The Effect of Alternative Nutrition Menu Labels on Children’s Meals Purchases and Parent-Child Decision-Making

Ashley Holmes
Elena Serrano
George C. Davis


Ashley Holmes is a Ph.D. candidate and Elena Serrano an Associate Professor in the Department of Human Nutrition, Foods, and Exercise and George C. Davis a Professor in the Department of Agricultural and Applied Economics and Department of Human Nutrition, Foods, and Exercise, all at Virginia Tech, Blacksburg VA 24061.

Copyright © 2011 by Ashley Holmes, Elena Serrano, and George C. Davis. 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.
Abstract

Children are one subpopulation that have seen a threefold increase in obesity over the last two decades but have received no attention in the menu labeling literature. The purpose of this study is to explore the effects of different menu labeling formats on purchases of children’s meals and parent-child decision-making at a family-oriented restaurant. The intervention consists of five children’s menus featuring six bundled, nutritionally diverse, and equally priced combinations that are implemented over about a year. Accompanying each menu is a survey postcard collecting information on the parent-child decision process in choosing the item. This is ongoing research and all data is not in but at this point, the very early evidence points toward child-menu labeling having very little impact on food choices and caloric intake. This result is likely due to low parental involvement in the decision process given that children are the main ones deciding what to eat.
The Effect of Alternative Nutrition Menu Labels on Children’s Meals Purchases and Parent-Child Decision-Making

The simultaneous increase in food expenditures away from home and the increase in obesity over the last two decades have not gone unnoticed by researchers. Several studies have established a positive link between eating food away from home and obesity (e.g., Niemeier, et al. 2006; Binkley, et al. 2000). The main argument for this association is that food away from home is higher in calories, fat, and sodium as documented in several studies (e.g., Guthrie, et al. 2002; Paeratakul, et al. 2003). In response, the recently passed Health Care Reform Act of 2010, requires restaurant establishments with 20 or more locations post “the number of calories contained in the standard menu item, as usually prepared and offered for sale…in a clear and conspicuous manner,” and with “a succinct statement concerning suggested daily caloric intake” (Health Care Reform 2010. Public Law 111-48). Of course the implicit assumption here is that providing nutrition information on menus changes behavior and yet there are only a handful of studies looking at the effectiveness of menu labeling.

Children are one subpopulation that have seen a threefold increase in obesity over the last two decades but have received no attention in the menu labeling literature. There is one study by Tandon, et al (2010) where parents of children 3 to 6 years of age were randomized to receive a sample McDonald’s menu with or without calorie information and to make hypothetical choices. Anyone with children knows that a child’s preferences and a parent’s preferences may be in conflict and it is often the interaction of the parent and child in a restaurant setting that ultimately determines choices. Consequently, we are skeptical that this single tightly controlled hypothetical study sheds much light on the effectiveness of menu labeling for items a child may consume. More research is needed to better understand the parent-child decision process and
effectiveness of alternative nutrition labeling formats in a more realistic environmental context (i.e. real purchases, actual restaurants).

The purpose of this study is to explore the effects of different menu labeling formats on purchases of children’s meals and parent-child decision-making at a family-oriented restaurant. The intervention consists of five children’s menus featuring six bundled, nutritionally diverse, and equally priced combinations: Menu 1 - Control, unmodified menu; Menu 2 - Nutrition labeling with calories and fat; Menu 3 - Nutrition labeling with a “Healthy Choice Symbol;” Menu 4 - Nutrition labeling with a “Nutrition Bargain Price” index; and Menu 5 - Nutrition labeling with a “Nutrition Value Price” index. All of these menu formats can be considered examples of explorations into “choice architecture” (Thaler and Sunstein 2008), whereby the goal is to determine if the choice architecture (i.e., menu labeling format) matters. In addition, accompanying each menu is a survey postcard collecting information on the parent-child decision process in choosing the item and some basic demographic information.

In the next section we give a brief review of the literature and then turn to our experimental setting and the preliminary results. This is ongoing research and we are presently in the middle of these experiments, which are scheduled to be finished in June of 2011. Consequently, at this point what can be reported is very limited.

**Previous Literature of Menu Labeling**

Table 1 list the major characteristics and findings of 16 studies on menu labeling. As shown, these studies have looked at a variety of restaurants in a variety of locations using a variety of methods. Regardless of these differences, 12 of the 16 studies find that menu labeling appeared to improve choices or caloric intake. However, these studies do not
distinguish adults from children. Only one study has been published that examines the effect of nutrition labeling on purchases for children and in a controlled, experimental study. Parents of children 3 to 6 years of age were randomized to receive a McDonald’s menu with or without nutrition information (Tandon, et al. 2010). Parents who received nutrition labeling on menus averaged 102 fewer calories for their children, suggesting that labeled menus may contribute to healthier purchases at restaurants for children if their parents make the decision. Needless to say, more research is warranted to examine the impact in ‘real-world’ settings where children have decision power.

Current Intervention Protocol

We are currently working with a local country club (Blacksburg Country Club) that has a paid membership of about 600 families. As part of the membership, the families have access to a family dining facility for a fixed fee per month. The members are required to purchase a minimum amount per month ($30) from the restaurant or incur an automatic charge of $30. An advantage of this setting and population, relative to a commercial facility and other studies, is we can track purchases by family over time and we have access to some important demographic information.

The manager of the club agreed to allow us to run an experiment consisting of five children’s menus featuring six bundled, nutritionally diverse, and equally priced combinations. Bundled items, or “combos” were created based on previous sales records and nutritional diversity. The 6 combos are: Combo #1 - Chicken Tenders and Fries; Combo #2 - Mini Pizza and Fruit; Combo #3 – Grilled Cheese and Chips; Combo #4 – Spaghetti and Fruit; Combo #5 – Hotdog and Applesauce; and Combo #6 – Corndog Nuggets and Celery/carrots.
We have created 5 different menu formats for the experiment (See Figure 1). Each menu is typical of a child’s menu found at a full service restaurant for child’s menus, being a single page (8.5” x 13.5”) with available food selections and games in the non-food space. The price of each combo is the same for each combo and remains the same throughout the experiment. The 5 menu formats we propose are as follows:

Control (C) - A reformatted kids menu to serve as the control. This menu consist of the 6 combos listing nothing but their brief description and the price, along with games.

Nutritional Information (I) – Having done a complete nutritional analysis in the process of creating the 6 combos, the total calories and total fat content is given on the menu for each of the 6 combos.

Healthy Symbol (S) – A ‘healthy’ symbol is assigned to each combo satisfying a minimum nutrient score.

Nutrition Bargain Price (B) – In addition to the regular price, a “nutrition bargain price” is also reported for each combo. The nutrition bargain price is defined on the menu as the price ($4.00) ÷ nutrition score. The lower the nutrition bargain price the better the nutrition bargain you get for your $4.00.

Nutrition Adjusted Value (V) – In addition to the regular price, a “nutrition adjusted value” is also reported for each combo. The nutrition adjusted value is defined on the menu as the price ($4.00) × nutrition score. The higher the nutrition adjusted value the more nutrition you get for your $4.00.
Why these four treatment formats? The nutrition information menu (I) reflects the legislation indicating calories would be posted on menus and we believe fat is important as well. The healthy symbol menu (S) is designed to determine if a simple symbol is more effective than posting grams of calories. The idea here is motivated by reducing the ‘computational processing load’ in making the choice (Payne, Bettman, and Johnson 1993). That is, implicit in any posting of calories is an assumption that individuals have the relevant frame of reference, can access that reference, and then evaluate the amount of calories relative to that reference. The symbol reduces this computational cost by effectively doing all these computations for the consumer. Consequently we may expect a simple symbol to be more effective, especially for children, than calorie posting.

The last two menus (B and V) are based the idea of immediacy or present bias as they utilize a rather simple design mechanism, or ‘nudge’ in the language of Thaler and Sunstein (2008), to combat the well know immediacy problem of present bias (e.g., Halvey 2008; Keren and Roelofsma 1995; O’Donoghue and Rabin 2000; Frederick, Loewenstein and O’Donoghue 2002) by presenting a dollar heath value of the chosen item. We attempt to exploit these insights by making the nutrition information more immediate. Specifically, in paying for a food item, the consumer experiences an immediate effect of the purchase – the amount of money given up. Alternatively, the nutrition information has no immediate impact, other than the projection of the uncertain health benefits into the future. However, the nutrition information is providing a signal as to the quality of the food and a common procedure in economics is to reflect the value of quality immediately using a quality adjusted price (e.g., Berndt chpt. 4 1990). A quality adjusted price effectively adjust prices of the different items for different levels of quality. In the present context we first utilize the online software at NutritionData.com to obtain the “completeness
score” for each combo. The completeness score is based on the nutrient balance of 23 essential nutrients and ranges from 0 to 100: a higher score the better. This nutrient profile score is then used to either deflake the price (B) or inflate the price (V). We consider both a deflated price, indicating the ‘real cost’ in terms of nutrients is actually less than paid, and an inflated price, indicating you are paying less than it is worth in terms of nutrition, because we expect the alternative formats may have different impacts based on the behavioral economics literature related to loss aversion and framing effects.

Each menu is accompanied by a patron survey card for the parent to complete (Figure 2). This brief survey card identifies the patron’s member number, age of each child, gender of each child, and which combo was ordered for each child. It also asks the parent to choose the most important reason for choosing the meal from the list: (1) Children likes it and will eat it; (2) Nutritional value; (3) Cost/value; and (4) Other. Finally, and most important, at the bottom of the survey card are five pie charts indicating the decision split on the choices between the parent and child: (1) Parent only; (2) 75% Parent, 25% Child (3) 50% Parent, 50% Child; (4) 25% Parent, 75% Child; and (5) Child only. We hypothesize that the more decision power the child has, the less impact more sophisticated menu labeling (I, B, and V) will have on choices. In addition, we would expect parents to become more engaged in decisions as information became more sophisticated.

**Preliminary Results and Some Future Questions to be Answered**

Each menu is run for two months and we are presently collecting data on the Nutrition bargain price menu (B). Table 1 shows the main results we have at this time. As seen, the Mean number of calories per item purchased was 623 kcal for the control menu (C), 616 kcal for the nutrition
information menu (I), and 642 for the healthy symbol menu (S). Note in the bottom part of table 1 the pattern of decision making. Children are making the decision alone in 52% of the transactions in the control menu (C), 46% in the nutrition information menu (I), and 63% in the healthy symbol (S). These numbers imply that parents get more involved when the nutrition information is displayed quantitatively versus in a symbol form and note the calories reflect this relationship: calories are lower when parents are more involved in decision making.

We will be testing many hypotheses in the future once all the data is in hand: does the distribution of food choices move toward more healthy choices when nutrition information is available? Are there significant differences in effects on choices by information format (i.e., calories/fat quantity, healthy symbol, and the nutrition index adjusted price)? Do parents become more engaged over time with different menu formats? Is one type of nutrition adjusted price more effective than another at reducing calories?

Conclusions

This paper reports very preliminary results from experiments with child menu labeling in a family style restaurant setting. The goal of the research is to consider menu-choice architecture and its affect on food choices. In addition, interest centers on the degree to which parents and children distribute the choice making process. At this point, the very early evidence points toward child-menu labeling having very little impact on food choices and this is likely due to the fact that children are the main ones deciding what to eat.
References


<table>
<thead>
<tr>
<th>Type of Restaurant</th>
<th>City</th>
<th>Labeling</th>
<th>Target Audience</th>
<th>Participants</th>
<th>Measured Outcomes</th>
<th>Study Location &amp; Type</th>
<th>Effects</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family-style</td>
<td>Stanford, CA</td>
<td>Symbol (low fat and low in cholesterol)</td>
<td>Families</td>
<td>526 (75 – 90%) adults</td>
<td>Sales data</td>
<td>At restaurants (6 weeks? Not clear)</td>
<td>+ for 2 restaurants ↔ for 2 (NS)</td>
<td>Albright, Flora, Fortmann, Health Ed Q 1990</td>
</tr>
</tbody>
</table>
| Fast Food (Burger) | Minneapolis St. Paul, MN | 4 different labels with calories and price:  
1) Control  
2) Calorie & value labeling;  
3) Calorie and no value labeling;  
4) No calorie and no value pricing | Adolescents and Adults (regulars) | 594 (98.3%) adults | Calories (Ordered/Consumed) | In laboratory Randomized controlled 2 X 2 factorial experiment One eating occasion | ↔ calories across control vs trt | Harnack, French, Story, Jeffery, etc. IJBNA 2008 |
| Fast Food (Burger, Chicken) | NYC, Newark | Calories                                                                  | Adults (18 & older)  mean age 38       | 1, 156 adults         | Calories, Saturated Fat, Sodium, Sugar (Purchased - receipts) | At restaurants 2 weeks before nutrition labeling, then 4 weeks following for 2 weeks Lunch or dinner hours, 3 d/week | ↔ (slight increase in calories, decrease in sat fat, increase in sodium and decrease in sugars) | Eibel, Kersh, & coll. Health Aff 2009 |
| Fast food (Pastry/Deli) | New Haven, CT | 1) No calorie labels  
2) Menu with calorie labels  
3) Menu with calorie labels and diet recommendations | Adults                               | 303 (52.8%) adults | Calories (Ordered, consumed, in evening after study dinner) | In laboratory Randomized design, controlled setting One eating occasion | + for calories ordered  
+ consumed (combined calorie and diet recomm versus no calorie labeling)  
<table>
<thead>
<tr>
<th>Workplace</th>
<th>United Kingdom</th>
<th>Computerized Display or Order Screen: Calories, Sat Fat, sugars, &amp; fiber</th>
<th>Employees of A:Oil Company &amp; B: Hospital</th>
<th>A: 387 B: 307</th>
<th>Food Choice</th>
<th>+ 16% patrons made 2nd choice that was healthier (reduced sat fat and added sugars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Food</td>
<td>New York City</td>
<td>Various chains provide different info</td>
<td>All types</td>
<td>7138 Patrons 275 Restaurants 11 Chains</td>
<td>Calories RCT in primary care pediatric clinic One eating occasion</td>
<td>+ : Calories those who saw nutrition info ordered 52 kcal less than those who didn’t see</td>
</tr>
<tr>
<td>Workplace cafeteria</td>
<td>Unknown</td>
<td>Calories/Price Change</td>
<td>Female employees of varying weight status</td>
<td>450 Women</td>
<td>Sales/Calories At restaurant At lunch</td>
<td>+ : decreased calories across all groups</td>
</tr>
<tr>
<td>Fast food (Burger)</td>
<td>Seattle, WA</td>
<td>Calories</td>
<td>Parents of children (3-6)</td>
<td>99 (82%) adults</td>
<td>Calories RCT, 11 chains. Significant data only for Subway (prominent posting of nutrition info)</td>
<td>+ 102 calories ordered for child</td>
</tr>
<tr>
<td>Full-service</td>
<td>Tacoma, WA</td>
<td>Calories, fat, sodium, and carbohydrates (750/21/2300/45)</td>
<td>All types</td>
<td>16,000 entrees purchased 46 to 64 years old</td>
<td>Sales/Calories At self-selected restaurants 30 days before and after labeling</td>
<td>+ calories, fat, sodium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pulos, Leng, Am J Public Health 2010</td>
</tr>
<tr>
<td>Fast Food (Taco)</td>
<td>King County, WA</td>
<td>Calories</td>
<td>All types (Restaurants *with drive-thru)</td>
<td>No data presented</td>
<td>Sales/Calories At restaurant Over 2 years</td>
<td>↔ food and drink calories</td>
</tr>
<tr>
<td>Type of Restaurant</td>
<td>City</td>
<td>Labeling</td>
<td>Target Audience</td>
<td>Participants</td>
<td>Measured Outcomes</td>
<td>Study Location &amp; Type</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
<td>---------------------------------</td>
<td>---------------------</td>
<td>--------------</td>
<td>-------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>College Cafeteria</td>
<td>United Kingdom</td>
<td>Calories/Fat</td>
<td>College Age</td>
<td>65</td>
<td>Calories/other nutrients</td>
<td>college Cafeteria (1 week baseline, 1 week with nutrition info)</td>
</tr>
<tr>
<td>Dorm Cafeteria</td>
<td>Unknown</td>
<td>Calories, fat calories percentage, cholesterol</td>
<td>College students</td>
<td></td>
<td>Proportion of low-cholesterol, low-fat, or low-calorie entrees selected at each meal</td>
<td>Multiple-baseline, quasi-experimental</td>
</tr>
<tr>
<td>College Cafeteria</td>
<td>Texas</td>
<td>Calorie Posting Green triangle symbol for low-fat, low-calorie options Tokens</td>
<td>College Students</td>
<td>ages 18 - 23 50% female</td>
<td>Percentage of customers who chose at least one food in a particular food group during a phase</td>
<td>Cafeteria</td>
</tr>
<tr>
<td>Coffee Shop Starbucks</td>
<td>New York City</td>
<td>Calories</td>
<td>All types</td>
<td></td>
<td>Calories/Sales</td>
<td>Track all transactions from Jan 08-Feb 09 (menu posting mandated in April) 2 control locations (Boston &amp; Philadelphia)</td>
</tr>
<tr>
<td>Type of Restaurant</td>
<td>City</td>
<td>Labeling</td>
<td>Target Audience</td>
<td>Participants</td>
<td>Measured Outcomes</td>
<td>Study Location &amp; Type</td>
</tr>
<tr>
<td>-------------------</td>
<td>------</td>
<td>----------</td>
<td>----------------</td>
<td>-------------</td>
<td>------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Department Store Restaurant (Target)</td>
<td>Minnesota</td>
<td>&quot;Good For You&quot; Symbol (Green Check)</td>
<td>All Types</td>
<td>Patrons of Target</td>
<td>Sales</td>
<td>Good for You promotion in 7 Target store- 4 mo baseline 9 mo intervention</td>
</tr>
<tr>
<td>Family-owned cafeteria</td>
<td>St. Louis, Missouri</td>
<td>Labeling of low-fat featured that day entrée’s on poster</td>
<td>All Types</td>
<td>Patrons Total Observations: 3,264</td>
<td>Food Choices-Made by observation Over 24 weeks</td>
<td>Observational times series A-B-A-B</td>
</tr>
</tbody>
</table>
Figure 1. Alternative Menu Formats
BCC CHEF FEATURED COMBOS

Want to know what's Healthy?

or make your own meal

Main Dish
- Grilled Cheese
- Chicken Tenders
- Cheeseburger
- Mini Pizza
- Mini Hamburger
- Peanut Butter & Jelly
- Spaghetti & Mushrooms
- Spaghetti & Butter

Sides
- Applesauce
- French Fries
- Carrots & Celery
- Pear Slices
- Celery & Peanut Butter
- Peanut Chips
- French Fries

Drinks
- Water
- Tea
- Lemonade
- Gatorade
- Soda

NBP: $3.40
Combo #1: Chicken Tenders & French Fries $4.00
NBP: $2.00
Combo #4: Spaghetti & Fruit $4.00

NBP: $2.50
Combo #2: Mini Pizza & Fruit $4.00
NBP: $4.00
Combo #5: Hamburger & Apple Sauce $4.00

NBP: $3.20
Combo #3: Grilled Cheese & Peanut Chips $4.00
NBP: $3.40
Combo #6: Country Cutlet & Carrot $4.00

Nutrition Bargain Price (NBP) is equal to the price ($4.00) + Nutrition Score.

The lower the NBP, the more you get for your $4.00!

or make your own meal

Main Dish
- Grilled Cheese
- Chicken Tenders
- Cheeseburger
- Mini Pizza
- Mini Hamburger
- Peanut Butter & Jelly
- Spaghetti & Mushrooms
- Spaghetti & Butter

Sides
- Applesauce
- French Fries
- Carrots & Celery
- Pear Slices
- Celery & Peanut Butter
- Peanut Chips
- French Fries

Drinks
- Water
- Tea
- Lemonade
- Gatorade
- Soda

More fun and games on back!
Nutrition Adjusted Value is price ($4.00) × nutrition score. The higher the number the more nutrition you get for your $4.00.

...or make your own meal

Main
- Grilled Cheese
- Chicken Tenders
- Cheeseburger
- Corn dog Nuggets
- Mini Pizza
- Hotdog
- Spaghetti & Meat Loaf
- Spaghetti & Marinara

Sides
- Applesauce
- Fries
- Carrots & Celery
- Fruit Salad
- Celery & Peanut Butter
- Potato Chips
- French Fries

Drinks
- Water
- Tea
- Lemonade
- Gatorade
- Soda
Figure 2. Survey Card Attached to Each Menu

Blacksburg Country Club: Kids' Menu Survey

Date: __ / __ / _______  Member #: ___________  Server Name: _________________________

Please take a few minutes to complete this short questionnaire to give us feedback on the new children's menu. Thank you!

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Gender (Circle)</th>
<th>Which Combo Number Ordered (1-6)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>M F</td>
<td>1 2 3 4 5 6 Other</td>
<td></td>
</tr>
<tr>
<td>Child 2</td>
<td>M F</td>
<td>1 2 3 4 5 6 Other</td>
<td></td>
</tr>
<tr>
<td>Child 3</td>
<td>M F</td>
<td>1 2 3 4 5 6 Other</td>
<td></td>
</tr>
</tbody>
</table>

What was the biggest reason for choosing the meal(s)? Please check just one response.

☐ Preference – Child(ren) likes it and will eat it  ☐ Cost/value – What you get for the price
☐ Nutritional value – Calories and fat in meal  ☐ Other (please specify): _________________________

How was the order decision split between you and your child(ren)?
Please circle one pie graph that represents the best response to this question.

- Parent Only
- 75% Parent, 25% Child
- 50% Parent, 50% Child
- 25% Parent, 75% Child
- Child Only

Please leave any additional comments on the reverse side.
Table 1. Calorie And Parental Decision Results

Results

Total Calories by Menu Format

<table>
<thead>
<tr>
<th></th>
<th>Total Calories</th>
<th># of Items Purchased</th>
<th>Mean calories per # of Items Purchased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>87,880 kcal</td>
<td>141</td>
<td>623 kcal</td>
</tr>
<tr>
<td>Nutrition</td>
<td>43,155 kcal</td>
<td>70</td>
<td>616 kcal</td>
</tr>
<tr>
<td>Symbol</td>
<td>68,686 kcal</td>
<td>106</td>
<td>642 kcal</td>
</tr>
</tbody>
</table>

Results

Decision-Making by Menu Format

<table>
<thead>
<tr>
<th></th>
<th>Parent Only</th>
<th>75 P/25 C</th>
<th>50/50</th>
<th>25 P/75 C</th>
<th>Child Only</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3 (3.19%)</td>
<td>4 (4.25%)</td>
<td>27 (28.7%)</td>
<td>11 (11.7%)</td>
<td>49 (52.12%)</td>
<td>94</td>
</tr>
<tr>
<td>Nutrition</td>
<td>1 (1.63%)</td>
<td>2 (3.27%)</td>
<td>7 (11.47%)</td>
<td>23 (37.7%)</td>
<td>28 (45.9%)</td>
<td>61</td>
</tr>
<tr>
<td>Symbol</td>
<td>2 (5%)</td>
<td>3 (7.5%)</td>
<td>1 (2.5%)</td>
<td>9 (22.5%)</td>
<td>25 (62.5%)</td>
<td>40</td>
</tr>
</tbody>
</table>

*Based on unpaired t-tests, adult 25: child 75 increased significantly (p<.05) between Control and Nutrition menus