



# Cornhusker Economics

## Does Targeting Healthy Food Labels to Populations at High Risk of Diet-Related Diseases Increase Label Effectiveness?

Market Report	Year Ago	4 Wks Ago	9-27-19
<b>Livestock and Products,</b>			
<b>Weekly Average</b>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight. . . . .	111.00	*	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . . .	181.38	162.40	155.87
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb. . . . .	165.10	152.91	149.95
Choice Boxed Beef, 600-750 lb. Carcass. . . . .	205.07	239.87	214.51
Western Corn Belt Base Hog Price Carcass, Negotiated . . . . .	62.50	*	*
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean. . . . .	79.40	79.44	71.14
Slaughter Lambs, woolled and shorn, 135-165 lb. National. . . . .	139.19	153.60	150.58
National Carcass Lamb Cutout FOB. . . . .	375.15	387.84	396.85
<b>Crops,</b>			
<b>Daily Spot Prices</b>			
Wheat, No. 1, H.W. Imperial, bu. . . . .	NA	3.42	3.63
Corn, No. 2, Yellow Columbus, bu. . . . .	3.27	3.67	3.85
Soybeans, No. 1, Yellow Columbus, bu. . . . .	7.31	7.66	8.06
Grain Sorghum, No.2, Yellow Dorchester, cwt. . . . .	5.20	5.48	5.95
Oats, No. 2, Heavy Minneapolis, Mn, bu. . . . .	3.12	3.02	3.08
<b>Feed</b>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton. . . . .	*	*	*
Alfalfa, Large Rounds, Good Platte Valley, ton. . . . .	102.50	110.00	105.00
Grass Hay, Large Rounds, Good Nebraska, ton. . . . .	95.00	105.00	105.00
Dried Distillers Grains, 10% Moisture Nebraska Average. . . . .	135.00	131.50	157.00
Wet Distillers Grains, 65-70% Moisture Nebraska Average. . . . .	48.50	44.00	48.50
<b>* No Market</b>			

The decades-long increase in obesity in the U.S. has inspired multiple policies aiming to improve individuals' food choices, which play an important role in diet-related diseases. Early policies—which have continued to be implemented and refined—took the view that providing consumers with information would give them the tools needed to choose a healthy diet. Both nutrition facts panels, which are provided on the side or back of nearly all packaged food products in the U.S, and calorie labeling in restaurant chains with 20 or more locations seek to address a lack of information among consumers.

While nutrition information is a necessary ingredient for people to choose healthier diets, studies of the effects of both policies show little effect on individuals' food choices. Part of this null effect may be due to the cost of searching for this information. Recently, efforts to make nutritional information easier for consumers to use in the retail environment have led to the creation of simple shelf-based or front-of-package labels. Simplified nutrition information included on front-of-pack or shelf-based labels shows more promise by making it easier for consumers who face cognitive or time constraints in the store to access and process nutrition information.

While average obesity rates have risen significantly in the U.S, these averages mask important differences in obesity rates, which correlate with demographic and socio-economic variables, including race, income, and place of residence. On average, minority, rural, and poorer households have higher body mass index (BMI) values, which are used to define weight categories such as overweight and obese than the general population. Although these groups are at higher risk of obesity-related diseases than the general population, research on shelf-based and front-of-pack labels has examined the effects of these labels in the general population. To effectively address the obesity epidemic, designing informational systems tailored to people who are at high risk for obesity-related diseases is important.

A recently published study<sup>1</sup> reports the results of a collaborative project conducted by a team of university researchers and members of the Rosebud Sioux tribal community to pilot, test, and ultimately implement an effective shelf-based healthy food labeling system. As part of this effort, the research team aimed to examine whether tailoring healthy food labels to a high-risk community—residents of a rural American Indian reservation in the Great Plains—would influence how effective the materials were in promoting choices of healthier foods. Labels were tailored to the community through the involvement of community members in the development of the materials. We tested the effect of the tailored label relative to a generic label that has been found to be effective in a multinational sample of consumers.

While health promotion efforts aimed at minority communities are often designed to be culturally appropriate, behavioral economics research provides reasons that tailoring materials to a community may make health promotion materials more effective. Tailored labels may convey social norms. Social norms describe what people do or what people believe should be done, and have been found to influence a range of behaviors. Tailored labels could also evoke positive elements of identity, which may influence food choices. Design efforts that engage the community more broadly in the design process might also increase effectiveness through involvement.<sup>2</sup>

We examined the effectiveness of labels by comparing three healthy food labels: a label featuring images and text tailored to the Rosebud population, a generic label that had been found to be highly effective at helping people identify and choose healthier foods among a large international sample, and a control label that included only the imagery incorporated into the tailored label. We included the third label to control for the effect of the culturally relevant symbol used in the tailored label.

The tailored label was developed by collaborators from the Rosebud Food Sovereignty Initiative, Sinte Gleska University, which is the tribal university of the Rosebud Sioux Tribe, and the University of Nebraska-Lincoln. Primary input for the design of the label came from Rosebud collaborators. The tailored and control labels featured an image of a bison. The bison image was identified by local community members as a culturally relevant image associated with notions of health and strength. Therefore, we hypothesized that the image would invoke participants' cultural identity, rendering the label more salient and prompting participants to consider health attributes. The tailored label included text around the bison image stating that the label was the product of a local, community-led initiative, which likely communicates social norms. We hypothesized that the norm messaging would increase

the likelihood that people would choose the healthier item relative to the generic label. The generic label was chosen based on previously published research that found the image—a smiley face—to be highly effective for the average consumer.

Data were collected via a survey conducted with adults who were shopping for food at a supermarket located on the Rosebud Indian reservation. Researchers recruited shoppers shortly after they entered the supermarket to participate in a choice experiment to examine the effect of the three labels on the healthfulness of food choices. Each participant made purchase decisions in eight choice sets. Each choice set contained a healthier product, a less healthy product, and an opt-out statement (“I would not buy either of these products”). In four of the eight choice sets, participants saw the healthy label applied to one of two types of healthier products. In the other four choice sets, no label was applied to the other type of healthier product, thereby serving as a control condition. Each participant only observed one of the three label types, and only saw that label applied to one of the two healthy product types. The label and labeled food type were determined randomly for each participant.

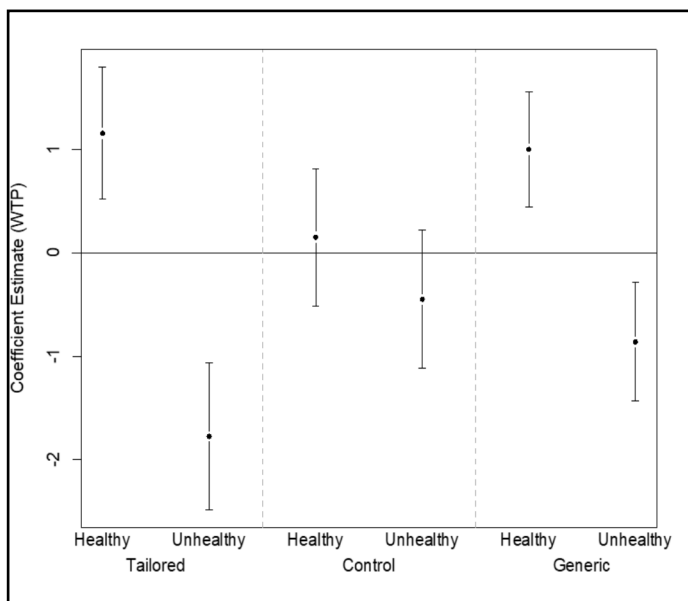
The products used in the choice experiment were bagged cereals: two corn-based cereals and two shredded wheat-based cereals. Breakfast cereals were used in the experiment following discussions with local project collaborators who identified breakfast cereal as a product that most local residents commonly purchase. We examined participants' choices between 40-ounce bags of healthier and less healthy cereals at two different price levels: \$4.99 and \$5.99, which reflect a typical range of regular and on-sale prices at the study location. The two healthier cereal varieties were corn flakes and shredded wheat, while the two less healthy varieties were frosted (corn) flakes and frosted shredded wheat.

We received 115 completed surveys. Ninety percent of participants reported being the primary shopper for their household, and 71 percent of participants were female. Over 90 percent of participants were members of the Rosebud tribe. We analyzed individuals' choices of healthier in situations where the relative prices of healthier and less healthy options varied: in some cases, the healthier option was more expensive; in others, the healthier option was cheaper; and in some, the price was identical for healthier and less healthy options.

We examine how label conditions influence the probability that participants choose the healthy product. In the unlabeled condition, participants are more likely to select the healthy item (relative to the unhealthy product in the unlabeled condition). Both the generic and tailored healthy food labels increase the probability

that participants choose the healthy item, and both are statistically significant. Interestingly, the control label is not statistically significant, though the point estimate is positive. Neither the presence of the generic label nor the control label in the choice set impacts the probability that the unhealthy item is chosen at a statistically significant level. The presence of the tailored label, however, significantly decreases the likelihood that the unhealthy item is chosen.

The estimates from the analysis of choice experiment data can be used to calculate the value people place on product attributes, which is referred to as their willingness to pay (WTP) for attributes. In this analysis, we focus on differences in WTP for health attributes when different labels are present. Figure 1 below presents the estimated WTP with bars that represent 95 percent confidence intervals for healthy and unhealthy items in each of the labeling conditions—Tailored, Control, and Generic.



**Figure 1: Willingness to pay for healthy and unhealthy foods in different labeling conditions**

WTP for the healthy product is \$0.50 greater than the unhealthy product in the unlabeled condition and is significant at the one percent level. WTP for the healthy item in the control label condition is \$0.35 and is not statistically significant. The tailored label and generic label both increase WTP for the healthy food item relative to a choice set in which no label is present. When the healthy item carries the tailored label, WTP for the healthy item is \$1.65, increasing WTP by over \$1 relative to the no-label condition, and is highly significant. WTP for the healthy item when carrying the generic label is \$1.50 and is also significant.

The presence of labels in a choice set generally decreases WTP for the unhealthy items, though WTP for the unhealthy item in the presence of the control label is very close

to zero. When the generic label is present, WTP for the unhealthy item decreases by \$0.38 relative to the no-label condition, though this is not statistically significant. WTP for the unhealthy item when the tailored label is present, however, is \$1.27 lower than when no label is present, which is significant.

While the generic and tailored labels both significantly increase the probability that the healthy item is chosen, only the tailored label additionally decreases the likelihood that the participant selects the unhealthy item. Taken together, the difference in WTP for the healthy and unhealthy items is markedly different across labeling conditions. The difference in WTP between the healthy and unhealthy products in the no-label condition is \$0.50. When the generic label is present, the difference in WTP is \$1.86, or \$1.36 more than when no label is present. The tailored label increases the difference in WTP further. When the tailored label is present in a choice set, the difference in WTP between the healthy product is \$2.93, or \$2.43 more than when no label is present.

We find support for our hypothesis that simple healthy food labels that are tailored to high-risk communities may increase the effectiveness of the labels in promoting healthy food choices. Both tailored and generic labels are effective at increasing healthier choices, but, additionally, the tailored label effectively decreased unhealthy choices in a choice experiment conducted with people actively shopping in a supermarket.

The findings from the choice sets with the control label, which featured the same imagery as the tailored label, suggest that the results of the tailored label may provide a lower estimate of the potential of tailored healthy food labels to positively influence food choice. Because the imagery on the control and tailored label is identical, the difference in results likely originate with the message indicating the local origin of the label in the tailored label. Without the message, the bison image alone is less effective than the generic label image, suggesting that both imagery and message play an important role.

### Discussion

In this research, we examine the effect of tailoring labels to high-risk communities through community involvement in the development of labels by comparing three healthy food labels in a choice experiment conducted in a rural, low-income, minority community. The labels were a generic label found to be highly effective at helping people identify and choose healthier foods among a large international sample, and two different labels that were targeted to the community: one of which featured text describing its local origin and imagery that had been identified as a symbol of health and one which

featured only the image (without any text implying local involvement in the label design). The choice experiment also permits explicitly comparing trade-offs between price and health with and without a healthy food label in place. The price of healthy foods is frequently cited as a substantive barrier to healthy food choice for low-income households, so it is important to consider trade-offs in price in the design of healthy food promotional efforts.

Our results suggest that local involvement in the development of healthy food labeling systems can increase the purchase of healthy foods, even when prices for healthier and less healthy items vary. Since many ethnic minority and rural populations experience diet-related health problems at a rate higher than the U.S. average, tailoring labels and other health promotion efforts—for instance, healthy food promotional materials, public health campaigns—to the population may lead to a greater effect than generic materials.

One potential explanation for the additional effectiveness of the tailored label—but not the control label featuring the same imagery as the tailored label—relative to the generic label is social norms. Social norms highlight what an individual's peers have chosen, referred to as descriptive norms, or communicating the choices that others believe are *good*, known as injunctive norms. The presentation of the tailored label implies an injunctive social norm valuing eating a healthy diet by stating that the label represented a local effort to promote healthy foods.

While there is a small, but promising lab and field-based literature suggesting that simple materials—for instance, shelf labels or front-of-pack labels—that prompt people to consider health when making food choices may lead to a healthier mix of products purchased, none of these earlier studies has tested a design targeted to high-risk populations against non-targeted materials. Both task-based (i.e., research in which participants are instructed to identify the healthier food) and hypothetical, preference-based (examining stated preferences in the presence/absence of labels) studies have been conducted on healthy food labels in laboratory settings.

The results of our collaborative labeling design efforts show promise, but there are some potential weaknesses of the study. We are primarily interested in the changes in choices among labeling conditions (and compared to the no-label control condition) rather than the absolute number of healthy choices. As is recommended, exposure of participants to label type (i.e., tailored, control, and generic) occurred as it would in a natural choice environment—with only one label type viewed by each participant. Our use of this design for label exposure eliminates participants' ability to consciously compare among labels. Given that two of the three labels were targeted to the local community, exposure to all of the labels would likely have led participants to evaluate each label relative to the other labels, which may have

resulted in choices in the experiment being made according to a different set of criteria than the participant would have used if exposed to a single label.

Future work in this area needs to address weaknesses in this study by evaluating non-hypothetical choices. A good test of the concept would be to compare the effectiveness of generic and tailored, social norms-based labels of healthy food labels in a retail environment. Future work could also investigate potential additional benefits from involving the community in the development of healthy food labels (rather than developing the labels without significant community input—only local members of our team were involved in label design, as was true of the labels used in this research). Research in other fields suggests that being involved in a process can boost intrinsic motivation and commitment to follow through on objectives, and has been found to make a difference in an experimental plate-waste study on vegetable choice and consumption with children.<sup>2</sup> Community involvement in the design of labels may also help establish and strengthen social norms related to healthy eating. Involving the community would also help guarantee that label design and messaging is effective and well aligned with community values prior to implementation, and may help establish individual healthy food eating goals, which can influence behavior.<sup>3</sup>

## References

- <sup>1</sup> Gustafson, C.R., Prate, M.R. 2019. Healthy Food Labels Tailored to a High-Risk, Minority Population More Effectively Promote Healthy Choices than Generic Labels. *Nutrients*, 11(10): <https://doi.org/10.3390/nu11102272>.
- <sup>2</sup> Gustafson, C.R., Abbey, B.M., Heelan, K.A., 2017. Impact of schoolchildren's involvement in the design process on the effectiveness of healthy food promotion materials. *Preventive Medicine Reports*, 6, pp. 246-250.
- <sup>3</sup> Gustafson, C.R., Kent, R. Prate, M.R., 2018. Retail-based healthy food point-of-decision prompts (PDPs) increase healthy food choices in a rural, low-income, minority community. *PLoS one*, 13 (12), p.e0207792.

Christopher R. Gustafson  
Associate Professor of Behavioral Economics and  
Health Disparities  
Department of Agricultural Economics  
University of Nebraska-Lincoln  
[cgustafson6@unl.edu](mailto:cgustafson6@unl.edu)