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Psychosocial Outcomes of Lunch is in the Bag, a Parent Program for Packing Healthy Lunches for Preschool Children

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INTRODUCTION

Lack of fruits, vegetables and whole grains (FVWG) in preschoolers' sack lunches is a serious concern because these foods have been identified as critical to healthy growth and development, maintenance of healthy weight, and prevention of certain cancers, diabetes and other chronic diseases (1-3). Only 48% of American preschool-aged children consume the recommended number of servings of fruits and vegetables (4). The average intake of whole grain foods of young children and adolescents is less than one serving per day, far short of the U.S. Dietary Guidelines recommended three servings per day or half of all servings of grains (5).

The preschool years represent a period when children establish food preferences, can accurately discern between healthy and non-healthy foods, and acquire dietary habits that track into their later years (6-8). More than three fourths of US children age five and under regularly spend at least one day a week in care outside of the home (9). This translates to many lunch meals consumed away from home. While the majority of childcare centers prepare the lunch meal in-house, many centers require parents to send all or part of the lunch meal from home (10). Daily preparation of sack lunches is an opportunity for parents to provide regular exposure to FVWG for their preschool children. The childcare center is a

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good setting for behavioral interventions to increase exposure to and preference for these foods.(10-12).

Several studies that have evaluated adult consumption of FVWG based on social cognitive theories show outcome expectations, subjective norms, and other psychosocial factors to be significant predictors of dietary intentions and behavior (14-17). For example, Havas demonstrated an increased consumption of fruits and vegetables among WIC mothers was directly related to increased knowledge, self-efficacy and attitudes (18). Gibson found that mothers' nutrition knowledge, frequency of fruit consumption and attitude about the health benefits of children's consumption of fruit and vegetables were independent predictors of children's fruit intake while attitude toward health benefits predicted children's vegetable consumption (19). Villarubia also found parents' attitudes had the strongest relationship to their intentions to serve vegetables to their third to fifth grade children, followed by perceived behavioral control and subjective norms while intentions and perceived behavioral control had the greatest influence on the behavior of serving vegetables to their children (20). Despite these studies, to our knowledge, Social Cognitive Theory (SCT) (21) and the Theory of Planned Behavior (TPB) (22) have not been applied to studies in the childcare setting targeting parents packing FVWG in sack lunches for their preschool age children.

To enable and encourage parents to pack better sack lunches for their young children, the *Lunch is in the Bag* program was developed using SCT and especially TPB as a framework. The expected primary outcome was that after exposure to *Lunch is in the Bag*, parents would pack at least one serving each of FVWG in preschool sack lunches each day. The program consisted of brief behaviorally-based activities presented to parents through a series of handouts for parents, classroom activities for the children, and parent-child activity stations at the childcare center over a five-week period. Theory-guided proximal objectives for the *Lunch is in the Bag* program were to increase knowledge (K) about how to pack nutritious, safe, and appealing lunches as well as increase outcome expectations (OE), perceived control (PC), subjective norms (SN), and intentions (I) for packing fruits, vegetables, and whole grains in the child's sack lunch every day.

The purpose of this pilot study was to (1) evaluate the achievement of the proximal objectives of the intervention and (2) examine the extent to which the psychosocial variables were useful as predictors of parents packing FVWG in children's sack lunches.

METHODS

Participants

Participants were recruited from six licensed childcare centers in a metropolitan area in Central Texas. Inclusion criteria for centers were: (1) state licensure of the center, (2) minimum enrollment of 20 children ages 3 to 5, (3) care for children during lunchtime, and (4) a requirement for children to bring their lunches from home. All families of 3-5 year old children (n=368) attending the selected childcare centers were invited to participate. Center directors were provided a letter of explanation that included a draft statement of their endorsement of the program to distribute to parents the week before recruitment. Enrollment criterion for the families was participation of one parent-child dyad per family, with the caveat that the "parent" member of the dyad was the primary preparer (≥ 3 days/week) of the child's lunch. The Institutional Review Boards of both The University of Texas at Austin and The University of Texas Health Science Center at Houston approved the study in accord with guidelines for human participants in research. Parents provided written consent before participating in study activities.

Study Design

In a quasi-experimental design, the centers were paired by size then randomly assigned to either an intervention (n=3) or comparison (n=3) group. Data were collected at baseline and again at follow-up six weeks later, following the 5 week intervention. Primary outcome measures were servings of FVWG packed in the children's lunches. Proximal outcome measures were parent knowledge (K); outcome expectations (OE); perceived control PC; subjective norms (SN); and intentions (I).

Intervention components

Lunch is in the Bag is a program for parents designed to be compatible with childcare centers requiring lunches sent from home. The program is an adaptation of a handout series, The Lunch Box, originally developed by the Agricultural Extension Service in San Luis Obispo, California (23). The revised handouts were sent from the center to the home where lunch packing behaviors occur, to provide education and motivation at an individual level to parents. Classroom activities were designed to provide education for the child as well as prompt parent packing behaviors. The weekly center-based Educational Activity Stations, held outside the classrooms at pick-up time, encouraged engagement of the parent and child at the interpersonal level to reinforce healthy lunch packing decisions and behaviors. The components were designed to fit into the childcare centers' current method of communication with parents, classroom curriculum and pickup time logistics. Daycare personnel received an hour long training led by a registered dietitian that included program content and implementation strategies. Materials were developed for sixth grade reading competency (24). The 5-week duration was determined in interviews with developers and providers of the original Lunch Box handouts and tested in group interviews with parents and childcare personnel. Cultural competence of the material content and imagery was evaluated and guided by an Advisory Panel and focus group testing by parents and childcare personnel. The intervention strategies were drawn from TPB and SCT and are summarized in Table 1.

Measurement

The two data sources for this study were questionnaires completed by the parents and direct observation of foods packed in children's lunch sacks at baseline and at follow-up. Demographic data for the parents were obtained in the baseline questionnaire. The lunch contents of participating children were recorded by trained observers on 3 random nonconsecutive days to account for variability in foods packed (25,26). Food observers (n=5) were trained with a research-based protocol (27) modified by training the observers to recognize foods and servings sizes common to lunches of preschool children (28). Observers recorded the contents of the lunches during the mid-morning hours, prior to the children's lunch times. Food amounts were classified by the age-appropriate servings sizes designated by the USDA Child and Adult Care Feeding Program (29).

Questionnaires were adapted from published survey instruments (19,30,31) with additional items developed by the study investigators and pilot tested at 3 additional childcare centers. Psychosocial variables were measured separately for FVWG. Item response options were anchored and scored on a scale of 1-5, with the exception of the seven multiple choice knowledge items and the three open-ended items asking about intentions. To facilitate comparisons across the measures, item total scores for K, OE, PC, and SN were expressed as percent of range on the respective raw score scale. Internal consistency of each of these scales was evaluated using all of the parent responses to the questionnaire at baseline.

The questionnaire was self-administered. To ensure the questionnaire data set contained records for only those parents who understood and willingly followed the self-administration

instructions, the quality assurance criterion specified that no more than 12 of the psychosocial items were missing on any one questionnaire. The final dataset included observations of sack lunch data by 132 parents, baseline questionnaires from 119 parents and follow-up questionnaires from 104 parents.

Knowledge (K)—The raw score scale was number of correct answers of seven multiple choice questions matched to MyPyramid guidelines for children (30).

Outcome Expectations (OE)—A 5-point Likert scale was used for 8 of the 12 items (“strongly agree” to “disagree strongly.”) The stem was “I like to pack [target food] because” and the item definitions included such statements as “they are good for health,” or “they taste good.” (31). The other four items asked the parents to evaluate the act of packing one serving of the target food on semantic differential scales with such anchors as harmful-beneficial, or foolish-wise (19). Internal consistency statistics based on parent responses at baseline were $\alpha = 0.76$ for fruit, $\alpha = 0.71$ for vegetables, and $\alpha = 0.80$ for whole grains.

Perceived Control (PC)—One of the six items had a Likert-type response scale to indicate if the parent “could easily pack [target food] if I wanted to;” two were semantic differential with anchors very little control – complete control and extremely difficult – extremely easy; and three were on scale with anchors “very sure I cannot” to “very sure I can” regularly “tell my child I like”, “encourage my child to eat”, and “insist my child try a bit of a new” target food (19). Internal consistency statistics were $\alpha = 0.57$ for fruit, $\alpha = 0.70$ for vegetables, and $\alpha = 0.81$ for whole grains. Because internal consistency for fruit approached the criterion for 0.60 despite a ceiling effect (average total score 28 of 30 possible), this measure was retained in the analysis.

Subjective Norms (SN)—Four of the five Likert-type items asked parents to indicate whether other people (e.g., the child's teachers, people important to the parent, other center parents, and the child) think the parent should pack one serving of the target food in the child's sack lunch every day, while the fifth item asked whether “people who are important to me support my packing one serving of [target food]” (19). Internal consistency statistics were $\alpha = 0.74$ for fruit, $\alpha = 0.66$ for vegetables, and $\alpha = 0.83$ for whole grains.

Intention (I)—Parents were asked to record the number of servings of [target food] they intended to pack in their child's lunch every day. Because parents often responded with a range, the coding rule was to round down to the nearest half serving--e.g., if the parent wrote “one or two,” a value of 1.5 was entered in the database.

Behavior—Contents observed in the children's lunch sacks were classified by food group and coded for age appropriate serving size based on MyPyramid for Kids (32). The parents' behavior was measured as number of servings of FVWG in the sack lunches.

Statistical Analysis

In this study, for each participating family, the child's lunch sack was observed on three days at baseline and three days at follow-up. Families were recruited from 3 childcare centers in the comparison group and 3 childcare centers in the intervention group resulting in a three-level hierarchical data structure with observations clustered within families and families clustered within centers. Three-level regression models were used to analyze the primary behavioral and proximal psychosocial outcomes and examine the extent to which the psychosocial variables were useful as predictors of the parents' behavior of packing FVWG in the children's sack lunches. In the initial analyses parent BMI, household size and parent ethnicity were not significant covariates for servings of FVWG. These variables were

therefore excluded from models of the proximal outcomes in this pilot study. The models were fitted to the data by the method of restricted maximum likelihood (REML), and the means and standard errors of the four treatment-time combinations were calculated for each outcome. Analyses were conducted using Stata (Stata Version 10.1, 2009, StataCorp, College Station, TX).

RESULTS

Of a total of 368 parent/child dyads in the six centers, 132 (36%) enrolled in the study. The family participation rates in the two groups of centers were not significantly different, but because the population of families eligible to participate in the study was slightly larger in the intervention group (Table 2) the absolute numbers of parents was larger for the intervention group ($n=81$) than for the comparison group ($n=51$). The centers ranged in size from 24 to 125 three to five year old children. The majority of the parents were mothers, with mean age of 36.7 years and self-reported height and weight indicating a mean body mass index (BMI) of 24.1 ± 5.2 (within healthy range). Many participants were college graduates (40%) or had completed graduate/professional education (>50%). Household income was over \$100,000 in 60.6% of families. There were no significant differences between demographic characteristics in the intervention and control groups.

Primary behavioral outcomes

As previously reported (33), analysis of amounts of the target foods packed in the children's lunches on 3 non-consecutive days showed a significant increase from baseline to follow-up in the number of servings of vegetables and whole grain items. Increase in vegetables averaged 0.24 servings ($p = .001$), increase in whole grains averaged of 0.52 servings ($p = .001$), and the mean number of servings of fruit did not change significantly. Means and standard deviations are shown in Table 2.

Proximal psychosocial outcomes

Significant interactive effects of time (baseline versus follow-up) and treatment (intervention versus comparison) on K ($p = 0.010$); on OE for whole grains ($p < 0.001$); and SN for fruit ($p = 0.002$), vegetables ($p = 0.046$), and whole grains ($p = 0.015$) were obtained. Post-hoc tests showed OE for vegetables was significantly greater at follow-up than at baseline for the intervention group ($p < 0.002$) although there was no significant interactive effect of time and treatment. There was no significant interactive effect of time and treatment on PC or on I for any of the target foods. Means and standard deviations for the psychosocial variables are shown in Table 2. Inspection of means and standard deviations displayed in Table 2 shows even before the intervention, scores for fruit were consistently higher than for whole grains and vegetables and parents already were packing more than one serving of fruit in their children's sack lunches.

Psychosocial predictors of behavior

Data in Table 3 show the amount of vegetables parents packed in their child's lunch sack increased an average of 0.05 servings for each unit of increase in parent's vegetable PC ($p < 0.001$); 0.02 servings for each unit of increase in the parent's vegetable OE ($p = 0.007$); and 0.009 servings for each unit of increase in parent's intention to pack vegetables ($p < .05$). The amount of whole grains parents packed in their child's lunch sack increased an average of 0.11 servings for each unit of increase in the parent's K ($p = 0.002$). None of the psychosocial variables was a significant predictor of amount of fruit parents packed in their children's lunch sacks.

DISCUSSION

This pilot study of *Lunch is in the Bag* indicated significant changes for the primary behavioral and proximal psychosocial objectives, and provided evidence of the usefulness of the psychosocial variables as predictors of the lunch packing behavior of parents. At the childcare centers where *Lunch is in the Bag* was implemented, there were increases from baseline to follow-up in parents' knowledge of age appropriate meal patterns, in outcome expectations for whole grains and vegetables, and in subjective norms regarding the packing of fruits, whole grains, and vegetables in the child's lunch sack every day. Increased knowledge of meal patterns was associated with parents packing more whole grains in their children's lunch sacks; and increased outcome expectations, perceived control, and intentions for packing vegetables were associated with parents packing more vegetables in their children's lunch sacks.

These results are consistent with other research showing parents' outcome expectations, perceived control, and intentions are associated with providing their children with vegetables (19,20). The mean number of servings of vegetables increased significantly at follow up in the intervention group to just over half a serving (from $0.42 \text{ SE} \pm 0.60$ to $0.66 \text{ SE} \pm 0.94$), but remained less than the goal of one serving. Although this represents a small (about two tablespoons) increase, the amount of vegetables supplies key nutrients and models an important component of a healthy lunch for a child. Survey of preschool children's food preferences show vegetables to be liked less compared to cereals and fruit (34). However, other research demonstrates that offering new and less preferred foods repeatedly can improve children's liking and intake of vegetables (35). *Lunch is in the Bag's* classroom activities for children and parent-child educational activity stations are components with potential for getting parents and children to agree the child likes vegetables, but additional research and development is needed to increase capabilities for getting more parents to pack more vegetables more often in their young children's sack lunches.

To our knowledge, no studies have been published regarding parents' offering whole grains to their preschool-age children, although in a recent study parents identified knowledge as a barrier to purchasing whole grains (36). That finding lends support to the relationship between caregiver knowledge and packing of whole grains. The outcome expectations, perceived control and intentions for fruits were consistently high in both groups at all points measured. This may correspond to the elevated mean number of servings for both groups at baseline (Intervention: 1.80 ± 0.145 ; Comparison: 1.25 ± 0.157) and follow up (Intervention: 1.75 ± 0.145 ; Comparison: 1.13 ± 0.156).

A primary strength of this pilot study is the exploration of an area of parental behavior that has not received much attention, yet plays an important role in the development of young children's dietary behaviors. With the exception of a few studies showing sack lunches sent from home have lower nutrition quality than school- or center-prepared lunches (37), very little is known about lunch packing behaviors and decisions in families with young children.

Further research is needed to address limitations of the pilot study. Small sample sizes prevented more complete analyses of the pathways linking the intervention to the outcomes. With only 3 centers in the intervention group, it was not possible to evaluate relative contributions of components targeted to the individual, interpersonal, and organizational levels. Also, this pilot study focused on change in the contents of the sack lunches without determining if there was a corresponding change in the child's intake or in the nutrition environment in the home. Another limitation of the pilot study is the skew toward higher income and few minority families in the sample, perhaps because centers that serve lower

income families are more likely to participate in federal programs that require or subsidize hot meal services. Prevalence and characteristics of childcare centers requiring lunches sent from home are a topic for further study (10). Additional research also is needed to identify options for strengthening the program's capabilities for increasing the amounts vegetables and whole grains parents pack in sack lunches for their young children. The amount of increase demonstrated in servings of vegetables and whole grains was promising but not robust.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The results of the pilot study support the use of theory-based programs for behavioral nutrition education for parents with children enrolled in a childcare center. Identification of specific constructs leads to selection of intervention strategies that can fit into the chosen environment. Behaviorally-based nutrition knowledge creates a solid foundation for a good program; however, other strategies that develop peer and organizational support as well as provide opportunities to practice new behaviors also are important. As an example of application, types of whole grain were nutrition knowledge items that were provided to children and teachers along with the parent. Then 1) the educational station provided an opportunity for the child to demonstrate the knowledge acquisition for the parent and 2) the classroom activity created an expectation by the child and teacher that the parent would practice the behavior. The interplay of knowledge, activity and expectation has the potential to influence subjective norms perceived control and intentions for a behavior. This multi-component program format can accommodate a variety of strategies and fits well in the childcare environment.

The use of classroom activities and parent-child activity stations in the intervention to stimulate greater parent-child interaction about nutrition and food choice presents an interesting area for the nutrition educator. Food preparation, shopping, and lunch packing are all junctures where bi-directional interaction may be taking place affecting availability and accessibility of food to the child. Opportunities for knowledge or skill demonstration by the child in front of the parent often stimulates conversation and encouragement by the parent. The nutrition educator is in a unique position to create awareness among parents about the importance of the food choices they make for their child. Understanding the influence of outcome expectations and subjective norms can guide the development of program messages.

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Table 1Behavioral constructs, intervention strategies and corresponding program components of *Lunch is in the Bag*

Behavioral construct	Intervention strategies	Program component
Knowledge/Actual Behavioral Control	Information about appropriate meal patterns and serving sizes for packing preschool lunches	Handouts weeks 1, 3, 4, 5 color-coded weekly lunch menus with 5 food groups
Outcome Expectations/Attitudes	Motivational messages about the benefits of packing fruits, vegetables, and whole grains in preschool lunches	Handouts 1 through 5 emphasizing disease prevention for children, and incorporating behavioral journalism stories from parent peers. Posters with motivational messages.
Self-efficacy/Perceived Behavioral Control	Simplified lunch menu pattern for parents to follow. Activities to recognize current strengths and provide practice and assurances that packing more fruits, vegetables, and whole grains is easy, affordable, and achievable using the lunch menu pattern	Handouts 1 through 6 Lunch Star game for parent to play with the child at the educational station to 'pack a good lunch'. Comparative shopping tips and suggestions to "try something new" assignment for parents to encourage step-wise changes in shopping and packing behaviors. Suggestion for parent and child to be "vegetable explorers" to try new vegetables.
Subjective Norms	Social references to legitimize recommended meal patterns and role model stories that parents can emulate to increase the number of servings of fruits, vegetables, and whole grains in their preschool child's lunch sack	Handouts 1 through 6 Behavioral journalism stories of parents packing appropriate lunches. Classroom activities that request parents send in child's favorite fruit, vegetable and whole grain. Parent station activities that ask parents to share ideas.
Intentions	Suggestions and tools for setting specific, challenging, achievable goals for packing more servings of fruits, vegetables, and whole grains.	Handouts weeks 3, 4, and 6 Goal setting activity for parents to plan and shop for then pack target foods; prompts from children for "colored" foods. Environmental cues
Behavior	Reminders, rewards and cues to reinforce positive changes	Lunch superstar certificates to send home to recognize excellent lunches during specific weeks. Child ask for "colored fruit and vegetables for their lunch

Table 2

Means and standard deviations for psychosocial and behavioral variables targeted in *Lunch is in the Bag* intervention shown by time (baseline versus follow-up) at comparison and intervention childcare centers.

Variables		Intervention (n = 81)			Comparison (n = 51)		
		Baseline	Follow-up	SD	Baseline	Follow-up	SD
Knowledge of meal pattern		37.1	49.9	16.7	37.4	17.4	36.5
Outcome expectations	F	87.7	8.3	91.1	7.6	89.3	11.6
	WG	80.6	11.6	86.7	10.9	83.8	12.2
	V	76.4	10.3	81.3	10.6	81.2	9.9
Subjective Norms	F	78.4	14.9	88.0	13.5	78.0	15.1
	WG	71.8	16.9	79.9	17.5	71.2	16.0
	V	69.5	15.2	78.4	14.2	68.1	13.4
Perceived Control	F	89.9	8.6	90.2	9.9	92.6	8.8
	WG	86.8	11.9	87.1	14.1	86.8	16.3
	V	84.8	10.2	85.5	11.5	84.6	15.0
Intentions: number of servings intended to pack	F	1.3	0.5	1.2	0.4	1.2	0.4
	WG	1.0	0.4	1.1	0.4	0.9	0.4
	V	0.9	0.3	1.0	0.3	1.1	1.4
Servings parents packed in child's sack lunches	F	1.9	1.3	1.9	1.2	1.2	0.8
	WG	0.6	0.9	1.2	1.3	0.5	1.0
	V	0.4	0.6	0.7	0.9	0.7	0.9

Significant time by intervention effects:

Abbreviations: SD, standard deviation; F, fruit; WG, whole grains; V, vegetables

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 3

Coefficients and p-values from multilevel regression of the Intervention parent psychosocial variables on the parent behavioral variables of packing fruit, whole grain and vegetable in their preschool child's sack lunches (N=81).

Criterion Variable	Predictor	Coeff.	p value
Serving of fruit	Knowledge of meal pattern	-0.03	0.4
	Fruit outcome expectations	0.02	0.1
	Fruit subjective norms	0.01	0.6
	Fruit perceived control	0.00	0.9
	Fruit intention	0.02	0.06
Serving of whole grain	Knowledge of meal pattern **	0.11	0.002
	WG outcome expectations	0.13	0.1
	WG subjective norms	0.03	0.06
	WG perceived control	0.22	0.1
	WG intention	0.01	0.4
Serving of vegetables	Knowledge of meal pattern	0.05	0.08
	V outcome expectations **	0.02	0.007
	V subjective norms	0.01	0.4
	V perceived control **	0.05	0.000
	V intention *	0.01	0.05

Significant predictive effects

*** $p < 0.001$

Abbreviations: Coeff, Coefficient; WG, whole grains; V, vegetables

* $p < 0.05$

** $p < 0.01$