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## The BackPack Food Program's Effects on Self-Reported Hunger and On-Task Behavior

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The Backpack Food Program's effects on self-reported hunger and on-task behavior

By

Meghan E. Ecker

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In

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The BackPack Food Program's effects on self-reported hunger and on-task behavior

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This thesis has been examined and approved by the following members of the thesis committee.

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### Abstract

Variations of the Backpack Food Program are implemented in cities and states throughout the nation, however little is known regarding the effects that providing this food has on student performance in school. The purpose of this study was to evaluate the Backpack Food Program's effectiveness in combating student's hunger over the weekends and school breaks, thus decreasing student's self-reported hunger levels. Additionally, this study attempted to analyze the program's effects on student's on-task behavior in the classroom. Over the course of three semesters, hunger surveys were evaluated for 82 students and observations of on-task behavior were recorded for 52 students. Statistical analysis indicated that reports of hunger did not decrease significantly and on-task behavior did not increase significantly. Several limitations must be considered when interpreting the results of this study. Therefore, results are discussed in terms of their implications for future research.

In a nation of plenty, childhood hunger and food insecurity continues to be a problem. Food insecurity (also referred to as food scarcity in the literature) refers to food scarce homes where families do not have access at all times to enough food to maintain an active and healthy lifestyle (Barrett, 2002; Nord & Parker, 2010; Rodgers & Milewska, 2007; United States Department of Agriculture, 2010). In 2009, 50.2 million Americans lived in food scarce homes; 17.2 million were children (Feeding America, 2011). The level of food insecurity a household encounters can range from mild to severe and can fluctuate over time. 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 Scarcity**

Characteristically, families who are living at or below the poverty line have experienced some form of food insecurity at least once. Children living in food scarce homes are less likely to have access to healthy foods that are nutrient-dense (Dunifon & Kowaleski-Jones, 2003). In addition, 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). It can reasonably be expected that the frequent consumption of high-calorie, high-fat foods may lead to complicated health problems such as obesity. Similarly, the limited access to nutrient-rich foods put this group of children at risk not only for physical health concerns, but also delays in mental and social development (Lozoff, Jimenez, Hagen, Mollen, & Wolf, 2000; United States Department of Agriculture, 2010). Ramey, Campbell, and Ramey (1999) point out that poverty and poor nutrition are among the social and biological risk factors for poor intellectual development.

Several studies highlight the academic difficulties and behavior problems encountered by children living in food scarce households. Children from food scarce homes were found to be 1.44 times more likely to have repeated a grade and 1.89 times more likely to have seen a psychologist compared with children from food-sufficient homes (Alaimo, Olson, & Frongillo, 2001). Likewise, Nord and Parker (2010) found significantly higher rates of repeating a grade among children ages 6-11 from food scarce homes. In a nationally represented sample, Winicki and Jemison (2003) found kindergarten children from food scarce homes made fewer academic gains throughout the school-year compared to children from food secure homes.

Additionally, food insecurity has been demonstrated to be associated with externalizing and internalizing behaviors. According to Carr (2006), externalizing behaviors encompass aggressive behaviors and conduct problems which include fighting, disobedience, drug abuse, and attention problems; internalizing behaviors are defined as emotional behaviors that include crying, worrying, and withdrawal. Slack and Yoo (2005) found that externalizing behavior problems were positively associated with food hardship. The United States Department of Agriculture (2010) reported higher rates of anxiety, depressive, and suicidal symptoms among school-aged children from food scarce homes. Compared with children from food secure homes, children living in food scarce homes are 1.49 times more likely to develop internalizing problems and 1.47 times more likely to develop externalizing problems (Slopen, Fitzmaurice, Williams, & Gilman, 2010).

Food insecurity is a phenomenon that affects not only children living in food scarce homes, but also their parents and/or caregivers. Several studies have found a strong association between parental depression and food insecurity (Ashiabi & O'Neal, 2007; Bronte-Tinkew, Zaslow, Capps, Horowitz, & McNamara, 2007; Heflin, Siefert, & Williams, 2005). These

studies suggest that parental depression 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 financial stresses that food insecurity causes (Wehler et al., 2004).

The literature provides several examples highlighting the importance of proper nutrition and food security. Children living in food scarce homes are at risk for mental, physical, and emotional problems. In an effort to combat food insecurity and shield youth from these associated problems, many families rely on government-funded food assistance programs.

### **Programs to Address Food Scarcity**

In 2006-07, four out of five food-insecure households with an income less than 185 percent of the poverty line received food-aid through federally, funded food and nutrition assistance programs (United States Department of Agriculture, 2010). Examples of federally, funded programs that are designed to offer assistance in providing food to low-income families with children include the Supplemental Nutrition Assistance Program (SNAP, formerly known as the Food Stamps Program) and the Women, Infants, and Children Program (WIC). Studies have shown that these food assistance programs are effective in improving several areas of functioning for participating children. In a follow-up study comparing 19 pairs of siblings who participated in the Women, Infants, and Children Program, Hicks and Langham (1988) found that younger siblings who began the program at an early age had significantly higher IQ scores on the Wechsler Intelligence Scale for Children-Revised (WISC-R) compared with their older sibling who began the program at an older age. Hicks and Langham's study demonstrates the importance of early intervention. Children who participated in the Food Stamp Program showed

greater increases in reading and math scores compared with children in households that discontinued the program (Frongillo, Jyoti, & Jones, 2006). These studies draw attention to the benefit and importance of programs designed to alleviate some of the struggles low-income families face as they try to provide food for their children.

Similarly, federally-funded programs have emerged that are designated to combat childhood hunger during the school day. The National School Lunch Program and the School Breakfast Program are intended to provide low-income children two nutritious meals at no, or reduced-cost. These school-based programs have also been found to be successful in improving children's academic performance and behavior. Bro, Shank, Williams, and McLaughlin (1994) found that the School Breakfast Program significantly increased "at-risk" student's on-task behavior at an alternative school.

However, not all studies support the notion that federally, funded programs are successful in improving child well-being. Utilizing data from the Child Development Supplement of Panel Study of Income Dynamics (CDS-PSID), Dunifon and Kowaleski-Jones (2003) found that participation in the National School Lunch Program was not associated with improvements in child well-being. Dunifon and Kowaleski-Jones examined internalizing (i.e., worrying) and externalizing (i.e., fighting) behaviors using the Behavior Problems Index, positive behavior was analyzed using a 10-item index, and achievement was measured using two measures, math and reading achievement, on the Woodcock-Johnson Psycho-Educational Battery-Revised. The authors found participation in the program was associated with increased externalizing behavior and lower math test scores.

Dunifon and Kowaleski-Jones acknowledge that unmeasured family-specific variables could have biased the sample which may explain insignificant findings. Perhaps those omitted



variables include those that are associated with the added stress and worry that children from food scarce homes have to deal with. For example, Connell, Lofton, Yadrick, and Rehner (2005) reported children's psychological perception of food insecurity resulted in feelings of worry, anxiety, and sadness about the family food situation. The findings from Connell et al. (2005) suggest that despite receiving two meals at school (lunch and breakfast), children from food scarce homes who participate in government-funded nutrition programs still have to worry about meals for dinner and weekends. The additional stress of finding food for dinner and weekends could explain why children from food scarce homes did not show improvements in child well-being in Dunifon and Kowaleski-Jones' study.

### **BackPack Food Program**

All of the above food assistance programs require families to demonstrate financial need as evidenced by income levels at or below 185 percent of the U.S. Federal Poverty Income Guidelines for family size. According to the 2011-2012 income guidelines, to qualify for a government-funded food assistance program a family of four would need an income less than \$41,348 (United States Department of Agriculture, 2012). Many families, however, sit just slightly above the cutoff range and are denied access to these programs. The BackPack Food Program evaluated in this study does not require financial documentation for children to participate. Therefore, this program serves as a supplemental program for children who already qualify for the National School Lunch Program and Breakfast Program, as well as provides food for children who do not qualify for government food assistance. In addition, this program attempts to provide children a sense of security over the weekend that will help reduce the anxiety and stress related to food insecurity.

The Backpack Food Program provides food over the weekend and school breaks to school-aged children. More than 38 states implement similar weekend food programs (Cotugna, & Forbes, 2007). The goal of this 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. For extended breaks (e.g. winter and summer break) the food is not placed in the backpacks due to weight constraints. During extended breaks, food can be picked up at the local food shelter or children can participate in the local public summer lunch program. There is enough food in the packs for the child to have breakfast, lunch, and a snack each day of the school break. The food packs contain child-friendly, single serving, non-perishable items that the children can prepare. Common foods found in the pack include: cereal bowls, instant oatmeal packs, peanut butter crackers, pudding cups, granola bars, tuna fish meals, beanie weenies, microwavable pasta bowls and fruit cups. The program works closely with registered dieticians to ensure that the packs have some nutritional components.

Along with providing food for the children, the backpacks also contain flyers with nutritional information and community resources for parents. The flyers are a way to provide nutritional education for parents. Hammerschmidt, Tackett, Golzynski, and Golzynski (2011) found that family nutrition programs were the highest rated method for low-income, K-8<sup>th</sup> grade students to receive nutrition education, yet this method was reported as being implemented the least. The flyers in the backpacks contain information about community resources indicating where families can go to obtain additional food if necessary (i.e., ECHO Food Shelf and the Salvation Army). The dual role of the flyer, educational tool and community resource, is an added benefit of the Backpack Food Program.

The Backpack Food Program that was evaluated in this study is run by Feeding Our Community Partners and uses funds provided by the Greater Mankato Area United Way, the Mankato Clinic Foundation, and Immanuel St. Joseph's-Mayo Health System. Volunteers play a vital role in the implementation of the Backpack Food Program by donating food, sorting food, packing backpacks, and delivering the backpacks to the schools.

### **Hypotheses**

As demonstrated through several studies, children from food scarce homes are at risk not only for malnutrition, but behavioral problems as well (Alaimo et al., 2001; Cotugna & Forbes, 2007; Melchior et al., 2009; Slack & Yoo, 2005). For example, Dunifon and Kowaleski-Jones (2003) reported that an increase in food insecurity is associated with decreased levels of positive behavior. The purpose of this study was to examine the impact of the Backpack Food Program on children's ability to maintain appropriate on-task behavior at school. An additional purpose of this study was to examine the effectiveness of the program on decreasing student's reported hunger levels. Based on previous research it is hypothesized that participation in the Backpack Food Program will increase student's on-task behavior. Additionally, participation in the program will result in decreased levels of self-reported hunger.

## Methods

### Participants and Setting

The participants in this study were elementary students in grades K-6<sup>th</sup> from three elementary schools located in a small Midwestern metropolitan area. The three schools that were selected for this study were the three schools in the area with the highest percentage of students receiving free and reduced lunch. Due to the confidential nature of the Backpack Food Program, data regarding ethnicity or socioeconomic status was not obtained. However, information from [www.greatschools.com](http://www.greatschools.com) provides an overview of ethnicity of each of the three schools. This information as well as information on the percentage of students who participate in the school lunch program is provided in Table 1. Over the course of three semesters, observations of on-task behavior were recorded for 52 students and hunger surveys were evaluated for 82 students. As part of the BackFood Program's procedures, parental consent was obtained for all participants prior to implementation of the food program and observations. Additionally, to ensure confidentiality hunger surveys were anonymous and observation sheets and hunger surveys were stored in a locked file cabinet.

### Dependent Variables

The Flexible Observation Recording System Manual (FORS, DeWitt, 1983) was used to operationally define "on-task" behavior. The FORS Manual has three major categories that are used to define on-task behavior: concentrating, working, and volunteering. Concentrating was coded if the student was paying attention to the task, overt physical or verbal activity was not required. Examples of concentrating include; looking at the teacher when he/she is speaking or reading the text silently. Working was coded if the student was performing some physical activity related to the classroom task. An example of working would be doing seatwork or

working on an assignment. Volunteering was coded if a student appropriately asks questions, responds to a question, or offers a comment related to the discussion.

Utilizing the FORS Manual (DeWitt, 1983), “off-task” behavior was operationally defined using five categories: looking around, writing, playing, distracted, or resting. Looking around was coded if the student was disregarding the classroom activity and was blankly looking around the room. Writing was recorded if the student was doodling, writing notes to classmates, or inappropriately working on homework (i.e., working on math when it is reading time). If the student was playing with his/her pencil, hair, toy, or other inappropriate materials this behavior was coded as playing. Distracted behavior was recorded if the student was drawn off task by the verbal or physical actions of other people or objects, the source of the distraction must be clearly identifiable by the observer. If the student was asleep or resting his or her head during classroom instruction, this behavior was coded as resting.

To assess hunger levels for participants, a hunger survey that contained words as well as pictures was utilized. A survey containing pictures was selected because some students at the participating schools are English Language Learner (ELL) students. The pictures were meant to make it easier for all participants to understand the survey. Additionally, if the students could not read the teacher would read the survey to the students. An example of the hunger survey is presented in Figure 1. To code the hunger surveys “not hungry” was coded as 1, “a little hungry” was coded as 2, and “very hungry” was coded as 3.

### **Observer Training**

Three graduate students and two undergraduate research assistants served as independent observers. 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 psychology course. Interobserver reliability was calculated using total agreement, by dividing the number of agreements by the number of agreements plus the number of disagreements and multiplied by 100. Reliability was found to be 100 percent.

### **Procedures**

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 observations were scheduled until lunch at 11:00 a.m., the majority of observations were completed by 10:00 a.m. Monday mornings were selected for observations because participants would not have eaten since the weekend and this would provide the best estimate of the impact of the food sent home in the packs. Due to constraints within the Backpack Food Program, only one baseline observation was permitted. The administrators of the program were not willing to withhold food from participants until more data could be collected; therefore baseline was only collected for participants who turned their consent forms in before the first day of food distribution (so baseline data could be collected on a Monday before food was distributed) or Thursday afternoons or Fridays (too late for food to be sent to the school to be handed out that Friday). Prior to each observation session, observers were given a list of the names of the students that would be observed during the session. During each observation session, on- or off-task behavior was recorded for the targeted student during 15 minute observation periods using momentary time-sampling, with 30-second intervals. Momentary time-sampling is a data collection procedure that involves recording the occurrence or nonoccurrence of on-task behavior at the end of each 30 second interval rather than recording the behavior throughout the interval. Therefore, at the end of each interval, observers recorded if

the targeted student was on- or off-task according to the operational definitions. Recording procedures and observation sheets were obtained from the FORS Manual (DeWitt, 1983).

Data on hunger was collected using the hunger survey that assessed the intensity of hunger. The survey was distributed to students by the classroom teacher Monday mornings at the beginning of first period. According to the United States Department of Agriculture (2010), hunger is an individual-level physiological condition that is potentially, not inevitably caused by food insecurity. The aim of this study was to examine self-reported hunger levels, rather than levels of household food insecurity. For that reason, the definition of hunger as defined by the United States Department of Agriculture was used. Although the aim of this study was not to examine the level of household food insecurity, a question regarding the amount of food in the home was included. This question was included as a way to help explain the reported hunger levels.

## Results

Based on previous findings in the literature, the first hypothesis was that student's on-task behavior would significantly increase after implementation of the Backpack Food Program. The second hypothesis was that students would report a decrease in hunger levels after participating in the program.

To analyze the first hypothesis, a paired-samples *t*-test compared the means of student's on-task behavior at baseline to the aggregated on-task behavior from the three follow-up observations. The paired-samples *t*-test indicated that there was not a significant increase in student's on-task behavior,  $t(51) = 1.33, p = .19$ . Student's percentage of on-task behavior at baseline ( $M = 74.06\%$ ,  $SD = .17$ ) was not lower than the percentage of student's aggregated on-task behavior during the follow-up observations ( $M = 70.35\%$ ,  $SD = .16$ ). An independent *t*-test was implemented to analyze student's self-reported hunger levels. The independent *t*-test was selected because hunger surveys were anonymous and student's surveys from baseline to follow-up were unable to be matched. The independent *t*-test indicated that there was not a decrease in student's self-reported hunger levels,  $t(145) = -.59, p = .56$ . Student's self-reported hunger levels at baseline ( $M = 2.12$ ,  $SD = .65$ ) were not higher than the hunger levels at the follow-up observations ( $M = 2.17$ ,  $SD = .46$ ).



### Discussion

The findings from this study are inconsistent with the evidence in the literature that suggests that supplemental nutrition programs enhance children's on-task behavior and decrease self-reported hunger levels. A plausible explanation for the inconsistent findings could be the lack of variance within the data which resulted in a non-normative distribution. Therefore, a post hoc test using the nonparametric Wilcoxon test was utilized to compare baseline and follow-up observations of on-task behavior. A Wilcoxon test indicated that there was not a significant increase in student's on-task behavior,  $z = -1.814, p = .07$ . Figure 2 demonstrates the lack of variance among baseline and follow-up observations for on-task behavior. To compare self-reported hunger levels from baseline to follow-up observations the nonparametric Mann-Whitney test was utilized. The Mann-Whitney test indicated that there was not a significant decrease in student's self-reported hunger levels,  $z = -.608, p = .54$ . Figure 3 displays the lack of variance among baseline and follow-up observations for self-reported hunger levels. The lack of support for decreased self-reported hunger levels was further examined by analyzing the results of the second question asked on the hunger survey (Was there enough food in your house to eat this weekend?). Approximately 75% of the participants reported that there was enough food in the house over the weekend in both baseline and intervention phases. These findings suggest that the majority of students participating in the program perceived having access to food at home which could have impacted their reported hunger levels on Monday mornings.

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 scarcity. Teachers reported and were observed to provide children with snacks during the day. Additionally, many of the students in the Backpack Food Program also

received breakfast and lunch at school. Thus, the children's experience of food scarcity may have been minimized by the food they received at school. This is particularly an issue in the data used in this study as the students were observed to be eating before or during the survey and observation periods. Perhaps this invalidated the assessments by resulting in students being similarly fed immediately before and after assessment in the baseline and intervention periods.

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. Several studies have found that parents of families living in food scarce homes will skip meals to allow the children to eat (McIntyre, Glanville, Raine, Dayle, Anderson, & Battaglia, 2003; Stevens, 2010; U.S. Department of Agriculture, 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. In addition, Dunifon and Kowaleski-Jones (2003) suggest that government-funded nutrition programs are perhaps used to replace food the child would have eaten anyway. If this is the case, it would add credence to why on-task behavior was not significantly different from baseline to follow-up observations.

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 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 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. In addition, although there was not significant findings in this study for increased on-task behavior and decreased self-reported hunger, satisfaction surveys were distributed at the midpoint of each semester of data collection and teachers, parents, and students all reported high levels of satisfaction with the program.

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. The director of the Backpack Food Program was not willing to withhold food from participants for an extended period of time and as a result only one baseline observation was collected. Therefore, there is not enough information on the student's typical on-task behavior to establish a baseline trend as one data point could be anomalous. Consequently, it is difficult to draw direct conclusions about the relationship between student's single baseline observation and the follow-up observations. Similarly, only one data point for self-reported hunger was collected during baseline which is not enough information on the student's typical hunger level to establish a baseline trend. As a result, it is difficult to draw direct conclusions about the relationship between the self-reported hunger level reported on the single baseline survey and the follow-up surveys.

Another methodological limitation in this study was the absence of reliability checks. As a result 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, this study was unable to implement reliability checks. Although each research assistant observed the same students during each observation period, the lack of reliability checks should be considered when interpreting these findings.

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 as soon as students arrive at school and before they receive any food.

The data collected for this study does not provide information to support or discredit these plausible explanations for the insignificant findings. Therefore, future research should attempt to establish a trend during baseline to provide a more accurate representation of student's behavior prior to the implementation of the nutritional program. Additionally, future research should address the issue of whether or not the nutritional program provides supplemental food that children would have otherwise had access to or if the program is the primary provider of food. By addressing these limitations, future research will provide a more thorough analysis of the effects of the Backpack Food Program and how it benefits the children and families who participate in the program.

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Table 1

*Overview of Student Characteristics for Each School*

Characteristic	School 1	School 2	School 3
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%
Student's eligible for free or reduced-price lunch program	43%	47%	46%

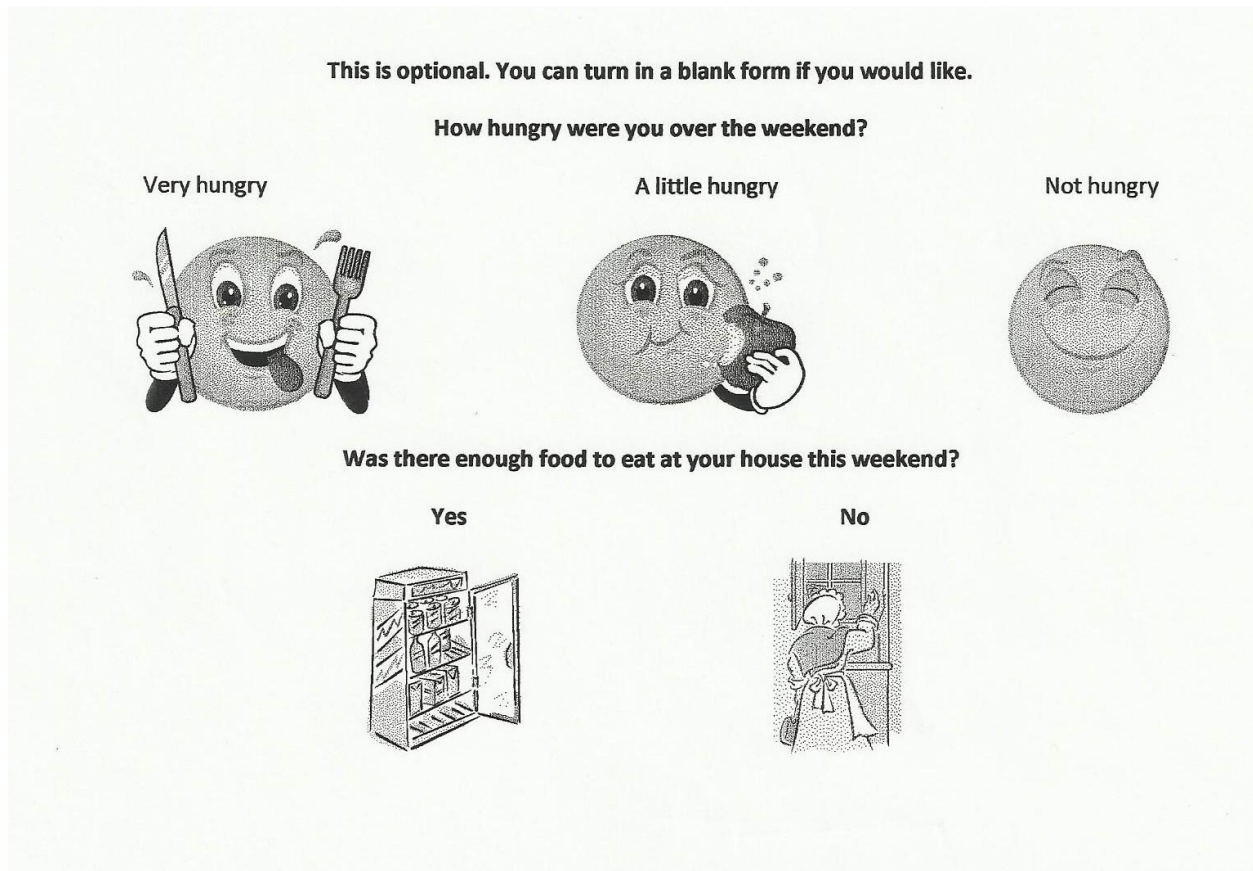


Figure 1. Hunger Survey.

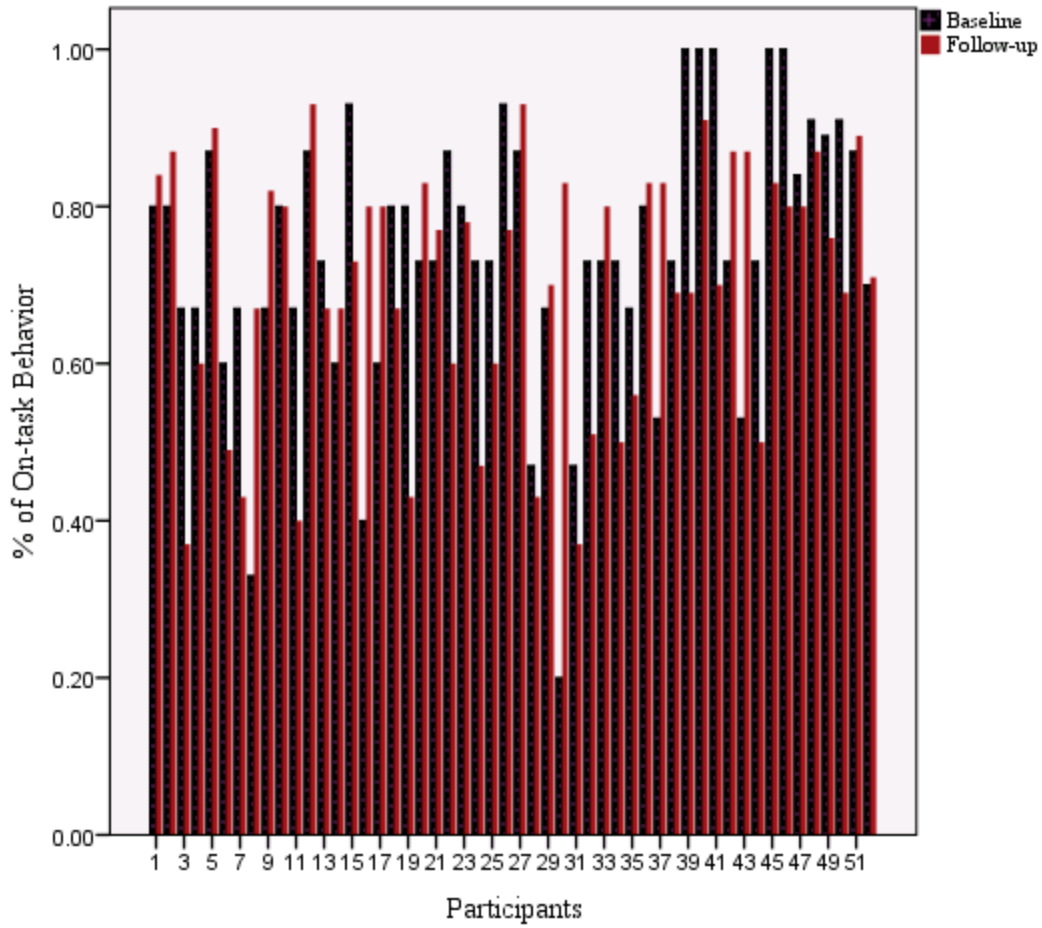


Figure 2. Variance among baseline and follow-up observations for on-task behavior.

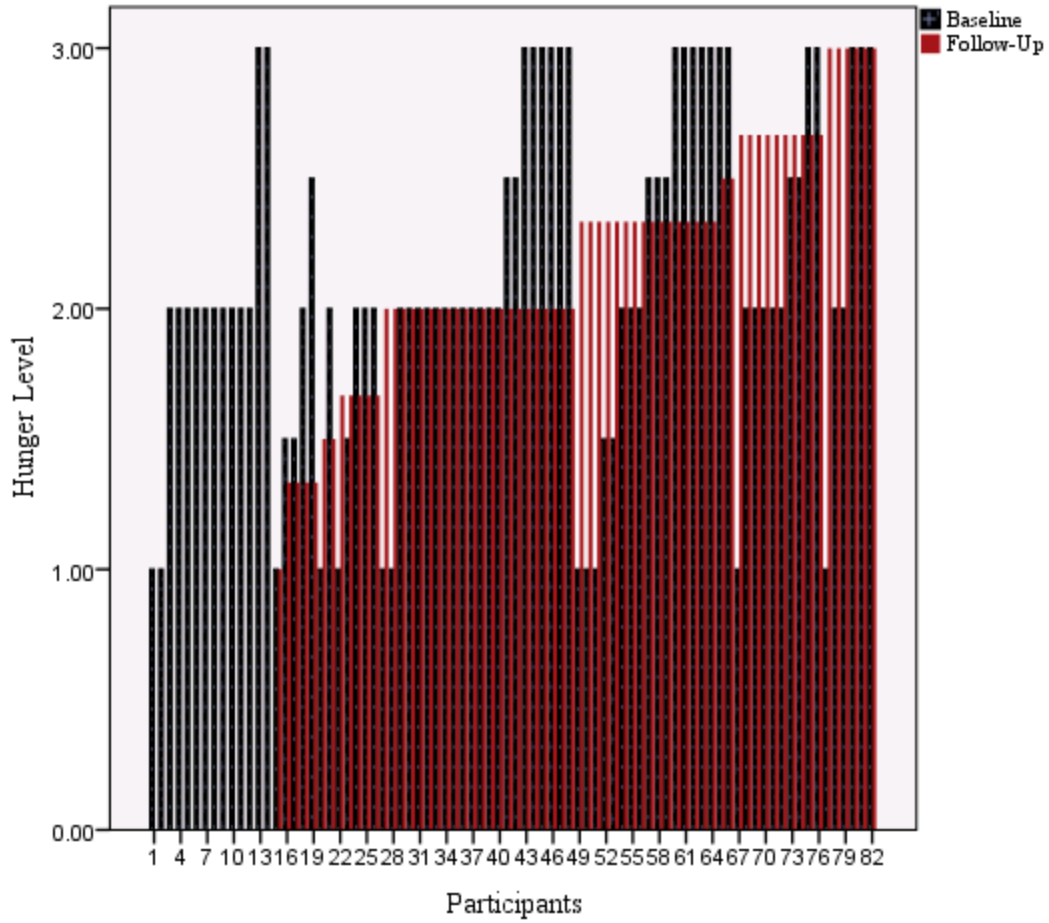


Figure 3. Variance among baseline and follow-up observations for self-reported hunger.