

ONLINE FIRST

RESEARCH LETTER

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 den-

sity 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 dishes, and full meals in both

Table. Preordering Nearly Doubles the Selection of Healthy Entrées^a

	%		Change	Odds Ratio (95% CI)
	Preordered Entrée in the Morning	Purchased Entrée at Lunchtime		
Selected a healthy entrée	29.4	15.3	–48.0	0.55 (0.35–0.86)
Selected a less healthy entrée	70.8	85.7	21.0	1.81 (1.14–2.87)

^aN = 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.

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.

Andrew S. Hanks, PhD
David R. Just, PhD
Brian Wansink, PhD

Published Online: May 3, 2013. doi:10.1001/jamapediatrics.2013.82

Author Affiliations: Department of Applied Economics and Management, Cornell University, Ithaca, New York.

Correspondence: Dr Hanks, Department of Applied Economics and Management, Cornell University, 17 Warren Hall, Ithaca, NY 14853 (ah748@cornell.edu).

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.

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA*. 2012;307(5):483-490.
2. Wansink B, Just DR, Payne CR. Mindless eating and healthy heuristics for the irrational. *American Economic Review*. 2007;99(2):165-169. doi:10.1257/aer.99.2.165.
3. Rock CL, Flatt SW, Sherwood NE, Karanja N, Pakiz B, Thomson CA. Effect of a free prepared meal and incentivized weight loss program on weight loss and weight loss maintenance in obese and overweight women: a randomized controlled trial. *JAMA*. 2010;304(16):1803-1810.
4. Loewenstein G, Brennan T, Volpp KG. Asymmetric paternalism to improve health behaviors. *JAMA*. 2007;298(20):2415-2417.