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Sampling tomorrow's lunch today: Examining the effect of sampling a vegetable-focused entrée on school lunch participation, a pilot study

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ABSTRACT

School lunch programs are important pillars in the food system, as they impact children's health, local agriculture, and community food security. When offering a new lunch entrée that contains vegetables, schools must consider whether students will choose the new entrée to avoid low participation rates and decreased revenue. Previous research in marketing suggests that sampling (i.e. taste testing) can positively impact consumer choice. In terms of encouraging students to eat school lunch and particularly items that include vegetables, it is often assumed that sampling will help direct food choice to healthier items, but little research has investigated the impact of sampling on food choice in a school lunch environment. The objective of this research was to investigate in a pilot study whether providing samples of a vegetable-focused lunch entrée the day before it appeared on the school lunch menu increased National School Lunch Program (NSLP) participation. The study took place at a Vermont middle school in 2015. Four new vegetable-focused entrées were supplied over three consecutive months. During month two, the entrées were sampled at a middle school the day before they were offered for sale, and NSLP participation, as well as revenue was tracked over three months. Our results suggest that sampling may have a positive impact on NSLP participation rates and food service revenue, but that more research is needed to better assess how sampling can be utilized in the most efficacious way to promote NSLP participation and healthy eating patterns.

1. Introduction

A successful school lunch program is an important contributor to not only children's nutritional status, but also to local agriculture and the broader community. Many schools now feature local produce in their meals especially in the Northeast (Ralston et al., 2017). The inclusion of local produce in school lunch programs has proliferated due to Farm to School programs that highlight the benefits to students, school lunch programs, and farmers of utilizing local fruits and vegetables (Feenstra and Ohmart, 2012). Additionally, school lunch programs have a positive impact on children's food security (Potamites and Gordon, 2010), which illustrates the important role school lunch programs play in community health. Without a school lunch program funded by the government, communities would need additional food pantry and other resources to combat food insecurity. To maintain or even enhance the benefits school lunch programs can have on many aspects of the food system, these programs must maximize their participation rates to maximize revenue generation.

Balancing school food budgets, the rate of school lunch participation, and the nutrition of school meals creates the school food service "trilemma" (Harvard Pilgrim Public Health, 2010; K. Ralston et al., 2008). Economically sustainable school food programs must maximize student participation to stay financially solvent, an increased challenge with the additional requirements of healthier school lunch regulations (Cohen et al., 2015; Harvard Pilgrim Public Health, 2010; Johns Hopkins University Bloomberg School of Public Health, 2014; US Department of Agriculture Food and Nutrition Service, 2012). In the United States, the federal government reimburses schools per student for serving lunch, allowing some students to receive lunch for free or at a reduced rate. Although National School Lunch Program (NSLP) participation rates have increased for free/reduced price eligible students, they have decreased for full paying students (Food Research and Action Center, 2015). Drops in participation of any group of students make it harder to pay for the production of meals that are both marketable and

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nutritious.

Despite being crucial for school lunch programs, mechanisms for increasing NSLP participation have received limited attention by researchers (Just et al., 2014). The presence of competitive foods, defined as any foods and beverages not part of the federal school lunch program sold during the school day, in most lunch rooms and schools adds a compelling need for evidence-based strategies to increase participation in the NSLP program. Although all foods sold during the school day are now required to meet nutrition standards, competitive foods, such as pizza or other á la carte items, do not provide the same overall nutrition that an NSLP entrée provides. Furthermore, competitive foods cost money, so they are often not an option for those who receive free/reduced price meals creating disparity between students. Schools do not receive reimbursements for competitive foods, so the more competitive foods purchased, the lower NSLP participation may be, and the quality of the NSLP at the school may decrease. Because competitive foods often come with large communication campaigns that reach students outside of school hours, the demand advantage of competitive foods is likely to remain or even increase, despite school food branding nudges (Wansink, Just, & Payne, 2012), further challenging NSLP food budgets.

One potential solution to marketing NSLP meals is offering students samples. Called “taste tests” in the farm-to-school lexicon, the use of sampling is almost ubiquitous in these programs, and their funding has expanded to help increase fruit and vegetable consumption by school children (Gretchen Swanson Center for Nutrition; USDA; USDA FNS, 2016). There is extensive literature on the efficacy of repeated exposure for the changing of taste preferences (Lakkakula et al., 2010; Wardle et al., 2003) from the repeated-exposure paradigm, we know that multiple interactions with a particular stimulus can produce a positive cognitive effect, even when experiences are completely benign (Zajonc, 2001). There is little empirical evidence showing that entrée sampling leads to behavior change, and only one pilot study has investigated the impact of chef-prepared samples specifically on NSLP participation (Just et al., 2014). Sampling has a long history of use in marketing, offering samples in diverse locations from retail establishments to physicians' offices (Adair and Holmgren, 2005; Bawa and Shoemaker, 2004). Allowing customers to try a product before purchase is an enduring practice because it is a behavioral strategy that is effective for increasing purchases (Cuddeford-Jones, 2011; Lammers, 1991). If “sampling tomorrow's school lunch entrée today” is a behavioral intervention that increases NSLP participation by all students, it could ameliorate the trilemma associated with providing healthy and appealing meals while balancing school food budgets.

The research objective of this pilot study was to investigate whether providing samples of a new, vegetable-focused lunch entrée the day before it appeared on the school lunch menu increased NSLP participation. Our hypothesis was that NSLP participation rates would increase, compared to baseline, after sampling.

2. Methods

All study procedures were approved by the University's Institutional Review Board Committee on Human Research in the Behavioral and Social Sciences. The samples were prepared and offered by the school staff as part of their usual cafeteria activities. Only group data was collected, so informed consent was not required.

2.1. Study population and setting

The study took place at a K-8 school in a rural Vermont community of approximately 10,000 people. The town is a Governor's designated “underserved area” based upon school lunch criteria and school testing results and it is committed to providing quality, nutritious meals (Lamdin, 2013). The middle school food service program, for which this study was conducted, typically serves lunch to 381students in grades 4 through 8, approximately 42% of whom received free or reduced price lunches. There were 578 fourth-eighth graders who were eligible to participate in the sampling intervention on a given day.

At the school, average school lunch participation was 70.2% for free, 74.6% for reduced, and 51.4% for full-price students, with an overall average of 66% NSLP participation. Each day, students could choose to bring a lunch from home, buy the daily NSLP entrée, or purchase pizza, a sandwich, or salad bar, all of which also meet the NSLP guidelines for reimbursable meals at the study school. Even though at the study school pizza, salad, and sandwiches were not technically competitive foods because they met NSLP meal standards, for the purposes of this study, pizza, sandwiches, and salad bar were considered “alternative entrées” to the NSLP entrées, as the sampling intervention targeted the daily NSLP entrée.

The new entrées were developed and selected for use in the study in consultation with the research team, including two registered dietitians, and were then prepared by the school food service staff. Entrées that featured whole foods were prioritized, to address the study's research question; the participating school's foodservice is committed to providing students appealing and healthy choices. The entrées chosen were Chicken & Broccoli Alfredo (CBA), Root Vegetable Stew (RVS), Savory Turkey Loaf (STL), and Eggplant Parmesan (EP).

2.2. Study intervention and timeline

In September, each entrée was offered with no additional information or sampling. In October, students were invited to taste a sample of the new entrée the day before it was served. In November, no additional samples or information were provided for the entrée. Each month, one new entrée was offered each week.

2.3. Recruitment

All students in grades 4–8 were invited to participate in the study during their lunch period. In October, students were encouraged to walk up to the sampling table, which was located between the lunch line and the compost/trash station in the cafeteria, to indicate that they wanted to participate. Participation was voluntary.

2.4. Measurement/monitoring

2.4.1. NSLP participation rates

Using their computer system, school staff collected data on the number of students who chose each targeted entrée at baseline (September), during the intervention (October), and post-intervention (November) intervention. School staff also collected information on how many students chose to eat school lunch of any kind on the days targeted entrées were served. By subtracting the number of students who chose a targeted entrée from the total number of students participating in the school lunch program, the number of students who chose an alternative entrée (pizza, sandwich, salad) was calculated.

Furthermore, foodservice staff collected information on the percentage of students eligible for free, reduced-price, or full-price meals participating in the lunch program on the days targeted entrées were served. Revenue generated by the foodservice program was also calculated for each day a targeted entrée was served. Lunch revenue was calculated by using the federal reimbursement rate from 2015 to 2016 of $3.13 for each lunch eligible for a free or reduced price lunch (the state of Vermont subsidizes all reduced eligible lunches at the “free lunch” rate) and $0.35 for each lunch not eligible for free/reduced price lunch.

2.5. Statistical methods

2.5.1. Sample size calculations

Given the population of 578 fourth-eighth graders and the school lunch participation rate of 66%, a sample of 290 students (grades 4–8)