The Influence of Unit Pricing on Snack Food Choices

Conference Draft

Sean B. Cash
Associate Professor
Friedman School of Nutrition Science and Policy
Tufts University
sean.cash@tufts.edu

Anna R. McAlister
Assistant Professor
Department of Advertising + Public Relations
Michigan State University
annamc@msu.edu

Chen Lou
Research Assistant
Department of Advertising + Public Relations
Michigan State University
louchen1@msu.edu


Copyright 2014 by Sean B. Cash, Anna R. McAlister, and Chen Lou. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.
The Influence of Unit Pricing on Snack Food Choices

Introduction

This study explores the influence of price on consumers’ decisions when purchasing snack foods. Though price has previously been examined for its role in snack food purchases (e.g., French, et al. 1997; French, et al. 2001; Kuchler, Tegene, and Harris 2005), the novel contribution of this research is to examine the specific role of *unit pricing* (UP) in guiding consumer choice. UP refers to the “pricing of goods on the basis of cost per unit of measure” (Sefcik 2013). For example, the retail price of a 12oz can of soda might be 99c and this could be expressed as a unit price of 8.25c per oz.

Since UP was introduced in the U.S. in 1970, the value of providing UP information to consumers has been debated by researchers, retailers, policymakers, consumer advocates, and economists (Russo 1977; Russo, Krieser, and Miyashita 1975). As Russo (1977, p. 193) stated, “The crux of the issue is whether unit pricing’s benefits to consumers can justify its cost to retailers.” Early research showed the cost of maintaining a UP system is less than .1% of sales for a typical chain store (Carman 1972/73). Benefits to consumers include a reduction in expenditure of 1-3%, in addition to needing less time to complete a shopping trip (Russo 1977).

Though early research examined the impact of UP on store costs and consumers’ wallets, the present research focuses on a cost/benefit trade-off of a different kind for consumers. Specifically, we examine the trade off between financial savings and the nutritional content of
consumers’ food choices. There is a well-documented perception among many consumers that healthy foods are more expensive than less healthy alternatives (Cade, Upmeier, Calvert and Greenwood 1999; Carlson and Frâzo 2012; Kettings, Sinclair and Voevodin 2009). This perception is arguably problematic if it leads consumers to purchase energy dense foods. Though various factors other than food choice are known to influence an individual’s weight (e.g., lifestyle, sedentary vs active behaviors), diet is obviously relevant.

In 2012, the obesity rate among U.S. adults was 35.7% (Ogden, Carroll, Kit, and Flegal 2012), a rate that has nearly tripled since the 1970s (NIH 2012). Hence, any modern discussion of the costs and benefits of providing unit prices to aid consumers’ food choices should include discussion in relation to an obesity epidemic that was not apparent in the 1970s when most UP studies were originally conducted. To this end, our research investigates how unit prices create perceptions of value around food items of differing nutritional quality. In any event, whether healthy foods are cheaper or more expensive than less healthy competing products, we anticipate that the presence of a unit price display may influence consumers’ choices, particularly by reinforcing a perception that energy-dense foods provide better value.

**Method**

**Participants**

Participants were 152 college students (106 females, 46 males). About two thirds of the sample were Caucasian (68%), 24% were Asian, and the remaining minority were African American (5%), Hispanic (1%), or Native American (1%). Most participants shopped once a week on
average (34%) or at least once every other week (29%). Some shopped more frequently and only 15 participants reported shopping once per month (11%) or less (5%).

**Design and Materials**

**Variables.** The study involves manipulation of three independent variables: price level (low vs. high), price display (retail price only vs. retail price accompanied by unit price vs. unit price only), and food type (fresh produce, packaged sweet snacks, or packaged salty snacks). There are three dependent variables examined here. First, we assess participants’ likelihood of choosing the healthier of the two foods (as indicated by NuVal® scores) on offer in each trial. Second, we examine the likelihood of participants choosing the raw food over packaged foods on trials where both types are offered. Finally, we examine whether participants chose the more energy dense offering, as measured by calories per ounce, within each choice set. Each of these three dependent variables is measured as the proportion of choice opportunities in which the respondent chose the relevant option in each pair.

The experiment was executed with a between-subjects manipulation so that participants’ attention would not be drawn to the difference in displays of price formats. The materials consisted of a food choice task, as well as basic demographic questions to describe the sample.

**Food choice task.** The food choice task was set up as an online task using images of 16 different foods (6 produce items and 10 packaged foods). Foods were selected on the basis of being familiar products that would be suitable for a fast snack (which is relevant to the vignette described in the task instructions). Each food item was assigned two price points, one low and
one high. These prices were determined by visits to two local grocery stores to find the price of each product at each of the two stores. See Table 1 for a full list of foods and price points.

Table 1. List of foods used as stimuli in the food choice task

<table>
<thead>
<tr>
<th>Produce Items</th>
<th>Low Price</th>
<th>High Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gala Apples</td>
<td>$1.79</td>
<td>$1.99</td>
</tr>
<tr>
<td>Baby Cut Carrots</td>
<td>$2.59</td>
<td>$3.69</td>
</tr>
<tr>
<td>Baby Cucumbers</td>
<td>$2.50</td>
<td>$2.99</td>
</tr>
<tr>
<td>Bananas</td>
<td>$0.35</td>
<td>$0.59</td>
</tr>
<tr>
<td>Pint Blueberries</td>
<td>$2.99</td>
<td>$3.49</td>
</tr>
<tr>
<td>Clementines, seedless</td>
<td>$4.69</td>
<td>$6.99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Packaged Foods</th>
<th>Low Price</th>
<th>High Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate chip Clif bar</td>
<td>$0.99</td>
<td>$1.29</td>
</tr>
<tr>
<td>Oreos cookies</td>
<td>$2.99</td>
<td>$3.49</td>
</tr>
<tr>
<td>Nature Valley crunchy granola bars</td>
<td>$2.49</td>
<td>$2.99</td>
</tr>
<tr>
<td>Think thin brownie crunch bar</td>
<td>$1.29</td>
<td>$1.49</td>
</tr>
<tr>
<td>Meijer potato chips</td>
<td>$1.99</td>
<td>$3.49</td>
</tr>
<tr>
<td>Orville Redenbacher popcorn</td>
<td>$2.49</td>
<td>$2.99</td>
</tr>
<tr>
<td>Frito Lay classic potato chips (regular)</td>
<td>$2.49</td>
<td>$2.99</td>
</tr>
<tr>
<td>Snyder’s mini pretzels</td>
<td>$2.49</td>
<td>$2.99</td>
</tr>
<tr>
<td>Frito Lay sun chips</td>
<td>$2.99</td>
<td>$3.99</td>
</tr>
<tr>
<td>Lay’s classic potato chips (small)</td>
<td>$0.50</td>
<td>$0.75</td>
</tr>
</tbody>
</table>
Trials were set up so that participants saw two food items side by side, with their corresponding price clearly marked on a price tag below. For each of the price conditions (retail price only vs. retail price accompanied by unit price vs. unit price only), participants were presented with one of four blocks of 24 choice sets that represented a balanced, orthogonal design of product pairings drawn from the 16 items listed above. Hence, there were 12 conditions in total. Some pairs included two produce items, some included two packaged foods, and some included one food item of each type. Figure 1 shows sample stimuli from one trial in each of two conditions.

**Figure 1. Screenshot samples of stimuli used in the food choice task**

![Example choice item with retail price only](image1)

![Example choice item with unit price and retail price](image2)

The following instructions were provided for the food choice task:

*Please imagine you are hungry and have gone to a store to buy a snack. You only have a small amount of money with you and so you can only afford to buy ONE item.*

*In the following section you will see several pairs of products. Each food product is displayed with a picture of the food and the price tag directly below the picture. For each pair of food products you will be asked which of the two foods you would choose as your snack.*

*For each pair, please imagine these are the only two foods on offer. The only options you have are*
to choose the first food or the second food or to decide that you would prefer to stay hungry than to buy either food. You cannot buy both foods and there are no other foods on offer.

Demographic questions. The demographic questions included questions about age, gender, and ethnicity. We also asked how frequently participants shop for groceries at physical stores (less than once a month, once a month, every other week, once a week, a few times a week, every day) and what factors are most important during decision making (allergens, brand, convenience, country of origin, health claims, ingredients, nutrition, price, recycled packaging, taste, organic product, locally produced product, or other factors).

Procedure

Following IRB approval, participants were recruited from undergraduate classes at a large university in the U.S. Midwest. Students were supervised as they completed the study. Participants were randomly assigned to one of the 12 conditions. Each condition was administered using Qualtrics survey software to deliver the stimuli and record responses. In each survey, participants first completed the 24 food choice items, then the demographic questions, and finally the question about which food attributes they most value. Participants were not aware of the purpose of the study.

Preliminary Results

The primary hypotheses tested here are that the presence of UP will be associated with a higher rate of individuals choosing (i) energy dense foods, (ii) less healthy foods (as measured by NuVal® scores), and (iii) packaged food items. These hypotheses were tested in a regression framework that modeled each of the three dependent variables as a function of the presence of
conventional retail pricing and UP. The hypothesis that the presence of UP will be associated with a higher rate of choice of more energy-dense food is supported by our data ($p < 0.05$). This is not the case for the selection of packaged foods vs. fresh produce or choice of healthier food options as indicated by NuVal ratings. These findings suggest that the provision of UP is reinforcing the value of energy-dense options, but not necessarily leading to less healthy choices overall. The choice of more energy dense items is also significantly related to respondents’ ranking of price as an important attribute in making food purchase decisions.

**Discussion**

UP is mandated in many jurisdictions to assist consumers. While this policy goal is important, our findings imply that the provision of UP may reinforce a perception that energy-dense foods provide better value. While the intention of UP is to facilitate cost comparisons among similar items, our results suggest that it may also influence the choice of products across food categories in ways that could counter policymakers’, and individuals’, dietary goals. Previous research has noted the inverse relationship between energy density and energy costs of food, and has suggested that this may be an important causal factor in obesity rates (e.g., Drewnoski and Specter 2004). UP may inadvertently contribute to this relationship by effectively making the dietary energy costs of food more salient to consumers.

One of the limitations of this research is the use of a relatively small sample of college students in a lab setting. We are currently collecting data using an intercept method to recruit shoppers in grocery stores. The exact same items are being administered with a more representative sample
of adult shoppers who complete the task on iPads in store in return for a $5 gift card, and these will results will be available soon.

References


Ogden, Cynthia L., Margaret D. Carroll, Brian K. Kit, and Katherine M. Flegal (2012),


