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# "Go-Slow-Whoa!": Will Nutritional Information Influence Adolescent Food Choices and Lead to a Healthier Generation? 

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Selected Paper prepared for presentation at the Agricultural \& Applied Economics Association's 2015 AAEA \& WAEA Joint Annual Meeting, San Francisco, California, July 26-28, 2015

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#### Abstract

The prevalence of obesity in adolescents and children, in the United States, was 16.9\% from 2009 to 2010 (Ogden, et al. 2012), and nearly a third of children between the ages of 6 and 19 are considered obese. It is due to these alarming figures, children are a major focus of public health efforts. Providing nutritional information on the healthfulness of entrées served in the school lunchroom could positively impact a student's daily dietary choices. Pre-ordering entrée systems have previously shown to have a positive (more healthful) impact on entrée selection (Hanks, Just, and Wansink 2013). The current study builds on the previous literature by including Go-Slow-Whoa nutritional information along with the entrée choice set to determine if the inclusion of nutritional labels can lead to more healthful pre-ordered entrée choices. Results find that older students are more likely to alter their choice to a healthier entrée when nutritional labels are present versus their younger cohort.


Keywords: nutrition labeling, behavioral economics, adolescents, entrée pre-ordering

## Introduction

As the United States continues to battle obesity and the associated health and welfare implications, adolescent nutritional decisions are of great importance. Nearly a third of children between the ages of 6 and 19 are considered obese. Furthermore, the prevalence of obesity in adolescents and children, in the United States, was $16.9 \%$ from 2009 to 2010 (Ogden, et al. 2012).It is due to these alarming figures, children are a major focus of public health efforts, and improving the nutrition quality of the American diet has become a national health priority (Burton, et al. 2006). Although childhood rates are no greater than adult rates, it is generally believed that it is much easier to prevent obesity than to combat it once it takes hold (Just and Wansink 2009 ), as obese children may be at risk for both short and long term health consequences (Barnes 2010). Many notions about what is good or acceptable to eat are determined in childhood, and therefore federal food assistance programs which provide services to children are increasingly examined (Just, Mancino, and Wansink 2007). In 2005, over half of all nutrition assistance program participants were children (Barrett 2006; Oliveiria 2006), and on average over 29 million children participated in the National School Lunch Program each day (USDA, Food and Nutrition Service 2006). Improving the diet for program participants is imperative as it is at this time when a child's dietary preferences are being defined (Just, Mancino, and Wansink 2007), and people tend to continue to form their diets based on what foods are familiar (Smith 2004; Smith and Tasnadi 2007).

School administrators are feeling this pressure not only from the government, but also from parents (Just and Wansink 2009), as food choice sets in school lunchrooms may contribute to the prevalence of adolescence obesity. The school nutrition standards have changed to require both fruits and vegetables be offered daily, eliminating milk that is greater than one percent fat
content, and putting constraints on contents of the foods offered (such as fat, sodium and calorie content) (Hanks, Just, and Wansink 2012). School districts are challenged to offer the healthier food options while facing decreased budgets. This brings about numerous challenges as healthier options are often times more costly and not highly sought after by students, thus potentially leading to a decrease in the number of students participating in school lunch lines.

In an effort to provide insight and relief, a new research area focusing on behavioral economics has uncovered lunchroom changes which could lead to a healthier generation (Just and Wansink 2010). Previous work in this area has discovered that minor presentation and logistical changes in the lunchroom can lead to an increase in healthful choices of adolescents. Drawing attention to more healthful foods-by making them more accessible or displaying them more prominently in school cafeterias has shown to increase the likelihood of a student to choose more healthful menu options (Just, Mancino, and Wansink 2007). The school cafeteria is a smart place to implement healthy food options as $70 \%$ of kindergarten through twelfth grade children eat a school lunch approximately three times a week (Hanks et al. 2012).

In 2009, Just and Wansink examined numerous school lunchrooms in the United States. In Minnesota, the simple movement of fruit to an area in close proximity to the cash register increased fruit sales and consumption while reducing the sales of unhealthy snacks which had previously been located near the cash registers. The visibility of healthy foods is imperative as seen by a school in Corning, New York. The salad bar was moved from the side of the cafeteria to the middle of the cafeteria (where all students would walk by it). This small adjustment increased salad sales and profitability. Not only is visibility and location imperative, but also allowing students to choose is important. During a summer 4-H program, Cornell gave junior high participants the option to choose between two vegetables. Once given the choice, vegetable
consumption increased (Just and Wansink 2009). It is through these research projects, behavioral triggers are being identified and an increase in consumption of healthful foods is the result.

Although the bulk of the research has been conducted inside the lunchroom, previous research by Hanks, Just, and Wansink in 2013, focused on electronically pre-ordering entrées rather than having students order their entrée in the lunch line. Their research found having students pre-order their entrée lead to $92 \%$ of students taking a healthier choice. Further, they also determined pre-ordering led to a $7.3 \%$ decrease in unhealthy entrée choices. We build on this literature in a variety of ways. We are unaware of research examining the use of an entrée preorder system that is coupled with nutritional information inside the classroom. Our primary research objective is to determine if coupling nutritional information will positively influence pre-order entrée choices of elementary children. Secondary objectives include assessment of alternative low-cost pre-ordering systems for elementary children. Although an electronic system would bring multiple efficiencies and benefits, it may not be economically feasible for school districts nationwide. We also determine if time away from nutritional information seminar leads to less healthy decisions made. The impact and influence of nutritional information can fade with time, much like New Year resolutions tend to fade as the months pass. We determine if positive healthful choices were made more frequently right after the nutritional seminar followed by students fading back to previous choices as the school year progressed.

The next section presents an explanation of the experimental design. This section is followed by sections describing the data, results, and discussion.

## Experimental Design

Crestview Elementary is one of eight elementary schools in Canyon Independent School District (CISD), but one of only two located in the city of Canyon, Texas (population 13,857). Canyon is comprised of primarily White not Hispanic residents at $77.1 \%$ followed by Hispanic residents at $17.3 \%$, and not Hispanic Black alone at 2.3\% (Texas Association of Counties 2014).

Crestview houses kindergarten through 4th grade and as a part of the CISD school lunch program, offer four entrée choices to students each day. The CISD school lunch program participates in the CATCH (Coordinated Approach to Child Health) Go-Slow-Whoa (GSW) program, which, in essence, communicates nutritional information of the entrée selections through a green-yellow-red labeling system. "Go" entrées are labeled green and are foods that are good to eat anytime, "Slow" entrées are labeled yellow, you can eat them, but in smaller portions, and lastly, "Whoa" entrées (labeled red) are once-in-a-while foods as they contain higher levels of calories from fat grams. The monthly schedule of entrée choices and their associated GSW labels are sent home to parents and made available online (see figure 1).

Each day, students are asked to pre-order their entrée choice in the morning hours to minimize waste in the lunchroom. Four alternative pre-order systems were introduced in the fall of 2014 . Over the 14 week period, 25 classrooms were examined (five classrooms per grade level). Each grade level was assigned to one of four low-cost pre-order treatments. During the initial nine weeks, daily data was collected including individual student identifiers, pre-order entrée choice, and actual lunchroom choice. Following the nutritional informational seminar explaining the GSW labels, color modifications were made to each treatment and individual data (student identifiers, pre-order entrée choice, and actual lunchroom choice) was collected in the
subsequent five weeks. Below is a brief descriptive explanation of the four pre-order treatments and a discussion of the nutritional labeling modifications implemented.

Treatment 1, Clip Treatment ( $C$ ): This treatment was implemented in both kindergarten and third grade. Each classroom was equipped with individually identified clothespins (student's first name). The four entrée choices (i.e. cheese pizza, hot dog on a bun, buffalo chicken salad) along with the 'lunchbox' choice were listed vertically on plain white poster board. Students were asked to move their clothespin to their entrée selection.

Label Modification: For the last five weeks, each entree was color coded to match the GSW color (green, yellow, or red). As before, students placed their clothespins on the lunch entrée during the morning hours. Figure 2 shows the clip treatment with and without the GSW labeling.

Treatment 2, Magnetic Board (MB): The magnetic board treatment is representative of the midcost method. Utilizing a magnetic white board with daily choices listed across the top (i.e. cheese pizza, hot dog on a bun, buffalo chicken salad, lunchbox), and individual magnets, this treatment is user friendly to younger age groups, and therefore was implemented in first grade. Each student individually moved their magnet and placed it under their entrée choice for the day. During the first nine weeks, all of the students in first grade were given a blue magnet to place next to their name for their entré selection.

Label Modification: During the second phase of the study, the GSW nutritional information was applied to the magnetic whiteboards, and each student was given a red, yellow and green magnet. Each entrée choice is color coded, and students individually moved their magnets (of corresponding color) to the entrée chosen. For example, if a yellow entrée is selected, the student
moved their yellow magnet to the yellow entrée box besides student's name. Students who bring their lunch continued to use the blue magnet to designate they had a lunchbox (figure 3).

Treatment 3, Box System (B): Included for two reasons, the box system is not only a low cost pre-order method but also a treatment which enables complete anonymity in entrée selection. Assigned to second grade, every classroom was equipped with five small black voting boxes, and each student is given a token with their name on it. The entree choices were listed on the top of each box for the day. Each student individually placed their token into the box of their selected entrée. This method was ideal in that it minimizes any impact a classroom might have from an "influencer child".

Label Modification: For the last five weeks, each voting box was color coded with the GSW nutritional information, and students were given red, yellow and green tokens. Students preorder their entree by placing their colored token in the corresponding colored entrée's voting box (figure 4).

Treatment 4, Recording Sheet Table (RST): Arguably the lowest cost system analyzed, the RST utilizes daily recording sheet where students' names are listed along the left hand side and the daily entrée choices (i.e. cheese pizza, hot dog on a bun, buffalo chicken salad. lunchbox) are listed across the top of the table. This treatment was the most suited to fourth grade classroom as penmanship was needed to make selections. The table was located in the classroom next to the door and each student individually 'checks' the entrée they would like using a black marker.

Label Modification: For the subsequent five weeks, the RST was altered to include the GSW labeling information. Each daily entrée choice displayed a dime sized colored dot next to the description (color coded red, yellow or green). Secondly, each student made their food choice
using the associated colored marker to indicate their choice. For example the pepperoni pizza column displayed a yellow dot next to the description and each student choosing pizza use the yellow marker to place a mark in the pizza column on their row (figure 5).

Prior to the onset of the research project, during Crestview Elementary Teacher In-Service Training, each individual treatment was presented and explained to teachers in each grade level. Classroom's were set up with their assigned treatment and updated following data collection each day.

## Student GSW Color Orientation

Before the introduction of the entrée GSW labels, it was crucial for all students to be equipped with accurate information. Therefore, during physical education on October 23, 2014, all students were given a presentation on healthy eating and the explanatory information regarding the GSW colors, conducted by the nutritional administer for CISD. This ensured that each student received consistent, accurate, and necessary information regarding the nutritional information prior to the introduction of the GSW colored labels.

## Pre-ordered Entrée vs. Actual Choice

The data of interest in this study in the pre-ordered entrée selection of each student, although students are asked to preorder their lunch entrée, it is allowed within the CISD that each student should have the right to alter their pre-ordered choice while going through the lunch line. Data collection of actual choice made in the lunchroom is merited due to the fact the children can alter their entrée choice. Ideally, this data would be collected in the lunchroom. However, due to lunchroom logistics, this was not feasible. In an effort to capture entrée consumption data, each student received an individual 'Food Journal' in which they self-reported what they ate for lunch
during the early afternoon. This data was periodically validated by lunch line observation. Data was collected in the lunch line on 15 days. Of the 1,600 lunch line observations collected, $99.4 \%$ were correctly self-reported. Due to the high accuracy rate of the validated observations, the selfreported entrée consumption data is considered viable.

## Data

During the 15 week study period, data was collected on 66 days. The initial data collection began on day -42 and the study concluding on day 23 . Study days -42 through day 0 are indicative of the control as no nutritional GSW labels were present. The nutritional seminar occurred on day 0 and the introduction of GSW labels followed on day 1 and continued until the final day of data collection on day 23. Although Crestview is home to over 500 elementary students, on average 245 students choose to eat in the lunchroom daily. Across grade levels the greatest percentage of students purchasing their lunch from the cafeteria is third grade at $55 \%$ while the least is second grade at $40 \%$ (kindergarten 46\%, first grade $44 \%$, and fourth grade $49 \%$ ). During this study the maximum number of students eating in the lunchroom occurred on day 53 with 298 lunches sold while the minimum occurred on day -42 selling 170 lunches. During the entire 15 week study, individual entrée selection was collected for students who purchased a CISD lunch, thus resulting in 16,126 observations.

Daily entrée choice sets consist of two hot line items, a sandwich or wrap, and a salad choice. Each daily choice set consists of a minimum of one green entrée and a minimum of one yellow entrée. Over the study period, $93.9 \%$ of days offered two or more Go (green) entrées, while $72.7 \%$ offered 2 or more Slow (yellow) entrée choices. The number of red entrées offered was minimal. Over the 66 day period, only $9 \%$ of the choice sets contained a Whoa (red) entrée
choice. While, for the purposes of this research, a higher number of Whoa entrées would have provided useful, it is in the best interest of the elementary students that these entrees are not offered in excess.

## Results and Discussion

Of the 66 days in the study period, 22 pairs of days offered the same four entree choice set ( 44 days in total). A frequency distribution was developed for entrée selection by grade level, and initially chi-square tests of frequency distributions comprise the statistical analysis. Statistically significant differences in frequency distribution were observed in less than $50 \%$ of the 22 sets of identical entrée selection sets. For the discussion that follows, four sets of days in which there is an identical entrée choice set are presented (tables 1-4) and examined further.

Interestingly, statistically significant differences were observed in kindergarten, third and fourth grades levels, while first and second grades never yielded differences in choices due to the GSW labels. Of the significant differences observed, third and fourth grades were the fewest, yet, when observed, positive changes were noted in both grade levels. In choice set 2, comprised of two Slow and two Go choices, the introduction of GSW labels yielded an increase of $16.6 \%$ of students choosing a Go option over a Slow entrée (table 1). Furthermore, the Go entrée selection ‘Chicken Nacho Salad’ alone increased by $15.2 \%$. Regarding fourth grade, the introduction of GSW labels in choice set 8 decreased Slow entrée selection from $96 \%$ to $85.7 \%$ while increasing Go entrée selection by $10.3 \%$ (table 2 ). Of the 22 identical choice sets examined by grade, a statistically significant difference was noted among kindergarten in $27 \%$ of the sets. Although introduction of the GSW labels on choice set 8 yielded positive results for fourth grade, this result was not indicative of kindergarten. Although the choice set is comprised of only Go and

Slow choices, an increase in Slow entrée selection was noted (24.4\%) (table 2). Frequency differences among kindergarten were also observed in set 16 and 21. Both choice sets were comprised of solely Go and Slow offerings. Increases in the percentage of Slow entrée selections were observed (Tables 3 and 4).

Continued analysis is merited to further asses if the introduction of GSW labels can positively influence student's daily entrée choice. Currently positive results have been observed in higher grade levels, while inconsistency is observed among kindergarten students. Although current results are somewhat inconclusive and yield potentially negligible differences, the noted positive changes in both third and fourth grade merit the inclusion of GSW labels during entrée pre-ordering. If the inclusion of nutritional labeling can move multiple students from consuming Slow (yellow) entrées to increasing their consumption of Go (green) entrées this is a step in a positive direction. Further the pre-order treatments implemented in third and fourth grade are among the lowest cost and highest in ease of implementation. The inclusion of nutritional labels during pre-ordering comes at little to no additional cost and can prove beneficial for students as it is during the adolescent years in which their diets are the most easily influenced. Although a profound increase in healthful entrée selection was not observed, the positive differences noted make the inclusion of nutritional labels worthwhile.

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Table 1. Entrée Choice by Grade, Set 2

| Day | Kindergarten |  | First |  | Second |  | Third** |  | Fourth |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | -17 | 8 | -17 | 8 | -17 | 8 | -17 | 8 | -17 | 8 |
| Yellow ${ }^{1,2}$ | 1 | 3 | 5 | 4 | 1 | 2 | 5 | 6 | 6 | 9 |
|  | 2.6 | 5.9 | 10.9 | 8.0 | 2.2 | 3.9 | 9.4 | 8.6 | 12.8 | 18.0 |
| Yellow | 33 | 42 | 40 | 40 | 41 | 45 | 47 | 51 | 35 | 36 |
|  | 84.6 | 82.4 | 87.0 | 80.0 | 91.1 | 88.2 | 88.7 | 72.9 | 74.5 | 72.0 |
| Green | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
|  | 5.1 | 2.3 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 1.4 | 2.1 | 0.0 |
| Green | 3 | 5 | 1 | 5 | 3 | 4 | 1 | 12 | 5 | 5 |
|  | 7.7 | 9.8 | 2.2 | 10.0 | 6.7 | 7.8 | 1.9 | 17.1 | 10.6 | 10.0 |

${ }^{1}$ Choice Set = Yellow: Philly Cheesteak, Yellow: Corn Dog, Green: Roasted Veggie Wrap, Green: Chicken Nacho Salad.
${ }^{2}$ The second row of each color indicates column percentages.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Table 2. Entrée Choice by Grade, Set 8

|  | Kindergarten* |  | First |  | Second |  | Third |  | Fourth* |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Day | -13 | 12 | -13 | 12 | -13 | 12 | -13 | 12 | -13 | 12 |
| Yellow ${ }^{\text {1,2 }}$ | 10 | 12 | 20 | 18 | 16 | 10 | 17 | 22 | 16 | 25 |
|  | 32.3 | 34.3 | 50.0 | 43.9 | 41.0 | 28.6 | 27.4 | 36.1 | 32.7 | 44.6 |
| Yellow | 9 | 18 | 10 | 18 | 15 | 18 | 43 | 37 | 31 | 23 |
|  | 29.0 | 51.4 | 25.0 | 43.9 | 38.5 | 51.4 | 69.4 | 60.7 | 63.3 | 41.1 |
| Green | 6 | 4 | 4 | 2 | 5 | 5 | 1 | 1 | 1 | 7 |
|  | 19.4 | 11.4 | 10.0 | 4.9 | 12.8 | 14.3 | 1.6 | 1.6 | 2.0 | 12.5 |
| Green | 6 | 1 | 6 | 3 | 3 | 2 | 1 | 1 | 1 | 1 |
|  | 19.4 | 2.9 | 15.0 | 7.3 | 7.7 | 5.7 | 1.6 | 1.6 | 2.0 | 1.8 |

${ }^{1}$ Choice Set = Yellow: Cheese Ravioli, Yellow: BBQ Pork Riblet Sandwich, Green: Chicken and Cheddar Wrap, Green: Tuna Salad with Carrots and Celery.
${ }^{2}$ The second row of each color indicates column percentages.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Table 3. Entrée Choice by Grade, Set 16

|  | Kindergarten** |  | First |  | Second |  | Third |  | Fourth |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Day | -2 | 23 | -2 | 23 | -2 | 23 | -2 | 23 | -2 | 23 |
| Yellow | 1 | 5 | 5 | 9 | 0 | 5 | 7 | 12 | 6 | 3 |
| 1,2 | 3.0 | 10.9 | 12.2 | 18.8 | 0.0 | 11.1 | 10.6 | 16.9 | 12.5 | 5.8 |
| Green | 22 | 16 | 19 | 14 | 27 | 28 | 56 | 53 | 39 | 41 |
|  | 66.7 | 34.8 | 46.3 | 29.2 | 62.8 | 62.2 | 84.9 | 74.7 | 81.3 | 78.9 |
| Green | 2 | 1 | 2 | 0 | 2 | 1 | 0 | 1 | 0 | 1 |
|  | 6.1 | 2.2 | 4.9 | 0.0 | 4.7 | 2.2 | 0.0 | 1.4 | 0.0 | 1.9 |
| Green | 8 | 24 | 15 | 25 | 14 | 11 | 3 | 5 | 3 | 7 |
|  | 24.2 | 52.2 | 36.6 | 52.1 | 32.6 | 24.4 | 4.6 | 7.0 | 6.3 | 13.5 |

${ }^{1}$ Choice Set = Yellow: Chili Con Carne, Green: Chicken Sandwich, Green: Turkey and Cheese Wrap, Green: Popcorn Chicken Salad.
${ }^{2}$ The second row of each color indicates column percentages.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.

Table 4. Entrée Choice by Grade, Set 21

| Kindergarten* |  |  | First |  | Second |  | Third |  | Fourth |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Day | -20 | 5 | -20 | 5 | -20 | 5 | -20 | 5 | -20 | 5 |
| Yellow ${ }^{1,2}$ | 6 | 6 | 6 | 3 | 3 | 3 | 10 | 5 | 5 | 7 |
|  | 14.0 | 11.3 | 9.5 | 5.5 | 5.5 | 6.0 | 14.3 | 8.2 | 9.3 | 13.2 |
| Yellow | 31 | 39 | 54 | 44 | 46 | 45 | 59 | 54 | 45 | 46 |
|  | 72.1 | 73.6 | 85.7 | 80.0 | 83.7 | 90.0 | 84.3 | 88.5 | 83.3 | 86.8 |
| Green | 4 | 0 | 2 | 6 | 3 | 1 | 1 | 2 | 0 | 0 |
|  | 9.3 | 0.0 | 3.2 | 10.9 | 5.5 | 2.0 | 1.4 | 3.3 | 0.0 | 0.0 |
| Green | 2 | 8 | 1 | 2 | 3 | 1 | 0 | 0 | 4 | 0 |
|  | 4.7 | 15.1 | 1.6 | 3.6 | 5.5 | 2.0 | 0.0 | 0.0 | 7.4 | 0.0 |

${ }^{1}$ Choice Set = Yellow: Sloppy Joe, Yellow: Chicken Nuggets, Green: Turkey and Cheese Sub, Green: Spicy Popcorn Chicken Salad.
${ }^{2}$ The second row of each color indicates column percentages.
*Significant mean difference in chi-square at 0.1 significance level.
**Significant mean difference in chi-square at 0.05 significance level.
***Significant mean difference in chi-square at 0.01 significance level.


Figure 1. Monthly calendar of entrée choices


Figure 2. Clip treatment


Figure 3. Magnetic board


Figure 4. Box system


Figure 5. Recording sheet table

