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The BackPack Food Program's Effects on U.S. Elementary Students' Hunger and On-task Behavior

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Please note that this study was published before the SY2014-15 implementation of the Smart Snacks Nutrition Standards for Competitive Food in Schools, as required by the Healthy, Hunger-Free Kids Acts of 2010. As such, certain research relating to food in schools may not be relevant today.

ABSTRACT

Purpose/Objectives
The purpose of this study was to evaluate the BackPack Food Program's effectiveness in combating students' hunger over the weekends and school breaks, as well as analyze the program's effects on students' on-task behavior in the classroom. Additionally, this study examined program satisfaction from students, parents, and teachers.
Methods
Over the course of three semesters, hunger surveys were evaluated for 82 students. Direct observations of on-task behavior were recorded for 52 students, and satisfaction surveys were collected from 192 students, 138 parents, and 82 teachers.
Results
Statistical analyses indicated that reports of hunger did not decrease significantly and on-task behavior did not increase significantly. However, surveys indicate high rates of child, parent, and teacher satisfaction with the program.
Application to Child Nutrition Professionals
Professionals who manage and implement supplemental weekend food programs may find it beneficial to measure the impact the food has on the entire family, rather than solely on the child. Therefore, program managers should focus efforts to remediate the effects of food insecurity on the whole family unit.

INTRODUCTION

In a nation of plenty, childhood hunger and food insecurity continue to be widespread problems. In 2009, 17.2 million children lived in food scarce homes (Feeding America, 2011). Food insecurity (also referred to as food scarcity) refers to homes where families do not have access at all times to enough food to maintain an active and healthy lifestyle (Nord & Parker, 2010). In extreme food scarce homes, at least one family member goes hungry at some point during the year because the household cannot afford to purchase enough food (Rodgers & Milewska, 2007).

Effects of Food Insecurity

Characteristically, families living at or below the poverty line have experienced some form of food insecurity at least once. Food insecurity has been linked to several negative outcomes. Children living in food scarce homes are less likely to have access to foods that are nutrient-dense (Dunifon & Kowaleski-Jones, 2003), and these children are more likely to consume foods that have a high-calorie, high-fat content because of the convenient, inexpensive nature of these foods (Winicki & Jemison, 2003). The negative effects of frequent consumption of high-calorie, high-fat foods have been well documented throughout the literature. Health problems such as obesity, delays in mental and social development (U.S. Department of Agriculture [USDA], 2010), and lower academic

achievement (Alaimo, Olson, & Frongillo, 2001; Nord & Parker, 2010; Tobin, 2011; Winicki & Jemison, 2003) have all been related to poor diets. Food insecurity has also been associated with higher incidents of behavioral problems (Slack and Yoo, 2005; Slopen, Fitzmaurice, Williams, & Gilman, 2010; USDA, 2010). Finally, Connell, Lofton, Yadrick, & Rehner (2005) reported children's psychological perception of food insecurity resulted in feelings of worry, anxiety, and sadness about the family food situation.

Food insecurity also affects parents and caregivers. Several studies have found a strong association between parental depression and food insecurity (Bronte-Tinkew, Zaslow, Capps, Horowitz, & McNamara, 2007; Heflin, Siefert, & Williams, 2005). Parental depression due to food scarcity strains positive parenting behaviors and can have detrimental effects on child well-being. Better parental mental health has been found to be a protective factor against childhood hunger because healthier parents typically have more adaptive coping strategies to manage the stresses that food insecurity causes (Wehler et al., 2004).

BackPack Food Program

To combat food insecurity, more than 38 states have implemented weekend food programs, such as the BackPack Food Program (Cotugna & Forbes, 2007). The goal of the BackPack Food Program is to reduce hunger among school-aged children through the distribution of easy-to-prepare food in children's backpacks every Friday or the last day of school prior to a long weekend. In this study, food was not placed in the backpacks over extended breaks due to weight constraints. During extended breaks, food was picked up at the local food shelter. There was enough food in the packs for the child to have breakfast, lunch, and a snack each day of the school break. The food packs contained child-friendly, single serving, non-perishable items that the children could prepare. Common foods found in the pack included: cereal bowls, instant oatmeal packs, peanut butter crackers, granola bars, tuna fish meals, beanie weenies, juice boxes, microwavable pasta bowls and fruit cups. The program worked closely with registered dietitians to ensure that the packs had some nutritional components. Consistent with past recommendations, schools were used to distribute food, local teams implemented the program, and all participants were asked to participate in the evaluation research (Reading, 2008).

Purpose/Hypotheses

As demonstrated through several studies, children from food insecure homes are at risk for several negative outcomes including behavioral problems and malnourishment (Alaimo et al., 2001; Cotugna & Forbes, 2007; Slack & Yoo, 2005). For example, an increase in food insecurity is associated with decreased levels of positive behavior (Dunifon & Kowaleski-Jones, 2003). The purpose of this study was to investigate the impact of a weekend food program on student's on-task behavior and hunger. This study also examined the social validity of the program. It was hypothesized that participation in the BackPack Food Program would increase students' on-task behavior, as well as decrease levels of self-reported hunger. Additionally, it was hypothesized that students, parents, and teachers would be generally satisfied with the program.

METHODOLOGY

Participants and Setting

Student participants in this study were enrolled in kindergarten through sixth grade in a small Midwestern area. The schools selected for this study were the three schools with the highest percentage of students receiving free and reduced lunches. Due to the confidential nature of the BackPack Food Program, data regarding ethnicity and family income was not collected. However, information from the National Center for Education Statistics (2011) provided an overview of ethnicity and percentage of students eligible for free or reduced lunch at each of the three schools (Table 1). Over the course of three semesters, observations of on-task behavior were recorded for 52 students and anonymous hunger surveys were evaluated for 82 students. The discrepancy between

the sample of students for on-task observations and hunger surveys was due to the limited number of research assistants available to collect observational data prior to the first weekend food was sent home. Additionally, some students enrolled in the program after food was being sent home, and some staff members were not willing to delay food distributions to allow for collection of baseline data (either on-task behavior or hunger). Therefore, more students participated in the program than completed behavioral observations or hunger surveys.

Table 1. Overview of Student Characteristics for Each School

Characteristic	School 1	School 2	School 3
Number of students	340	640	400
White, not Hispanic (%)	75	75	70
Black, not Hispanic (%)	13	17	19
Hispanic (%)	6	4	7
Asian/Pacific Islander (%)	3	3	3
American Indian/Alaskan Native (%)	<1	1	1
Eligible for free or reduced-price lunch (%)	43	47	46
Girls (%)	47	46	46
Kindergarten (%)	19	10	16
First grade (%)	17	10	18
Second grade (%)	16	10	15
Third grade (%)	16	10	16
Fourth grade (%)	19	12	14
Fifth grade (%)	12	10	22
Sixth grade (%)	0	38	0

Measures

A hunger survey (Figure 1) that contained words as well as pictures was utilized because some students were not able to read yet or were English Language Learner (ELL) students. The pictures were meant to make it easier for all participants to understand the survey. Results were coded as “not hungry”= 1, “a little hungry” = 2, and “very hungry” = 3.

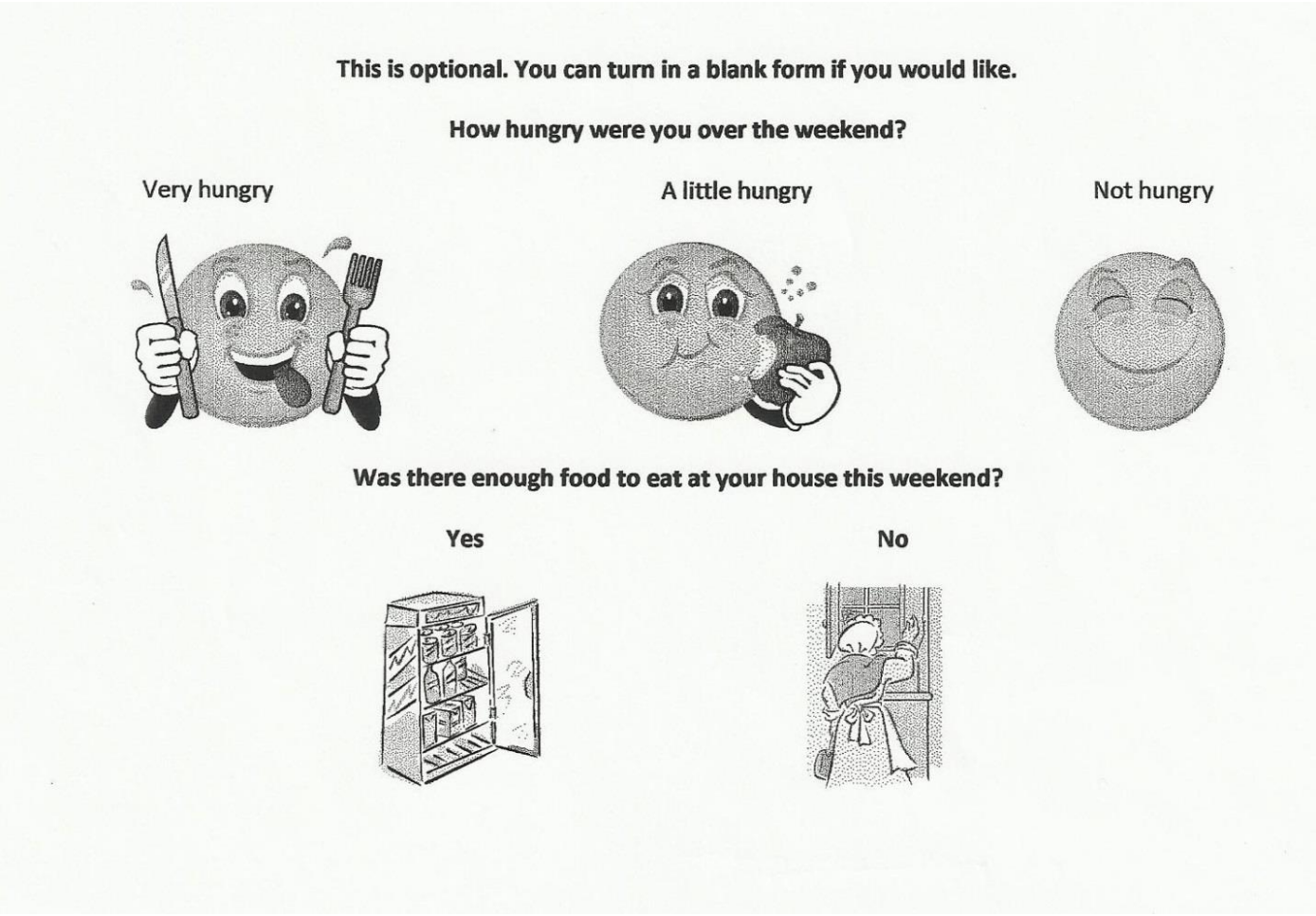

Figure 1. Hunger Survey

Brief, one-page satisfaction surveys (Figures 2, 3, and 4) created by the researchers were distributed to students, parents, and teachers once a semester at parent teacher conferences. While all surveys addressed overall satisfaction with the program, additional questions were tailored for each specific group. The student surveys asked who ate the food sent home and how much the student looked forward to the food. The parent survey assessed the family's reliance on the food, as well as changes seen in the student's behavior at home. Finally, the teacher survey addressed improvements in behavior, concentration, and energy levels seen in students.

BackPack Food Program: Student Evaluation
We want to know what you think of the BackPack Food Program. We can make the program even better if we know what you like and don't like. Please answer these questions. **This is optional—you will still be given food even if you don't fill out the survey.**

1) Do you look forward to getting the pack? (circle your answer)
- I look forward to the BackPack Food Program each week.
- I look forward to it only some weeks.
- I do not like the BackPack Food Program.

2) Who ate the food that you received? (circle all that apply)
- I ate the food
- I shared the food with other kids in my house
- I shared the food with grownups in my house

BackPack Food Program: Student Evaluation
We want to know what you think of the BackPack Food Program. We can make the program even better if we know what you like and don't like. Please answer these questions. **This is optional—you will still be given food even if you don't fill out the survey.**

- I shared the food with people I don't live with
- No one ate the food

3) Tell us what BackPack Food Program foods you like best:
4) Tell us what BackPack Food Program foods you don't like:
5) What would you change if you were in charge of the BackPack Food Program?
Draw a picture on the back showing how you feel about the BackPack Food Program.

Figure 2. Student BackPack Food Program Evaluation

BackPack Food Program: Parent Evaluation
Please take a few minutes to tell us how the **BackPack Food Program** is working for you and your child. Please give as much information as possible, as this will help us improve the program for your child. **This is optional—food will be sent home with your student even if you don't fill out the survey.**

1) The BackPack Program helps my family
- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

2) It is hard to provide enough food for everyone in my household
- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

3) Without the program, I or another adult in the home might have to skip a meal
- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

4) The program has made a difference in the well-being of my child
- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

5) Was there enough food in the pack for each meal? Yes No (if not, what is needed?)
6) Are there things in the pack that have not been eaten? If so, what?
7) What foods in the pack does your child like?
8) Did you use the nutrition information in the newsletter? Yes No
9) Did you contact any of the community resources or social service providers listed in the newsletter? Yes No
10) Please share any questions or comments that you have that could make the program better.

BackPack Food Program: Parent Evaluation
Please take a few minutes to tell us how the **BackPack Food Program** is working for you and your child. Please give as much information as possible, as this will help us improve the program for your child. **This is optional—food will be sent home with your student even if you don't fill out the survey.**

Figure 3. Parent BackPack Food Program Evaluation

BackPack Food Program: Teacher Evaluation

Please take a few moments to comment on how the BackPack Food Program is working. Please give as much information as possible, as this will help us improve the program's future operation. Answer all questions for your class as a whole.**This is optional—your students will still get the food even if you don't fill out the survey.**

1) Do you feel that there are any problems with confidentiality?
- Yes (If yes, please explain)
- No

2) In general, have you noticed any improvements in the following for any of your students since the BackPack Food Program started?
- Ability to concentrate:
- Much Improved
- Some Improvement
- No Improvement
- Physical appearance:
- Much Improved
- Some Improvement
- No Improvement
- Energy level:
- Much Improved
- Some Improvement
- No Improvement
- Behavior:
- Much Improved
- Some Improvement
- No Improvement
- Emotional well-being:
- Much Improved
- Some Improvement
- No Improvement

3) Have you noticed a decrease in the number or frequency of students complaining of hunger?
- Yes
- No

4) Have you noticed any other changes in the students since the start of the program? Please explain.
5) Are you providing snacks for your students? If so, how many students and how often?

Figure 4. Teacher Backpack Food Program Evaluation

Procedures
The research design for this study included direct observation of students in the classroom, student hunger surveys, and satisfaction surveys conducted with students, parents, and teachers. Dependent variables were operationally defined using the same manual (The Flexible Observational Recording System Manual [FORS])(DeWitt, 1983) that was utilized by the school psychologists at the participating school district. The FORS Manual has three major categories used to define on-task behavior: concentrating, working, and volunteering. "Off-task" behavior was defined using five categories: looking around, writing, playing, distracted, or resting.

Five research assistants who received prior training served as independent observers of students in the schools. Training lasted approximately one hour and consisted of review and practice of the dependent variables outlined in the FORS Manual (DeWitt, 1983). Systematic direct observation using momentary time sampling was practiced by observing a large undergraduate course. Inter-observer reliability calculated using total agreement (number of agreement observations divided by the total number of observations) was found to be 100 % for the training sessions.

Systematic direct observations were utilized for data collection of on-task behavior. Observations of on-task behavior occurred on Monday mornings from approximately 8:00 a.m. until lunch at 11:00 a.m., although the majority of observations were completed by 10:00 a.m. Monday mornings were selected for observations because this provided the best estimate of the impact of the food sent home over the weekend. Only one baseline observation was collected due to ethical considerations surrounding the idea of withholding food from participants; therefore baseline data was only collected for participants who turned in their consent forms before the first day of food distribution. Additionally, this study was unable to implement reliability checks due to the limited number of research assistants working on this project.

According to the U.S. Department of Agriculture (2010), hunger is an individual-level physiological condition that is potentially caused by food insecurity. Therefore, data on hunger was collected using a survey that assessed individual-level intensity of hunger. The survey was distributed to students by the classroom teacher Monday mornings at the beginning of first period. A question regarding the amount of food in the home was also included to help explain reported hunger levels.

Satisfaction surveys were distributed at the midpoint of each semester at parent-teacher conferences. Surveys were distributed to teachers one week before conferences. Teachers were asked to have parents and students who attended conferences fill out the surveys. A research assistant picked up the completed surveys from the school office approximately two weeks after conferences took place.

RESULTS AND DISCUSSION

To analyze whether students' on-task behavior increased after implementation of the BackPack Food Program, a paired-samples t-test compared the means of student's on-task behavior at baseline (M = 74.06%, SD = .17) to the aggregated on-task behavior from the three follow-up observations (M = 70.35%, SD = .16). There was not a significant increase in students' on-task behavior, $t(51) = 1.33$, $p = .19$.
A nonparametric Mann-Whitney test was implemented to analyze whether students' self-reported hunger levels decreased after implementation of the BackPack Food Program. The Mann-Whitney was selected because hunger was assessed on a 3 point scale which created nonparametric data. Additionally, data from this survey were anonymous and student surveys from baseline to follow-up were unable to be matched. There was not a decrease in students' self-reported hunger levels, z = .608, p = .54. Students' self-reported hunger levels at baseline (M = 2.12, SD = .65) were not higher than the hunger levels at the follow-up observations (M = 2.17, SD = .46).

To assess the satisfaction surveys, descriptive statistics were calculated. Across the three semesters, surveys were returned from 192 students (54%), 138 parents (43%), and 82 teachers (95%). Almost all (97%) of the children reported looking forward to the food and 60% reported

sharing the food with other children in the home. Nearly all parents (98%) reported that the program helps their family and all indicated that the program has made a difference in the well-being of their child. More than half (53%) indicated that it is hard to provide enough food for everyone in the home, and 14% said that without the program they or another adult in the home would have had to skip a meal. The majority of teachers reported some or much improvement in students' energy level, emotional well-being, and behavior.

Findings from this study are inconsistent with the evidence in the literature that suggests that supplemental nutrition programs enhance children's behavior (Dunifon & Kowaleski-Jones, 2003). A post hoc test using the nonparametric Wilcoxon test was utilized to compare baseline and follow-up observations of on-task behavior. This test indicated that there was not a significant increase in student's on-task behavior ($z = -1.814$, $p = .07$). A plausible explanation for the inconsistent findings could be the lack of variance within the data, which resulted in a non-normative distribution.

The lack of support for decreased self-reported hunger levels was further examined by analyzing whether students reported food scarcity on the hunger survey. Approximately 75% of the participants reported that there was enough food in the house over the weekend in both baseline and intervention phases, which could have resulted in the majority of students not indicating a decrease in hunger over the weekend.

The lack of variance in hunger and on-task behavior at baseline and the subsequent lack of change from baseline to intervention may be due to factors buffering students against the negative effects of food insecurity. The fact that many of the children did not report hunger and were not off-task during the baseline observation could be due to participation in the Federal Breakfast Program and the benevolence of teachers, many of whom reported purchasing food with their own money to give to hungry students during school, so that they would not be negatively affected by food scarcity.

Another explanation for why significant results were not found in this study could be due to parents or caregivers skipping meals to avoid their children going without food (USDA, 2010). If parents or caregivers are going without food to provide for their children, the children's hunger levels may not have been affected over the weekend and in turn, their on-task behavior would not have been impacted on Monday morning. This does not, however, mean that the program is not helpful. Sending food home with the students may have benefited the students' home experiences by reducing the negative impact of food scarcity. Several studies have found that parental depression and parenting practices are significantly affected by food insecurity (Bronte-Tinkew et al., 2007; Heflin et al., 2005). Therefore, sending food home may allow parents to be better fed and less stressed about feeding the family, resulting in a more positive parenting family environment. Investigating the impact the food has on the student's home life and parenting practices are areas that future research should attempt to address. Knowing more about the impact that the food has on parental hunger may influence policy about the distribution and management of supplemental nutrition programs.

CONCLUSIONS AND APPLICATION

Although there were not significant findings for increased on-task behavior and decreased self-reported hunger in this study, satisfaction surveys demonstrated social validity for the BackPack Food Program. Satisfaction surveys were distributed at the midpoint of each semester of data collection, and students, parents, and teachers all reported high levels of satisfaction with the program. These results suggest that there may be benefits of this program that were unmeasured or obscured due to some families participating despite a lack of food insecurity. In the future, it might be better for programs to make clear that they are targeting food scarce homes, but it is difficult to do this in a way that does not discourage participation by families who would benefit.

The time of day that observations took place could have created an incomplete viewpoint of students on-task behavior and needs to be considered when evaluating the results. According to Mahoney, Taylor, and Kanarek (2005), students, especially those who consume breakfast, are typically more alert and perform better on cognitive tasks during the earlier part of the day. Since

observations took place in the mornings prior to lunch, it is probable that students consumed breakfast the morning of observations, which could have interfered with the observations. In addition, several teachers provided students with a mid-morning snack, which also could have impacted their behavior. Ideally such observations would be conducted before students receive any food.

There are several limitations that need to be considered when interpreting the results of this study. A major limitation of this study was the limited number of baseline observations for on-task behavior and surveys of hunger. There was not enough information on the students' typical behavior and hunger to establish a baseline trend, as one data point could be anomalous. Consequently, it is difficult to draw firm conclusions regarding changes due to the program.

Another methodological limitation in this study was the absence of reliability checks during classroom observations. This occurred because of the disproportionately high number of students participating in the program compared to the small number of research assistants aiding with this project and concerns about having too many observers in the classroom. Although each research assistant observed the same students during each observation period, the lack of reliability checks should be considered when interpreting these findings.

Results from this study suggest that weekend food programs such as the BackPack Food Program, may be impacting families beyond the scope of children's classroom behavior. Therefore, school-based nutrition program managers and staff should monitor the effects that the supplemental food has on overall family well-being. Program managers and staff could utilize the program to send information regarding other community food resources to parents. Additionally, these weekend food programs can serve as a vehicle of communication among parents and staff regarding the benefits of proper nutrition and suggestions on how families can implement and utilize the nutrition information at home.

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