

High School Students Are More Satisfied Customers When Nutrition Information Is Posted

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Please note that this study was published before the implementation of Healthy, Hunger-Free Kids Act of 2010, which went into effect during the 2012-13 school year, and its provision for Smart Snacks Nutrition Standards for Competitive Food in Schools, implemented during the 2014-15 school year. As such, certain research may not be relevant today.

ABSTRACT

Objectives

Previous research has shown that supplying nutrition information at the point of selection (POS) can persuade high school students to choose more healthful food items. This study was designed to determine if supplying nutrition information at the POS increases student satisfaction with those choices and their school nutrition program, which could impact their desire to continue to make more healthful food selections in the future.

Methods

Four foodservice directors from rural, suburban, and urban school districts participated in the study involving Grades Nine through Twelve. School nutrition program satisfaction ratings were collected from students prior to and at the end of a six-week period when nutrition information for entrees was posted on the serving line. No other changes were made to the programs, including no alterations to the menus. Ratings were compared using one-way within subjects analysis of variance (ANOVA).

Results

Student ratings for food quality and overall satisfaction with school nutrition programs were significantly higher when nutrition information was posted at the POS. Additional findings indicate that increased satisfaction extended to ratings of foodservice staff, but not to dining ambiance and cost issues.

Application to Child Nutrition Professionals

Results suggest that supplying nutrition information at the POS significantly increases student satisfaction with the food served and with the school nutrition program. Nutrition information is readily available to school nutrition directors and could easily be used to market their programs, which would allow students to make informed choices about the foods they consume.

INTRODUCTION

The school environment has the potential to impact students' food choices and their satisfaction with those choices (Conklin et al., 2004; French et al., 2002). Over 50% of students in the United States receive breakfast and/or lunch from a school meal program (Dwyer, 1995). Research findings support the fact that students who consume the reimbursable school meal have better dietary intakes than students who do not (Dwyer et al., 2002; Rainville, 2001; Watkins, 2001).

Diet quality is a major concern for adolescents. In the past decade, only 1% of youth met all the food consumption guidelines addressed in the *U.S. Food Guide Pyramid* (Munoz et al., 1997). Kant (2003) found that 30% of the daily calories American adolescents consume come from foods of low-nutritional value, with sweeteners and desserts accounting for nearly 25% of this amount. Changing these eating habits and increasing the intake of more healthful foods may be useful in lowering the incidence of obesity (Epstein et al., 2001), which among children and young adults has reached epidemic proportions. The U.S. surgeon general's *Call to Action to Prevent and Decrease Overweight and Obesity* (2001) states that 33% of children aged 6- to 11-years-old, and 34% of adolescents aged 12- to 19-years-old were overweight or obese. This is an increase of almost 200% in the last 20 years (American Obesity Association, 2003).

Croll et al. (2001) found that healthy eating messages based on the *Dietary Guidelines for Americans* are reaching adolescents, but that interventions are needed to help their transition to more healthful eating behaviors. Strategies to alter eating behaviors with adolescents, therefore, should match nutrition intervention with motivational factors (Storey et al., 2002). Satisfaction with the choice of more healthful foods may be a significant motivational factor.

David Satcher, former U.S. surgeon general, stated, "School is where children spend their time; where they learn, be it from books, from example, from teachers, or from their peers" (*Action for Healthy Kids*, 2004). School nutrition programs are not the only answer to improving children's weight and eating habits, as these initiatives only interface with most students five out of seven days per week. Nonetheless, school nutrition programs *can* play an important role.

Most school nutrition programs have resources to give students a choice in their meals, but students may not be informed of the differences in nutritional content among the choices provided. This situation does not allow for an informed choice. Focus groups conducted with high school students to explore their perceptions of an ideal school nutrition program found that the availability of nutrition information was desired, especially information on calories and fat content of menu items (Meyer, 2002; Meyer & Conklin, 1998; Meyer et al., 1997). Most school nutrition directors calculate the nutritional content of each food item to ensure they meet the U.S. Department of Agriculture's (USDA) *Healthy School Meals Initiative*, but they overlook the opportunity to supply this desirable and useful information to students to help them make healthful, informed choices. Perhaps a better understanding by school nutrition directors of the nature of informed choice--and its role in increasing customers' perception of their program--is needed.

People's reactions to events are determined largely by their mental representation or construal of events (Fiske & Taylor, 1984). When people are given a choice, they tend to hold an exaggerated belief that their behavior controls the outcome (Langer, 1975; Langer & Rodin, 1976; Langer & Roth, 1975) and, therefore, take personal responsibility for the end result (Weiner, 1995). This belief is likely to be stronger when the choice is informed than when it is not. In fact, a choice made without relevant information (an uninformed choice) is likely to be viewed as not being a "true" choice or as no choice at all. An uninformed choice may bring into play a negative cognition of fairness or perceived justice (Collie et al., 2000; Mattila, 1999; Mattila & Mount, 2000; McCollough, 2000). An informed choice increases satisfaction and loyalty even after a negative experience (Cranage & Sujana, 2004; Cranage et al., 2004).

Participants' increased feelings of empowerment and self-determination are linked with increased satisfaction with their choices. Based on their research, Pawelko and Magafas (1997) assert, "Adolescence is a time for individuals to test themselves and the world around them." Suls' (1989) discussion on self-awareness in young adults emphasizes the significant role self-identity development plays as the center for all other youthful decision-making processes. Providing information facilitates empowerment and self-determination in the decision-making process (Lawler, 1992; Spreitzer, 1996).

Child nutrition research has demonstrated that nutrition information affects students' eating behaviors (Bordi et al., 2003; Butcher-Powell et al., 2003). A study by Conklin et al. (2005) shows that supplying nutrition information was associated with students making more healthful food choices. The purpose of this research is to investigate if high school students, when supplied with nutrition information at the POS, have a greater sense of satisfaction with the food they chose and with the school nutrition program, in general.

METHODOLOGY

Study Sample

School nutrition directors were solicited for participation in the study through E-mail. Ten directors from towns within 200 miles of The Pennsylvania State University participated in the study, with four school districts providing usable data. From this sample, data were collected in all high schools in the four districts.

Procedures

In each school district, high school administrators or district school boards approved the study methodology, as did the The Pennsylvania State University Institutional Review Board (IRB). Baseline data on student satisfaction with the school nutrition programs were collected in each school after one rotation through the menu cycle--approximately six weeks into the Fall 2003 semester. Students in Grades Nine through Twelve completed the National Food Service Management Institute's (NFSMI) *High School Foodservice Survey* (Meyer et al., 1997) as part of classroom or study hall activities. Questions asked on the survey can be seen in Table 1. Teachers administered the surveys following directions developed by researchers and approved by the IRB. Letters of consent were obtained from students in order for them to participate, and they had the option of removing their survey from data analysis, if they so chose.

For the next six-week period, participating high schools supplied POS nutrition information for each entree item. The nutrition information looked very similar to the Nutrition Facts Labels designed by the U.S. Food and Drug Administration (FDA), for which nutrient values are given without summative judgment as to the nutrient content of the food. Labels were printed from a Microsoft Word® template. An illustration of these labels has been published previously (Conklin et al., 2005). Researchers supplied nutrient data for districts that were not already calculating this type of information using Nutri-Kids software (LunchByte Systems, 2003). School nutrition directors helped to establish a standard format for presenting the information within the cafeteria service area so that the information was present at the point of selection. Directors instructed their staff on where labels were to be posted and reinforced with them that no other changes were to be made in service; in particular there was to be no mention or or

interpretation of the nutrition information labels to students. Menus in all districts were the same or similar as the initial six-week period used to collect baseline data.

At the end of the six-week intervention, students were again asked to fill out the survey to evaluate their satisfaction level with the school nutrition program. Data collection procedures occurred in the same classrooms or study halls.

Data Analysis

Pre- and post-data from the student satisfaction survey were analyzed using a one-way within subjects analysis of variance (ANOVA) and MS(error) for the overall analysis of variance table and means testing. Results from each school were analyzed separately. In two school districts, the authors compared a high school cafeteria with no intervention (the control school) to a second high school cafeteria with informed choice; this served as a manipulation check on the nutrition information that was supplied. Additionally, the authors compared differences in satisfaction between schools that did and did not supply nutrition information, but had identical menus. Here ANOVA, using the MS(error) from the overall analysis of variance table and means testing was used to identify differences among schools. Finally, the authors analyzed the relationship between student satisfaction and intervention affects upon gender, grade, and frequency of lunch purchase.

RESULTS AND DISCUSSION

Participants

School nutrition directors from four school districts provided usable data. Two districts each had an intervention and a control high school while the others had only one high school in their respective districts. The total number of schools in the study was six. The high schools were varied in regard to the background of students and school nutrition program characteristics (Conklin et al., 2005).

Manipulation Check

A manipulation check was run on the study intervention by comparing ratings before and after the introduction of nutrition information. The three items included in the nutrition category survey instrument pertained to whether the information for nutrition, calories, and fat contained in the food products were posted (Meyer et al., 1997). In all of the intervention schools, significantly higher scores ($p < .001$) were found in all three measures for the intervention period than for the baseline period at the beginning of the school year. In contrast, the control (non-intervention) schools did not show higher scores. This would indicate that the nutrition information supplied was observed by the students and may explain the effects discussed below.

Student Satisfaction

ANOVA and two sample means testing showed that when nutrition information was supplied, student satisfaction increased for food quality and service quality. In all intervention schools, means for most of six measures for food quality increased. Students consistently rated appearance and quality of food higher ($p < .05$). All significant differences for the intervention period are shown in Table 1.

Table 1. Mean Satisfaction Scores for Six Schools Before and After Posting Nutrition Information at POS (N=2,513)

Intetvention Period	Nat'l Aveb	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Intetvention vs. Control		Inter _c	Inter	Cond	Con	Inter	Inter	Inter	Inter	Inter	Inter	Con	Con
School		1	1	2	2	3	3	5	5	6	6
Staff													
Foodservice staff listen to the students		3.9 _e (1.3) ^g	4.1 _f (1.0)	3.8 (1.3)	3.6 (1.5)	4.1 (1.4)	4.2 (1.3)	4.2 (1.2)	4.7 (1.3)	4.2 (1.2)	4.7 (1.6)	4.4 (1.2)	4.3 (1.6)
The foodservice staff treat me with respect		4.5 (1.2)	5.1 (1.3)	4.2 (1.2)	3.6 (1.2)	4.5 (1.4)	4.8 (1.3)	4.7 (1.3)	5.5 (1.6)	4.6 (1.5)	5.0 (1.2)	4.9 (1.3)	4.8 (1.4)
The foodservice staff are courteous		4.4 (1.3)	5.2 (1.1)	3.9 (1.5)	3.6 (1.7)	4.4 (1.2)	4.8 (1.2)	4.8 (1.2)	5.4 (1.4)	4.8 (1.5)	4.9 (1.9)	4.9 (1.2)	4.7 (1.5)
The foodservice staff smile and greet me		3.4 (1.3)	4.3 (1.2)	2.9 (1.2)	2.9 (1.4)	3.9 (1.4)	4.0 (1.5)	4.1 (1.5)	5.1 (1.6)	4.2 (1.2)	4.6 (1.1)	4.4 (1.1)	4.2 (0.8)
The foodservice staff answer my questions		4.3 (1.4)	4.9 (1.2)	4.2 (1.3)	4.0 (1.2)	4.3 (1.5)	4.4 (1.3)	4.6 (1.2)	5.3 (1.5)	4.8 (1.3)	4.9 (1.5)	5.2 (1.3)	5.0 (1.2)
The foodservice staff are friendly		4.3 (1.2)	4.1 (1.1)	3.7 (1.2)	3.5 (1.5)	3.2 (1.2)	3.7 (1.0)	4.8 (1.4)	5.3 (1.2)	4.5 (1.2)	4.8 (1.1)	4.7 (1.4)	4.6 (1.2)
The appearance of the foodservice staff		4.1 (1.2)	4.5 (1.2)	3.5 (1.4)	2.9 (1.1)	3.8 (1.5)	3.9 (1.7)	4.2 (1.6)	5.0 (1.1)	4.3 (1.5)	4.5 (2.1)	4.2 (1.4)	4.1 (1.3)
Category average	4.1	4.1 (1.4)	4.8 (1.5)	3.8 (1.3)	3.5 (1.5)	4.3 (1.5)	4.5 (1.4)	4.5 (1.3)	5.2 (1.4)	4.5 (1.3)	4.8 (1.5)	4.8 (1.5)	4.6 (1.4)

Food Quality													
Food variety		3.4 (1.8)	3.6 (1.4)	3.1 (1.2)	3.2 (1.4)	3.3 (1.1)	3.7 (1.3)	3.8 (1.0)	4.4 (0.9)	4.2 (1.1)	4.6 (1.0)	4.6 (1.4)	4.4 (1.5)
Food attractiveness		3.4 (1.1)	4.0 (0.9)	2.7 (1.5)	2.4 (1.2)	3.2 (1.3)	3.7 (1.0)	3.5 (1.1)	4.0 (1.2)	3.9 (0.9)	4.4 (1.2)	4.1 (1.3)	4.2 (1.1)
Food choice		3.1 (1.2)	3.7 (1.1)	2.9 (1.4)	2.7 (1.2)	3.3 (1.3)	3.6 (1.1)	3.9 (1.2)	4.3 (1.0)	4.1 (1.0)	4.5 (0.8)	4.4 (1.0)	4.1 (1.1)
Food brands		3.5 (1.3)	3.6 (1.1)	2.7 (1.5)	2.6 (1.4)	3.4 (1.0)	3.8 (.09)	3.6 (1.1)	4.4 (0.8)	4.1 (1.1)	4.5 (0.9)	4.4 (1.2)	4.3 (1.4)
Food ingredients		4.0 (1.4)	4.1 (1.2)	3.2 (1.3)	3.1 (1.1)	3.5 (1.2)	4.0 (1.1)	3.9 (0.9)	4.6 (1.1)	4.2 (1.2)	4.7 (1.3)	4.6 (1.1)	4.6 (1.3)
Food flavor		3.4 (1.0)	4.0 (0.9)	3.1 (1.2)	2.8 (1.5)	3.4 (1.1)	3.8 (1.0)	3.6 (1.2)	4.4 (1.1)	4.1 (1.4)	4.7 (1.4)	4.3 (1.4)	4.2 (1.3)
Category average	3.2	3.51 (1.4)	3.86 (1.2)	2.9 (1.2)	2.8 (1.3)	3.4 (1.4)	3.8 (1.3)	3.7 (1.1)	4.4 (1.0)	4.1 (1.3)	4.6 (1.2)	4.4 (1.5)	4.3 (1.4)
Nutrition													
Nutrition information on food products is posted		3.3 (0.9)	4.5 (.07)	2.7 (1.1)	2.5 (1.0)	3.3 (1.0)	5.3 0.8	2.9 (1.1)	5.0 (1.0)	4.1 (1.0)	4.8 0.9	4.3 (1.2)	4.2 (1.1)
Information on calories in food is posted		3.5 (1.0)	4.5 (0.8)	2.8 (1.0)	2.3 0.9	3.5 (1.1)	5.3 0.7	3.3 (1.0)	5.3 (0.9)	4.3 (1.2)	4.9 (0.8)	4.4 (1.3)	4.2 (1.1)
Information on fat contained in food is available		3.4 (0.7)	4.4 (0.6)	2.8 (1.1)	2.1 (1.1)	3.4 (0.9)	5.3 (0.6)	3.0 (1.2)	5.2 (0.7)	4.2 (1.0)	4.9 (.06)	4.4 (1.0)	4.1 (1.0)
Category average	2.5	3.4 (0.9)	4.5 (0.7)	2.8 (1.1)	2.3 (1.0)	3.4 (1.0)	5.3 (.07)	3.1 (1.1)	5.2 (0.9)	4.2 (1.1)	4.9 (0.8)	4.4 (1.2)	4.2 (1.1)
Diversity													
The choices available allow me to meet religious needs		4.6 (1.3)	4.9 (1.2)	4.7 (1.3)	3.9 (1.0)	5.1 (1.2)	5.4 (1.0)	5.1 (1.1)	5.3 (1.2)	5.3 (1.0)	5.5 (0.9)	5.9 (1.0)	5.59 {0.9}
The choices available allow me to meet ethnic and cultural preferences		4.0 (1.4)	4.2 (1.4)	3.9 (1.5)	3.7 (1.4)	5.0 (1.2)	4.9 (1.2)	5.0 (1.1)	5.2 (1.1)	4.9 (1.3)	5.1 (1.2)	5.3 (0.9)	5.17 (1.2)
Category average	3.7	4.3 (1.4)	4.5 (1.4)	4.3 (1.4)	3.8 (1.1)	5.0 (1.2)	5.2 (1.1)	5.0 (1.1)	5.2 (1.1)	5.1 (1.2)	5.3 (1.1)	5.6 (1.0)	5.38 (1.2)

Time/Cost													
School foodservice prices are reasonable		3.6 (1.4)	3.8 (1.4)	3.1 (1.5)	2.9 (1.3)	2.2 (1.3)	2.9 (1.1)	3.8 (1.4)	4.1 (1.2)	3.3 (1.1)	4.1 (1.2)	3.6 (1.5)	3.6 (1.3)
Time given for meal periods is adequate		3.5 (1.5)	3.7 (1.2)	3 (1.5)	2.8 (1.3)	4.6 (1.4)	4.7 (1.3)	4.6 (1.2)	4.7 (1.2)	4.7 (1.2)	4.8 (1.4)	5.5 (1.2)	5.1 (1.0)
Time available to eat once seated is adequate		3.0 (1.)	3.5 (1.1)	2.6 (1.4)	2.7 (1.2)	3.9 (1.1)	4.2 (1.1)	3.9 (1.1)	4.4 (1.0)	4.4 (1.1)	4.7 (1.0)	5.1 (1.2)	5.0 (1.2)
The number of serving lines is adequate		3.4 (1.2)	3.9 (1.1)	2.7 (1.4)	2.0 (1.0)	4.1 (1.1)	4.4 (1.3)	3.2 (1.2)	4.5 (1.1)	3.6 (1.3)	4.3 (0.9)	4.2 (1.3)	4.1 (1.1)
Category average	3.3	3.4 (1.3)	3.7 (1.2)	2.8 (1.4)	2.6 (1.2)	3.7 (1.2)	4.1 (1.2)	3.9 (1.3)	4.4 (1.1)	4.0 (1.2)	4.5 (1.2)	4.6 (1.3)	4.5 (1.2)
Dining													
Tables in the dining area are clean		3.7 (1.5)	3.9 (1.3)	2.7 (1.5)	2.7 (1.5)	3.6 (1.4)	3.7 (1.3)	3.7 (1.3)	3.9 (1.2)	4.3 (1.1)	4.4 (1.3)	4.4 (1.3)	4.2 (1.4)
Ambiance													
Theme days/special events are offered		4.6 (1.3)	4.5 (1.2)	4.1 (1.4)	3.8 (1.3)	4.2 (1.4)	4.2 (1.5)	4.3 (1.3)	4.5 (1.1)	4.7 (1.0)	4.9 (1.2)	5.1 (1.1)	4.8 (1.2)
Special events and promotions are offered		3.7 (1.4)	3.7 (1.4)	3.1 (1.4)	3.1 (1.5)	3.7 (1.4)	3.6 (1.3)	4.1 (1.2)	4.3 (1.1)	4.4 (1.2)	4.5 (1.3)	4.8 (1.4)	4.4 (1.0)
The dining area temperature is comfortable		4.4 (1.3)	4.60 (1.2)	3.4 (1.2)	3.1 (1.3)	4.7 (1.1)	4.5 (1.2)	4.6 (1.1)	4.6 (1.2)	4.3 (1.1)	4.4 (1.0)	4.7 (1.2)	4.6 (1.1)
The noise level in the dining area is OK		4.2 (1.0)	4.4 (1.2)	4.1 (1.4)	4.3 (1.3)	4.4 (1.2)	4.4 (1.1)	4.6 (1.2)	4.7 (1.0)	4.1 (1.0)	4.3 (1.3)	4.6 (1.2)	4.5 (1.2)
Category average	3.9	4.1 (1.3)	4.2 (1.3)	3.5 (1.4)	3.4 (1.4)	4.1 (1.3)	4.1 (1.3)	4.3 (1.2)	4.4 (1.2)	4.4 (1.1)	4.56 (1.3)	4.7 (1.2)	4.5 (1.3)
Overall Satisfaction													
Category average	3.49	3.57 n.	4.22 n. 1	3.02 n.	3.18 n.	3.84 n.	4.16 (1.2)	4.01 (1.3)	4.65 (1.1)	4.35 (1.2)	4.89 (1.1)	4.75 (1.3)	4.67 (1.3)
³ Number of student participating per school are: school 1 intervention: 318; school 2 control: 309; school 3: 410, school 4: 374; school 5 intervention: 579; school 6 control: 523. ^b National averages supplied by the National Food Service Management Institute, Applied Research Division, Foodservice Analysis and Benchmarking Service, University of Southern Mississippi, Hattiesburg, MS. Data represent over 90,000 high school students' ratings, July 2004. ^c Inter = Intervention school where nutrition information was posted at point of service ^d Con = Control school where no nutrition information was posted-appear shaded. ^e Means were calculated from scores based on a scale of 1 to 7. ¹ Means in bold are significantly different for the intervention period versus the non-intervention period ⁹ Standard Deviations are in parentheses.													

In all intervention schools, ratings for almost all mean scores increased. Interestingly, when nutrition information was supplied, not only did student satisfaction with the quality of the food chosen increase, but this intervention also seemed to spread to increased satisfaction with the service of the food. Students in the intervention schools rated several measures of service quality significantly higher than the control schools. The item that was rated higher in all four schools concerned the friendliness of the foodservice staff even though researchers specifically asked employees to "carry on as usual and not make comments to students about the nutrition labels" during the intervention period.

Student satisfaction did not increase for food quality, service quality, or any other category in the two control schools (Table 1). In control schools, the trend was a decreasing means for most measures of student satisfaction ($p < .05$). It may suggest that students became bored with menu offerings and cafeteria settings over time, which resulted in lower satisfaction with most aspects of the school nutrition program. This would indicate that supplying nutrition information not only halts such a waning trend in satisfaction, but increases student satisfaction from baseline measures.

Supplying nutrition information is not a panacea that creates a halo effect over the entire school nutrition program. In intervention schools, nutrition information had no effect on student ratings of pricing, dining room ambiance, or perceptions of menu variety. This would add evidence to the validity of the study. One would not expect nutrition information at the POS to increase student satisfaction with room temperature, noise levels, or the cleanliness of tables.

Surprisingly, however, even though students did not rate the "time given for meal periods is adequate" category any higher after the introduction of nutrition information, students *did* rate the "time available to eat once seated is adequate" category as higher. At first this might seem contradictory, but the ratings of the "number of servings lines is adequate" category also increased after nutrition information was introduced. This finding might suggest that students knew that the time they were given for meal periods did not change, but when the nutrition information was introduced, selection of food items became easier and faster, giving the impression of more adequate serving lines and eating time. This phenomenon did not occur in the control schools.

The authors also tested to see if gender, grade, or frequency of participation would explain some of the results found in satisfaction levels. Results indicated that gender ($p > .26$), grade ($p > .34$), and frequency of participation ($p > .46$) did not have a significant effect on any satisfaction score for any of the schools. For both overall foodservice and food quality, satisfaction ratings dropped as grade level increased. Ninth Grade ratings were higher than Tenth Grade, Tenth Grade was higher than Eleventh Grade, and Eleventh Grade was higher than Twelfth Grade. Similar results have been found in other research (Meyer, 2000).

The opposite held true for service personnel ratings. Ninth Grade gave the lowest ratings, while Twelfth Grade gave the highest ratings for satisfaction with service personnel. Tenth and Eleventh Grades ranked in increasing order. These results are intuitively appealing, as one would expect students to become more disinterested with the overall foodservice and food quality the more exposure they have to them. Conversely, the ratings for familiar and friendly (and possibly more satisfied) service personnel would increase as students have more exposure to the staff.

Further analysis revealed a number of interaction effects. In each intervention school, there was a gender by intervention effect for overall foodservice [i.e. $F(1, 507) = 4.58, p < .03$], and for food quality [i.e. $F(1, 507) = 8.81, p < .003$]. Although there was no difference between male and female satisfaction rates with foodservice operations that provided no nutrition information at the POS [means: male = 3.8 and female = 3.9, $t(253) = 0.73, n.s.$], there was a gender difference when nutrition information *was* available [means: male = 4.1 and female = 4.4, $t(254) = 2.16, p < .03$]. Similar results were found for food quality. There was no difference between male and female satisfaction rates with food quality when nutrition information was not provided at the POS [means male = 3.3 and female = 3.4, $t(253) = 0.29, n.s.$], however, a gender difference was present when nutrition information was available [means male = 3.6 and female = 4.0, $t(254) = 2.95, p < .003$]. This would suggest that when nutrition information was available, satisfaction with overall foodservice and food quality was greater for females than for males. Other research with young adults similarly has found that females are more influenced by nutrition information than males (Marietta et al., 1999).

Based on previous research on empowerment and self-determination (Cranage & Sujan, 2004; Cranage et al., 2004), these findings suggest that supplying nutrition information at the POS empowers students and enables a stronger sense of self-determination. This newfound sense of empowerment results in greater satisfaction with the quality of food and service. Additionally, total food selections were recorded at each school for a study focused on healthful selections and have been reported in a previous article; results showed there was a distinctive increase in more healthful food selections as an aggregate number for all Ninth through Twelfth Grade students (Conklin et al., 2005). If supplying nutrition information also influences students to make more healthful food choices, then an increased satisfaction could reinforce their choices and persuade them to make the more healthful selection repeatedly.

CONCLUSIONS AND APPLICATIONS

Findings from this study illustrate the value of informed choice in yielding greater customer satisfaction with dining occasions. Even though more research is needed to determine whether these findings with Northeastern high school students can be extended to students from other parts of the United States, these results do mirror previous studies with adults (Cranage & Sujan, 2004; Cranage et al., 2004).

Also of note is that student satisfaction ratings in all six schools were above the national means as established by the NFSMI benchmarking service (Table 1). Providing nutrition information at the POS increased the student ratings of school nutrition programs that already were rated above average, especially in food quality. However, specific selections could not be linked to satisfaction data due to privacy restrictions and, therefore, statistical significance could not be evaluated for food choices in relation to student satisfaction ratings. Although the authors controlled for as many variables as possible, including using control groups, it is possible that variables other than informed choice may have had an effect on their results.

The period of intervention was only six weeks. Further study is needed to explore whether there would be a "wear out" effect in which students become desensitized to nutrition information at

the POS and revert to former opinions about food quality and satisfaction with the school nutrition program. Also of interest would be a study to determine whether these findings could be replicated in a younger population, such as students in the middle grades. The POS for these grades may be in classroom tallies taken by teachers, and it would be important to display the information when the students decide what they will eat for lunch.

This study indicates that providing students with information by which an informed choice can be made on foods they are about to consume is directly related to their feelings of satisfaction with their school nutrition program. School nutrition directors could use the results of this study to evaluate the cost-effectiveness of fostering informed choice. Nutrition information is available in most school districts, and this same information could be made available at the POS with very little additional cost. The format of the information could be altered to determine what elements are critical for students' informed choice. If providing nutrition information at the POS creates a sense of student empowerment and, ultimately, a higher satisfaction level, directors would have a great opportunity to promote more healthful food choices at a minimal cost.

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