Associations between Family Nutrition and Physical Activity Behaviors and Successful Learning Characteristics in Elementary School Children

Presented by Jenny Jackson, MS, RD
OPHA Conference 2013

Research supported by the National Research Initiative of the USDA National Institute of Food and Agriculture, grant 2011-68001-30020.
Project Directors: Katherine B. Gunter, PhD and Deborah John, PhD

Oregon State UNIVERSITY OSU College of Public Health and Human Sciences

---

Learning Objectives

- Attendees will:
  - be able to describe the relationships between family-level nutrition and physical activity environmental and behavioral characteristics and indicators of successful learning among a sample of elementary school children.

Oregon State UNIVERSITY OSU College of Public Health and Human Sciences

---

The Issue

Oregon State UNIVERSITY OSU College of Public Health and Human Sciences

---

Prevalence of Overweight K-6th Graders among a Sample of Oregon Children

Grade	K	1	2	3	4	5	6	Total
Boys Measured	162	160	191	164	160	169	145	1151
Girls Measured	114	127	133	120	162	149	112	917
Total Measured	276	287	324	284	322	318	257	2068

The Issue

- Childhood obesity
  - Multiple risk factors
    - Genetic, psychological, sociocultural, environmental
  - Multiple consequences
    - Increased risk for chronic disease, social and psychological problems
    - Negatively associated with **academic achievement**[*]
- Nutrition and physical activity
  - Key behavioral factors involved in energy balance
  - Also connected with **school performance**[**]

[*]Taras and Potts-Datema 2005
[**]Kristjánsson et al 2010

Environment influences behavior

- The home environment plays a key role in obesity prevention.[*]
  - Children obtain more than half their daily energy from foods consumed at home.[**]
  - Food availability, family food rules, parental influences, and family meal patterns influence risk for childhood obesity.

[*]Koplan et al 2005
[**]Briefel et al 2009

The Question

Are aspects of the <u>home environment</u> associated with risk for <u>childhood obesity</u> also associated with <u>learning</u>?

Oregon State OSU College of Public Health and Human Sciences

Study Aim

- *To determine whether **family nutrition and physical activity** environmental and behavioral factors are associated with **successful learning skills**.*

Oregon State OSU College of Public Health and Human Sciences

Methods

- **Participants**
  - Parents of K-5 students at 3 elementary schools in Corvallis, OR.
- **Procedures**
  - Online survey, February 2013
    - Invitation to participate via school email listserv
    - Parent report of child/family nutrition and physical activity and child learning characteristics
- **Data analysis**
  - Descriptive, correlation, and linear regression analyses

Measures

- **Demographics**
  - Child/caregiver
- **Family Nutrition and Physical Activity (FNPA) screening tool***
  - Measure of family/child food and physical activity behaviors, family home characteristics, family rules governing food and PA
  - Validated measure of risk for overweight

*Ihmels et al 2009

The Family Nutrition and Physical Activity (FNPA) screening tool

Nutrition	Physical Activity
• 10 items	• 10 items
• 5 domains	• 5 domains
Family meal patterns	Screen time behavior
Family eating habits	Healthy environment
Food choices	Family activity involvement
Beverage choices	Child's activity involvement
Restriction and reward	Family routine (sleep)

Item Response Categories

Almost Never (1)	Sometimes (2)	Usually (3)	Almost Always (4)

Measures continued…

Characteristics of a Successful Learner	Score
Safe: Keeps hands and feet to self, Carefully uses materials, Makes appropriate choices	
Respectful: Shows respect for classmates, adults and property, Works and interacts well with others, Respects the personal space of others	
Responsible: Focuses and listens attentively, Follows directions, Completes work in a reasonable amount of time, Takes responsibility for picking up after him/herself, Functions independently	
Social Emotional Growth: Establishes friendships, Accepts correction or redirection, Verbalizes feelings appropriately	

Characteristics of a Successful Learner (CSL)
- School district determined indicators of learning behaviors
- Item response categories
  - Emergent (1)
  - Developing (2)
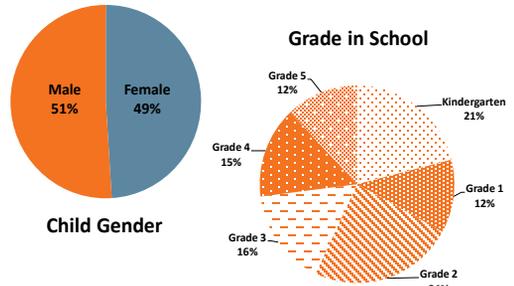 - Proficient (3)
  - Exceeds (4)

Results

- 122 surveys received from a total of 544 families reached (22% response rate)

Final sample size = 85

Demographics

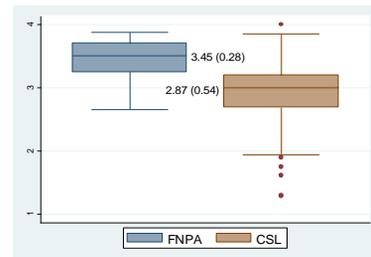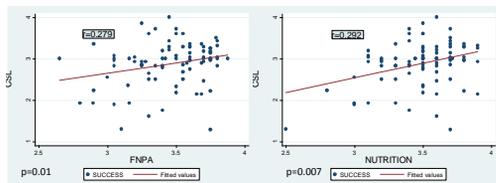Male 51% / Female 49%
Child Gender

Grade in School
Kindergarten 21%, Grade 1 12%, Grade 2 24%, Grade 3 16%, Grade 4 15%, Grade 5 12%

Results: Demographics

Child Race/Ethnicity
White 85%, Hispanic 2%, Asian 6%, Other 7%

Eligibility for Free/Reduced School Meals
Yes 14%, No 86%

Parent Education
4 or more years of college 86%, High School 2%, Some College 12%
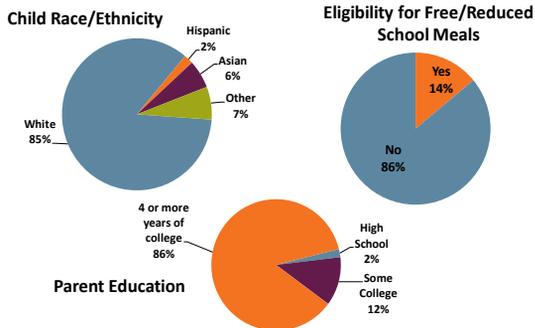
Results: Mean FNPA and CSL Scores

FNPA: 3.45 (0.28)
CSL: 2.87 (0.54)

Results: Unadjusted correlations between CSL and FNPA Scores

r=0.279, p=0.01

r=0.292, p=0.007

Positive correlations were also found for **family eating habits**, **beverage choices**, and **restriction/reward** domains as well as **fast food** and **sweetened beverages** ($p<0.05$).

Results

Multiple linear regression analyses examining associations between the FNPA and CSL								
	Model 1			Model 2			Model 3	
Variable	Coef	p	95% CI	Coef	p	95% CI	Coef	p	95% CI
FNPA	**0.54**	0.02	0.10,0.97					
Nutrition Component				**0.74**	0.00	0.31,1.16		
Family Eating Habits							**0.32**	0.01	0.08,0.56

Adjusted for school, grade, gender, race/ethnicity, eligibility for free and reduced school meals, and parent education. The unstandardized coefficients reflect the increase in characteristics of a successful learner score for each 1 point increase in the FNPA-related score.

Results

Multiple linear regression analyses examining associations between the FNPA and CSL

Variable	Model 4			Model 5			Model 6		
	Coef	p	95% CI	Coef	p	95% CI	Coef	p	95% CI
Restriction and Reward	**0.27**	0.02	0.05,0.49						
Fast Food				**0.26**	0.01	0.06,0.46			
Sugar-Sweetened Beverages							**0.37**	0.00	0.14,0.59

Adjusted for school, grade, gender, race/ethnicity, eligibility for free and reduced school meals, and parent education. The unstandardized coefficients reflect the increase in characteristics of a successful learner score for each 1 point increase in the FNPA-related score.

Conclusion

- Among the variables studied, six were positively and statistically associated with successful learning:
  - Total FNPA and Nutrition component
  - Two domains:
    - Family eating habits
      - Less eating while watching TV + less fast food
    - Restriction and reward
      - monitor eating of junk food + do not use candy as reward
  - Two items:
    - Families that eat less fast food
    - Children who drink fewer sugar-sweetened beverages

- More favorable family nutrition and physical activity environments and behaviors may positively influence learning-related skills in elementary-age students.

Limitations

- Observational, cross-sectional study
- Sample size
- Selection bias
- Measures
- No adjustment for classroom/teacher
- Other variables?

Implications

- Home environments that promote healthy eating and activity behaviors may also support healthy weight status, reduced risk for chronic disease, and learning outcomes.

- Together with the current emphasis on improving school nutrition and physical activity environments, increased efforts to support healthy lifestyle habits in the family home environment are also warranted.

Next steps

Special thanks to…

- Corvallis Schools and study participants
  - Franklin, Hoover, and Lincoln elementary schools
- OSU CPHHS faculty mentors
  - Kathy Gunter, PhD
  - Deborah John, PhD
  - Adam Branscum, PhD
  - Donna Champeau, PhD
- Hallie E. Ford Center for Children and Families

Thank you!