Preordering School Lunch Encourages Better Food Choices by Children

Nearly one-third of children between ages 6 and 19 years are considered obese1 and their choosing of less healthy foods in school lunchrooms may contribute.2 To encourage students to select healthier foods, recent research has focused on how environmental changes and behavioral economics can guide children to make healthier choices.3-4 This includes the preordering of lunch. Preordering could preempt hunger-based, spontaneous selections and eliminate the sensory cues—evocative smells and sights—that lead to less healthy choices. We examine whether having students preorder their entrée (main dish) improves the healthfulness of entrées selected for lunch.

Methods | The Cornell University institutional review board approved this study and waived written consent, yet teachers, staff, school administrators, and parents were notified. In 2 elementary schools in upstate New York, students use an electronic system to preorder their lunch entrée. The schools are located in a predominantly white (96.6%) county where 55% of students receive free or reduced-price lunches. Over a 4-week period (November 14-December 9, 2011), 14 classrooms (grades 1-5) were randomly assigned to 1 of 3 conditions. In weeks 1 and 2, all classrooms preordered as usual. In week 3, 4 classrooms discontinued preordering but resumed preordering in week 4. (Because this could lead to contamination of behavior in week 4, we omit these observations.) In week 4, 5 classrooms discontinued preordering. Five classrooms never stopped preordering.

Sales records, including school, grade, classroom, student identifiers, and daily entrée choice, were collected for 272 students. Entrées with the greatest nutrient density on any given day were coded as healthy while others were coded as unhealthy. Data were analyzed with Stata 12 (StataCorp) using a mixed-effects logistic model with students nested within classroom.

Results | When students preordered their entrée, 29.4% selected the healthier entrée compared with 15.3% when preordering was not available (Table). Conversely, the less healthy entrée was chosen 70.8% of the time by students who preordered, and students who ordered in the lunch line selected the less healthy entrée 85.7% of the time (Table). When students did not order but instead selected their entrée as they entered the lunch line, it appears that hunger-based, spontaneous selection diminished healthy entrée selection by 48% and increased less healthy entrée selection by 21% (Table).

Consumption data (not reported), which were collected in the cafeterias via a visual estimation technique, support this robust result and suggest preordering the entrée also affects selection and consumption of side items. Together, both consumption and selection data demonstrate how a simple environmental change—preordering—can prompt children to choose healthier food.

Discussion | In a school setting, preordering can effectively lead students to pick healthier entrées. Students who selected their entrée in the lunch line, where decisions are biased by aromas and sights of tasty, less healthy foods, decreased selection of healthy entrées by 48% and increased selection of less healthy entrées by 21%. Though this research did not change the layout of the lunch line, students precommitted to a lunch entrée outside of the cafeteria, effectively modifying the decision environment. A smarter lunchroom is not confined to the space within the cafeteria walls.

Whereas this research used a computerized preordering system, paper-based systems are easy, inexpensive, and an immediately implementable alternative. The ease of implementing these systems can allow future research to examine the effectiveness of these systems on the selection of entrées, side...

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**Table. Preordering Nearly Doubles the Selection of Healthy Entrées**

<table>
<thead>
<tr>
<th>Entrée</th>
<th>Percent Preordered in the Morning</th>
<th>Purchasing Entrée at Lunchtime</th>
<th>Change</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy entrée</td>
<td>29.4</td>
<td>15.3</td>
<td>-48.0</td>
<td>0.55 (0.35-0.86)</td>
</tr>
<tr>
<td>Less healthy entrée</td>
<td>70.8</td>
<td>85.7</td>
<td>21.0</td>
<td>1.81 (1.14-2.87)</td>
</tr>
</tbody>
</table>

*N = 2422. Results are based on a mixed-effects logistic regression where students were nested within grades. Dependent variables were healthy entrée and less healthy entrée. Healthy and less healthy entrées were determined using a nutrient-based method.*

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**Funding/Support:** We thank the Children’s Hospital of Philadelphia Department of Pediatrics (Dr Goyal) and the National Institutes of Health (grant K23 HD070990-01A1 [Dr Goyal]) for providing funding to support this research.

**Role of the Sponsors:** The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

dishes, and full meals in both middle and high schools where menu choices are more expansive. This can also facilitate research in precommitment and social pressure by allowing students to retract their initial decision, once they are in the lunch line, surrounded by their peers.

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Author Contributions: All authors had full access to the data used in analysis and take full responsibility for the integrity and accuracy of the results. Study concept and design: Hanks, Just, and Wansink. Acquisition of data: Hanks and Just. Analysis and interpretation of data: Hanks, Just, and Wansink. Drafting of the manuscript: Hanks, Just, and Wansink. Critical revision of the manuscript for important intellectual content: Hanks, Just, and Wansink. Statistical analysis: Hanks and Just. Obtained funding: Just and Wansink. Administrative, technical, and material support: Wansink. Study supervision: Just and Wansink.

Conflict of Interest Disclosures: None reported.

Funding/Support: We thank the US Department of Agriculture (USDA) for their generous support of this research through the grant that established the Cornell Center for Behavioral Economics in Child Nutrition Programs, USDA/Economic Research Service grant 59-5000-0-0090.

Role of the Sponsors: The USDA had no role in the design and conduct of the study, collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

Additional Contributions: We thank Adam Brumberg, BS, and Kathryn Hoy, RD, for coordinating the project with the participating schools and collecting tray waste data. We recognize Nutri Kids for its support in extracting sales information. We also are grateful for assistance from Laura Smith and Julia Hastings-Black.


Convergent Validity of Parent-Reported Attention-Deficit/Hyperactivity Disorder Diagnosis: A Cross-Study Comparison

Getahun et al recently published a study titled “Recent Trends in Childhood Attention-Deficit/Hyperactivity Disorder” in which they used medical records and well-defined criteria to generate the prevalence of diagnosed attention-deficit/ hyperactivity disorder (ADHD) in a large southern California administrative sample. Their study contributes important geographically based estimates of ADHD and draws conclusions about increasing ADHD prevalence within southern California. However, the authors cited our previous research to support a commonly held assertion that parent and teacher reports of ADHD “overestimate true prevalence.” To date, parent-reported ADHD diagnosis on national health surveys has not been directly validated against a clinical standard and thus needs further study before conclusions related to validity can be made. However, studies like that by Getahun and colleagues may inform the evidence base for the validity of using survey data for monitoring ADHD over time. Our research estimated that the parent-reported prevalence of ADHD for children aged 4 to 17 years in California was 6.2% (in 2007), which may appear high compared with the estimate by Getahun and colleagues of 4.9% among children aged 5 to 11 years in California (in 2001-2010). Herein, we replicate our previous analyses of parent-reported ADHD with a sample more comparable to the study population analyzed by Getahun and colleagues.

Methods | To allow for descriptive comparison, we revisited our previous analyses of data from the 2007 National Survey of Children’s Health (NSCH), further restricting the sample (72,123 children aged 4-17 years) to one more closely reflecting that used by Getahun and colleagues: specifically, children in California aged 5 to 11 years who were covered by health insurance (n = 590). The NSCH has 2 ADHD diagnostic indicators: one for having ever been told by a health care provider that a child had ADHD and the other for having current ADHD. The ADHD case definition by Getahun and colleagues was more reflective of a period prevalence rate than a point prevalence rate, suggesting that the “ever” diagnostic indicator was more appropriate for cross-study comparison. Prevalence estimates of the national, state-based, and age- and insurance-restricted NSCH survey estimates and 95% CIs of parent-reported ADHD were calculated using SUDAAN version 10.0.1 statistical software (RTI International) to account for the complex sampling design.

Results | Based on NSCH data, nationally, 9.5% (95% CI, 9.0%-10.0%) of children aged 4 to 17 years had ever received a parent-reported ADHD diagnosis (Figure). This estimate was only slightly lower than, but statistically indistinguishable from, that of children with health insurance (9.8%; 95% CI, 9.2%-10.3%). Restricting the data to insured children aged 5 to 11 years, the national prevalence of children with a history of ADHD diagnosis decreased by 14.3%, to 8.4% (95% CI, 7.7%-9.1%). Further subsetting the age- and insurance-restricted analysis to children in California reduced the prevalence by 44.3% of the national rate, to 4.7% (95% CI, 2.5%-8.4%) of insured California children aged 5 to 11 years with a history of ADHD.

Discussion | On initial inspection, the ADHD rate reported by Getahun and colleagues (4.9%) appears lower than previous national (9.5%) and California-based (6.2%) estimates of parent-reported ADHD. However, the analyses presented here confirm previous reports of the sensitivity of these estimates to insurance status, geography, and age.3 When considering these factors, the estimated prevalence of parent-reported ADHD in California closely approximates the rate of documented ADHD diagnosis in medical records of a southern California popula-