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Healthy Eating and Physical Activity Environmental and Policy Assessment – Measurement Issues and Implications

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by

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DEDICATION

To my parents Jamea and Ayesha for their unconditional love and support and my husband Jeff for believing in me no matter what, your support means the world to me.

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ABSTRACT

Current research has suggested that supportive healthy eating and physical activity (HEPA) policy and practice environments play a significant role in shaping the physical activity levels and eating habits of youth. Subsequently, a wide array of audit tools assessing policy and practice environment characteristics across settings that care for youth were developed. However, the extent that available audit tools accurately reflect the policy environment characteristics of the settings that care for the youth population remains unknown. Therefore, this dissertation encompasses four studies.

The purpose of the first study was to examine the measurement properties of audit tools currently in use for assessing policy environment characteristics across a variety of settings that care for youth. Fifty-three individual tools that met the inclusion criteria were identified. Reliability and validity data were available for only 11 tools. Reliability coefficients (median) for individual items across tools were 0.62 (kappa), 0.88 (ICC), 74.0% (percent agreement), 0.62 (Pearson correlation) and 0.73 (Cronbach's α). Validity coefficients (median) for individual items across tools were 0.35 (kappa), 0.98 (ICC), 0.22 (*r*) and 74.7% (percent agreement).

The purpose of the second study was to determine the feasibility of training afterschool program (ASP) leaders to use the Healthy Afterschool Program Index - Physical Activity (HAPI-PA) and the Healthy Afterschool Program Index – Nutrition (HAPI-N) scales] accurately. Forty-four program leaders across South Carolina were

recruited. Program leaders were randomized to either in-person or distance training group. Ninety percent of the items in the in-person group and 73% of the items in the distance group had a kappa ≥ 0.70 for the HAPI-PA scale. In comparison, 83% of the HAPI-N scale items in the in-person group and 67% of the items in the distance group had a kappa ≥ 0.70. Equivalency between the two training methods was established for 5 of the 11 items in the HAPI-PA scale and 3 of the 12 items in the HAPI-N scale.

The purpose of the third study was to evaluate the responsiveness of the HAPI-PA and HAPI-N scales to policy and practice environment characteristics change. Twenty afterschool programs across South Carolina serving over 1700 children (5-12 years old) participated Baseline data were collected during spring 2013 and post-1 year follow-up data during spring 2014. The HAPI-PA and HAPI-N scales median and interquartile range (IQR) score improved from a baseline score of 9.5 (±5.8) to 13.5 (±2.0) for HAPI-PA and a score 6.5 (±6.5) to 21.0 (±4.0) for HAPI-N after year 1 in the intervention group. For the intervention group the HAPI-PA and HAPI-N scales effect sizes were 0.70 and 2.23, standardized response median were 0.94 and 1.45 and responsiveness index were 1.07 and 2.5, respectively. In comparison, the HAPA-PA and HAPI-N scores showed non- significant changes between baseline and year 1 follow up in the control group in both the median and IQR and using the effect size indices.

The purpose of the fourth study was to examine the influence of both the physical and policy and practice environment characteristics of ASP's settings on the HEPA behaviors of youth. A total of 1,302 children attending 20 ASPs across South Carolina wore accelerometers (ActiGraph GT3X+) for up to 4 non-consecutive days. Policy-level characteristics were evaluated using the HAPI-PA scale. Physical activity space was measured using a measuring wheel (indoor, ft^2) and GIS (outdoor, acres). The structure

(free-play or organized) of activity opportunities was evaluated via direct observation. For every 5000ft^2 of utilized indoor activity space an additional 2.4 and 3.3 minutes/day of sedentary behavior was observed among boys and girls, respectively. A higher ratio of free-play to organized play was associated with higher indoor sedentary behavior among boys and girls (3.9 minutes/day and 10.0 minutes/day, respectively). For every one acre of outdoor activity space used, an additional 2.7 minutes/day of MVPA was observed for boys. A higher free-play to organized play ratio was associated with higher outdoor MVPA for boys and girls (4.4 and 3.4 minutes/day increase, respectively). Policy characteristics were unrelated to MVPA levels and time spent sedentary.

In summer, this dissertation found that audit tools are widely used to quantify the impact of supportive HEPA policy and practice environmental characteristics across settings that care for youth, however, little effort is taken to evaluate the measurement properties of such tools. This wok showed that ASP's site leaders are able to provide accurate information regarding their program HEPA policy and practice environment using a newly developed audit tool (i.e., the HAAND). Furthermore, the HANND instrument appears to be capable of detecting changes in the ASP's HEPA environment. More effort should be directed towards providing ASP's with strategies to meet current HEPA policy and practice recommendation.

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CHAPTER 1: INTRODUCTION

Childhood Obesity

The increasing prevalence of childhood overweight and obesity nationwide is a serious public health issue,[1-3] with approximately 32% of children falling into the overweight or "at-risk" of overweight category and 17% of children and adolescents age 2-19 years categorized as obese.[4] Furthermore, although childhood obesity affects a large proportion of children in the U.S., the trends are much higher in minority children.[4] At the local level, the situation is similar with 31.7% of South Carolina children categorized as overweight or obese,[5] and according to the latest reports, South Carolina ranks number 2 nationally in childhood obesity among children age 10-17 years old.[6] Obesity in youth is associated with several chronic conditions previously known to occur much later in life such as diabetes, hypertension and dyslipidemias.[7-11] The economic burden of obesity is also of concern, with the cost of childhood obesity in 2005 estimated at around $14.1 billion in additional services such as prescription drug, emergency room, and outpatient visits annually[12] and $237.6 million in direct inpatient costs.[13] Additionally, the average hospitalization cost of obese children is estimated to be three times higher than that of their non-obese peers.[13] As overweight and obesity in childhood is more likely to persist through adulthood,[14, 15] the cost incurred grows larger with the obesity-attributed medical expenditure in the U.S. estimated to be around $147 billion in 2008 annually, with approximately one-half of that being financed by Medicare and Medicaid.[16]

Obesity is a complex health issue with multiple factors, some of which are more amenable to change (e.g., behavior, environment) than others (biological),[17] however, scholars agree that the major cause of childhood obesity is the combination of what some call the "energy gap" (i.e., imbalance between calories consumed and calories required) coupled with a decreased level of physical activity of youth.[18, 19] Additionally, recent trends suggest that the rise in childhood obesity is the result of increased consumption of high energy-dense food, the low consumption of fruits and vegetables coupled with a decline in physical activity levels.[20-22]

Physical Activity and Children's Health

The 2008 Physical Activity Guidelines for Americans recommends that children and adolescents participate in a minimum of 60 minutes of moderate to vigorous physical activity (MVPA) daily.[23] Participation in regular physical activity by youth has well-documented positive health benefits including decreased risk for childhood obesity.[23] In addition, increased physical activity has been associated with lower BMI and less TV watching.[24] Despite such evidence, currently physical activity levels of youth remain low with more than 71% children aged 9-13 years not achieving the recommended 60 minutes per day of daily physical activity[25] and 23% are not engaging in any free-time physical activity.[26] Furthermore, the latest national estimates using accelerometry data indicate that less than half of children age 6–11 years old accumulate the recommended amount of 60 minutes or more of daily MVPA.[27]

Diet and Children's Health

Diet and eating habits are another factor contributing to childhood obesity. Consumption of fruits and vegetables among children has shown to result in decreased consumption of energy-dense food, total energy intake and adiposity, however, consumption of fruits and vegetables by US children and adolescents remains below recommended levels,[20] with only around 22.3% of children eating the recommended 5 servings of fruits and vegetables per day.[28] In addition to falling short of meeting the fruit and vegetable recommendations, in today's society, the top source of energy for US children (2-18 years old) are grain desserts, pizza and soda.[20] In terms of calories consumed, sugar-sweetened beverages and 100% fruit juice account for 10%-15% of total calories consumed by children.[29] Additionally, according to a recent study by Piernas and colleagues, 27% of the calories consumed by children come from snacks, specifically salty snacks, candy, desserts and sweetened beverages.[21]

Policy Environment Characteristics and Youth Healthy Eating and Physical Activity Behaviors

From childhood to adolescence, children spend an extended amount of their waking hours exposed to a variety of settings such as childcare, schools, afterschool programs (ASP's) and summer camps. Nearly 60% of children under the age of 5 years attend some type of childcare center,[30] and over 95% of youth age 5-17 years are enrolled in public/private schools.[31] Additionally, over 10.2 million school-aged children are enrolled in afterschool programs [32] and over 14 million youth (≤18 years) attend summer

day camps annually [33]. Given the extended reach of these settings, whether or not they support or hinder HEPA behaviors is of critical importance.

Over the past decades, there has been an increased recognition of the role the current obesogenic environment defined as the *"sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations"*[34] plays in the current childhood obesity epidemic.[35] Accordingly, creating environmental changes supportive of healthy eating and physical activity (HEPA) has become a public health priority in recent years. One aspect of the environmental influences that has gained considerable attention over the years is policy. Policy (defined as the set of formal rules, laws, or regulations)[36] is conceptualized as the primary mechanism for bringing about essential environmental changes to combat obesity through the creation of opportunities and physical environments (both built and natural environments., e.g., playgrounds, green fields, facility design, etc.) supportive of HEPA,[37, 38] and thus serves as a primary prevention tool in the fight against chronic diseases linked to obesity.[39] This effort has resulted in the visible increase in the prevalence of policies and standards designed to influence settings that care for youth to be more supportive of HEPA.[31, 40, 41]

Afterschool Program's Role in Promoting Healthy Eating and Physical Activity Behaviors among Youth

For many years a large proportion of policy interventions promoting HEPA among school-aged children were mostly directed at childcare and school settings,[31, 42, 43] however, in recent years ASP's have been recognized as an important setting in which to

combat childhood obesity[44, 45] among school-age children. Consequently, a number of state and national organizations have developed supportive policies specifically for ASP's that (1) outline the minimal requirements for the amount of physical activity children should accumulate while attending afterschool programs; (2) specify the nutritional quality of foods and beverages to be served during snack time and; (3) describe the core competencies afterschool programs staff should exhibit as it pertains to promoting HEPA among children.[46, 47]

In the context of this work, ASP's afterschool programs are defined as "*community-based programs that take place in the time immediately after the regular school day; typically from 3-6 pm; can be located in school settings or in community organizations such as YMCA, Boys and Girls Club or faith organizations; available throughout the academic year (Monday-Friday); and provide a combination of scheduled activities which typically including snacks, homework, enrichment activity (e.g. art and crafts, music) and opportunities for children to be physically active".*[48] ASP's that provide single activity such as academics, dance or music lessons or solely sports activity, although they occur during after school hours, are not included in this definition. This definition is also consistent with the Afterschool Alliance, which define afterschool programs as *"... a program that a child regularly attends that provides supervised enriching environment in the hours after the school day ends. These programs are usually offered in schools or centers and are different from individual activities, such as sports, special lessons, or hobby clubs*.". (*www.naaweb.org*) [49,50]

Despite the fact that children attending afterschool programs can obtain as much as one-third of the recommended 60 minutes per day of MVPA,[47, 50, 51] and around 20%

(1 out of 5) of their daily intake of fresh/frozen fruits and vegetables in the form of snacks, the amount of activity children accumulate while at afterschool programs remains well below recommendations.[47, 52] Likewise, the nutritional value of the snacks served at the afterschool programs falls short of existing standards with the majority of the afterschool programs serving low-nutrient density items (i.e., chips, cookies, and sugar-sweetened beverages).[46, 53-55]

Measuring Policy and Practice Environment Characteristics in Afterschool Programs

Current literature suggests that providing a user-friendly policy and practice auditing tool would help organizations target areas in need of attention and foster more sustainable improvements through voluntary participation and self-initiated change.[56] If settings that children are exposed to throughout their childhood and adolescence are to play a major role in shaping their health behaviors towards more healthy lifestyles, as policies and standards would indicate,[31, 41, 46, 57] then the ability to characterize the "quality" of the HEPA environment of such settings is essential. Thus, the ability of audit tools used to provide accurate information regarding policy and practice environmental characteristics is crucial as information collected by such tools is not only used to direct future policy decisions but can also be used to evaluate the impact of policy interventions on health outcomes.

A vital step in helping the field move forward in understanding and quantifying the impact of HEPA supportive policies and practices on youth health behaviors is the development of quality audit tools that demonstrate validity, reliability, and

responsiveness to change.[58] ASP settings are no different to other settings in the lack of consistency in reporting measurement properties of newly developed audit tools. Currently limited numbers of validated audit tools that focus on assessing policy and practice environments in ASP's setting exist. For example: the Healthy Afterschool Activity and Nutrition Documentation (HAAND) instrument, the Out-of-School Nutrition and Physical Activity Observational Practice Assessment Tool (OSNAP-OPAT) and the Y's HEPA survey. The HAAND instrument is a tool designed to be used by both researchers and practitioners (i.e., program leaders) to assess the extent to which the afterschool programs align with current state and national HEPA policies and standards.[49] The other two tools are limited to assessing either specific intervention impact such the case for the OSNAP-OPAT [59]or specific organizational HEPA standards implementation as in the case of the Y's HEPA survey.[60] Worth noting is that although, audit tools are increasingly being used to measure policy intervention effectiveness (impact) on the HEPA behaviors of youth, they are rarely evaluated for their ability to detect changes in policy and practice environment. The lack of assessing such important measurement property must be addressed given that tools ability to detect change in policy and practice environment is critical if such audit tools are to be used as outcome measures.[61-63]

The Health Afterschool Activity and Nutrition Documentation (HAAND) instrument

The HAAND instrument was developed to specifically measure the HEPA environment of ASP's.[49] The HAAND consists of two sub-indices and their corresponding rating scales – the Healthy Afterschool Program Index for Physical

Activity and Nutrition (HAPI-PA and HAPI-N). Both of the HAPI-PA and HAPI-N indices consist of 7 domains (polices, training, child involvement, evaluation, curriculum, screen time or access to vending machines, scheduling of activity or quality of snack served). Items in the HAAND were aligned with existing recommendations, accreditations, and policies from the Council on Accreditation (www.castandards.org), the School-Age Care Environment Rating Scale (http://ers.fp.unc.edu/), the New York State Afterschool Network Program Quality Self-Assessment Tool (www.nysan.org) and recently endorsed physical activity and nutrition standards from the National Afterschool Association (Table 1.1).[41] The total score for each scale is presented as either a continuous measure (e.g., 0-25 or 0-34) or as an ordinal rating based on a star system. Items in the HAAND are given a score based on information collected via direct observation, brief interview with ASP's leader/site director and written documents reviewed during a day's visit to the afterschool programs.

The HAAND is a valid and reliable instrument designed to be used by both researchers and non-researcher.[49] Validity testing of the Healthy Afterschool Program Index for Physical Activity (HAPI-PA) was obtained by comparing HAPI-PA item scores (total 10 items) to pedometer-determined steps collected in a sub-sample of 934 children attending 25 afterschool programs. For the HAPI-Nutrition (HAPI-N), item scores (total 11) were compared against the mean number of times fruits and vegetables (FV), and whole grains were served in the program per week. The findings showed that inter-rater percent agreement ranged from 85% to 100% across all items in the HAAND instrument. For the HAPI-PA, increased pedometer steps were associated with the presence of a written policy, with higher scores in the amount and quality of staff training, the use of a

curriculum, and the offering activities that appeal to both boys and girls. The HAPI-N scores indicated that an increase in servings of FV and whole grains per week was associated with the presence of a written policy.

Conceptual Framework.

This dissertation is informed by the social ecological model,[64] which postulates that health behaviors are the product of dynamic interaction between individuals and their environment, holding both individual and environmental factors as equal contributors to obesity,[65-67] in addition to the large body of work on policy environment characteristics and behavior.[65, 68, 69] The key role of policy and practice audit tools is to gather data to inform the current and future HEPA policies and practices, however, historically, audit tools were most likely developed on an ad hoc basis necessitated by the need to evaluate the impact of policy adherence on health outcomes for a specific project and or population,[70] that is to say that policy development preceded the audit tool development. The framework (Figure 1.1) in this dissertation indicates that in the majority of cases audit tools are developed with the expectation that such tools will provide accurate data on HEPA policy adherence, which in turn further informs future decisions with minimal evaluation as to their measurement properties. In reality, audit tool development is a complex process that includes the establishment of elements such as psychometric properties, knowledge of intended users and intended purpose, all of which ultimately aid in the dissemination of tools. In order to advance knowledge in the HEPA policy field, high quality audit tools with acceptable validity, reliability and responsiveness to change are an absolute must if we are to establish a causal relationship between policy environment characteristics and behavior change. In the absence of quality audit tools,

the full impact of HEPA policies is unlikely to be determined, which in turn will hinder our ability to understand how and which of the specific policy level factors result in the desired HEPA habits.[58, 70]

The first study is a comprehensive review of environmental audit tools currently used to evaluate policy environment characteristics at various settings caring for youth (≤ 18 years). This study specifically examined measurement properties of tools in terms of the validity and reliability evidence. The validity and reliability of audit tools designed to evaluate policy environment characteristics is of critical importance as information gathered from such instruments is often used to inform policy makers regarding the impact/effectiveness of policy interventions on health outcomes and as guidance in implementation of future policies. Findings from this study provide both researchers and non-researchers (such as practitioners and site leaders) with valuable information regarding the measurement quality of currently available tools and in return help guide their choices for the most appropriate tools to evaluate their settings.

The second study examined the feasibility of training ASP's site leaders to use the HAAND tool accurately and effectively. This was determined through comparison of the HAAND scores awarded by an ASP site leader (non-researcher) with the HAAND scores awarded to the same ASP by the gold standard rater (researcher). In addition, this study compared in-person training method to distance training method in order to determine which training method resulted in the most accurate answers and subsequently the most cost-effective method of training delivery. The evaluation of this measurement property (criterion-reference validity) is of crucial importance and will insure the accuracy of the policy and practice environment characteristics evaluation conducted by ASP's site

leaders. This is essential since, in most cases, tools are developed by researchers for external evaluation and made available for non-researchers but rarely examined for accuracy when used by non-research users. This study therefore seeks to identify the most accurate and cost-effective training method when introducing the HAAND to ASPs staff by comparing the two methods of training (in-person and distance training). Identifying the training method that results in the most accurate use of the tool by program staff is of great importance prior to the nationwide dissemination of the tool as ASP's site leaders need to demonstrate accuracy when assessing whether or not their ASP's are meeting current policies and standards related to HEPA.

The third study evaluated the responsiveness of the HAAND tool to policy and practice environment characteristics change. Audit tools can be used in a number of ways: they can serve as means of collecting baseline data; as a method to evaluate policy intervention effectiveness (i.e., policy impact evaluation); and as a way to track changes in the environment over time.[71] For audit tools to be useful in informing decision makers about intervention effectiveness, they must demonstrate the ability to detect changes in the policy environment characteristics.[70, 71] However, in the majority of the cases, the tools are rarely evaluated for how well they capture changes in the policy environment characteristics. In the current climate of limited resources, the ability to detect policy changes and identifying effective policies in a timely and efficient manner becomes increasingly important for policy makers. Findings from this study establish the evidence regarding the responsiveness of the HAAND instrument to changes in the policy environment characteristics in the ASP's settings.

The fourth study examined the impact of the contextual characteristics (physical environment characteristics defined as amount of space available for physical activity and type of activity offered i.e., organized play vs. free play) and policy environment characteristics on the physical activity levels of children attending ASP's. In recent years, evidence supporting the role of the physical environment and policy environment characteristics on children's physical activity environment has emerged,[72, 73] yet, to date there have been there have only been a limited number of studies looking at the impact of policy and practice environment characteristics and no study assessing the role of available space on the physical activity of children attending afterschool programs.[18, 49, 74] ASP's take place in either school or community centers and often have to share facilities with other programs taking place during the same time period. However, the extent to which ASP's physical environment along with policy environment characteristics impact the physical activity level of children attending is unknown. Therefore this study provides evidence of the influence of such characteristics on children's activity levels in diverse ASP's.

This dissertation is unique in that it offers a number of important advances in scientific knowledge. This dissertation aimed to provide much needed evidence regarding the quality of audit tools currently in use to evaluate policy environment characteristics in settings that care for youth. This work also bridges the current gap in knowledge between policy environment characteristics and program contextual characteristics and the physical activity levels of youth in ASP's settings as well as provides evidence for the training non-researchers to become accurate users of newly developed environmental audit instrument (i.e., HAAND) consisting of two scales the Healthy Afterschool

Program Index for Physical Activity (HAPI-PA) and the Healthy Afterschool Program Index for Nutrition (HAPI-N) designed by our research team to evaluate policy environment in ASP's settings. Although the findings is in the context of ASP's, the implications are far reaching and expected to inform current practice when advocating for the dissemination of newly developed tools.

Table 1.1: Healthy Afterschool Activity and Nutrition Document (HAAND) domain/item alignment with existing standards.

Scale	Domain	Item	Source	Standard
HAPI-PA	Policy	Written Policies	Document review	OST 5, SACERS Healthy Safety, NYSAN 4, NYSAN 9, NAA Program Support
	Child Involvement	Feedback	Document Review/Self-report	ECCD 7, OST 5, NYSAN 7, NAA Social Support
	Screen time			NAA Program Support
	Schedule of PA	Time Allocated	Document review or Observation	OST 7, SACERS Program Structure, NAA Content and Quality
		Types of Activities	Document review or Observation	OST 5, NYSAN 5, NAA Content and Quality
		Equity	Document review or Observation	OST 5, OST 7, NAA Content and Quality
	Training for PA	Staff Training – Amount	Document review/ Self-report	ECCD 12, OST 3, OST 13, SACERS Staff Development, NYSAN 4, NAA Staff Training
		Staff Training – Quality	Document review/ Self-report	ECCD 12, OST 3, OST 13, SACERS Staff Development, NYSAN 4, NAA Staff Training
		Parent Workshop	Document review/ Self-report	ECCD 3, OST 9, NYSAN 8, NAA Social Support
	Curricula		Document review	
	Evaluation		Document review or Observation	NYSAN 10, NAA Program Support
HAPI-N	Policy	Written Policies	Document review	OST 5, SACERS Healthy Safety, NYSAN 4, NYSAN 9,NAA Program Support
	Child Involvement	Feedback	Document Review/Self-report	ECCD 7, OST 5, NYSAN 7, NAA Social Support
	Quality of Snacks	F&V	Document Review or Observation	USDA Reimbursement Guidelines, Harvard Prevention Center Guidelines, ECCD 12, OST 8, SACERS 18, NYSAN 1, NAA Content and Quality
		Sugar-Sweetened Beverages	Document Review or Observation	USDA Reimbursement Guidelines, Harvard Prevention Center Guidelines, ECCD 12, OST 8, SACERS 18, NYSAN 1, NAA Content and Quality
		Whole Grains	Document Review or Observation	USDA Reimbursement Guidelines, Harvard Prevention Center Guidelines, ECCD 12, OST 8, SACERS 18, NYSAN 1, NAA Content and Quality
	Access to		Document Review or Observation	Harvard Prevention Center Guidelines,

	vending Machines			NAA Environmental Support
	Training	Staff Training amount	Document review	ECCD 12, OST 3, OST 13, SACERS Staff Development, NYSAN 4. NAA Staff Training
		Staff Training quality	Document review	ECCD 12, OST 3, OST 13, SACERS Staff Development, NYSAN 4 , NAA Staff Training
		Parent Workshops	Document review	ECCD 3, OST 9, NYSAN 8, Social Support
	Curricula		Document review	NAA Nutrition Education Curriculum
	Evaluation		Document Review or Observation	NYSAN 10

Abbreviations: ECCD (www.coastandards.org)= Early Child Care and Development Services (Council on Accreditation); OST = Out-of-School Time Services; SACERS (http://ers.fpg.unc.edu/ = School-Age Care Environment Rating Scale; NYSAN (http://www.nysan.org/) = New York State Afterschool Network Program Quality Self-Assessment; NAA (www.niost.org) = National AfterSchool Assocaition

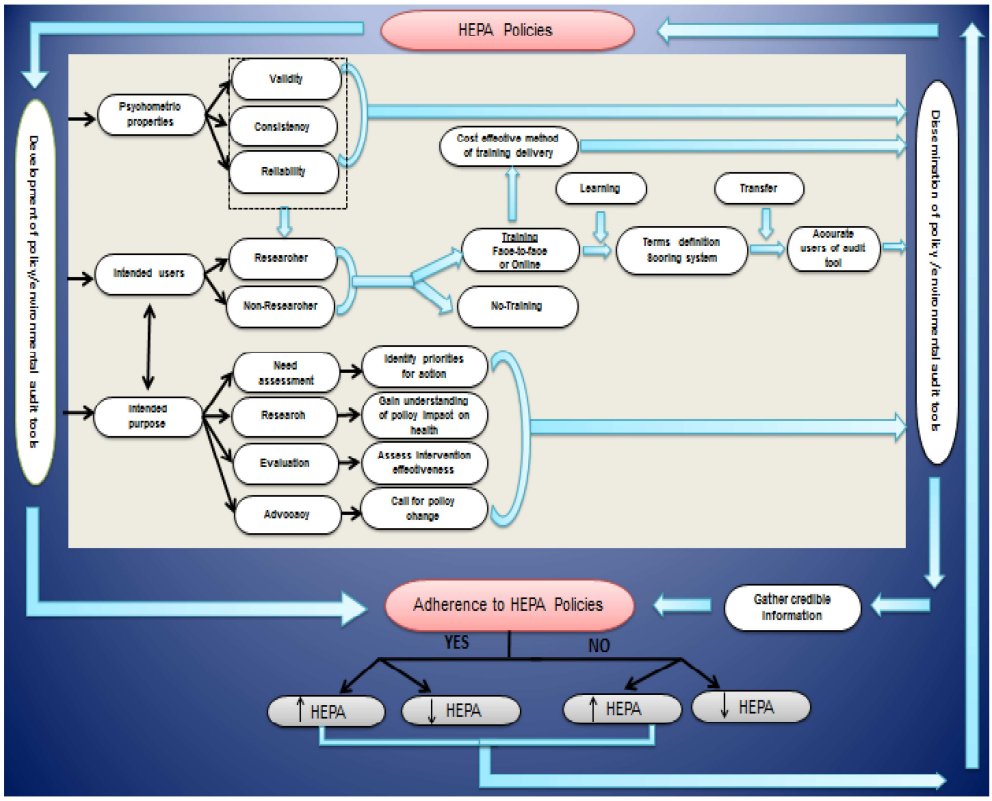

Figure 1.1: Conceptual framework illustrating the relationship between audit tools development and HEPA policies

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CHAPTER 2: PHYSICAL ACTIVITY AND HEALTHY EATING ENVIRONMENTAL AUDIT TOOLS IN YOUTH CARE SETTINGS- A SYSTEMATIC REVIEW [1]

[1] Ajja R, Beets MW, Chandler J, Kaczynski AT, Ward DS. Submitted to *Preventive medicine*, 10/6/2014

Abstract

Background. There is a growing interest in evaluating the physical activity (PA) and healthy eating (HE) environmental characteristics in settings frequented by youth (<18yrs).

Objective. This review evaluates the measurement properties of audit tools designed to assess PA and HE environmental characteristics in settings that care for youth (<18 yrs).

Method. Audit tools were identified by searching English language databases and national organizations' web pages. Two reviewers independently classified audit tools as meeting the following inclusion criteria: tools assessing PA and/or HE environmental characteristics in any setting caring for youth (<18yrs).

Results. Sixty-five audit tools were identified of which 53 individual tools met the inclusion criteria. Reliability and validity data were available for only 11 tools. Reliability coefficients (median) for individual items across tools were 0.62 (kappa), 0.88 (Intraclass Correlation Coefficient, ICC), 74.0% (percent agreement), 0.62 (Pearson correlation) and 0.73 (Cronbach's α). Validity coefficients (median) for individual items across tools were 0.35 (kappa), 0.98 (ICC), 0.22 (r) and 74.7% (percent agreement).

Conclusions. Limited attention has been given to establishing the reliability and validity of audit tools for settings that care for youth. Future efforts should be directed towards establishing a strong measurement foundation for these important environmental audit tools.

Context

From childhood to adolescence, youth are exposed to a variety of settings such as preschool, school, afterschool and summer camp. Nearly 60% of children age 3-5 years

attend some type of childcare center[1] and over 95% of youth age 5-17 years are enrolled in public/private school.[2] Additionally, over eight million school-age children are enrolled in afterschool programs[33] and over 14 million youth (<18 yrs) attend summer day camps annually.[4] Given the extended contact youth have with these settings, whether these environments support or hinder physical activity and healthy eating is of critical importance.

In recent decades there has been an increased recognition of the role that the obesogenic environment plays in the current childhood obesity epidemic.[5] One aspect of the environment that has gained considerable attention over the years are the environmental characteristics of these settings, which range from having physical activity and healthy eating policies, provision of professional training on physical activity and healthy eating promotion to staff, scheduling of physical activity, quality of physical activity and food served, to monitoring and evaluation processes on physical activity levels and healthy behaviors of youth.[6-9]

The presence of supportive physical activity and healthy eating environmental characteristics has been associated with a greater adoption of healthy behaviors.[10, 11] As a result, there has been a visible increase in the prevalence of policies and standards designed to influence settings that care for youth to be more supportive of physical activity and healthy eating.[2, 12, 13] Examples of these include "wellness" policies in school settings that dictate the amount and quality of daily physical education students must receive per week during the school year and/or the type of foods and beverages sold or served at schools.

In response, a wide array of audit tools designed to assess environmental characteristics have been developed. Audit tools come in a variety of forms, such as questionnaires, checklists, observation scales, and surveys. These tools are designed to capture information pertaining to the alignment or presence of physical activity and healthy eating environmental characteristics of a given setting with existing state or national policies, standards, or scientific position statements. [6, 8, 14, 15] The extent to which audit tools designed to assess environmental characteristics provide an accurate reflection of such settings and the validity of the data collected, however, remains unknown.

The accurate assessment of the environmental characteristics in settings that serve youth is important for many reasons. Foremost, reliable and valid data will aid researchers and decision makers to accurately evaluate the impact of environmental characteristics on child health outcomes. In addition, credible data will inform future policy decisions regarding the adoption or implementation of supportive physical activity and healthy eating environmental interventions.[16-19] To the authors' knowledge, no reviews have examined audit tools designed to assessing environmental characteristics used in a wide range of settings that care for youth. Therefore, the aim of this review is to identify and examine the quality of environmental audit tools currently in use at various settings caring for youth.

Evidence acquisition

Literature Search

A systematic literature search was conducted to identify tools assessing environmental characteristics related to physical activity and healthy eating in settings caring for youth (3-18 years old). Three electronic databases, PubMed, Web of Science,

and CINAHL, were searched for all relevant articles published between January 1980 and February 2014. Search strategies for the databases included the following key words: population (child, youth, adolescent); settings (preschool, childcare, homecare, school, afterschool, summer camp); apparatus (tool, kit, instrument, index, survey, questionnaire, checklist, audit); quality (assessment, development, validity, reliability); and area (environmental, policy, standards, benchmarking, physical activity and nutrition). In addition to database searches, reference lists of identified articles were screened in order to identify additional tools to include in the review.[8, 14, 15, 20-27]

Tools were also sourced from the following national health organizations' web pages: National Cancer Institute, Active Living Research, Robert Wood Johnson Foundation, Center for Diseases Control and Prevention (CDC), Yale Rudd Center for Food Policy and Obesity, National Association of School Nurses, USDA's "Changing the Scene" and National Association of State Boards of Education (NASBE). The following keyword combinations were used when conducting an electronic search of national education departments and health organization web pages: wellness, policies, tool (kit), audit, assessment, resources, measurements, school (pre-, after-), summer camp, and home childcare.

Eligibility Criteria

Tools were included in the review if they met the following inclusion criteria: (1) the tool as a whole or sections of the tool assessed physical activity and/or healthy eating environmental characteristics (e.g. written policies, provision of professional training on physical activity and /or healthy eating promotion and the credentials of staff delivering the training, scheduling of physical activity and/or snack/meals, quality of physical

activity and food served, monitoring and evaluation processes), (2) the setting assessed included one or more of the following: preschool, school, afterschool, summer camp, homecare, (3) the tool could be used by researchers and/or non-research affiliated staff in the field, (4) it was an English language publication, and (5) an electronic link for the tool was available. Two independent reviewers (RA and JC) screened and selected the audit tools included in the review based on the above inclusion criteria. Tools were excluded from this review if they (1) only assessed the physical environment (e.g., facilities, room space, playground features, green field, etc.), (2) were designed to evaluate strategies for meeting national/state policy recommendations, or (3) were a non-English publication. For the purpose of this review, we only included articles reporting psychometric properties as part of the tool development/testing procedure.

Selection of Tools

The electronic search strategies were executed by two independent researchers (RA and JC). Disagreements were discussed and resolved, and, if required, a third reviewer (MWB) was consulted. A copy of the latest version of the tools included in the review was retrieved, and when available, the full text papers of abstracts that reported on tools measurement properties that fulfilled the inclusion criteria were also retrieved.

Description of Tools

The following information was extracted from the tools included in this review: (i) name of the tool, (ii) developer; (iii) the purpose of the tool development; (iv) setting; (v) intended users; (vi) data collection method; (vii); time frame needed to complete the tool; (viii) number of items in the tool; and (ix) domains (e.g. policy, child feedback, time allocated for physical activity, type of activity, staff professional training, screen

time, time allocated for snack/meals, meal quality, evaluation, etc.,) assessed by the tool. In addition, when psychometric (i.e. reliability and/or validity) information of the tool was available, the following information was extracted: (i) type of validity and or/reliability evaluated; (ii) time frame for reliability testing (test-retest); (iii) type of analysis used; (iv) validity comparison, and (v) reliability and validity findings.

Evidence synthesis

Description of Tools

A total of 123 tools were identified from the initial search of the three databases, review of references from these articles, and from a search of national health organizations/agencies' web pages. After excluding duplicates, 65 tools were retained, of which 53 tools were included in this review based on the inclusion/exclusion criteria (Figure 2.1).

Table 2.1 presents summaries of the audit tools included in this review. Environmental characteristics were evaluated solely in 34 tools[28-61] compared to 19 tools[27, 62-79] which assessed both environmental characteristics and the physical characteristics. Physical activity and healthy eating domains were assessed in 33 tools[27-29, 31-33, 35, 39-42, 44, 47-49, 51, 55-57, 59, 62, 64, 65, 68, 70, 71, 74, 75, 78-81] compared to six tools[36, 52, 66, 67, 73, 7736, 52, 66, 67, 73, 77] that assessed only physical activity and 14 tools that assessed only healthy eating.[30, 34, 37, 38, 43, 46, 50, 53, 54, 58, 60, 69, 76, 82]

School was the setting with the most tools assessing physical activity and/or healthy eating environments (n= 33)[27, 41-60, 70-72, 78-85] followed by childcare settings (n= 12).[29, 51-54, 57-59, 70, 78, 80, 81] There were 4 tools evaluating afterschool settings[40, 41, 49, 55,] and 4 tools evaluating community settings with sections dedicated to evaluating childcare, school,

and/or the afterschool setting.[43, 48, 71, 79] Forty out of the 53 tools[30-34, 38, 40-48, 50, 52-55, 57-60, 62, 64-68, 70, 71, 73-79, 81, 83] were categorized as self-assessment tools designed to be used by staff/community members, 12 tools[27-29, 39, 51, 56, 69, 82, 84, 35-37] were designed to be completed by researchers/public health practitioners for research purposes or for assessments within specific projects, and a single tool was intended to be used by both researchers and staff members.[49]

The majority of the tools assessing physical activity focused on items such as written policies (n=31) and time allocation (n=31). A considerable number of tools included items such as activity types (n=26), staff training (n=20), curriculum (n=19), staff behavior (n=16), staff credentials (n=16), and screen time (n=14). Fewer tools included items such as evaluation and monitoring process (n=10), parent workshop (n=8), child involvement (n=5,) and barriers and support (n=4). When healthy eating was evaluated, the majority of tools focused on written policies (n=40) and menu quality (n=30). The majority of tools included staff training (n=26), behavior (n=19), access to water (n=21), access to vending machines (n=18), curriculum (n=18), food safety (n=12) and child involvement (n=12). Fewer tools included meals/snack schedules (n=10), parent workshops (n=10), evaluation (n=10), staff credentials (n=9), and barriers and support (n=2).

Reliability

Inter-rater reliability (Table 2.2) was the most commonly tested type of reliability (n=7)[14, 21-23, 25, 89, 90] followed by test-retest (n=3),[15, 85, 86] and internal consistency (n=1).[25] For reliability assessment, studies reported Pearson correlation, Cronbach's α, kappa coefficient, percent agreement and/or interclass correlation coefficient (ICC) scores. For

reliability, the median (range) item scores of tools were as follows: 0.62 (0.07-1.00) (Kappa), 71% (34% -100%) (Percent agreement), 0.88 (0.72 -0.99) (ICC), 0.62 (0.26-0.96) (Pearson correlation, *r)* and 0.73 (0.53-0.93) (Cronbach's α), respectively. The highest reliability coefficients were reported for the Wellness Child Care Assessment Tool (WellCCAT, ICC ranged from 0.84-0.99)[25], the Food and Beverage Environment Analysis and Monitoring System (FoodBEAM, ICC ranged from 0.97-0.99),[26] the Community Healthy Living Index (CHLI, percent agreement ranged from 84%-93)[23] and the Healthy Afterschool Activity and Nutrition Documentation (HAAND, percent agreement ranged from 85%-100% and kappa coefficients ranging from 0.73-1.00).[14]

Validity

Construct validity (Table 2.2) was the most reported type of validity (n=5),[6, 14, 25, 27, 87] followed by face and/or content validity (n=3),[14, 21, 86] criterion validity (n=3)[8, 15, 21]and convergent validity (n=1).[88] Construct validity comparisons were made against national expert review,[21], comparison to environmental characteristic quality scores among sites[25] using a known-groups design, and objective measures of child-level physical activity such as pedometers[14] and direct observation.[6, 27] For validity assessment, studies reported Pearson correlation coefficient (*r*), weighted kappa coefficient, percent agreement, means and standard deviation, multi-level modeling and one-way ANOVA. Median (range) item scores were as follows: 0.35 (-0.06-1.00) (kappa), 74.7% (0-100%) (percent agreement), 0.98 (0.98-0.98) (ICC) and 0.22 (-0.91-0.79) (Pearson correlation coefficient, *r*) respectively. In cases where multi-level modeling and one-way ANOVA were reported, items scores showed significant associations in the expected direction when compared to known group scores or data from objective measures such as

pedometer step counts. The audit tools with the highest reported validity coefficients were the WellCCAT (significant association between items scores and known group with centers known to have supportive environmental characteristics scoring higher than centers with less supportive environments),[25] the Child Care Nutrition and Physical Activity Assessment Survey (62% of the items reported ≥ 80% agreement between item scores and criterion measures such as in-person interviews, direct observations, and a newly-developed tool to assess menu items),[8] and the HAAND (reporting significant positive associations between item scores and pedometer step counts).[14]

Discussion

The purpose of this review was to examine the measurement properties of audit tools currently used to evaluate environmental characteristics at various settings caring for youth (<18 years). Fifty-three tools evaluating the physical activity and healthy eating environmental characteristics in a variety of youth care settings were included in this review. The findings from this review indicate that although a considerable number of tools have been developed over the past decade, relatively little work has been devoted to establishing their reliability and/or validity, with only 11 out of 53 tools reporting information on a tools measurement properties.

This review highlights several key issues regarding the utility and the quality of the data collected by the audit tools identified. Several tools (n=7) were developed to assess a specific project or environmental interventions[35-37, 87, 93]or to evaluate the validity of another pre-existing audit tool.[84] For example, the Policy Assessment Tool, the 2-minute Program Assessment and the Program Assessment Tools are all tools developed to assess the Out of School Nutrition and Physical Activity (OSNAP) intervention in the

afterschool setting.[89] Another example is the Principals Survey Tool[82] which was developed as part of evaluating the Teens Eating for Energy and Nutrition at School (TEENS) intervention. As a result, the generalizability of such tools is limited to the projects/interventions they were developed to evaluate and may therefore not provide accurate reflection of practice when used to assess alignment with national and state level physical activity and healthy eating environmental characteristic recommendations.

Psychometric properties

Reliability

In the context of audit tools assessing physical activity and/or healthy eating environmental characteristics, reliability refers to the ability of the tools to consistently capture the same information with repeated use and/or when used by two or more users.[90] Inter-rater reliability was the most reported type of reliability. Assessing tool test-retest and internal consistency reliability is an essential step in establishing measurement properties in the early stages of audit tool development. This is especially important to establish in self-assessment tools, as it provides critical information about the stability of the item scores on multiple administrations (test-retest reliability) and the extent to which items in the tools all measure the same underlying construct (internal consistency reliability).[91] However, for observational audit tools, inter-rater reliability is most critical as it will confirm that individuals using the tools observe the same items. For instance, do multiple evaluators assign similar scores to items with respect to the presence or absence of environmental characteristics? An example might be "does the school have a written policy banning cafeteria from serving sugar–sweetened beverages?".

For continuous data, the intraclass correlation coefficient (ICC) is recognized as the most preferred analysis, whereas for ordinal/categorical data, the recommended analysis is kappa statistics.[92, 93] An ICC and kappa coefficient of ≥ 0.7 is considered an acceptable reliability coefficient[94, 95] while use of Pearson correlation coefficient (*r*) when assessing test-retest reliability is not recommended as correlations are considered a measure of association not agreement.[96] In this review, only a single study reported using a Pearson correlation coefficient (*r*) to evaluate test-retest reliability[15] Overall, there are large variations in the reported reliability coefficients, with reliability coefficient values ranging from poor agreement (i.e. ≤ 0.2) to almost perfect (0.8 to 1.00) for kappa while many of the items across the tools reviewed failed to reach the acceptable level for reported reliability (i.e. Kappa above 0.70).

This review found that although the majority of the tools assessing the physical activity and/or healthy eating environmental characteristics were designed to be used by staff/community members (i.e., self-assessment tools), only two studies[23, 88] evaluated inter-rater reliability of the tool when used by different groups (i.e. among non-research affiliated staff/community members and/or when compared to research staff). The first study was conducted by Kim et al[23] to evaluate the reliability of the CHLI tool. They reported that the items in the audit tool showed substantial to almost perfect agreement between staff/community members. The second study was done by Bullock et al.,[26] to evaluate researcher–to-researcher and researcher-to-non-researcher inter-reliability of the FoodBEAMS tool. In this study, they reported perfect agreement between researchers as well as between researchers and non-researcher staff. The ability of the staff/community members to rate the environmental characteristics as accurately as researchers is an

essential step in tool development for several reasons. Audit tools designed to evaluate the environmental characteristics are often definition-dense, with terminology that does not easily lend itself to use by community members. In addition, one cannot assume that establishing inter-rater reliability across researchers will necessary translate to inter-rater reliability when used by staff/community members. Therefore, more research is needed to evaluate the ability of newly developed tools to yield accurate data when used by intended audiences (i.e., staff/community members).

Validity

Validity refers to the ability of the tools to accurately measure what they were designed or intended to measure.[90] Establishing all types of validity (e.g., content, face, criterion, and construct) is an essential step in new tool development.[97] Construct validity is particularly important as it provides important details as to whether or not a tool actually measures the construct it intends to measure. An important question is "do the items in the tool consistently follow a predicted pattern or theory?". [97, 98] An example of this type of validity would be settings which score higher in physical activity-promoting policies having a higher participant physical activity levels when an objective measurement is used, such as accelerometers/pedometer.

The use of Pearson correlation coefficient (r), ICC, percent agreement, scatter plots of interest differences versus means (i.e., visual inspection), and one-way ANOVA are considered acceptable analyses for reporting on validity of continuous measures.[98] For ordinal continuous data, the use of Spearman rank correlation coefficient (r_s) is recommended and for categorical (ordered) data, weighted kappa statistics are often recommended.[99] When a tool's validity coefficients were reported, there were wide

variations in the reported values across tool items, with many of the studies reporting that tools demonstrate good to acceptable validity coefficients, despite the fact that multiple items within those tools fail to reach acceptable coefficient values. Overall this review found that the majority of the studies evaluating measurement properties used appropriate terminology when reporting on the type of validity evaluated. However, a single study[8] reported criterion validity using follow-up interview with site director who completed the original assessment as a criterion comparision to evalate policy and practice items of the tool. Accurate use of terminology is of critical importance as such misclassification of the type of measurement evaluated will imapct the quality of the data collected.

In this review, apart from the study by Lounsbery et al.,[86] which only reported on content validity for the S-PAPA tool, all the other studies examined additional validity types such as construct or criterion validity to establish stronger measurement proprieties of the newly developed tools. When validity was tested, construct validity was the most often reported validity type, which is an essential measurement property to establish if audit tools are expected to be used to evaluate the environmental characteristics in relation to health outcomes.[100]

These elements, reliability and validity, are fundamental measurement properties necessary for the collection of quality information on environmental characteristics of settings that serve youth. This review shows the lack of consistency when reporting on measurement properties of such tools, with 7 studies out of 11 reporting both validity and reliability properties of environmental characteristics audit tools, and 4 studies reporting on either validity or reliability properties of such tools. For example, Kim et al.,[23] and Schwartz et al.,[22] reported only the reliability of the CHLI and the WellSAT tools,

respectively. Henderson et al.,[8] reported on only the validity of their newly developed tool.

Validity testing of newly developed tools is an important first step in establishing the measurement quality of newly developed tools prior to establishing tool reliability. However, this review indicates that, when measurement properties were tested, the focus was more on reliability testing than validity testing, with reliability reported more often than validity when assessing newly developed instruments, which is in line with current literature findings[101] Future studies, should address the cause for this apparent lack of validity reporting in the field.

Limitation

Despite great efforts to identify current environmental audit tools used in youth care setting; the authors understand that some tools could have been overlooked. In addition, as indicated by this review many of the tools were developed for specific projects never intended for publication making their identification harder.

Recommendations regarding future audit tool development

Audit tools designed to evaluate the environmental characteristics of settings that care for children must demonstrate minimal acceptable levels of reliability and validity evidence. This is critical as information gathered from such tools is being used to inform policy makers' decisions regarding the impact or effectiveness of environmental characteristics interventions and to, in turn, formulate future strategies regarding the promotion of physical activity and healthy eating habits among youth. Saelens et al.,[90] put forward a set of guidelines for reporting on newly developed instruments. These

guidelines include: (1) the rationale and justification for developing the tool and how it differs from existing tools, (2) the construct measured by the tool, (3) reliability and validity of the tool, (4) detailed protocols on how to use the tool, (5) scoring and scaling of the tool, (6) modifications made to the tool, (7) the setting, geographical area, and population or environments where the tool was used, and (8) ways to access the tool.

In the future, when developing new audit tools to assess the environmental characteristics, we recommend that the guidelines put forward by Saelens et al.,[90] be followed when evaluating new audit tools designed to measure environmental characteristics. In addition, we propose that when developing such audit tools, 1) greater efforts must be put towards evaluating inter-rater reliability between researchers and intended users of the tool (e.g., staff/community members, researchers); 2) establishment of construct validity should be given a high priority; and 3) reliability and validity coefficient scores across items of newly developed tools should be reported.

Conclusion

Little attention has been given to establishing reliability and validity evidence of newly developed tools designed to assess physical activity and/or healthy eating environmental characteristics in settings caring for youth. Future efforts should be directed towards establishing a strong measurement foundation for these important environmental audit tools in order to maximize understanding of the health-promoting potential of these critical developmental settings.

Table 2.1: Description of Environmental Audit Tools assessing Healthy Eating and Physical Activity

Tool Name	Setting	Developer	Purpose	User	
				Staff/community member (Self-assessment)	Researcher
Child Care Nutrition and Physical Activity Assessment Survey	Childcare	Rudd Center for Food Policy and Obesity, Yale University.	To evaluate nutrition and physical activity environment of child care centers.	•	
Child Care Nutrition and Physical Activity Policies- Communication & Promotion	Childcare	Connecticut State Department of Education.	To assess communication level and health promotion strategies of childcare centers in the state of Connecticut.	•	
Child Care Nutrition and Physical Activity Policies- Eating Environment	Childcare	Connecticut State Department of Education.	To assess nutrition standards of childcare centers in the state of Connecticut.	•	
Child Care Nutrition and Physical Activity Policies- Evaluation	Childcare	Connecticut State Department of Education.	To assess evaluation policies of childcare centers in the state of Connecticut.	•	
Child Care Nutrition and Physical Activity Policies- Nutrition Education	Childcare	Connecticut State Department of Education.	To assess nutrition education of childcare centers in the state of Connecticut.	•	
Child Care Nutrition and Physical Activity Policies- Nutrition Standard	Childcare	Connecticut State Department of Education.	To assess nutrition standards of childcare centers in the state of Connecticut.	•	
Child Care Nutrition and Physical Activity Policies- Physical Activity	Childcare	Connecticut State Department of Education.	To assess nutrition standards of childcare centers in the state of Connecticut.	•	
Childcare director interview	Childcare	Rudd Center for Food Policy and Obesity, Yale University.	To assess nutrition and physical activity environment at childcare settings.		•
Environment and Policy Assessment and Observation (EPAO)	Childcare	Ward et al., (2008): Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill.	To evaluate the Nutrition and Physical Activity Self-Assessment for Child Care Program (NAP SACC).		•
Nutrition and Physical Activity Self-Assessment for Child Care Program (NAP SACC)	Childcare	Ward D, et al., (2004): Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC), Center for Health Promotion and Disease Prevention and Department of Nutrition, University of North Carolina at Chapel Hill	Developed for the Nutrition and Physical Activity Self-Assessment for Child Care Program (NAP SACC) intervention.	•	

Study of Healthy Activity and Eating Practices and Environments in Head Start (SHAPES) Self-assessment Survey	Childcare	Whitaker, et al (2009). Department of Public Health and Pediatrics, Center for Obesity Research and Education, Temple University.	To evaluate nutrition and physical activity environments in childcare setting.	•	
Wellness Child Care Assessment Tool (WellCCAT)	Childcare	Falbe (2011). Rudd Center for Food Policy and Obesity, Yale University.	To assess written health-related polices (nutrition and physical activity and wellness polices).		•
Abbreviated Wellness School Assessment Tool (WellSAT)	School	Robert Wood Johnson Foundation Healthy Eating Research Program, Working Group 1 (2008).	To evaluate the quality of existing school district wellness policies.		•
Competitive Foods and Beverages Toolkit	School	Alliance for Healthier Generation.	To help schools with their wellness polices.	•	
Food and Beverage Environment Analysis and Monitoring System (FoodBEAM)	School	Samuels & Associates (2011).	Developed to capture the following: Venues where competitive foods and beverages are sold. Types of foods and beverages sold. Compliance of foods and beverages with the California school nutrition standards for competitive foods.		•
Food and Fitness School Health Policies and Practices Questionnaire	School	Turner (2012) for Bridging the Gap Research Program.	Developed as part of a study to assess school health policy and programs.	•	
Gold Medal Rating Scale – Elementary School	School	Massachusetts Action for Healthy Kids supported by the MetroWest Community Health Care Foundation.	Developed as part of Action for Healthy Kids initiative for schools to assess their local wellness policies.	•	
Gold Medal Rating Scale – Middle & High School	School	Massachusetts Action for Healthy Kids supported by the MetroWest Community Health Care Foundation	Developed as part of Action for Healthy Kids initiative for schools to assess their local wellness policies.	•	
Illinois Needs Assessment & Evaluation Tool	School	Illinois State Board of Education.	Developed to evaluate the local wellness polices in Illinois.	•	
Local Wellness Policy	School	National Team Nutrition Office for the Colorado Healthy Schools Summit (2006).	Developed to assess local wellness programs.	•	
Michigan's Healthy School Action Tools (HSAT)- Nutrition service	School		Developed for schools create healthier environments initiative	•	
Michigan's Healthy School Action Tools (HSAT)- Physical education and other physical activity opportunities	School		Developed for Michigan schools to create healthier environments initiative.	•	

Michigan's Healthy School Action Tools (HSAT)- School Health & Safety Policies	School		Developed for Michigan schools to create healthier environments initiative.	•	
Mississippi School Nutrition and Physical Activity Environment Assessment	School	Mississippi Department of Education.	Developed for Mississippi schools to evaluate their health and wellness environment.	•	
Neumark-Sztainer Food Policies and Practices questionnaire	School	Developed by the Minnesota Association of Secondary School Principals and the University of Minnesota, Division of Epidemiology.	To assess high school food policy and environment.	•	
New Hampshire School Wellness Policy Assessment Form	School	New Hampshire Department of Education Local.	Developed to evaluate the complete school environment.	•	
Policy and Systems Toolkit	School	Alliance for Healthier Generation.	To help schools with their wellness polices.	•	
Principals Survey	School	Lytle et al (2006). Division of Epidemiology, University of Minnesota.	Developed as part of the TEENS intervention.		•
Rhode Island Nutrition & PA survey	School	Rhode Island Healthy Schools Coalition.	Developed for Rhode Island schools to assess their school environment with respect to nutrition and physical activity.	•	
Rhode Island Needs Assessment Tool (RINAT)	School	Pearlman (2005), Rhode Island Department of Health.	Developed as part of needs assessment and intervention project in Rhode Island schools.		•
School Environment Assessment Tool (SEAT)	School	Nathan et al., (2013). Hunter New England Population Health and School of Medicine and Public Health, The University of Newcastle, Australia.	Developed to assess quality of school food and physical activity environment.		•
School food policies and practices: a state-wide survey of secondary school principals	School	French 2002. University of Minnesota, Division of Epidemiology.	To evaluate food related policies and practices in secondary schools in Minnesota.	•	
School Health Index (SHI) (2012) - Elementary School	School	Centers for Disease Control and Prevention.	Developed for schools to assess health and safety policy and for planning.	•	
School Health Index (SHI) (2012) - Middle/High school	School	Centers for Disease Control and Prevention.	Developed for schools to assess health and safety policy and for planning.	•	
School Health Policies and Practices Study (SHPPS 2006) questionnaire- Nutrition	School	Centers for Disease Control and Prevention.	Developed for the School Health Policies and Practices study.		•

School Health Policies and Practices Study (SHPPS 2006) questionnaires- Physical Education and Activity	School	Centers for Disease Control and Prevention.	Developed for the School Health Policies and Practices study.		•
School Health Policies and Practices Study (SHPPS 2006) questionnaires- School Policy & Environment	School	Centers for Disease Control and Prevention.	Developed for the School Health Policies and Practices study.		•
School Meals Program Toolkit	School	Alliance for Healthier Generation.	To help schools with their wellness polices.	•	
School Nutrition by Design	School	California Department of Education Nutrition Services Division (2006).	Developed as part of the recommendation of State Superintendent Advisory Committee on Nutrition Implementation Strategies.	•	
School Physical Activity Policy Assessment	School	Lounsbery (2011).	Developed to assesses physical activity policy at the district & school level.	•	
Student Wellness Toolkit – Elementary school	School	Alliance for Healthier Generation.	To help schools with their wellness polices.	•	
Student Wellness Toolkit – High School	School	Alliance for Healthier Generation.	To help schools with their wellness polices.	•	
Student Wellness Toolkit – Middle School	School	Alliance for Healthier Generation.	To help schools with their wellness polices.	•	
Survey of school vending machines	School	Johanson and Wootan. (2003). Center for Science in the Public Interest (CSPI).	Developed as part of the CSPI nutrition policy project to evaluate the nutrition quality of food in school vending machines.	•	
Wellness School Assessment Tool (WellSAT-96)	School	Robert Wood Johnson Foundation Healthy Eating Research Program, Working Group 1 (2008).	To provide a standard method for assessing school district wellness policies.		•
Community Healthy Living Index (CHLI)	Community	Y-USA collaborated with Stanford, Harvard, and St. Louis Universities (2008).	To examine environmental and social supports for healthy eating and active living.	•	
Healthy Community Checklist	Community	Michigan Healthy Communities Collaborative.	To assess community's health environment with regard to promoting and supporting: Physical Activity. Healthy Eating & Healthy Weight. Smoke-Free Environments & Tobacco-Free Lifestyles.	•	
Nutrition Environment Assessment Tool (NEAT) – section 3 (school)	Community	Michigan Healthy Community Collaboration.	Developed to help communities assess how supportive their environment is to healthy eating.	•	

The Environmental Nutrition and Physical Activity Community Tool (ENACT)	Community	Strategic Alliance (California).	Developed to help community assess current policy status and develop an action plan.	●	
2 Minute Program Assessment	Afterschool	Harvard School of Public Health Prevention Research Center as part of the Out of School Nutrition and Physical Activity (OSNAP) Initiative.	To assess how closely program adheres to the OSNAP nutrition and physical activity environmental standards.	●	
Healthy Afterschool Activity and Nutrition Documentation Instrument (HAAND)	Afterschool	Ajja et al (2010). Arnold School of Public Health, University of South Carolina, Columbia.	To assess the extent to which the afterschool environment meets current physical activity and nutrition policies.	●	●
Policy assessment tool	Afterschool	Harvard School of Public Health Prevention Research Center as part of the Out of School Nutrition and Physical Activity (OSNAP) Initiative.	To identify existing nutrition, physical activity and screen time polices.	●	
Program self-assessment observation tool	Afterschool	Harvard School of Public Health Prevention Research Center as part of the Out of School Nutrition and Physical Activity (OSNAP) Initiative.	To assess the nutrition and physical activity of program during the OSNAP intervention.	●	

Table 2.1: Extended

Data collection method				Time frame	No. of items	Domain of physical activity environment covered		Domain of nutrition environment covered		Note
Observation	Document review	Interview	Self-report			Environmental (Policy/ practice) characteristics	Physical characteristics	Environmental (Policy/ practice) characteristics	Physical characteristics	
●	●			1 day site visit	43	Policy, activity types , screen time, staff behavior, training barriers and support	Equipment, space	Policy, menu quality, meal schedule, food safety, staff behavior, training, curriculum, access (water)		Close-ended questions with appropriate responses as follows: - Choose one response category from several possible answers.
	●			Not reported	12	Policy, staff behavior		Policy, staff behavi advertising		Close-ended questions with appropriate responses as follows: - Full/Partial/None/NA
	●			Not reported	31			Policy, meal schedule, food safety, staff behavior, training		Close-ended questions with appropriate responses as follows: - Full/Partial/None/NA
	●			Not reported	6	Policy, evaluation		Policy, evaluation		Close-ended questions with appropriate responses as follows: Full/Partial/None/NA
	●			Not reported	17			Policy, staff behavior, curriculum, advertising		Close-ended questions with appropriate responses as follows: - Full/Partial/None/NA
	●			Not reported	51			Policy, menu quality, meal schedule, food safety, access (water, vending machines), fundraising		Close-ended question with appropriate responses as follows: - Full/Partial/None/NA.
	●			Not reported	45	Policy, amount of time allocated, activity types , screen time, staff	Equipment, space, safety			Close-ended questions with appropriate responses as follows: - Full/Partial/None/NA

					behavior, curriculum				
		●	Not reported	73	Policy, amount of time allocated, screen time, staff behavior, training barriers and support		Policy, staff behavior/modeling and training, nutrition curriculum, barriers and support, fundraising		Close-ended questions with appropriate responses as follows: - Yes/No - Choose one response category from several possible answers.
●	●		1 full day visit	192	Policy, amount of time allocated, activity types, screen time, staff behavior and training, curriculum	Space, equipment, safety	Policy, menu quality, meal schedule, staff behavior/modeling, training, nutrition curriculum, access (water, vending machines), fundraising	Vending machine location	Close-ended questions with appropriate responses as follow: - yes/no - Choose one response category from several arranged in hierarchical order.
●	●		1 full day visit	56	Policy, amount of time allocated, activity types, screen time, staff behavior, training	Equipment, space	Policy, menu quality, meal schedule, staff behavior, training, access (water/vending machines), fundraising		Close-ended questions. - Each question has 4 possible response options ranging from minimum standard to best practice).
		●	30 min	90	Policy, amount of time allocated, screen time, curriculum	Space, equipment	Policy, menu quality, staff behavior/modeling, curriculum, fundraising		Close-ended questions with appropriate responses as follows: - Yes/No
	●		N/A	64	Policy, amount of time allocated, activity types, screen time, staff behavior, training, curriculum, evaluation	Safety, space	Policy, menu quality, meal schedule, staff behavior , training, access (water), curriculum, evaluation, fundraising		Close-ended questions with 4 possible response options ranging from: - 0, 1, 2, NA.
	●		45 min	50	Policy, amount of time allocated, activity types, , staff behavior, training and	Equipment	Policy, child involvement, menu quality, meal schedule,		School policy statement are rated “0” “1” or “2” rating “3” “4” only apply to specific section 3

				credentials, curriculum, evaluation,		staff behavior, training and credentials, food safety, access (water, vending machines), curriculum, advertising, fundraising,	
	●	Not reported	8			Policy, access (vending machines).	Uses best practice framework of criteria at the bronze, silver and gold levels as a way of scoring the program policy.
●		Varies based on school size and number, location where food is sold	N/A			Policy, menu quality, access (vending machines), advertising, fundraising.	Online assessment tool. Data collector enters the information guided by the software that matches the information items with nutrient profile which is housed in the nutrient database in imbedded in the software. Software has a drop-down menu as well as the ability to add new items not in the database.
	●	Not reported	100	Policy, amount of time allocated, activity types, staff credentials, curriculum, barriers and support.	Equipment	Policy, menu quality, meal schedule, access (vending machines), curriculum, fundraising.	Combination of close- and open-ended questions: Close-ended questions: possible responses - Yes/ No - Choose one response category from several possible answers Likert scale
	●	Not reported	29	Policy, amount of time allocated, activity types, staff behavior, training.	Safety		Close-ended questions with possible responses. Choose one response category from several arranged in hierarchical order.
	●	Not reported	33	Policy, amount of time allocated, staff behavior, training, curriculum.	Safety		Close-ended questions with possible responses. Choose one response category from several

								arranged in hierarchical order.
	●	Not reported	49	Policy, amount of time allocated, staff behavior training.	Safety	Policy, child involvement, menu quality, meal schedule, food safety, staff behavior, training, advertising.	Food facility	Close-ended questions with possible responses as follows: - OK/Need For Improvement
	●	Not reported	40	Amount of time allocated, staff behavior and credentials, curriculum.	Space	Menu quality, meal schedule, food facility, staff behavior, training, access (water), fundraising.	Food facility	Close-ended questions with possible responses as follows: - fully implemented - partially implemented - still in planning - not applicable - Don't know
	●	2 to 7 hours	51			Policy, menu quality, meal schedule, staff behavior , training and credentials, fundraising.		Combination of open ended and close ended questions with possible reposes ranging from: - Yes/No Choose the most appropriate statement
	●	2 to 7 hours	92	Policy, amount of time allocated, activity types, staff behavior, training and credentials, curriculum.	Equipment			Combination of open-ended and close-ended questions with possible responses ranging from: - Yes/No. Choose the most appropriate statement.
	●	2 to 7 hours	353	Child involvement, amount of time allocated, activity types, staff behavior, training, evaluation.	Equipment, space, safety	Policy, child involvement, menu quality, meal schedule, food safety, staff behavior, training, access (water, vending machine), evaluation, food safety, advertising, fundraising.	Food facility	Combination of open-ended and close-ended questions with possible responses ranging from: - Yes/No. Choose the most appropriate statement.
	●	Not reported	57	Amount of time allocated, screen time, curriculum.	Equipment	Policy, child involvement, menu quality,		Close-ended questions: Choose one response category from several

						meal schedule, food safety, food facility, staff training, access (water, vending machines), curriculum, advertising	arranged in hierarchical order.
	●	Not reported	36			Policy, access (vending machines).	Close-ended questions possible responses: - Yes/No - Likert scale. - Choose one response category from several arranged in hierarchical order.
	●	Not reported	50	Policy, type, staff behavior, training, credentials, evaluation		Policy, nutrition curriculum, staff behavior, , training, meal schedule, evaluation, fundraising.	Close-ended questions with - Yes /No response Points reported as numeric scores and percentages
	●	Not reported	8	Policy, child involvement.		Policy, menu quality, food facility, staff behavior, training.	Uses best practice framework of criteria at the bronze, silver and gold levels as a way of scoring the program policy.
●		Not reposted	22			Policy, menu quality, staff training, advertising	Combination of open-ended and close- ended questions: - Close-ended questions possible responses: Yes/No/Don't know
	●	Not reported	49	Amount of time allocated, staff behavior, staff credentials.	Equipment, space,	Policy, menu quality, meal schedule, staff behavior, training, access (vending machine), curriculum	Combination of close- and open-ended questions. Close-ended questions possible responses: - Yes/No
●		Not reported	40	Policy, child involvement, amount of time allocated, barriers and support.	Space	Policy, child involvement, barriers, advertising, access	Combination of open-ended and close-ended questions: Close-ended questions

						(vending machines).	possible response answers: - Yes/No - Likert scale
	●	20 min	65	Amount of time allocated, screen time.	Facility, equipment,	Menu quality, access (water, vending machines), fundraising.	Close-ended questions with possible responses: Yes/ No/Don't know
		● Not reported	36			Polices, menu quality, access (vending machines), attitudes, advertising, fundraising.	Close-ended questions
		● 6 hr	105	Policy, amount of time allocated, activity types , staff behavior, training and credentials	Space, safety	Policy, menu quality, meal schedule, food safety, staff behavior, training and credentials, access (water), curriculum, evaluation, advertising, fundraising	Close-ended questions with possible responses: Fully in place/partially in place/ underdeveloped/not in place
		● 6 hr	122	Policy, amount of time allocated, activity types , staff training and credentials, curriculum	Space, safety	Policy, menu quality, meal schedule, food safety, staff behavior, training and credential, access (water), curriculum, evaluation, advertising, fundraising	Close-ended questions with possible responses: Fully in place/partially in place/ underdeveloped/not in place
		● 40 min	88			Child involvement, menu quality, meal schedule, food safety, staff training, staff credentials, access (water), evaluation	Combination of open-ended and close-ended questions: - Close ended questions possible responses: Yes / No, Likert scale

		●	60 min	114	Amount of time allocated, activity types , staff training and credential, evaluation			Combination of open-ended and close-ended questions: - Close-ended questions with possible responses: Yes/No, Likert scale
		●	60 min	201	Policy, amount of time allocated		Policy, menu quality, meal schedule, access (water) evaluation, fundraising	Combination of open-ended and close-ended questions: Close-ended questions possible responses: - Yes/No - Likert scale
		●	Not reported	29			Policy, menu quality, food facility, staff behavior, training.	Uses best practice framework of criteria at the bronze, silver and gold levels as a way of scoring the program policy.
		●	Not reported	36			Policy, child involvement, staff behavior, training, access (vending machine), curriculum, evaluation, fundraising.	Close-ended questions. Choose one response category from three categories arranged in hierarchical order
●	●		30 min	96	Policy, amount of time allocated, activity types , staff behavior, training and credential, curriculum, evaluation.	Space		Close ended questions with possible responses: - Yes/No/Don't know - No/Partially/Yes Choose one response category from several arranged in hierarchical order
		●	Not reported	11	Policy, amount of time allocated, activity types, staff training, curriculum		Policy, staff training, curriculum.	Uses best practice framework of criteria at the bronze, silver and gold levels as a way of scoring the program policy. Close-ended response option: choose the most appropriate statement.
		●	Not reported	10	Policy, amount of time allocated, activity types, staff		Policy, menu quality, curriculum.	Uses best practice framework of criteria at the bronze, silver and gold

				training, curriculum.			levels as a way of scoring the program policy.
		●	Not reported	8	Policy, amount of time allocated, activity types, curriculum.			Uses best practice framework of criteria at the bronze, silver and gold levels as a way of scoring the program policy.
●			Not reported	18			Snack/beverages quality.	Open-ended questions (listing how many selections of each type of food and drink items available)
	●		Not reported	96	Policy, amount of time allocated, activity types , staff behavior, training and credentials, curriculum, evaluation	Equipment, safety, space	Policy, child involvement, menu quality, meal schedule, staff behavior, training and credentials, food safety, access (water, vending machines) curriculum, advertising, fundraising.	School policy statement are rated "0" "1" or "2".
	●		Not reported	160 (childcare) 123 (school) 110 (afterschool)	Policy, child/parent involvement, amount of time allocated activity types, screen time, staff behavior, training and credentials, curriculum evaluation.	Equipment, safety, space	Policy, menu quality, meal schedule, staff training, access (water), fundraising.	Combination of close- and open-ended questions. Close-ended questions with possible responses: Choose one response category from several arranged in hierarchical order - Yes/No
	●		Not reported	8 (schools)	Polices.		Policy	Combination of close- and open-ended questions. Close-ended questions possible responses: Choose one response category from several arranged in hierarchical order. Choose all response categories that apply
	●		1 to 4 hours	37(school)			Policy, access	Combination of open- and

							(water), menu quality, staff training, advertising.	close-ended questions. Close-ended questions with possible responses. Choose all that applies to your program
		●	Not reported	8 (Childcare) 6 (school) 7 (afterschool)	Policy, amount of time allocated, activity types, staff credentials.	Space	Policy, menu quality, meal schedule, staff training, access (water), fundraising.	Close-ended questions with possible responses. Choose one response category from several arranged in hierarchical order ranging from 1 (elements not in place) to 5 (elements are culturally appropriate, accessible and available).
		●	2 min	9	Amount of time allocated, screen time.		Menu quality, access (water)	Close-ended questions with appropriate response as follows: - Yes/No/In Progress/Unsure answer
●	●	●	1 day site visit	23	Policy, child involvement, amount of time allocated, activity types, gender equity, screen time, staff training, credentials, curriculum, evaluation.		Policy, child involvement, menu quality, access (vending machines), staff training, credentials, curriculum, evaluation.	Close-ended questions. Choose one response category from several arranged in hierarchical order.
	●		Not reported	10	Policy, amount of time allocated, activity types, screen time.		Policy, menu quality, access (water)	Close-ended questions with appropriate response as follows with appropriate response: - Yes/No/In Progress/Unsure answer
●			Program length	27	Amount of time allocated, activity types, screen time.		Menu quality, access (water)	Combination of close-ended and open-ended questions. Close-ended questions with appropriate response as follows: - Yes/No

Table 2.2: Summary of Tools Reporting Psychometric Properties

Author (year)Tool name	Reliability			Validity		
	Type	Analysis	Findings	Type	Analysis	Findings
Ward (2008) Bower (2008) EPAO	Interobserver (Concurrent)	For all Item: Percent agreement For Subscale: ICC[¥](one-way ANOVA)	Mean percent agreement was 87.26% for observation section and 79.29% for document review section ICC values ranged from 0.45 to 0.97	Construct comparing EPAO subscales with mean activity level and % MVPA using OSRAP[§]	Pearson correlation	Pearson correlation: Strongest correlation between mean PA and %MVPA PA policy had weak correlation with estimate of PA (r=-0.076 to 0.157)
Benjamin (2007) NAP SACC	Test-retest (2 time over 3 wk. period)	kappa coefficients & percent agreement	Test-retest: Kappa ranged from 0.07 to 1.00; interquartile ranged from 0.27 to 0.45 percent agreement ranged from 34.3% to 100%	Face and content	Conducting a comprehensive literature and resource review	Reasonable face and content validity
	Inter-rater (concurrently using 50 triad and 9 dyads)[3]	kappa coefficients & percent agreement	Inter-rater: Kappa ranged from 0.20 to 1.00; Interquartile ranged from 0.45 to 0.63 and percent agreement ranged from 52.6% to 100%	Construct Expert review from Jan to April 2004		validity was reported to be established through National expert review
				Criterion comparing each question from the NAP SACC to the EPAO data from 69 childcare centers)	Weighted Kappa coefficients & percent agreement	Kappa ranged from -0.01 to 0.79 & percent agreement ranged from 0 to 93.65%
Henderson (2011) Child Care Nutrition and Physical Activity Assessment Survey				Criterion For policy & practice items survey answers were compared with in-person interview with mirroring items For Practice & environment items survey answers to direct observation data For nutrition quality items survey answers were compared to a measurement tool created for this project.	Percent agreement	Percent agreement 39% - 97% (62% item achieved ≥ 80%)

Falbe (2011) WellCCAT	Inter-rater (18 random documents coded by 2 raters independently)	ICC	For total comprehensiveness and strength score ICC was 0.98 and 0.94 respectively For Subscale ICC ranged from 0.84-0.99 respectively.	Construct compared policy quality scores for Head Stare centers to those of non-Head Stare centers and centers accredited by the National Association For Education of Young Children	simple *t* test	Comprehensiveness and strength scores were higher for head start centers than non-head start centers across most domains and higher for national association for education of young children accredited centers than non-accredited centers across some domain
	Internal Consistency	Cronbach's α coefficients	Cronbach's α ranged from = 0.53 to 0.83			
Brener (2003) SHPP 2000	Test-retest (2 interviews) 1st interview was computer assisted 2nd interview field staff led Interview conducted 10 to 20 days apart)	kappa coefficients & Pearson correlation	School level PE Kappa ranged from 51.4% to 80.7% Classroom PE kappa ranged from 51% to 74.4% Person correlations for both school and classroom level PE questions ranged from 0.39% to 0.67% Food service, Kappa ranged from 36.6% to 88.5% and Pearson correlation coefficient ranged from 0.45 to 0.75	Construct only for the state and district level questionnaires (through a follow up a telephone interview with a subsample of the original state and district level respondent)	Comparison between the questionnaire data and interview data	Interviews with the state and district level respondents indicated that overall the questionnaire produced valid data
Lounsbery (2012) S-PAPA	Test-retest (measured 14 days apart)	kappa, percent agreement, Phi and Chi Square tests	PE module Kappa ranged from 0.14 to 0.99 and first and second administration responds had significant x^2 association *p* values ranging from 0.001 to 0.04 with percent agreement ranging from 67% to 87% Recess module Kappa ranged from 0.33 to 0.81and first and second administration responds had significant x^2 association p values ranging from <0.001 to 0.034 with percent agreement ranging from 71% to 97% For before, during and after school program kappa ranged from 0.31 to 0.84 and first and second administration responds had mostly significant x^2 association *p* values ranging from <0.001 to 0.065 with	Content	Instrument review by content expert and PE teachers	Draft instrument was reviewed by content expert, revision was made then the revised instrument was re-sent to the content expert and a third draft was prepared. This draft was sent to 4 PE teachers and based on their feedback a final fourth instrument was prepared resent to PE teachers and based on their feedback final instrument was completed.

			percent agreement ranging from 61% to 87%			
Bullock (2010) FoodBEAM	Inter-rater (for researcher to researcher (4 dyads) and researcher non-researcher (5 dyads)	ICC	For both food and beverages researcher versus researcher and researcher versus non-researcher ICC ranged from 0.972 to 0.987	Convergent Comparing FoodBEAMs to the school environmental assessment tool (Samuels, 2008)	ICC scatterplot of EAT*FoodBEAMS versus percent adherence by venue to California state standards for Beverages and Food	ICC for Beverages = 0.982 and for food = 0.975 and shows that the FoodBEAMS is a valid method for collected this type of data.
Schwartz (2209) WellSAT	Inter-rater (by pairs of researcher 1 in-state and 1 out-of-state)	ICC Cronbach's alpha	For total comprehensiveness and strength ICC = 0.82 For subscale scores was 0.70 For Individual items ICC was 0.72. Cronbach's alpha ranged from 0.90 to 0.93			
Kim (2010) CHLI	Inter-rater (4 sites with two interviews)	Percent agreement	93.0% school items & 84.9% afterschool items showed substantial to almost prefect agreement			
Ajja (2012) HAAND	Inter-rater (concurrently)	Percent agreement kappa statistic	Percent agreement raged from 85% to 100% across all items. Kappa statistics ranged from 0.73 to 1.00 for HAPI-PA(Healthy Afterschool Program Index-Physical activity) and 0.76 to 1.00 for HAPI-N (Healthy Afterschool Program Index-Nutrition)	Content	Items of HAAND tool were developed based on extensive literature review of the existing PA& nutrition environment quality rating, standards and policies from state and national organization and input from expertise in childcare and afterschool field	Good content validity

	Construct Pedometer step counts were compared to the HAPI-PA scores Menu from observation day was compared to number of time FV Whole grains and Sugar sweeten beverages reported on the HAPI-N	Means and standard deviation calculated and one-way ANOVA test used	HAPI-PA, ↑ pedometer steps were significantly associated with presence of a written policy related to PA, amount/quality of staff training use of PA curriculum and offering activity that appeal to both genders For HAPI-N, higher servings of FV and whole grains per week were significantly associated with the presence of a written policy regarding the nutritional quality of snacks
Nathan (2013). (SEAT)	Construct Principals self-report using the SEAT was compared with scores from direct observations by research staff	Kappa/ PABAK coefficients & percent agreement	Percent agreement = 37% to 100% PABAK = -0.06 to 1.00

[¥] ICC: intraclass correlation coefficient; [§] OSRAP: observation system for recording activity in preschools

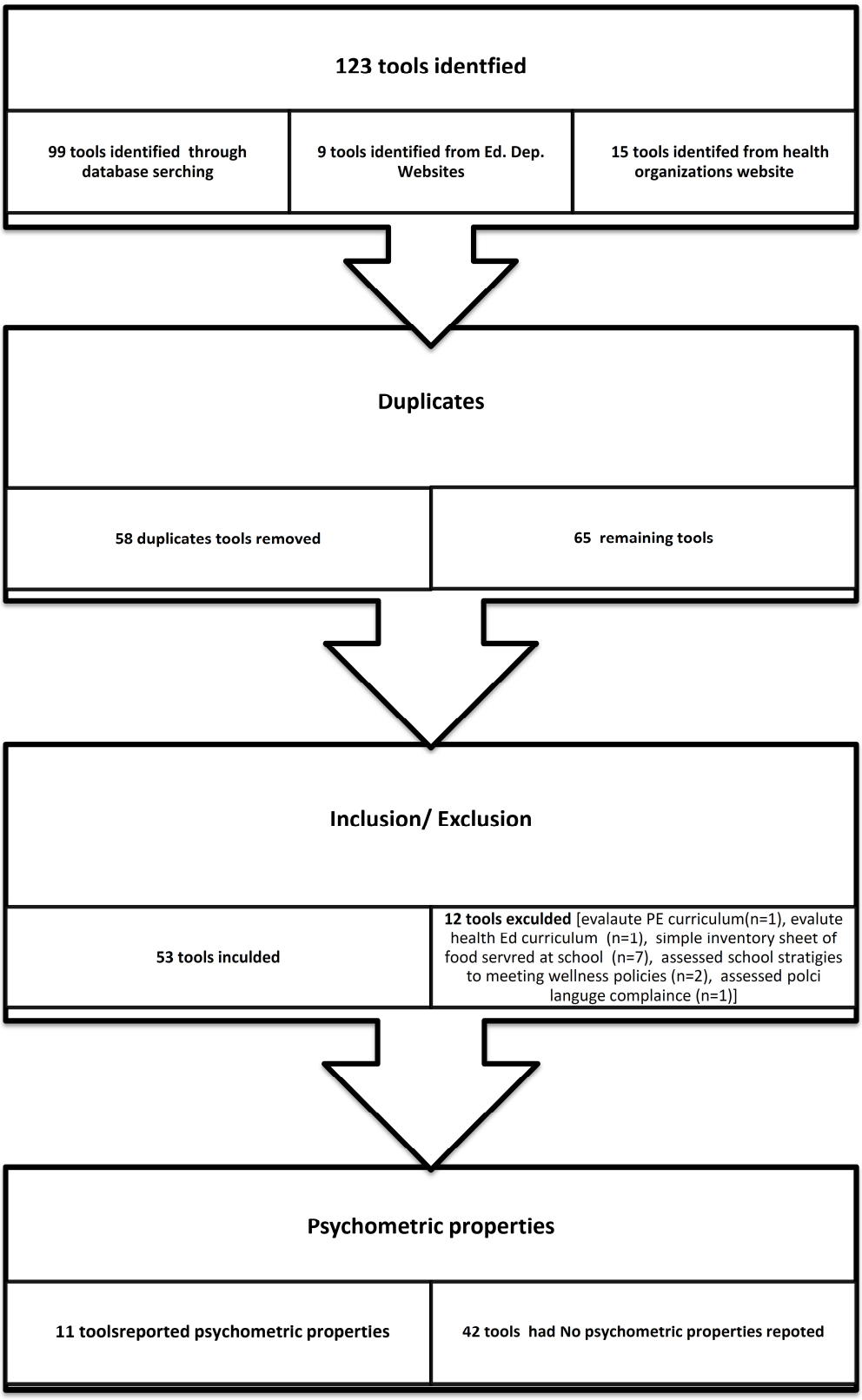

Figure 2.1: Tool selection process

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CHAPTER 3: FROM THE RESEARCHER TO THE PRACTITIONER: A RANDOMIZED CONTROL TRIAL COMPARING IN-PERSON TO DISTANCE TRAINING OF AFTERSCHOOL PROGRAM LEADERS USING POLICY AND PRACTICE AUDIT TOOL[2]

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Abstract

Background: The vast majority of policy and practice audit tools intended for use by practitioners (i.e., non-researchers) are never evaluated for accuracy when used by the practitioners themselves.

Purpose: This study aims evaluate afterschool program leader's accuracy in assessing their program policy environment characteristics using the Healthy Afterschool Program Index - Physical Activity (HAPI-PA) and the Healthy Afterschool Program Index – Nutrition (HAPI-N) scales (criterion-reference validity). The second aim was to determine if a distance training method is as effective as in-person training (equivalency test).

Design: Randomized block posttest design was conducted during the fall of 2014.

Settings/participants: Forty-four program leaders across South Carolina were recruited.

Intervention: Program leaders were randomized based on the program's organizational association. An in-person training session was conducted 1 hour prior to the program start. Distance training groups were sent electronic training materials 1 week prior to a scheduled site visit. Program leaders and a gold standard rater completed the HAPI-PA and HAPI-N scales independently during a single day site visit.

Main Outcome Measures: Percent agreement and kappa were calculated to compare the two training methods and to validate the program leader's accuracy compared to the gold standard rater.

Results: For the HAPI-PA scale, 90% of the items in the in-person group and 73% of the items in the distance group had a kappa ≥ 0.70. In comparison, 83% of the HAPI-N scale items in the in-person group and 67% of the items in the distance group had a kappa ≥ 0.70. Equivalency between the two training methods was established for 5 of the 11 items in the HAPI-PA scale and 3 of the 12 items in the HAPI-N scale.

Conclusion: In-person training is a more effective training method than distance training, yet distance training provides reasonable accuracy of items compared to a gold-standard rater. Future studies should examine if web based training is as effective as in-person training.

Introduction

Childhood obesity continues to be a major public health issue.[1] Over the past several years a large body of evidence has emerged implicating obesogenic environments as one of the key factors in the current childhood obesity epidemic.[2] More specifically, the literature suggests that the policy and practice environments play a significant role in shaping the eating habits and physical activity levels of children.[3-5] As a result, there has been a visible increase in the prevalence of policies and standards supportive of healthy eating and physical activity (HEPA) in settings that care for youth.[4, 6-9]

With over 10.2 million youth attending afterschool programs (3-6 pm) for an average of 8.1 hours per week,[10] afterschool programs are increasingly being recognized as an important setting that can contribute to solutions to childhood obesity.[11, 12] The responsibility of implementing HEPA policies and standards often falls on afterschool program leaders, yet there are a limited number of self-assessment tools that afterschool program leaders can use to assess the extent to which their programs align with state,

national and/or organizational HEPA policies and practice recommendations.[13-15] More specifically a recent review by Ajja and colleagues found that although the majority of audit tools were categorized as self-assessment tools designed to be used by staff/community members, a limited number of tools have been tested for accuracy when used by practitioners.[13]

Self-assessment tools designed to evaluate the policy and practice environment are often definition-dense, with terminology that does not easily lend itself to use by community members. Therefore, if such tools are to provide credible information when used by non-researchers such as afterschool program leaders, they first must be provided with adequate training and instructional material to enable them to accurately carry out program self-assessment. Next, program leader's accuracy in assessing their program policy and practice environment characteristics should be evaluated against users with established accuracy (i.e., gold standard raters) referred to herein as criterion-reference validity. The training of program leaders in the accurate use of such audit tools can be delivered during in-person training sessions or can take the form of distance training such as the provision of the training material and instructional use documents electronically to program leaders. In-person training, although seen as the more desirable method of training as it provides the opportunity for both trainer and trainee to ask and respond to questions and clarify information[16], is potentially more expensive and requires greater time commitment (trainee burden) to attend such training in comparison to distance training.

Self-assessment tools that do not rely on trained researchers are valuable for a number of reasons: (1) such tools provide programs with ongoing surveillance through

helping program leaders identify areas of strength and target areas in need of attention, (2) they assist programs to foster more sustainable improvements through voluntary participation and self-initiated change[17] and (3) they allow program leaders to have an accurate understanding of the standards to which they are being held.

Currently there are only three validated audit tools designed to evaluate the policy and practice environment characteristics in the afterschool setting.[13-15] Of the three tools, the Healthy Afterschool Activity and Nutrition Documentation (HAAND) instrument is the only tool designed to be used by both researchers and practitioners (i.e., program leaders) to assess the extent to which the afterschool programs align with current state and national HEPA policies and standards in the afterschool setting.[13] This makes the HAAND tool versatile and comprehensive in assessing the policy and practice environment in afterschool setting given there are numerous national, state, and local physical activity and healthy HEPA policies and standards programs can adopt. The other two tools, the Out-of-School Nutrition and Physical Activity Observational Practice Assessment Tool (OSNAP-OPAT) and the Y's HEPA survey, were designed to assess specific organizational and/or intervention standards.[14, 15]

The purpose of this study was to evaluate whether afterschool program leaders can provide accurate assessments of their program policy and practice environment characteristics when compared to users of established accuracy (i.e., gold standard rater) using the HAAND instrument (criterion-reference validity). In addition, we aim to determine if distance training is as effective in preparing program leaders to accurately assess their program's HEPA policy environment characteristics as in-person training (equivalency test).

Method

Participants, settings and design

Organization/program leaders were selected from a pre-existing list of 535 programs across the state of South Carolina (e.g., YMCA, Boys and Girls Clubs, parks and recreational facilities, etc.). An electronic letter was sent to organization/program leaders inviting them to participate in the study. Two weeks after the receipt of the letter, organization/program leaders were telephoned by the lead-author to confirmed eligibility, sought consent to participate in the study, and scheduled a time for the site visit. This method resulted in the recruitment of 44 afterschool program leaders representing 4 different organizations. For this study afterschool programs - defined as a childcare program operating immediately after the school day every day of the school year for a minimum of 2 hours, providing a snack, homework assistance, enrichment activities and opportunity for physical activity were included in this study.[18]

Program leader eligibility consisted of currently being employed at the afterschool program, willing to attend a 1-hour in-person training session and having access to a computer in order to be able to receive electronic copies of the training material. Participating afterschool program leaders in the in-person and distance training groups were given a $30 incentive for participation in the study. In addition to the cash incentive, the training was registered with the South Carolina Department of Social Services (SCDSS), thus providing participating afterschool program site leaders with a 1 hour professional development credit with the SCDSS agency.

The study was a randomized block posttest design based on the program's organizational association. Once recruited into the study, site leaders within each

organization were randomized into one of the two conditions: 1) in-person (n=22) or 2) distance (n=22) training groups. All study procedures were approved by the Institutional Review Board at the University of South Carolina.

Instrument

Detailed information of the HAAND instrument is reported elsewhere.[19] In brief, the HAAND instrument is a rubric-based index where scores for each item range from 0 to a maximum of 4 and is designed to quantify the physical activity and nutrition environment within afterschool programs. The HAAND instrument consists of two sub-indices and corresponding rating scales - HAPI-PA and HAPI-N indices. Each scale consists of 7 domains (i.e., polices, training, child involvement, evaluation, curriculum, screen time, or access to vending machines, scheduling of activity or quality of snack served). The HAPI-PA consists of 11 items with an overall score ranging from 0 to 25, whereas the HAPI-N consist of 12 items with an overall score ranging from 0 to 34. In addition, the total score for each scale can be presented as an ordinal rating based on a star system. The star rating for HAPI-PA were 1–5 = 1 star, 6–9 = 2 stars, 10–14 = 3 stars, 15–201 = 4 stars, and 221–25 = 5 stars, whereas the star ratings for the HAPI-N were 1–6 = 1 star, 7–14 = 2 stars, 15–21 = 3 stars, 22–27 = 4 stars, and 28–34 = 5 stars. The scores/star ratings of the HAPI-PA and HAPI-N serve as site level indicator for supporting physical activity and healthy eating environments.

Development of a Training manual

Both the in-person and the distance training methods were designed to be similar in the content and structure in order to test differences in training modalities. To achieve this, only material and examples from the training manual were used during the in-person

training sessions. The training manual was used to prepare program leaders in both the in-person and distance training groups on using the HAAND instrument. The manual was designed to be self-explanatory and consisted of: 1) an introduction section with general information on the tool, tips on the type of documents needed to complete the HAAND instrument, instructions on how to complete the HAAND along with an explanation of what the score means; 2) important terms to understand before completing the HAAND section including term definitions, examples to guide users on the scoring system and helpful hints of where to obtain information needed to score each item; 3) a copy of the HAAND instrument, 4) and two appendices with detailed item descriptions including multiple examples of each of the items from both the HAPI-PA and HAPI-N scales.

Formative evaluation of the training manual

The training manual was pilot-tested with 4 YMCA afterschool programs site leaders in the midlands area of South Carolina during the fall of 2013. The pilot-testing mimicked the distance training method in that each of the program leaders was sent a copy of the training manual and the HAAND instrument with instructions to review the manual and use the HAAND instrument to self-evaluate their programs. Program leaders were also instructed to provide feedback regarding the clarity of the instruction and training manual. Once the program leaders completed the self-assessment using the HAAND instrument, a site visit was scheduled within the same week and an afterschool program evaluation using the HAAND instrument was conducted by trained research staff. HAAND scores awarded by the research staff were compared to that of the afterschool program leader. In cases where differences in scoring were observed, a subsequent interview was conducted at the end of the site visit with the afterschool

program site leader to determine the nature of the discrepancy. Based on our pilot tests a number of modifications were made to the training manual to improve the training manual clarity and ease of use. These included changing the format of the training manual, changing some of the language used to define item levels and resulted in the newest version of the training manual (Appendix A).

Procedures

In-person Training Procedures

All training sessions were delivered to participating program leaders individually during the fall of 2014 (September 2014 to December 2014). The in-person training sessions were arranged to take place before the start of the afterschool program, and lasted 1 hour. Reminder e-mails confirming the visit date and time were sent to participants at 7 and 2 days before the scheduled training/site visit. The reminder e-mails also encouraged program leaders to locate and have the following program documents available on the day of the site visit: program schedule, parent and staff handbooks, physical activity and nutritional training documents (if available), curricula, and policy documents (if applicable). Each in-person training session consisted of reviewing the training manual with the participating site leader, specifically, reviewing each section of the training manual and answering any questions the participating site leader may have using examples from the training manual. All of the in-person training sessions were delivered by the lead author in a structured and consistent manner using material from only the training manual.

Immediately following the training session, participants were asked to complete a program self-evaluation using the HAAND instrument and the training manual during the

afterschool program time. At the same time the research staff (gold standard rater) conducted program observations independently. A brief interview (about 15 minutes) with the site leader was conducted to access available documents in which all the HAAND domains were covered using a script interview guide. To minimize the potential of influencing the participating site leaders self-evaluation, the brief interview of the site leader to access available documents was conducted upon receipt of the completed HAAND instrument by the research staff. Each site visit lasted from 3 to 4 hours depending on the afterschool program duration not including the 1 hour training session before the program start.

Distance Training Procedures

The afterschool program leaders randomized to the distance training group were e-mailed an electronic copy of the training manual and HAAND instrument in the form of pdf with instructions to review the training manual 7 days before the scheduled site visit. Reminder e-mails confirming the site visit date and time and to review the HAAND training manual were sent to participants at 4 and 2 days before the scheduled site visit. In addition, the e-mail encouraged site leaders to locate and have available the following program documents on the day of the site visit: program schedule, parent and staff handbooks, physical activity and nutritional training documents (if available), curricula, and policy documents (if applicable).

As with the in-person training group, during the distance training group site visit the participating program leader and the gold standard rater observed the program activities offered during that day and conducted document reviews concurrently, but independently. A brief interview (about 15 minutes) of the site leader to access available

documents was conducted in which all the HAAND domains were covered using a scripted interview guide. To minimize the potential of influencing the participating program leader self-rating, the gold standard rater conducted the interview after receipt of the completed HAAND instrument from the program leader. Each site visit lasted from 3 to 4 hours depending on the afterschool program duration.

All program evaluations were conducted by two research assistants (gold standard raters). Reliability (percentage agreement and kappa) across all items ranged from 83% to 100% and $\kappa = 0.70$ to 1.00.

Statistical analysis

Descriptive means, standard deviations and percentages (for dichotomous variables) were computed to present site level information across the organizations.

Criterion-reference validity

The criterion measure in this study was the gold standard raters with established agreement. Median score, interquartile range (IQR) and the mean difference in scores between gold standard raters and site leaders were calculated for each item in both the HAPI-PA & and HAPI-N scales. In addition, the proportion of the exact agreement (percent agreement) and kappa statistics were calculated to assess the overall agreement for each item on the HAAND instrument between the site leader at the afterschool program and the gold standard rater. The following ratings of Landis and Koch were used to interpret the kappa; 0.8 – 1.0 (almost perfect agreement); 0.60 – 0.79 (substantial agreement); 0.40 – 0.59 (moderate agreement); 0.20 – 0.39 (fair agreement); and 0.00 – 0.19 (poor agreement).[20] A kappa score of ≥ 0.70 (substantial to almost perfect) was established as the acceptable value for criterion validity assessment to determine if

program leaders can provide accurate self-assessment when compared to the gold standard rater.[20]

Equivalence-test

For equivalency testing, the two kappa values or the two percent agreement values (i.e., in-person and distance training) obtained for each item were compared using one-sided t-test (TOST) procedures.[21, 22] Using this procedure (TOST), equivalency was established at the α (0.05) significance level if a (1-2α) x 100% confidence interval (CI) for the difference between the two training delivery modes (distance – in-person) is contained within the interval (-Δ, +Δ). For example: Using the two kappa values as point estimates, two groups accuracy using the HAAND instrument are similar if ($kappa_{distance} - kappa_{in\text{-}person}$) ± 1.645 ($standard\ deviation_{distance}^2 + standard\ deviation_{in\text{-}person}^2$)$^{0.5}$ is completely contained in the interval with endpoints -Δ and +Δ. For the purpose of this study an acceptable degree of difference between the two methods across all items was 10% (0.1). The two training modes demonstrated equivalency if the 90% confidence interval (90%CI) for the difference if the kappa score was completely contained in the interval with end points +10% and -10%. Wilcoxon sign-rank was used to examine the differences in total score between the gold standard rater and the site leader within each training group. All statistical analyses were conducted using STATA (v.12.College Station, TX).

Results

A total 44 afterschool program leaders, representing 4 different organizations across South Carolina participated in this study. Table 3.1 shows participating program leader's characteristics. There were significant differences in the average ages of the in-

person and distance training groups ($p < 0.024$), with participating site leaders in the in-person group having an average (SD) age of 32 years (±10.8) compared to distance training group 42 years, (±15.9). However, no other significant differences were found between the two groups. In both groups (in-person and distance), the majority of the participants were white (55%) and (64%), female (86%) and (91%), with some college level education (37%) and (41%) and had been working at the current site on average about 3 (±3.0) and 4 (±5.0) years respectively.

Gold standard versus program leader (Criterion reference)

For the HAPI-PA scale, 100% of the items had a percent agreement ≥ 80% for both groups (i.e., in-person and distance), whereas, 91% of the items in the in-person group and 73% of the items in the distance group had a kappa agreement ≥ 0.70 (Table 3.2). Using the star rating scores of the HAPI-PA scale, all the items in both the in-person and distance training groups had a percent agreement ≥ 80% and a kappa agreement of ≥ 0.70.

For the HAPI-N scale, 83% of the items had a percent agreement ≥ 80% for both training groups, whereas 83% of the in-person group and 67% of the distance group had a kappa agreement ≥ 0.70. Using the stare rating scores of the HAPI-N scale, all the items in both the in-person and distance training groups had a percent agreement ≥ 80%. However; 83% of the items in the in-person group had a kappa agreement of ≥ 0.70, whereas the 67% of the items in the distance training group had a kappa agreement of ≥ 0.70. There were no statistical differences in the HAPI-PA and HAPI-N scale scores between the gold standard rater and the site leader (Table 3.2).

In-person training versus distance training (Equivalency assessment)

Table 3.3 shows the equivalency testing results for both the HAPI-PA and HAPI-N scales. In the HAPI-PA and the HAPI-N scales, for each item, the two groups are similar (i.e., equivalent) if the confidence interval for the difference between the two groups is completely contained in the interval with the end points of -10 percent and +10 percent for each item.

Using percent agreements as point estimates and the ±10% difference between the two methods, the two training methods resulted in similar accuracy in all of the items except for evaluation for the HAPI-PA scale. For the HAPI-N scale the two training methods resulted in similar accuracy when assessing the following items: the number of times vegetables, sugar-added beverages and whole grain foods were served per week; access to vending machine; staff training (amount and quality); parent workshop; evaluation and star rating scores (Table 3.3).

When kappa values were used as point estimates, comparison of the distance training group to the in-person training group resulted in similar scoring accuracy assessing the following items: written policy, time allocated for physical activity, types of activity provided at the program, the quality of the physical activity training provided and the quality of the physical activity curriculum used at the afterschool program for the HAPI-PA. For the HAPI-N scale, site leaders in the distance training group had a similar accuracy assessing the number of times whole grains were served per week, children's access to vending machine during program time, parent workshop items and star rating score. In those instances where similarity between the two training groups was not established, program leaders in the in-person training group were more accurate in

assessing their program HEPA policy and practice environment characteristics compared to distance training group (Table 3.3).

Discussion

Policy and practice audit tools are often developed by researchers for external evaluation and made available for non-researchers as self-assessment tools, but rarely examined for accuracy when used by non-research users. This is the first study to test the accuracy (criterion-reference validity) of afterschool program leaders in assessing HEPA policy and practice environment characteristics at their programs using the HAAND instrument. This study also evaluated the equivalency of two training methods, i.e., in-person and distance training.

Overall, our findings suggests that program leaders in both groups were able to accurately report on HEPA policy and practice environment of their programs once provided with simple instructional material. Specifically, based on our results, more than half of the items assessed in both the HAPI-PA and the HAPI-N scales had substantial or almost perfect agreement between the gold standard rater and the program leaders in both training groups. However, in-person training was a more effective training method than distance training. The distance training group was expected to review the training manual on their own time prior to the scheduled site visit. When asked, all participating program leaders in the distance training group indicated they had reviewed the training material, however, we have no way of establishing if that had occurred or the extent to which the participating program leaders reviewed the material prior to completing the HAAND instrument. In contrast, all the participating program leaders the in-person group the in

attended a 1 hour training sessions of the training material where all the items in the tools were reviewed. The observed difference between the two training groups in our results could potentially be explained by the participating program leaders simply not reviewing the training manual prior to carrying out the self-assessment using the HAAND instrument, rather than the in-person training simply being superior to distance training method.

A number of items showed low (unacceptable) kappa as defined in this study by a kappa <0.70 in both the HAPI-PA and the HAPI-N scales in both groups. There are a number of possible reasons for such observed low kappa scores. The magnitude of kappa is affected by the prevalence of the characteristics evaluated with high prevalence resulting in lower kappa than lower or zero prevalence.[23, 24] For example, the equity item in the HAPI-PA scale assessed whether or not the physical activity offered at the program appealed to both genders (i.e., activity enjoyed by both boys and girls) compared to offering activities enjoyed largely by one gender (i.e., mainly boys such as football or mostly girls such as dancing). Although this item showed the lowest kappa in both the HAPI-PA and the HAPI-N scales with a kappa of 0.00 in both training groups, there was 95% agreement between the gold standard rater and program leaders, with only one incidence of disagreement between the two raters in both groups. In this sample the vast majority of the programs offered activity that appealed to both genders. Although the use of prevalence-adjusted-bias adjusted kappa (PABAK) has been suggested by some as a means of addressing such issues (i.e., zero kappa with high % agreement),[23, 25-27] the PABAK values are seen as unrealistic since this type of kappa assesses items in ideal situation and assumes 50% prevalence with zero bias.[28, 29] In this study we decided to

present the proportion of overall agreement alongside kappa. This is in line with Cicchetti and Hoehers who advocated for providing statistics such as the proportion of positive agreements alongside kappa values is more appropriate and provides the reader with enough information in order to facilitate informed decision regarding the quality of the data.[25]. In addition, we feel that providing median scores and IQR for each item as well as the mean difference between the two raters when there was a difference in the scores provides much more useful information to orient the reader to the magnitude of the difference (Table 3.2).

Contrary to our expectation, participating program leaders were more accurate in assessing the physical activity policy and practice environment in comparison to the nutrition policy and practice environment, with more items in the HAPI-PA scales achieving substantial to almost prefect agreement (kappa ≥0.70) compared to items in the HAPI-N scale (Table 3.2). Findings from the available limited validation literature of the HEPA policy and practice environment are inconsistent. Lee et al (2014) evaluated the validity of a practitioner-administered observational tool using direct observation and accelerometers (The OSNAP-OPAT) and based on their findings, the nutrition items had higher person correlation values in comparison to the physical activity items[14] suggesting that afterschool program practitioners were more accurate in assessing nutrition related items compared to physical activity items. However, one should exercise caution when interpreting these results. In this study the authors reported using Pearson correlation (*r*) to test the criterion validity of the OSNAP-OPAT. When assessing accuracy of measure against a criterion, the use of statistics that calculate the level of agreement between the

two measures (e.g., kappa, intraclass and ICC statistics) have been shown to be more appropriate and informative compared to correlation statistics[30].

Another recent study by Hohman and Mantinan (2014) assessed afterschool programs leaders' self-assessment using the HEPA tool developed by the Y of USA in comparison to direct observation and document reviews. Findings from this study indicate that practitioners were more accurate in assessing physical activity items in comparison to nutrition items.[31] Having said that, the HEPA survey showed variable accuracy; when criterion methods such as direct observation and documents review were compared with self-report using the HEPA survey. Of concern is that some of the largest discrepancies were found in items that inherently should be easier to report such as whether fruits or vegetables are served during meals or snacks.

There are several strengths to this study. This study was first to assess the accuracy of program leaders when assessing their program HEPA policy environment characteristics using the HAAND instrument. Secondly, this study used a randomized block design to assess the two methods of training delivery (i.e., in-person vs. distance). Thirdly, this study recruited a diverse range of afterschool program leaders across the state of South Carolina representing 4 organizations. There are several limitations to this study. First, program leaders were provided with a hard copy of the training manual and encouraged to use it while conducting program evaluation. Since training materials were sent as pdf files via e-mails we have no way to tracking how much of the material was reviewed prior to the site visit or the amount of time program leaders spent in reviewing. Future studies should investigate and develop interactive web based training where the amount of time spent on reviewing the material and access could be tracked. We were

unable to do this in the current study due to limited resources. Second, several of the items scores in the two scales (HAPI-PA & HAPI-N) were based on self-reporting (i.e., child involvement, staff training quality and quantity, parent workshop, evaluation) due to the lack of available documentation. We recognize that some element of recall bias may operate in those cases. To minimize this, the gold standard rater conducted the interview to get information for those items at the end of the program, which was about 2.5 hours after program leader had handed their completed HAAND instrument to the gold standard rater. Despite the current limitations, overall almost all the items achieved moderate, substantial or almost perfect kappa with kappa ranging from 0.56 to 1.00 in both scales (HAP-PA and HAPI-N).

Conclusion

Afterschool program site leaders play a crucial part in shaping the HEPA policy and practice environment at their programs. Overall, our results demonstrate that in-person training is a more effective training mode than distance training; however, distance training provides reasonable accuracy of items compared to a gold-standard rater. Using the HAAND tool self-assessment will aid program leaders in identifying areas for potential improvement and hopefully initiate self-motivated changes in order to meet recommended HEPA policies and standards. In light of current findings, afterschool program leaders can provide accurate assessment of their program HEPA policy and practice environments using the HAAND instrument.

Table 3.1: Afterschool Program Site leader Characteristics

Characteristics	In-person										Distance										
	Total n=22		Organization 1 n=4		Organization 2 n=10		Organization 3 n=5		Organization 4 n=3		Total n=22		Organization 1 n=3		Organization 2 n=10		Organization 3 n=6		Organization 4 n=3		P-value[b]
Age in years (SD)[a]	32.0	(10.8)	26.8	(8.3)	33.4	(10.9)	28.2	(11.8)	40.3	(10.4)	41.5	(15.9)	32.7	(5.1)	49.3	(14.9)	29.2	(16.0)	49.3	(4.5)	0.0241
Gender (%)																					0.500
Male	14		0		20		20		0		9		0		10		17		0		
Female	86		100		80		80		100		91		100		90		83		100		
Race																					0.537
white	55		75		70		40		0		64		0		90		50		67		
other	45		25		30		60		100		36		100		10		50		33		
# Years afterschool program (SD)	3.4	(3.0)	2.3	(1.3)	4.1	(3.6)	1.3	(1.6)	6.0	(2.0)	4.0	(5.0)	4.8	(3.3)	5.25	(6.7)	1.3	(0.8)	4.7	(4.2)	0.6000
# Years in site leader role(SD)	2.4	(2.9)	0.8	(1.0)	3.5	(3.7)	0.6	(0.5)	4.0	(2.0)	3.2	(5.0)	1.8	(2.0)	4.9	(6.9)	0.8	(0.8)	4	(3.5)	0.5181
Education (%)																					0.581
High school	14		75		-		-		-		46		-		10		-		-		
Some college	36		25		20		60		67		41		67		40		50		-		
Bachelors	23		-		40		20		-		36		33		40		17		67		
Graduate	27		-		40		20		33		18		-		10		33		33		
# of overall training received (SD)	6.0	(5.3)	5.5	(4.2)	7.1	(7.2)	4.0	(1.2)	6.3	(3.5)	6.6	(6.0)	8.7	(9.8)	6	(4.7)	4.5	(1.4.0)	10.7	(11.6)	0.7314
# of HEPA training attended (SD)	1.5	(1.5)	1.0	(0.8)	1.6	(1.8)	0.8	(0.8)	3.0	(0.0)	2.1	(2.6)	2.3	(2.3)	1.9	(1.7)	1	(0.6)	5	(6.1)	0.3268

[a]SD: standard deviation, [a]P-value is for the comparison of the total values for in-person groups to distance group.

Table 3.2: The Healthy Afterschool Activity and Nutrition Documentations (HAAND): Criterion assessment (Gold standard rater vs. Site Leader)

The Healthy Afterschool Program Index - Physical activity Scale (HAPI-PA)																			
		In-person group									Distance group								
		Gold standard		Site leader							Gold standard		Site leader						
Item level	Score range	Median	IQR	Median	IQR	% agreement	Kappa	Mean Diff[a]	SD[b]	P-value[c]	Median	IQR	Median	IQR	% agreement	Kappa	Mean Diff	SD	P-value[c]
Written Policy	0-2	2.0	1.0	2.0	1.0	90.9	**0.85**	1	0		1.0	1.5	1.0	1.0	90.9	**0.86**	1.5	0.7	
Child Involvement	0-2	1.0	1.0	1.0	1.0	100	**1.00**	0	0		1.0	0.8	1.0	0.0	90.9	**0.79**	1	0	
Screen Time	0-2	2.0	1.0	2.0	0.8	90.9	**0.81**	1	0		2.0	1.0	1.5	1.0	95.5	**0.92**	2	-	
Time allocated	0-3	2.0	1.0	2.0	1.0	95.5	**0.92**	1	-		1.0	1.0	1.5	1.0	90.9	**0.84**	1	0	
Type	0-2	1.0	0.0	1.0	0.8	86.4	**0.73**	1	0		1.0	0.0	1.0	1.0	81.8	0.66	1.3	0.5	
Equity	0-1	1.0	0.0	1.0	0.0	95.5	0.00	1	-		1.0	0.0	1.0	0.0	95.5	0.00	1	-	
Staff training amount	0-3	2.0	2.0	2.0	2.0	95.5	**0.93**	1	-		2.0	1.8	1.0	2.0	86.4	**0.80**	1.3	0.6	
Staff training quality	0-2	1.0	2.0	1.0	2.0	100.0	**1.00**	-	-		1.0	1.8	1.0	2.0	95.5	**0.93**	1	-	
Parent workshop	0-2	0.0	0.0	0.0		100.0	**1.00**	-	-		0.0	0.0	0.0	0.0	94.7	**0.77**	2	-	
Curricula	0-2	1.5	2.0	1.5	2.0	85.0	**0.74**	1	0		2.0	2.0	1.5	2.0	85.0	**0.75**	1	0	
Evaluation	0-4	0.0	2.0	0.0	2.0	95.2	**0.92**	2	-		0.0	1.0	0.0	1.0	75.0	0.57	1.5	0.6	
Star rating	1-5	-	-	-	-	86.4	**0.77**	-	-		-	-	-	-	90.9	**0.84**	-	-	
Total HAPI-PA score	1-25	12.0	4.0	12.5	4.8	-	-	-	-	0.25	11.5	3.0	11.5	3.8	-	-	-	-	1.00
The Healthy Afterschool Program Index - Nutrition Scale (HAPI-N)																			
		In-person group									Distance group								
		Gold standard		Site leader							Gold standard		Site leader						
Item level	Score range	Median	IQR	Median	IQR	% agreement	Kappa	Mean Diff[a]	SD[b]	P-value[c]	Median	IQR	Median	IQR	% agreement	Kappa	Mean Diff	SD	P-value[c]
Written Policy	0-2	2.0	0.8	2.0	1.0	90.5	**0.81**	1	0		2	1.0	1.0	1.8	76.2	0.63	1	0	
Child Involvement	0-2	1.0	1.0	1.0	1.0	100	**1.00**	-	-		1.0	1.0	0.5	1.0	78.3	0.66	1.4	0.5	
Fruit	0-4	2.0	2.0	2.0	3.0	78.3	**0.72**	1.2	0.4		2.5	3.0	2.5	2.8	90.9	**0.89**	1	0	
Vegetable	0-4	1.0	4.0	1.0	4.0	90.9	**0.86**	1.5	0.7		0.5	3.8	1.0	3.8	81.8	**0.72**	1.3	0.5	
Sugar-sweetened beverages	0-4	4.0	0.0	4.0	0.0	100.0	**1.00**	-	-		4.0	0.0	4.0	0.0	95.5	0.65	2	-	
Whole Grain	0-4	1.0	2.0	1.5	2.8	81.8	**0.76**	1.5	1		2.0	2.0	2.0	1.8	81.8	**0.77**	1	1	
Access to	0-1	1.0	0.0	1.0	0.0	100	**1.00**		-		1.0	0.0	1.0	0.0	100.0	**1.00**	-	-	
Staff training amount	0-3	2.0	2.0	1.0	2.0	90.9	**0.87**	1	0		1.5	1.0	1.0	2.0	81.8	**0.74**	1.3	0.5	
Staff training quality	0-2	1.0	2.0	1.0	2.0	95.5	**0.93**	1	-		1.0	1.0	1.0	1.8	86.4	**0.79**	1.7	0.6	
Parent workshop	0-2	0.0	0.0	0.0	0.0	95.5	0.65	2	-		0.0	0.0	0.0	0.0	86.4	0.60	1.3	0.6	
Curricula	0-2	0.0	1.0	0.0	1.8	95.5	**0.92**	1	-		0.5	2.0	1.0	2.0	81.8	**0.72**	1	0	
Evaluation	0-4	4.0	4.0	1.5	4.0	77.3	0.61	2.2	1.3		3.0	2.8	2.0	3.0	81.8	**0.76**	2.8	1	
Star rating	1-5	-	-	-	-	82.8	**0.74**	-	-		-	-	-	-	77.2	**0.70**	-	-	
Total HAPI-N score	1-34	20.0	13.0	19.0	14.0	-	-	-	-	1.00	18.0	9.8	17.5	11.5	-	-	-	-	0.38

[a]mean difference in scores between gold standard rater and site leader (when there was a differences between the two scores), [b]SD: standard deviation, [c]test of difference in median total score between gold standard rater and site leader using Wilcoxon sign-rank test, star rating for IIAPI-PA scale: 1 to 5 = ★, 6 to 9 = ★★, 10-14 = ★★★, 15-21 = ★★★★, and 22-25 = ★★★★★, star rating for IIAPI-N scale: 1 to 6 = ★, 7 to 14 = ★★, 15-21 = ★★★, 22-27 = ★★★★, and28-34 = ★★★★★

Note: Bolded values indicate kappa values ≥0.70.

Table 3.3: The Healthy Afterschool Activity and Nutrition Documentations (HAAND): Equivalency assessment (in-person vs. distance training)

	Healthy Afterschool Program Index - Physical activity Scale (HAPI-PA)									Healthy Afterschool Program Index - Nutrition Scale (HAPI-N)									
	Kappa					% agreement					Kappa					% agreement			
Item level	In-person	Distance	90 % Confidence interval for equivalency testing (Δ= 10%)[a]			In-person	Distance	90 % Confidence interval for equivalency testing (Δ= 10%)[b]			Item level	In-person	Distance	90 % Confidence interval for equivalency testing (Δ= 10%)[a]			In-person	Distance	90 % Confidence interval for equivalency testing (Δ= 10%)[b]	
Written Policy	0.85	0.86	**2**	-	**0**	0.91	0.91	**1**	-	**-1**	Written Policy	0.81	0.63	-15	-	-19	0.90	0.76	-13	-	-16
Child Involvement	1.00	0.79	-20	-	-22	1.00	0.91	**-8**	-	**-10**	Child Involvement	1	0.66	-32	-	-36	1.00	0.78	-20	-	-23
Screen Time	0.81	0.92	12	-	10	0.91	0.95	**5**	-	**4**	Fruit	0.72	0.89	19	-	15	0.78	0.91	14	-	11
Time allocated	0.92	0.84	**-7**	-	**-9**	0.95	0.91	**-4**	-	**-5**	Vegetable	0.86	0.72	-12	-	-16	0.91	0.82	**-8**	-	**-10**
Type	0.73	0.66	**-5**	-	**-10**	0.86	0.82	**-3**	-	**-6**	Sugar -sweetened beverages	1	0.65	-33	-	-37	1.00	0.95	**-4**	-	**-5**
Equity	0.00	0.00	**0**	-	**0**	0.95	0.95	**0**	-	**0**	Whole Grain	0.76	0.77	**2**	-	**-2**	0.82	0.82	**2**	-	**-2**
Staff training amount	0.93	0.80	-12	-	-15	0.95	0.86	**-8**	-	**-10**	Access to	1	1.00	**0**	-	**0**	1.00	1	**0**	-	**0**
Staff training quality	1.00	0.93	**-6**	-	**-7**	1.00	0.95	**-4**	-	**-5**	Staff training amount	0.87	0.74	-11	-	-15	0.91	0.82	**-8**	-	**-10**
Parent workshop	1.00	0.77	-22	-	-24	1.00	0.95	**-5**	-	**-6**	Staff training quality	0.93	0.79	-12	-	-15	0.95	0.86	**-8**	-	**-10**
Curricula	0.74	0.75	**3**	-	**-1**	0.85	0.85	**1**	-	**-1**	Parent workshop	0.65	0.60	**-2**	-	**-7**	0.95	0.86	**-8**	-	**-10**
Evaluation	0.92	0.57	-33	-	-37	0.95	0.75	-19	-	-22	Curricula	0.92	0.72	-18	-	-21	0.95	0.82	-12	-	-15
											Evaluation	0.61	0.76	17	-	13	0.77	0.82	**6**	-	**3**
Star rating	0.77	0.84	**8**		**5**	0.86	0.91	**5.6**		**3.5**	Star rating	0.74	0.70	**-1**		**-6**	0.82	0.77	**-2.8**		**-9.3**

[a]90% confidence interval for the difference in kappa agreement between distance training and in-person training methods (distance training kappa minus in-person training kappa). Bolded values indicate Equivalency between the two training methods. The two group are equivalent if ($kappa_{distance} - kappa_{in\text{-}person}$) ± 1.645 (standard deviation distance2 + standard deviation in-person 2)0.5 is completely contained in the interval with endpoints -10 and +10.

[b]90% confidence interval for the difference in % agreement between distance training and in-person training methods (distance training % agreement minus in-person training % agreement). Bolded values indicate Equivalency between the two training methods. The two group are equivalent if ($\%\ agreement_{distance} - \%\ agreement_{in\text{-}person}$) ± 1.645 (standard deviation distance2 + standard deviation in-person 2)0.5 is completely contained in the interval with endpoints -10 and +10.

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CHAPTER 4: EVALUATING THE RESPONSIVENESS OF POLICY AND PRACTICE AUDIT TOOL TO CHANGES IN THE HEALTHY EATING AND PHYSICAL ACTIVITY POLICY AND PRACTICE IN THE AFTERSCHOOL SETTING[3]

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Abstract

Background/ Objectives: Audit tools used to measure the effectiveness of policy interventions are rarely evaluated for their ability to detect changes in policy and practice environment, referred to as responsiveness. The Healthy Afterschool Activity and Nutrition Documentation (HAAND) instrument is a newly developed audit tool consisting of two sub-indices and their corresponding rating scales-the Healthy Afterschool Program Index (HAPI) for Physical Activity (HAPI-PA) and for Nutrition (HAPI-N). The purpose of this study is to examine the responsiveness of the HAAND instrument to changes in policy and practice environment.

Methods: Twenty afterschool programs across South Carolina serving over 1700 children (5-12 years old) participated in a group randomized controlled trial. The HAAND instrument responsiveness to change was assessed using HAAND baseline data (Spring 2013) and post-1 year follow-up data (Spring 2014). HAAND scores were computed and policy environment characteristics changes were calculated as the difference between baseline and year 1. Wilcoxon signed-rank test and effect size, standardized response median, and responsiveness index were used to examine the difference between the intervention and control groups.

Results: The HAPI-PA and HAPI-N scales median and interquartile range (IQR) score improved from a baseline score of 9.5 (±5.8) to 13.5 (±2.0) for HAPI-PA and a score 6.5 (±6.5) to 21.0 (±4.0) for HAPI-N after year 1 in the intervention group. In comparison, the HAPA-PA and HAPI-N scores showed non- significant changes between baseline and year 1 follow up in the control group. For the intervention group the HAPI-PA and HAPI-N scales effect sizes were 0.70 and 2.23, standardized response median values were 0.94 and 1.45 and responsiveness index scores were 1.07 and 2.5, respectively. For the control group the

HAPI-PA and HAPI-N scales effect size were 0.13 and 0.09, standardized response median were 0.14 and 0.11 and responsiveness index were 0.13 and 0.09, respectively.

Conclusion: The HAAND instrument showed moderate to high responsiveness to changes in the afterschool programs' HEPA policy and practice environment.

Introduction

In recent years audit tools have increasingly been used to collect information on the effectiveness (impact) of policy and practice interventions on healthy eating and physical activity (HEPA) levels of youth across various settings.[1] Accurate audit tools are the foundation for understanding and quantifying the impact of supportive HEPA policy and practice environment.[2] Therefore, if audit tools are to be useful in informing decision makers about the effectiveness of interventions, they must first demonstrate acceptable levels of validity, reliability, and responsiveness to change.[1,3] The later property (responsiveness to change) defined as the ability of (the) instrument to detect change when real change has occurred,[4-7] is of particular importance and has been proposed as an informative and a necessary psychometric property of audit tools used as an outcome measure.[8-10]

Emerging literature indicates that the vast majority of audit tools lack even the basic measurement property information such as validity and reliability.[11] Furthermore, since cross-sectional studies still dominate validation studies, most audit tools lack information on their "responsiveness to change".[2, 11] Afterschool settings are no different to other settings in the lack of consistency in reporting measurement properties of newly developed audit tools. Currently there are three audit tools with reported psychometric

properties designed to evaluate the policy and practice environment in the afterschool setting:[12-14] the Out-of-School Nutrition and Physical Activity Documentation Observational Practice Assessment Tool (OSNAP-OPAT), the Healthy Eating and Physical Activity (HEPA) survey and The Healthy Afterschool Activity and Nutrition Documentation (HAAND) instrument. The HAAND instrument is unique in that first; the HAAND tool is designed be used by both researchers and practitioners (i.e., program leaders) to assess the extent to which the afterschool programs align with current HEPA policy and practice recommendations and secondly: items in the HAAND instrument are based on current states, national, and organizational HEPA policies and standards.[12, 15] This makes the HAAND tool versatile and comprehensive in assessing the policy and practice environment in afterschool setting given there are numerous national, state, and local HEPA policies and standards programs can adopt.

In comparison, the OSNAP-OPAT and the HEPA survey are self-assessment tools designed to be used by practitioners to evaluate specific intervention or organizational standards.[13, 14] The HAAND instrument has established validity and reliability, [15] however, to date the instrument responsiveness to changes in the policy and practice environment in the afterschool setting has not yet been established. The purpose of this study was to evaluate the responsiveness of the HAAND instrument to policy environment characteristics following the implementation of a multi-step adaptive intervention called Strategies To Enhance Practice to Healthy Eating and Physical Activity (STEPs-HEPA)[16]

Method

Sample

Twenty afterschool programs across South Carolina serving over 1700 children (5-12 years old) were randomly selected from an existing registry of 535 afterschool programs to participate in this study. All participating afterschool programs were part of a large group randomized control trial testing the effectiveness of strategies designed to improve the quality of snacks served and increase moderate to vigorous physical activity (MVPA) levels in children attending community-based afterschool programs. Inclusion and exclusion criteria and intervention protocol have been described previously.[16] Briefly, afterschool programs within 1.5 hours drive from the university and defined as a childcare program operating immediately after the school day every day of the school year for a minimum of 2 hours, providing a snack, homework assistance, enrichment activities and opportunity for physical activity were included in this study. Programs ranged in organizational type (e.g., Boys and Girls Club, Parks and Recreation, etc.) and location (i.e., school-based, faith-based, or community-based).

Procedure

Changes to the policy and practice environment was evaluated using the HAAND instrument during a single day visit (Monday – Thursday) in spring 2013 for baseline data and again in spring 2014 for year 1 follow up data. On the day of the site visit, research staff arrived at the site 30 minutes before the start of the program. A brief 15 minute interview was conducted with the program leader to access available documents (e.g. parent and/or staff handbook, program schedule, snack menu etc.), in which all the HAAND domains were covered using a script interview guide. Once the afterschool

program started, research staff conducted direct observation of program delivery, specifically observing all scheduled physical activity opportunities. The HAAND tool was scored based on information collected from the interview with the afterschool program leader, review of existing documents, and observation of the scheduled physical activities. HAAND data were collected by 8 research assistants. The inter-rater reliability of the HAAND items (percentage agreement and kappa) across all items ranged from 70% to 100% (median 78%) and $\kappa = 0.60$ to 1.00 (median 0.64).

Instrument

Detailed information of the HAAND instrument is reported elsewhere [15]. In brief, the HAAND instrument is a rubric-based index where scores for each item range from 0 to a maximum of 4 and is designed to quantify the physical activity and nutrition environment within afterschool programs. The HAAND instrument consists of two sub-indices and corresponding rating scales - HAPI-PA and HAPI-N indices. Each scale consists of 7 domains (i.e., polices, training, child involvement, evaluation, curriculum, screen time, or access to vending machines, scheduling of activity or quality of snack served). The HAPI-PA consists of 11 items with an overall score ranging from 0 to 25, whereas the HAPI-N consist of 12 items with an overall score ranging from 0 to 34.

Intervention

Detailed descriptions of the interventions have been reported previously [16] Briefly, the intervention - Strategies To Enhance Practice (STEPs) for HEPA is a multi-step, adaptive approach aimed at incorporating the HEPA polices into daily routine practice. This approach consists of identifying essential afterschool program characteristics that represent fundamental building blocks which function as necessary programmatic

components to achieve full integration of HEPA policies. STEPs focuses on intentional programming of HEPA into each afterschool programs' daily schedule. This includes the identification of low cost outlets to reduce price barriers to purchasing fruit and vegetables (FV), delivering professional development training to promote healthy eating and physical activity and to develop core physical activity competencies, as well as providing ongoing technical support/assistance.

Data analysis

In general, responsiveness is commonly quantified using paired t-test (or its equivalent non-parametric test, i.e., Wilcoxon sign-rank tests), effect size statistic, standardized response mean (SRM) or the Guyatt responsiveness index (GRI) (Beaton et al., 2001a; García de Yébenes Prous et al., 2008),with calculations usually based on comparing the scores obtained by the measure (i.e., tool/instrument) prior to and following an intervention of known efficacy or by comparing the changes in scores over time to scores obtained using a gold standard outcome measure.[17, 18]

To assess the responsiveness of the HAAND instrument in this study, year 1 scores of the HAAND instrument and subscales (HAPI-PA & HAPI-N) were subtracted from the baseline scores (year 1 scores – baseline scores). Consequently, a positive change in scores indicates an improvement in afterschool program HEPA policy and practice environment. Since the outcome variables used (i.e., HAPI-PA & HAPI-N total scores) were not normally distributed, Wilcoxon sign-rank tests were used examine the differences in the HAAND scores between baseline and year 1. In addition, three statistical analyses were performed to assess the HAAND responsiveness: effect size

(ES), the standardized response median (SRM) and the Guyatt responsiveness index (GRI).

The ES is obtained by dividing the median change in scores from baseline to year 1(i.e. difference in median scores from baseline to year 1) by the interquartile range (IQR) of baseline scores.[18, 19] The SRM is obtained by dividing median change in scores by the IQR of the differences between year 1 and baseline scores.[18, 19] The GRI represents the ratio of observed change in a group of subjects expected to undergo change (i.e., intervention group) to the variability (i.e., IQR) in stable subjects (i.e., control).[18, 19] In this study the GRI was calculated as the median change in scores from baseline to year 1 between the intervention and control group divided by the IQR of the control group individual change scores.[19] Cohen effect size benchmarks are used to indicate the magnitude of change, with the absolute values of <0.2 categorized as having minimal responsiveness, ≥0.2 and ≤ 0.5 considered as low, >0.5 and ≤0.8 considered moderate, and ≥ 0.8 considered high responsiveness.[17, 20]

Results

Table 4.1 presents the total HAAND median and IQR scores, and individual HAPI-PA & HAPI-N median (IQR) scores at both baseline and year 1 for participating programs. Overall, the intervention group total HAAND median scores (sum of HAPI-PA & HAPI-N scales) showed a significant increase of 16 (±10.0) points (p=0.001,) from baseline to year 1, whereas the control group total HAAND median score increased by 1.0 (±7.5) point (p=0.623) from baseline to year 1. The intervention group median IQR baseline for total HAPI-PA was 9.5 (±5.8), which improved to 13.5 (±2.0) after the intervention period (P = 0.002), whereas the control group showed a non- significant

decrease of 0.5 (±3.5) from baseline to year 1. For the HAPI-N, the intervention group median IQR baseline was 6.5 (±6.5), which improved to 21.0 (±4.0) after the intervention period (P=0.001). In comparison, the control group's HAPI-N scores showed non-significant decrease of 0.5 (±4.5) between baseline and year 1.

All three statistical metrics indicated that the HAAND instrument showed moderate to high responsiveness to known changes in the afterschool program policy and practice environment (Table 4.2). Specifically, the intervention group ES, SRM and RI were 0.70, 0.94, and 1.07, respectively for HAPI-PA. Whereas, the control group ES, SRM, and RI were 0.13, 0.14, and 0.13, respectively for HAPI-PA. For HAPI-N, the intervention group ES, SRM and RI were 2.23, 1.45, and 2.52, respectively, whereas, the control group ES, SRM, and RI were 0.09, 0.11, and 0.09 respectively.

Discussion

The aim of this study was to investigate the responsiveness of the HAAND instrument using the baseline and year 1 data from the Strategies To Enhance Practice (STEPs) for HEPA intervention. The STEPs intervention was designed to assist afterschool programs improve their nutrition and physical activity environment. Based on year 1 findings, this multi-step adaptive intervention has shown to produce meaningful changes in both the nutrition and physical activity environments in the afterschool setting.[21, 22]

The finding of this study indicates that the HAAND instrument is responsive to changes in the HEPA policy and practice environment resulting from the implementation of the strategies To Enhance Practice (STEPs) for HEPA intervention. More specifically, our results found that the HAPI-N scale showed a larger increase (14.5 point increase) in

comparison, the HAPI-PA scale (4.5) from baseline to year1. The observed differences in the magnitude of change between the HAPI-N and HAPI-PA scales scores was not surprising and mirrored previous intervention findings, with a larger gain observed in changing the nutrition environment compared to physical activity environment.[21, 22]

There are several possible explanations for the observed difference in the magnitude of change between the two scales. One possible reason could be that the STEPs-HE strategies focused on identifying low-cost outlets for programs to purchase healthy snack. Once programs were able to access a healthy snack option without increasing their costs, programs in the intervention group showed an increase in the food and beverages served that met Healthy Eating Standard, with the intervention group serving significantly more fruits and vegetables and less sugar sweetened beverages at year 1 compared to baseline.[22] In contrast, although implementing the STEPs-PA strategies was successful in helping some of the intervention programs develop physical activity schedules, follow those schedules, and schedule more quality structured physical activity time, there were limited changes observed in the intervention group related to the scheduling of physical activities. In addition, some of the intervention programs had reduced the total amount of time allocated for physical activity.[21] This, in turn, may explain the lower magnitude of change in the HAPI-PA scale compared to the HAPI-N scale between baseline and year 1. All of the control group scores showed negligible changes in the total HAAND scale scores (i.e., an increase of 1 point) and both the HAPI-PA and HAPI-N scales scores (i.e., a decrease of 0.5 points) from baseline to year 1. These changes were non-significant.

There is a wide disagreement in the literature on defining responsiveness and how it should be assessed.[18, 23, 24] For example, Beaton et al., (2001a) reported 16 definitions of responsiveness suggesting that part of the issue for the lack of agreement between existing opinions is related to the nature of the change that is being detected. This lack of agreement on the concept and terminology of responsiveness has resulted in the development of a wide range of statistical methods intended to quantify responsiveness of outcome measures.[18, 19] In this study, in addition to examining the within-group differences (baseline vs. year 1) using Wilcoxon sign-rank test, we used effect size statistics (e.g., ES, SRM, and GRI) which measure the relationship between the magnitude of change (signal) and variability (background noise)[19] to examine the HAAND instrument responsiveness. Our findings revealed that although the numerical values of the three indices were different, all showed a similar ranking order of responsiveness in the HAPI-N scale. However, the ES index for the HAPI-PA showed the scale as moderately responsive in comparison to the SRM and the GRI indices that showed the HAPI-PA scale as a highly responsive tool. ES is still largely being reported in responsiveness studies, although there are calls to not use this index when reporting responsiveness of outcome measures as it fails to account for response variance in the stable group (i.e., control group). The use of the SRM has been encouraged as it accounts for the response variance in the control,[7, 25] while some authors recommend the use of the GRI as it has been reported in the literature as the more superior statistical tool when assessing outcome measures responsiveness[19]. In this study, the ES and SRM for the HAPI-PA and HAPI-N ranged from moderate to large [20]. Likewise, the GRI index scores for both the HAPI-PA & HAPI-N scales showed that the two scales are highly responsive

with GRI values of 1.07 and 2.54 for HAPI-PA and HAPI-N respectively. In comparison, the values of the three indices (i.e., ES, SRM, and GRI) in the control group showed minimal responsiveness (<0.2), indicating the discriminative ability that the HAAND instrument to differentiate between real change and the absence of change at the group level.

Despite the wide increase in the use of audit tools as outcome measures to evaluate policy interventions, the majority of such tools were rarely evaluated for their responsiveness.[2, 11] This is a significant omission given that responsiveness is a crucial criterion when using audit tools to assess changes over time.[8, 26, 27] To highlight this point, recently two validations studies reported on the validity the OSNAP-OPAT[13] and the Y-USA HEPA survey.[14] Both tools are reported to be valid measures in either assessing intervention impact as the case in the OSNAP-OPAT which is designed to evaluate the effectiveness of the OSNAP intervention; or assessing implementation of specific organizational standards as the case with the Y-USA HEPA survey. However, neither tool has been assessed for responsiveness to change although being used as outcome measures. To the extent of our knowledge, the HAAND instrument is currently the only audit tool designed to evaluate the healthy eating and physical activity policy environmental characteristics with reported responsiveness statistics, adding to the utility of the HAAND instrument as credible outcome measure tool as well as being a valid and reliable tool.

There are a number of strengths to this study. These include the number of afterschool programs (n=20), the use of control group, and the use of the pre- and post-test design. There are also some limitations. This study assessed responsiveness via

comparing the scores obtained by the measure (i.e., HAAND) prior to and following an intervention of known efficacy (i.e., Strategies To Enhance Practice (STEPs) for HEPA intervention). The field of policy and practice environment measurement in the afterschool setting is in its infancy and lacks acceptable external standards against which to test responsiveness against gold standard measure. Therefore, although validating the HAAND this dimension of responsiveness is desirable, this was not possible due to the lack of an acceptable reference measure designed to assess the changes in the afterschool program policy and practice environment. In addition, the focus of this study was to examine the ability of the HAAND instrument to capture program level changes using pre- and post-design and not to assess the accuracy of the HAAND instrument against other measures known to be responsive. In addition, we feel that the use of a control group as a comparison group serves as a strong indicator of the discriminative ability of the HAAND tool in the absence of an external standard.

In conclusion, the HAAND instrument is not only capable of detecting changes in the afterschool programs policy and practice environment but is also able to detect the absence of change. Policy makers and researchers could use the HAAND instrument to both assess policy and practice environment characteristics (i.e., as an evaluation tool) as well as to the measure the impact of policy interventions on the policy environment (i.e., as an outcome measures).

Table 4.1: Afterschool programs Healthy Afterschool Activity and Nutrition Documentation (HAAND) instrument scores

	HAPI-PA [a]				HAPI-N [b]				Total HAAND			
ASP's Intervention	Baseline	Year 1	*Diff*	p-value	Baseline	Year 1	Diff	p-value	baseline	year 1	*Diff*	p-value[c]
Program 1	10	14	4		10	21	11		20	35	15	
Program 2	9	12	3		12	21	9		21	33	12	
Program 3	4	12	8		1	22	21		5	34	29	
Program 4	10	14	4		4	24	20		14	38	24	
Program 5	12	12	0		5	21	16		17	33	16	
Program 6	11	13	2		8	26	18		19	39	20	
Program 7	12	16	4		3	23	20		15	39	24	
Program 8	3	15	12		10	16	6		13	31	18	
Program 9	5	14	9		9	17	8		14	31	17	
Program 10	5	11	6		2	18	16		7	29	22	
Median (IQR)	9.5 (5.8)	13.5(2.0)		0.002	6.5(6.5)	21(4.0)		0.01	14.5(5.3)	30.0(10.0)		0.001
ASP's Control												
Program 1	7	7	0		7	2	-5		14	9	-5	
Program 2	11	5	-6		9	6	-3		20	11	-9	
Program 3	12	13	1		12	8	-4		24	21	-3	
Program 4	12	14	2		6	7	1		18	21	3	
Program 5	10	9	-1		11	17	6		21	26	5	
Program 6	6	4	-2		18	16	-2		24	20	-4	
Program 7	8	9	1		6	6	0		14	15	1	
Program 8	8	13	5		5	9	4		13	22	9	
Program 9	11	8	-3		12	12	0		23	20	-3	
Program 10	6	8	2		5	7	2		11	15	4	
Median (IQR)	9.0(3.8)	8.5(4.8)		0.500	8.0(5.8)	7.5(5.0)		0.637	19(8.5)	20.0(6.0)		0.623

[a]Healthy Afterschool Program Index – Physical Activity; [b] Healthy Afterschool Program Index – Nutrition; Test of change from baseline to year 1 using Wilcoxon sign-rank.

Table 4.2: Within-group comparison of the Healthy Afterschool Activity and Nutrition Documentation (HAAND) instrument Responsiveness, Median (IQR)

	Baseline	Year_1	Change score[a]	*P* difference[b]	Responsiveness to change		
	Median(IQR)	Median(IQR)	Median (IQR_{diff})		ES[c]	SRM[d]	RI[e]
Intervention group							
Total HAAND	14.5(5.3)	30.5(10.0)	16.0(10.0)	0.001			
HAPI-PA	9.5(5.8)	13.5(2.0)	4.0(4.3)	0.002	0.70	0.94	1.07
HAPI-N	6.5(6.5)	21.0(4.0)	16.0(10.0)	0.01	2.23	1.45	2.52
Control group							
Total HAAND	19.0(8.5)	20.0(6.0)	1.0(7.5)	0.623			
HAPI-PA	9.0(3.8)	8.5(4.8)	0.5(3.5)	0.500	-0.13	-0.14	-0.13
HAPI-N	8.0(5.8)	7.5(5.0)	0.0(4.5)	0.637	-0.09	-0.11	-0.09

[a]change score is the differences between year1 and baseline scores.

[b]P-value for the comparison between baseline and year 1. Wilcoxon sign-rank test were used to test significant of difference.

[b] ES, effect size: M_2-M_1/$IQR_{baseline}$ (M_2 = median at follow up, M_1= median at baseline, $IQR_{baseline}$= inter-quarter range at baseline).

[c] SRM, standardized response mean: M_2-M_1/IQR_{diff} (M_2 = median at follow up, M_1= median at baseline, IQR_{diff} = inter-quarter range of the difference between year 1 & baseline).

[d] RI, responsiveness index: M_2-M_1/IQR_{stable} (M_2 = median at follow up, M_1= median at baseline (IQR_{stable} = inter-quarter range of control group).

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CHAPTER 5: ASSOCIATION OF ENVIRONMENT AND POLICY CHARACTERISTICS AND CHILDREN'S ACTIVITY LEVELS[4]

[4] Ajja R, Clennin MN, Weaver RG, Moore JB, Huberty JL, Ward DS, Pate RR., Beets MW. 2014. *Preventive medicine*. 69:S49-S54. Reprinted here with permission of publisher (see appendix B)

Abstract

Background: Afterschool programs (ASPs) are an important setting in which to promote children's physical activity. This study examines the association of environmental and policy characteristics on the moderate-to-vigorous physical activity (MVPA) and sedentary behavior of children attending ASPs.

Methods: A total of 1,302 children attending 20 ASPs across South Carolina wore accelerometers (ActiGraph GT3X+) for up to 4 non-consecutive days. Policy-level characteristics were evaluated using the Healthy Afterschool Program Index-Physical Activity (HAPI-PA) scale. Physical activity space was measured using a measuring wheel (indoor, ft^2) and GIS (outdoor, acres). The structure (free-play or organized) of activity opportunities, was evaluated via direct observation. Time spent in MVPA and sedentary, both indoors and outdoors, was estimated using accelerometry.

Results: For every $5000ft^2$ of utilized indoor activity space an additional 2.4 and 3.3 minutes/day of sedentary behavior was observed among boys and girls, respectively. A higher ratio of free-play to organized play was associated with higher indoor sedentary behavior among boys and girls (3.9 minutes/day and 10.0 minutes/day, respectively). For every one acre of outdoor activity space used, an additional 2.7 minutes/day of MVPA was observed for boys. A higher free-play to organized play ratio was associated with higher outdoor MVPA for boys and girls (4.4 and 3.4 minutes/day increase, respectively). Policy characteristics were unrelated to MVPA levels and time spent sedentary. **Conclusion:** Findings indicate that policies and the size of activity space had limited

influence on MVPA and sedentary behavior, suggesting that programmatic structure may be a more effective option to improve MVPA levels of children attending ASPs.

Introduction

The majority of children and youth fail to meet current physical activity guidelines,[1, 2] making inactivity among school-age children an important public health concern. In recent years, afterschool programs (ASPs; 3:00pm-6:00pm) have emerged as an opportune setting for children to accumulate up to half of their total daily recommended moderate-to-vigorous physical activity MVPA.[3, 4] However, the majority of children attending ASPs are failing to accumulate 30 minutes of MVPA.[5, 6] In an effort to increase the physical activity levels of youths attending ASPs, 14 states and a number of national organizations (e.g., the National Afterschool Alliance, Boys & Girls Club, etc.) have developed and/or endorsed policies and standards aimed at creating supportive physical activity environments.[4, 7] At their core, these policies focus on characteristics such as the amount of physical activity accumulated by the youth attending (e.g., in California, 30 minutes of MVPA, and in North Carolina, 20% of attendance spent in MVPA), the presence of written policies, the provision of professional training for staff on physical activity promotion, scheduling of physical activities, quality of physical activities offered, and an evaluation process.[4, 8]

Few studies have evaluated the impact of supportive physical activity polices/standards on the activity levels of children attending ASPs. Findings from these studies indicate that policies are largely unrelated to children's physical activity levels[9] suggesting other ASP characteristics may be influencing children's activity levels. These include physical characteristics such as size of activity space, and contextual

characteristics such as location of activity opportunities (i.e., indoor vs. outdoor), and type/structure of the activity sessions (i.e., free-play vs. organized-activities).[10-12] To date, a limited number of studies have evaluated the association between such ASP contextual program characteristics and children's physical activity and sedentary behaviors. Findings from these studies suggest that children spend significantly more time in MVPA when engaged in outdoor free-play.[13, 14] Additional examination of these associations can assist in identifying modifiable leverage points within the ASP setting that can be targeted in interventions to increase children's MVPA.[15] Therefore, the purpose of the present study is to evaluate the association of policy characteristics and other program characteristics (i.e. physical and contextual characteristics) with the MVPA and sedentary behavior of children attending a diverse range of ASPs.

Methods

Participants

Twenty diverse ASPs across South Carolina, serving over 1,800 children (K to 5th grade), were recruited as part of a larger group randomized controlled trial (Beets, 2014). Baseline measurement took place during Spring 2013. Programs ranged in organizational type (e.g., YMCA, Boys and Girls Club, Parks and Recreation, etc.) and location (i.e., school-based, faith-based, or community-based). On average, program duration was 206.7 minutes/day, ranging from 135 to 255 minutes. The average percent population in poverty across the census track in which the 20 ASPs were located was 15.6 (range 4.4% to 28.8%).[16] All procedures were approved by the Institutional Review Board at the University of South Carolina.

Physical Activity Measurements

Physical activity was collected via the ActiGraph GT3X+ (Shalimar, FL) accelerometer using a standardized protocol.[5, 17] In brief, accelerometers were programmed to collect activity in 5-second epochs to account for the sporadic nature and transitory pattern of children's physical activity.[18] The accelerometers were fitted around the children's waist on the right hip upon arrival to the ASP by research staff and time was recorded (time on), as well as demographic information of participating children. Research staff removed the accelerometer prior to the child's departure and recorded the time (time off). Research staff continuously monitored the entire ASP for child compliance in wearing the accelerometer. Data was collected on four unannounced non-consecutive week days (i.e., Mon-Thur), with each child having the opportunity to wear an accelerometer for up to 4 days. A total accelerometer wear-time of ≥60 minutes was considered a valid ASP day of accelerometer data.[6, 19, 20] The cut-points established by Evenson and colleagues for MVPA were used to estimate physical activity intensity levels.[21] Matthews and colleagues' cut-points were used to estimate sedentary behavior.[22] Time (minutes/day) spent indoors and outdoors was determined using the GT3X+ ambient light sensor. A lux threshold of 32 was applied to accurately assess indoor and outdoor locations (ROC Curve – AUC 0.93, sensitivity 92.7, and specificity 92.6). These procedures were performed throughout the duration of the study.

Policy Characteristics

Each afterschool program was evaluated for the presence of 11 supportive physical activity policy characteristics/items [i.e., (1) the presence of written policy to promote physical activity, (2) child feedback, (3) screen time, (4) types of physical

activities, (5) allocation of time for physical activity in the schedule, (6) the presence and (7) quality of staff training to promote physical activity, (8) providing activities that appeal to both girls and boys, (9) curriculum, (10) providing parent workshop(s) and (11) evaluation/monitoring using the Healthy Afterschool Program Index-Physical Activity (HAPI-PA) scale from the Healthy Afterschool Activity and Nutrition Document (HAAND) tool.[23] In the HAPI-PA, each item was scored on an ordinal scale from zero up to four. All items were summed to represent an overall total score ranging from zero to 25 with higher scores indicating more supportive policy characteristics for physical activity. All policy characteristic data were collected by two research assistants during a single day site visit that consisted of an interview with the ASP site leader, review of available documents, and direct observation of program delivery. Reliability (percentage agreement and kappa) across all items ranged from 87.5% to 100% and $\kappa = 0.73$ to 1.00.

Contextual Characteristic of Physical Activity

For the purpose of this study, contextual characteristics refer to the type/structure of the physical activity offered at the program and was classified as either free-play or organized-activity. Free-play was defined as unplanned activity and/or that not led by staff, commonly consisting of children being released to play in an area with fixed (e.g., playground, basketball hoops) and/or portable physical activity equipment (e.g., balls, jump ropes) while supervised by staff. Organized-activity was defined as planned physical activities led by staff, and include sports, games (e.g., tag, duck-duck goose), dances, races etc.[13, 19] Activity type was evaluated via direct observation using the System for Observing Staff Promotion of Activity and Nutrition.[24] The SOSPAN is based on momentary time sampling in which continuous scans (i.e., one after another) are

performed for the duration of the ASP to capture the contextual factors within pre-designated target areas. Trained research assistants conducted the observations by systematically rotating through target areas where children were present. Reliability (percentage agreement and kappa scores) for activity type (i.e., free-play vs. organized-activities) was 98.1% and 98.7% and κ= 0.96 and 0.97, respectively. Because both free-play and organized activities could occur simultaneously, for analytical purposes, a ratio of free-play to organized-activities was created, where higher numbers indicated a greater amount of free-play occurring during the physical activity opportunity (i.e., the number of scans observing free-play divided by the number of scans observing organized activity).

Physical Characteristics

Based on the ASP site directors' self-report, all areas available for physical activity (e.g., gym, open green space, courts, etc.) and non-physical activity space (e.g., classrooms, cafeteria, etc.) were identified, divided into target areas, and measured for physical size. Utilized indoor and outdoor physical activity space was verified by the program site director and direct observation via SOSPAN. Indoor physical activity area (ft^2) was measured using a measuring wheel (Keson RoadRunner). Google Earth software was used to obtain aerial imagery (top down) of the outdoor area used for physical activity. A polygon measurement tool was then used to map target area boundaries. Estimates of the outdoor spatial area (acre) were calculated using Geographical Information Systems software (GIS).[25, 26]

Anthropometry

Height and weight measurements were conducted with children wearing light clothing and no shoes. Height was measured to the nearest 0.1 cm, using a portable stadiometer (Charder HM 200P) and weight was measured to the nearest 0.1 lbs with a high precision electronic scale (TANITA HD-314). Details of the measurement protocol are reported elsewhere.[5, 6]

Statistical Analysis

Descriptive means, standard deviations, and percentages (for dichotomous variables) were computed. The association between time spent being physically active or in sedentary behavior in relation to environmental and policy characteristics was evaluated using random effects mixed model regression accounting for multiple measurement days, nested within children, nested within ASP. The dependent variables in the model were the minutes spent in physical activity (MVPA) and sedentary behavior. Independent variables included in each model were total HAPI-PA score, utilized indoor or outdoor physical activity space (based on direct observation), and the ratio of free-play to organized-play observed (defined as the proportion of free-play to organized activities with positive values indicating more free-play compared to organized-activities). Models were evaluated separately for the amount of time spent engaged in MVPA and time spent in sedentary behavior during indoor and outdoor opportunities for boys and girls. All estimates were adjusted for child-level characteristics (i.e., age, race, BMI percentile) and ASP characteristics (i.e., and percent population in poverty and program duration). Additionally, the interaction between policy scores and indoor and outdoor space, as well as, the interaction between policy scores and type of physical activity (i.e., organized or

free play) were evaluated in the models. Only interactions that were statistically significant ($p < .05$) were retained in the model. All analyses were conducted using Stata (v12, College Station, TX).

Results

A total of 1,302 children (5-12 years old) wore accelerometers for up to 4 non-consecutive days while attending the ASPs. Table 5.1 presents the descriptive characteristics of children attending the ASPs, specific program characteristics, as well as physical activity outcomes. Boys and girls accumulated an average of 24.2 and 18.1 minutes of MVPA/day and 64.6 and 69.8 minutes/day of sedentary behavior, respectively. Boys accumulated 11.3 minutes of indoor MVPA/day (49%) and 13.4 minutes of outdoor MVPA/day (51%), while girls obtained 7.9 minutes of indoor MVPA/day (47%) and 10.7 minutes of outdoor MVPA/day (53%).

Model-derived estimates for the amount of time boys and girls spent in MVPA and sedentary behavior while indoors and outdoors are presented in Table 5.2 and Table 5.3. The presence of physical activity supportive policy characteristics was unrelated to boys' MVPA and sedentary behavior both indoors and outdoors. For every one unit increase in HAPI-PA score, girls accumulated fewer daily minutes of indoor MVPA [-0.7 (95%CI -1.1 to -0.4) minutes/day (i.e., -42 seconds/day)] and more daily minutes of outdoor MVPA [0.9 (95%CI 0.0 to 1.7) minutes/day (i.e., 54 seconds/day)].

With each additional 5,000ft^2 of utilized indoor activity space (i.e., approximately the size of a small gymnasium with one basketball court), boys and girls spent an additional 2.4 (95%CI 0.5 to 4.4) and 3.3 (95%CI 0.9 to 5.7) minutes/day sedentary while indoors respectively. Girls' accumulated an additional 0.7 (95%CI 0.1-1.3) minutes/day

(i.e., 42 second/day) of indoor MVPA. A higher free-play to organized activities ratio was associated with an additional 3.9 (95%CI 0.2 to 7.5) and 10.0 (95%CI 5.7 to 14.3) minutes/day of indoor sedentary behavior for boys and girls, respectively, and an additional 2.4 (95%CI 0.9 to 3.9) minutes/day of indoor MVPA for boys. For every additional acre of utilized outdoor activity space, an additional 2.7 (95%CI 1.2 to 4.3) minutes/day of outdoor MVPA was observed among boys. A higher free-play to organized activities ratio was associated with an additional 4.4 (95%CI 1.8 to 6.9) and 3.4 (95%CI 1.4 to 5.5) minutes/day of outdoor MVPA for boys and girls, respectively. None of the interactions met the criteria for statistical significance and therefore, not included in the final models.

Discussion

The findings from this study suggest ASP policies were not associated with MVPA or time spent sedentary. Furthermore, the space utilized for physical activity opportunities had minimal impact on the activity levels of children attending ASPs. In contrast, modifiable programmatic features, such as the type/structure of activity provided were associated with relatively more/less time spent in MVPA and sedentary. These findings pinpoint areas of additional focus and potential modification that may assist ASPs in improving children's activity levels.

Numerous physical activity policies for ASPs have been widely endorsed by national organizations.[4, 7] The overall intent of these policies is to facilitate active environments that should lead to higher levels of physical activity. The findings in this study suggest policy characteristics, as currently enacted in ASPs, are unrelated to either MVPA or time spent sedentary in this setting. The reasons for this are unclear. The

majority of ASPs in this study were not currently receiving professional development training. Those that did offer training provided less than 1 hour of physical activity promotion instruction to their staff each year. Training is considered a cornerstone of providing high quality physical activity opportunities for children.[8, 15, 17] Additionally, current policies recommend ASPs should provide up to 8 hours of physical activity-related training each year,[7] well above the amount reported by the ASPs in this study. Of concern was the low overall score on the HAPI-PA scale, indicating the observed ASPs paid limited attention to any of the physical activity facilitating policy elements (e.g., monitoring, curricula adoption, child feedback) called for in existing national and state physical activity policy documents.[4, 7] This is consistent with recent studies evaluating the adoption of physical activity policies nationally[27] and suggests dissemination and uptake of policy in ASPs has not been accomplished. Currently in South Carolina there is no state-mandated physical activity policy for the ASP setting which could explain, in part, the low score on the HAPI-PA scale. The absence of state-mandated policy may translate to lack of accountability for ASPs in meeting nationally established physical activity guidelines.

Of note, two of the largest ASP providers in the nation, the National Recreation and Park Association and the Boys and Girls Clubs of America, have recently joined the Y of USA in adopting the National Afterschool Association's Healthy Eating and Physical Activity (HEPA) Standards.[28] These national efforts are likely to help catalyze the recognition and adoption of policies in ASPs, which in turn, may assist ASPs in creating physical activity-friendly environments. However, while the presence of supportive physical activity policy is important, the adoption of such policies does not

often translate into practice.[9] Thompson et al., evaluated compliance with policy mandates calling for providing scheduled physical education (PE) during the school day at elementary, middle and high schools in California and reported regular lack of adherence to PE schedules by teachers, in addition to discrepancies between self-reported and objectively-reported PE time.[29] In light of these results, the development and adoption of supportive physical activity policies may not translate to changes in practice. Hence, future efforts should move beyond the development and institutionalization of ASP physical activity policies and focus on the development of effective strategies to increase implementation and compliance with established policy mandates.

Consistent with previous studies,[30-32] the size of outdoor play space was associated with children's physical activity and sedentary behaviors. Our models showed that boys accumulated more MVPA when more outdoor space was utilized. However, the magnitude of association was relatively small in proportion to the increase in the size of outdoor play space (i.e., for boys an additional 2.7 minute/day of MVPA for each additional acre used). This association did not hold true for girls. Based on model estimates, ASPs would need to use approximately 6.8 acres of outdoor activity space in order for attending children to meet California's physical activity policy that calls for children to be engaged in 30 minutes of MVPA while attending ASP.[4] Conversely, the size of indoor play space was associated with children accumulating more sedentary time during the ASP. This could be due to the widely observed use of physical activity space for other non-physical activity programming such as enrichment activities and homework in this sample. The limited association observed suggests that what's important is not the size of the space ASPs have, but how the space is utilized. This finding is crucial for

ASPs with limited space that struggle to meet physical activity goals outlined in existing policies.

Evidence indicates outdoor free-play is associated with children accumulating higher amounts of physical activity.[12, 13, 19] Findings from the present study reinforce previous literature, with outdoor free-play resulting in children accumulating more minutes of outdoor MVPA with boys accumulating more MVPA during outdoor free-play compared to girls. However, calling for more outdoor free-play opportunities may not be the most practical or feasible course of action to increase children's physical activity levels. Free-play relies on children to self-select to be active. In this scenario, children who want to be physically active are active, while other children will consistently self-select not to be physically active. Furthermore, studies indicate that under free-play conditions, physical activity levels decline quickly within the first 10 minutes.[12, 33, 34]

An interesting finding of the present study is that, although indoor free-play was associated with boys accumulating more MVPA/day, indoor free-play was also associated with boys and girls accumulating more indoor sedentary time, with girls accumulating more sedentary time compared to boys. This is likely due to the self-selection of children into non-active activities during this time. In this study, children were observed to select sedentary activities, such as sitting and talking with friends, during indoor physical activity time. This was largely attributed to the lack of structured physical activity provided during indoor opportunities. In addition, one of the potential reasons for the lack of observed association between organized physical activities and MVPA levels could be due to the type/structure of organized physical activities offered in

these programs. Traditional activities/games, such as tag and kickball, included children standing and waiting for their turn and/or children being eliminated from games. This translates into children spending more time in sedentary behavior when playing these games.[19, 35] Thus, while free-play can be part of activity offerings, providing high quality structured activities will assist all children to meet physical activity recommendations.

Emerging literature suggests that children accumulate greater amounts of MVPA in the ASP setting when simple modifications to traditional organized games (e.g., removing lines, eliminating elimination, and reducing team sizes) are implemented. [36, 37] Additionally, ASPs should consider limiting children's opportunities to engage in sedentary behaviors during designated indoor physical activity time. For instance, program leaders can schedule two or more physical activities simultaneously to allow for choice, but should not allow the choice to be inactive. Incorporating scheduling techniques such as this into ASPs is a viable strategy to reduce the amount of time children spend sedentary while indoors.

A major strength of this study was the use of objective measurement tools (accelerometers) to assess physical activity levels among a diverse sample of ASPs serving over 1,800 participants across the state of South Carolina. This study also used direct observation to examine contextual information regarding the type of activity provided and evaluated accumulated activity both indoor and outdoor. A major limitation of this study includes defining physical environment in terms of the size of utilized activity space only. Studies have reported that other physical attributes of activity space such as playground design, types of activity space (courts, open space, fields, etc.), as well as the quality and quantity of play equipment could impact children's activity

levels.[31, 33] However, due to the resource limitation of this study, we were unable to incorporate these physical attribute measures of the play space into the current analysis. Future research should examine the influence physical attributes of the activity space have on children's physical activity levels in addition to the environmental variables examined in the present study. Furthermore, geographical location (rural vs. urban vs. suburban) and organizational affiliations (faith-based, The Y of USA, Boys & Girls Club, in-depended owned programs etc.,) may have an impact on children physic activity levels, however, due to limited variability in this sample, these program attributes were not assessed. Ultimately, additional research looking into those attributes is needed to further understand the role ASP physical environments play in children's physical activity levels.

Recommendation

To address the gap between ASP physical activity policies and practice and to promote adherence to policy guidelines, the following recommendations should be considered:

1) A greater emphasis should be placed on quality ASP staff training for physical activity to ensure staff can competently carry out policy recommendations, which is critical for policy success as these individuals are often responsible for carrying out adopted policies.
2) In order to evaluate current program adherence to policies and monitor progress, ongoing evaluations of children's physical activity levels during ASP

must be endorsed as part of program quality assessment. The importance of evaluating and monitoring program practices cannot be overstated.

3) Finally, in order to increase ASP accountability for meeting physical activity policy goals, ASP quality evaluation and licensing must incorporate physical activity metrics as part of its assessment and standards.

Conclusion

In summary, physical activity policies are important. However, in the absence of supportive strategies aimed at increasing policy implementation and adherence, policies are unlikely to be translated into practice in the ASP setting which will result in minimal influence on children's activity levels. Together, these findings indicate that programmatic structure, aimed at creating physical activity-friendly environments, may be more influential in increasing MVPA levels of children attending ASPs than calling for more supportive physical activity policies or more outdoor activity space.

Table 5.1: Child-level characteristics, afterschool program characteristics, physical activity and time spent in sedentary, Mean (SD) unless otherwise noted

	Overall	
Child-level Characteristics		
Age (Year)	7.9 (1.8)	
Gender (%)		
Boys	53.6	
Girls	46.4	
Race (%)		
White	56.1	
Non	43.9	
BMI[a] z-score	0.7 (1.0)	
Afterschool Program Characteristics		
Percent population poverty	15.6 (6.6)	
Program duration (minutes)	206.7(27.5)	
HAPI-PA[b]	9.1 (2.9)	
Indoor used activity space (5000ft^2)	1.0 (1.3)	
Outdoor used activity space (acre)	0.9 (1.0)	
Physical Activity Level Characteristics	Boys	Girls
Average time in attendance (minutes/day)[c]	130.1 (40.3)	131.4 (39.7)
Total physical activity (minutes/day)[d]	34.7 (26.0)	31.2 (23.1)
Sedentary (minutes/day)		
Total Sedentary	64.6 (25.7)	69.8 (27.4)
Total sedentary indoor	53.3 (25.3)	53.0 (28.2)
Total sedentary outdoor	12.0 (12.0)	16.9 (15.3)
Moderate-to-vigorous physical activity (minutes/day)		
Total MVPA	24.2 (14.4)	18.1 (11.1)
Total MVPA indoor	11.3 (11.3)	7.9 (7.5)
Total MVPA outdoor	13.4 (12.4)	10.7 (9.6)

[a]BMI represent body mass index; [b]HAPI-PA represent total score of the Healthy Afterschool Program Index – Physical Activity; [c] Time in attendance represent the total amount of time children wore the accelerometers; [d]Total physical activity represent light-to-vigorous physical activity. All physical activity estimates are adjusted for total time in attendance.

Note: Not all ASPs provided outdoor physical activity opportunities resulting in discrepancies between total mean activity and the sum of total mean indoor and total mean outdoor activity accumulated
Study location/time: South Carolina/ Spring 2013

Table 5.2: Association of Afterschool Program Environment and Policy Characteristics on Boys and Girls Time Spent in Indoor Moderate-to-Vigorous Physical Activity and Sedentary.

	Boys						Girls					
	Sedentary[a]			Moderate-to-Vigorous[b]			Sedentary[a]			Moderate-to-Vigorous[b]		
	Coef.	Std. Err.	(95% CI)	Coef.	Std. Err.	(95% CI)	Coef.	Std. Err.	(95% CI)	Coef	Std. Err.	(95% CI)
Age (years)	0.9	0.5	(-0.1 - 1.9)	**-0.5**	**0.2**	**(-1.0 - -0.0)**	**2.1**	**0.6**	**(0.9 - 3.2)**	**-1.0**	**0.2**	**(-1.4 - -0.7)**
Race (Referent = White)												
Other	1.6	2.0	(-2.3 - 5.4)	**-2.8**	**0.9**	**(-4.6 - -1.0)**	**4.6**	**2.1**	**(0.6 - 8.7)**	**-1.9**	**0.7**	**(-3.2 - -0.5)**
BMI[c]- z score	0.5	0.8	(-1.1 - 2.2)	0.3	0.4	(-0.5 - 1.1)	1.2	0.9	(-0.7 - 3.0)	0.2	0.3	(-0.4 - 0.8)
Percent population in poverty	-0.3	0.4	(-1.0 - 0.5)	-0.1	0.2	(-0.6 - 0.3)	0.2	0.5	(-0.7 - 1.2)	-0.1	0.1	(-0.3 - 0.0)
Total HAPI-PA scores[d]	-1.2	0.9	(-3.0 - 0.6)	-0.3	0.5	(-1.3 - 0.6)	-0.5	1.2	(-2.8 - 1.8)	**-0.7**	**0.2**	**(-1.1 - -0.4)**
Used physical activity indoor space (5000ft^2)	**2.4**	**1.0**	**(0.5 - 4.4)**	-0.6	0.4	(-1.4 - 0.3)	**3.3**	**1.2**	**(0.9 - 5.7)**	**0.7**	**0.3**	**(0.1 - 1.3)**
Activity type ratio[e]	**3.9**	**1.9**	**(0.2 - 7.5)**	**2.4**	**0.8**	**(0.9 - 3.9)**	**10.0**	**2.2**	**(5.7 - 14.3)**	0.4	0.6	(-0.7 - 1.6)

[a] time spent in sedentary time estimated via accelerometry using Matthews cut points; [b]time spent in moderate-to-vigorous activity estimated using Evenson cut points; [c]BMI represents body mass index; [d]HAPI-PA represents total score of the Healthy Afterschool Program Index – Physical Activity; [e]activity type ratio variable represent the proportion of free-play to organized activities with positive values indicated more free-play compared to organized activities.

Note: Bolded values are significant at $p<0.05$.

Study location/time: South Carolina/ Spring 2013

Table 5.3: Association of Afterschool Program Environment and Policy Characteristics on Boys and Girls Time Spent in Outdoor Moderate-to-Vigorous Physical Activity and Sedentary.

	Boys						Girls					
	Sedentary[a]			Moderate-to-Vigorous[b]			Sedentary[a]			Moderate-to-Vigorous[b]		
	Coef.	Std. Err.	(95% CI)	Coef.	Std. Err.	(95% CI)	Coef.	Std. Err.	95% CI)	Coef	Std. Err.	95% CI)
Age (Years)	0.3	0.2	(-0.1 - 0.8)	0.4	0.2	(-0.1 - 0.8)	**1.0**	**0.4**	**(0.3 - 1.7)**	1.0	0.2	(-0.3 - 0.5)
Race (Referent=White)												
Other	**2.6**	**0.9**	**(0.8 - 4.4)**	0.2	0.9	(-1.6 - 2.0)	-0.2	1.4	(-2.9 - 2.5)	-1.4	0.8	(-3.0 - 0.3)
BMI[c] z-score	-0.1	0.1	(-0.3 - 0.1)	**-0.2**	**0.1**	**(-0.4 - -0.0)**	-0.2	0.2	(-0.5 - 0.1)	-0.2	0.1	(-0.4 - 0.0)
Percent population in poverty	**0.4**	**0.2**	**(0.0 - 0.7)**	-0.0	0.3	(-0.5 - 0.5)	0.1	0.2	(-0.3 - 0.6)	0.1	0.2	(-0.3 - 0.5)
Total HAPI-PA scores	0.3	0.4	(-0.5 - 1.0)	0.8	0.6	(-0.4 - 1.9)	0.3	0.5	(-0.7 - 1.3)	**0.9**	**0.4**	**(0.0 - 1.7)**
Used physical activity outdoor space (acre)	1.00	0.8	(-0.4 - 2.5)	**2.7**	**0.8**	**(1.2 - 4.3)**	1.7	1.2	(-0.6 - 4.0)	1.2	0.6	(-0.0 - 2.4)
Activity type ratio	1.5	1.2	(-0.8 - 3.9)	**4.4**	**1.3**	**(1.8 - 6.9)**	0.5	1.9	(-3.2 - 4.2)	**3.4**	**1.0**	**(1.4 - 5.5)**

[a] time spent in sedentary time estimated via accelerometry using Matthews cut points; [b]time spent in moderate-to-vigorous activity estimated using Evenson cut points; [c]BMI represents body mass index; [d]HAPI-PA represent total score of the Healthy Afterschool Program Index – Physical Activity; [e]activity type ratio variable represent the proportion of free-play to organized activities with positive values indicated more free-paly compared to organized activities.

Note: Bolded values are significant at $p<0.05$.

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CHAPTER 6: DISCUSSION

Significance

Childhood obesity continues to be a challenging public health issue. In recent years, a large body of evidence has emerged implicating obesogenic environments as one of the key factors in the current obesity epidemic.[1] More specifically, the literature suggest that policies and the physical environment characteristics play a significant role in shaping the physical activity levels and eating habits of youth (≤ 18 years of age).[2-4] As a result, there has been a visible increase in the prevalence of policies and standards supportive of healthy eating and physical activity (HEPA) in settings that care for youth.[5-9] Subsequently, audit tools designed to assess policy environment characteristics have been developed; however, the measurement properties of available audit tools and the quality of collected data remains largely unknown. With nearly 10.2 million youth attending afterschool programs (ASP's) (3-6 pm) for an average of 8.1 hours per week,[10] ASP's are increasingly being recognized as an important setting in which to combat childhood obesity through promoting HEPA among school-age children.[11, 12] If settings such as ASP's are to play a major role in promoting healthy lifestyles, the ability to accurately assess the quality of the HEPA policy environment characteristics is essential. This necessitates the development of valid and reliable audit tools responsive to change that can be used by both researchers and non-researchers.

Purpose

The purpose of this dissertation was to address a number of issues pertaining to the measurement of HEPA policy and practice environment characteristics in settings that care for youth (≤ 18 years). The first aim of this dissertation was to examine the measurement properties of audit tools currently in use for assessing policy environment characteristics across a variety of settings that care for youth (≤ 18 years). The second aim was to first evaluate ASP leader's accuracy in assessing their program policy and practice environment when compared to users of established accuracy (i.e., gold standard rater) using the HAAND instrument (criterion-reference validity), and to determine if a distance training method is as effective in getting program leaders become accurate users of the HAAND as in-person training (equivalency test). The third aim was to evaluate the responsiveness of the HAAND tool to policy and practice environment changes. Finally, the fourth aim of the dissertation was to examine (1) the influence of both the physical environment characteristics of ASP's settings defined as the amount of space available for physical activity and (2) the policy environment characteristics, which ranges from having HEPA written policies, provision of professional training of HEPA promotion to staff, scheduling physical activities, quality of physical activities and food served to the monitoring and evaluation processes of HEPA behaviors of youth attending ASP's. Such information will serve to increase our current knowledge regarding the role of physical and policy environments characteristics on youth activity levels.

CHAPTER 2: Physical activity and healthy eating environmental audit tools in youth care settings: a systematic review

This study was a systematic review to examine the measurement properties of audit tools designed to assess PA and HE environmental characteristics in settings that

care for youth (<18 years). The study findings indicate that despite the fact that there are a wide range of audit tools measuring policy environment characteristics across the different settings that care for youth in recent years, little work has been devoted to establishing their reliability and/or validity and that only 11 out of 53 tools reported information on tools measurement properties. In addition, the majority of the tools assessing the HEPA policy environment were designed to be used by staff/community members (i.e., self-assessment tools), yet they were rarely evaluated for accuracy when used as a self-assessment tool.

CHAPTER 3: From the Researcher to the Practitioner: A Randomized Control Trial Comparing In-Person to Distance Training of Afterschool Program Leaders on the HAAND Instrument

This is the first study to test the accuracy (criterion-reference validity) of afterschool program leaders in assessing HEPA policy and practice environment characteristics at their programs using the HAAND instrument, in addition to evaluating the equivalency of two training methods, i.e., in-person and distance training. This study found that more than half of the items assessed in both the HAPI-PA and the HAPI-N scales had substantial or almost perfect agreement between the gold standard rater and the program leaders in both training groups. Though in-person training was a more effective training method than distance training, our results suggest that program leaders in both groups were able to accurately assess their HEPA policy and practice environments using the HAAND instrument.

CHAPTER 4: Measuring the policy and practice environment: Responsiveness to change of the Healthy Afterschool Activity and Nutrition Documentation (HAAND) Instrument.

The findings of this study indicate that the HAAND instrument is responsive to changes in the HEPA policy and practice environment resulting from the implantation of a promising multi-step adaptive intervention called Strategies To Enhance Practice (STEPs) for HEPA intervention which is aimed at assisting ASP's improve their nutrition and physical activity policy and practice environment. Although both scales of the HAAND instrument (i.e., the HAPI-PA and the HAPI-N) showed significant score increases in the intervention group compared to the control between baseline and year 1, the HAPI-N scale showed a larger score increase (14.5 point increase) in comparison to the HAPI-PA scale (4.5 point increase). The control group showed no significant changes in the HAAND scores from baseline to year 1. In addition, our results indicate that, both scales (HAPI-PA and HAPI-N) were moderately to highly responsive to changes in the ASP's policy and practice resulting from the STEPs intervention at year 1.

CHAPTER 5: Association of Environment and Policy Characteristics and Children's Activity Levels

Findings from this study suggest that ASP policies were not associated with MVPA or time spent sedentary. In addition, the space utilized for physical activity opportunities had minimal impact on the activity levels of children attending ASPs. On the other hand, modifiable programmatic features, such as the type/structure of activity provided were associated with relatively more/less time spent in MVPA and sedentary.

With higher free-play to organized-play ratio being associated with higher outdoor MVPA for boys and girls.

Practical Implications

The work described in this dissertation is unique and among the first to shed light on the current state of the science pertaining to the measurement quality of the audit tools used to measure HEPA policy and practice environments across settings that care for youth. Audit tools designed to evaluate the environmental characteristics of settings that care for children must demonstrate minimal acceptable levels of reliability and validity evidence. This is critical as information gathered from such tools is being used to inform policy makers' decisions regarding the impact or effectiveness of policy and practice environmental interventions and to, in turn, formulate future strategies regarding the promotion of physical activity and healthy eating habits among youth. To date, little effort has been taken to test the measurement quality of such tools (i.e. validity, reliability and responsiveness to change). Policy makers and practitioners should exercise great caution when using data from tools without reported measurement quality to evaluate the impact of HEPA related policy and practice on youth health behaviors. To move the field forward, only tools with an acceptable level of validity and reliability should be used. This review provides policy makers and practitioners with needed information to make informed decisions regarding the most appropriate tool for their setting.

To foster the adoption of supportive HEPA policy and practice, greater efforts are needed to make sure that audit tools used to measure the impact/effectiveness of policy interventions are tested for their ability to detect change when real change had occurred

as a result of the intervention. An important achievement in this work is that we took it upon ourselves to provide the ASP's settings with an audit tools that could be used by both researchers and non-researchers (program leaders). The HAAND instrument assesses the extent to which ASP's HEPA policy and practice environment align with state and national policy and practice recommendations. An important distinction between the HAAND and other tools currently in use in the ASP's setting is that the HAAND instrument is currently the only tool with reported responsiveness statistics, adding to the utility of the HAAND instrument as credible outcome measurement tool as well as being a valid and reliable tool. The HAAND provides a method by which ASP's leaders can prove accurate assessment of their programs. Greater effort should be taken to include instructional and term definitions along with newly developed audit tools, such as the HAAND and others, prior making them available for wider dissemination and use.

Consideration for Future Research

The findings from this work have several additional implications for future studies. First more efforts should be directed towards establishing a strong measurement foundation for these important environmental audit tools in order to maximize understanding of the health-promoting potential in across settings that frequented by youth. Secondly, additional research is needed to track the amount of time spent on reviewing training material and its impact on the accuracy of site leaders self-assessing their programs HEPA policy and practice environment. Furthermore, future studies should investigate and develop more interactive web-based training methods. The field of policy and practice environment measurement in the ASP setting is in its infancy and lacks acceptable external standards measure (or gold standard measure) against which to

test responsiveness. Future studies should examine the responsiveness to change of the HAAND instrument in comparison to other tools also designed to evaluate HEPA policy and practice environment in ASP setting.

Finally, our findings indicate that, contrary to expectation, policies and physical environment (defined as size of activity space) showed a limited influence the activity levels of children attending ASP's. Previous studies have identified physical attributes of activity spaces such as playground design, types of activity spaces (courts, open space, fields, etc.), as well as the quality and quantity of play equipment as factors which could impact children's activity levels.[13, 14] Future research is needed to explore the influence that physical attributes of the activity space have on children's physical activity levels in addition to the contextual variables examined in the present study.

Overall, the result of these four studies suggest that a wide array of audit tools designed to assess the HEPA policy and practice environmental charatericitsics are currently available. Yet the majority of available tools lack psychometric property information. ASP's are in a great position to impact attending children eating habits and physical activity levels. A first step in realizing such potential is through empowering ASP's leaders in self- evaluation using audit tool with established measurement properties (i.e., valid, reliable and responsiveness to change). The responsibility of achieving HEPA policy and practice recommendation is usually left for ASP's leaders. If program leaders are expected to regularly evaluate their programs alignment with current HEPA recommendation, providing them with adequate training on available self-assessment tools is crucial. The HAAND instrument developed and tested as part of this dissertation work is a valuable tool with established validity and reliability that can be

used by program leaders for the purpose of self-evaluation. Finally HEPA policy and practice recommendations are only the first step in creating healthy eating and physical activity-friendly environment. Future research should be directed at identifying effective strategies aimed at supporting ASP's meet policy and practice recommendations.

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APPENDIX A: THE HEALTHY AFTERSCHOOL ACTIVITY AND NUTRITION DOCUMENTATION (HAAND) TOOL TRAINING MANUAL

*Introduction**

The HAAND is a tool that allows afterschool leaders to assess how well their programs meet current state and national polices for afterschool settings. After completing this assessment you will be able to identify your program's strengths and any areas that may be improved. The HAAND tool consists of two scales: (1) the Physical Activity scale and (2) the Healthy Eating scale.

Before you begin:

- ✓ **Make sure that you have the items listed below:**
  - o Parent Handbook
  - o Staff Handbook
  - o Staff Training Handbook
  - o Program Schedule
  - o Snack Menu
  - o Any materials that state your afterschool program policies regarding physical activity and nutrition practices.
- ✓ **You will need approximately one hour to complete the HAAND.**

As you are filling out the HAAND make sure to:

✓ Review the important terms (below) to help you complete this self-assessment.

✓For each item, select the level that best describes your afterschool program.

✓Write where you found the information in the comments/notes section at the end of each scale.

What do your scores mean?

✓Higher scores for both the Physical Activity & Healthy Eating Scales mean your program is closer to meeting best practice recommendations.

***For more examples and detailed explanation please look at the appendix section.**

Important terms to know:

Electronic media: Any type of hand held devices such as video games, iPods or phones.

Total time allowed for physical activity: The amount of time in the daily program schedule that is assigned for children to be active.

Written Policy: Includes guidelines or statements about your program's physical activity opportunities and the types of snacks served.

Policies are usually found in the parent handbook, staff handbook/training and or materials, or newsletters and flyers given to families.

- Example: vague policy
  - Physical Activity: *Our program provides children with a variety of physical activities and games*.
  - Healthy Eating: *Children will be provided with healthy snacks during their time at the program*.
- Example: specific policy:
  - Physical Activity*: We provide all children attending our programs with 60 minutes of physical activity time.*
  - Healthy Eating: Snack served must contain at least one of the following options: whole grain, fruit, or vegetable.

Child feedback: How your program receives feedback from the parents and/or children about physical activity (such as games or activity offered) and snacks provided.

- Example: Informal feedback:
  - Staff ask the children, but this is done spontaneously.
- Example: Formal feedback:
  - Program sends surveys on monthly or annual basis or provides feedback box to collect feedback from children and/or parents.

Screen time: Includes time spent watching TV and DVDs, using computers and/or playing video games.

Time allocated for physical activity: The percentage of time scheduled for physical activity opportunities at your program (see below).

Physical activity time is usually found in the program schedule.

To find the percentage of time scheduled for physical activity use this simple formula:

$$\frac{\text{Total amount of time scheduled for physical activity in minutes}}{\text{Total program duration in minutes}} \times 100$$

- Example: If the program ran for 3 hours (180 minutes) and physical activity (free play or staff-led games) were scheduled for 60 minutes then the total amount allocated for physical activity will be calculated this way:

$$\frac{60\text{min}}{180\text{ min}} \times 100 = 33\%$$

Type of physical activity: The number and types of different staff led activities/games offered at your afterschool program.

Equity: Does the type of activities offered appeal more to boys or girls?

- Example: Activity favoring single gender: Program offers activities that only boys (football) or girls (dance) will participate in.

  Example: Activity appeals to both genders: Program's daily schedule includes activities/game that favor a single gender but are offered at the same time (such as dance and football) that appeals to both genders (such as tag games).

Staff training quantity: The number of physical activity and healthy eating training hours staff at your program receive.

Training may include general information related to promoting physical activity and healthy eating habits.

Staff training quality: The qualification of the person providing staff physical activity and healthy eating promotion training at your program.

Non-certified person: Persons with no formal education in promoting physical activity or healthy eating.
Certified person: Persons with formal education in promoting physical activity/healthy eating such as *physical educators, a health promotion specialist, or an individual who holds a graduate degree in health education*.

Parent workshops: Workshops to promote physical activity and healthy eating among parents.

Curriculum: Educational material used at your program to promote physical activity and healthy nutrition among the children.

Non-research-based curriculum: Educational material (curricula) have no formal evaluation to support its effectiveness in afterschool programs.
Research-based curriculum: Educational contents material (curricula) have undergone formal evaluation for effectiveness in afterschool programs (such as SPRAK, CATCH, Play works, NFL Play 60).

Evaluation: How does your program assess the physical activity levels of children and the quality of snacks served at your program?

- Limited evaluation/*self-report methods*: This is done a single time per year using staff verbal feedback.
- Ongoing evaluation/*self-report methods*: This is done two or more times per year using staff verbal feedback.

  Example *self-report methods*;
  - Example: Physical activity: Staff observed how active children are at the playground or during activity time and report back to program site leader.
  - Example: Healthy Eating: Program site leader looks at the snack quality in comparison to the guidelines.

- Limited evaluation/*objective methods*: This is done a single time per year using measurement tools such as pedometers for Physical Activity scale and nutrition calculator for Healthy Eating scale.
- Ongoing evaluation /*objective methods*: This is done two or more times per year using measurement tools such as pedometers for Physical Activity scale, and trained observers for Healthy Eating scale.

  Example objective methods:

  - Example: Physical activity: Children's physical activity levels are measured using pedometers and/ or trained observation methods
  - Example: Healthy Eating: Quality of snack served is measured using trained observation methods and/ or external evaluation agency (for example reporting back to reimbursement agency such as DSS).

Fruit: Includes all fresh, dried or frozen fruit with no added sugar.

Vegetables: Includes all fresh uncooked vegetables.

Sugar-Sweetened Beverages: Includes drinks with sugar added, such as Kool-Aid, fruit drinks with added sugar, non-100% juice, sport drinks and soda.

Whole Grain: Includes food that contains a whole grain as the first ingredient (e.g. whole wheat, whole oat, whole barley etc.)

General information: Healthy Afterschool Activity and Nutrition Documentation – HAAND

Program Name: _____ Date of Observation: ____ / ____ / ____

Children in Attendance: ____ # Staff: ____

Location: School ____ Fitness Center ____ Faith-based ____ Other ____ Program Start: ____ Program End: ____

Today's Weather: Sunny ____ Partly cloudy ____ Cloudy ____ Rainy ____

How much does your program spend on snacks per month?				
What was served for snack today?			Describe	
Do you get reimbursed for snack?	YES	NO	If YES, by whom?	
Did children bring outside food?	YES	NO	If YES, describe…	
Did children bring outside drinks?	YES	NO	If YES, describe…	
Did staff eat/drink foods other than snack in front of children?	YES	NO	If YES, describe…	
Are children allowed to bring electronic media devices?	YES	NO	If YES, describe…	
Total time allocated for Physical Activity (PA)			# Minutes Scheduled for PA	

Physical Activity Scale

			Level					
Domain	Item	Source	0	1	2	3	4	Score
Policy	Written Policies	Document review	No written policies	Written policies, non-specific language	Written policies, explicit language *(i.e., measurable)*			
Child Involvement	Feedback	Document review or self-report	None	Informal collection	Formal collection			
Screen Time	Screen Time	Document review or self-report	≥ 1 hr/day	< 1 hr/day	None allowed			
Schedule of PA	Time Allocated	Document review	No scheduled time	Less than 25% of schedule	25-49% schedule	50% or more of schedule		
	Types of Activities	Document review or observation	Free play	Limited # of activities 1 to 2 structured activities	Diverse range of activities ≥ 3 structured			
	Equity	Document review or observation	Activities favor single gender	Activities appeal to both genders				
Training for PA	Staff Training - Quantity	Document review or self-report	No training for physical activity promotion	Less than 1hr/yr devoted to physical activity promotion	1-4hrs/yr devoted to physical activity promotion	4 4hrs/yr devoted to physical activity promotion		
	Staff Training - Quality	Document review or self-report	No training for physical activity promotion	Training delivered by non-certified person	Training delivered by certified person *(e.g., physical educator, health promotion specialist, graduate degree in health education field)*			
	Parent Workshop	Document review or self-report	None	1 time/yr	+2 times/yr			
Curricula	Curricula	Document review	None	Non-evidence-based curriculum	Evidence-based curriculum			
Evaluation	Evaluation	Document review or self-report	None	Limited evaluation *(e.g., single time per year)* Using *self-report* methods *(e.g., staff reports)*	Ongoing evaluation *(e.g., 2 or more times per year)* Using *self-report* methods *(e.g., staff reports)*	Limited evaluation *(e.g., single time per year)* *Using objective* methods *(e.g., pedometers, accelerometers, trained observation)*	Ongoing evaluation *(e.g., 2 or more times per year)* *Using objective* valid methods *(e.g., pedometers, accelerometers, trained observation)*	
							Total Score	25

Star Rating: 1 to 5 = ★, 6 to 9 = ★★, 10-14 = ★★★, 15-21 = ★★★★, and 22-25 = ★★★★★

Physical Activity Scale- Notes/Comments

Domain	Item	Source	Notes/Comments
Policy	Written Policies	Document review	
Child Involvement	Feedback	Document review or self-report	
Screen Time	Screen Time	Document review or self-report	
Schedule of PA	Time Allocated	Document review	
	Types of Activities	Document review or Observation	
	Equity	Document review or Observation	
Training for PA	Staff Training - Amount	Document review or self-report	
	Staff Training - Quality	Document review or self-report	
	Parent Workshop	Document review or self-report	
Curricula	Curricula	Document review	
Evaluation	Evaluation	Document review or self-report	

Healthy Eating Scale

			Level					
Domain	**Item**	**Source**	**0**	**1**	**2**	**3**	**4**	**Score**
Policy	Written Policies	Document review	No written policies	Written policies, non-specific language	Written policies, explicit language (measurable)			
Child Involvement	Feedback	Document review or self-report	None	Informal collection	Formal collection			
Quality of Snacks	Fruit	Document review or self-report	None served	1 time/wk	2 times/wk	3 times/wk	4 or more times/wk	
	Vegetable	Document review or self -report	None served	1 time/wk	2 times/wk	3 times/wk	4 or more times/wk	
	Sugar Sweetened Beverages	Document review or self-report	4 or more times/wk	3 times/wk	2 times/wk	1 time/wk	None served	
	Whole Grains	Document review or self-report	None served	1 time/wk	2 times/wk	3 times/wk	4 or more times/wk	
Access to Vending Machines	Access to Vending Machines	Document review or observation	Full access	No access				
Training	Staff Training - amount	Document review or self-report	No training for nutrition promotion	Less than 1hr/yr devoted for healthy eating promotion	1-4hr/yr devoted for healthy eating promotion	+4hrs/yr devoted for healthy eating promotion		
	Staff Training - quality	Document review or self -report	No training	Training delivered by non-certified person	Training delivered by certified person *(e.g., health promotion specialist, graduate degree in health education , field)*			
	Parent workshops	Document review or self-report	None	1/yr	+?/yr			
Curricula	Curricula	Document review	None	Non-evidence-based curriculum	Evidence-based curriculum			
Evaluation	Evaluation	Document review or self-report	None	Limited evaluation *(e.g., single time per year)* Using *self-report* methods *(e.g., staff reports)*	Ongoing evaluation *(e.g., 2 or more times per year)* Using *self-report* methods *(e.g., staff report)*	Limited evaluation *(e.g., single time per year)* *Using objective* methods *(e.g. trained observation)*	Ongoing evaluation *(e.g., 2 or more times per year)* *Using objective* methods *(e.g. trained observation)*	
							Total Score	/34

Star Rating: 1 to 6 – ★, 7 to 14 – ★★, 15-21 – ★★★, 22-27 – ★★★★, and28-34 – ★★★★★

Healthy Eating Scale-Notes/Comments

Domain	Item	Source	Notes/Comments
Policy	Written Policies	Document review	
Child Involvement	Feedback	Document review or self-report	
Quality of Snacks	F&V	Document review or self -report	
	Sugar Sweetened Beverages	Document review or self -report	
	Whole Grains	Document review or self -report	
Access to vending Machines	Access to Vending Machines	Document review or self -report	
Training	Staff Training - Amount	Document review or self -report	
	Staff Training - Quality	Document review or self -report	
	Parent Workshops	Document review or self -report	
Curricula	Curricula	Document review	
Evaluation	Evaluation	Document Review or self-report	

Congratulations!!
You have finished reviewing the HAAND self-assessment tool

For more detailed examples

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

1. Written Policy: This item refers to formal written statements related to opportunities for children to participate in physical activity at the afterschool program.
Acceptable source. Document review.

Hint: Look for information in the parent handbook, the program policy document, the program official website and

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

ɛm level	Description	Level score (circle one)	Examples
No written policy	Program has no written policy regarding physical activity opportunities	0	• None
Written policy non-specific language	Program has general written policy regarding physical activity opportunities	1	• The program will offer physical activity opportunities for children • Children will participate in variety of physical activities
Written policy explicit language (measurable)	Program has detailed (explicit) written policy regarding physical activity opportunities	2	• 30 minutes of afterschool program time is dedicated to physical activity/games • Our afterschool program will provide all children with 45 minutes of daily physical activity

Notes (indicate your document source): If you have written policy please provide the policy in the comment section of the tool.

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

2. Child feedback: This item refers to how feedback about activities/games offered at the program is collected from the children attending the afterschool program.

Acceptable source. Document review or self-report.

Hint: Look for information in the parent handbook, the program policy document, the program official website and staff handbook.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
None	Program does not collect feedback from the children or their parents regarding the activity/games provided at the afterschool program	0	• Activities/games are selected by the afterschool program staff with no input from the children attending the program
Informal collection	No formal process in place, but program staff collects verbal feedback from children regarding scheduled activity/ games	1	• Staff asks the children about their favorite activities/games • Children are given the opportunity to tell staff about their favorite activities/games
Formal collection	A formal process is in place to collect feedback from children regarding activity/games offered at your program	2	• Surveys are sent to children and parents biannually to get their feedback about the activities offered at the program • The program has feedback box where children and parent can provide their feedback comments on the type of activity/games scheduled

Notes (indicate your document source): If child feedback is collected, describe how the feedback is collected in the comment section of the tool.

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

3. Screen time: This item refers to the amount of time children are allowed to spend watching television, movies, or play with computer games and or hand held electronic devices while at the afterschool program.

Acceptable source. Document review or self-report.

Hint: Look for information in the weekly schedule official website, and program policy document.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
≥1 hour/day	Children at the program are spending about 1 hour or more every day watching TV or playing with digital devices	0	• Children have access to TV/ digital devices such as Gameboy and other computer games for 1 hour or more every day
< 1 hour/day	Children at the program are spending less than 1 hour per day watching TV or playing with digital devices	1	• Children have access to TV/ digital devices such as Gameboy and other computer games for up to 30 minutes daily
None	Children are not allowed any screen time while at the program	2	• Children do not have access to TV/ digital devices such as Gameboy and other computer games while at the program

Notes (indicate your document source): If screen time is allowed, report the amount of time allocated for such activity at your program in the comment section of the tool.

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

4. Time allocated for physical activity: This item refers to the amount of time allocated for children to participate in physical activities based on the afterschool program schedule.

Acceptable source. Document review.

Hint: Look for information in the weekly schedule, official website, and parent handbook

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
No Scheduled time	No scheduled time for physical activities opportunities at the program	0	• The afterschool program schedule does not have allocated time/slot for physical activities
Less than 25% Scheduled	Program schedules less than 25% of the total program time dedicated to physical activities	1	• In a 3 hour afterschool program children are scheduled to participate in physical activities for a total of 45 minutes
25-49% Scheduled	Program schedules 25-49% of total program time for physical activities	2	• In a 3 hour afterschool program children are scheduled to participate in physical activities for 45 to 89 minutes
50% or more 2 Scheduled	Program schedules 50% or more of total program time for physical activities	3	• In a 3 hour afterschool program children are scheduled to participate in physical activities for 90 minutes or more

Notes (indicate your document source):

Divide the amount of time allocated for physical activity in minutes by the length of the afterschool program in minutes to obtain the percentage of time your program allocates for physical

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

5. Type of activities: This item refers to the number of different structured physical activities/games offered at the afterschool program that are directed by staff such as follow the leader, soccer, football or musical games.

Acceptable source. Document review or observation.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Hint: Look for information in the weekly schedule or observed a minimum of 2 physical activity sessions if document not available.

Item level	Description	Level score (circle one)	Examples
Free play	Program offers only unstructured free play activities/games	0	• During physical activity/games time children can play any game they like without direction from staff
Limited number of organized activities	Program offers limited number of structured activities/directed by staff that children can engage in at any given program day as well as unstructured free play activities/games	1	• The program offers 1 to 2 structured physical activities or games to the children (for example football and tag or dodgeball and "follow the leader" type games), in addition to free play activities
Diverse range of organized activities that appeal to children of all skill levels	Program offers a diverse range of structured activities/games directed by staff that children can engage in on any given program day as well as unstructured free play activities/games	2	• 3 or more types of structured physical activities such as football, dance, tag games, follow the leader, soccer , Frisbee, dodgeball, musical games and kickball, etc. in addition to free play activities

Notes (indicate your document source):

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

6. Equity: This item refers to providing activities/games that children of both genders can enjoy and participate in while at the afterschool program.

Acceptable source. Document review or observation.

Instructions. Read item description and provided examples. Circle the score level that best matches your program.

Hint: Look for information in the weekly schedule, or observed a minimum of 2 physical activity sessions if document not

Item level	Description	Level score (circle one)	Examples
Activities favor single gender	Program offer activities/games that favor one gender or children with certain abilities/skills	0	• Offers football only • Offers dance only
Activities appeal to both gender	Program offers activities/games that appeal to both genders	1	• Scheduled physical activity opportunities include a range of activities such as tag games, follow the leader, musical games, Frisbee • Scheduled physical activity opportunities consist of free play

Notes (indicate your document source): -

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

7. Staff training quantity: This item refers to the amount of time allocated for training staff at the afterschool program on youth physical activity promotion on a yearly basis. This may include general information related to promoting physical activity.

Hint: Look for information in the staff handbook, and staff training material.

Acceptable source. Document review or self-report.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
No Training	Program does not offer staff physical activity promotion training	0	• None
Less than 1 hour/year	Program staff attends less than 1 hour of physical activity promotion training annually	1	• Seminars, classes or instruction sessions on youth physical activity promotion of less than 1 hour per year
1-4 hours/year	Program staff attends 1 to 4 hours of physical activity promotion training annually	2	• Seminars, classes or instruction sessions on youth physical activity promotion from 1 to 4 hours per year
+ 4 hours/year	Program staff attends more than 4 hours of physical activity promotion training annually	3	• Seminars, classes or instruction sessions on youth physical activity of more than 4 hours per year

Notes (indicate your document source): If training is offered, write the number of hours assigned for physical activity promotion in the comment section of the tool.

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

8. Staff training quality: This item refers to the credentials or certifications of the person providing the physical activity promotion training at the afterschool program (for example physical educator, health promotion specialist, degree /certificate in exercise sciences/physical activity). Acceptable source. Document review or self-report.

Hint: Look for information in the staff handbook, and staff training material.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
No Training	Program does not offer staff training on physical activity promotion	0	• None
Training delivered by non-certified personal	Physical activity training is delivered by non-certified personnel at your program	1	• Afterschool program counselor without physical activity /health promotion certification
Training delivered by certified personal	Physical activity training is delivered by qualified professional at your program	2	• Physical educator • Health promotion specialist • Degree/certificate in health and wellness field

Notes (indicate your document source): If training is delivered by certified person, write down the certification of the trainer in the comment section of the tool.

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

9. Parent workshop: This item refers to the availability of physical activity promotion workshops at the afterschool program for the parents as part of parent's night to learn ways of increasing/encouraging children to participate in physical activities.
Acceptable source. Document review or self-report.

Hint: Look for information in the parent handbook, newsletters and program official website.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
None	Program does not offer physical activity promotion workshops for the parents	0	• The program does not provide parental workshops to promote physical activity
1 workshop/ year	Program offers physical activity workshops for parents once a year	1	*Family nights are offered once a year. Pertaining to health & wellness and keeping active*
+2 workshop/year	Program offers physical activity workshops for parents two or more times per year	2	*Family nights are offered two times a year. Pertaining to health & wellness and keeping active*

Notes (indicate your document source): If parent workshop is provided, describe the workshop content in the comment section of the tool

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

10. Curricula: This item refers to the source of physical activity curriculum used at the afterschool program. Note that the physical activity curriculum used at your program can be either purchased as a package or developed by your afterschool program.

Acceptable source. Document review.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Hint: Look for information in the parent handbook, newsletters and program official website.

Item level	Description	Level score (circle one)	Examples
None	Physical activities/games offered at your program are not based on a curriculum	0	• The physical activity/games opportunities are not based on any curriculum and are developed by the after school program staff
None evidence-based curriculum	Program uses physical activity curriculum developed by the program	1	• Scheduled physical activity/games opportunities follow a physical activity curriculum developed at the afterschool program organization level
Evidence-based curriculum	Program uses research-based physical activity curriculum	2	• Scheduled physical activity opportunities and games follow a curriculum that has been evaluated and is based on published results (for example CATCH, S.P.A.R.K, YMCA'S Food and Fun after School curriculums)

Notes (indicate your document source): If you use a physical activity curriculum, write down the name of the curriculum (if known) and the name of the developer in the comment section of the tool.

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

11. Evaluation: This item refers to how the amount of physical activity children accumulate while at the afterschool program is measured using a variety of strategies such as staff self-report or step counters (such as Pedometers).

Acceptable source. Document review or self-report.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Hint: Look for information in the staff handbook, program policy document and official website.

Item level	Description	Level score (circle one)	Examples
None	Program does not track the amount of physical activity accumulated by the children while at the program	0	• No monitoring done, no data collected
Limited evaluation using non-valid methods	Program tracks the amount of physical activity children accumulate while at the program only once a year using simple (non-valid) methods	1	• Physical activity measures are conducted once a year using staff or child self-reporting
Ongoing evaluation using non-valid methods	Program tracks the amount of physical activity children accumulate while at the program multiple times per year using simple (non-valid) methods	2	• Physical activity measures are conducted 2 or more times per year using staff or child self-reporting
Limited evaluation using valid methods	Program tracks the amount of physical activity children accumulate while at the program once a year using activity monitoring devices such as pedometers (valid methods)	3	• Physical activity measures are conducted once a year using activity monitors such as pedometers and/ or accelerometers
Ongoing evaluation using valid methods	Program tracks the amount of physical activity children accumulate while at the program multiple times per year using activity monitoring devices such as pedometers (valid methods)	4	• Physical activity measures are conducted 2 or more times per year using activity monitors such as pedometers and/ or accelerometers

Healthy Afterschool Program Index for Physical Activity (HAPI-PA) scale.

11. Evaluation (continued):

Notes (indicate your document source): If the amount of physical activity children accumulate while at the program is tracked describe how this is done **in the comment section of the tool.**

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

1. Written Policy: This item refers to formal written statements related to the quality of the snack served at the afterschool program.
Acceptable source. Document review.

Hint: Look for information in the parent handbook, the program policy document, the program official website and staff handbook.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
No written policy	Program has no written policy regarding the type of snacks served to children	0	• None
Written policy non-specific language	Program has undetailed (general) written policy regarding the type of the snack served to the children	1	• Children will be provided with healthy snacks during their time at the program • Nutritious snack will be served to children during the program time
Written policy explicit language (measurable)	Program has detailed (explicit) written policy regarding the type of snacks served to the children Examples are seen in the National School lunch Program (NSLP) standards and the DSS Afterschool Snack Program standards	2	• At least 2 of the following snack component must be served at snack time: whole grains, milk, fruit, and vegetables • Food high in fats, salts and sugar are not served during the program and children will be served milk or 100% fruit juice and not soda or fruit drinks

Notes (indicate your document source): If you have written policy please provides the policy text in the comment section of the tool or the source i.e. hand book page #).

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

Hint: Look for information in the parent handbook, the program policy document, the program official website and staff

2. Child feedback: This Item refers to how feedback from the children regarding the snack offered at the afterschool program is collected.

Acceptable source. Document review or self-report.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
None	Program does not collect feedback regarding served snack from the children or their parents	0	• Items on the snack menu are selected by the program leader with no input from the children
Informal collection	No formal process is in place, but program staff collects feedback from children regarding the served snack by asking the children about their favorite snack	1	• Staff verbally ask the children about the snacks served at the program • Children are given the opportunity to tell staff how they feel about the snack provided at the program
Formal collection	A formal process is in place to collect feedback regarding offered snack at your program from children and/or parents	2	• Surveys are sent to the children and parents biannually to get their feedback regarding the snacks served at the program • Monthly surveys are sent to parents giving them the opportunity to give feedback on the type of snack served at the program

Notes (indicate your document source): If child feedback is collected at your program, describe how program collect child feedback in the comment section of the tool.

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

3. Fruit.: This Item refers to the number of times per week that fruit (i.e. fresh, dried, frozen, canned with no added sugar) is served at the after school program.

Acceptable source. Document review or self-report.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Hint: Look for information in the monthly/weekly

Item level	Description	Level score (circle one)	Examples
None served	Fruits are not served at your program	0	• No fruit is included in the snack menu
1 time/week	Fruits are served once a week at your program	1	• One or more of the following fruits; banana, apple, orange is served once a week during snack
2 times/week	Fruits are served twice a week at your program	2	• One or more of the following fruits; banana, apple, orange is served 2 times a week during snack
3 times/week	Fruits are served 3 times a week at your program	3	• One or more of the following fruits; banana, apple, orange is served 3 times a week during snack
4 or more times/week	Fruits are served 4 times or more per week at your program	4	• One or more of the following fruits; banana, apple, orange is served 4 or more times week during snack

Notes (indicate your document source in the comment section of the tool).

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

4. Vegetables: This item refers to the number of time per week fresh vegetables are served at the afterschool program.

Acceptable source. Document review or self-report.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Hint: Look for information in the monthly/weekly

Item level	Description	Level score (circle one)	Examples
None served	Vegetables are not served at your program	0	• No vegetable is included in the snack menu
1 time/week	Vegetables are served once a week at your program	1	• One or more of the following vegetables; baby carrots, celery sticks is served once a week during snack
2 times/week	Vegetables are served twice a week at your program	2	• One or more of the following vegetables; baby carrots, celery sticks is served 2 times a week during snack
3 times/week	Vegetables are served 3 times a week at your program	3	• One or more of the following vegetables; baby carrots, celery sticks is served 3 times a week during snack
4 or more times/week	Vegetables are served 4 times or more per week at your program	4	• One or more of the following vegetables; baby carrots, celery sticks is served 4 or more times a week during snack

Notes (indicate your document source in the comment section of the tool).

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

5. Whole grains: This item refers to the number of time per week snacks that contains whole grains as part of the ingredients are served at the program. The first ingredient listed must state it is "whole" such as "whole wheat" or "whole grain" to be considered a whole grain product.

Hint: Look for information in the monthly/weekly

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
None served	Snack containing whole grains as part of the ingredients not served at your program	0	• No whole grain snack is included in the snack menu
1 time/week	Snack containing whole grains as part of the ingredients served once a week at your program	1	• One or more of the flowing whole grains snacks; Goldfish, granola bar, breakfast cereal is served once a week during snack
2 times/week	Snack containing whole grains as part of the ingredients served twice a week at your program	2	• One or more of the flowing whole grains snacks; Goldfish, granola bar, breakfast cereal is served 2 times a week during snack
3 times/week	Snack containing whole grains as part of the ingredients served 3 times a week at your program	3	• One or more of the flowing whole grains snacks; Goldfish, granola bar, breakfast cereal is served 3 times a week during snack
4 or more times/week	Snack containing whole grains as part of the ingredients served 4 times or more per week at your program	4	• One or more of the flowing whole grains snacks; Goldfish, granola bar, breakfast cereal is served 4 or more times a week during snack

Notes (indicate your document source in the comment section of the tool).

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

6. **Sugar sweetened beverages:** This item refers the number of time per week sugar added beverages (for example soda, Kool-Aid, sweetened iced tea, sports drinks) are served at the afterschool program.
Acceptable source. Document review or self-report.

Hint: Look for information in the monthly/weekly menu.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
4 or more times/week	Sugar sweetened beverages are served 4 times or more per week at your program	0	• Kool-Aid/lemonade is served every day during snack.
3 times/week	Sugar sweetened beverages are served 3 times a week at your program	1	• Kool-Aid/lemonade is served 3 times a week during snack
2 times/week	Sugar sweetened beverages are served twice a week at your program	2	• Kool-Aid/lemonade is served 2 times a week during snack
1 time/week	Sugar sweetened beverages served once a week at your program	3	• Kool-Aid/lemonade is served once a week during snack
None served	Sugar sweetened beverages not served at your program	4	• No sugar sweetened beverage is included in the snack menu

Notes (indicate your document source in the comment section of the tool.

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

7. **Access to vending machines:** This item refers to children access to vending machines or concession stands while at the afterschool program. This includes drinks such as soda, sport drinks, energy drinks or snacks such as chips, candy or cookies.
Acceptable source. Document review or observation.

Hint: Look for information in the staff handbook, parent handbook or program policy document

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
Access	Program allows children full access to vending machines	0	• Vending machines freely accessible to children
No Access	Program does not allow the children any access to vending machines.	1	• No vending machines on premises or access limited to adults

Notes (indicate your source in the comment section of the tool)

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

8. Staff training quantity: This item refers to the amount of time allocated for training staff at the program on healthy nutrition/eating promotion on a yearly basis.

Acceptable source. Document review or self-report.

Hint: Look for information in the staff handbook, and staff training material.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
No Training	Program does not offer staff training on healthy eating promotion	0	• None
Less than 1 hour/year	Program staff attends less than 1 hour of healthy eating promotion training annually	1	• Staff attends seminars, classes or instruction sessions on healthy eating promotion for less than 1 hour per year
1-4 hours/year	Program staff attends 1 to 4 hours of physical healthy eating promotion training annually	2	• Staff attends seminars, classes or instruction sessions on healthy eating promotion for 1 to 4 hours per year
+ 4 hours/year	Program staff attends more than 4 hours of healthy eating promotion training annually	3	• Staff attends seminars, classes or instruction sessions on healthy eating for more than 4 hours per year

Notes (indicate your document source): If training is offered, write the number of hours assigned for physical activity promotion in the comment section of the tool.

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

9. Staff training quality: This item refers to the credentials or certifications of the person(s) providing the nutrition/healthy eating promotion training at afterschool program (for example nutritionist, health and wellness counselor or health education specialist).
Acceptable source. Document review or self-report.

Hint: Look for information in the staff handbook, and staff training

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
No Training	Program does not offer staff training on healthy eating/ nutrition promotion	0	• None.
Training delivered by non-certified personal	Training on healthy eating/ nutrition promotion is delivered by non-certified personnel	1	• Afterschool program counselor/staff without nutrition training certification.
Training delivered by certified personal	Training on healthy eating/ nutrition promotion is delivered by qualified professional	2	• Nutritionist • Health promotion specialist • Health and wellness counselor

Notes (indicate your document source): If training is delivered by certified person, write down the certification of the trainer in the comment section of the tool.

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

10. Parent workshop: This item refers to the availability of healthy eating workshops for the parents (as part of parents' night) at the afterschool program.

Acceptable source. Document review or self-report.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Hint: Look for information in the parent handbook, newsletters and program official

Item level	Description	Level score (circle one)	Examples
None	Program does not offer healthy eating workshops for the parents	0	The program does not provide parental workshops to promote healthy eating habits
1 workshop/ year	Program offers healthy eating workshops for parents once a year	1	Family nights are offered once a year. These events include cooking classes, and healthier eating ideas for the family
+2 workshop/year	Program offers healthy eating workshops for parents two or more times per year	2	Family nights are offered two times a year. These events include cooking classes, and healthier eating ideas for the family

Notes (indicate your document source): If parent workshop is provided, describe the workshop content in the comment section of the tool.

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

11. Curricula: This item refers to the source of educational contents used at the program to promote healthy nutrition among the children. Note that the healthy nutrition curriculum used at your program can be either purchased as a package or developed by your afterschool.
Acceptable source. Document review.

Hint: Look for information in the parent handbook, newsletters and program official website.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
None	Healthy eating/nutrition education offered at your program is not based on a curriculum	0	• Healthy eating education promotion activities are developed by the after school program staff
None evidence-based curriculum	Program does not use a research-based curriculum	1	• The program offers healthy eating education sessions for the children developed by the staff at the program (for example Triple Play)
Evidence-based curriculum	Program uses research-based curriculum	2	• The program offers nutrition education sessions using evaluated curriculum based on published results (for example CATCH Kids Club, YMCA'S Food and Fun after School)

Notes (indicate your document source): If you use a physical activity curriculum, write done the name of the curriculum if known and the name of the developer in the comment section of the tool.

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

12 Evaluation: How does program assess the quality of snacks served to children in comparison to guidelines?

Hint: Look for information in the staff handbook, program policy document and official website.

Acceptable source. Document review or self-report.

Instructions. Read item description and provided examples. Circle the level score that best matches your program.

Item level	Description	Level score (circle one)	Examples
None	Program does not assess the quality of the snack offered to children	0	• No monitoring done, no data collected
Limited evaluation using non-valid methods	Program assesses the quality of the snack offered to the children once a year using self-report methods	1	• Snack quality is assessed annually using staff/child self-reporting
Ongoing evaluation using non-valid methods	Program assesses the quality of the snack offered to the children multiple times per year using self-report methods	2	• Snack quality is assessed two or more times per year using staff/child self-reporting
Limited evaluation using valid methods	Program assesses the quality of the snack offered to the children once a year using validated methods such as trained observers objective	3	• Snack quality is assessed annually using for example nutrition calculator or trained observation to determine whether snack served meet national/local guidelines
Ongoing evaluation using valid methods	Program assesses the quality of the snack offered to the children multiple times per year using validated methods such trained observers objective	4	• **Snack quality is assessed two or more times per year by using trained observation methods and or external evaluation agency (for example reporting back to reimbursement agency such as DSS**

Healthy Afterschool Program Index for Nutrition (HAPI-N) scale.

11. Evaluation (continued):

Notes (indicate your document source): If the program track the nutrition quality of snack offered to children against policies and standard recommendation describe how this is done in the comment section of the tool.

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