Nudging National School Lunch Program Participants Toward Healthier Choices

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Smarter Lunchrooms Symposium, Cornell University
May 10, 2018
Overview

• Background/motivation
• 2 pre-ordering studies
  – Journal of Economic Psychology
    • IFAS High Impact Research Publication
  – Working paper
• Other on-going studies
Public Health Concerns

• More than one-third (36.5%) of U.S. adults are obese.
• Approximately 17% children and adolescents aged 2-19 years are obese.
• Increased risk of cardiovascular diseases, cancers, and type 2 diabetes.
• Annual medical cost of obesity in the US is $147 billion.

Source: CDC 2015
Obesity Rates in Children and Adolescents

Source: Ogden et al. 2015
Causes of Obesity

• Genetics, food environment, energy balance, sedentary lifestyles, wrong mix of foods

• 99.9% of adolescents consume fruits and vegetables, but only 0.9% consume the recommended amounts (Kimmons et al. 2009)
National School Lunch Program (NSLP)

• Adolescents consume 1/2 to 1/3 of daily calories at school
• 2nd largest food assistance program
• In 2016, >5 billion lunches served to an average of 30.4 million students per day
• Offers free, reduced-price, and full-price meals
• 73% free or reduced-price (USDA-FNS 2017)
Healthy, Hunger-Free Kids Act of 2010

• Reformed nutritional guidelines
  – 2010 Dietary Guidelines For Americans
• Reductions in sodium and saturated fats
• Limits on total calories
• Elimination of trans-fat and whole milk
• Increase whole grains and availability of fruits and vegetables
• Restrictions on a la carte/competitive foods
• Farm to school program
Behavioral Economics

• Using psychology to influence choice
• Nudging (Thaler and Sunstein 2009)
  – 4.5% increase in selection of green labeled foods & 9.2% decrease in red labeled foods (Park 2012)
  – Fruit selection increased by >100% when placed in a colorful bowl (Wansink et al. 2012)
• Convenience and pre-ordering (Hanks et al. 2012; Ammerman 2013)
Convenience

• Hanks et al. (2012) moved unhealthy items such as desserts to less convenient locations and healthy items to more convenient spots
  – high school students were 28% less likely to select unhealthy items
Pre-commitment and Self-control

• Hanks et al. (2012) allow elementary students to pre-order school lunches using SMART boards
  – 12.1% of students who pre-ordered chose a “healthy” entrée compared to 5.3% of students who went through the normal cafeteria line
  – 18.3% increase in the selection of fruits by students who pre-ordered
  – cut down on waste and increased consumption
Pre-ordering with MyPlate Nudge

Choose MyPlate.gov
Pre-ordering with MyPlate Nudge

• 5 offered
  – Meat/meat alternative
  – Grain/starch
  – Vegetable
  – Fruit
  – Milk

• Student must select 3
  – Must select fruit or vegetable
Pre-ordering with MyPlate Nudge

- 4th - 7th graders
- May of 2013 – 4 weeks
- Divided student in 3 groups
  1) Ordered through normal lunch line (Control)
  2) Pre-ordering – ordered on-line
  3) Pre-ordering with nudges – ordered on-line and received MyPlate nudges

Objective: Increase selection of fruits, vegetables, and low-fat milk
# Choose the Food Items:

<table>
<thead>
<tr>
<th>Main Entrée</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oven Fried Chicken with Whole Grain Roll</td>
<td></td>
</tr>
<tr>
<td>Chef Salad with Fruit Cup and Saltines</td>
<td></td>
</tr>
<tr>
<td>Philly Cheesesteak on Whole Grain Bun</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vegetable</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mashed Potatoes with Gravy</td>
<td></td>
</tr>
<tr>
<td>Potato Smiles with Ketchup</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dairy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No Fat Chocolate Milk</td>
<td></td>
</tr>
<tr>
<td>Low Fat White Milk</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fruit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Wedges</td>
<td></td>
</tr>
<tr>
<td>Honeydew/Cantaloupe</td>
<td></td>
</tr>
</tbody>
</table>
YOUR MEAL DOES NOT LOOK LIKE A BALANCED MEAL

A Balanced Meal Should Have All Five Components

CHANGE ORDER

DO NOT CHANGE ORDER
YOU HAVE ORDERED A BALANCED MEAL

CHECK OUT
Selection Behaviors

![Bar chart showing selection behaviors for Fruits, Vegetables, and Low-fat Milk under Baseline and Intervention conditions.](chart_image)
Increases in Selection

- Fruits: Pre-Ordering 28%, Pre-Ordering With Nudges 51%
- Vegetables: Pre-Ordering 16%, Pre-Ordering With Nudges 30%
- Low-fat Milk: Pre-Ordering 16%, Pre-Ordering With Nudges 37%
Increases in Selection by Week

- Fruit
  - Pre-Ordering: 20%
  - Pre-Ordering w/ Nudging: 50%

- Veg
  - Pre-Ordering: 10%
  - Pre-Ordering w/ Nudging: 40%

- Milk
  - Pre-Ordering: 30%
  - Pre-Ordering w/ Nudging: 50%
Summary of Findings

• Pre-ordering led to increased selection of fruits (27.7%), vegetables (15.8%) and low-fat milk (16.3%)

• Pre-ordering with MyPlate nudge increased the selection of fruits (51.4%), vegetables (29.7%) and low-fat milk (37.3%)

• MyPlate nudge increase selection more than pre-ordering alone
Pre-ordering with Informational Nudges

• Funded by Cornell Center for Behavioral Economics in Child Nutrition Programs
• 2 middle schools (6th – 8th graders)
• 9 weeks:
  – 3 weeks of pre-ordering
  – 4 weeks of pre-ordering with nudging
  – 2 weeks of pre-ordering
• Menu cycle is 3 weeks
Peer Influences

• Positive correlation between peer weight and individual weight in adolescents (Trogdon, Nonnemaker, and Pais 2008)

• Peer effects and social comparisons affect energy conservation, voting, retirement savings, and charitable giving (Allcott 2011; Ayres et al. 2012; Costa and Kahn 2013; Frey and Meier 2004; Schultz et al. 2007; Nolan et al. 2008; Gerber and Rogers 2009)
Peer Influences

• Motivated by Allcott (2011)
• Home Energy Report letters
  – Bar graph depictions of customers’ and neighbors’ electricity use
  – Reduced energy consumption by 2.0%
Please Choose your other Food items (Please check ✓):

**VEGETABLE**
- Mashed Potatoes with Gravy
- Mashed Potatoes with Gravy
- Potato Smiles with Ketchup

**STARCH**
- Potato
- Pizza

**FRUIT**
- Apple Wedges
- Apple Wedges
- Apple Wedges
- Honeydew/Cantaloupe

**DAIRY**
- No Fat Chocolate Milk
- Low Fat White Milk

Average number of servings in last 5 days

Vegetables

Fruits
Please Choose your other Food items (Please check ✓):

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- Mashed Potatoes with Gravy
- Mashed Potatoes with Gravy
- Potato Smiles with Ketchup

**STARCH**
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- Pizza

**FRUIT**
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- Apple Wedges
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- No Fat Chocolate Milk
- Low Fat White Milk
Please choose your other food items (Please check ✓):

Average number of servings in last 5 days

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**DAIRY**
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Submit
Plate Waste

- Plate waste data collected 4 times
  - Prior baseline period
  - During baseline period
  - During intervention (nudging) period
  - Month after post-intervention ended
Meals Containing a Vegetable

![Bar chart showing the percentage of meals containing a vegetable under different conditions: Own, Own+Peer, Own+Peer+Recommended. The chart compares Before: Pre-ordering, During: Nudging, and After: Pre-ordering.]
Meals Containing a Fruit

- Before: Pre-ordering
- During: Nudging
- After: Pre-ordering

<table>
<thead>
<tr>
<th></th>
<th>Own</th>
<th>Own+ Peer</th>
<th>Own+ Peer+ Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-ordering</td>
<td>0.95</td>
<td>0.90</td>
<td>0.92</td>
</tr>
<tr>
<td>Nudging</td>
<td>0.90</td>
<td>0.87</td>
<td>0.85</td>
</tr>
<tr>
<td>Pre-ordering</td>
<td>0.95</td>
<td>0.90</td>
<td>0.92</td>
</tr>
</tbody>
</table>
## Vegetable Selection

<table>
<thead>
<tr>
<th></th>
<th>Own</th>
<th>Own + Peer</th>
<th>Own + Peer + Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>During: Nudging</td>
<td>1.1%</td>
<td>-8.5%</td>
<td>0.3%</td>
</tr>
<tr>
<td>After: Pre-Ordering</td>
<td>-7.5%</td>
<td>-19.1%</td>
<td>-3.7%</td>
</tr>
<tr>
<td>School2</td>
<td>-10.1%</td>
<td>-26.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Male</td>
<td>-8.7%</td>
<td>-2.6%</td>
<td>5.5%</td>
</tr>
<tr>
<td>White</td>
<td>-0.6%</td>
<td>-21.2%</td>
<td>-14.4%</td>
</tr>
<tr>
<td>Other</td>
<td>14.2%</td>
<td>0.1%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Paid</td>
<td>2.5%</td>
<td>-0.5%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Grade=7</td>
<td>13.7%</td>
<td>-0.2%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Grade=8</td>
<td>19.0%</td>
<td>6.5%</td>
<td>5.8%</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>1458</td>
<td>1389</td>
<td>637</td>
</tr>
</tbody>
</table>
# Fruit Selection

<table>
<thead>
<tr>
<th></th>
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<th>Own + Peer + Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>During: Nudging</strong></td>
<td>-0.7%</td>
<td>-1.1%</td>
<td>-0.9%</td>
</tr>
<tr>
<td><strong>After: Pre-Ordering</strong></td>
<td>-1.1%</td>
<td>-1.6%</td>
<td>-0.4%</td>
</tr>
<tr>
<td><strong>School2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4.9%</td>
<td>-1.0%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>White</td>
<td>-0.1%</td>
<td>0.2%</td>
<td>1.1%</td>
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## Treatment Effects on Selection

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td></td>
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<td>Own + Peer + Recommended</td>
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<td><strong>-8.2%</strong></td>
<td><strong>-0.6%</strong></td>
</tr>
<tr>
<td>After: Pre-Ordering</td>
<td><strong>-7.5%</strong></td>
<td><strong>2.4%</strong></td>
</tr>
</tbody>
</table>
Results for Vegetables

• Peer information negatively impacts selection
• Students at school 2 less likely to selected a vegetable (French fry effect)
• White students less likely than black students to take a vegetable
• Older students are more likely to select a vegetable
Results for Fruits

• Treatment effects not significant
• Students at school 2 more likely to select a fruit
• Students who pay full-price are less likely to select a fruit than students receiving free or reduced price lunches
• Older students are less likely to select a fruit
Summary of Findings

• Students who received information on peers’ selections:
  – 8% less likely to select vegetables during pre-ordering phase
  – 7.5% less likely to select vegetables during post-intervention

• Information about recommend servings appears to mitigate the peer effects

• No change in average plate waste
Further Research

• What is driving the peer-effect response?
• Control for specific offerings
• Plate waste
Other Research

• Lunchroom report cards
• Evaluation of farm to school programs
• Evaluation of school gardens
• White vs. flavored milk
• Choices and consumption by demographic & socioeconomic characteristics
• Obesity and NSLP participation
• Dietary diversity in Bangladesh
Questions

Food and Resource Economic Department (FRED)

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