



Does a grill menu redesign influence sales, nutrients purchased, and consumer acceptance in a worksite cafeteria?

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ABSTRACT

Worksite cafeterias are compelling venues to improve diet quality through environmental changes.

We conducted a pre-post study to evaluate how a cafeteria-initiated grill menu redesign influenced sales, revenue, and nutrient content of foods purchased. Secondly, we evaluated consumer opinions about menu changes to inform practices for worksite environment interventions. Monthly sales data (2012–2015) were used to compute gross sales and revenue of entrées and side dishes pre-post menu changes. Alternative protein sources replaced red meat; nutrient composition and nutrients purchased were compared using Food Pro software. Consumer responses were queried using online surveys; open-ended responses were analyzed using NVivo. Differences in sales and nutrient content pre-post menu redesign were tested with Wilcoxon Rank Sum tests. Gross sales of entrées (61 vs. 222 servings/month; $p = 0.01$) and side dishes (120 vs. 365 servings/month; $p = 0.001$) increased more than three-fold post-menu changes. Revenue from entrées (312 vs. 1144 USD/month; $p = 0.01$) and side dishes (238 vs. 914 USD/month; $p = 0.001$) also increased; per entrée, consumers purchased significantly more unsaturated fat (5 g), and less saturated fat (3 g) and sodium (100 mg). For side dishes, they purchased fewer calories (48 kcal) and unsaturated fat (2.9 g), but more fiber (1.8 g), and sodium (260 mg). Four themes emerged from consumer responses: the importance of 1) variety, novelty, choice; 2) cost, affordability, value; 3) health; and 4) food quality, taste. Menu redesign can improve nutrient content, while also increasing sales and revenue. Multi-dimensional assessment of the nutritional, consumer, and retailer implications is desirable practice for enacting similar environmental changes.

1. Introduction

The food environment is an important driver of food decisions (Story et al., 2008). Worksite cafeterias are promising environments to promote eating behavior change by providing varied opportunities throughout the day for both meals and snacks to diverse groups of people who spend many hours a day in that space (Almeida et al., 2014). Within graduate universities, worksite cafeterias reach an unusual cross-section of the population, by serving notable numbers of young adults (ages 20–35) (Allman-Farinelli et al., 2016), faculty, and staff with varied educational and socioeconomic backgrounds and food preferences.

Changing the food environment in a location that caters to differing groups of consumers faces unique challenges. For example, young

adulthood has been characterized by more frequent meal skipping, snacking, preference for larger portion sizes, high fast-food and sugar-sweetened-beverage consumption, and low fruit and vegetable intake (Allman-Farinelli et al., 2016). In contrast, adults tend to improve dietary habits as they age, but disparities related to socioeconomic status persist, and lower income adults often have poorer dietary quality (Kanjilal et al., 2006). The differences in food preferences, eating patterns, and disposable income between these groups challenge worksite cafeterias interested in redesigning their menus to improve the healthfulness of offerings. Thus, it is critical that stakeholders evaluate whether redesigned environments can provide foods that are both acceptable and nutrient-dense to diverse groups of customers.

Despite these challenges, evidence suggests that altering workplace food choices influences dietary intake (Roy et al., 2015; Story et al.,

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2008). For example, greater availability and variety of healthful foods in a worksite intervention improved dietary quality (Jeffery et al., 1994), and workplace health promotion campaigns influenced dietary intake (Engbers et al., 2005). While worksite dietary interventions can modestly improve dietary intake (Geaney et al., 2013), better accounting for the heterogeneity in the groups of consumers served, and stronger alignment between public health practitioners, consumers, and retailers prior to implementing worksite interventions may enhance the strength of interventions. Additional research incorporating multi-dimensional assessment is needed to develop evidence-based best practices for worksite interventions (Engbers et al., 2005). Furthermore, objective assessments of environmental changes on sales, nutritional composition, and customer satisfaction is insufficiently studied (Ni Mhurchu et al., 2010), hindering larger scale adoption of environmental interventions.

Enacting environmental change challenges food retailers because the effects on sales and profitability are not always clear. Changing pricing, meal formulations, or food availability could result in greater food waste, preparation time, and labor costs, and ultimately, reduced sales and profitability (Glanz et al., 2007). However, food retailers seem willing to partner with public health practitioners to improve the health profile of their offerings provided sufficient consumer demand (Glanz et al., 2007). Some evidence shows that consumers are demanding and paying for healthier options (Hudson Institute, 2013), but it is not clear how robust this trend is in cafeteria settings. As such, public health advocates developing healthier cafeterias must consider whether such changes will align with other drivers of consumption, and determine if profitability can be maintained along health promotion efforts (Story et al., 2008).

Therefore, using a quasi-experimental pre-post design, we aimed to contrast the sales, revenue, and nutrient composition of grill items purchased during the periods of usual (pre) versus enhanced (post) offerings in a university worksite cafeteria. A secondary aim was to evaluate consumer opinions about the menu changes. The overarching goal was to comprehensively analyze the effect of a menu redesign in one section of the cafeteria to identify challenges and opportunities for larger health-promoting environmental change in worksite cafeterias.

2. Material and methods

2.1. Quasi-experimental study design

This study examined all purchases of grill entrées and sides (approximately 1–3% of total cafeteria revenue) from the Harvard T.H. Chan School of Public Health cafeteria (Sebastian's Café) between Fall 2012 and Winter 2015; this included Fall 2014 when Sebastian's Café revitalized their grill menu, thus facilitating a quasi-experimental pre-post design (Harris et al., 2006). The cafeteria is accessed by graduate students (~20%), faculty (~50%), university employees (~30%), and visitors of the Harvard-Longwood Medical Area. New items were introduced with the goal of replacing red meat with other protein sources to improve both individual and planetary health, and to create more upscale and appealing offerings; no other notable changes were made during this period, and other stations including the salad bar, heart-healthy entrees, and pizza bar remained operational. Menu changes were not community-initiated, but rather supported by the administration.

Entrees and side dishes prior to menu changes and after the October 2014 menu redesign are detailed in Table 1. Sebastian's Café continued to intermittently offer some usual entrées and sides – particularly french fries – during Fall 2014. While usual entrées and side dishes were sold as combination meals, enhanced entrees and sides were sold individually, which increased the total price of purchasing an entrée and side dish. All data were collected from three fall semesters (2012–2014) and Winter 2015. We contrasted monthly sales and nutrients purchased from the usual menu from Fall 2012–Fall 2014 to the enhanced menu

from Fall 2014–Winter 2015. This study does not constitute human subjects research and was therefore exempt from Institutional Review Board review.

2.2. Data collection and analysis

2.2.1. Sales

Monthly sales data recorded by Sebastian's management between Fall 2012 and Winter 2015 were used to compute gross sales and revenue from individual grill items during each academic semester. For each item, we computed the average servings sold per month, the price/serving, gross monthly revenue from that item, and the nutrient content per serving. We then examined the average quantity sold, monthly revenue, and nutrient content for all entrees and all side dishes.

2.2.2. Nutrients

FoodPro software was used to estimate nutrient composition (ESHA, 2017) using recipes and portion sizes provided by the cafeteria. We calculated the composition of key nutrients from individual servings of entrées and sides (total energy (kcal), saturated fat (g), unsaturated fat (g), sodium (mg), and fiber (g)), to evaluate whether changes to the menu influenced: 1) the average nutrient composition of the items available and 2) the average nutrients purchased from the grill items, calculated from sales data as described below. Average nutrients purchased were evaluated across comparable grill categories to evaluate the combined effect of changing sales and changing nutrient composition on the overall nutritional composition of grill purchases. Nutrients selected were based on their associations with overall diet quality (McCullough et al., 2002) and based on the general nutrient composition of the foods evaluated. Trans-fat was not evaluated because cooking oils were trans-fat free during the study.

2.2.3. Statistical analysis

We calculated total nutrients purchased by multiplying total energy and nutrient content of each item by the number of servings sold and then summing total energy and nutrients purchased for all items. The average nutrients purchased per month during the period were calculated by dividing total energy or nutrient content by the number of months during which purchases were made. Finally, the average nutrient content purchased was computed by dividing average nutrients purchased by the average number of servings sold during the time period.

Wilcoxon Rank Sum tests were used to determine whether sales, revenue, and nutrients purchased of five classes of entrees and side dishes differed before and after the grill menu was redesigned. We examined the purchases of meat- and fish-based burgers, turkey burgers, meatless burgers, french fries, and other sides (Table 1). Analyses were conducted using SAS 9.4.

2.2.4. Consumer satisfaction

Consumer responses to menu changes were queried via email survey sent to the university community listserv by Sebastian's Café in Winter 2015. Participants were asked “Do you like the recent changes to the grill menu?,” to which they could respond: ‘yes,’ ‘no,’ ‘haven't noticed,’. They had the option to leave additional comments. An inductive approach was used to code free response comments using NVivo 11 software (QSR International Pty Ltd., 2012). The lead author initially identified thematic nodes, and consensus and refinement of those themes was established with the senior author; no discrepancies in coding were apparent. Quotations were selected based on their representativeness within each node.

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