EFFECT OF MENU SIGN POSITION ON CUSTOMER ORDERING TIMES AND NUMBER OF FOOD-ORDERING ERRORS

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ABSTRACT: Data were collected to determine if an additional menu sign, visible to restaurant customers as they waited in line to order food, would reduce both the amount of time taken to order food as well as the number of food-ordering errors. An A-B-A-B design was utilized in which ordering times and errors were recorded before the addition of a second menu sign, after the addition of the second sign, after the removal of the second sign, and after the reinstallation of the second menu sign. Results indicated that the additional menu sign led to a significant decrease in both ordering times and ordering errors. Without the second sign, customers took an average of 23.82 seconds to place an order and made an average of .26 errors. In the two sign intervention conditions, customers took an average of 6.48 seconds to order and made an average of .08 errors. The sign manipulation resulted in effect sizes of 1.18 for ordering times and .99 for ordering errors.

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For restaurants, peak customer ordering hours occur during the lunch and dinner periods. During the other periods of the day, relatively few customers place orders. This lack of consistency in customer flow presents many problems for the restaurant industry. Restaurants must be able to schedule enough workers to handle the peak-time crowds, but then must pay these same workers during periods of customer inactivity.

Compounding the problem of peak-time crowds is the inefficiency of the food-ordering process. After being asked for their order, many customers spend time looking at the menu sign before making a decision. This process is especially true for the drive-through windows at fast food restaurants where customers do not have access to the menu sign until they have arrived at the food-ordering station.

In addition to the time that must be spent making a food-ordering decision, it is possible that perceived pressure from other customers and/or employees may cause the customer to feel rushed to make a decision. These quick decisions may lead to ordering mistakes by customers that result in either corrections that waste additional time or a customer accepting a less than satisfactory order.

In order to handle the problem of peak-time crowds, some organizations have adopted a system of higher hourly pay for workers who work during the peak hours only (Mahlin and Charles, 1984). While hiring additional workers for peak hours is a possible solution to the heavy customer flow, it does not reduce the amount of time spent studying the menu sign or the possible perceived pressure placed on individuals causing them to make mistakes. Looking at recent advances in the area of environmental behavioral research, the most plausible solution to these problems created by heavy customer flow appears to be a sign intervention strategy.

Research has shown that simple written environmental manipulations have been successful in producing a number

of desired behaviors. For example, Geller and his colleagues (Geller, 1973; Geller et al., 1977) demonstrated that by providing specific written prompts, appropriate antilitter behavior could be increased. Furthermore, written prompts and signs have been used in restaurant and supermarket settings to influence customer food choices (e.g., Mayer et al., 1986; Davis-Chervin et al., 1985; Zifferblatt et al., 1980). These studies strongly suggest that people can be influenced by various written prompts and signs located within the environment.

In addition, research has demonstrated that properly designed and placed signs can increase the efficient handling of lines (Kantowitz and Sorkin, 1983). Further research support of the importance of proper sign and prompt positioning has also been demonstrated by Finnie (1973) and Geller et al. (1979).

Thus it was the purpose of the present study to determine the effect of an additional menu sign on customer-ordering times and errors in a fast food restaurant. The additional sign was placed so that customers could see the sign while standing in line. The restaurant previously had used one sign visible only when the customer was at the food-ordering station. It was expected that the proper positioning of the additional sign would result in a decrease in both ordering times and ordering errors.

METHOD

SUBJECTS

Subjects were 233 customers of the Radford University Highland Room. Only customers who examined (i.e., looked at) the menu signs before placing an order were included in the study. Other customers were thought to have preconceived ideas of what they wanted and therefore would not be affected by any manipulation of signs.

PROCEDURE

Experimental Environment

The experiment was conducted in the Highland Room, a convenience fast food restaurant located in the student center at Radford University, a medium-sized southeastern university.

The restaurant was designed such that customers entered through a north door and then waited in line to order. During peak ordering periods, line length averaged around 20 customers with typical waiting times of approximately 10 minutes. As depicted in Figure 1, the original menu sign was located in the order-taking area, designated by a line on the floor. The menu sign hung directly above the customers on a protruding wall unit, which made the sign unusable to the customer unless he or she stepped out of line and entered the order-taking area.

Experimental Design

The study was divided into four conditions of two weeks each. The purpose of the first condition was to establish baseline data for both ordering times and number of ordering errors.

During the second phase of the experiment a second sign was added in a position thought to be more efficient. Customers could see the sign while waiting in line, allowing them the opportunity to decide on an order before entering the order-taking area.

In order to demonstrate functional control, a third condition was included to serve as a second baseline. During this condition, the new sign was removed and measurements were taken as in other conditions.

To more fully assess the impact of the sign intervention a fourth condition was included. Here the "new" sign was positioned as in condition B and the same measurements were taken.

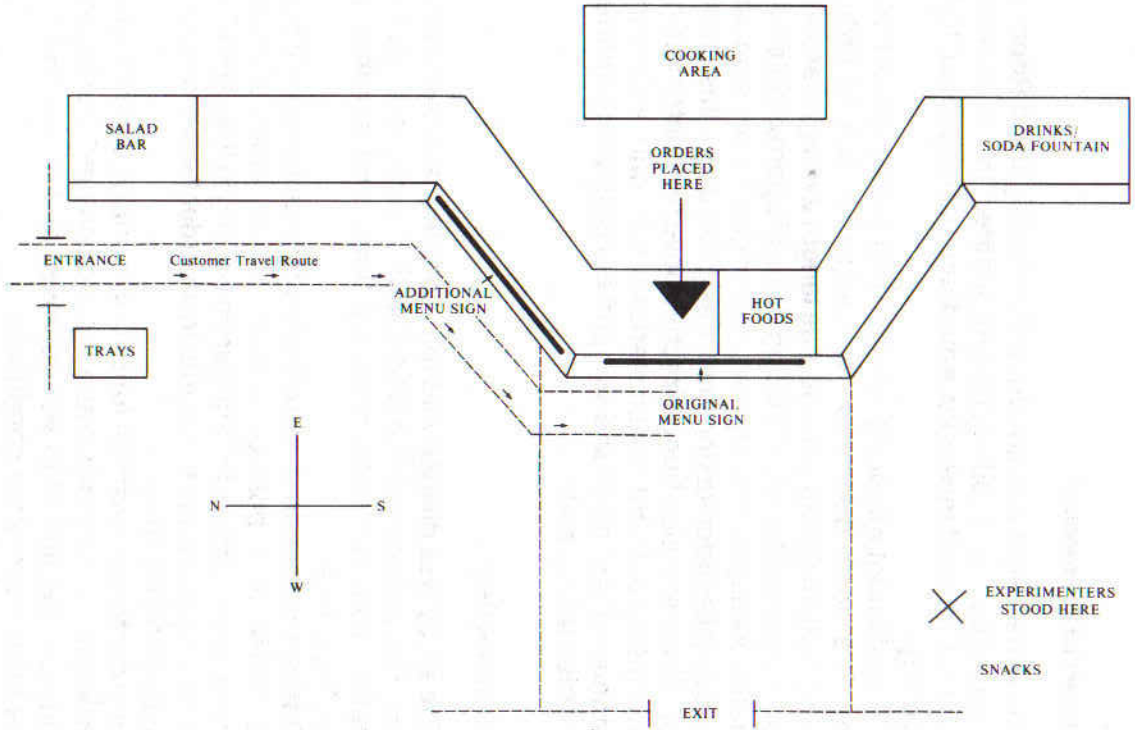

Figure 1 Basic Layout of the Highland Room

Outcome Measures

In order to measure ordering times and record the number of ordering errors, the researchers were situated in an area providing a clear view of the customers during the ordering process. Attempts were made to keep the researchers as unobtrusive as possible. Time and error measurements were taken for all subjects during the four conditions. Times for subjects were taken by three different researchers using analog stopwatches. The times collected by the researchers had sufficient measurement reliability ($r = .97$, $p < .0001$). Since only customers who made use of the menu signs were relevant to the study, it was necessary to designate when to measure ordering times. Here the lead researcher would verbally indicate to the other researchers which subject to observe. Errors were operationalized as either a changed or incorrect order. For example, there were instances where the customer changed their original order, thus resulting in the need for a correction. Also, there were instances when the employee took an incorrect order; observed when the employee would verbally confirm the order with the customer.

Each customer's ordering time began when they entered the order-taking area and either started looking at the menu or were asked to place an order. Timing ended when the order-taker acknowledged the completion of the order by nodding their head, turning away to give the order to the cook, or verbally stating that they had received the order.

RESULTS

The General Linear Model (GLM) procedure of the Statistical Analysis System (SAS) was utilized to analyze the data. The results of this ANOVA showed a significant effect for ordering latency, $F(3, 229) = 45.5$, $p < .0001$ and accounted for 37% of the order latency variance. As

depicted in Figure 2, further paired comparisons revealed that the mean ordering latency for the first (M = 7.11 sec.) and second (M = 5.86 sec.) manipulation conditions were significantly lower than the mean ordering latency in both the first (M = 27.5 sec.) and second (M = 20.1 sec.) baseline conditions. The mean ordering latency in the second baseline condition was significantly lower than that of the first baseline, perhaps indicating a slight temporal or practice effect (i.e., customers became familiar with the menu).

Analysis of the mean numbers of ordering errors also yielded a significant effect, $F(3, 229) = 3.52$, $p < .02$ and accounted for 4.4% of the variance in ordering errors. Paired comparisons revealed that the first manipulation condition resulted in significantly fewer errors (M = .12) than in the first baseline condition (M = .29), but not in the second baseline condition (M = .22). The second manipulation condition (M = .04) resulted in significantly fewer errors than the number of errors occurring in either baseline condition.

DISCUSSION

The results of this study demonstrated that an additional menu sign, located so that it can be read by customers before entering the order-taking station, can increase efficiency in food ordering by reducing both the ordering times and the number of ordering errors. These findings are important for three major reasons.

First, the findings are consistent with previous written environmental manipulation research that has shown that such interventions are successful in producing desired behaviors with a wide range of variables in a wide variety of settings, including reducing the amount of litter in a grocery store (Geller et al., 1977), increasing the number of low-fat or low-calorie entree choices in a restaurant (Mayer

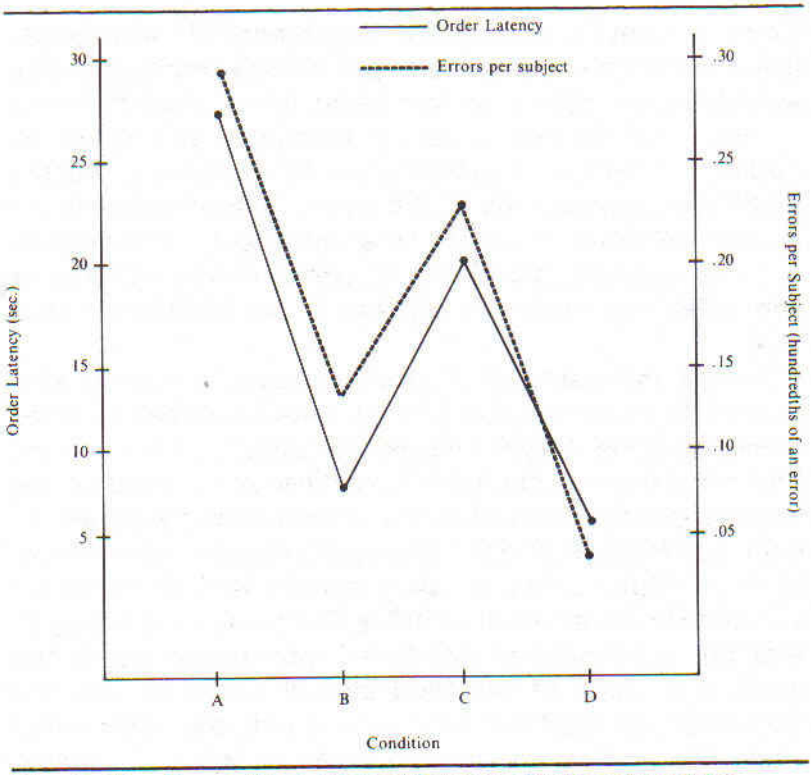

Figure 2 Mean Time and Mean Errors per Person as a Function of Condition

et al., 1986a; Dubbert et al., 1984), and increasing the number of people wearing safety belts while stopped at traffic lights (Geller et al., 1985).

Second, the results suggest that the use of a menu sign visible to a customer in line, will reduce both ordering times and ordering errors. This reduction in time and error should be of interest to restaurants that have drive-through windows and/or long ordering lines during peak customer periods.

For example, in our study the average ordering latency in the two baseline periods was 23.82 seconds. Given maximum employee and customer efficiency, this figure would project to 151 customers being able to place an order in an hour.

However, with the average ordering latency of 6.48 seconds in the two intervention periods, providing an additional sign would result in 555 customers being able to place orders in an hour. Of course, ordering efficiency will never be optimal, nor will every customer need to use a menu, but the additional sign may still lead to over a 300% increase in the number of possible orders taken per hour. Furthermore, this improvement in ordering efficiency can be obtained at very little cost—just the expense of an additional menu sign.

Finally, the results of this study suggest a new variable that might be included in future point-of-purchase studies involving signs. Mayer and her colleagues (1986a) found that including nutritional information about food at the point-of-purchase resulted in an increase in low-fat entree choices. However, in other studies (Cincirpini, 1984; Mayer et al., 1986b) nutrient labeling did not lead to increased selection of more nutritious items. Our study would suggest that the placement of additional information about the nutritional value of the food should occur so that the customer can read the menu and additional information while still in line rather than when at the order-taking station. This idea is consistent with the writing of Berkman and Gilson (1978) regarding the location of point-of-purchase displays.

In the successful study by Mayer and her colleagues (1986), the order-prompting poster was located at the beginning of the line while additional signs were located directly above the entree selections. It is interesting to note that 80% of the customers reported noticing the sign at the beginning of the line while only 60% noticed the sign after arrival at the order-taking station. It is possible that while the customer is at the order-taking station, he or she is already concerned about both the time that it normally takes to place an order as well as the pressure that might be involved if there is a long line. Therefore, the customer may be willing to spend additional time noticing signs and

restructuring thinking patterns. In conclusion, placing a second menu sign that could be read by customers as they stood in line significantly reduced ordering times and errors. For future meta-analyses, the effect size of the intervention was 1.18, which was computed by averaging the ordering times for the two intervention periods, subtracting the mean ordering times for the two baseline periods, and dividing the difference by the overall standard deviation of 14.74 seconds (Glass et al., 1981). The effect size for ordering errors was .99 with a standard deviation of .176. Both effect sizes are well above the average effect size of .44 typically found in organizational interventions (Guzzo et al., 1985).

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