informal interviews and observations in 4 ASPs across one year. Perspectives from three levels of the organizational structure of the ASPs (i.e., branch directors, ASP leaders and frontline-staff) were collected. Data were analyzed via modified analytic induction where themes were mapped onto the Framework for Effective Implementation (FEI). Themes were compared between and within organizational levels. Themes represented sixteen factors in the FEI. Within and across organizations, participants working at different ASP levels had different perspectives of how certain factors affected the implementation of the standards. For example, there were differing views of the influence of parents on standards implementation. Branch directors and ASP leaders saw parents as barriers to implementation (believing parents mainly prioritized their children’s homework completion) whereas frontline staff saw parents as enablers (believing parents mainly wanted their children to be “worn out” by the end of the ASP). During the study, participants’ communicated that their beliefs changed in ways that enabled standards implementation. For example, ASP leaders indicated that they initially resisted the standards because they believed their programs were active. Program monitoring and feedback revealed programs were inactive, increasing ASP leaders’ receptiveness to standards. Implementation of the standards was a contextually-driven and dynamic process involving many influential factors. Encouraging open channels of communication between different ASP levels and establishing continuous program monitoring are recommended strategies for ensuring ASPs develop effective strategies for implementing physical activity standards.
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CHAPTER 1: INTRODUCTION

The purpose of this research project is to increase policy recommended staff behaviors related to promoting children’s healthy eating and physical activity (PA) in eight out-of-school time programs in the metropolitan Columbia, SC area. For this project, out-of-school time programs are defined as afterschool programs and summer day camps. The work described herein is part of a larger study funded by the National Institutes of Health (1R21HL106020) focused on creating healthier out-of-school time programs by increasing the quality of snacks served and children’s PA at out-of-school time programs.

Children are not achieving PA levels prescribed by health professionals (e.g. 60 minutes of moderate-to-vigorous PA—MVPA daily) and too many of the foods they consume consist of empty calories (Reedy & Krebs-Smith, 2010). In a recent study Troiano (2008) found that only 42% of children (6-11 years) are obtaining 60 minutes of MVPA daily. Furthermore, a national study conducted by the Centers for Disease Control and Prevention reported that 62% of children aged nine to 13 engaged in no organized PA during non-school hours (Duke, Huhman, & Heitzler, 2003). Low levels of PA deprive children of the health benefits related to PA (Warburton, Nicol, & Bredin, 2006) including placing children at increased risk of being overweight or obese (i.e. children with a BMI at or above the 85th and 95th percentile respectively). Overweight and obesity are caused by a positive energy balance created by eating high levels of empty calories and not engaging in health enhancing levels of PA (Hall, 2010).

Childhood obesity has been a growing concern for the last three decades (Ebbeling, Pawlak, & Ludwig, 2002). In 2008 31.7% of children and adolescents in America were overweight while 16.9% were considered obese (Ogden, Margaret, Curtin,
Lamb, & Flegal, 2010). Obesity is of concern because of the short- and long-term health risks, the social burden that obesity places on children and the financial drain that obesity places on the U.S. health care system (Ebbeling, et al., 2002; Must & Strauss, 1999). Increasing children’s PA levels and decreasing children’s consumption of empty calories are components of addressing childhood obesity rates in America.

Out-of-school Time Programs’ Role in Increasing Children’s Healthy Eating and Physical Activity

Out-of-school time programs have been identified as one setting that can help address the obesity epidemic in America (Koh, 2010). For the purpose of this research project, afterschool programs are defined as pre-existing programs that take place immediately after the regular school day (typically 3-6pm), are located in either a school setting or take place in a community organization outside the school environment (e.g., YMCA, Boys and Girls Club, faith organization), are available Monday through Friday throughout the school year and provide a variety of scheduled activities, commonly including snack, academic time, enrichment activities (e.g., arts and crafts, music), and opportunities for children to be physically active (Halpern, 2000). Summer day camps are defined as structured programs that provide a variety of activities (e.g. snack/lunch, enrichment, PA), are available daily throughout the summer (Monday through Friday), and do not provide accommodations for children to stay overnight (America After 3 PM, 2009a; American Camp Association, 2009). These definitions do not include sports teams, specialty programs that focus on one activity (e.g. sports camps, tutoring) or programs specifically created to promote physical activity (e.g. walking/running club).

Out-of-school time programs (i.e. afterschool programs and summer day camps) serve millions of children annually. Over 8 million children attend afterschool programs in America, for an average of 8 to 9 hours per week (America After 3 PM, 2009b), while summer day camps serve over 14 million children annually (American Camp Association, 2009). Because of their broad reach, out-of-school time programs have been identified as a setting that should provide health snacks to children and help children accumulate health enhancing levels of PA. Furthermore, the relatively small impact that school-
based PA interventions have had on increasing children’s PA during and outside of school (Demetriou & Höner, 2011) and the continued struggle to provide children with a healthy lunch at school, has led researchers to explore out-of-school time programs as a potential setting for increasing child healthy eating and physical activity (Beets, Beighle, Erwin, & Huberty, 2009b; Beighle et al., 2010).

Despite the capacity of out-of-school time programs to impact child PA levels, studies indicate the vast majority of children attending out-of-school time programs are not accumulating health enhancing levels of PA. A recent study of over 1000 children in 25 after-school programs found that only 17% of children were accumulating 30 minutes of MVPA while in attendance at the program (Beets, Huberty, & Beighle, 2012). Another study conducted in three large scale after-school programs indicated that, on average, girls accumulated 12.9 minutes of moderate to vigorous PA while boys engaged in 18.5 minutes of moderate to vigorous PA, while in attendance at the after-school program (Beets, Rooney, Tilley, Beighle, & Webster, 2010).

Two studies to date have examined children’s PA levels while in attendance at summer day camps (Beets, Weaver, Beighle, Webster, & Pate, in press-a; Hickerson & Henderson, 2010). Hickerson and Henderson (2010) measured 154 day campers’ activity levels via pedometer. Their data indicated that, on average, children accumulated 11,916 steps while in attendance at the day camp. However, because intensity of activity was not measured it is hard to draw any meaningful conclusions about the amount of MVPA these children were accumulating (i.e. how much of the activity was in moderate to vigorous PA). Furthermore, the authors imputed steps for activities that were not recorded by pedometers such as swimming and rock climbing, casting doubt on the accuracy of the study findings. Beets, Weaver, Beighle, Webster and Pate (in press-a) systematically observed 2,462 children using the System for Observing Play and Leisure Activity in Youth. They conducted 4,649 scans over 27 days in four large scale summer day camps. The results indicated that during the scans 74-79%, 13-16%, and 7-9% of girls were observed Sedentary/Walking/Vigorous and 62-67%, 18-19%, and 15-18% of boys were observed Sedentary/Walking/Vigorous during scheduled PA time.
While this data does indicate that a small percentage of children are engaged in MVPA during scans it does not supply information on the amount of time individual children were engaged in MVPA. Because both these studies do not provide children’s accumulated MVPA while in attendance at summer day camps it is impossible to ascertain how much MVPA summer day camps are contributing to children’s daily PA. However, it is clear that PA levels of children in afterschool programs are low and have the potential to increase and a similar trend seems to be emerging in summer day camps.

Similar to findings on children’s current PA levels in afterschool programs and summer day camps, evidence supporting the afterschool program’s untapped potential to increase children’s PA is emerging (Beets, 2012; Beets, et al., 2009b), however, to date, there is no evidence supporting the effectiveness of summer day camps to increase child PA. In a recent review of the literature Beets (2012) identified 17 interventions in afterschool programs that reported PA outcomes. Studies’ findings were mixed due to methodological weaknesses in many of the interventions (Beets, Beighle, Erwin, & Huberty, 2009a). Further blurring the picture, many of the successful and unsuccessful studies employed the same promotion strategies (Beets, 2012). This overlap of promotion strategies producing mixed and differing results makes interpreting which practices are most useful for increasing child PA levels impossible. Despite these limitations, six of the 17 interventions reported increases in child PA levels enhancing the notion afterschool programs can increase children’s PA levels while in attendance. Furthermore, the similarities between afterschool programs and summer day camps and the bulk of time children spend in summer day camps (i.e. up to 10 hours a day) make it feasible to conclude that summer day camps can also have a meaningful impact on child PA levels.

Information on the snacks served in out-of-school time programs is nearly non-existent. To date, there have been two studies examining the quality of snacks in afterschool programs and no studies examining the quality of foods brought from home or served in the summer day camp setting. One study examined snack menus from 32
YMCA afterschool programs nationwide and found that only 17% of the snacks served were meeting quality standards (Mozaffarian, Andry, Lee, Wiecha, & Gortmaker, 2012). Another study from the same research group found that 7 YMCA sites in the northeastern United States were serving foods with added sugars for snack up to 3.9 times per week and foods with trans fats up to 2.6 times per week (Mozaffarian, et al., 2010). While they represent only a limited amount of programs within one organization, initial evidence indicates that snacks in afterschool programs are not nutritious. However, there is no evidence related to what is being served or brought from home in summer day camps.

**YMCA Out-of-School Time Programs**

The YMCA serves thousands of communities across the U.S. with approximately 2,600 locations operating within 10,000 communities across the nation (www.ymca.net). To date, there are 20.9 million YMCA members, including 9 million youth 17 years of age and under. In addition to those that hold paid memberships, about 32 million children 14 years and under live within three miles of a YMCA. Two of the many youth programs that the YMCA offers are afterschool programs and summer day camps. The potential reach of the YMCA makes it an attractive setting for promoting child PA because of the possible large-scale impact the YMCA could have on children’s PA and healthy eating.

Recognizing its potential to impact the health of millions of children, the YMCA of USA created and officially adopted *Healthy Eating and Physical Activity Standards* for its out-of-school time programs, in August of 2011. These policies focus on ensuring children engage in sufficient amounts of PA and are served a healthy snack while attending YMCA out-of-school time programs (Wiecha, Gannett, Hall, & Roth, 2011). Specifically, policies target the child, staff, parent, schedule, and the environment (see Appendix A). These policies do not, however, include funding or mandate changes to the structural environment of out-of-school time programs. While policies are a crucial first step to enhancing child healthy eating and physical activity, they do not detail strategies
for meeting policy goals (Wiecha, Gannett, Hall, & Roth, 2011). This is a crucial limitation to the policies which the authors of the polices recognize and articulate:

...achieving these standards requires more than an executive decision. While many of the standards are easily adopted and cost little or nothing, some of the standards are harder than others to put into place, and many will require planning, retraining, and even rebudgeting. Programs should set themselves on a path to accomplish them over time. Programs should also seek help with this process, and accordingly these guidelines are not meant to stand alone.

Without outlining strategies for change, policies fall short of bridging the gap between policy and changes to routine practice. Thus, YMCA out-of-school time programs have unrealized potential because of their substantial reach and their stated policy goals to provide children with health enhancing out-of-school time programs. This potential can only be realized by identifying and implementing strategies to bridge the gap between policy and changes to routine practice.

CONCEPTUAL FRAMEWORK

Organizations such as out-of-school time programs can be conceptualized as a system or a collection of parts that function together as a whole (Foster-Fishman, Nowell, & Yang, 2007). For example, the policies in place at the national level can effect what occurs at individual YMCA site locations. Conceptualizing and understanding the interactions of the parts that comprise a system becomes essential to understanding the system as a whole. Complex systems change (Foster-Fishman, et al., 2007) and ecological models of health behavior (Sallis & Owen, 2002) provide useful guides for conceptualizing the vast array of variables that may influence systems. These variables can then be manipulated to influence individuals’ health behaviors interacting with that system. Beets, Webster, Saunders and Huberty (in press-b) recently developed a conceptual model for identifying potential modifiable levers that can enhance children’s healthy eating and physical activity while in attendance at out-of-school time programs. This framework was influenced by the emerging literature surrounding the potential impact of public health policy (Brownson & Jones, 2009; Brownson, Seiler, & Eyler,
and is consistent with the multi-level approach of the *Healthy Eating and Physical Activity Standards* adopted by the YMCA. Identified levers for change include the policy environment at the national, state and local levels; individual site characteristics; program leadership, staff, and child characteristics; and existing outside organizational partnerships. Altering these levers could enhance routine practice to align with policy mandates.

Using this framework as a guide, the current research project developed an intervention that targeted two levers within the conceptual framework—out-of-school time program leaders and frontline-staff. Out-of-school time program leaders were chosen as a lever for change for two reasons. The first reason is that policy mandates the schedule and environment of the out-of-school time program support healthy eating and physical activity. Out-of-school time program leaders have direct control over the schedule (e.g. 20% or at least 30 minutes of schedule dedicated to PA) and environment (e.g. environment provides positive messages about healthy eating and safe, developmentally appropriate physical activity through posters, pictures and books) of their out-of-school time program making them the primary driver of policy mandated changes to these out-of-school time program components. The second reason out-of-school time program leaders were chosen as a lever for change is because they are ultimately responsible for the implementation of policy mandates. out-of-school time program leaders are responsible for delivering a program that complies with policy mandates; therefore, they must be supplied with the skills necessary to recognize policy non-compliance, and strategies to work toward policy compliance.

Frontline-staff were targeted in this study for three reasons. First, research has demonstrated that policy implementation is mediated by behaviors of those delivering the program. Numerous studies in the school setting have shown that teacher’s behaviors influence program fidelity (i.e. implementation of policy) (Basch, 1984; Basch, Sliepcevich, Gold, Duncan, & Kolbe, 1985; Han & Weiss, 2005). Similar to the school setting frontline-staff behaviors will influence policy implementation in out-of-school time programs. Therefore, it is crucial to provide frontline-staff with high quality training
focused on the skills necessary to align their behaviors with policy mandates. The second reason frontline-staff were targeted in this intervention is because policy explicitly mandates frontline-staff display certain behaviors (e.g. lead and participate in active games, eat healthy snacks with children). Preliminary research demonstrates that staff are not displaying high levels of policy mandated behaviors (Weaver, Beets, Webster, & Huberty, In Review) therefore training is required to assist frontline-staff in meeting policy mandates. Finally, frontline-staff directly interact with children on a daily basis in out-of-school time programs. Therefore, their behaviors will directly influence the ultimate intended outcome of policy—child PA levels.

The centerpiece of this intervention was a competency based professional development training built upon five key concepts and referred to as the 5Ms (see Appendix B) (Huberty, Beets, Beighle, & Balluff, 2010; Weaver, Beets, Webster, Beighle, & Huberty, 2012). The model includes five overarching categories: mission—clearly defined policy/standards for healthy eating and physical activity; motivate—providing choices, developmentally appropriate activities, feedback, and encouragement; manage—structuring and managing the environment for safety, routines, and discipline; monitor—ongoing evaluation of healthy eating and physical activity; and maximize—incorporating all former Ms. Nested within the 5Ms training the LET US Play principles (i.e. lines, elimination, team size, uninvolved staff/kids, and space, equipment and rules) for promoting physical activity. The LET US Play principles were introduced to staff in order to provide a reflective tool for the identification of barriers that limit children’s activity during free-play and organized activity opportunities in the afterschool program setting. This training is designed to provide frontline-staff and out-of-school time program leaders with competencies related to creating healthy eating and physical activity friendly environments. By creating these healthy eating and physical activity friendly environments it is theorized that children’s healthy eating and physical activity will increase while in attendance at the out-of-school time programs. The application of this training model, therefore; should lead to improved implementation and eventual
achievement of policy goals for healthy eating and physical activity in out-of-school time programs.

MEASURING STAFF BEHAVIORS IN OUT-OF-SCHOOL TIME PROGRAMS

An objective measure of frontline-staff behaviors related policy mandates is needed in order to inform policy makers, staff members and parents about the achievement of policy benchmarks. Consistent with the belief that the onus to meet policy benchmarks is in the hands of frontline-staff and the belief that children’s healthy eating and physical activity behaviors are largely molded and influenced by their caregivers (Baranowski, Cullen, & Baranowski, 1999; Stutz & Weiss, 2010), frontline-staff behaviors related to healthy eating and physical activity promotion need to be measured. Policies also explicitly call for the systematic observation of promotion behaviors related to healthy eating and physical activity to ensure that staff are facilitating the achievement of policy benchmarks (Wiecha, Gannett, Hall, & Roth, 2011).

Few objective measurement tools exist that focus specifically on quantifying frontline-staff (i.e., adult) behaviors related to promoting the healthy eating and physical activity of children. Those tools that do exist, such as the Systematic Observation of Physical and Leisure Activity in Youth, System for Observing Fitness Instruction Time, Observational System for Recording Physical Activity in Children - Preschool, Environment and Policy Assessment and Observation, focus on a narrow range of frontline-staff behaviors and are not aligned with existing out-of-school time program policies (Beets, Tilley, Kim, & Webster, 2011; Beets, Wallner, & Beighle, 2010).

The absence of a systematic observation instrument for the measurement of frontline-staff behaviors in out-of-school time programs is a gap in the literature. A tool of this sort could provide valuable information which could inform policy decisions and the design of interventions to target out-of-school time program shortcomings related to policy implementation. Out-of-school time program administrators could also use this information as a barometer of their program’s achievement related to policy compliance. The instrument could be used as a measure of policy implementation in research projects as well.
Policy Implementation

In addition to measuring staff behaviors it is essential to identify what factors are driving the behaviors of staff in order to develop effective strategies for meeting standard benchmarks. Increasingly researchers understand that developing effective interventions is only the first step to affecting the health and well-being of populations (Green, 2001; Green & Glasgow, 2006). There is a growing body of literature dealing with the transfer of research to best practices in real world settings. The process of transferring new ideas or best practice knowledge from research into real world settings is known as diffusion (Rogers, 2003). Durlak and DuPree (2008) identified four critical phases of diffusion including information about the value of the program (dissemination), whether an organization decides to adopt the new program (adoption), how well the organization adheres to the program (implementation), and how well the program is maintained over time (sustainability).

Research has demonstrated the extent to which health promotion policy is implemented varies greatly in school settings (Dusenbury, Brannigan, Falco, & Hansen, 2003; McGraw et al., 2000) and there is little reason to believe that this will be different in the out-of-school time program setting. The degree to which a program is implemented can be influenced by a variety of factors including motivation of the staff and an organizations access to resources (McGraw, Stone, Osganian, & Elder, 1994). In out-of-school time programs inadequate equipment, spaces, funding and time have been identified as barriers to program implementation (Copeland, Sherman, Kendeigh, Kalkwarf, & Saelens, 2012; Thomas, Fellner, Tucker, & Irwin, 2011; Zarrett, Skiles, Wilson, & McClintock, 2012). Furthermore, frontline-staff’s skills, beliefs and values influence the extent to which programs have been implemented (Thomas, et al., 2011; Zarrett, et al., 2012). Ensuring fidelity (i.e. the extent to which policies are implemented) necessitates the evaluation of policy implementation to avoid “Type III error,” or concluding that an intervention was unsuccessful when, in reality, it was not implemented completely or correctly (Dusenbury, et al., 2003).
Furthermore, by identifying what factors influenced the implementation of a program, researchers can plan more effective interventions that address the gap between research and best practices (Green, 2001). Many of the factors influencing implementation are contextual such as community environment, provider characteristics, characteristics of the innovation, organizational capacity and factors related to the prevention support system (Durlak & DuPre, 2008). One way to understand out-of-school time programs is as complex systems because they are made up of many parts (i.e. staff, children, parents, and environment) that function together as a whole (Foster-Fishman, Nowell, & Yang, 2007). Interventions in complex systems, such as out-of-school time programs, must therefore be sensitive to the multitude of contextual factors that will affect implementation. It is therefore essential for interventions to possess flexibility to adapt to the contextual needs of different sites. One way to achieve the desired flexibility it to standardize the steps involved in the change process rather than the components delivered (Hawe, Shiell, & Riley, 2004). For example, an alternative way of thinking about standardization is to identify the “fixed aspects” that provide essential functions in the intervention (e.g. training sessions) as well as the “variable aspects;” that is the fixed aspect’s form in differing contexts (i.e. trainings provide different skills to each site). This approach is ideal to research in real world settings (Campbell et al., 2007) such as out-of-school time programs. Uncovering barriers and enablers to implementation may help researches identify fixed aspects of an intervention that can vary based on specific contextual characteristics of a site. For example, sites with limited staff could receive the fixed aspect of training focusing on the variable aspect of large group games that promote physical activity. By identifying these barriers and enablers to implementation, interventions in the future can be designed to function in real world settings.

Out-of-school time programs represent a promising setting for increasing children’s healthy eating and physical activity while in attendance. In order to help out-of-school time programs realize their potential impact on children’s healthy eating and
physical activity and to uncover the enablers and barriers to changing routine practice in out-of-school time programs the following questions will be considered.

- What healthy eating and physical activity promotion behaviors have been identified in healthy eating and physical activity standards documents, “best practices” position statements, competencies literature for school wide and afterschool PA promotion and health behavior theory?
- What coding and scoring scheme can be created to measure the behaviors identified above?
- What impact will standards and a competency based professional development training program have on out-of-school time program leader and frontline-staff healthy eating and physical activity promotion behaviors identified above?
- What factors in the community environment, afterschool program structure, policies, and the prevention support system are barriers and enablers to demonstrating policy mandated PA promotion behaviors?

These questions will be addressed in four separate studies. The first study will focus on the development of a systematic observation instrument. This study will fill a gap in the literature by providing a systematic observation instrument to measure staff behaviors related healthy eating and physical activity promotion in out-of-school time programs. The second study will examine the design and outcomes of an intervention to provide frontline-staff with competencies related to healthy eating and physical activity promotion and its effects on frontline-staff behaviors in the afterschool program environment. The third study will highlight the outcomes of a similar intervention designed to provide summer day camp staff with competencies related to promoting healthy eating and physical activity. The final study will be a qualitative inquiry into the enablers and barriers to physical activity policy implementation.
CHAPTER 2: STUDY 1

SYSTEM FOR OBSERVING STAFF PROMOTION OF ACTIVITY AND NUTRITION (SOSPAN).¹

Out-of-school-time-programs, defined as afterschool programs (ASP) and summer day camps (SDC) in this study, have the potential to meaningfully impact children’s physical activity and nutrition (Beets, Beighle, Erwin, & Huberty, 2009; Beighle et al., 2010a; Mozaffarian et al., 2010). These programs have the ability to promote physical activity and nutrition through a wide variety of scheduled activities (e.g., free-play and organized physical activity) and snacks offered daily. Moreover, out-of-school-time-programs serve a substantial number of children from diverse backgrounds (Halpern, 2000). Currently, 8.4 million youth attend ASPs for an average of 8.1 hours per week during the school year (Afterschool Alliance, 2009) and more than 5000 SDCs are in operation nationwide (American Camp Association, 2009) with 14.3 million children in attendance annually (America After 3 PM, 2009). Because of the large number of children attending out-of-school-time-programs, state and national organizations have called upon these programs to promote health enhancing physical activity and nutrition.

State and national organizations have recently developed and endorsed policies related to children’s physical activity and nutrition in out-of-school-time-programs (Beets, Tilley, Kim, & Webster, 2011; Beets, Wallner, & Beighle, 2010; Mozaffarian, et al., 2010; Wiecha, Gannett, Hall, & Roth, 2011). These policies imply that achieving policy benchmarks (e.g., children engage in 30min of physical activity daily, serve fruits and vegetables daily) is a function and responsibility of frontline-staff (i.e., those individuals responsible for interacting with the children attending out-of-school-time-programs—hereafter referred to as staff). This is clearly indicated in the policy language that specifically calls upon staff to exhibit certain behaviors that are both theoretically and empirically linked with achieving physical activity and healthy eating goals (e.g. providing a variety of activities, encouraging physical activity and nutrition, modeling healthy eating habits, etc.) (Huberty, Beets, Beighle, & McKenzie. 2012; Stuntz, & Weiss, 2010; Weaver, Beets, Webster, Beighle, & Huberty, In Press).

The notion that staffers are the critical link in the causal pathway between policy adoption and eventual changes in child health behaviors (as suggested by the outcomes
of increased child physical activity and serving fruits and vegetables daily expressed in existing policies) is grounded in school-based prevention research. Numerous studies demonstrate that the link between program fidelity (i.e., implementation) and program outcomes (e.g., reduced substance use/abuse, reduction in violent behaviors) is mediated by the behaviors of teachers – the primary implementers of school-based prevention programming (Basch, 1984; Basch, Sliepcevich, Gold, Duncan, & Kolbe, 1985; Beets et al., 2008; Dane & Schneider, 1998; Han & Weiss, 2005; Lytle, 2009). We hypothesize that a similar phenomenon is taking place in other settings, including out-of-school-time-programs, where policies are adopted/enacted that specify benchmarks of performance in the absence of structural/physical changes to the built environment (e.g., increase the amount of greenspace for children to be active).

In these settings, the responsibility of meeting policy benchmarks is placed on the shoulders of staffers, who are frequently not given the training needed to implement the policies (Weaver, et al., In Press). Staff behavior (i.e. whether or not they encourage, role model, or are directly engaged with the children in physical activity and/or healthy eating habits), therefore; is the primary driver of policy implementation. It is through the behaviors of staff that policies can either thrive or fail. Hence, in the out-of-school-time-program setting staff behaviors are an essential factor in determining whether a policy will ultimately have its desired impact.

Because of the important role staff play in implementing out-of-school-time-program policies, it is essential to evaluate whether their behaviors support policy goals. Few objective measurement tools exist that focus specifically on quantifying staff (i.e., adult) behaviors related to promoting the physical activity and nutrition of children. Those tools that do exist, such as the Systematic Observation of Physical and Leisure Activity in Youth, System for Observing Fitness Instruction Time, Observational System for Recording Physical Activity in Children - Preschool, Environment and Policy Assessment and Observation, focus on a narrow range of staff behaviors and are not aligned with existing out-of-school-time-program policies (Beets, et al., 2011; Beets, et
al., 2010). The purpose of this study, therefore, was to describe the development, reliability, and validity of a systematic observation instrument to measure staff behaviors related to physical activity and nutrition in out-of-school-time-programs - the System for Observing Staff Promotion of Activity and Nutrition (SOSPAN).

METHODS

OBSERVATION INSTRUMENT

SOSPAN was designed to be used in out-of-school-time-program settings as either a stand-alone systematic observation instrument for the assessment of staff behaviors and contextual factors related to the promotion of physical activity and nutrition or in conjunction with the Systematic Observation of Physical and Leisure Activity in Youth (SOPLAY) by comparing the behaviors and contextual factors derived from SOSPAN to children’s physical activity levels via SOPLAY. SOSPAN is based on momentary time sampling, identical to the SOPLAY, using a series of scans (i.e. from left to right) systematically and continuously performed throughout the out-of-school-time-program in order to assess behaviors of staff.

The categories and behaviors included in SOSPAN were developed through an extensive review of physical activity and nutrition policy documents (Beets, et al., 2011; Beets, et al., 2010; Smit, Beets, Zeebregts, Rood, & Welters, 2010; Wiecha, Gannett, Hall, & Roth, 2011), “best practices” position statements from elementary and middle school physical education (National Association for Sport and Physical Education, 2008; National Association of Sport and Physical Education, 2009), literature on competencies for school wide and afterschool physical activity promotion (American Academy of Pediatrics, 2010; Beighle, et al., 2010a; Beighle, Erwin, Beets, Morgan, & Le Masurier, 2010b; Kelder et al., 2005; North Carolina Afterschool Professional Development Work Group, 2010), health behavior theory (Deci & Ryan, 1987; Stuntz & Weiss, 2010), and preliminary site visits to the target SDCs and ASPs. Upon the compilation of promotion behaviors, a modified Delphi method was employed to confirm and expand upon candidate promotion behaviors in the out-of-school-time-program setting (Linstone &
Turoff, 1975). The Delphi survey was distributed to 23 experts (i.e. expertise established via line of research in out-of-school-time-program physical activity and nutrition promotion or service in out-of-school-time-program physical activity and nutrition promotion) via survey monkey with 12 experts responding. The first round was exploratory and qualitative in nature requesting that the expert panel list staff behaviors that promote physical activity and nutrition. Thematic saturation occurred in the expert’s responses so further exploratory rounds were not pursued. A second survey was created in which the common themes were returned to respondents in order to convert the themes into observable staff behaviors.

Findings from both documents and expert responses were distilled into codes and operationally defined yielding three overall categories included within SOSPAN: staff management of physical activity and nutrition, staff behaviors, and context of the ASP/SDC. A complete description of the items is presented in Table 2.1. In brief, staff management of physical activity and nutrition were contextual factors of the activity occurring (e.g. during snack/lunch staff practiced safe food handling; during physical activity time children stand and wait-in-line for turn) totaling ten variables in the instrument. Staff behaviors included the actions that staff directly performed (e.g. during snack/lunch staff verbally promoted healthy eating; during physical activity time staff were directly participating in the activity with the children) encompassing 13 categories in the instrument.

Context of the ASP/SDC included scheduled activity, the grade level of children observed and location of activity. Location of activity was recorded via pre-identified target areas – analogous to target areas defined by the SOPLAY protocol (McKenzie, Marshall, Sallis, & Conway, 2000). Scheduled activity (e.g. academics, enrichment, physical activity, snack/lunch) was recorded via the written schedule obtained from the out-of-school-time-program (Coleman, Geller, Rosenkranz, & Dzewaltowski, 2008). Categories were mutually exclusive. Where appropriate, grade level was recorded (i.e. k-1, 2-3, 4-5, mixed grades) based on the grade level represented in the target area.
Where multiple grade levels were present more than one group was recorded. When observers could not discern the grade level of the children observed, “mixed grades” was coded.

Consistent with SOPLAY protocol, type of activity and equipment available was recorded. *Type of activity* included the activity in which children and staff were engaged (e.g. basketball, dance, tag games). Additionally, in each scan the primary activity (i.e. activity in which the majority of children were engaged) was identified and recorded. *Equipment* availability consisted of portable items used in games and free-play (e.g. hula hoops, balls, jump ropes, non-physical activity equipment) and was coded as equipment available as well as the amount of equipment (i.e. all active equipment summed).

One complete SOSPAN scan differed based on the context of the out-of-school-time-program (nutrition promotion scans or physical activity promotion scans) and included several sub-scans (see Table2.2). Sub-scans were completed from the left-to-right of all target areas and then the appropriate variables were coded before continuing to the next sub-scan (McKenzie, et al., 2000). A complete SOSPAN nutrition promotion scan consisted of three sub-scans involving two staff behavior scans (i.e. number of staff present, staff nutrition promotion, nutrition education, staff eating/drinking) and one staff management of nutrition scan (i.e. safe food handling) and were completed during snack time, only. A complete SOSPAN physical activity promotion scan consisted of seven sub-scans involving three staff behavior sub scans (i.e. staff physical activity promotion, staff engaged in physical activity with children), 2 staff management sub scans (e.g. small sided games, children eliminated, children stand and wait-in-line for turn) and 2 context sub-scans (i.e. scheduled activity, the grade level of children observed, location of activity, equipment available) and were completed during all scheduled activities, including snack/lunch. Scans were broken into sub-scans due to the breadth of the variables observed. A complete SOSPAN scan, including all sub-scans, took approximately three minutes for SOSPAN physical activity promotion scans and less than one minute for SOSPAN nutrition promotion scans. Staff behaviors,
staff management of physical activity and nutrition, scheduled activity, grade level of children, scheduled activity, type of activity and equipment (except for total number of pieces of equipment) utilized a binary coding scheme (i.e. Yes/No). In addition, the total number of staff and children present in the target area were recorded in each scan. Both staff management of physical activity and nutrition and staff behaviors were not mutually exclusive (i.e. many behaviors could be occurring during one scan). All scans were completed and then entered into a custom user interface developed on Pendragon Forms VII® on the Samsung Galaxy Tablets® (see Figure 2.1).

**SETTINGS AND OBSERVATION SCHEDULE**

Due to the observational nature of the data collection, passive consent was obtained by the out-of-school-time-program, their staff, and the parents enrolling their children in the programs. Research design and protocol were approved by the university's institutional review board. Data were collected in 8 large scale out-of-school-time-programs (four ASPs and four SDCs) involved in an intervention study to increase children’s physical activity and healthy eating in the metropolitan Columbia, SC area. Data were collected over 28 (SDCs) and 27 (ASPs) days during baseline. For this study, ASPs were defined as: pre-existing community-based programs that take place immediately after the regular school day (typically 3-6pm), are located in either a school setting or take place in a community organization outside the school environment (e.g., YMCA, Boys and Girls Club, faith organization), are available daily throughout the academic year (Monday through Friday), and provide a combination of scheduled activities which commonly include snack, homework assistance/tutoring, enrichment activities (e.g., arts and crafts, music), and opportunities for children to be physically active (Halpern, 2000). SDCs were defined as structured programs that provide a variety of activities (e.g. snack/lunch, enrichment, physical activity), are available daily throughout the summer (Monday through Friday), and do not provide accommodations for children to stay overnight (America After 3 PM, 2009; American Camp Association, 2009). ASPs and SDCs that focused solely on a single activity (i.e. sports camps, music camps, intramural programs) were not included in this study.
Per the SOPLAY protocol, each site was visited prior to data collection to identify size, location, and boundaries of each target area (McKenzie, et al., 2000). A total of 91 target areas were identified with each individual site having anywhere from 17-28 target areas (e.g. playgrounds, fields, gyms, pools). Variations in how the SDCs and ASPs were structured (e.g. SDCs split children into grade levels, ASPs did not) required modified observation strategies as outlined below.

**SDC Observation Schedule.** SDCs divided children into grade levels (e.g. k-1, 2-3, 4-5) that engaged in scheduled activities daily. Because of this, each grade level was observed on four nonconsecutive weekdays throughout May, June, and July 2011. Trained observers arrived unannounced at the program and followed a single grade level each day while systematically and continuously scanning the target areas in which the group was present. Scans started at the beginning (i.e. ~7:30am) and continued until the end (i.e. ~6:00p.m.) of the SDC program daily. Observers took two 15 minute breaks and one 30 minute lunch break throughout the day. Lunch breaks did not overlap the scheduled lunch of children in order to ensure staff behaviors related to nutrition were observed during this time. Scans were initiated when the target group entered a target area and suspended while the target group moved to a new target area (i.e. ~two-five min to move to a new target area). During scheduled program snack/lunch periods physical activity promotion scans were alternated with nutrition promotion scans.

**ASP Observation Schedule.** ASPs, for the most part, did not divide children into grade levels (the largest ASP program with ~190 children divided children into grade levels for managerial reasons). All ASPs divided their program schedule into distinct activity tracks (e.g., organized or free-play PA, arts and crafts, dance) from which children could choose. Tracks lasted for ~45-60 minutes each. Observers rotated through scheduled tracks after completing 5 consecutive scans in each target area where the track was located prior to moving to the next track. Observations were conducted continuously from the beginning (i.e. ~2:00-3:30pm) to the end (i.e. ~6:00-6:30pm) of the program. In the single program that divided children by grade level,
observers rotated systematically through each grade level’s scheduled track choices. Observation occurred on four unannounced nonconsecutive weekdays (Mon-Thurs) throughout August, September, and October 2011 at each ASP. Two observers completed scans every day. During scheduled snack time one observer completed physical activity promotion scans while one observer completed nutrition promotion scans. During all other scheduled activities observers systematically rotated through scheduled tracks separately in order to maximize the amount of the program observed.

**OBSERVER TRAINING AND SOSPAN RELIABILITY**

Five observers recorded all observations. Training was conducted by the lead author. Observers completed classroom training, video analysis, and field practice during training. Classroom training lasted two days (i.e. 3 hrs each day) and included reviewing study protocol, familiarizing observers with the instrument, and committing observational categories and codes to memory. Observers also viewed the SOPLAY Training DVD available through Active Living Research (http://www.activelivingresearch.org) and practiced coding children’s activity levels (e.g. sedentary, walking, vigorous) while receiving feedback from the lead author. Observers completed three days (i.e. 3 hours each day) of field based observations including familiarization with target areas at program sites. Inter-rater agreement criteria were set at >80% using interval-by-interval agreement for each category (McKenzie, et al., 2000; Ridgers, Stratton, & McKenzie, 2010). At predetermined times during SDC data collection observers would conduct reliability scans for one hour. During ASP data collection observers would complete 5 reliability scans at multiple times throughout the day (i.e. when observers overlapped the same target area because groups were combined). Observers then dispersed to continue their systematic rotation through target tracks. In both SDC and ASP data collection observers completed scans on one grade level simultaneously coordinating the timing of each scan. Consistent with published reliability protocols (Brown et al., 2006; Ridgers, et al., 2010), reliability was collected on eight of the 27 measurement days (30%) in SDCs and nine of the 28 days (32%) in ASPs.
SOSPAN VALIDITY

We hypothesized that staff behaviors/management related to physical activity captured by SOSPAN would either contribute to (i.e. verbal physical activity promotion, small sided games) or detract from (i.e. withholding physical activity, elimination games) children’s physical activity levels. In order to establish construct validity of staff management of physical activity and promotion behaviors related to physical activity, the presence/absence of these were compared to children’s activity levels measured via SOPLAY. Following the standardized SOPLAY protocol, children’s physical activity was observed (i.e. sedentary, walking, vigorous) immediately following each SOSPAN scan. Because staff have minimal control over what children eat for snack in ASPs and limited control over the types of foods/beverages children bring with them for snack/lunch in SDCs, staff behaviors corresponding to nutrition were not compared to a child-level outcomes (e.g., nutritional quality of snacks served in the afterschool program). Hence, only reliability of staff nutrition behaviors was estimated. However, the extensive literature review and consensus of expert opinion via the Delphi method lend content validity to the nutrition promotion behaviors included in SOSPAN.

DATA ANALYSIS

All statistical analyses were performed using STATA (v.12.0, College Station, TX). Reliability for SOSPAN and SOPALY were estimated via interval-by-interval intraclass correlations (ICCs) and percent agreement. Validity of SOSPAN items referring to physical activity were examined by comparing the presence/absence of these behaviors with the percentage of children observed sedentary, walking and vigorously active, separately, using multi-level mixed effects linear regressions. Separate models were estimated by gender and type of out-of-school-time-program (i.e. SDC, ASP). Scheduled activity was also included in the model (with scheduled physical activity opportunities serving as the referent group) in order to include non-physical activity schedule time when staff are able to demonstrate SOSPAN behaviors. The percentage of time the children in each scan were observed sedentary, walking, and vigorous was determined
by summing the total number of children observed in each scan and dividing that by the amount of children observed sedentary, walking, and vigorous.

RESULTS

RELIABILITY

SOSPAN staff behaviors and management of physical activity and nutrition. Staff management of physical activities yielded consistently high percent agreement between observers in both SDCs and ASPs. Observer agreement ranged from 74.5% to 100% (mean—95.5%, median—98.1%). Percent agreement for children stand and wait-in-line for turn (78.7%) and idle time (74.5%) in the SDC setting having moderate agreement. In ASPs, integrated activities and small sided games were not observed, therefore percent agreements were not calculated. Observer agreement for staff behaviors in SDCs and ASPs was also consistently high ranging from 84.1% to 99.8% (mean—95.0%, median—97.1%). Percent agreement for staff eating and drinking was high (>96.2%) in both SDCs and ASPs (see Table 2.1). Other staff behaviors related to nutrition promotion (i.e. nutrition promotion, nutrition education) were not observed in either the SDCs and ASPs (see Table 2.3). Therefore, reliability was not calculated for these behaviors.

SOPLAY activity levels and total number of children observed. ICCs for the total number of children and the activity levels of children were high. For girls in both SDCs and ASPs, ICCs for sedentary, walking, vigorous and total children observed ranged from 0.89 to 0.99. For boys in both locations, ICCs for sedentary, walking, vigorous and total children observed ranged from 0.80 to 0.99.

FREQUENCY OF STAFF BEHAVIORS AND MANAGEMENT OF PA

Overall, the SDCs and ASPs served ~500 children and ~40 staff were in attendance across all sites. Observers completed 4591 physical activity promotion scans in SDCs and 1755 physical activity promotion scans in ASPs. Significantly fewer nutrition promotion scans were completed in both SDCs and ASPs (315 and 360 scans respectively). In SDCs the mean number of boys (14.8), girls (10.7) and staff (3.5) per
scan was similar to ASPs (11, 9.5 and 2.3 respectively). The percent of observations from SOSPAN across the two out-of-school-time-program settings are displayed in Table 2.3. Overall percentage of staff behaviors and management of activity were similar across settings with the exception of “other task” in the SDCs. Staff promotion behaviors (i.e. nutrition behaviors, PA promote) were virtually non-existent with less than 0.6% of the scans including nutrition promotion behaviors and no more than 3.9% of scans including physical activity promotion.

**Validity**

Regression models of staff behaviors related to the percentage of children sedentary, walking and vigorously active in SDCs and ASPs are presented in Tables 2.4 and 2.5, respectively. As expected, children’s physical activity was higher during scheduled physical activity time than in any other ASP or SDC context. Across both settings, a priori hypotheses were supported by the direction of the relationships between child activity levels and staff management of physical activity and staff behaviors (see Table 2.4 and 2.5). In both SDCs and ASPs the strongest predictor of less sedentary children and more walking and vigorously active children is staff engaging in activity with children. Staff giving instructions and disciplining children are related to more sedentary children and less active children. In the SDC setting providing children choice and eliminating idle time reduces child sedentary behaviors and increases walking and vigorous activity. Elimination games and staff discouraging physical activity are related to fewer children active and more children sedentary in the ASP setting.

In four instances the direction of the relationship of frontline staff behaviors/management was contradictory to a priori hypotheses. Boys were 8.7% more sedentary and 7.2% less vigorous when staff were promoting physical activity in SDCs. During the ASPs, children stand and wait-in-line for turn was related to a lower level of children observed sedentary (boys -8.2%, girls -5.9%), and higher levels of boys walking (4.1%) and more boys and girls vigorously active (3.7%, 3.3%). In SDCs elimination games related to higher levels of girls walking (7.4%). This differed from ASPs where
elimination games related to a higher percentage of children sedentary (boys 14.5%, girls 11.4%) and less children walking and vigorous (boys -7.9%, -6.7%; girls -5.3%, -5.9%, respectively). In SDCs withholding physical activity related to lower levels of boys sedentary (-9.2%) and higher levels of boys walking (7.3%).

**DISCUSSION**

The SOSPAN instrument described herein is the first systematic observation instrument to measure staff behaviors aligned with existing policies related to promoting physical activity and nutrition in out-of-school-time-programs. The school-based intervention literature has established that staff are the driving force behind policy implementation, ultimately leading to policy success or failure. The achievement of policy benchmarks, therefore, rests squarely on the shoulders of frontline staff in out-of-school-time-program. SOSPAN is a tool to measure policy achievement in out-of-school-time-programs, providing data that was previously unattainable. This data will be instrumental to the conceptualization of staff physical activity and nutrition promotion training.

While, overall the instrument was found to be valid and reliable, several staff behaviors and management practices related to promoting physical activity and nutrition occurred at such a low incidence that reliability was impossible to establish. These were nutrition promotion, nutrition education, safe food handling and small sided games. Furthermore, several behaviors (i.e. PA promote, discipline, PA withhold) were observed at such a low incidence that their relationship with children’s observed physical activity should be interpreted with caution. The reasons for these low occurrences are unclear. It appears that, while these behaviors are described in policy documents, staff in the out-of-school-time-programs included in this study are not performing them. We are confident that this study reflects the physical activity and nutrition behaviors/management of staff in these ASPs and SDCs because of the amount of time spent in the programs (i.e., SDCs—28 days, ASPs—27 days) and the quantity of scans conducted (SDCs—4591 scans, ASPs—1755 scans). The total number of scans is
larger than other systematic observation studies (McKenzie, Cohen, Sehgal, Williamson, & Golinelli, 2006; McKenzie, et al., 2000; McKenzie, Sallis, & Nader, 1992; Ridgers, et al., 2010), and therefore, extending the observation period over a longer time would most likely not address the low incidence of these behaviors since the behaviors occurred so infrequently. Nevertheless, the staff behaviors and management practices related to physical activity and nutrition included in SOSPAN are clearly described in existing policies, evident in the literature, and confirmed by expert input. These three factors lend content validity to the behaviors and management practices included in SOSPAN.

The small number of nutrition behaviors/management, compared to PA behaviors/management included in SOSPAN was due to the limited type of behaviors/management practices staff could perform regarding nutrition. Moreover, based on the systematic review of policy documents and expert opinion, these were the only nutrition behaviors identified. Nevertheless, the nutrition items included in SOSPAN do capture the extent of policy language, literature on nutrition promotion and expert input about nutrition promotion. Additionally, opportunities to promote nutrition are relatively few in the ASP and SDC environment compared to PA promotion opportunities–snack lasting approximately 15min in each setting and lunch lasting 30min in SDCs compared to more than 60min of scheduled physical activity time in ASPs and well over 3 hours of scheduled physical activity time in SDCs. As a result, the majority of SOSPAN items focus on staff physical activity promotion behaviors and management of physical activity. Furthermore, the responsibility to provide nutritious snacks/lunch falls outside the responsibilities of typical staff (i.e. program administration, children’s parents). Despite this, the nutrition items represented in SOSPAN do reflect important behaviors/management practices that staff should demonstrate when working with children.

It is unclear why the direction effects of several staff behaviors observed differed from a priori hypotheses. Upon further examination, the relationship between staff promotion of physical activity, children stand and wait-in-line for turn, elimination
games, withholding physical activity and child physical activity levels might be explained by a combination of factors. *Simultaneity* is a term often used in the education literature to refer to the fact that many events are occurring at once in the classroom (Doyle, 1980). This same phenomenon was occurring in the out-of-school-time-programs observed. For example, 24% of the time that staff were promoting physical activity staff were also instructing children (which was found to be negatively related to child physical activity levels). The complex nature of the out-of-school-time-program setting, with many events happening simultaneously could be contributing to these contradictory relationships. Initial low levels of child activity might also be contributing to the contradictory relationship between physical activity promotion and child physical activity. When staff notice low levels of child physical activity it is possible they increase the amount of verbal promotion of physical activity; skewing the relationship between child physical activity and staff verbal promotion of physical activity. Girls increased levels of walking during elimination games may be related to the lack of clear protocol for what to do when eliminated from a game. Often staff did not communicate an explicit protocol for children to observe once eliminated from a game, therefore, elevated levels girls walking could be a symptom of those children eliminated in search of something to fill their time until the next round began. However, all other statistically significant relationships between child physical activity and elimination games supported *a priori* hypotheses. Finally, the relationship between child physical activity levels and staff withholding physical activity may be explained by the operational definition of withholding physical. For this study withholding physical activity included when staff verbally threatened to remove children from physical activity as a result of misbehavior, thus, a child may actually never have been required to sit out yet the variable was still coded. This could explain the aberrant relationship between child physical activity and withholding physical activity.

Despite the limitations discussed above the SOSPAN instrument is a valuable tool for the out-of-school-time-program setting. Based on initial SOSPAN observations, staff behaviors and management of physical activity and nutrition do not appear to be in line
with policies related to promoting physical activity and nutrition in these out-of-school-time-programs. Promotion behaviors in these out-of-school-time-programs occurred at a very low incidence and inappropriate management practices (e.g., elimination games, excessive idle time) occurred at relatively high rates. The SOSPAN instrument’s utility lies in its ability to uncover such practices in out-of-school-time-programs. It is the first systematic observation instrument in which policy mandated staff behaviors/management related to physical activity and nutrition promotion are overtly assessed.

In conclusion, due to the critical nature staff play in the achievement of policy benchmarks, SOSPAN can be used as a measure of policy implementation at the staff level and a proxy measure of policy benchmarks related to child activity. Furthermore, SOSPAN will be a useful outcome measure of staff trainings related to physical activity and nutrition promotion, an essential component to the eventual achievement of policy benchmarks in out-of-school-time-programs.
Table 2.1. Operational definitions of the SOSPAN instrument and inter-rater percent agreement

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational Definition</th>
<th>Inter-Rater Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Percent Agreement Summer Day Camp&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Physical Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Behaviors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervise</td>
<td>Staff member is present and monitoring children. This is the default code if staff member is engaged in or leading an activity other than a PA.</td>
<td>92.4</td>
</tr>
<tr>
<td>Other Task</td>
<td>Staff member is present but is engaged in behaviors related to their duties as an ASP/SUMMER staff member (e.g. setting up next activity, taking roll).</td>
<td>86.5</td>
</tr>
<tr>
<td>Off Task</td>
<td>Staff member is present but is engaged in behaviors other than their duties related to the ASP/SUMMER or monitoring children (i.e. texting/talking on phone, back turned to all children).</td>
<td>95.2</td>
</tr>
<tr>
<td>PA Instruct/Lead</td>
<td>Staff member is instructing children about physical activity or leading activity but not directly participating in activity.</td>
<td>84.1</td>
</tr>
<tr>
<td>PA Engaged</td>
<td>Staff member is participating with children in physical activity.</td>
<td>88.6</td>
</tr>
<tr>
<td>PA Promote</td>
<td>Staff member verbally promotes physical activity (e.g. keep going, awesome job, good effort).</td>
<td>98.1</td>
</tr>
<tr>
<td>PA Discourage</td>
<td>Staff member verbally discourages PA (e.g. “stop running” “slow down”).</td>
<td>99.1</td>
</tr>
<tr>
<td>PA Withhold</td>
<td>Staff member removes a child from physical activity (i.e. present or future) or threatens to remove a child from physical activity (i.e. present or future) as a consequence for behavior.</td>
<td>99.8</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff giving instructions</td>
<td>Staff are giving instructions (i.e. other than PA instructions) to children</td>
<td>89.8</td>
</tr>
<tr>
<td>Staff disciplining children</td>
<td>Children are being disciplined by staff</td>
<td>99.1</td>
</tr>
<tr>
<td>Idle time</td>
<td>Children are not engaged in any specific activity and are awaiting instructions from staff</td>
<td>74.5</td>
</tr>
<tr>
<td>Children stand and wait-in-line for turn</td>
<td>Children stand and wait their turn to play/participate in PA.</td>
<td>78.7</td>
</tr>
<tr>
<td>Elimination game</td>
<td>Game eliminates children from PA opportunities as it progresses</td>
<td>98.6</td>
</tr>
<tr>
<td>Choice provided</td>
<td>Children have a choice of PAs in which to participate (i.e. NOT do this or sit).</td>
<td>93.1</td>
</tr>
<tr>
<td>PA unsafe</td>
<td>Children are at risk of being injured (e.g. children in danger of colliding, children in danger of being hit with ball/racket, in danger of running into wall).</td>
<td>98.6</td>
</tr>
<tr>
<td>Behavior</td>
<td>Description</td>
<td>Percentage</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Small sided game</td>
<td>Children are divided into several small games instead of one large game.</td>
<td>98.8</td>
</tr>
<tr>
<td>Rules modified for PA</td>
<td>Staff modified the rules of an active game in some way to maximize children’s physical activity (e.g. eliminated lines, added active part to non pa activity, stations).</td>
<td>98.1</td>
</tr>
</tbody>
</table>

**Nutrition**

**Staff Behaviors**

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition Promote</td>
<td>Staff member verbally promotes healthy eating</td>
</tr>
<tr>
<td>Nutrition education</td>
<td>Staff member is educating children about healthy snack options (e.g. talking about nutrition content of snacks, using nutrition education curricula)</td>
</tr>
<tr>
<td>Staff eating</td>
<td>Staff member is eating, has food in their hand or in their vicinity in the presence of children. Type of food was then coded as fast food (e.g. fast food containers, hot dogs, pizza) fruits and vegetables, chips and trail mixes, candy, snack bars.</td>
</tr>
<tr>
<td>Staff drinking</td>
<td>Staff member is drinking, has a cup in their hand or in their vicinity in the presence of children Type of drink was then coded as fast food (e.g. fast food cups), water, soda/colored drink, non-identifiable.</td>
</tr>
</tbody>
</table>

**Management**

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe food handling</td>
<td>Staff are observed practicing safe food handling techniques (e.g. washing hands before serving food, disposing of unsanitary food, etc.).</td>
</tr>
</tbody>
</table>

*423 total reliability scans over eight days in 4 summer day camps
†288 total reliability scans over nine days in 4 afterschool programs
"-" indicates that the behavior was never observed therefore percent agreement was not calculated
Table 2.2. SOSPAN instrument sequence of scans and variables collected

<table>
<thead>
<tr>
<th>Scan</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOSPAN Physical Activity Promotion Scan</strong></td>
<td></td>
</tr>
<tr>
<td>Activity Context</td>
<td></td>
</tr>
<tr>
<td>Scheduled activity</td>
<td></td>
</tr>
<tr>
<td>Grade level of children</td>
<td></td>
</tr>
<tr>
<td>Location of activity</td>
<td></td>
</tr>
<tr>
<td>Equipment available</td>
<td></td>
</tr>
<tr>
<td>Child Physical Activity Levels</td>
<td></td>
</tr>
<tr>
<td>Sedentary</td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td></td>
</tr>
<tr>
<td>Vigorous</td>
<td></td>
</tr>
<tr>
<td>Staff Behaviors</td>
<td></td>
</tr>
<tr>
<td>Supervise</td>
<td></td>
</tr>
<tr>
<td>Other Task</td>
<td></td>
</tr>
<tr>
<td>Off Task</td>
<td></td>
</tr>
<tr>
<td>Physical activity instruct/lead</td>
<td></td>
</tr>
<tr>
<td>Physical activity engaged</td>
<td></td>
</tr>
<tr>
<td>Physical activity promote</td>
<td></td>
</tr>
<tr>
<td>Physical activity discourage</td>
<td></td>
</tr>
<tr>
<td>Physical activity withhold</td>
<td></td>
</tr>
<tr>
<td>Staff eating</td>
<td></td>
</tr>
<tr>
<td>Staff drinking</td>
<td></td>
</tr>
<tr>
<td>Staff Management</td>
<td></td>
</tr>
<tr>
<td>Staff giving instructions</td>
<td></td>
</tr>
<tr>
<td>Staff disciplining children</td>
<td></td>
</tr>
<tr>
<td>Idle time</td>
<td></td>
</tr>
<tr>
<td>Children stand and wait-in-line for turn</td>
<td></td>
</tr>
<tr>
<td>Elimination game</td>
<td></td>
</tr>
<tr>
<td>Choice provided</td>
<td></td>
</tr>
<tr>
<td>Physical activity unsafe</td>
<td></td>
</tr>
</tbody>
</table>
**SOSPAN Nutrition Promotion Scan**

<table>
<thead>
<tr>
<th>Staff Behaviors</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition promote</td>
<td>Safe food handling</td>
</tr>
<tr>
<td>Nutrition education</td>
<td></td>
</tr>
<tr>
<td>Staff eating</td>
<td></td>
</tr>
<tr>
<td>Staff drinking</td>
<td></td>
</tr>
</tbody>
</table>

**Small sided game**
Rules modified for physical activity

---

*Scans completed during all scheduled activities*  
†Scans completed during scheduled snack or lunch only

For operational definitions of variables see Table 2.1
Table 2.3. Incidence of behaviors, management of the physical activity environment, and scheduled activity across total scans

<table>
<thead>
<tr>
<th></th>
<th>Summer Day Camps</th>
<th>Afterschool Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage of Total Observations (n = 4591)</td>
<td>Percentage of Observations during Physical Activity Time (n = 1,829)</td>
</tr>
<tr>
<td>Staff Physical Activity Behaviors(^\d)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervise</td>
<td>89.3</td>
<td>87.5</td>
</tr>
<tr>
<td>Other Task</td>
<td>9.3</td>
<td>8.1</td>
</tr>
<tr>
<td>Off Task</td>
<td>3.8</td>
<td>3.6</td>
</tr>
<tr>
<td>PA Instruct/Lead</td>
<td>6.4</td>
<td>9.8</td>
</tr>
<tr>
<td>PA Engaged</td>
<td>15.6</td>
<td>29.0</td>
</tr>
<tr>
<td>PA Promote</td>
<td>1.7</td>
<td>3.2</td>
</tr>
<tr>
<td>PA Discourage</td>
<td>2.6</td>
<td>2.1</td>
</tr>
<tr>
<td>PA Withhold</td>
<td>1.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Staff Management of Physical Activities(^\d)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff giving instructions</td>
<td>8.4</td>
<td>12.1</td>
</tr>
<tr>
<td>Staff disciplining children</td>
<td>1.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Idle time</td>
<td>57.6</td>
<td>50.0</td>
</tr>
<tr>
<td>Children stand and wait-in-line for turn</td>
<td>10.8</td>
<td>24.3</td>
</tr>
<tr>
<td>Elimination game</td>
<td>5.8</td>
<td>13.0</td>
</tr>
<tr>
<td>Two or more physical activities provided (choice)</td>
<td>4.9</td>
<td>8.0</td>
</tr>
<tr>
<td>Staff Nutrition Behaviors</td>
<td></td>
<td>0.6</td>
</tr>
<tr>
<td>Nutrition promote</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrition education</td>
<td></td>
<td>0.0</td>
</tr>
<tr>
<td>Staff eating food other than fruit/veg</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Staff drinking</td>
<td>2.9(^\dd)</td>
<td></td>
</tr>
<tr>
<td>Staff Management of Nutrition</td>
<td></td>
<td>99.7</td>
</tr>
<tr>
<td>Safe food handling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^\d\) Choice was provided during the ASP at the site level – selection into “tracks.” Choice not provided within individual sessions.

\(^\dd\) Variables are not mutually exclusive therefore cannot be summed to equal 100%

\(^\dd\) Does not include incidences of staff drinking water
**Table 2.4. Construct validity of the SOSPAN instrument in Summer Day Camps.‡**

<table>
<thead>
<tr>
<th>Staff Behaviors</th>
<th>Boys</th>
<th></th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sedentary b (95% CI)</td>
<td>Walking b (95% CI)</td>
<td>Vigorous b (95% CI)</td>
</tr>
<tr>
<td>PA Instruct/Leading (i.e. leading or instructing PA)</td>
<td>9.1 (1.1 3.3)</td>
<td>4.8 (1.8 1.6)</td>
<td>11.7 (1.7 1.7)</td>
</tr>
<tr>
<td></td>
<td>-3.0 (-3.4 1.6)</td>
<td>6.1 (1.8 1.8)</td>
<td>-3.7 (-1.9 1.9)</td>
</tr>
<tr>
<td></td>
<td>-2.7 (-3.5 1.1)</td>
<td>-4.2 (-3.9 1.2)</td>
<td>-4.9 (-3.2 1.2)</td>
</tr>
<tr>
<td></td>
<td>-3.6 (-3.5 4.3)</td>
<td>8.0 (1.8 1.8)</td>
<td>5.5 (1.8 1.8)</td>
</tr>
<tr>
<td></td>
<td>-3.8 (-4.3 3.1)</td>
<td>1.1 (1.8 1.8)</td>
<td>1.1 (1.8 1.8)</td>
</tr>
<tr>
<td></td>
<td>-2.0 (-2.4 1.8)</td>
<td>-1.3 (-2.0 1.8)</td>
<td>-0.4 (-0.6 1.8)</td>
</tr>
<tr>
<td></td>
<td>-3.2 (-2.8 1.6)</td>
<td>-0.1 (-3.1 1.6)</td>
<td>-0.7 (-1.5 1.5)</td>
</tr>
<tr>
<td></td>
<td>-0.6 (-3.0 2.4)</td>
<td>-1.8 (-2.0 1.8)</td>
<td>-1.0 (-2.0 1.0)</td>
</tr>
<tr>
<td></td>
<td>-3.4 (1.6 1.6)</td>
<td>-1.3 (1.6 1.6)</td>
<td>-1.3 (1.6 1.6)</td>
</tr>
<tr>
<td></td>
<td>-7.6 (-3.3 1.3)</td>
<td>-7.9 (-3.5 1.5)</td>
<td>-7.2 (-3.5 1.5)</td>
</tr>
<tr>
<td></td>
<td>-3.1 (2.3 1.3)</td>
<td>-2.6 (1.6 1.6)</td>
<td>-2.5 (1.6 1.6)</td>
</tr>
<tr>
<td>Staff engaged activity with children (i.e. playing the game)</td>
<td>-16.0 (-5.3 4.3)</td>
<td>4.8 (-1.8 1.8)</td>
<td>-13.0 (-5.3 1.8)</td>
</tr>
<tr>
<td></td>
<td>-12.1 (1.3 1.3)</td>
<td>1.4 (-0.9 1.9)</td>
<td>-13.6 (0.3 1.9)</td>
</tr>
<tr>
<td>Other Task</td>
<td>-0.9 (-3.5 3.5)</td>
<td>-2.2 (-0.5 1.5)</td>
<td>-1.5 (-0.5 1.5)</td>
</tr>
<tr>
<td></td>
<td>-0.2 (-3.3 1.1)</td>
<td>-0.4 (1.5 1.5)</td>
<td>-0.4 (1.5 1.5)</td>
</tr>
<tr>
<td></td>
<td>-0.7 (-1.1 1.1)</td>
<td>-1.1 (1.1 1.1)</td>
<td>-0.2 (1.1 1.1)</td>
</tr>
<tr>
<td></td>
<td>-2.4 (1.3 1.3)</td>
<td>-1.3 (1.3 1.3)</td>
<td>-0.3 (1.3 1.3)</td>
</tr>
<tr>
<td></td>
<td>-3.7 (1.7 1.7)</td>
<td>-1.5 (1.5 1.5)</td>
<td>-0.7 (1.5 1.5)</td>
</tr>
<tr>
<td>Staff Promote</td>
<td>8.7 (0.8 16.5)</td>
<td>2.7 (-1.4 1.4)</td>
<td>2.3 (-0.6 1.6)</td>
</tr>
<tr>
<td></td>
<td>-12.1 (1.3 1.3)</td>
<td>-1.3 (1.3 1.3)</td>
<td>-1.3 (1.3 1.3)</td>
</tr>
<tr>
<td></td>
<td>-12.3 (1.6 1.6)</td>
<td>-0.9 (1.6 1.6)</td>
<td>-0.7 (1.6 1.6)</td>
</tr>
<tr>
<td></td>
<td>-2.0 (1.4 1.4)</td>
<td>-1.7 (1.4 1.4)</td>
<td>-1.1 (1.4 1.4)</td>
</tr>
<tr>
<td></td>
<td>-4.4 (1.4 1.4)</td>
<td>-5.4 (1.4 1.4)</td>
<td>-5.4 (1.4 1.4)</td>
</tr>
<tr>
<td>PA Discourage</td>
<td>1.3 (-4.7 1.7)</td>
<td>-1.5 (-3.4 1.4)</td>
<td>0.4 (-5.6 6.5)</td>
</tr>
<tr>
<td></td>
<td>-6.4 (1.3 1.3)</td>
<td>-0.5 (5.4 4.4)</td>
<td>-0.5 (5.4 4.4)</td>
</tr>
<tr>
<td></td>
<td>3.3 (2.3 1.3)</td>
<td>4.4 (1.4 1.4)</td>
<td>4.1 (1.4 1.4)</td>
</tr>
<tr>
<td>Staff Management of Physical Activities</td>
<td>17.0 (-21.6 12.0)</td>
<td>6.5 (2.8 7.2)</td>
<td>7.2 (3.6 7.2)</td>
</tr>
<tr>
<td></td>
<td>6.5 (2.8 7.2)</td>
<td>7.2 (3.6 7.2)</td>
<td>9.1 (4.7 1.7)</td>
</tr>
<tr>
<td></td>
<td>6.5 (2.8 7.2)</td>
<td>9.1 (4.7 1.7)</td>
<td>13.7 (13.7 13.7)</td>
</tr>
<tr>
<td></td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
<td>15.8 (12.9 12.9)</td>
</tr>
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<td></td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
</tr>
<tr>
<td></td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
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<td></td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
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<td></td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
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<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
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<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
<td>13.7 (13.7 13.7)</td>
</tr>
</tbody>
</table>

**Notes:**

1. Based on 4591 scans over 27 days of observations in 4 large-scale community day camps
2. Reference group is scheduled physical activity
3. Too few observations within assembly to estimate
4. Statistically significant relationships are bolded
Table 2.5. Construct validity of the SOSPAN instrument in Afterschool Programs.‡

<table>
<thead>
<tr>
<th>Activity</th>
<th>Staff Behaviors</th>
<th>Sedentary</th>
<th>Walking</th>
<th>Vigorous</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b (95% CI)</td>
<td>b (95% CI)</td>
<td>b (95% CI)</td>
<td></td>
</tr>
<tr>
<td>Staff engaged in the activity with children (i.e. playing the game)</td>
<td>-21.2 ( -25.2 - 17.3 )</td>
<td>9.6 ( 6.3 - 13.1 )</td>
<td>11.5 ( 9.1 - 14.0 )</td>
<td></td>
</tr>
<tr>
<td>Other Task</td>
<td>0.8 ( -2.0 3.5 )</td>
<td>-2.4 ( -4.8 - 0.1 )</td>
<td>1.8 ( 0.1 - 3.5 )</td>
<td></td>
</tr>
<tr>
<td>Off Task</td>
<td>-5.2 ( -11.9 1.4 )</td>
<td>1.7 ( -4.0 7.4 )</td>
<td>3.6 ( -0.5 7.7 )</td>
<td></td>
</tr>
<tr>
<td>PA Promote</td>
<td>2.4 ( -5.8 10.9 )</td>
<td>-2.3 ( -9.6 4.7 )</td>
<td>-0.3 ( -5.3 5.0 )</td>
<td></td>
</tr>
<tr>
<td>PA Discourage</td>
<td>7.1 ( 2.2 12.1 )</td>
<td>-5.8 ( -10.0 - 1.5 )</td>
<td>-1.4 ( -4.5 1.6 )</td>
<td></td>
</tr>
<tr>
<td>Staff Management of Physical Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children stand and wait-in-line for turn</td>
<td>-8.2 ( -13.0 - 3.5 )</td>
<td>4.1 ( 0.2 8.4 )</td>
<td>3.7 ( 0.8 6.6 )</td>
<td></td>
</tr>
<tr>
<td>Elimination game</td>
<td>14.5 ( 8.8 20.2 )</td>
<td>-7.9 ( -12.8 - 3.0 )</td>
<td>-6.7 ( -10.2 - 3.2 )</td>
<td></td>
</tr>
<tr>
<td>Staff giving instructions (i.e. not relate to physical activity)</td>
<td>7.0 ( 3.3 10.7 )</td>
<td>-2.7 ( -5.9 0.5 )</td>
<td>-4.4 ( -6.7 - 2.1 )</td>
<td></td>
</tr>
<tr>
<td>Staff disciplining children</td>
<td>15.0 ( 8.9 22.5 )</td>
<td>-10.0 ( -17.3 - 5.6 )</td>
<td>-4.8 ( -8.3 0.1 )</td>
<td></td>
</tr>
<tr>
<td>Idle time</td>
<td>1.8 ( -0.5 4.0 )</td>
<td>-0.8 ( -2.7 1.2 )</td>
<td>-0.9 ( -2.3 0.4 )</td>
<td></td>
</tr>
<tr>
<td>Withholding PA</td>
<td>1.4 ( -5.3 8.1 )</td>
<td>-2.9 ( -8.6 2.8 )</td>
<td>1.4 ( -2.7 5.5 )</td>
<td></td>
</tr>
<tr>
<td>Scheduled Activity†‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Enrichment</td>
<td>28.1 ( 25.0 31.3 )</td>
<td>-16.6 ( -19.1 - 13.7 )</td>
<td>-11.7 ( -13.7 - 9.8 )</td>
<td></td>
</tr>
<tr>
<td>Scheduled Snack</td>
<td>15.3 ( 10.5 20.3 )</td>
<td>-6.9 ( -10.8 - 2.6 )</td>
<td>-8.7 ( -11.7 - 5.8 )</td>
<td></td>
</tr>
<tr>
<td>Scheduled Academics</td>
<td>31.5 ( 28.3 34.5 )</td>
<td>-18.6 ( -21.1 - 15.8 )</td>
<td>-12.9 ( -14.9 - 11.0 )</td>
<td></td>
</tr>
<tr>
<td>Scheduled Bathroom/Water</td>
<td>24.0 ( 18.2 29.8 )</td>
<td>-14.5 ( -19.4 - 9.5 )</td>
<td>-9.7 ( -13.2 - 6.1 )</td>
<td></td>
</tr>
<tr>
<td>Scheduled Track Change</td>
<td>17.7 ( 10.3 24.9 )</td>
<td>-11.7 ( -17.7 - 5.3 )</td>
<td>-6.5 ( -11.1 - 2.1 )</td>
<td></td>
</tr>
</tbody>
</table>

‡Based on 1755 scans across 28 days in 4 large-scale community based afterschool programs.

†Reference group is Scheduled Physical Activity
Statistically significant relationships are bolded
**Figure 2.1. Screenshot of the custom user interface in Pendragon Forms VII© on the Samsung Galaxy Tablets©**
REFERENCES


National Association of Sport and Physical Education. (2009). Physical Activity Used as Punishment and/or Behavior Management: American Alliance for Health Physical Educaiton Recreation and Dance.


Weaver, Beets, Webster, Beighle, & Huberty. (In Press). A conceptual model for training afterschool program staffers to promote physical activity and nutrition. *J Sch Health.*

CHAPTER 3: STUDY 2

A COMPREHENSIVE PROFESSIONAL DEVELOPMENT TRAINING’S EFFECT ON AFTERSCHOOL PROGRAM STAFF BEHAVIORS TO PROMOTE HEALTHY EATING AND PHYSICAL ACTIVITY. JOURNAL OF PUBLIC HEALTH MANAGEMENT AND PRACTICE

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In recent years afterschool programs have been called upon to promote healthy eating and physical activity (HEPA) of the children they serve (Beets, Huberty, & Beighle, 2012; Beets, Tilley, Kim, & Webster, 2011; Beighle et al., 2010). National and state organizations have responded to this call by developing HEPA Standards for afterschool programs (Beets, et al., 2011; Beets, Wallner, & Beighle, 2010b). These HEPA Standards outline key behaviors frontline-staff (i.e. those individuals interacting with children daily - hereafter referred to as “staff”) should exhibit to create a HEPA friendly afterschool program environment. These behaviors include modeling HEPA, verbally promoting HEPA, facilitating games that encourage child physical activity (e.g. modifying games that involve elimination or lines) and refraining from withholding or prescribing physical activity as punishment.

The YMCA of USA is one of the largest afterschool program providers in the country. In November 2011, the YMCA of USA adopted HEPA Standards to address the nutritional quality of snacks served and childhood inactivity in their afterschool programs (Wiecha, Gannett, Hall, & Roth, 2011). Consistent with other HEPA Standards, the YMCA of USA standards describe key behaviors staff should exhibit that theoretically and intuitively lead to successfully meeting HEPA goals. However the standards do not outline strategies for increasing staff behaviors that promote child HEPA or eliminating staff behaviors which are inconsistent with HEPA Standards (Weaver, Beets, Webster, & Huberty, in press). This omission leaves program leaders with no guidance for how to incorporate standards into routine practice.

Several studies have intervened on child HEPA in the afterschool program setting (Beets, 2012 epub). These studies have used a variety of approaches including delivering physical activity curriculum, environmental changes driven by policy adoption and programs tailored to the cultural needs of afterschool programs but have resulted in limited success. Some studies have reported minimal increases in child activity (Dzewaltowski et al., 2010; Gortmaker et al., 2012; Sharpe, Forrester, & Mandigo, 2011) while other studies have reported no increase in child activity (Iversen, Nigg, &
Titchenal, 2011; Nigg, Battista, Chang, Yamashita, & Chung, 2004). We hypothesize that, one reason for the limited success of these studies may be that staff are not displaying behaviors linked to child physical activity, and outlined in HEPA Standards, at a sufficient level to affect child physical activity (Weaver, et al., in press). Interventions targeting snacks served in afterschool programs have enjoyed more success (Giles et al., 2012; Mozaffarian et al., 2010) but there is a scarcity of these studies in the literature. To this point, no studies have evaluated interventions in respect to their effect on staff HEPA promoting or discouraging behaviors. This gap in the literature is problematic because there is no evidence for what intervention strategies align staff behaviors with HEPA Standards in the afterschool program setting, and what HEPA promoting or discouraging behaviors affect child HEPA. As a necessary first step, it is critical to develop strategies to align staff behaviors with HEPA Standards and to evaluate the effects of such strategies on staff HEPA promoting or discouraging behaviors. The purpose of this study is to describe the development and first year outcome evaluation of competency based professional development training (Weaver, Beets, Webster, Beighle, & Huberty, 2012) on staff engagement in HEPA promoting behaviors and the elimination of staff engagement in HEPA discouraging behaviors.

METHODS

PARTICIPANTS

Four large scale YMCA afterschool programs in the Columbia, SC area participated in this pilot study. These programs were pre-existing community-based programs taking place immediately after the regular school day (typically 3-6pm), were located at a community organization outside the school environment (i.e., YMCA), were available daily throughout the academic year (Monday through Friday), and provided a combination of scheduled activities which included snack, homework assistance/tutoring, enrichment activities (e.g., arts and crafts, music), and opportunities for children to be physically active.
INTERVENTION

These results represent the baseline and first year findings of a two year evaluation using a pre/post-assessment no control group design. A comprehensive and coordinated approach was developed with the objective of identifying low- and no-cost strategies after-school programs can employ to align routine practice with HEPA Standards. The approach was informed by social ecological models of health promotion (Sallis & Owen, 2002), complex systems change (Foster-Fishman, Nowell, & Yang, 2007), and public health policy literature (Brownson & Jones, 2009; Brownson, Seiler, & Eyler, 2010). The conceptual model has been explained in detail elsewhere (Beets, Webster, Saunders, & Huberty, 2013). In brief, after-school programs were conceptualized as complex systems in which multiple levels exist. Characteristics each of these levels are capable of influencing the successful implementation of HEPA standards and, in turn, impact children’s HEPA during the program. In this case, the system included standards at the national, state and organizational levels; site characteristics; individual program leaders; staff and the characteristics of children attending. Modifiable characteristics at each level were identified and targeted to help facilitate the achievement of the standards.

HEPA Standards. In November of 2011 the YMCA of USA adopted HEPA Standards for all of their after-school programs, including the sites participating in this study (Wiecha, et al., 2011). Using principles of community-based participatory research (Israel, Schulz, Parker, & Becker, 1998), university and after-school program staff created a collaborative work group to review the HEPA Standards adopted by the YMCA of USA, in addition to all national, state and local after-school program standards related to HEPA (Beets, et al., 2011; Beets, et al., 2010b). Utilizing an iterative process, the collaborative work group identified strategies to achieve HEPA Standards and meet the needs of each after-school program site.

Standards identified five levels of influence on children’s HEPA (i.e. child, staff, program leader, parent, and environment of the after-school program). Those influences
deemed most salient and modifiable were selected by the collaborative work group and targeted in this intervention. Specifically standards that targeted the physical and social environment of the afterschool program were selected. These standards explicitly targeted appropriate and inappropriate behaviors of staff (e.g. removing elimination games from the program, prepare an activity plan, modeling HEPA) the physical environment (i.e. posters about HEPA, modifying games to increase activity) and schedule (i.e. non-sport activity daily, 60 min of program time for physical activity, snack time daily) of the afterschool program. Specific strategies were developed to support staff in the modification of the social and physical environment of the afterschool program to promote HEPA.

*Professional development training.* The primary strategy for the increased engagement of staff in HEPA promoting behaviors was through professional development training consisting of a 2 hour healthy eating training and 3 hour physical activity training. The trainings were incorporated into semi-yearly professional development trainings previously in place at the YMCA afterschool programs. All staff were required to attend along with their program leaders. The professional development training was founded on the 5Ms—*Mission, Manage, Motivate, Monitor, Maximize* (Weaver, et al., 2012) training model and was designed to develop afterschool program staff competencies related to increasing child engagement in HEPA. Competencies included in the trainings are consistent with policy documents (Beets, Rooney, Tilley, Beighle, & Webster, 2010a; Beets, et al., 2011; Wiecha, et al., 2011; Zarrett, Skiles, Wilson, & McClintock, 2012), “best practices” position statements from elementary and middle school physical education (American Academy of Pediatrics, 2010; National Association of Sport and Physical Education, 2009) literature on competencies for school wide and afterschool physical activity promotion (Beighle, et al., 2010; Kelder et al., 2005; Missouri Afterschool Network, 2006; North Carolina Afterschool Professional Development Work Group, 2010) theory (Deci & Ryan, 1987; Stuntz & Weiss, 2010), and our extensive experiences working in afterschool programs. During trainings staff participated in and led healthy eating exercises and physical
activities in the five domains of the training program. Competencies included in the healthy eating training included role modeling healthy eating, promoting healthy eating, and safe food handling. The physical activity component of the professional development training utilized the LET US Play competencies nested within the 5Ms professional development training model. These competencies included the LET US Play (i.e. lines, elimination, team size, uninvolved staff/kids, and space, equipment and rules) principles. The LET US Play principles were introduced to staff in order to provide a reflective tool for the identification of barriers that limit children’s activity during free-play and organized activity opportunities in the afterschool program setting. During trainings staff also practiced competencies related to managing children in physical activity environments (e.g. using countdowns to transition between activities quickly, actively supervising children, keeping all children in view) in order to reduce time children were idle and the time staff were instructing and disciplining children. The trainings were led by university personnel with expertise in HEPA promotion for all afterschool program sites.

**On-site booster sessions.** A total of 3 booster sessions were conducted in each afterschool program site. Booster sessions consisted of real-time feedback and modeling of HEPA promotion strategies over one complete program day (i.e. ~3-6pm). Program leaders and staff received feedback on successes and areas for improvement tailored specifically to each program. Observation notes were compiled, along with suggestions for program enhancement and emailed to program leaders and branch directors for dissemination to staff. Observations and suggestions were aligned with competencies presented to staff in the 5Ms professional development training and focused on modifying games to enhance child physical activity levels based on the LET US Play principles, managing physical activity environments effectively, as well as modeling and encouraging child HEPA.

**Ongoing feedback and technical support.** Weekly contact (face-to-face, phone, email) with program leaders was provided by the lead author to give ongoing feedback.
and technical support regarding each afterschool program site’s progress toward goals outlined in the HEPA Standards. Feedback highlighted the level of implementation of staff HEPA promoting/discouraging behaviors in each site. Weekly contact also included follow-up on the professional development training and booster sessions. Furthermore, ongoing technical support for afterschool program leaders in regards to barriers to implementation of the staff HEPA promoting/discouraging behaviors and for immediate feedback and solutions for addressing the identified barriers.

**SYSTEM FOR OBSERVING STAFF PROMOTION OF ACTIVITY AND NUTRITION (SOSPAN)**

Implementation of the HEPA behaviors by staff was collected via direct observation using the SOSPAN instrument. Designed as a systematic observation instrument SOSPAN measures staff behaviors related to HEPA promotion and is aligned with HEPA standards (Weaver, et al., in press). Behaviors included in SOSPAN are described in Table 3.1. The SOSPAN instrument is based upon momentary time sampling techniques and is reliable and valid (Weaver, et al., in press). In brief, SOSPAN captures 20 staff behaviors (13 physical activity behaviors and 7 healthy eating behaviors) that either promote (e.g. verbal promotion, modeling HEPA) or discourage (e.g. verbal discouragement of physical activity, unsafe food handling) HEPA. The instrument is divided into three subsections including staff management behaviors, staff promotion behaviors, and context of the afterschool program. Staff management behaviors (n = 10) consist of contextual factors of the activity (e.g. children eliminated from physical activity opportunities, children stand and wait in line for turn, unsafe food handling) occurring, over which staff have direct control. Staff promotion behaviors (n = 10) include actions that staff perform (e.g. supervise physical activity, engaged in physical activity with children, verbally promote HEPA, educating children about HE). The context of the afterschool program (i.e. scheduled physical activity, snack, enrichment, academics) in which staff behaviors occur is also recorded by the SOSPAN instrument.
Observation Schedule and Protocol

Observation occurred on a minimum of four unannounced nonconsecutive weekdays (Mon-Thurs) throughout August, September, and October 2011 (baseline) and again during April and May 2012 (outcome) at each afterschool program. Data were collected over 50 program days across both measurement periods. Scans were completed continuously from the beginning to the end of each program day. Consistent with the SOSPAN protocol, each site was visited prior to data collection to identify size, location, and boundaries of each target area (Weaver, et al., in press). A total of 91 target areas were identified across the four afterschool programs, with each individual site having anywhere from 17-28 target areas (e.g. playgrounds, fields, gyms, pools). Variations in how the afterschool programs were structured required modified observation strategies as outlined below.

Afterschool programs, divided children using two strategies: by grade level (e.g. k-1, 2-3 and 4-5) or activity tracks (e.g., organized or free-play physical activity, arts and crafts, dance) lasting ~45-60 minutes from which children could choose. When children were divided by grade level observers rotated through each grade level’s scheduled activity. When children were divided into activity tracks observers rotated through scheduled tracks. Observers completed five consecutive scans in each target area in which the track/grade level was located prior to moving to the next track/grade level. Two observers completed scans daily; systematically rotating through scheduled tracks/grade levels separately in order to maximize the amount of the program observed. No observations were made in target areas where no children were present.

Observer Training and SOSPAN Reliability

Five trained observers completed all observations. Observer training was conducted by the lead author prior to baseline and post-assessment data collection. Observers completed classroom training and field practice. Classroom training lasted two days (i.e. 3 hrs each day) and included reviewing study protocol, orienting observers to the instruments, and committing observational categories and codes to memory.
Observers completed at least three days (i.e. 3 hours each day) of field based observations including familiarization with target areas at program sites and completing practice/reliability scans. Inter-rater agreement criteria were set at >80% using interval-by-interval agreement for each category (McKenzie, Marshall, Sallis, & Conway, 2000; Ridgers, Stratton, & McKenzie, 2010). Consistent with published reliability protocols (Brown et al., 2006; Ridgers, et al., 2010), reliability was collected on at least 30% of measurement days during baseline and post-assessment data collection. Reliability for SOSPAN was collected over 34 days across all four participant afterschool programs. Estimates are based upon 952 reliability scans across baseline and post-assessment. Percent agreement between observers for staff behaviors ranged from 84-100 percent.

**Data Analysis**

Changes over time in staff behaviors were examined using multilevel mixed effects linear (i.e., staff behaviors expressed as a percentage of the number of scans observed) and logistic regression. Logit models were used to analyze the odds of observing a behavior at post-assessment as compared to baseline. The models for staff behaviors were estimated including only those scans that were performed during scheduled snack or physical activity time because that is when staff had the greatest opportunity to display HEPA promoting or discouraging behaviors. For six variables (i.e. staff eating or drinking inappropriate foods, staff practicing unsafe food handling, children preparing food, children distributing food to other children and staff verbally educating children about healthy eating) data were converted into the percentage of days where the behavior was observed because HEPA Standards call for these behaviors to be displayed during a finite time period (i.e. children should prepare and distribute food at the beginning of snack) or call for a staff behavior to be displayed daily/weekly (i.e. staff should deliver nutrition education weekly). All models were estimated using Stata (v.12.0., College Station, TX).
RESULTS

CHANGES IN STAFF BEHAVIORS

Observers completed 2976 SOSPAN scans during scheduled physical activity and snack across the two measurement periods. At baseline, five of the 20 HEPA behaviors recorded in this study were not observed in any scans. Due to zero observations linear and logit models for these behaviors were not estimated, unadjusted means are presented instead (see Table 3.2). Overall, of the 20 HEPA staff behaviors observed at baseline and post-assessment, 17 moved in the desired direction (i.e. including behaviors that were not observed at baseline but were observed at post-assessment) with 10 staff behaviors reaching statistically significant changes. Changes in staff behaviors that promote physical activity ranged from a 1.9% increase for staff leading or instructing physical activity to a 14.1% increase for small games, while the odds of observing staff behaviors that promote physical activity ranged from no statistically significant increase for staff leading or instructing physical activity to 12.98 times more likely for small games at post-assessment. Changes in staff behaviors that discourage physical activity ranged from a 3.7% increase for staff engaged in other tasks, a behavior that has been linked to decreased child activity levels (Huberty, Beets, Beighle, & McKenzie, 2012), to a 26.4% decrease for children engaged in idle time (i.e. waiting for staff to give direction). Odds of observing physical activity discouraging behaviors at post-assessment ranged from 1.33 times more likely (i.e. staff engaged in other tasks) to 0.05 times (i.e. staff withholding physical activity as a consequence for misbehavior) as likely to be observed as at baseline.

Staff verbally promoting healthy eating was observed in 10.5% of scans at post-assessment while it was not observed at baseline. Staff eating or drinking inappropriate foods during scheduled snack was observed on 37.6% and 20.1% fewer days at post-assessment while the odds of observing these behaviors were 0.07 and 0.42 times as likely at post-assessment as they were at baseline, respectively. Staff verbally educating children about healthy eating, children preparing and children distributing food were
not observed on any days at baseline and were observed on 9.5%, 18.8% and 31.3% of days respectively at post-assessment.

**DISCUSSION**

This study is the first to evaluate a professional development training to increase staff HEPA promoting behaviors and decrease HEPA discouraging behaviors. Findings indicate that after as few as four months changes in staff behavior can be amended to be more consistent with HEPA standards. Thus, these findings represent the first step towards creating HEPA friendly environments by demonstrating their impact on key staff behaviors.

An important aspect of the approach was that the strategies developed (i.e. initial and continuous training, feedback, technical support) and implemented involved minimal changes to routine practice. Strategies that are easily integrated into routine practice are more likely to be adopted by afterschool programs and thus more likely to affect staff behaviors and ultimately child HEPA (Durlak & DuPre, 2008). Furthermore, these strategies can be easily implemented in a wide variety of settings including YMCAs and other afterschool programs across the country. Thus, the strategies developed herein have the potential to impact a large number of children attending afterschool programs daily.

The impact of these strategies extends beyond staff behaviors to child level outcomes, as well. Theoretically, changes in HEPA promoting and discouraging behaviors should be linked to increases in child HEPA. In a recent study, a limited number of staff physical activity promoting and discouraging behaviors included in the SOSPAN instrument (i.e. staff promotion of physical activity, staff engaged in physical activity) were related to a decrease in sedentary children and an increase in the proportion of children engaged in MVPA (Huberty, et al., 2012). This study is part of the growing body of literature linking staff behaviors to child activity levels in the afterschool program setting (Weaver, et al., in press). For healthy eating, since all children receive the same snack, and the nutritional quality of the snack is often outside
the control of staff, it is difficult to link the healthy eating staff behaviors to a child-level outcome. Nevertheless, the healthy eating behaviors (e.g., role modeling) outlined in the HEPA Standards documents are theoretically supported and therefore, important to ensure staff exhibit during the afterschool program.

This study has a variety of strengths. The partnership between community and university personnel enabled the collaborative team to identify barriers to staff engagement in HEPA promotion behaviors. This collaboration also allowed for the development of strategies to address these barriers. The number of scans collected is also a strength of this study. The abundance of data collected (i.e. 2976 SOSPAN scans) allowed the researchers to capture a large number of instances where staff had the opportunity to demonstrate the HEPA promoting or discouraging behaviors. Thus, the data presented is representative of staff behavior occurring within these afterschool programs. This study also has limitations that must be considered when interpreting the findings. The small number of YMCA’s included in this study (n=4) limit the generalizability to other YMCA afterschool programs. The lack of a control group also raises the concern that increases or decreases in staff behaviors may have occurred in the absence of the intervention (i.e. internal validity). In the future, randomized controlled trials with similar findings would strengthen the findings of this study. Future work is also needed linking staff behaviors aggregated at the site level to child physical activity time (i.e. are children accumulating more physical activity at sites that employ staff who display more promotion behaviors)?

In conclusion, the adoption and implementation of HEPA Standards and the collaborative effort of community and university staff to create HEPA promoting strategies to meet these standards led to increases in staff behaviors that promote HEPA and decreases in staff behaviors that discourage HEPA. Future work is necessary where changes in staff behaviors are linked to child-level outcome (e.g., objectively measured physical activity).
Table 3.1. SOSPAN instrument sequence of scans and variables collected

<table>
<thead>
<tr>
<th>Scan</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOSPAN Physical Activity Promotion Scan</strong>&lt;sup&gt;†&lt;/sup&gt;</td>
<td><strong>Activity Context</strong>&lt;br&gt;Scheduled activity&lt;br&gt;Grade level of children&lt;br&gt;Location of activity&lt;br&gt;Equipment available</td>
</tr>
<tr>
<td><strong>Staff Behaviors</strong>&lt;br&gt;Staff engaged in other tasks&lt;br&gt;Staff leading or instructing physical activity&lt;br&gt;Staff verbally promoting physical activity&lt;br&gt;Staff verbally discouraging physical activity&lt;br&gt;Staff engaged in physical activity with children (i.e. playing the game)&lt;br&gt;Withholding physical activity as a consequence of misbehavior&lt;br&gt;Staff eating inappropriate foods&lt;br&gt;Staff drinking other than water</td>
<td></td>
</tr>
<tr>
<td><strong>Staff Management</strong>&lt;br&gt;Staff giving instructions&lt;br&gt;Staff disciplining children&lt;br&gt;Idle time (i.e. children waiting for direction from staff with no specific task)&lt;br&gt;Choice provided (i.e. more than one activity opportunity provided)&lt;br&gt;Small game (i.e. games with less than 10 children participating)&lt;br&gt;Children standing in line and waiting for turn&lt;br&gt;Playing elimination game (i.e. children eliminated from PA opportunities)</td>
<td></td>
</tr>
<tr>
<td><strong>SOSPAN Nutrition Promotion Scan</strong>&lt;sup&gt;‡&lt;/sup&gt;</td>
<td><strong>Staff Behaviors</strong>&lt;br&gt;Staff verbally promoting healthy eating&lt;br&gt;Staff verbally educating children about healthy eating&lt;br&gt;Staff eating inappropriate foods&lt;br&gt;Staff drinking other than water</td>
</tr>
<tr>
<td><strong>Management</strong>&lt;br&gt;Unsafe food handling&lt;br&gt;Children preparing food&lt;br&gt;Children distributing food to other children</td>
<td></td>
</tr>
</tbody>
</table>

<sup>†</sup>Scans completed during all scheduled activities<br>‡Scans completed during scheduled snack or lunch only
### Table 3.2. Increase/Decrease in staff HEPA promotion/management behaviors from baseline to post-assessment.

<table>
<thead>
<tr>
<th>Staff Behavior a</th>
<th>Fall 2011 (Sep-Oct)</th>
<th>Spring 2012 (Apr-May)</th>
<th>Percent Change</th>
<th>95% CI</th>
<th>Odds post assessment d</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff engaged in other tasks</td>
<td>26.6</td>
<td>30.3</td>
<td>3.7</td>
<td>(-1.3, 8.7)</td>
<td>1.33</td>
<td>(0.91, 1.93)</td>
</tr>
<tr>
<td>Staff leading or instructing physical activity</td>
<td>16.0</td>
<td>17.9</td>
<td>1.9</td>
<td>(1.2, 4.2)</td>
<td>1.32</td>
<td>(0.81, 2.16)</td>
</tr>
<tr>
<td>Staff verbally promoting physical activity</td>
<td>4.7</td>
<td>13.2</td>
<td>8.5</td>
<td>(5.3, 11.8)</td>
<td>3.60</td>
<td>(2.17, 5.96)</td>
</tr>
<tr>
<td>Staff verbally discouraging physical activity</td>
<td>5.2</td>
<td>0.9</td>
<td>-4.3</td>
<td>(-6.3, -2.3)</td>
<td>0.21</td>
<td>(0.09, 0.46)</td>
</tr>
<tr>
<td>Staff engaged in physical activity with children (i.e. playing the game)</td>
<td>26.6</td>
<td>37.0</td>
<td>10.4</td>
<td>(4.5, 16.4)</td>
<td>1.66</td>
<td>(1.22, 2.2)</td>
</tr>
<tr>
<td>Withholding physical activity as a consequence of misbehavior</td>
<td>5.9</td>
<td>0.5</td>
<td>-5.4</td>
<td>(-7.6, -3.2)</td>
<td>0.05</td>
<td>(0.02, 0.16)</td>
</tr>
</tbody>
</table>

### Staff Management of PA a

<table>
<thead>
<tr>
<th>Staff Management of PA a</th>
<th>Fall 2011 (Sep-Oct)</th>
<th>Spring 2012 (Apr-May)</th>
<th>Percent Change</th>
<th>95% CI</th>
<th>Odds post assessment d</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children standing in line and waiting for turn</td>
<td>18.5</td>
<td>7.8</td>
<td>-10.7</td>
<td>(-17.5, -3.9)</td>
<td>0.41</td>
<td>(0.19, 0.89)</td>
</tr>
<tr>
<td>Playing elimination game (i.e. children eliminated from PA opportunities)</td>
<td>13.2</td>
<td>8.9</td>
<td>-4.3</td>
<td>(-11.3, 2.7)</td>
<td>0.64</td>
<td>(0.22, 1.89)</td>
</tr>
<tr>
<td>Staff giving instructions</td>
<td>15.7</td>
<td>14.5</td>
<td>-1.2</td>
<td>(-6.8, 4.4)</td>
<td>0.93</td>
<td>(0.56, 1.54)</td>
</tr>
<tr>
<td>Staff disciplining children</td>
<td>3.0</td>
<td>3.9</td>
<td>0.9</td>
<td>(-1.9, 3.6)</td>
<td>1.63</td>
<td>(0.66, 4.03)</td>
</tr>
<tr>
<td>Idle time (i.e. children waiting for direction from staff with no specific task)</td>
<td>40.9</td>
<td>14.4</td>
<td>-26.4</td>
<td>(-34.3, -18.6)</td>
<td>0.23</td>
<td>(0.14, 0.37)</td>
</tr>
<tr>
<td>Choice provided (i.e. more than one activity opportunity provided)</td>
<td>8.9</td>
<td>22.3</td>
<td>13.4</td>
<td>(5.2, 21.6)</td>
<td>6.11</td>
<td>(2.32, 16.04)</td>
</tr>
<tr>
<td>Small game (i.e. games with less than 10 children participating)</td>
<td>2.7</td>
<td>16.9</td>
<td>14.1</td>
<td>(7.2, 21.1)</td>
<td>12.98</td>
<td>(3.43, 49.18)</td>
</tr>
</tbody>
</table>

### Healthy Eating Staff Behaviors c

<table>
<thead>
<tr>
<th>Healthy Eating Staff Behaviors c</th>
<th>Fall 2011 (Sep-Oct)</th>
<th>Spring 2012 (Apr-May)</th>
<th>Percent Change</th>
<th>95% CI</th>
<th>Odds post assessment d</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff verbally promoting healthy eating c</td>
<td>0.0</td>
<td>10.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Staff verbally educating children about healthy eating c, e</td>
<td>0.0</td>
<td>9.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Staff eating inappropriate foods e</td>
<td>42.1</td>
<td>4.5</td>
<td>-37.6</td>
<td>(-60.2, -14.9)</td>
<td>0.07</td>
<td>(0.01, 0.59)</td>
</tr>
<tr>
<td>Staff drinking other than water e</td>
<td>47.4</td>
<td>27.3</td>
<td>-20.1</td>
<td>(-49.0, 8.8)</td>
<td>0.42</td>
<td>(0.11, 1.53)</td>
</tr>
</tbody>
</table>

### Staff Management of Snack b

<table>
<thead>
<tr>
<th>Staff Management of Snack b</th>
<th>Fall 2011 (Sep-Oct)</th>
<th>Spring 2012 (Apr-May)</th>
<th>Percent Change</th>
<th>95% CI</th>
<th>Odds post assessment d</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe food handling c, e</td>
<td>0.0</td>
<td>0.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Children preparing food c, e</td>
<td>0.0</td>
<td>18.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Children distributing food to other children c, e</td>
<td>0.0</td>
<td>31.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

All percentages derived from multilevel mixed effects linear regression models unless otherwise noted.

- **a** 2,173 scans over 44 days (49.4 scans/day, 11 days/site)
- **b** 803 scans over 40 days (20 scans/day, 10 days/site)
- **c** Models were not estimated because behavior was not observed at baseline, post-assessment or both, unadjusted mean percentages are presented
- **d** Odds ratios derived from multilevel mixed effects logit regression models (e.g. odds of observing staff engaged in other duties at post-assessment are 1.33 times more likely than at baseline)
- **e** Presented as a percentage of days that the behavior was observed

Statistically significant changes are bolded.
REFERENCES


Missouri Afterschool Network. (2006). Kansas and Missouri Core Competencies for Youth Development Professionals (1 ed.).


National Association of Sport and Physical Education. (2009). Physical Activity Used as Punishment and/or Behavior Management: American Alliance for Health Physical Educaiton Recreation and Dance.


CHAPTER 4: STUDY 3

A COORDINATED COMPREHENSIVE PROFESSIONAL DEVELOPMENT TRAINING’S EFFECT ON SUMMER DAY CAMP STAFF HEALTHY EATING AND PHYSICAL ACTIVITY PROMOTING BEHAVIORS

Summer Day Camps (SDCs) have been recognized as a setting, outside of the school year, that can impact the healthy eating and physical activity (HEPA) of children. With more than 5,000 camps in operation across the nation (American Camp Association, 2009) and 14.3 million children in attendance annually (America After 3 PM, 2009) SDCs have substantial reach. Moreover, body mass index gains are greater over the summer than during the school year, (Downey & Boughton, 2007; von Hippel, Powell, Downey, & Rowland, 2007) making summer a crucial time to intervene on children’s HEPA. Initial research indicates children are not sufficiently active while attending SDCs (Beets, Weaver, Beighle, Webster, & Pate, 2012; Hickerson & Henderson, 2013), while the quality of foods consumed by both staff and children at SDCs is currently unknown. These findings suggest that SDCs have unrealized potential to affect the HEPA of millions of children in attendance annually.

Recently, one of the largest SDC providers in the United States, the YMCA of America, adopted HEPA Standards to address children’s inactivity and the quality of foods in their SDCs. (Wiecha, Gannett, Hall, & Roth, 2011) These standards focus on the amount of physical activity children should accumulate while attending (i.e. 60 minutes daily) and the quality of foods/beverages children should bring to the program (e.g., eliminate sugar sweetened beverages and bring fruits or vegetables daily). In addition to child outcomes, the HEPA Standards outline the behaviors staff should display, which are theoretically and empirically linked to promoting child HEPA (e.g., role modeling HEPA, verbally encouraging HEPA), as well as behaviors staff should avoid such as: eating unhealthy foods in front of children and withholding physical activity as punishment. (Wiecha, et al., 2011) However, HEPA Standards fall short of highlighting the strategies SDCs can use to increase appropriate staff behaviors and eliminate inappropriate staff behaviors. Therefore, SDC program leaders and staff need support to help staff meet HEPA Standards.

Standards for the SDC setting grew from attempts to implement standards in afterschool programs related to children’s HEPA and staff behaviors (Beets, Wallner, &
These standards were informed by studies attempting to intervene on children’s HEPA in the school and afterschool setting (Annesi, Marti, & Stice, 2009; Dzewaltowski et al., 2010; Gortmaker et al., 2012; Kelder et al., 2005; Luepker et al., 1996; Sallis et al., 1997; Sharpe, Forrester, & Mandigo, 2011). However, these studies have produced limited and mixed results. One of the weaknesses of previous studies is their reliance upon the delivery of an intervention, with little flexibility to adapt to local conditions. Staff members are often trained to deliver a pre-packaged program (Gortmaker, et al., 2012; McKenzie, Sallis, Kolody, & Faucette, 1997; Sharpe, et al., 2011) leaving little room for adaption to individual school and afterschool program needs, a key component to increasing the intended outcomes of interventions (Durlak & DuPre, 2008; Dusenbury, Brannigan, Falco, & Hansen, 2003).

To date we are aware of no studies that have evaluated the effect of an intervention on staff HEPA promoting or discouraging behaviors in SDCs and the related changes in child activity levels. Consequently, little is known about effective intervention strategies for aligning staff behaviors with HEPA Standards in the SDC setting. Further, by providing staff with competency based training that focuses on demonstrating behaviors rather than implementing a pre-packaged program, we hypothesize that the program will be more adaptable and experience greater outcomes. The purpose of this study was to describe the development and first year outcome evaluation of competency-based professional development training (Weaver, Beets, Webster, Beighle, & Huberty, 2012) on staff engagement in HEPA promoting behaviors in SDCs. Additionally, this study evaluated the impact of the professional development training on children’s activity levels in the participant SDCs.

**METHODS**

**SETTING AND PARTICIPANTS**

The results in this paper represent the first year findings of a two year intervention and evaluation cycle using a no control group pre/multiple-post assessment design related to staff behaviors and child activity levels. Child level
nutrition findings are reported elsewhere (Tilley, Beets, Jones, & Turner-McGrievy, in review). Due to the observational nature of the data collection, passive consent was obtained from the parents of the children in attendance and the staff employed by the SDCs. All procedures were reviewed and approved by the university's institutional review board.

Four large scale YMCA SDCs in the Columbia, SC area took part in this study. These SDCs each serve approximately 200 children per day and employed around 300 staff across the two measurement periods. The SDCs participating were structured programs that provided a variety of activities (e.g. snack/lunch, enrichment, physical activity) daily throughout the summer (America After 3 PM, 2009; American Camp Association, 2009). Activities included free-play opportunities; organized games, such as sports and tag games; water-based activities such as swimming, playing at a water park, or splash pad (i.e. concrete pad with fountains, water guns and water based play structures); and enrichment activities, such as arts and crafts.

Each SDC employed a site leader and staff members. Site leaders created daily schedules, managed staff, interacted with parents and generally oversaw program operations. Staff’s main responsibility was to manage children as they moved through the planned activities each day. Scheduled activities at the SDCs were held from 9am to 4:30pm. Participant SDCs operated on an 11-week schedule throughout the summer with parents enrolling their children in camp for one week (Monday through Friday) at a time. The camps maintained a 1:10 staff-to-child ratio and grouped children by grade level (e.g. k-1st, 2nd-3rd and 4-5th). Grade levels were divided into smaller groups of children with one to staff member responsible for 10-15 children each. For example, there could be 4 groups of 4-5th graders each with 10 to 15 children. Most of the children were under 12 years of age and were enrolled in the program for 8 weeks during the summer. Enrolled children attended the program on average 4 days a week for 8 hours each day.
The average daily low and high temperatures during data collection were 76.5 °F (range 70 to 82.4 °F) and 95 °F (range 84.9 to 102 °F) at baseline and 76.3 °F (range 71.1 °F to 82.9 °F) and 93.2 °F (range 86 to 102.9 °F) at post-assessment.

**INTERVENTION**

*Professional development training.* The primary strategy for increasing staff engagement in HEPA promoting behaviors was professional development training. All trainings were led by university personnel; each training lasted about 1.5 hours. The professional development training was grounded in the 5Ms training model—Mission, Manage, Motivate, Monitor, Maximize (Weaver, et al., 2012) which focuses on core competencies consistent with theory (Deci & Ryan, 1987; Stuntz & Weiss, 2010), “best practices” position statements from elementary and middle school physical education (American Academy of Pediatrics, 2010; National Association of Sport and Physical Education, 2009), literature on competencies for school wide and out of school time physical activity promotion (Beighle et al., 2010; Kelder, et al., 2005; Missouri Afterschool Network, 2006; North Carolina Afterschool Professional Development Work Group, 2010), policy documents (Beets, Rooney, Tilley, Beighle, & Webster, 2010; Beets, Tilley, Kim, & Webster, 2011; Wiecha, et al., 2011; Zarrett, Skiles, Wilson, & McClintock, 2012), and our substantial experience working with SDCs. These principles were communicated to staff via the catchphrase, “LET US Play.” LET US is an acronym for lines, elimination, team size, uninolved staff/kids, and space, equipment and rules. The trainings emphasized LET US Play as a reflective tool for staff to identify barriers to children’s activity during free-play and organized activities. Staff also practiced competencies related to managing children in physical activity environments (e.g. using countdowns to transition between activities quickly, actively supervising children, keeping all children in view) in order to reduce idle-time (i.e. when children wait for direction from staff) and time spent instructing and disciplining children. The healthy eating components of the professional development training included role modeling and promoting healthy eating and using healthy eating resources (i.e. coloring sheets, crossword puzzles etc.) for nutrition education.
**On-site booster trainings.** Six training “booster” sessions were conducted at each SDC. Bi-weekly booster sessions occurred immediately following the SDC program and lasted approximately one hour each. Boosters were conducted by the lead author and consisted of participatory activities designed to provide site leaders and staff with PA planning resources, reinforce HEPA promotion strategies, demonstrate appropriate management of children during scheduled physical activity time, and reinforce principles LET US Play covered in the 5Ms trainings.

**Workshop – Schedule Modification.** A lack of detailed schedules was identified by university personnel and YMCA site leaders as one of the barriers to quickly moving through scheduled activities in the SDC during following baseline data collection. Schedules created by the participant SDCs initially listed only general activities (i.e. enrichment, field games) and did not indicate location, equipment needed or staff roles within the activity to be played. This led to extended times of child inactivity (approximately 10-15min) while staff chose the specific activity, organized children, and retrieved and set up necessary equipment for the activity. Prior to post-assessment program leaders attended a workshop about creating schedules with specific activities, activity location, equipment needed, and staff roles during these activities.

**Weekly feedback.** During post-assessment evaluation, site leaders and staff received feedback twice per week. Observation notes from the evaluation team were compiled and emailed to site leaders for dissemination to staff. Feedback focused on modifying games, effective management of children during physical activities, and staff HEPA modeling and encouragement. Feedback was aligned with the 5Ms model and the LET US Play principles.

**Weekly self-evaluation.** A checklist consistent with the HEPA Standards was developed and distributed to site leaders. Initial checklists were completed at each SDC by university personnel and site leaders in order to clarify definitions of items and explain procedures for completing checklists. Subsequent checklists were utilized as a
self-evaluation tool to identify appropriate and inappropriate staff behaviors and collected by the lead author as a process evaluation measure.

**INSTRUMENTATION**

*System for observing staff promotion of activity and nutrition (SOSPAN).* Staff HEPA promotion behaviors were collected via direct observation. The SOSPAN instrument is a systematic observation instrument that utilizes momentary time sampling and measures staff HEPA promotion behaviors consistent with HEPA standards. SOSPAN captures 17 staff behaviors (13 physical activity promotion behaviors and 4 healthy eating promotion behaviors) and has been validated and found reliable (Weaver, Beets, Webster, & Huberty, in press) in the SDC setting. The instrument is divided into three subsections, including staff management behaviors, staff promotion behaviors, and ASP context. Staff management behaviors (n=7) include contextual factors of the activity (e.g. children eliminated from physical activity opportunities, children standing and waiting in line for their turn, unsafe food handling) over which frontline-staff have direct control. Staff promotion behaviors (n=10) include behaviors that staff performed during observation (e.g. engaging in physical activity with children, verbally promoting HEPA, educating children about healthy eating). ASP context includes scheduled activity and activity location.

*Systematic observation of physical and leisure activity in youth (SOPLAY).* Child physical activity levels were collected via SOPLAY (McKenzie, Marshall, Sallis, & Conway, 2000) concurrently with staff behaviors. Utilizing momentary time sampling, SOPLAY captures activity levels (i.e. sedentary, walking, vigorous) of large groups of children. Prior research has used the activity codes captured by SOPLAY extensively (McKenzie, 2002; McKenzie, Cohen, Sehgal, Williamson, & Golinelli, 2006; McKenzie, et al., 2000; McKenzie, Sallis, & Nader, 1992). Construct validity of the activity codes has been established through heart rate monitors (McKenzie et al., 1991) and accelerometry. (Saint-Maurice, Welk, Ihmels, & Krapfl, 2011) Consistent with previous research (Saint-
Maurice, et al., 2011), the vigorous activity level of the SOPLAY instrument was considered moderate-to-vigorous-physical-activity (MVPA) for this study.

Observation Schedule and Protocol. Baseline data were collected over 28 program days, whereas first year outcome data were collected over 39 program days. Observation occurred on unannounced nonconsecutive weekdays (Mon-Thurs) at each site throughout June, July and August 2011 (baseline) and July and August 2012 (outcome). Alternating SOPLAY and SOSPAN scans were completed continuously from the beginning to the end of each program day (i.e., scan sequence: SOPLAY, SOSPAN, SOPLAY, SOSPAN). Number of target areas (e.g., pools, fields, gyms, playgrounds) at individual sites ranged from 17-28, with 91 target areas identified across the four SDCs. Size, boundaries, and locations of target areas were identified prior to data collection in the Summer of 2011 (McKenzie, et al., 2000).

On observation days, trained observers arrived unannounced before the program began and followed a randomly selected group of children within a pre-selected grade-level. Grade levels were systematically selected prior to the site visit in order to ensure at least 75% of the groups within grade levels were observed and that each grade level was observed on at least 4 program days across both measurement occasions (i.e., pre- and post-assessment). This protocol led to an increased number of observation days at post-assessment because the number of children attending the SDCs grew from serving approximately 500 to 800 children daily. The randomly selected groups of children and staff were followed throughout the day while observers systematically and continuously scanned the target areas populated by the group. Scans of the children and the staff responsible for the target group started at the beginning (i.e. 9am), and were made continuously (i.e., one-after-the-other) until the end (i.e. 4:30p.m.) of the SDC program. Observers took two 15-minute breaks and one 30-minute lunch break during the day. Lunch breaks did not overlap scheduled lunch for children to ensure staff promotion behaviors for healthy eating could be observed during this time. Scans started when the target group entered a target area and suspended while the
target group moved to a new target area (i.e., transitions between target are took between two to five minutes). Across pre- and post-assessment, the same time of day was observed across all days (i.e., 9am to 4:30pm) for all groups of children.

**Observer Training and SOSPAN/SOPLAY Reliability.** Eleven trained observers completed all observations (i.e. 4 per site per observation day). The lead author conducted observer training prior to baseline and post-assessment data collection. Observers completed classroom training, video analysis, and field practice. Classroom training lasted two days (i.e. 6 hrs each day) and included a review of study protocol, an orientation to the instrument, and observers committing observational categories and codes to memory. Observers completed at least six days (i.e. 3 hours each day) of field practice including familiarization with target areas at program sites and completing practice/reliability scans. Inter-rater agreement criteria were set at >80% using interval-by-interval agreement for each category (McKenzie, et al., 2000; Ridgers, Stratton, & McKenzie, 2010). Consistent with published reliability protocols (Brown et al., 2006; Ridgers, et al., 2010), reliability was collected prior to measurement and on at least 30% of measurement days during baseline and post-assessment data collection.

Reliability for SOSPAN and SOPLAY was collected over 31 days across all four participant SDCs. Estimates are based upon 1384 reliability scans across baseline and post-assessment. Reliability for SOSPAN and SOPALY were estimated via interval-by-interval intraclass correlations (ICCs) and percent agreement, where appropriate. Percent agreement between observers for SOSPAN behaviors ranged from 77.3% to 99.8%. “Staff engaged in other tasks” was the only variable where observers did not achieve the >80% agreement threshold (77.3%); consistent with previous research, it was still deemed acceptable agreement (Weaver, et al., in press). Further, staff “verbally promoting healthy eating” and “verbally educating children about healthy eating” were never observed during reliability scans. However, since neither observer coded these behaviors, the definitions for the behaviors were considered acceptable. Further, the large number of reliability scans (i.e. 1384 over 31 days) suggests that these behaviors
were so rare that further reliability scans would not have yielded more observations of these two variables. ICCs for SOPLAY categories ranged from 0.88 to 0.98.

DATA ANALYSIS

All statistical analysis was completed using Stata (v.12.0., College Station, TX). Changes in child the percent of children observed in MVPA and sedentary and staff behaviors were examined using multilevel mixed effects linear regression models with scans nested within days nested within ASP sites. Intervention effects were modeled at the site level. Child activity levels were expressed as the percentage of children engaged in sedentary behavior or MVPA in each SOPLAY scan. Staff behaviors were expressed as a percentage of total scans a behavior was observed. Primary outcome models were estimated for girls’ and boys’ activity levels, separately. Secondary models were estimated for girls and boys by grade level, separately. Logistic regression models were also estimated to evaluate the odds of observing a staff behavior at post-assessment compared to baseline. Models for child activity levels were estimated exclusively for scheduled physical activity time because that is the time that HEPA Standards target child activity levels. Models for staff behaviors were estimated including only those scans that were performed during scheduled snack or physical activity time because that is when staff had the greatest opportunity to display HEPA promoting or discouraging behaviors. Also, HEPA Standards call for certain staff behaviors to happen daily/weekly (i.e., staff should promote nutrition daily and deliver nutrition education weekly) or during the entire program day (i.e., staff refrain from eating or drinking inappropriate foods in front of children). Therefore, these variables were converted into the percentage of days in which the behavior was observed.

RESULTS

Over the two measurement periods 10,509 SOSPAN and 8,528 SOPLAY scans were completed. A total of 8,528 SOSPAN physical activity promotion scans were completed during all times except snack or lunch and 1,981 SOSPAN nutrition promotion scans were completed during scheduled snack and lunch. Observers
completed 4,938 SOSPAN and SOPLAY scans during scheduled physical activity. These scans represent 1,645 girls and 1,838 boys activity days (i.e. children could have been observed on more than one day) across baseline and post-assessment.

CHECKLISTS

A total of 48 checklists were completed representing 65.9 percent of the SDC program weeks. One site leader submitted checklists representing all 11 program weeks (21 total checklists were completed with multiple checklists completed every program week) while one SDC program submitted checklists representing 5 program weeks (i.e. five total checklists completed) and another site leader complete checklists representing 6 program weeks (i.e. six total checklists). The final site leader completed checklists during seven of the 11 program weeks for a total of 16 checklists.

CHANGES IN THE PERCENTAGE OF CHILDREN IN MVPA AND SEDENTARY

Unadjusted means of the percentage of sedentary children and children engaged in MVPA across scheduled activities are presented in Table 4.1. Table 4.2 presents the linear regression model estimates of changes in MVPA and sedentary behaviors for boys and girls during scheduled physical activity time. Overall, there was an 8.7% and 7.0% reduction in percent of boys and girls observed sedentary, respectively. The largest reduction in the percent of children observed sedentary was during organized activity, with an approximate 11.5% and 10.4% reduction for boys and girls, respectively. Conversely, increases in the percent of children engaged in MVPA were seen for boys during overall physical activity opportunities (+3.3%), while the percent of girls in MVPA increased during organized activities (+4.5%).

Figure 4.1 and 4.2 present changes from baseline to post-assessment, by grade level, in the percent of boys and girls sedentary and engaged in MVPA, based on the linear regression models. Changes in the percent of boys engaged in MVPA ranged from a 6.2 percent increase to a 3.5 percent increase, while changes for girls ranged from a 7.6 percent increase to a -0.1 percent decrease. Changes in the percent of boys observed sedentary range from an 11.6 percent decrease to a 6.9 percent decrease,
while changes for girls ranged from 12.0 percent decrease to a 4.2 percent decrease. Not all changes reached statistical significance (see Figure 4.1 and 4.2).

**CHANGES IN STAFF BEHAVIORS**

At baseline, 2 of the 17 staff behaviors (i.e., “staff verbally promoting healthy eating” and “staff verbally educating children about healthy eating”) were not observed (see Table 4.3). For these behaviors, logit and linear models were not estimated and unadjusted means are presented instead. Of the 17 staff behaviors observed, 12 moved in the desired direction, including behaviors that were not observed at baseline but were observed at post-assessment. Significant changes from baseline to post-assessment were observed in 4 staff behaviors (i.e., “staff engaged in other tasks,” “staff leading or instructing physical activity,” “staff engaged in physical activity with children,” and “children engaged in idle time”). Changes in staff behaviors that promote or discourage child physical activity ranged from a 39.4% decrease in child idle time to an 11.2% increase in staff engaging in other program duties (i.e., setting up for activities, taking children to bathroom/water). Odds of observing staff behaviors that promote or discourage child physical activity at post-assessment compared to baseline ranged from 3.33 times as likely to 0.24 times as likely.

Staff verbally promoting healthy eating was observed on 50% of days at post-assessment, whereas it was not observed at baseline. Staff verbally educating children about healthy eating was observed on 34.1% of evaluation days at post-assessment while it was never observed at baseline. Staff consuming inappropriate foods and drinks was observed on 8.2% and 8.3% fewer observation days at post-assessment compared to baseline, although these changes were not statistically significant. Staff were also 0.71 and 0.67 times less likely to be observed eating or drinking inappropriate foods in front of children at post-assessment.

**DISCUSSION**

This is the first study to evaluate a professional development training’s effect on HEPA promoting behaviors and decreases in HEPA discouraging behaviors of staff in the
SDC setting. Additionally, this is the first study to evaluate an intervention on children’s physical activity in SDCs. We observed statistically significant and positive changes in HEPA promoting/discouraging staff behaviors and increases in the percent of children physically active along with reductions in the percent of children sedentary. Although additional work is necessary, these findings represent a first step toward creating HEPA friendly environments within SDCs.

Unlike previous interventions in the school and afterschool program setting (Gortmaker, et al., 2012; Iversen, Nigg, & Titchenal, 2011; Nigg, Battista, Chang, Yamashita, & Chung, 2004; Sharpe, et al., 2011), this intervention delivered ongoing professional development training focused on providing staff competencies related to promoting child HEPA. This training appears to be effective at increasing desired and reducing less than desirable staff behaviors identified in HEPA standards. Two of the largest increases were seen in the amount of days staff promoted and educated children about healthy eating and the reduction of the number of days they ate or drank unhealthy foods in front of children. HEPA standards specifically call for staff to display or eliminate these behaviors in order to create a health enhancing SDC environment for children. Staff training and education in concert with adopting standards related to role modeling appropriate behaviors (i.e. the HEPA Standards adopted by the YMCA of America) appears to be an effective strategy for increasing staff healthy eating promotion behaviors.

Changes in 12 of the 17 staff HEPA promotion behaviors were observed in the desired direction from baseline to post-assessment. While additional work may be needed to reach higher levels of these behaviors, this study is among the first to show that staff HEPA promotion behaviors can be altered by professional development training, onsite booster sessions and feedback. Further, these changes occurred within only 3 months of contact. While the majority of the staff behaviors moved in the desired direction two staff behaviors did not. One physical activity discouraging behavior (i.e. “staff engaged in other tasks”) increased, whereas one physical activity encouraging
behavior (i.e. “staff engaging in activity with children”) decreased from baseline to post-assessment. It is unclear why these behaviors changed in undesired directions, particularly since staff engagement with children during activity opportunities was emphasized during initial and follow-up booster trainings as one of the components of LET US Play. A possible explanation for these findings is that staff were leading modified activities that aligned with the LET US Play principles more often at post-assessment. These games may have involved more set-up and may have involved more instruction because of the novelty of the games. Setting-up activity spaces before beginning activities and encouraging staff to work together (e.g. one staff member leads and presents games while the other participates) may be two strategies to address these issues in the future.

Recent research in the afterschool program setting has confirmed that staff engaging in activity with children and verbally promoting physical activity is related to increases in child MVPA and decreases in the number of children sedentary (Huberty, Beets, Beighle, & McKenzie, 2012). Therefore, it is not surprising that, along with changing staff behaviors related to promoting physical activity, there was a corresponding increase in children engaged in MVPA and decrease in sedentary behaviors. The strategies adopted in this intervention (i.e., Physical Activity Standards, training and feedback for program leaders and staff), while not directly targeting child physical activity, appear to have increased children’s engagement in MVPA and decreased the percentage of sedentary children.

Moreover, this intervention appears to be most effective at reducing the percentage of children sedentary and increasing the percentage of children in MVPA during organized activities. For boys, changes in the percent of children in MVPA and sedentary were consistent across grade levels. For girls, changes in the percent of children in MVPA and sedentary fluctuated across grade levels, with the greatest changes for the 2nd and 3rd grade girls. It is well established that girls are less active than boys (Troiano et al., 2008). However, at post-assessment, increases in the percentage of
girls’ engaged in MVPA were twice as much as the increase in boys observed in MVPA during organized activity, thereby minimizing the gap between girls and boys observed in MVPA during organized activities. Therefore, the strategies used in this intervention seem to be particularly promising for increasing the percentage of girls’ in MVPA during organized activities in SDCs. At post-assessment, substantially fewer children were observed sedentary. As decreasing child sedentary behaviors gains footing as a public health goal (Pate, O’Neill, & Lobelo, 2008) strategies used in this intervention may be essential for reducing sedentary behavior in the SDC setting. Further SDCs have tremendous potential for impacting children’s activity levels during the summer where unhealthy behaviors may lead to accelerated body mass index gains (Downey & Boughton, 2007; von Hippel, et al., 2007).

This study has several strengths. The collaborative partnership between university and SDC personnel led to the adoption and evaluation of HEPA standards in existing programs, which promoted the use of practices that are feasible and relevant within current constraints. This, in turn, helped to ensure that the intervention was adaptable to the unique context of each program and, therefore, adoptable, which can lead to large scale changes to routine practice (Beets, Webster, Saunders, & Huberty, 2013). The large number of scans completed is another strength of this study. We are confident that these data are a comprehensive view of HEPA promoting/discouraging staff behaviors displayed and the percent of children sedentary and engaged in MVPA in the SDCs evaluated. This study also has limitations. The intervention was evaluated in only 4 SDCs, which may not be representative of all SDCs (i.e. external validity). The lack of a control group also raises the concern that increases or decreases in staff behaviors may have occurred in the absence of the intervention (i.e. internal validity) due to history, selection bias, regression to the mean, and/or the “Hawthorne effect.” However, the changes in the majority of the behaviors in the desired directions along with corresponding changes in the percent of children active make it unlikely that these changes were caused by anything other than the intervention.
In conclusion, this study is the first to develop and evaluate strategies to create health-enhancing SDC environments. Corresponding changes in staff HEPA promoting/discouraging behaviors, a reduction in the percent of children sedentary, and an increase in percent of children engaged in MVPA were observed from baseline to post-assessment. This evidence suggests that the adoption and implementation of HEPA Standards and the collaborative effort of community and university staff to create HEPA promoting strategies to meet these standards can lead to positive changes in staff behaviors and children’s physical activity.
Table 4.1. Percentage of Girls and Boys Engaged in Sedentary and MVPA by Scheduled Activity

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrichment</td>
<td>22.2</td>
<td>14.8</td>
<td>-7.4</td>
<td>89.6 91.3 1.7</td>
<td>2.2 1.2 -1.0</td>
<td>92.5 92.5 0.0</td>
<td>1.0 1.1 0.1</td>
<td>66.8 59.9 6.9</td>
<td>15.4 17.9 2.5</td>
<td></td>
</tr>
<tr>
<td>Physical Activity</td>
<td>52.9</td>
<td>56.9</td>
<td>4.0</td>
<td>62.1 53.4 -8.8</td>
<td>18.3 20.6 2.3</td>
<td>61.6 58.9 -2.7</td>
<td>14.9 15.1 0.2</td>
<td>14.9 15.1 0.2</td>
<td>75.9 66.6 -9.3</td>
<td>6.8 11.2 4.4</td>
</tr>
<tr>
<td>Free play</td>
<td>34.2</td>
<td>27.3</td>
<td>-6.9</td>
<td>54.4 48.6 -5.8</td>
<td>20.4 19.7 -0.6</td>
<td>75.9 66.6 -9.3</td>
<td>6.8 11.2 4.4</td>
<td>14.9 15.1 0.2</td>
<td>75.9 66.6 -9.3</td>
<td>6.8 11.2 4.4</td>
</tr>
<tr>
<td>Organized</td>
<td>51.9</td>
<td>52.8</td>
<td>0.9</td>
<td>70.8 60.6 -10.2</td>
<td>11.2 12.7 1.5</td>
<td>47.1 43.7 -3.4</td>
<td>14.9 15.1 0.2</td>
<td>75.9 66.6 -9.3</td>
<td>6.8 11.2 4.4</td>
<td></td>
</tr>
<tr>
<td>Swim/water</td>
<td>13.9</td>
<td>19.9</td>
<td>6.0</td>
<td>50.2 41.3 -8.9</td>
<td>40.5 42.3 1.8</td>
<td>47.1 43.7 -3.4</td>
<td>14.9 15.1 0.2</td>
<td>75.9 66.6 -9.3</td>
<td>6.8 11.2 4.4</td>
<td></td>
</tr>
<tr>
<td>Bathroom/Changing</td>
<td>13.8</td>
<td>8.9</td>
<td>-4.9</td>
<td>83.5 83.6 0.2</td>
<td>1.6 2.0 1.2</td>
<td>84.3 90.2 6.0</td>
<td>3.0 1.9 -1.1</td>
<td>84.3 90.2 6.0</td>
<td>3.0 1.9 -1.1</td>
<td></td>
</tr>
<tr>
<td>Assembly</td>
<td>5.8</td>
<td>3.3</td>
<td>-2.5</td>
<td>82.5 85.6 3.1</td>
<td>3.8 2.0 -1.8</td>
<td>84.3 90.2 6.0</td>
<td>3.0 1.9 -1.1</td>
<td>84.3 90.2 6.0</td>
<td>3.0 1.9 -1.1</td>
<td></td>
</tr>
<tr>
<td>Other (i.e. devotion, transition)</td>
<td>6.0</td>
<td>16.2</td>
<td>10.2</td>
<td>86.8 85.3 -1.5</td>
<td>2.2 2.1 -0.1</td>
<td>89.5 84.7 -4.9</td>
<td>2.7 2.2 -0.5</td>
<td>89.5 84.7 -4.9</td>
<td>2.7 2.2 -0.5</td>
<td></td>
</tr>
</tbody>
</table>

Percentages are unadjusted means
Based on 8528 SOSPAN and SOPLAY scans over 67 program days in the Summer of 2011 and 2012
3483 child days (girls = 1645) observed across baseline and post-assessment
Table 4.2. Changes in the Percentage of Boys and Girls Observed Sedentary and in MVPA during Scheduled Physical Activity Time

| Scheduled Activity                        | Boys          |               |         |         |        |         |         |        |         |         |        |         |         |        |         |         |
|------------------------------------------|---------------|---------------|---------|---------|--------|---------|---------|--------|---------|---------|--------|---------|---------|--------|---------|
|                                          | Sedentary     | MVPA          | Sedentary | MVPA   | Δ      | 95% CI  | Sedentary | MVPA   | Δ      | 95% CI  | Sedentary | MVPA   | Δ      | 95% CI  | Sedentary | MVPA   | Δ      | 95% CI  |
| Physical Activity                        |               |               | 2011     | 2012    | Δ      | 95% CI  | 2011     | 2012    | Δ      | 95% CI  | 2011     | 2012    | Δ      | 95% CI  | 2011     | 2012    | Δ      | 95% CI  |
| Free play                                | 62.3          | 53.6          | -8.7     | (-12.6,|-4.8 ) | 17.9    | 21.2     | 3.3      | (0.0,   | 6.6 )  | 66.8     | 59.8     | -7.0   | (-10.8,|-3.2 ) | 15.3     | 18.3    | 3.0      | (-0.3,  | 6.3 )  |
| Organized Activity (e.g. sport, game,    |               |               |         |         |        |         |         |        |         |         |        |         |         |        |         |         |
| dance)                                   | 55.4          | 50.6          | -4.8     | (-10.2,| 0.7 )   | 18.1    | 18.6     | 0.6      | (-4.0,  | 5.1 )  | 63.9     | 61.6     | -2.3   | (-7.9,  | 3.3 )   | 12.2     | 14.0    | 1.8      | (-2.4,  | 6.0 )  |
| Swimming or water activity (e.g. pool,   | 72.3          | 60.8          | -11.5    | (-17.2,| -5.8 )  | 10.2    | 12.6     | 2.4      | (-0.7,  | 5.4 )  | 76.9     | 66.5     | -10.4  | (-15.5,|-5.3 ) | 6.6      | 11.2    | 4.5      | (2.2,   | 6.8 )  |
| waterpark)                               | 49.3          | 41.3          | -8.0     | (-15.2,| -0.8 )  | 39.1    | 42.2     | 3.0      | (-6.2,  | 12.2 ) | 48.3     | 43.8     | -4.5   | (-11.1,| 2.1 )   | 40.9     | 39.5    | -1.5     | (-10.1,| 7.2 )  |

Statistically significant changes are bolded
Based on 4,938 scans over 67 days
3483 child days (girls = 1645) observed across baseline and post-assessment
Table 4.3. Increases and Decreases of Staff Healthy Eating and Physical Activity Promotion Behaviors from Baseline to Post-assessment

<table>
<thead>
<tr>
<th>Staff Behavior</th>
<th>Summer 2011</th>
<th>Summer 2012</th>
<th>Percent Change</th>
<th>95% CI</th>
<th>Odds post intervention</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff engaged in other tasks</td>
<td>7.4</td>
<td>18.6</td>
<td><strong>11.2</strong></td>
<td>(6.6, 15.9)</td>
<td><strong>2.79</strong></td>
<td>(1.84, 4.24)</td>
</tr>
<tr>
<td>Staff leading or instructing physical activity</td>
<td>6.6</td>
<td>16.8</td>
<td><strong>10.2</strong></td>
<td>(5.6, 14.9)</td>
<td><strong>3.33</strong></td>
<td>(1.94, 5.73)</td>
</tr>
<tr>
<td>Staff verbally promoting physical activity</td>
<td>3.2</td>
<td>5.2</td>
<td><strong>2.0</strong></td>
<td>(-0.1, 4.1)</td>
<td>1.75</td>
<td>(0.97, 3.14)</td>
</tr>
<tr>
<td>Staff verbally discouraging physical activity</td>
<td>2.0</td>
<td>1.3</td>
<td><strong>-0.7</strong></td>
<td>(-1.6, 0.2)</td>
<td>0.64</td>
<td>(0.35, 1.16)</td>
</tr>
<tr>
<td>Frontline staff engaged in physical activity with children (i.e. playing the game)</td>
<td>31.8</td>
<td>21.0</td>
<td><strong>-10.8</strong></td>
<td>(-17.2, -4.4)</td>
<td><strong>0.54</strong></td>
<td>(0.37, 0.80)</td>
</tr>
<tr>
<td>Withholding physical activity as a consequence of misbehavior</td>
<td>2.3</td>
<td>1.8</td>
<td><strong>-0.5</strong></td>
<td>(-2.0, 1.0)</td>
<td>0.79</td>
<td>(0.37, 1.70)</td>
</tr>
</tbody>
</table>

Staff Management of PA

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Summer 2011</th>
<th>Summer 2012</th>
<th>Percent Change</th>
<th>95% CI</th>
<th>Odds post intervention</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children standing in line and waiting for turn</td>
<td>26.9</td>
<td>5.6</td>
<td><strong>-21.3</strong></td>
<td>(-27.0, -15.6)</td>
<td><strong>0.14</strong></td>
<td>(0.08, 0.27)</td>
</tr>
<tr>
<td>Playing elimination game (i.e. children eliminated from PA opportunities)</td>
<td>10.9</td>
<td>7.4</td>
<td><strong>-3.4</strong></td>
<td>(-7.8, 0.9)</td>
<td>0.61</td>
<td>(0.28, 1.33)</td>
</tr>
<tr>
<td>Frontline staff giving instructions</td>
<td>9.5</td>
<td>12.3</td>
<td><strong>2.9</strong></td>
<td>(-0.5, 6.2)</td>
<td>1.39</td>
<td>(0.98, 1.99)</td>
</tr>
<tr>
<td>Frontline staff disciplining children</td>
<td>1.7</td>
<td>3.1</td>
<td><strong>1.4</strong></td>
<td>(-0.1, 2.8)</td>
<td>1.73</td>
<td>(0.86, 3.48)</td>
</tr>
<tr>
<td>Idle time (i.e. children waiting for direction from staff with no specific task)</td>
<td>56.0</td>
<td>16.6</td>
<td><strong>-39.4</strong></td>
<td>(-47.3, -31.4)</td>
<td><strong>0.12</strong></td>
<td>(0.07, 0.19)</td>
</tr>
<tr>
<td>Choice provided (i.e. more than one activity opportunity provided)</td>
<td>5.7</td>
<td>3.8</td>
<td><strong>-1.9</strong></td>
<td>(-5.6, 1.9)</td>
<td>0.50</td>
<td>(0.12, 2.19)</td>
</tr>
<tr>
<td>Small game (i.e. games with less than 10 children participating)</td>
<td>0.5</td>
<td>1.8</td>
<td><strong>1.3</strong></td>
<td>(-0.1, 2.7)</td>
<td>4.91</td>
<td>(0.92, 26.21)</td>
</tr>
</tbody>
</table>

Healthy Eating Staff Behaviors

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Summer 2011</th>
<th>Summer 2012</th>
<th>Percent Change</th>
<th>95% CI</th>
<th>Odds post intervention</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff verbally promoting healthy eating</td>
<td>0.0</td>
<td>50.0</td>
<td>50.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Staff verbally educating children about healthy eating</td>
<td>0.0</td>
<td>34.1</td>
<td>34.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Staff eating inappropriate foods</td>
<td>55.9</td>
<td>47.7</td>
<td><strong>-8.2</strong></td>
<td>(-32.4, 16.0)</td>
<td>0.71</td>
<td>(0.25, 1.98)</td>
</tr>
<tr>
<td>Staff drinking other than water</td>
<td>33.3</td>
<td>25.0</td>
<td><strong>-8.3</strong></td>
<td>(-30.8, 14.1)</td>
<td>0.67</td>
<td>(0.22, 2.00)</td>
</tr>
</tbody>
</table>

Bolded numbers are statistically significant changes at p = 0.05

a During Scheduled PA (n = 4938)
b During all times except scheduled snack or lunch time (n = 8,528)
c 1,981 scans completed during scheduled snack
d Odds ratios derived from multilevel mixed effects logit regression models (e.g. odds of observing staff engaged in other duties at post-assessment are 2.79 times more likely than at baseline)
e Presented as a percentage of days that the behavior was observed
Figure 4.1. Changes in the percent of boys observed in MVPA and sedentary from baseline to post-assessment.
Figure 4.2. Changes in the percent of girls observed in MVPA and sedentary from baseline to post-assessment.
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CHAPTER 5: STUDY 4

BARRIERS AND ENABLERS TO IMPLEMENTATION OF PHYSICAL ACTIVITY STANDARDS IN AFTERSCHOOL PROGRAMS: A QUALITATIVE INQUIRY.  

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Increasing children’s physical activity is an important public health goal (Koh, 2010). With over 8.4 million children attending afterschool programs (ASPs) for an average of 8 hours a week (Afterschool Alliance, 2009), these programs are positioned to play an important role in children’s accumulation of health enhancing levels of physical activity. Further, the majority of children attending ASPs come from underserved, low-income households (Afterschool Alliance, 2009). Children from low-income households are a population of special interest because they are more likely to reside in less active and more sedentary home environments (Tandon et al., 2012). Recently, national and state organizations have developed physical activity standards that address children’s activity while in attendance at ASPs (M. W. Beets, Wallner, & Beighle, 2010). These standards indicate the amount of activity children should accumulate during the ASP and recommend the creation of “activity friendly” social (e.g., staff promoting and engaging in physical activity with children) and physical environments (e.g., scheduling physical activity daily) in ASPs.

Initial evidence suggests that current practice in ASPs falls short of creating activity friendly environments (Weaver, Beets, Webster, & Huberty, in press) and children in ASPs are not accumulating specified amounts of physical activity (M. Beets, Rooney, Tilley, Beighle, & Webster, 2010; M. W. Beets, Huberty, & Beighle, 2012). Several studies have attempted to modify routine practice of ASPs in order to increase physical activity of children (Dzewaltowski et al., 2010; Gortmaker et al., 2012; Iversen, Nigg, & Titchenal, 2011; Robinson et al., 2010; Sharpe, Forrester, & Mandigo, 2011). However, these studies have produced modest (Dzewaltowski, et al., 2010; Gortmaker, et al., 2012) or no (Iversen, et al., 2011; Nigg, Battista, Chang, Yamashita, & Chung, 2004) increases in overall child activity. One intervention even reported a slight decrease in overall child activity (Robinson, et al., 2010).

One explanation for the varied and modest results of these studies may be differing levels of intervention implementation. The degree to which a program is delivered as the developers intended (Dusenbury, Brannigan, Falco, & Hansen, 2003) is
defined as “fidelity of implementation.” It is unlikely programs will achieve the desired results if it is not delivered as intended (Dusenbury, et al., 2003). Reduced fidelity of implementation is also a challenge to determining the effectiveness of health promotion programs (Durlak & DuPre, 2008; Dusenbury, et al., 2003). When interventions fail to produce the desired outcomes and the program was not delivered as intended, it becomes impossible to conclude whether or not that program was effective. Understanding implementation can explain the mechanisms that made an intervention successful or led to its failure. For example, Sharpe, Forrester and Mandigo (2011) found that staff did not implement a physical activity curriculum in YMCA ASPs because staff members felt they did not have the knowledge and skills necessary to deliver the games in the curriculum. The authors found only modest increases in children’s activity because children’s exposure to the curriculum was limited. Therefore, it is essential to determine what factors lead to increased fidelity of implementation.

Recently, Durlak and DuPre (Durlak & DuPre, 2008) developed a Framework for Effective Implementation (FEI), based on their comprehensive review of the health promotion program literature. In this framework, 23 factors that influence the implementation of health promotion programs are identified. These factors can be understood through a multi-level ecological perspective (Altschuld, Kumar, Smith, & Goodway, 1999; Riley, Taylor, & Elliott, 2001; Sallis & Owen, 2002). The levels of the framework include: community characteristics, provider characteristics, characteristics of the innovation, the prevention delivery system and the prevention support system. Utilizing the FEI, it is possible to gain a comprehensive understanding of the factors that influence the fidelity of implementation in health promotion interventions. A brief description of the framework follows.

**Community Level Factors.** The community characteristics identified in the framework include: prevention theory and research, politics, policy and funding. According to the framework, health promotion programs should be founded in prevention theory and research. Policy and politics at the national, state and local level
can either hinder or help the implementation of a health promotion program. Proper funding is also key to the implementation of any health promotion program. For example, research in ASPs has shown that staff believe a lack of funding and equipment can prevent them from implementing games (Thomas, Fellner, Tucker, & Irwin, 2011; Zarrett, Skiles, Wilson, & McClintock, 2012).

**Provider Characteristics.** There are four provider characteristics related to implementation. These include: perceived need for the innovation, belief that the innovation will produce the desired benefits, self-efficacy and skill proficiency. Providers that believe there is a need for the innovation, trust that the innovation will deliver expected results, believe they have the skills to deliver the innovation (i.e., self-efficacy) and actually have the skills necessary to deliver the innovation (i.e., skill proficiency) are more likely to implement the innovation (Durlak & DuPre, 2008). Specific to the ASP setting, frontline-staff beliefs and values have been identified as enablers to physical activity promotion (Copeland, Kendeigh, et al., 2012). For example, one study in a child care setting (Copeland, Kendeigh, et al., 2012) found that frontline-staff who believed they could not effectively manage the physical activity environment were hesitant to allow children on the playground, limiting children’s physical activity. Low self-efficacy and frontline-staff’s lack of skills may also limit children’s opportunities to be active in the ASP setting (Copeland, Kendeigh, et al., 2012; Sharpe, et al., 2011; Tucker, van Zandvoort, Burke, & Irwin, 2011; Zarrett, et al., 2012).

**Characteristics of the Innovation.** Two characteristics of a health promotion program – its compatibility and its adaptability – are identified within the FEI. Compatibility is the extent to which an innovation is congruent with the goals of an organization whereas adaptability is the ability of an innovation to be flexible in its implementation. Innovations that align with current goals of the organization and are flexible enough to fit the needs of the organizations in which they are introduced are more likely to be implemented (Durlak & DuPre, 2008).
**Prevention delivery system.** General organizational elements, specific practices and processes of the organization, and the staff of the organization are components that make up the prevention delivery system. These three components are also referred to as organizational capacity or the ability to deliver the innovation (Durlak & DuPre, 2008). Positive work climate, organizational norms regarding change, integration of new innovation and a shared vision are all general organizational factors that can influence organizational capacity for the implementation of a health promotion program. Shared decision-making, coordination with other agencies, communication and formulation of tasks are specific practices and processes that effect organizational capacity. Finally, leadership, identifying a program champion and managerial support are specific staffing considerations that influence an organization’s capacity.

**Prevention support system.** Training and technical support related to the intervention make up the prevention support system. Training refers to the training strategies offered to the organization in relation to the innovation. Training can build skills and efficacy of staff related to the change that is required to meet the desired outcomes. Technical support refers to the resources offered to the organization once the implementation begins and may include more training, feedback, problem solving strategies and emotional support.

Given that ASPs have been identified as a setting that can increase children’s accumulation of physical activity, and health promotion programs designed to enhance current practice in ASPs are not producing the desired results, it is essential to understand factors related to the fidelity of implementation of these programs.

**Identification and Adoption of Standards in One YMCA Organization**

In the summer of 2009 The CEO of one YMCA organization agreed to take part in a collaborative effort with university personnel to identify, adopt and implement physical activity standards in their four ASPs. This partnership was formed in the larger context of a national movement of the YMCA of the USA to adopt and implement physical activity standards for all YMCA ASPs (Wiecha, Hall, Gannett, & Roth, 2012).
The collaborative partnership was founded in the principles of community-based participatory research (Israel, Schulz, Parker, & Becker, 1998) and consisted of staff at three organizational levels within the participant YMCA organization (i.e., Branch Directors: those individuals responsible for running the YMCA site, ASP leaders: those individuals responsible for running the YMCA ASPs, and ASP frontline-staff: those individuals responsible caring for the children in the YMCA ASPs), and university personnel. Monthly meetings were held from October 2011 to April 2012. During these 2 hour meetings, a review of existing physical activity standards, including those developed by the YMCA of the USA were examined. Standards were identified in the fall of 2011 and adopted in the spring of 2012 by the participant ASPs. In brief, standards focused on the amount of physical activity children should accumulate while attending (i.e. 30 minutes daily) behaviors staff should display, which are theoretically and empirically linked to promoting child physical activity (e.g., role modeling physical activity, verbally encouraging physical activity), as well as behaviors staff should avoid such as: withholding physical activity as punishment, the amount of time the ASP should allocate for physical activity daily, and informing parents by providing educational physical activity materials. Standards had been continuously implemented for one full year at the time of the writing of this manuscript. Results of the these strategies have been reported elsewhere (M. W. Beets et al., in review; Weaver, Beets, Saunders, Beighle, & Webster, in review)

PURPOSE OF THE STUDY

The purpose of this study was to identify barriers and enablers to the implementation of the adopted physical activity standards through the lens of the FEI. Specifically, the research team was interested in understanding a) what factors in the FEI were enablers of and barriers to the implementation of the physical activity standards in the ASPs b) if these enablers and barriers varied across and within the organizational levels of the ASPs c) if the FEI provided a comprehensive understanding of the factors related to implementation in this study.
METHODS

PARTICIPANTS

ASP branch directors (n=3), ASP leaders (n=6) and frontline-staff (n=13) from the four ASP sites participated in this study. Only three branch directors (mean age = 36) were included because one branch director relocated to a different region of the country and was unavailable for participation. Another branch director served as interim director of two sites for the period of the study. Branch directors had an average of 14.3 years’ experience at the YMCA, and 2.7 years’ of experience in their current position. Two of the branch directors were male and all branch directors were Caucasian. Six ASP leaders (mean age = 28.8) participated because two sites experienced turnover during the course of the study. ASP leaders worked at the YMCA for an average of 3.2 years. Three of the ASP leaders were female and all were Caucasian. The 13 frontline-staff (mean age = 20.2 years) were chosen to provide a diverse representative sample of frontline-staff employed at the four sites and represented 26% percent of the total frontline-staff employed by the ASPs. Frontline-staff averaged less than one year of experience. Eight frontline-staff were female, nine were Caucasian and four were African American.

DATA COLLECTION

Approval for this study was obtained from the University Institutional Review Board prior to data collection. There were three qualitative data collection procedures. First, data were collected via participant observation over a one year period (i.e. spring to fall 2012) concurrent with the adoption of the standards (Zahle, 2012). The lead author completed 24 walk-through observations with ASP leaders, attended five ASP planning meetings and led 24 trainings for frontline-staff related to the physical activity standards. The focus of the observations was on strengths and areas that need additional support related to the implementation of the HEPA standards. Field notes were kept during and prior to each observation (DeWalt & Dewalt, 2010). Second, informal interviews with staff and site leaders were conducted during and following
participant observations to identify possible reasons for the strengths and areas needing additional support. These two methods allowed the lead author to develop a close working relationship with the study participants. Finally, over a four month period (i.e., August to December) in the fall of 2012 data were collected via 24 semi-structured interviews with branch directors, ASP leaders and frontline-staff.

Participant interviews followed a semi-structure interview guide (see Appendix A and B) to ensure consistency across interviews and flexibility during the interviews (Barriball & While, 1994). The interview question guide included a balanced set of broad open-ended questions designed to probe participants’ perceptions of the barriers to and enablers of implementation of the physical activity standards. The interview guide was tailored to the unique perspective represented by differing organizational levels of the participants included in the study (i.e., branch director, ASP leader, frontline-staff). Questions were also informed by the FEI (Durlak & DuPre, 2008) and field notes from participant observation and informal interviews. The second author conducted interviews with the frontline staff while the lead author conducted interviews with ASP leaders and branch directors. All interviews were held in a private room at the participants’ place of work, lasting for approximately one hour. Interviews were audio recorded and then transcribed verbatim.

Data Analysis

Data from semi structure interviews were coded by the lead and second author only for consistency (Bornstein, Caroske, Tabak, Maddock, Hooker, and Evenson, 2013). A codebook was created prior to coding the interviews with codes based on the FEI. Data were coded in three successive readings. In the first reading the transcripts were examined as a whole to become familiar with the text. During the second reading detailed notes were taken to identify themes in the text that aligned with the predetermined codes based on the FEI. In the third reading the themes were assigned codes. If the identified themes did not fall into any existing codes a new code was added to the FEI. The process of placing identified themes into the predetermined theoretical
framework and then examining negative cases and modifying the framework accordingly is consistent with modified analytic induction (Ratcliff, 2002). After each reading the first and second author discussed the themes and codes in relation to the FEI in order to arrive at consensus on key ideas in the transcripts, code definitions, and the relation of the key ideas to the FEI.

**Trustworthiness**

Several methods were utilized to ensure the quality of the data collected. Data were collected via multiple methods (i.e. semi-structured interviews, observation and informal interviews), reducing the risk of systematic biases due to one method (Maxwell, 2005). During interviews, key concepts identified by the participants were explained back to the interviewees to ensure that the researcher correctly interpreted the responses of participants. This method was used as a form of member checking (Creswell & Miller, 2000). Peer debriefing (i.e., discussion with the second author) was also used to ensure objectivity and accuracy of the participant observer and themes emerging from interviews (Creswell, 2008). Finally, a pre-existing theoretical framework (i.e., the FEI) was used when developing the interview question guide and codebook. This framework allowed for a comprehensive understanding of possible enablers and barriers to implementing the physical activity standards and led to rich data encompassing a broad spectrum of topics.

**Results**

The data revealed a variety of factors related to the implementation of the physical activity standards, with all five levels of the FEI represented. The identified factors are presented in Table 1. Within the five levels of the FEI, 16 factors emerged composed of 30 themes. Thirteen of the themes were barriers to implementation while 17 themes were enablers. Themes ranged from applying to one specific organizational level to all three organizational levels. During interviews participants identified that barriers to and enablers of standard implementation changed over time.
COMMUNITY LEVEL FACTORS

Funding. Funding emerged primarily as a perceived barrier to the implementation of the physical activity standards in the ASPs. Specifically ASP leaders identified a lack of resources due to inadequate funding as a barrier to implementing physical activity standards. Resources identified by program leaders included staff, space for the program and equipment. For example, one ASP leader said, “I know, at least in our branch that we try to also find games that don’t necessarily require any [equipment] just because we don’t always have the [equipment].” Another ASP leader said, “we are not in a good place financially right now and so having the appropriate amount of staff and equipment, I mean, it is just financially that is the only thing that is really a hindrance.”

Insufficient staffing was evident during walkthroughs with ASP leaders. As part of the booster training the ASP leader and research personnel would conduct a walkthrough of the ASP in order to identify strengths and weaknesses of the program. On several occasions ASP leaders were pulled away from the walkthrough in order to supervise a group that did not have sufficient staff to meet the YMCA’s staff to child ratio.

In addition to not having enough staff, another ASP leader lamented not having the financial resources to hire motivated staff, “I feel like if you are paying someone $7.25 an hour what is their motivation to be the best they can be at their job? I mean that is a totally a lame excuse I mean you should always be the best you can be, but I feel if you really want top notch people then you need to pay them more money.”

Politics/Policy. In August 2011, the YMCA of the USA adopted Physical Activity Standards aiming to increase physical activity in their ASPs. In the Fall of 2012 the YMCA of the USA began providing trainings and educational physical activity resources online for YMCA ASPs. One branch director, one ASP leader and the lead author participated in a day long training provided by the YMCA of the USA. During informal interviews the branch director and ASP leader expressed that they were disappointed in the quality of
the training. Their main complaint was that the trainings focused on a curriculum that was delivered once weekly and did not address challenges related to increasing children’s physical activity, daily. The online resources also aligned with this curriculum and lacked practical resources for increasing children’s physical activity daily in the ASP.

The physical activity standard document adopted by the participant ASPs emerged as an enabler to increasing children’s physical activity. Branch directors, ASP leaders and frontline staff all expressed their appreciation of the physical activity standards as a guide for common practice. For example, one frontline staff member said, “I like having a hard copy of something to go to for a reference. If you think you are not doing something right you can actually look and see what it doesn’t fit under or what is wrong about it.” An ASP leader added that they appreciated the physical activity standards because it gave them answers to questions about how to properly run their program, “[With] the standards you actually have it written out. I mean if they weren’t standards then you would have all these questions and no answers so the standards give you answers.” Finally, a branch director communicated that they appreciated the standards because, “I can take [the physical activity standards] and use [them] as a punch list to see how we are operating the program. I can use it as, ‘ok these are the 10 items that I know staff aren’t supposed to be engaged in,’ and its simple stuff.” Overall the physical activity standards facilitated branch directors, ASP leaders and frontline staff when evaluating their programs ability to promote physical activity for the children in attendance.

Parental support. One important factor, identified by branch directors, ASP leaders and frontline staff, was parental support for the physical activity standards. This factor was absent from Durlak and Dupree’s (2008) initial framework, and emerged as both an enabler and a barrier. In general three themes emerged surrounding parental support: 1) community alignment 2) novelty and 3) differing priorities. At the frontline staff level some staff perceived that the community supported the physical activity standards because they aligned with the priorities of the community. For instance one
frontline staff member commented, “I think that you know adults in general too are trying to get more healthy, so they want their kids to come [to a physically active ASP].” Frontline-staff believed that parents were trying to live more healthfully and that the physical activity standards aligned with that goal. Further, frontline-staff also believed that parents wanted their children to be “worn out” when they picked them up from the ASP. By incorporating more physical activity into the ASP frontline-staff believed they were “tiring kids out” and fulfilling the parents desire.

Parental support, or the lack of support, was also identified as a barrier by frontline-staff because of the novelty of the physical activity standards. Prior to and in the initial stages of the adoption of the physical activity standards parents expressed concerns because they did not know what to expect from the ASP. For example one frontline staff member noted, “[Parents] were worried also that their kids would be too active, and they were like, ‘my kid’s tired,’ or whatever or, ‘does my kid have to play the game?’” These concerns waned as parents asked and received answers to their questions and both children and parents became accustomed to the physical activity standards.

At the ASP leader and branch director levels differing priorities of parents and schools were identified as a barrier to implementing the physical activity standards. Commonly at ASP planning meetings, branch directors and ASP leaders noted that parents wanted their children to have their homework completed before they were picked up from the ASP. Branch directors and ASP leaders struggled to reconcile parents’ desire for their children to complete their homework during the ASP, and the physical activity standards which call for 60min of the ASP to be dedicated to physical activity. One branch director noted, “Some parents just want their kids to get their homework done because they don’t want to deal with it. Do I agree philosophically? Not one bit, but it is what it is, so I think for cases like that we have to squeeze in physical activity where we can.” Another ASP leader noted that homework was a priority in the ASP for parents because, “as soon as they leave [the ASP] they go to another activity. So
they don’t have time to get the homework done.” Reconciling the amount of time that should be dedicated to physical activity and the amount of time that should be dedicated to homework within the ASP schedule was a major barrier identified by ASP leaders and branch directors.

**PROVIDER CHARACTERISTICS**

*Perceived need for the innovation.* Consistently across all three levels (branch directors, ASP leaders and frontline-staff) there was a perception that physical activity standards were needed in the ASP. The perceived need for the physical activity standards fell into three major themes: 1) children cannot sit all day, 2) ASPs as a healthy environment surrounded by unhealthy environments and 3) the obesity epidemic.

Frontline staff, ASP leaders and branch directors all communicated that they perceived children were sitting for the majority of their day, especially at school and home. For example, one branch director stated, “[Children] have been sitting in school all day.” While frontline-staff consistently mentioned, “it’s wrong to make [children] sit all day long,” and, “They’ve sat from you know, school starts at like 8 in morning and some of them have been at before school care so they have been sitting even longer.”

The idea that children cannot sit all day led to the assertion that the ASP was the only place that children were being physically active and that their ASP was a bastion of health in an otherwise inactive and unhealthy world. “Video games” were singled out as one cause for children to be inactive along with “eliminating physical education and recess from the school day,” or allowing children to opt out of physical education class. The common perception was that by the time children arrived at the ASP they had not accumulated much physical activity, and when they left the ASP they would not accumulate much more physical activity. Therefore, it was crucial to branch directors, ASP leaders and frontline staff to provide children with physical activity while they attended the ASP.
One branch director did identify a barrier related to perceived need for the physical activity standards. During the development of the physical activity standards in the fall of 2011, ASP leaders and branch directors believed that their ASPs were, “already meeting [the physical activity] standards.” Therefore, because ASP leaders believed they were providing children ample physical activity, they did not see the need for change. According to the branch director, this belief initially led to “pushback” against implementing the physical activity standards.

**Perceived benefits of the innovation.** Frontline staff perceived that the standards helped children become more active, the intended outcome of the standards. This was one of the benefits of the physical activity standards. Frontline-staff noted that since the physical activity standards had been adopted “the kids are more active,” and that they go home to their parents, “tired at the end of the day.” Beyond providing children with more physical activity, ASP leaders and frontline-staff also noted that the children’s increased activity levels led to reduced misbehavior. This reduction in misbehavior was attributed to less time when children were sitting out and getting “bored,” and more time with a specific activity in which to be engaged. Another benefit of the standards related to parental support; as discussed previously, parents were satisfied because their children were not “bouncing off the walls” when they picked them up from the ASP.

**Self-efficacy.** Branch directors expressed different perceptions related to self-efficacy than ASP leaders and frontline-staff. Branch directors indicated that ASP leaders were hesitant to implement the standards in the Spring of 2012 because they thought “[implementing the standards] is going to be too hard, parents aren’t going to like [the standards] we don’t have the budget, kids aren’t going to like [the standards].” According to one branch director, this belief hindered implementation of the physical activity standards because of initial hesitation of ASP leaders. Further, one branch director said that the community in which their ASP was located embraced a culture of
mediocrity. This made implementing any program challenging because it was difficult to hold staff to a high standard.

The perceptions of ASP leaders and frontline staff did not mirror those of branch directors. In general there was an attitude of “we can do this” and there is “nothing holding us back.” For example, several frontline staff said they believed that the standards were “attainable” or “doable.” There was a general sentiment that attaining the standards was simply a matter of doing what the standards say because, “they are pretty much just handed to us ,” and, “when it comes down to it [all we have to do is] play soccer with the kids.”

**Skill proficiency.** One theme emerged relating to skill proficiency. In general, frontline staff struggled to manage children effectively. This led to behavior problems and reduced children’s time in physical activity. On several walkthrough observations staff struggled to command and maintain children’s attention when presenting activities. Frontline staff also identified managing children’s behavior as a challenge during semi-structured interviews. One staff member commented, “when children misbehave it holds us back [from achieving the physical activity standards] like a lot.” They went on to say that rules are not consistently enforced so children behave however they would like.

**Characteristics of the innovation**

**Compatibility.** Overwhelmingly, at all organizational levels there was a perception that the standards were compatible with the mission of the YMCA ASPs. The physical activity standards were perceived as compatible because they aligned with the mission of the YMCA: “to put Christian principles into practice through programs that build a healthy spirit, mind and body for all” (YMCA of the USA, http://www.ymca.net/about-us/). Branch directors, ASP leaders and frontline-staff commonly identified this mission statement and reconciled it with the physical activity standards adopted by their ASP. One branch director said, “If we look at the [physical activity] standards for our program what they do is simply bullet point tactical, practical
ways that we should be running our program daily, and so for me it absolutely falls right in line with what we should be doing.” An ASP leader added that, “Keeping [the children] active definitely goes with the healthy [part or our mission]. We are providing the program for the healthy spirit mind and body and with snacks and activities we fall in line with them with the mission of the YMCA.” One ASP leader expressed a more nuanced view of the compatibility of the physical activity standards with the mission of the YMCA. This ASP leader indicated, while the physical activity standards aligned with the stated mission of the YMCA that, “[the standards] are totally separate [from the mission of the ASP] because; I mean, I just feel like the [ASP] is just more like watch the kid, make sure the kids are safe, make sure that we are in budget and make sure the kid has a good time.” The same ASP leader added that, “you know [the standards] honestly make [my job] more difficult, a challenge isn’t bad obviously I think [the physical activity standards] are important but I think these are just totally separate.” This site leader believed that, while the YMCA had an explicit mission, a separate underlying mission was reinforced by supervisors. This implicit mission to: keep kids safe, stay in budget and make sure kids have a good time, was the mission for which she was held accountable in her YMCA and, at times, trumped the explicit mission.

Adaptability. Collaborative meetings during the creation of the physical activity standards were identified by branch directors and ASP leaders as an enabler to implementation. These meetings allowed branch directors and ASP leaders to provide feedback on early drafts of the physical activity standards. One program leader recalled a specific standard on which they provided feedback, “I thought that having the quantitative description of how big the group [could be] was too limiting with the resources that we had, you know. Saying that there were small group games [in the physical activity standards] was something that I helped change or make better actually.” The feedback requested from branch directors and ASP leaders on early drafts of the physical activity standards prior to their adoption led branch directors and ASP leaders to feel that they had a voice in the development of the physical activity standards. The feeling that branch directors and ASP leaders developed the standards
together with research personnel led to increased ownership of the standards and facilitated implementation.

Factors Relevant to the Prevention Delivery System: Organizational Capacity

Organizational norms regarding change. Overall participants thought that their local YMCA was open to new ideas at all organizational levels. One site director commented, “At this [association] creativity makes you climb the ladder.” This site director indicated that creativity was a commodity within the YMCA that was recognized and rewarded. Further this site director noted that a vision is shared with employees and then employees are asked to provide ideas for achieving that vision. ASP leaders and frontline-staff indicated that the YMCA organization had top leaders who were interested in changing their ASPs to align with the physical activity standards because they were committed to implementing the standards. This commitment was expressed by support for changing common practice within their ASPs in order to achieve the physical activity standards. One ASP leader said that her superiors would be, “ruthless” when it came to identifying and securing resources for her program.

Integration of new programming. Several themes emerged related to integrating the physical activity standards into the existing ASP structure with the majority of these themes identified as barriers. For frontline-staff the main challenge to implementing the physical activity standards related to a specific standard specifying that “sitting out is not an option” for children during physical activity. Repeatedly in the interviews and during observation staff would lament the challenge of engaging all children in physical activity. One frontline-staff member noted, “I think it’s a challenge [to meet the physical activity standards] because some of [the children] don’t want to be active they just want to sit.” A site director added that some parents expressed concern that their children could not “sit down and do nothing all day long.” Parents expressed the opinion that, “I pay you good money,” and, because of this, their child should be allowed to do what they want. While this challenge is related to community support as well it makes it challenging to integrate a physical activity standard calling for
all children to participate in physical activity when some parents dissent. Another challenge related to community support is parents that identify the completion of homework as their child’s main priority within the ASP.

*Shared vision.* From site directors to frontline-staff there was a consistent shared vision that their ASPs should be a bastion of health in an otherwise unhealthy world. As discussed previously, site directors, ASP leaders and frontline-staff were unified behind the belief that the physical activity standards are needed within their ASPs because children sit all day and children are becoming obese. A shared vision is identified as an enabler to innovation implementation by Durlak and Dupree (2008) and was clearly evident in the YMCA ASPs.

*Communication.* Branch directors, program leaders and frontline-staff were familiar with the physical activity standards, indicating frequent and clear communication. Participating in the development of the standards no doubt led to branch directors and ASP leaders who were familiar with the standards. ASP leaders indicated that the mechanisms for clear and open lines of communication were frequent staff meetings (bi-weekly), conversations with program leaders once a week and emails to frontline-staff. Frontline-staff also indicated that they received multiple copies of the physical activity standards and that physical activity standards were posted in ASP leader’s offices in plain sight. Further, upon reviewing program materials portions of the physical activity standards were identified on ASP schedules, internal memos and emails. It was clear that there was frequent communication about the physical activity standards within the ASPs.

*Accountability.* During observations and informal interviews it became evident that holding frontline-staff accountable for implementing the physical activity standards was a struggle for branch directors and site leaders. During several walkthrough observations frontline-staff were observed leading games with children that did not conform to the physical activity standards. When noncompliance to the physical activity standards was observed by ASP leaders or branch directors, immediate action to amend
the games was rarely taken. One ASP leader explained that “we cannot send staff home because who is going to replace them. They know I can’t send them home.” Another ASP leader conceded that “I don’t know how to write up” staff when they are out of line. Overall, there was not a culture of accountability within the YMCA organization which led to decreased implementation of the physical activity standards.

**Program Champion.** Within the YMCA organization and the ASPs the branch directors were committed to implementing the physical activity standards. This commitment to implementation was observed through the integration of the research team into the long-term planning and daily running of the local YMCA ASPs. Research personnel were invited to all strategic planning meetings for YMCA ASPs. At these meetings decisions on budgeting, schedules and direction of the YMCA ASPs were made. Further, research personnel were invited to job interviews for new frontline-staff and ASP leaders. Integration of research personnel into everyday practice was an indicator that branch directors were dedicated to implementing the standards and was a step to support ASP leaders.

Despite branch directors’ commitment to the implementation the physical activity standards, turnover of frontline-staff and ASP leaders emerged as a barrier. Based on observations and informal interviews with ASP leaders, the YMCA experiences an attrition rate of approximately 50% of frontline staff annually. Further, at the beginning of the Fall 2012 ASP year, all of the ASP leaders were new to their position (i.e. one ASP leader changed ASP sites, one ASP leader moved from a different department within the YMCA to lead the ASP, and two ASP leaders were new to the YMCA). The abundance of new staff makes training essential. Extensive resources (i.e. paying new frontline staff and ASP leaders to attend trainings) and time were required to train new ASP leaders and frontline staff. Often this training was not complete prior to frontline staff and ASP leaders’ assumption of responsibilities due to the time and resource demands. Turnover at the ASP leader level also led to re-organization of schedules and structure of the ASP, and the misplacement of resource materials.
provided by the research team. ASP leader and frontline-staff turnover was a barrier to the implementation of the physical activity standards.

**FACTORS RELATED TO THE PREVENTION SUPPORT SYSTEM**

*Training/Technical assistance.* Training and technical assistance was identified as a barrier and an enabler to physical activity standard implementation. Modeling of skills and behaviors related to implementing the physical activity standards was identified as an enabler at all organizational levels. Frontline-staff indicated that they appreciated practicing leading games similar to what they would be delivering in the ASP. This authentic environment allowed staff to observe and practice delivering games before they were expected to do so in front of children. Frontline-staff also indicated that the environment at trainings was supportive and allowed for a more relaxed, open and cooperative environment.

Frontline-staff also identified two barriers related to training: 1) fatigue and 2) repetitive content. Several of the booster trainings were scheduled immediately following the ASP beginning at 6:30pm. One staff commented, “We were all tired. We all just got done working.” Frontline-staff indicated that sometimes it was hard to concentrate and be actively engaged in the trainings because they occurred at the end of the day. However, they also expressed that scheduling booster trainings immediately following ASP was the only time that all staff could make meetings because of conflicting schedules prior to the ASP. Another barrier identified by some frontline-staff was repetitive content in trainings. One frontline-staff member observed, “[There have] been points where we’ve played the same games like when I first started doing this, [there have] been points where I’ve heard the same things over and over again that I’ve already [heard] like 20 times before.” The repetitive nature of some of the trainings may lead to a perception that frontline-staff already know everything covered in the trainings and reduced motivation of staff because of the perception that the content was not relevant to them any longer. However, frontline-staff went on to note that content needed to be repeated because of the influx of new staff every year and the
idea that some content was meant to be repeated to build a framework of understanding.

**DISCUSSION**

Implementing health promotion programs in community settings is complex. There are a myriad of factors that can either affect successful implementation. Understanding these barriers and enablers allows for communities and researchers alike to design better health promotion programs (Durlak & DuPre, 2008; Dusenbury, et al., 2003). This study used the FEI to examine the barriers to and enablers of physical activity standard implementation in one YMCA organizations ASPs.

Novel findings in this study include the identification of parental support as a perceived barrier to and enabler of implementation of physical activity standards in the ASP setting. This finding is not surprising considering that ASPs depend on the financial support of parents (i.e. parents pay for afterschool care of their children). This means that ASPs must tailor their programs to cater to the priorities of the parents. Consequently, considering how the standards would affect the ASPs’ enrollment numbers was a concern of branch directors and ASP leaders. Specifically, branch directors and ASP leaders believed that parents’ number one priority was for their children to complete their homework during the ASP. Any strategies to increase children’s physical activity in the ASP setting must not reduce allocated homework time. Further, tailoring messages to parents about the benefits of physical activity on academic achievement may be helpful gain parents’ support for said changes (Ahamed et al., 2007; Trudeau & Shephard, 2008).

Factors also varied across and within different levels of the organizational structure. For example, while some frontline-staff believed that the physical activity standards aligned with a community priority of becoming healthier, others believed that the novelty of the standards and parents’ emphasis on academics hindered community support for the physical activity standards. These differing perceptions may be a barrier to physical activity standard implementation in and of themselves. Further, barriers at
the site director level often differed from those at the ASP leader and frontline-staff level. For example, frontline-staff were often more aware of barriers to physical activity standards at the everyday operations level (e.g., getting children to play the games) while site directors identified enablers and barriers that were more overarching and big picture (e.g., keeping parents happy, mission of the YMCA). This finding suggests that trainings related to implementing physical activity standards should address every day operations as well as the big picture. For example, as it became apparent that staff required skills related to group management the booster trainings were tailored to provide staff with skills related to group management.

Finally, barriers and enablers seemed to evolve over time suggesting that implementation is not static and can deteriorate or increase. For example, at the beginning of standard implementation, ASP leaders and branch directors believed that changes were unnecessary because the children in their programs were already sufficiently active. To combat this perception, one of the strategies of the intervention was to provide site directors and ASP leaders with detailed feedback related to the activity levels of children in their ASPs. In the winter of 2011 activity levels of children attending the YMCA ASPs prior to implementing the physical activity standards were presented to site directors. On average across the four sites girls and boys were accumulating 17.7 and 22.9 minutes of MVPA daily. These activity levels were well below the YMCA’s stated goal of 30 minutes of MVPA daily for both boys and girls. This information led to a shift in the belief at the ASP leader and site director level and a realization that, “the truth was we weren’t meeting those standards.” Therefore, by sharing the activity levels of children with ASP leaders and branch directors, a potential barrier was transformed into an enabler. Evolving implementation over time is consistent with previous health promotion research in a variety of settings (McCormick, Steckler, & McLeroy, 1995; Noell, Witt, Gilbertson, Ranier, & Freeland, 1997; Rohrbach, Graham, & Hansen, 1993; Story et al., 2000). As suggested by Durlak and Dupree (2008) it may be useful to establish a monitoring and feedback system to inform sites of barriers that emerge over time to implementing physical activity standards. This
feedback system could help sites identify and address evolving barriers and enablers to physical activity standard implementation.

Some aspects should be considered when evaluating the results of this study. First, this study was conducted in one YMCA association which may not be representative of all YMCA associations. Factors influencing standards implementation in this study may not be consistent with other YMCA or non-YMCA ASPs. Also, this study took place over a limited period of time and, as noted, implementation is inconsistent over time. Therefore, enablers and barriers identified within this study may evolve in the future, emphasizing the need for continued monitoring and feedback related to implementation of the physical activity standards.

Despite these limitations this study has several strengths. Data were collected from multiple organizational levels using three data collection methods allowing for data to be triangulated. Triangulation ensures the dependability of the data (Maxwell, 2005). Despite a lack of in depth analysis because of the numerous themes identified, the study provides a comprehensive view of the barriers and enablers related to the physical activity standard implementation in the programs studied. The data collected are also founded in a pre-existing theoretical framework that highlights the most likely factors influencing implementation. This theoretical model was created from an extensive review of literature and was developed based on empirical evidence. Because of this, the authors are confident that the data represents the crucial barriers and enablers to the implementation of the physical activity standards.

This study’s findings allow for a comprehensive understanding of the barriers and enablers related to implementation of physical activity standards in the participant YMCA ASPs. These findings suggest the need for continued examination of enablers and barriers to physical activity standard implementation as they evolve over time. The development of feedback mechanisms for programs adopting physical activity standards related to implementation of those standards is also warranted if physical activity standards are to have their intended effect on child activity levels. Further, when
implementing health promotion programs in the ASP setting providers and research personnel must consider strategies for gaining parental support. Finally, understanding the various organizational levels and tailoring the prevention support system (i.e., training and technical assistance) to meet the needs of the various levels will lead to increased implementation.
### Table 5.1. Barriers to and Facilitators of Physical Activity Standards Implementation

<table>
<thead>
<tr>
<th>Theoretical Factor Identified</th>
<th>Definition</th>
<th>Theme</th>
<th>Systems Level</th>
<th>Sample Quote</th>
<th>Participant Observation/Informal Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community Level Factors</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Funding</td>
<td>Money provided by an organization for the purpose of supporting the innovation</td>
<td>Resources (-)</td>
<td>ASP leader, Frontline-staff</td>
<td>I mean we are not in a good place financially right now and so having the appropriate amount of staff and equipment is the only thing that is really a hindrance</td>
<td>Programs were understaffed during walk-throughs and trainings</td>
</tr>
<tr>
<td>Policy</td>
<td>A formal statement that defines priorities for action, goals and strategies (Bull, Bellew, Schöppe, &amp; Bauman, 2004)</td>
<td>Policies as a guide to everyday practice (+)</td>
<td>Branch director, ASP leader, Frontline-staff</td>
<td>[With] the standards you actually have it written out I mean if they weren’t standards you would have all these questions and no answers so the standards give you answers</td>
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<td></td>
<td></td>
<td>Policies as a tool for accountability and barometer for success (+)</td>
<td>Branch director, program leaders</td>
<td>As an [branch director] I love that I can take [the standards] and use it as a punch list to see how we are operating the program I can use it as ok these are the 10 items that I know staff aren’t supposed to be engaged in</td>
<td>Weekly standards checklists completed by program leaders</td>
</tr>
<tr>
<td>Parental Support*</td>
<td>Expressions of support or disapproval for the physical activity standards and related changes in the afterschool programs from parents, or others in the surrounding community</td>
<td>Community alignment (+)</td>
<td>Branch director, Frontline-staff</td>
<td>I think that you know adults in general too are trying to get more healthy so they want their kids to come [to a physically active ASP]</td>
<td></td>
</tr>
<tr>
<td>Provider Characteristics</td>
<td>Extent to which the proposed innovation is relevant to local needs</td>
<td>Perceived Need for the Innovation</td>
<td>Branch director, ASP leader</td>
<td>ASP Leader, Frontline-staff</td>
<td>Branch director, ASP leader, Frontline-staff</td>
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<tr>
<td>Differing priorities (-)</td>
<td>Branch director, ASP leader</td>
<td>Our parents want their kids to get their homework done so there are things that we are going to have to create really a balance sheet for hey how do we balance this out how do we effectively balance this out and still meet the expectations that we are setting</td>
<td>Including enough academic time was a consistent theme in ASP planning meetings</td>
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<tr>
<td>Novel practices (-)</td>
<td>Frontline-staff</td>
<td>[Parents] were worried also their kids would be too active and they were like my kids tired or whatever or does my kid have to play the game</td>
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<tr>
<td>Provider Characteristics</td>
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</tr>
<tr>
<td>Perceived Need for the</td>
<td>Extent to which the proposed innovation is relevant to local needs</td>
<td>Children cannot sit all day (+)</td>
<td>I think it is very important because of the time of day that they get to us. They've sat from you know school starts at like 8 in morning and some of them have been at before school care so they have been sitting even longer.</td>
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<tr>
<td>Innovation</td>
<td></td>
<td>ASP Leader, Frontline-staff</td>
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<td></td>
<td>I think it’s totally necessary I am gung ho I think it is a wonderful idea because kids don’t always get it at school or home so I think doing it in the ASP environment is a great place to promote these ideas</td>
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<tr>
<td>ASP as a bastion of</td>
<td>Branch director, ASP leader</td>
<td></td>
<td>There are a lot of obese children around, especially at a young age. So you want to give them the mindset to eat healthy and have physical activity.</td>
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<tr>
<td>health in an otherwise</td>
<td>Frontline-staff</td>
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<tr>
<td>unhealthy world (+)</td>
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<tr>
<td>The obesity epidemic (+)</td>
<td>Branch director, Frontline-staff</td>
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<tr>
<td>We are already doing</td>
<td>Branch director, ASP leader</td>
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<tr>
<td>this (-)</td>
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<tr>
<td>We feel like we are already meeting those standards.</td>
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<tr>
<td>Perceived Benefits of the Innovation</td>
<td>Extent to which the innovation will achieve benefits desired at the local level</td>
<td>Children are more physically active (+)</td>
<td>Branch director, ASP leader, Frontline-staff</td>
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<tr>
<td>Reduced misbehavior (+)</td>
<td>ASP leader, Frontline-staff</td>
<td>Our behaviors reports have dramatically adjusted. I think part of that is because instead of having the kids sit down, where the kid gets bored then hits a kid that’s next to them. You know, if you’re like, ‘hey lets go walk around and talk to each other,’ or something like that, it’s kept them out of trouble, which kept them from pushing somebody else.</td>
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<tr>
<td>Self-efficacy</td>
<td>Extent to which providers feel they will be able to do what is expected</td>
<td>We can do this (+)</td>
<td>ASP leader, Frontline-staff</td>
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<tr>
<td></td>
<td></td>
<td>I think we are at a point now where everything is concrete and definitely attainable. There is nothing here that is impossible. It has been a challenge, but there is nothing I would change at this point.</td>
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<tr>
<td>Culture of mediocrity (-)</td>
<td>Branch director</td>
<td>I think too often we make excuses that this won’t work and it’s just the nature of the beast in the area that we work. I haven’t wrapped around the answer for three years now. It’s just different here. We accept mediocrity on so many levels</td>
<td></td>
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<tr>
<td>Changes are too hard to make (-)</td>
<td>ASP leader o</td>
<td>[Initially] for [the ASP leaders] it was like turning around the titanic. They saw it as an impossible task.</td>
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</tbody>
</table>

*ASP = After School Program*
<table>
<thead>
<tr>
<th>Skill proficiency</th>
<th>Possession of the skills necessary for implementation</th>
<th>Group Management</th>
<th>Frontline-staff</th>
<th>Game presentation and transitions between activities take excessive amount of time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of the Innovation</td>
<td>Compatibility</td>
<td>Alignment with the explicit mission of the ASP (+)</td>
<td>Branch director, ASP leader, Frontline-staff</td>
<td>The ASP is not just to look after kids after school but to make sure they are doing the right things: getting their homework done, getting PA and getting healthier especially now a days, so yeah, I think it’s on point.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Misalignment with the implicit mission of the ASP (-)</td>
<td>ASP leader</td>
<td>I just feel like the Y is just more like, ‘watch the kid, make sure the kids are safe, make sure that we are in budget and make sure the kids have a good time,’ and then you know [the PA standards] honestly, makes it more difficult. A challenge isn’t bad obviously, I think it is important but I think [the PA standards] are just totally separate [from the mission of the YMCA].</td>
</tr>
<tr>
<td>Adaptability</td>
<td>The extent to which the proposed program can be modified to fit provider preferences, organizational practices, and community needs, values, and cultural norms</td>
<td>Feedback on the final product (+)</td>
<td>Branch director, ASP leader</td>
<td>I really didn’t agree with having a small limitation on the group game sizes [in the PA standards]. I thought that having the quantitative description of how big the group was too limiting with the resources that we had, you know. Saying that there were small group games [in the PA standards] was something that I helped change or make better actually.</td>
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</tbody>
</table>

Factors Relevant to the Prevention Delivery System: Organization Capacity
<table>
<thead>
<tr>
<th>General Organizational Factors</th>
<th>Organizational norms regarding change</th>
<th>Open to new ideas (+)</th>
<th>Branch director, ASP leader, Frontline-staff</th>
<th>At this [association] creativity makes you climb the ladder so I think this association is perfect with that.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared vision</td>
<td>The extent to which organizational members are united regarding the value and purpose of the innovation</td>
<td>ASP as a bastion of health in an otherwise unhealthy world (+)</td>
<td>Branch director, ASP leader, Frontline-staff</td>
<td>Most these kids these days after school tend to go home and play video games but coming here it gives the kids time to interact with friends and be active, the whole time they are here and eat healthy rather than just going home to have a snack and sit in front of the TV so we keep them healthy.</td>
</tr>
<tr>
<td>Integration of new programming</td>
<td>The extent to which an organization can incorporate an innovation into its existing practices and routines</td>
<td>Children do not want to participate (-)</td>
<td>ASP leader, Frontline-staff</td>
<td>I think it’s a challenge because some of [the children] don’t want to be active they just want to sit.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Children sit out of games during walk through with ASP leader</td>
</tr>
<tr>
<td>Specific Practices and Processes</td>
<td>Communication</td>
<td>Effective mechanisms encouraging frequent and open communication</td>
<td>Frequent Communication about the PA standards (+)</td>
<td>Branch director, ASP leader, Frontline-staff</td>
</tr>
<tr>
<td>Accountability*</td>
<td>Responsible to someone for some action</td>
<td>Holding staff accountable for implementing PA standards (−)</td>
<td>Branch director, ASP leader</td>
<td>ASP leader did not know how to document staff. ASP leaders and branch directors do not require staff to change inappropriate games during walkthrough observations.</td>
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<tr>
<td>Specific Staffing Considerations</td>
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<tr>
<td>Program Champion</td>
<td>An individual who is trusted and respected by staff and administrators, and who can rally and maintain support for the innovation, and negotiate solutions to problems that develop</td>
<td>Top leaders in the organization committed to the PA standards (+)</td>
<td>Branch director, ASP leader</td>
<td>I think it's more of our Y has embraced it because we have support from a leader at a higher leadership level</td>
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<td></td>
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<td></td>
<td>Research personnel invited to participate in ASP planning all meetings</td>
</tr>
<tr>
<td>Prevention Support System Training/Technical Assistance</td>
<td>Approaches to insure provider proficiencies in the skills necessary to conduct the intervention and to enhance providers' sense of self efficacy</td>
<td>Modeling (+)</td>
<td>Branch directors, ASP leader, Frontline-staff</td>
<td>At our staff meeting I know we play the games to get us involved, and they're fun, and so like if we think they are fun then obviously we are going to want to play them again with our kids, so it's good.</td>
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<tr>
<td>Perceived Barrier</td>
<td>Frontline-staff Comment</td>
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<tr>
<td>Supportive environment (+)</td>
<td>It's never been like, oh my gosh, you are doing this wrong. We've pretty much gotten it in our heads that you guys are here to help us. It's not like you guys are coming here to audit us from downtown (central YMCA location), it's not like when you come everybody here is nervous and up tight, and oh my gosh am I doing this right. It's you know, you guys are here and the kids know your faces. We know your faces. We know your names. We've built a bond. So, you know, we're more out to want to cooperate with you guys.</td>
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<tr>
<td>Fatigue caused by scheduling trainings following the work day (i.e. 6pm) (−)</td>
<td>I think it was more the fact that if it didn’t help it was the fact that we were all tired. We all just got done working.</td>
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<tr>
<td>Trainings became repetitive (−)</td>
<td>It's been points where we've played the same games like when I first started doing this, it's been points where I've heard the same things over and over again that I've already known like 20 times before.</td>
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</table>

− perceived barrier
+ perceived facilitator
* Identified by interview participants or during observations but not explicitly identified by Durlak and Dupree (2008)
* As expressed by branch director
* Sentiment that the ASP was a chance to expose children to a healthy environment while surrounded by other environments are unhealthy was echoed at all three levels of the systems framework. See also “perceived need for the innovation.”
REFERENCES


CHAPTER 6: DISCUSSION

Out-of-school time programs have been called upon to promote healthy eating and physical activity by state and national organizations. The main objective of the work described herein was to develop an intervention to increase staff behaviors called for in standards documents in 8 out-of-school time programs. The work presented herein also describes the development of a tool to measure staff behaviors and their alignment with healthy eating and physical activity standards. This instrument was developed as the outcome measure for the intervention. Finally, a qualitative inquiry of the barriers and enablers related to implementing the standards is described. In this final chapter findings from the 4 studies will be discussed.

CHAPTER 2: SYSTEM FOR OBSERVING STAFF PROMOTION OF ACTIVITY AND NUTRITION (SOSPAN).

This study describes the development of the SOSPAN instrument, a systematic observation instrument for the measurement of staff promotion behaviors related to children’s healthy eating and physical activity. Initial categories and behaviors included in SOSPAN were identified through an extensive literature review followed by a modified Delphi method to elicit expert feedback on the behaviors identified. The complete SOSPAN instrument consisted of 23 variables in three categories 1) staff management of healthy eating and physical activity, 2) frontline-staff behaviors, 3) and context of the afterschool program and summer day camp.

In general findings from this study indicate that staff in the 8 out of school time programs observed did not align their behaviors with those called for in standards documents. This finding is novel and has not been duplicated in any other research to date. However, it is not surprising considering that standards were developed at the state and national level with no support strategies for implementation in place.

Reliability and Validity. Overall, SOSPAN demonstrated high inter-rater reliability with observer agreement ranging from 74.5% to 100%. Consistent with published
systematic observation instrument reliability protocols 80% agreement is considered strong (Brown et al., 2006; Ridgers, Stratton, & McKenzie, 2010). Of the 23 staff behaviors observed in the two settings (i.e., summer day camps and afterschool programs) only two behaviors, child idle time and children stand and wait for their turn in line; in the summer day camp setting fell below this level. These behaviors were only slightly below 80% agreement, however. Further, after refinement of the definitions and additional training, inter-rater agreement increased in the afterschool setting to 83.7% and 96.2% respectively.

The SOSPAN instrument also demonstrated construct validity. In order to establish construct validity of staff management of physical activity and promotion behaviors related to physical activity, the presence or absence of these behaviors and management strategies were compared to children’s activity levels, measured via SOPLAY. In all but 4 instances the direction of the relationship between staff behaviors and children’s activity was as hypothesized. The strongest predictor of increased activity in children was staff engagement with children in the activity. This is an encouraging fact because the message to out of school time program providers that would like to increase children’s activity can be as simple as: play with the children.

As stated previously some staff behaviors, called for by standards and included in SOSPAN, were not seen at a high rate. Specifically staff nutrition promotion behaviors were almost nonexistent in both the afterschool programs and summer day camps included in this study. Further, because of the time spent in these programs and the large amount of scans collected it is unlikely that prolonged exposure to the programs would have yielded observation of these behaviors. This made it impossible to establish reliability and construct validity for these behaviors. However, the consistent non-recording of behaviors by both observers lends some evidence to the reliability of the instrument. Also, content validity of the staff behaviors included in SOSPAN is clearly demonstrated because these behaviors are described in existing policies, evident in the literature, and confirmed by expert input. Still these results should be interpreted with caution due to the low incidence of these behaviors.
CHAPTER 3: A COMPREHENSIVE PROFESSIONAL DEVELOPMENT TRAINING’S EFFECT ON AFTERSCHOOL PROGRAM STAFF BEHAVIORS TO PROMOTE HEALTHY EATING AND PHYSICAL ACTIVITY.

This study was the first to evaluate ongoing professional development training, feedback, and technical support’s effect on afterschool program staff behaviors called for in standards documents. An important aspect of the approach was that these strategies involved minimal changes to routine practice. Despite these minimal changes increases in desired staff behaviors were seen in as little as four months. Strategies that are easily integrated into routine practice are more likely to be adopted by afterschool programs and thus more likely to affect staff behaviors, and ultimately child healthy eating and physical activity (Durlak & DuPre, 2008). Furthermore, unlike the majority of interventions in the afterschool program setting that have relied upon delivering a curriculum (Dzewaltowski et al., 2010; Kelder et al., 2005; Nigg, Battista, Chang, Yamashita, & Chung, 2004; Sharpe, Forrester, & Mandigo, 2011), these strategies can easily be implemented in a wide variety of settings. This fact allows these strategies greater potential to impact the large number of children attending afterschool programs daily.

CHAPTER 4: A COORDINATED COMPREHENSIVE PROFESSIONAL DEVELOPMENT TRAINING’S EFFECT ON SUMMER DAY CAMP STAFF HEALTHY EATING AND PHYSICAL ACTIVITY PROMOTING BEHAVIORS

Similar to the study described in chapter 3, this study is the first to evaluate strategies’ (i.e., ongoing professional development training, feedback and technical support) impact on staff behaviors in summer day camps. This study also evaluated changes in children’s physical activity from baseline to post-assessment. Positive changes in staff behaviors and the percent of children sedentary and physically active were observed over the three month contact period. These changes represent an important first step toward creating more healthy summer camp environments.

Like the afterschool program setting these strategies focused on staff integrating behaviors called for in standards documents into routine practice rather than implementing a set curriculum. These strategies proved to be effective at increasing desirable and decreasing undesirable staff behaviors, with 12 of the 17 staff behaviors
moving in the preferred direction from baseline to post-assessment. Again, these strategies show initial promise for creating a healthier summer camp environment.

Since staff behaviors are theoretically and empirically linked to children’s physical activity levels it is not surprising that, along with changing staff behaviors, there was a corresponding increase in children engaged in moderate-to-vigorous physical activity and decrease in sedentary behaviors. The strategies adopted in this intervention (i.e., Physical Activity Standards, training and feedback for program leaders and staff), while not directly targeting child physical activity, appear to have increased children’s engagement in moderate-to-vigorous physical activity and decreased the percentage of sedentary children.

CHAPTER 5: BARRIERS AND ENABLERS TO PHYSICAL ACTIVITY POLICY IMPLEMENTATION IN AFTERSCHOOL PROGRAMS: A QUALITATIVE INQUIRY.

The study described in this project was a qualitative inquiry into the barriers and enablers of physical activity standard implementation. Parental support was discovered as a perceived barrier to and enabler of implementation of physical activity standards in the afterschool program setting. Enablers and barriers also varied across and within different levels of the organizational structure. Finally participants discussed how their view of barriers and enablers evolved over time.

These three findings can inform interventions designed to promote physical activity in the future. It is not surprising that parental support is crucial considering that afterschool programs depend on the financial support of parents (i.e. parents pay for afterschool care of their children). Considering how any changes in the program will be received by parents is crucial to an intervention’s success.

Differing staff perceptions of barriers and enablers across organizational levels may be a barrier to physical activity standard implementation. Specifically, barriers at the site director level often differed from those at the afterschool program leader and frontline-staff level. For example, frontline-staff were more aware of how physical activity standards affected daily operations (e.g., getting children to play the games) while site directors identified enablers and barriers that were more overarching (e.g., keeping parents happy, mission of the YMCA). This finding suggests that trainings
related to implementing physical activity standards should address every day operations as well as the big picture. For example, as it became apparent that staff required skills related to group management the booster trainings were tailored to provide staff with skills related to group management. Separate trainings for frontline staff and site directors and afterschool program leaders may also help to address these differing barriers.

Finally, participants admitted that their perceived barriers and enablers evolved throughout the course of the intervention, suggesting that implementation is not static and can deteriorate or increase over time. Evolving implementation over time is consistent with previous health promotion research in a variety of settings (McCormick, Steckler, & McLeroy, 1995; Noell, Witt, Gilbertson, Ranier, & Freeland, 1997; Rohrbach, Graham, & Hansen, 1993; Story et al., 2000). Durlak and Dupree (2008) suggest that, interventions should include a monitoring and feedback system to inform participants of barriers that emerge over time. This feedback system could help participants identify and address evolving barriers and enablers to physical activity standard implementation.

**Synthesis of Findings**

The work reported herein is among the first to begin to translate standards for healthy eating and physical activity into routine practice. By conceptualizing out-of-school programs as complex systems it was possible to identify the different system levels; B) what elements of the out-of-school time program influence children’s physical activity and healthy eating behaviors; C) what resources were required to modify these elements with a realistic input of resources; and D) how to work with change agents to create standards integrate them into routine practice (Beets, Webster, Saunders, Huberty, 2013). The systems framework utilized herein and described in detail elsewhere (Beets, Webster, Saunders, Huberty, 2013) provides a useful tool for moving beyond standard adoption to standard implementation and eventual changes in routine practice to create healthy eating and activity friendly environments.

An important distinction between the studies described herein and previous studies is the fact that strategies did not rely on delivering a pre-packaged curriculum
but rather providing staff competencies related to creating a healthy eating and physical activity friendly environments in afterschool programs and summer days camps. Other interventions have focused on delivering a pre-packaged physical activity curriculum as the main strategy for increasing children’s healthy eating and physical activity (Dzewaltowski, et al., 2010; Iversen, et al., 2011; Nigg, et al., 2004; Sharpe, et al., 2011). These studies reported modest (Dzewaltowski, et al., 2010; Nigg, et al., 2004) or no (Iversen, et al., 2011; Sharpe, et al., 2011) increases in child healthy eating and physical activity during program time. Not surprisingly, one study reported limited implementation of the pre-packaged program (Sharpe, et al., 2011). Leaders reported allowing children to opt out of the program and not offering the curriculum daily. Staff members also reported not delivering curriculum components (i.e. physically active games) because they did not understand the games or feel they possessed skills to lead said games (Sharpe, et al., 2011). Further, a limitation of teaching staff specific games, rather than skills, is that they cannot and will not deliver these games if they do not have the appropriate equipment (Hastmann, Bopp, Fallon, Rosenkranz, & Dzewaltowski, 2013). These challenges indicate that delivering a new curriculum may be more difficult than demonstrating behaviors learned during professional development training. This study focused on the staff’s role in creating a physical and social environment to promote healthy eating and physical activity by displaying certain behaviors called for in healthy eating and physical activity standards. Training targeting these behaviors was provided to staff to enable them to create a healthy eating and physical activity-promoting environment. An approach that may be more effective at changing routine practice, as demonstrated by the changes in staff behaviors in these studies.

To this point no other studies have intervened on staff behaviors and management practices and evaluated subsequent changes in staff behaviors in out-of-school time programs. The studies reported herein are the first to provide initial evidence that routine practice can be amended to create a healthy eating and physical activity friendly environment for children through professional development training coupled with feedback and technical support. Since healthy eating and physical activity
Standards call for staff to display or refrain from certain healthy eating and physical activity promotion or discouraging behaviors, and staff behaviors are linked to children’s healthy eating and physical activity (Huberty, et al., 2012; R. Weaver, et al., in press; R. G. Weaver, et al., in press) identifying effective strategies for modifying staff behaviors and management practices is an essential first step to creating the desired changes in children’s healthy eating and physical activity in afterschool programs.

IMPLICATIONS FOR FUTURE RESEARCH

The work described herein has several implications for future research. While it appears that staff in the afterschool and summer day camp programs included in this study were not aligning their behaviors with those called for in standards documents it is important to realize that these findings represent one organization in one region of the country and cannot be generalized to afterschool or summer day camps as a whole. Large scale nationally representative studies are needed to understand current practice in summer day camps and afterschool programs and how it aligns with standards documents. These studies should explore staff behaviors and how they align or misalign with those behaviors called for in standards documents in addition to their effect on child level outcomes, the ultimate target of standards documents.

There is emerging evidence that staff behaviors in the afterschool and summer day camp settings influence child physical activity. In a recent study, a limited number of staff physical activity promotion behaviors included in the SOSPAN instrument (i.e. staff promotion of physical activity, staff engaged in physical activity) were related to a decrease in sedentary children and an increase in the proportion of children engaged in moderate-to-vigorous physical activity (Huberty, Beets, Beighle, & McKenzie, 2012). This study is part of a body of literature, in its infancy, linking staff behaviors to child activity levels in the afterschool program setting. Extensive work needs to be done linking staff behaviors to child level outcomes, especially linking staff behaviors to child level healthy eating outcomes, considering the dearth of literature on this subject. These studies should aggregate staff behaviors at the site level to child activity. That is are programs
that employ staff who display these behaviors actually increasing children’s physical activity and consumption of healthy snacks.

Despite the shortage of empirical evidence linking staff behaviors to child level outcomes in these settings, the behaviors described in standards documents should increase children’s activity and consumption of healthy snacks while in attendance at summer camps and afterschool programs. The strategies described herein show promise for increasing staff behaviors called for in standards documents and should be tested in a larger sample. Strategies included were ongoing professional development training, working with afterschool program and summer day camp leaders to create detailed schedules, and providing consistent feedback and technical assistance. What sets these strategies apart from previous interventions, in the out-of-school time program setting, is that they are easily tailored to individual programs. This is because they are not dependent upon delivering a set curriculum, as many other interventions in out-of-school time programs have been (Dzewaltowski, et al., 2010; Kelder, et al., 2005; Nigg, et al., 2004; Sharpe, et al., 2011). Because trainings can be tailored to each program it is ideal to the real world setting in which standards are targeting change (Campbell et al., 2007). However, while these strategies show promise they have only been tested in a small non-representative sample of afterschool programs and summer day camps and must be tested on a larger scale. While these studies utilized a pre- post-assessment no control group design, future studies should test these strategies using randomized controlled trials, a stronger study design, in a larger sample of programs. By conducting randomized controlled trials many threats to internal validity (i.e. history, selection bias, regression to the mean, and/or the “Hawthorne effect”) could be eliminated.


Beets, Weaver, Beighle, Webster, & Pate. (in press). Physical activity levels of children attending day-long summer camps. Journal of Physical Activity and Health.


## Appendix A: Summary of YMCA Healthy Eating and Physical Activity Standards

<table>
<thead>
<tr>
<th>Level</th>
<th>Standard, Policy, Recommendation, Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td>Children are moderately to vigorously active for at least 50% of the physical activity time.</td>
</tr>
</tbody>
</table>
| Staff   | Receive annually a minimum of eight contact hours of professional development on effective practices and strategies for including physical activity and healthy eating options.  
Staff leads and participates in active play  
Staff does not withhold or use physical activity as a punishment or reward.  
Staff models healthy eating in front of children |
| Parent  | Educational materials are made available to parents/families through pamphlets, newsletters, email blasts or other means.  
Parent events incorporate healthy foods and physical activity.  
Programs develop parent advisory groups to support healthy eating and physical activity at home. |
| Schedule| Dedicates at least 20% or at least 30 minutes to physical activity (60 minutes for a full day program)  
Offers non-competitive activities  
Includes a variety of physical activity options aimed at engaging children in fun, recreational, and life-long learning opportunities  
Serves a fruit or vegetable daily  
Offers water with the snack |
| Environment | Provides physical activities in which children are moderately to vigorously active for at least 50% of the physical activity time  
Equipment for games, sports and activities is age and developmentally appropriate.  
The program environment provides positive messages healthy eating and physical activity through posters, pictures and books. |

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# APPENDIX B: 5 Ms PROFESSIONAL DEVELOPMENT TRAINING SUMMARY

<table>
<thead>
<tr>
<th>The “Ms”</th>
<th>The construct</th>
<th>The message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>Policy</td>
<td>Programs need to adopt an existing policy or develop a policy that clearly defines the expectations on the amount of physical activity children accumulate daily. Programs need to adopt existing policy or develop a policy that clearly defines daily expectations on the nutritional quality of snacks.</td>
</tr>
<tr>
<td>Motivate</td>
<td>Autonomy: the belief that you are in control of your own actions and not being forced to participate (e.g. “I choose to play” instead of “I am forced to play”)</td>
<td>More choice equals more motivation to engage in physical activity and eat healthier snacks.</td>
</tr>
<tr>
<td></td>
<td>Competence: ability level</td>
<td>Children who believe they can successfully participate in physical activity will participate more. Elementairy aged children rely on their ability to be successful, enjoyment, and feedback to construct perception of competence. Children choose more nutritious snacks when both adults and children understand what constitutes a healthy snack.</td>
</tr>
<tr>
<td></td>
<td>Feedback and Encouragement</td>
<td>Encouragement after failure related to continued participation in PA. Feedback based on personal accomplishment rather than outperforming a competitor increases confidence, effort, enjoyment, and persistence. Praise that is contingent upon performance increases self-perception, enjoyment and motivation.</td>
</tr>
<tr>
<td></td>
<td>Enjoyment</td>
<td>Enjoyment is the strongest predictor of continued participation in PA. Participants that continue to engage in PA report positive past experiences in PA.</td>
</tr>
<tr>
<td>Manage</td>
<td>Structure the environment</td>
<td>Safety is the first concern when managing a PA environment. Schedule PA immediately upon arrival can reduce behavior problems during planned sedentary activities (e.g. academics, snack time). Higher levels of PA are achieved when activity is scheduled in 15-20 minute sessions. Children are dependent upon care providers to offer healthy food.</td>
</tr>
<tr>
<td></td>
<td>Manage the environment</td>
<td>Youth show preference to teachers who establish rules and consistently enforce them. Establishing routines for interruptions and transitions between activities can decrease management time. Preventative management can reduce discipline time and increase in activity. Modeling healthy eating can contribute to children’s perception of the social norm. Time outs reduce time in activity. Prescribing PA as punishment frames PA negatively.</td>
</tr>
</tbody>
</table>
| Monitor          | 4600 steps in 60-80 minutes is valid predictor of 30 min of MVPA  
|                 | Setting goals related to step counts may also provide ample motivation to increase PA  
|                 | When children perceive healthy snacking as part of the social norm they are more likely to consume FV |
| Maximize        | Only by implementing the 5 M’s in concert with one another will an ASP maximize children’s PA and healthy dietary intake |
1) What is your opinion about the idea that children should be physically active in afterschool programs?
   a. How important is it for afterschool programs to provide children with physical activity opportunities?
   b. Think about some of the other afterschool program staff at your site, or that you have worked with in the past. How do your opinions about children’s physical activity in the afterschool program compare with other staff?
   c. Have you ever disagreed with another staff member about children’s physical activity while at the afterschool program? If so, tell me about what happened and how you handled it.

2) Here is a copy of the standards adopted by your YMCA in January of 2012. Are there any standards included here that you are not familiar with? (Clarification: anything that makes you say, “Oh I didn’t know we were or weren’t supposed to be doing that”).
   a. Do these standards align with the mission of the YMCA and your afterschool program? If so why, if no why not?

3) What is your opinion about these physical activity standards?
   a. Have you noticed any changes in the program that have taken place since the standards were adopted (schedule, logistics, staff morale, children, parents)?
   b. Is there anything about the YMCA or this afterschool program that could affect your ability to implement the physical activity standards?
   c. When you face one of these challenges what do you do?
      i. Is there someone that you go to with problems?
   d. What are some ways in which your afterschool program could overcome some of these challenges? (clarification: What could be improved about the standards)
   e. Have the parents of the children in your program expressed opinions about these physical activity standards?
   f. Did the YMCA provide the support you need to meet these standards? If so how?
g.
   i. Did the trainings and resources provide you with skills and resources necessary to implement the physical activity standards
   ii. What did you like about the standards? In terms of structure of the after-school program, logistics, support from research personnel, staff morale, communication among staff, communication with parents?
4) How did you learn about these standards?
   a. Who communicates with you about the standards
   b. How do you receive communication about the standards (e.g. email, verbal, phone)
   c. How often is there communication about the standards
5) Share one example of a time that the YMCA changed common practice.
APPENDIX D: SEMI-STRUCTURED INTERVIEW QUESTION GUIDE (BRANCH DIRECTORS AND ASP LEADERS)

1) What is your opinion about the idea that children should be physically active in afterschool programs?
   a. How important is it for afterschool programs to provide children with physical activity opportunities?
   b. Think about some of your colleagues at your site or that you have worked with in the past. How do your opinions about children’s physical activity in the afterschool programs compare with those colleagues?
   c. Now think about some of the staff that work at your site or that have worked at your site in the past. How do your opinions about children’s physical activity in the afterschool program compare with those staff members?
   d. Have you ever disagreed with a colleague or staff member about children’s physical activity while at the afterschool program? If so, tell me about what happened and how you handled it.

2) Here is a copy of the standards adopted by your YMCA in January of 2012. Are there any standards included here that you are not familiar with? (Clarification: anything that makes you say, “oh I didn’t know we were or weren’t supposed to be doing that”).
   a. What was your role in the development of these standards?
   b. Do these standards align with the mission of the YMCA and your afterschool program? If so why, if no why not?

3) What is your opinion about the physical activity standards your YMCA has adopted?
   a. Is there anything about the YMCA or this afterschool program that could affect your ability to implement the physical activity standards?
   b. What did you like about the standards?
   c. Have the parents of the children in your afterschool program expressed opinions about the physical activity standards?
   d. Do you feel like the YMCA provided the necessary support for staff to meet these goals? (Clarification: Training, boosters, verbal support, equipment, facilities, funding)
   e. Did the trainings and resources provide staff with the skills and resources necessary to implement the physical activity standards?
i. Managing children, modifying games, motivating children to be physically active

f. (Program leaders only) Did the trainings and resources provide you with the skills and resources necessary to implement the physical activity standards?
   i. Activity plans, schedules, activity breaks

4) Can you give me one example of a time that the Y changed common practice.

5) Do the physical activity standards place a financial strain on the afterschool program?
   a. In what ways?

6) Who is responsible for standard achievement in your afterschool program?
   a. Who communicates with the staff about the standards
   b. How does this/these person/people communicate with staff (e.g. email, verbal, phone)
   c. How often is there communication about the standard?
## APPENDIX E: SAMPLE AFTERSCHOOL PROGRAM SCHEDULE

<table>
<thead>
<tr>
<th>Time</th>
<th>New Monday</th>
<th>Location</th>
<th>Activity</th>
<th>Notes</th>
<th>Equipment</th>
<th>Staffer</th>
<th>Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30-3:45</td>
<td><strong>Staff Arrive</strong></td>
<td></td>
<td><strong>Prepare Equipment</strong></td>
<td>Staff identify today’s equipment and set aside for easy access</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:45-4:00</td>
<td><strong>Rides In</strong></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>4:00-4:15</td>
<td><strong>Instant Activity</strong></td>
<td><strong>Gym</strong></td>
<td><strong>Dance</strong></td>
<td>Get kids get in, up-n-active</td>
<td>Boom-box, speakers, markers for spaces on floor</td>
<td>A/B/C</td>
<td>1</td>
</tr>
<tr>
<td>4:15-4:30</td>
<td><strong>Snack</strong></td>
<td><strong>Gym</strong></td>
<td></td>
<td></td>
<td></td>
<td>D/E/F</td>
<td></td>
</tr>
<tr>
<td>4:30-5:15</td>
<td><strong>Homework</strong> (for kids needing to complete) or Tracks</td>
<td><strong>T1: Outdoor Field</strong></td>
<td><strong>Flag Football</strong></td>
<td>10 per game</td>
<td>Footballs (4), Cones (16), Flags</td>
<td>A/B</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>T2: Gym</strong></td>
<td><strong>Tag</strong></td>
<td>15 per game</td>
<td>Cones (16)</td>
<td>C/D</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Jump rope</strong></td>
<td>up to 15 kids</td>
<td>Bucket of jump ropes</td>
<td>D/E</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>HW Room</strong></td>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>5:15-6:00</td>
<td><strong>A and C or Tracks</strong></td>
<td><strong>T1: Field</strong></td>
<td><strong>GAGA Ball</strong></td>
<td>10 per game</td>
<td>Bag of Gator Balls, Cones (16)</td>
<td>C/D/E</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>T2: Gym</strong></td>
<td><strong>Dance</strong></td>
<td></td>
<td>Boom-box, speakers, markers for spaces on floor</td>
<td>F/B</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>A&amp;C Room</strong></td>
<td></td>
<td></td>
<td>Nutrition Education Materials/Seasonal</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>6:00-6:30</td>
<td><strong>Ending Activity</strong></td>
<td><strong>Gym</strong></td>
<td><strong>Tag</strong></td>
<td>Small sided games (15 per game)</td>
<td>Cones (10)</td>
<td>A/B</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Jump Rope</strong></td>
<td></td>
<td>Bucket of jump ropes</td>
<td>C/D</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Football</strong></td>
<td></td>
<td>Footballs (5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**APPENDIX F: SAMPLE ACTIVITY PLAN**

**Game:** Shark Tag

**Rules:**
- Sharks are the taggers and they have to run with their hand on their head like a fin
- Don’t get tagged while staying in bounds (ocean)
- If you get tagged you become a shark

**Variation of Rules:**
- When tagged swim to the beach before you can get back in the ocean
- When tagged by a shark you must go find a lifeguard to get back in (change shark and lifeguard every 2 min)
- When tagged you must link arms with the shark (because the shark is growing larger as it eats more food) and try and catch other fish

**Time:** 5 minutes with each change of rules

**Management**

<table>
<thead>
<tr>
<th>Signals</th>
<th>Protocols</th>
<th>Rules</th>
<th>Consequences</th>
<th>Checks for Understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Go” to start “freeze” to stop</td>
<td>When I say freeze mouths closed, eyes on me.</td>
<td>Be respectful Be safe Be active</td>
<td>1) Warning 2) Sit for 1 min 3) See Site Leader 4) See Parent</td>
<td>1) when I introduce the game 2) when I introduce a variation Sample: Chris what do you do if you are tagged?</td>
</tr>
</tbody>
</table>

**Diagram**

What will your space look like before the children arrive? Where will children, equipment, other staff and you be positioned? What equipment will I need to play all variations?

![Diagram of Shark Tag game setup](image)

**Active Transitions:**
- Swim to me
- Move like a cheetah/ninja/shark
- Jump from wave to wave on a jet ski

**Countdowns:**
- To spread children out on the court (3 sec count down)
- To get pennies from the wall (5 sec count down)
- Picking new lifeguard (3 sec count down)