Improving Preschool Children's Food Knowledge and Food Choice Intentions: Results from a Childhood Obesity Preventive Intervention

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Background

- Nearly 14% of U.S. children between the ages of 2 and 5 years were classified with obesity in 2015-2016.[1]

- Combatting childhood obesity requires a multilevel and multicomponent intervention approach to changing obesogenic environments in school and home settings.

- Improving young children's food knowledge and healthy eating choices may impact food preferences and dietary patterns in ways that reduce risk for obesity.

Objectives

- To examine the impact of an ongoing childhood obesity preventive intervention on preschool children's food knowledge, and intentions to choose nutrient-dense foods for meals and snacks.

Methods

Participants included 1034 predominantly rural, Pennsylvania preschool children from 2 of 3 cohorts in an ongoing childhood obesity preventive intervention. Child characteristics at study entry:
- Mean Age (SD) = 4.4 ± 0.6y
- 48.7% female
- Predominantly non-Hispanic, White (89.7%)
- 12.6% with obesity

Study Design: Multiphase Optimization Strategy (MOST)

- Uses a 2^4 factorial design with 16 experimental conditions.
- Childcare centers are randomized into one of the 16 conditions.
- Conditions vary based on whether a treatment is turned on or off.

**Advantages to using the MOST Framework**

- Using MOST, the efficacy of each individual component is examined, individually and in combination, allowing researchers to engineer the most efficient, effective and scalable intervention.
- This approach will allow us to efficiently examine the efficacy of components on children's outcomes before packaging them together.

Methods

Intervention Components

- Core Curriculum: Food literacy curriculum that encourages fruit and vegetable intake by introducing children to various fruits and vegetables from A through Z. All classrooms receive this component.

- **Healthy Eating Curriculum: Designed to increase children's nutrition knowledge (Go/Whoa Foods and food groups) and ability to build a healthy plate (using MyPlate).**

- Active Play Curriculum: Designed to increase children's time spent in active play.

- Child Self-Regulation Curriculum: Play-based curriculum designed to improve children's emotional, behavioral and intake regulation.

- Enhanced Parent Education: A video-based curriculum that maps to constructs in the preschool curriculum and reinforces the messages outlined in the classroom curricula by providing guidance on ways to increase/improve child outcomes.

**Healthy Eating Curriculum Materials**
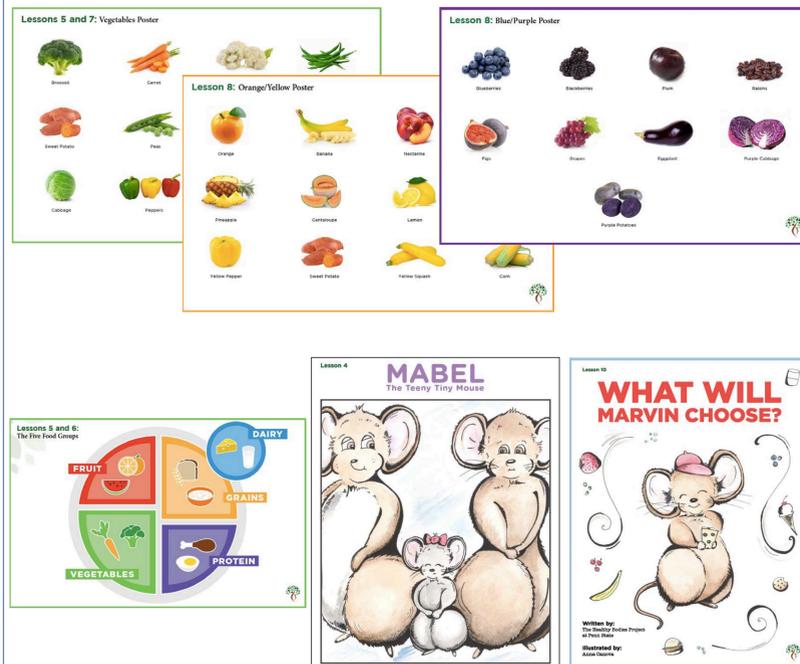
Methods

Procedures

Healthy Eating Curriculum – Children were exposed to 11 lessons on Go and Whoa foods, MyPlate, food groups and building a healthy plate (variety). Preschool teachers were trained to deliver all lessons.

Child Assessments – Children were interviewed one-on-one in their classrooms by trained research assistants. Measures included height, weight, behavioral assessments of self-regulation and measures assessing children's food knowledge and healthy snacking choices.

Measures

Food Knowledge – This measure was an adapted version of a food knowledge measure developed by Harrison et al. (2016).[2] It consisted of a 2-step process in which children were first asked to choose their **FAVORITE** foods for lunch from a list of 6 foods within each food group (30 foods total), as well as their **FAVORITE** beverage (4 beverages total). In the second step, children were asked to choose **HEALTHY** foods and beverages from the previous foods. The proportion of "healthy" foods chosen was calculated.
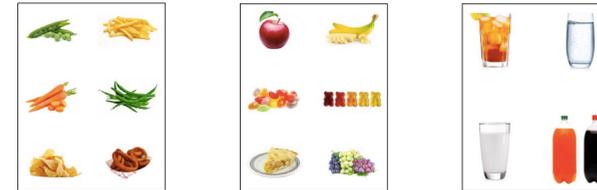
Snack Selection Protocol – This measure was developed by Sigman-Grant (2014)[3] and was adapted for use in this study. The original measure consisted of three rounds; we added a fourth. In Round 1, children identify each food pictured. In the second round, children are presented with foods in pairs; a nutrient-dense food is paired with an energy-dense food. Children are asked to choose which food from the pair they would pick for their snack. In Round 3, children are asked to point to the "healthy" food that makes them grow big and strong. In the final round, children are asked to sort cards containing the individual foods into piles of "foods that are good for your body" and "other foods." Children receive a score of 1 for each food correctly identified (Round 1), and each food correctly sorted (Round 4). The number of nutrient-dense foods chosen were calculated for Rounds 2 and 3.
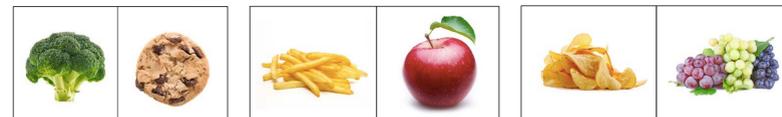

Analysis and Results

Statistical Analyses: All analyses were conducted in SAS 9.4. Sample descriptives (variable means and frequencies) were calculated, and pre-post differences in outcomes, by HE condition, were measured using proc GLM. Preliminary analyses revealed that children HE OFF condition were slightly older than children in the HE ON condition (4.5 vs. 4.3y), thus, all analyses were adjusted for child age. A total of 988 children with complete data were included in the analysis.
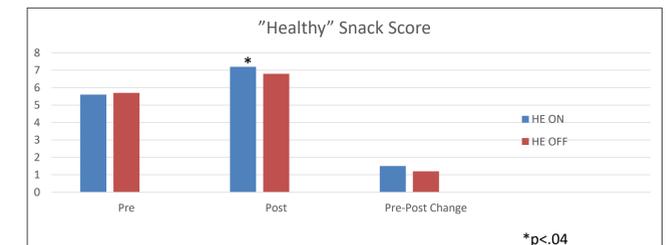
Food Knowledge
- No significant baseline differences in food knowledge by condition.
- Children in the HE condition has higher food knowledge scores at baseline.
- Children in the HE condition also showed greater pre-post increases in food knowledge, compared to children in HE OFF.
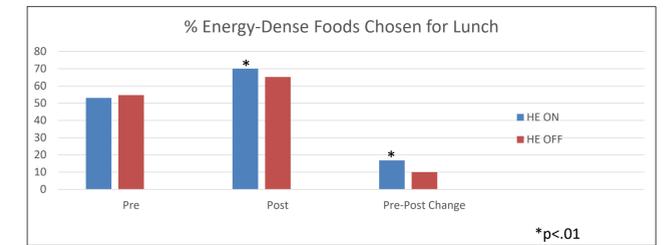
Snack Selection
- No significant differences by condition in snack selection scores at baseline.
- There were significantly higher nutrient-dense snack food choices at post-test for children in the HE ON condition.
- There was a trend towards pre-post change in children's choice of nutrient-dense foods being greater in the HE ON condition.

Conclusions

- Increasing children's food knowledge and intentions to choose nutrient-dense over energy-dense foods may lead to the development of healthy dietary patterns that prevent the development of obesity in children.

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References

1. Hales, C.M., Fryar, C.D., Carroll, M.D., Freedman, D.S. and Ogden, C.L. (2018). *Trends in Obesity and Severe Obesity Prevalence in US Youth and Adults by Sex and Age, 2007-2008 to 2015-2016.* JAMA. 319 (16):1723-1725.
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