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# Point-of-Decision Prompts and Cognitive Resources

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# Cornhusker Economics

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| Market Report | Year Ago | 4 Wks Ago | 5-24-19 |
|---|---|---|---|
| **Livestock and Products, Weekly Average** | | | |
| Nebraska Slaughter Steers, 35-65% Choice, Live Weight. . . . . | * | 130.00 | * |
| Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . . . | * | 183.384 | 168.64 |
| Nebraska Feeder Steers, Med. & Large Frame 750-800 lb. . .. . | * | 155.53 | 145.13 |
| Choice Boxed Beef, 600-750 lb. Carcass. . . . . | 229.34 | 232.50 | 220.64 |
| Western Corn Belt Base Hog Price Carcass, Negotiated . . . . . | 66.06 | 81.17 | 75.82 |
| Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean. . . . . | 74.44 | 85.88 | 83.66 |
| Slaughter Lambs, wooled and shorn, 135-165 lb. National. . . . . | 152.25 | 152.54 | 155.58 |
| National Carcass Lamb Cutout FOB. . . . . | 381.03 | 378.29 | 393.43 |
| **Crops, Daily Spot Prices** | | | |
| Wheat, No. 1, H.W. Imperial, bu. . . . . | 4.92 | 3.83 | 4.10 |
| Corn, No. 2, Yellow **Columbus**, bu. . . . . | 3.76 | 3.44 | 3.84 |
| Soybeans, No. 1, Yellow **Columbus,** bu. . . . . | 9.55 | 7.75 | 7.34 |
| Grain Sorghum, No.2, Yellow Dorchester, cwt. . . . . | 5.89 | 5.36 | 6.14 |
| Oats, No. 2, Heavy Minneapolis, Mn, bu. . . . . | 2.92 | 3.29 | 3.24 |
| **Feed** | | | |
| Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton. . . . . | * | * | * |
| Alfalfa, Large Rounds, Good Platte Valley, ton. . . . . | * | 123.33 | 105.00 |
| Grass Hay, Large Rounds, Good Nebraska, ton. . . . . | 100.00 | * | 90.00 |
| Dried Distillers Grains, 10% Moisture Nebraska Average. . . . . | 155.00 | 133.50 | 121.00 |
| Wet Distillers Grains, 65-70% Moisture Nebraska Average. . . . . | 47.50 | 46.00 | 42.75 |

*** No Market**

Many of us have long-term goals to maintain or achieve a healthy body weight. However, most of us have a hard time following through on these plans. Maintaining a healthy body weight requires constant consideration of the future consequences of our current actions, which are shaped by our immediate desires, such as eating the tasty-looking brownie at the coffee shop or relaxing after a long day of work instead of forcing ourselves to go to the gym. The difficulty in balancing short-term and long-term goals is reflected in the change in the average American body type over the past five decades. Since the 1960s, the percentage of Americans who are overweight or obese has increased markedly. Currently, around 70 percent of adults in the United States are overweight or obese.

An increasingly popular approach to help people self-correct the tendency to ignore long-term goals is to provide prompts at the point at which an individual will be making a decision. These are referred to as point-of-decision prompts (PDPs). Examples can be overt—providing messages and environmental cues encouraging people to take the stairs instead of riding the escalator—or subtle, such as incorporating front-of-package labels displaying key nutrients—e.g., calories, fats—onto packaged foods. A major policy response to the increase in overweight and obesity in the United States has been to increase the availability of nutrition information on packaged foods and in prepared food retail outlets, with the intention being to help consumers to make healthier choices. This information—available for packaged products in on-package panels or labels and for prepared foods in the form of posted calorie information at restaurants or other food retail outlets serving prepared foods with 20 or more locations—constitutes a PDP.

Evidence of the effect of informational PDPs shows a mixed record. The rule that requires prepared food retailers to post calorie amounts and to make available information about other nutrients upon request went into effect on May 7, 2018. This does not provide enough time for widely available evidence on the effect of this as a PDP. However, some local governments, such as New York City, were early adopters of nutritional PDPs, providing a sense of the likely effectiveness of calorie labeling in restaurants and other retailers of prepared foods. Research that examines evidence from multiple locations and individual studies, referred to as meta-analysis, does not find much evidence that calorie labeling changes consumers' food purchasing behavior (see, for instance, VanEpps et al., 2016 or Bleich et al., 2017). Evidence from packaged products also suggests that providing nutrition facts does little to change food choices (Variyam, 2008).

One potential problem with informational PDPs is that people may fail to process the information provided in the prompt. Presenting the information in ways that highlight nutritional tradeoffs (Gustafson and Zeballos, 2018) or prompting people to explicitly consider their health (Hare, Malmaud, and Rangel, 2011) increases the proportion of individuals choosing healthier items. Focusing attention on a few key nutrients or a summary nutritional score promotes healthier choices (Zhu et al., 2016), particularly if people are in a hurry (Crosetto et al., 2016). An important consideration for the design of PDPs is that these health-related choices are often made under conditions that tax individuals' cognitive resources, particularly for low-income individuals who are, on average, at higher risk of being overweight or obese.

We recently conducted a test to see if it is important to consider cognitive factors when designing PDP messages. The study was designed to test a PDP aimed at increasing purchases of healthy foods in a supermarket in a rural, low-income community. We integrated a focus on cognitive factors by examining two different PDPs. One PDP encouraged shoppers to set a goal of purchasing five healthy items from all food categories (which was twice the average number of healthy items purchased based on an examination of purchases before the study began); we refer to this as the broad PDP condition (B-PDP). The second PDP encouraged shoppers to set a goal of purchasing five fruits and/or vegetables. This prompt condition is referred to as the narrow PDP condition (N-PDP). Since the items in the N-PDP condition are a subset of the items in the B-PDP condition, shoppers should have an easier time finding five items that they would like to consume in the B-PDP condition than the N-PDP condition. However, the B-PDP prompt may lose its effect on shoppers as the process of shopping takes up cognitive resources.

The following results are drawn from a recently published study (Gustafson, Kent, and Prate, 2018) that examine food purchases in the B-PDP condition, the N-PDP condition, and in a no-prompt control condition. The published article is freely available to read or download[1] A finding that the percentage of healthy purchases increases more in the N-PDP condition than in B-PDP would suggest that cognitive factors (such as attention and memory) may reduce the effectiveness of point-of-decision prompts if they are not carefully designed.

**Setting**

The research was conducted in a supermarket on the Rosebud Indian Reservation in Mission, Todd County, South Dakota. The Rosebud Indian Reservation is the home of the Rosebud Sioux Tribe—over 90 percent of Reservation residents are tribal members. Residents of the Rosebud Indian Reservation have many of the characteristics that are associated with poorer health outcomes. According to the American Community Survey of the United States Census, the per-capita income in 2016 was under $12,000, and nearly 50 percent of residents lived in poverty. Educational attainment is markedly lower than the United States average, with less than 15 percent of adults having completed college. Access to food retail outlets is also limited. There are only two other grocery locations on the reservation. All of these factors are associated with lower quality diets and poorer health.

Narrow and broad prompt messages were printed on posters, which were two feet high by three feet wide. The posters were displayed on an easel just inside the sole entry point into the supermarket so that all shoppers entering the store passed by the posters. Easels were set to be in the line of sight of shoppers with the bottom edge of a poster 3.5 feet above the ground. The N-PDP condition message read "*For a healthy diet, try to buy at least five fruits and vegetables. Food is Good Medicine.*" The B-PDP message read "*For a healthy diet, try to buy at least five healthy food items. The Food Is Good Medicine label can help you identify healthy food choices.*" Both messages refer to a healthy food label featuring the phrase "Food Is Good Medicine" (FIGM). The FIGM label was developed within the community to identify healthier food items and had been implemented in the supermarket nine months before the current study took place. A university-employed registered dietitian evaluated the supermarket inventory to estab-

[1] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0207792[1].

lish which items to label as healthy. All items highlighted in the prompts carried the FIGM label so that shop-pers would be able to easily identify healthy choices in both N-PDP and B-PDP conditions.

**Results**

We examine purchases of fruits and vegetables (F&V) and all healthy items (including F&V) in the narrow (N-PDP) and broad (B-PDP) message conditions as well as the control (no-prompt condition). Results are reported in Table 1. The proportion of healthy items purchased by shoppers in the control condition was 0.114. In the B-PDP condition, the proportion of healthy items purchased items was 0.138, while in the N-PDP condition, it was 0.170. The difference between N-PDP and the control condition is significantly different.

0.099, while the proportion of expenditures on healthy foods was 0.112 in the B-PDP condition. Shoppers in the N-PDP condition spent a significantly higher proportion, 0.151, of total expenditures on healthy items than shoppers in the control condition.

The proportion of expenditures on F&V is slightly lower than the proportion of F&V purchased but shows the same relationship across conditions. The lowest proportion of total expenditures on F&V occurred in the control condition (0.063), followed by the B-PDP condition (0.067). In the N-PDP condition, the proportion spent on F&V was highest: 0.102. Expenditures on F&V in the N-PDP condition were significantly higher than the proportion of F&V expenditures in the control condition.

**Table 1: Purchases of healthy foods in N-PDP, B-PDP, and Control conditions**

| | Condition | | | % Difference | | |
|---|---|---|---|---|---|---|
| **Measure** | **N-PDP Mean (SD)** | **B-PDP Mean (SD)** | **Control Mean (SD)** | **N-PDP-B-PDP** | **N-PDP-Control** | **B-PDP-Control** |
| Healthy Products Purchased | 0.17 | 0.136 | 0.114 | 25.0 | 49.1** | 19.3 |
| | (0.220) | (0.211) | (0.157) | | | |
| Fruit and Vegetables Purchased | 0.109 | 0.075 | 0.068 | 45.3 | 60.3* | 10.3 |
| | (0.193) | (0.168) | (0.122) | | | |
| Expenditures on Healthy Products | 0.151 | 0.112 | 0.099 | 34.8 | 52.5* | 13.1 |
| | (0.219) | (0.189) | (0.189) | | | |
| Expenditures on Fruits & Vegetables | 0.102 | 0.067 | 0.063 | 52.2 | 61.9* | 6.3 |
| | (0.196) | (0.150) | (0.115) | | | |
| N | 189 | 138 | 126 | | | |

Notes: Means represent the fraction of each measure (items and expenditures on any healthy item and fruits and vegetables). Significance is calculated using pairwise t-tests with Bonferroni adjustment for multiple comparisons. (* $p<0.05$; ** $p<0.01$).

Next, we examine the proportion of F&V purchased by condition. In the control condition, 0.068 of shoppers' items were F&V. In the B-PDP condition, the proportion was 0.075, while in the N-PDP condition, the proportion was 0.109. The proportion of F&V purchased in the N-PDP condition was significantly higher than in the control condition.

Expenditures on healthy items follow a pattern similar to the number of items purchased. In the control condition, the proportion of expenditures on healthy food items was

We use one additional measure to assess whether shoppers' responses to the PDPs are consistent with the PDP's message. If shoppers respond to the prompt, shoppers in the N-PDP condition should increase purchases of F&V relatively more than shoppers in B-PDP. For this measure, we calculate the change in each of the four variables we examined above between the control and both PDP conditions. We calculated this measure for all four variables and for both PDP conditions. We then look at the percent-

age of the difference in healthy food purchases/ expenditures attributable to fruits and vegetables. For instance, we take the proportion of F&V purchased in N-PDP minus the proportion of F&V purchased in the control condition, and the proportion of all healthy foods purchased in N-PDP minus the proportion of all healthy foods purchased in the control condition. We then divide the difference in F&V by the difference in all healthy foods.

The results suggest that shoppers did respond differently to the two prompts (Table 2). In the B-PDP condition, 31 percent of the difference in healthy food purchases relative to the control condition is attributable to F&V, while the remaining 69 percent comes from other healthy foods. In the N-PDP condition, 75 percent of the difference in healthy food purchases comes from F&V, while the remaining one-quarter is attributable to other healthy foods.

Table 2: Increase in proportion of all healthy foods and fruits and vegetables purchased in N-PDP and B-PDP relative to Control.

| | N-PDP--Control | B-PDP--Control |
|---|---|---|
| Number of items purchased: | | |
| Fruits and Vegetables (F&V) | 0.041 | 0.007 |
| All Healthy Foods (AHF) | 0.056 | 0.022 |
| F&V/AHF | 73% | 31% |
| | | |
| Expenditures: | | |
| Fruits and Vegetables (F&V) | 0.039 | 0.004 |
| All Healthy Foods (AHF) | 0.052 | 0.013 |
| F&V/AHF | 75% | 31% |

**Discussion**

In our grocery store-based field experiment, we examined the effect of two PDP prompts that differed in the ease with shoppers could keep them in mind that encouraged setting a healthy food purchase goal. Shoppers were from a low-income community with high rates of obesity and diet-related health problems, and the prompts were designed to test whether interaction between naturally occurring cognitive costs related to shopping and the prompt message influences PDP effectiveness.

We consistently find that shoppers purchase the greatest amount and spend the most on healthy food items in the N -PDP condition. While the number of items purchased and amount spent in the B-PDP condition for healthy foods is higher than the control condition, the differences are not statistically significant. Shoppers in the N-PDP condition purchased a higher proportion of healthy foods overall (49 percent higher) and F&V (60.3 percent higher) than the control condition. The N-PDP condition yielded more purchases than the B-PDP condition of all healthy foods (25 percent higher) and F&V (45 percent higher). Expenditures show a similar pattern.

The observed patterns support our hypotheses about the interaction between prompt design and cognitive resources. Shoppers in the N-PDP consistently purchased more F&V than shoppers in the B-PDP or control condition, leading to higher overall purchases of healthy items. Shoppers in the B-PDP did not increase purchases of other healthy items enough to keep pace with the increases in healthy purchases of shoppers in N-PDP.

These findings yield multiple important points. First, a simple, inexpensive, poster-based prompt can lead to an immediate, significant increase in healthy food purchases in a low-income community at high risk of obesity and diet-related diseases. This is important because research findings frequently suggest that it is difficult to change the shopping habits of low-income consumers (though we cannot say whether these changes are sustained over time). Second, the PDP messages were overlaid on pre-existing informational PDPs, illustrating the importance of designing PDPs that go beyond simply providing information to targeting motivation or goals. Packaged products in the supermarket already contain nutrition facts panels, which have been defined as a PDP. There is also a healthy food labeling system in the supermarket that identifies healthier products. While this research does not explicitly test our messages against the existing information-based PDPs, which are present in all three conditions, the results suggest that PDPs that encourage consideration of health promote healthy choices beyond prompt strategies that rely on simply providing information to consumers. Thus, optimal design of PDPs may require multiple layers of informational and motivational prompts.

Third, our results suggest that the design of prompts and other point-of-decision materials needs to consider other demands on individuals' cognitive resources. We find that shoppers purchase a significantly higher percentage of healthy foods and fresh fruits and vegetables when exposed to a PDP message focused on a limited set of products (N-PDP) compared to a control group, while shoppers exposed to a PDP message encouraging the purchase of a broader range of products (B-PDP) did not significantly increase their healthy food purchases. This is despite the fact that shoppers have access to more products available for purchase in the B-PDP condition than in the N-PDP condition—since items identified in N-PDP are a subset of items in B-PDP. This finding may result from the narrow prompt being easier to keep in mind for shoppers who must actively think about their food needs and budget.

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