

**Original Research**

# Validity of a Measure to Assess the Child-Care Nutrition and Physical Activity Environment

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**ABSTRACT**

**Background** Licensed child-care centers represent an opportunity to positively influence children's health behaviors. Valid and easy-to-use measures of the child-care environment are needed to assess the influence of environmental change on health.

**Objective** To develop and validate a self-administered survey to assess the nutrition and physical activity environment of child-care centers, and to identify domains that may be evaluated adequately through self-report.

**Design** A survey was developed to assess four areas related to nutrition and physical activity: center policies, practices related to the social environment, physical environment, and nutrition quality. Development involved review of the literature, existing measures, and regulations/standards as well as collaboration with a working group. The survey was pilot tested and feedback was sought from expert consultants. It was administered statewide and validated against a menu rating tool, interviews with a center director, and a direct observation tool that was developed for this study.

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**Participants/setting** Participating sites were drawn from Child and Adult Care Food Program-participating licensed Connecticut child-care centers serving 13 or more children aged 3 to 5 years. Survey responses from 146 center directors were included, as were 62 center menus, and director interviews and observational data from 33 sites.

**Primary outcomes/statistical analyses** Criterion validity of the survey was assessed through percent agreement with mirroring items in the additional measures. Healthy and unhealthy food scores were calculated for menu and survey tools, and Pearson correlations were computed.

**Results** Percent agreement with criterion outcomes ranged from 39% to 97%, with 61% of items achieving agreement  $\geq 80\%$ . Agreement was highest for nutrition and policy domains, and lowest for physical activity and barriers to promoting health. Correlations between food scores across measures were moderate.

**Conclusions** The self-report survey demonstrated adequate criterion validity. We make recommendations for improving validity of low-agreement items and for the use of more labor-intensive evaluation procedures for domains not adequately assessed through self-report.

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Nearly 60% of children aged 3 to 5 years attend a licensed child-care center (1). Young children spend, on average, 28 hours per week in nonparental care (1), where it is suggested that they consume one third to two thirds of their daily recommended nutrition allowance (2) and engage in a majority of their daily physical activity (3). However, research has shown that preschoolers in child care often do not meet nutrient recommendations (4) and are largely inactive (5). Thus, child-care centers represent an opportunity to engage a large number of children in healthier behaviors (4).

A growing body of literature has documented the influence of environmental factors on children's nutrition and physical activity. Environmental factors may be social (eg, if food is used to reward behavior), physical (eg, types of playground equipment), or policy (eg, nutrition standards for meals). Research has shown that length of outdoor play (6-9) and play equipment (3,7) influence children's physical activity levels. Further, dietary habits are influenced by portion size (10,11); presence of high-energy, low-nutrient-dense foods (12); the number of children at the dining table (13); teacher behavior and feeding style (14-16); and children's involvement in mealtime set up and clean up (16).

The importance of the environment to health behaviors

necessitates development of tools that accurately measure the nutrition and physical activity environment, particularly in child care (17,18). A recent literature review of food environment assessments deemed this area a nascent field and noted that few researchers evaluate the psychometric properties of such instruments (18). Similarly, a review of tools designed to assess the built environment's influence on physical activity revealed that the validity of self-report measures is rarely addressed (19).

Currently, two tools designed to assess the child-care nutrition and physical activity environment have published psychometric properties. The Environment and Policy Assessment and Observation (EPAO) instrument was developed to evaluate the Nutrition and Physical Activity Self Assessment for Child Care (NAP SACC) program, an environmental intervention (17). Through a 1-day observation, the EPAO measures several domains, including types of foods served to children, staff mealtime interactions, physical activity and sedentary opportunities, staff support, and the physical environment. It includes a document review of menus, handbooks, training documents, curricula, policies, and a playground safety check. Although the EPAO has many merits, it is resource-intensive, requiring a full day of observation and thorough document review. Construct validity, predictive validity of the physical activity environment domains, and interobserver reliability of the instrument have been published (7,17,20).

The NAP SACC intervention includes a self-assessment tool that allows child-care providers to evaluate their facility's nutrition and physical activity environment (21). This instrument's validity and reliability are established, but it was designed to aid centers in identifying areas of improvement within their own sites (21) and may not be appropriate for researchers interested in studying the role of environmental factors across multiple child-care centers.

We developed a self-administered child-care director survey to assess the nutrition and physical activity environment of child-care centers. The survey was designed to allow researchers to study environmental factors across a large number of child-care centers. This survey development was part of a larger research project exploring the nutrition and physical activity environment in preschools serving low-income families. This article reports on the validity of the director survey by comparing survey responses to observation, interview, and document data.

## METHODS

### Survey Development

We began with a review of existing measures (16,21-24) and the public health and early education literature, as well as guidelines from the National Association for the Education of Young Children (25), Head Start (26), *Caring for Our Children* (27), the National Association for Sport and Physical Education (28), and laws pertaining to the Child and Adult Care Food Program (CACFP) (29). We collaborated with the Connecticut Department of Education's Nutrition Education Coordinator, who works closely with the state's child-care centers. The Robert Wood Johnson Foundation Working Group on Child Care also provided feedback. The survey was reviewed by three

child-care expert consultants, pilot-tested at three CACFP-participating sites, and modified according to feedback. These steps ensured that the survey had adequate content validity. The final survey contains 74 items and covers four broad areas related to nutrition and physical activity: center policies, practices related to the social environment, the physical environment, and nutrition quality. Response options for individual items varied according to the nature of the items.

**Policies.** The survey contains nine items addressing the strength of center nutrition and physical activity policies (eg, staff use of food as reward for children's behavior). Four response options were provided: no policy, informal policy (spoken but not written), written policy (not included in parent handbook), and written policy (included in parent handbook). We considered a written policy included in a parent handbook to be the strongest form of policy. The purpose of creating a policy is to ensure that decisions are made in a consistent manner and reflect the values of the organization. Policies should be clearly written and publicly available to set the stage for effective and consistent implementation. If a question on implementation arises, the written policy can be consulted and changed if necessary to provide further clarity. If there is a change in personnel, written policies can remain to ensure that valued practices within the organization continue.

**Practices.** Twenty-three items assessed center practices and aspects of the social environment (eg, how health information is communicated to parents). Barriers to promoting healthy eating and physical activity practices (eg, lack of support from teachers) were also assessed.

**Physical Environment.** Three items assessed the availability of drinking water, the presence of 11 types of equipment, books, and posters, and the suitability of the indoor space for physical activity.

**Nutrition Quality.** Thirty-six items addressed on how many days during the past school week specific foods and beverages were served; response options included "none served," "1 to 2 days," "3 to 4 days," and "5 days (every day)." Eleven additional items addressed the nutritional content of foods served in the past week (eg, fat content of milk, for which response options were "none served," "skim (nonfat)," "1% low fat," "2% reduced fat," "whole," and "never served"). Three items addressed the types of foods used in fundraising and center celebrations (response options varied across the three items).

### Additional Measure Development

Three measures were developed to validate the survey instrument. These measures were designed to mirror items included in the survey to allow for direct comparison. An in-person director interview was created to help determine the validity of the practice and policy items on the director survey. A direct observation tool was created to capture lunchtime practices, outdoor play practices, and the indoor and outdoor environment for comparison with survey practice and environment items. A menu rating tool was created to assess the quality of foods offered, variety of foods served, and the degree of clarity in the menus. This tool renders a total menu quality score, as well as seven subscale scores for breakfast,

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