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

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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 deflate 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 your 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.

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Table 1. Summary Of Menu Labeling Studies.

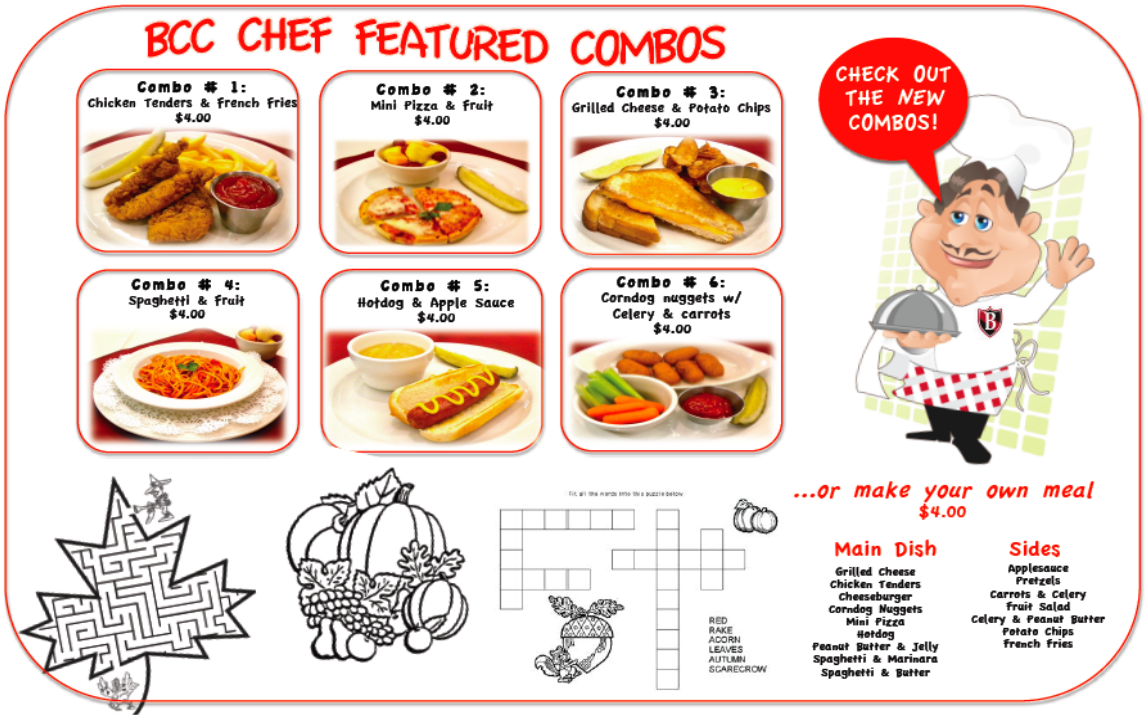
Type of Restaurant	City	Labeling	Target Audience	Participants	Measured Outcomes	Study Location & Type	Effects (+= improved outcomes; - = decreased outcomes; ↔ = equivocal)	Reference
Family-style	Stanford, CA	Symbol (low fat and low in cholesterol)	Families	526 (75 – 90%) adults	Sales data	At restaurants (6 weeks? Not clear)	+ for 2 restaurants ↔ for 2 (NS)	Albright, Flora, Fortmann, Health Ed Q 1990
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. IJBNPA 2008
Fast Food (Burger, Chicken)	NYC, Newark	Calories	Adults (18 & older)	1, 156 adults mean age 38	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) + total calories consumed during and after meal for calorie labels plus diet recomm ONLY	Roberto, Larsen, et al, Brownell, Am J Pub Health, 2010

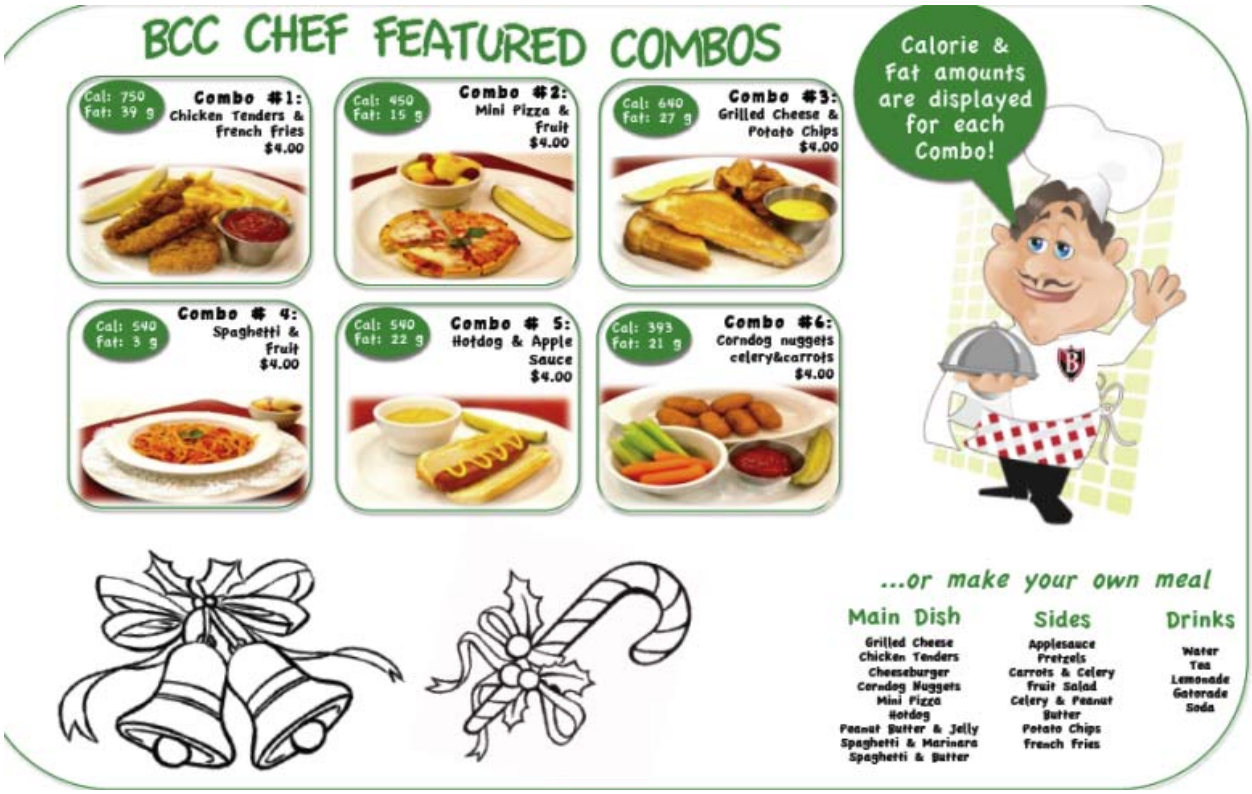
Workplace	United Kingdom	Computerized Display or Order Screen: Calories, Sat Fat, sugars, & fiber	Employees of A:Oil Company & B: Hospital	A: 387 B: 307	Food Choice		+ 16% patrons made 2nd choice that was healthier (reduced sat fat and added sugars)	Balfour et al. J of Human Nutrition & Dietetics, 1996
Fast Food	New York City	Various chains provide different info	All types	7138 Patrons 275 Restaurants 11 Chains	Calories	RCT, 11 chains. Significant data only for Subway (prominent posting of nutrition info	+ :Calories those who saw nutrition info ordered 52 kcal less than those who didn't see	Basset, et al. Am J Public Health 2008
Workplace cafeteria	Unknown	Calories/Price Change	Female employees of varying weight status	450 Women	Sales/ Calories	At restaurant At lunch	+: decreased calories across all groups	Milch, et al. Perpetual & Motor Skills 1974
Fast food (Burger)	Seattle,WA	Calories	Parents of children (3-6)	99 (82%) adults	Calories	RCT in primary care pediatric clinic One eating occasion	+ 102 calories ordered for child	Tandon, et al.Pediatrics 2010
Full-service	Tacoma, WA	Calories, fat, sodium, and carbohydrates (750/21/2300/45)	All types	16,000 entrees purchased 46 to 64 years old	Sales/ Calories	At self-selected restaurants 30 days before and after labeling	+ calories, fat, sodium	Pulos, Leng, Am J Public Health 2010
Fast Food (Taco)	King County, WA	Calories	All types (Restaurants *with drive-thru)	No data presented	Sales/ Calories	At restaurant Over 2 years	↔ food and drink calories	Finkelstein, et al. Am J Prev Med 2011

Type of Restaurant	City	Labeling	Target Audience	Participants	Measured Outcomes	Study Location & Type	Effects (+= improved outcomes; - = decreased outcomes; ↔ = equivocal)	Reference
College Cafeteria	United Kingdom	Calories/Fat	College Age	65	Calories/other nutrients	college Cafeteria (1 week baseline, 1 week with nutrition info)	-: Increased kcal, fat, carb, and decrease protein	Aron et al. Nutrition research 1995
Dorm Cafeteria	Unknown	Calories, fat calories percentage, cholesterol	College students	Dorm Café 1 : 175-200 1st year students Dorm Café 2: 450-500 Students all years	Proportion of low-cholesterol, low-fat, or low- calorie entrees selected at each meal	Multiple-baseline, quasi-experimental	+: Dorm Café 1: Proportion of low cholesterol, low-fat, low cal higher during intervention than baseline Dorm Café 2: No differences	Davis-Chervin et al, J of Nutrition Education 1985
College Cafeteria	Texas	Calorie Posting Green triangle symbol for low-fat, low-calorie options Tokens	College Students	ages 18 - 23 50% female	Percentage of customers who chose at least one food in a particular food group during a phase	Cafeteria	+: Calories reduced red meat and CHO consumption; Tokens increased fruit & veg/low-fat dairy	Cinciripini, Behavior Modification 1984
Coffee Shop Starbucks	New York City	Calories	All types	All patrons of Starbucks Starbucks Cardholders	Calories/ SALES	Track all transactions from jan 08-feb 09 (menu posting mandated in april) 2 control locations (Boston & Philidelphia)	+: 6 % decrease in calories consumed (food related not beverage) Sales not adversely affected	Bollinger, 2011

Type of Restaurant	City	Labeling	Target Audience	Participants	Measured Outcomes	Study Location & Type	Effects (+= improved outcomes; - = decreased outcomes; ↔ = equivocal)	Reference
Department Store Restaurant (Target)	Minnesota	"Good For You" Symbol (Green Check)	All Types	Patrons of Target	Sales	Good for You promotion in 7 Target store- 4 mo baseline 9 mo intervention	+: Items with Good for you symbol Before labeling as low-fat sandwiches comprised 18.5% of total sandwich sales to 21.7%	Elridge et al Society for Nutrition Edu 1997
Family-owned cafeteria	St. Louis, Missouri	Labeling of low-fat featured that day entrée's on poster	All Types	Patrons Total Observations: 3,264	Food Choices- Made by observation Over 24 weeks	Observational times series A-B-A-B	+: The proportion of LowFat entrees increased significantly when the intervention was implemented, from Baseline 1 to Intervention 1 & from Baseline 2 to Intervention 2,	Mayer J of Applied Behavioral Analysis 1986

Figure 1. Alternative Menu Formats





BCC CHEF FEATURED COMBOS

Combo # 1:
Chicken Tenders & French Fries
$4.00

Combo # 2:
Mini Pizza & Fruit
$4.00

Combo # 3:
Grilled Cheese & Potato Chips
$4.00

Combo # 4:
Spaghetti & Fruit
$4.00

Combo # 5:
Hotdog & Apple Sauce
$4.00

Combo # 6:
Corndog nugget
Celery & carrots
$4.00

Want to know what's Healthy?

...or make your own meal

Main Dish
Grilled Cheese
Chicken Tenders
Cheeseburger
Corndog Nuggets
Mini Pizza
Hotdog
Peanut Butter & Jelly
Spaghetti & Marinara
Spaghetti & Butter

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

Drinks
Water
Tea
Lemonade
Gatorade
Soda

BCC CHEF FEATURED COMBOS

All BCC Combos are $4.00 but check out Nutrition Bargain Price

NBP: $3.40
Combo #1:
Chicken Tenders & French Fries
$4.00

NBP: $2.50
Combo #2:
Mini Pizza & Fruit
$4.00

NBP: $3.20
Combo # 3:
Grilled Cheese & Potato Chips

NBP: $2.00
Combo # 4:
Spaghetti & Fruit
$4.00

NBP: $4.00
Combo # 5:
Hotdog & Apple Sauce
$4.00

NBP: $3.40
Combo # 6:
Corndog
Celery/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
Corndog Nuggets
Mini Pizza
Hotdog
Peanut Butter & Jelly
Spaghetti & Marinara
Spaghetti & Butter

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

Drinks
Water
Tea
Lemonade
Gatorade
Soda

More fun and games on back!

BCC CHEF FEATURED COMBOS
All $4.00

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
Corndog Nuggets
Mini Pizza
Hotdog
Peanut Butter & Jelly
Spaghetti & Marinara

Sides
Applesauce
Pretzels
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!

	Age (years)	Gender (Circle)	Which Combo Number Ordered (1-6) Circle *other*, if a combo was not chosen
Child 1		M F	1 2 3 4 5 6 Other
Child 2		M F	1 2 3 4 5 6 Other
Child 3		M F	1 2 3 4 5 6 Other

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

	Total Calories	# of Items Purchased	Mean calories per # of Items Purchased
Control	87,880 kcal	141	623 kcal
Nutrition	43,155 kcal	70	616 kcal
Symbol	68,686 kcal	106	642 kcal

Results

Decision-Making by Menu Format

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

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