Investigating Child Feeding In A Virtual Reality Buffet

Field Experience Presentation

Corey Miller
Friday, November 10th, 2017
Presentation Agenda

- Field experience location
- Agency background information
- Preceptor background
- Field experience objectives
- Research projects
- Finished capstone project
- Core competencies
Field Experience

- National Institutes of Health
- Dr. Susan J. Persky, PhD
  - June 5th, 2017 through August 11th, 2017
Mission:
To enhance and protect the health and well being of all Americans.

- Effective health and human services
- Medicine, Public health, Social sciences
11 Operating Divisions

- Administration for Children and Families (ACF)
- Administration for Community Living (ACL)
- Agency for Healthcare Research and Quality (AHRQ)
- Agency for Toxic Substances and Disease Registry (ATSDR)
- Centers for Disease Control and Prevention (CDC)
- Centers for Medicare & Medicaid Services (CMS)
- Food and Drug Administration (FDA)
- Health Resources and Services Administration (HRSA)
- Indian Health Service (IHS)
- National Institutes of Health (NIH)**
- Substance Abuse and Mental Health Services Administration (SAMHSA)
National Institutes of Health

- Primary resource for biomedical & public health research

Main campus: Bethesda MD
  - 20,000 employees

Other:
Baltimore, MD
Frederick, MD
Research Triangle, NC
Hamilton, MT
Phoenix, AZ
Mission:
Seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.
27 NIH Institutes and Centers

- NIAAA
- National Institute of Alcohol Abuse and Alcoholism
- NIEHS
- National Institute of Environmental Health Sciences
- National Library of Medicine
- National Human Genome Research Institute
- National Heart Lung and Blood Institute
- National Institute of Allergy and Infectious Diseases
- National Cancer Institute
- National Institute of Neurological Disorders and Stroke
- NIDCD
- National Institute of Deafness and Communications Disorders
- NICHD
- National Institute of Child Health & Human Development
- NIDA
- National Institute on Drug Abuse
- NIBIB
- National Institute of Biomedical Imaging and Bioengineering
- NINDS
- National Institute of Neurological Disorders and Stroke
- NIDDK
- National Institute of Diabetes and Digestive and Kidney Diseases
- National Institute of Dental and Craniofacial Research
- Fogarty International Center
- National Institute of Biomedical Imaging and Bioengineering
- NICAM
- National Center for Complementary and Alternative Medicine
- National Institutes of Health
Mission:
To encompass a broad range of studies aimed at understanding the structure and function of the human genome and its role in health and disease.
9 NHGRI Branches

- Cancer Genetics & Comparative Genomics Branch (CGCGB)
- Computational & Statistical Genomics Branch (CSGB)
- Genetics Disease Research Branch (CSGB)
- Genetics & Molecular Biology Branch (GMBB)
- Medical Genetics Branch (MGB)
- Medical Genomics & Metabolic Genetics Branch (MGMGB)
- Metabolic, Cardiovascular & Inflammatory Disease Genomics Branch (MCIDGB)
- Translational & Functional Genomics Branch (TFGB)
- Social & Behavioral Research Branch (SBRB)**
Social & Behavioral Research Branch

- Applying new genomic discovery to improve health & clinical care
- Translates genomic discoveries into interventions that improve health-related decisions and outcomes, and investigates the social, ethical and public policy impact of genomic research
Dr. Susan J. Persky, PhD

- Senior Investigator
- Head of the Immersive Virtual Testing Area (IVETA)

**Her work:**
- Virtual reality-based healthcare simulations to investigate how information about genomic discoveries related to common conditions influence outcomes.

**Other interest:**
- New genomic information might influence social stigma, health disparities & other forms of unequal treatment.
- Examines the context and ways in which genomic information is disseminated
Learning Objectives

1. Describe the body of work, including that taking place in SBRB, linking genetics, nutrition oriented behavior & psych factors.

2. Discuss simulation approaches to measuring food intake.

3. Implement coding systems to transform observed dietary behavior into quantitative variables.
Research Projects

- ParentsTAKE
- Diabetes
- New Technology & Child Health (nTech)
Parents TAKE

Purpose:

To assess the influence of information about children's obesity risk on parental feeding behavior, beliefs & attitudes
Objectives

Primary:
What is the influence of information on children's obesity risk on parent feeding behavior?

Secondary:
Discover the mechanisms that explain the influence of information regarding children’s obesity risk on parental feeding behavior.

Exploratory:
Understand user behavior in the virtual reality buffet, along with gender differences in behavior.
Duties

- Literature reviews/Ref Searches
- Redesign study materials
Lit Review Topics

- Identifying gender differences in specific eating behavior traits
  - Disinhibition, pickiness, food neophobia, binge eating
- Investigating if parents feed boys more than girls
- Identifying if parents have a sense of whether they are feeding high or low-calorie meals to their kids
Lit Review Topics cont.

- Investigating if fathers are under-represented in the child feeding literature
- Identifying if kids would eat less if parents put less food on their plates
- Identifying methods and papers in which parent feeding of a child was measured in a variety of ways
Task:

- Public health oriented educational materials
  - Obesity risks, family environment, genetics
- List of web-based sources for parents regarding information on children's health
  - Nutrition, physical activity, sleep
- Building blocks for healthier life for children
Nutrition

- Protein
- Carbohydrates  
  - Fiber
- Fats
- Calcium
- Vitamin D
- Iron
- Vitamin A
Physical Activity

- healthy growth
- leaner body
- less likely to become overweight

- better concentration
- better outlook on life

- decreased risk of disease
- increased ability to fight sickness
Sleep is important to kids’ well-being

Most children spend 40 percent of their day asleep

Sleep directly impacts mental and physical development

Children aged 1-12 years should get 9-12 hours of sleep per day
Raising Healthy Kids Module

Raising Healthy Kids

Physical Activity
Nutrition
Sleep
Data Coding & Management

- Data must be analyzed
- Working with original data can be complicated
- Minimizes potential errors
  - Improves worker efficiency
- Data coding makes the researchers job easier!
- Codebook provides an ordered guide for identifying values associated with a coding response given for a specific survey question.
Diabetes

Type 1
- Pancreas produces little or no insulin
- Early onset
- Believed to be more genetic in origin

Type 2
- Body resists insulin or doesn’t produce enough
- Later onset
- Attributed to lifestyle behaviors
Diabetes Stigma

Over the years, advocacy groups & scientist have communicated the need for diabetes-related stigma research.

– Qualitative

- Health-related stigma is highly associated with poorer health outcomes
Diabetes Stigma Background Info

- Research focused on health outcomes associated with causal understanding, stigma and self-concept

- Anonymous questionnaires to patients with type 1 & 2 diabetes
  - Sample of healthy controls through online surveys to help researchers understand how people think & feel about issues related to diabetes
Participants in all groups completed questions assessing general perceptions, quality of life, health status and demographics.

Patients with type 1 or type 2 diabetes completed an additional questionnaire related to disease management, diabetes symptoms, disease perceptions and disease-related self-concept.

Incentivized via amazon gift cards.
Duties

Coded 3 specific questions:

1. What is type 1 diabetes?
2. What is type 2 diabetes?
3. What is the difference between type 1 & type 2 diabetes?
“Type 1 involves the body not being able to make insulin properly, while Type 2 can still produce insulin, but the cells can't absorb it from the blood. Type 1 is unavoidable, but Type 2 can be prevented or mitigated through lifestyle changes. Type 1 also usually appears during childhood or the teen years, while Type 2 usually shows up later.”

“Type 1 is non-curable and Type 2 is curable.”

“You grow out of type 1 and you have to live with type 2 forever.”

<table>
<thead>
<tr>
<th>Good Understanding</th>
<th>Satisfactory Understanding</th>
<th>Poor Understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\geq 2$ with no mistakes</td>
<td>1 and/or minor mistakes</td>
<td>0 / major mistakes</td>
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</tbody>
</table>
New Technology & Child Health (nTech)

Evaluated & tested new behavioral science methods and measures using virtual reality tools in the IVETA research facility for future research projects.

- IVETA had recently acquired a tool that is designed to assess participant emotional state based on automated, computer-based coding of facial expressions.
  - Test its feasibility, efficacy and validity in social and behavioral health research.

- Multiple research questions were tested in regards to the influence of emotion and health communication information framing on food choices made for one’s child.
Capstone Project

- Investigating child feeding in a virtual reality buffet and the influences that message framing has on parent emotion.

- Benefits of fruit & vegetable consumption
  - Disease prevention, reduce risk of chronic disease
  - Fruits & Veggies supplying vitamins & minerals
    - Provide antioxidants & anti-inflammatory agents that fight off disease

- Importance is known but parents still aren’t feeding nearly enough to kids
Investigating Child Feeding in a Virtual Reality Buffet: Influences of Message Framing and Parent Emotion
Corey Miller1,2, Megan Goldring2, Rachel Cohen2, William Kistler2, Sofia Bouhila3,4, Rebecca Ferrer5, William Klein6, Susan Persky2
1Kansas State University, 2Social and Behavioral Research Branch, 3NIHGR, 4NIAAA, 5NIDA, 6Behavioral Research Program, NCI

Background
- Important to understand effective ways for communicating to parents about child nutrition, as well as contextual factors that influence parent responses to health messages
- Previous literature found that a gain frame was more effective in increasing fruit and vegetable consumption for those in an anger state and a loss frame more effective for those in a fear state
- A lack of literature exists regarding the role of emotion and message framing in decision making for child-feeding
  - There is some speculation that these factors may have different influences
- We examined this possibility within the mTech study which explored the role of these factors in genetic information seeking and child feeding

Objective
Determine whether emotion induced in participants (fear vs. anger), crossed with language framing of a preventive health message (gain vs. loss frame) results in hypothesized effects consistent with previous research, and whether this differs for mothers vs. fathers.

Hypothesis
Elicited emotion and framing of the health message will interact such that participants will select more servings of fruit and vegetables from the buffet for their child when exposed to the following combinations: anger with gain frame, and fear with loss frame.

Methods
Sample:
- 190 parents of children 4-7 years old
Outcome Measure:
- Number of servings of fruits and vegetables chosen from virtual reality buffet
  - Oranges, Grapes, Carrots, Corn, Green beans, Black beans

Results
Sample Demographics

<table>
<thead>
<tr>
<th>Race</th>
<th>Mothers (n=126)</th>
<th>Fathers (n=64)</th>
<th>Total (n=190)</th>
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<tbody>
<tr>
<td>White</td>
<td>60 (47%)</td>
<td>28 (43%)</td>
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<td>Ethnicity: Hispanic</td>
<td>12 (10%)</td>
<td>6 (10%)</td>
<td>18 (10%)</td>
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<td>College educated</td>
<td>100 (79%)</td>
<td>51 (79.6%)</td>
<td>151 (79%)</td>
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<td>Child gender: Male</td>
<td>61 (48%)</td>
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<tr>
<td>Parent Age</td>
<td>37.1 (5.7)</td>
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Emotional State and Message Frame

- **Anger**
  - High certainty
  - High perceived control
  - Low risk perception
  - High reward seeking
- **Fear**
  - Low certainty
  - Low personal control
  - High risk perception

Gain Frame
- What one will gain from doing the preventive behavior.
- Ex: Eating plenty of fruits and vegetables can protect your child's health.

Loss Frame
- What one will lose by not doing the behavior.
- Ex: Not eating plenty of fruits and vegetables can endanger your child's health.

Virtual Reality Buffet

Manipulation Checks

Main Outcome
- Mothers chose more servings when they were angry and received the gain frame message.

Conclusions
- Mothers followed hypothesized pattern, based on previous literature. However, fathers followed a different pattern.
- Will follow up on why. Possibly related to an emotion induction problem.
- Fathers are under-studied in the literature, therefore influences on behavior are not well understood.
- Future research is needed to help understand factors that influence behavior in response to health messages for all parents.

References

Study Design and Procedure

Consent and Questionnaire
- Film-Based Emotion Induction
- Randomized to anger or fear
- Received Health Message
- Randomized to gain or loss framing

Virtual Reality Feeding Measure
- Questionnaire
Objective

Determine whether emotion induced in participants (fear vs anger), crossed with language framing of a preventive health message (gain vs. loss frame) results in hypothesized effects consistent with previous research, and whether this differs for mothers vs. fathers.

Hypothesis

Elicited emotion and framing of the health message will interact such that participants will select more servings of fruit and vegetables from the buffet for their child when exposed to the following combinations: anger with gain frame, and fear with loss frame.
Capstone Project cont.

Emotional State and Message Frame

**Anger**
- High certainty
- High perceived control
- Low risk perception
- High reward seeking

**Gain Frame**
- What one will gain from doing the preventive behavior.
- Ex: Eating plenty of fruits and vegetables can protect your child's health.

**Fear**
- Low certainty
- Low personal control
- High risk perception

**Loss Frame**
- What one will lose by not doing the behavior.
- Ex: Not eating plenty of fruits and vegetables can endanger your child's health.
Study Design and Procedure

Consent and Questionnaire ➔ Film-Based Emotion Induction ➔ Received Health Message
Randomized to anger or fear ➔ Randomized to gain or loss framing

Questionnaire ➔ Virtual Reality Feeding Measure ➔ Questionnaire

Virtual Reality Buffet

Methods

Sample:
• 190 parents of children 4-7 years old

Outcome Measure:
• Number of servings of fruits and vegetables chosen from virtual reality buffet
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## Results

**Sample Demographics**

*N and (%) or M and (SD)*

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Manipulation Checks

Message Framing Perceptions
1=More Loss  
7= More Gain

Main effect of framing:  
$F(1,180) = 108.68, p < .0001$

Self-Report Anger

Main effect of emotion induction:  
$F(1,179) = 520.23, p < .0001$

Self-Report Fear

Main effect of emotion induction: NS
Capstone Project cont.

Main Outcome

Mothers chose more servings when they were angry and received the gain frame message. Fathers chose more servings when they were fearful and received the gain frame message.

Conclusions

- Mothers followed hypothesized pattern, based on previous literature. However, fathers followed a different pattern.
- Will follow up on why. Possibly related to an emotion induction problem.
- Fathers are under-studied in the literature, therefore influences on behavior are not well understood.
- Future research is needed to help understand factors that influence behavior in response to health messages for all parents.
Core Competencies

- **Biostatistics**
  
  Biostatistics was used during my field experience to analyze results using SPSS for my summer NIH research poster. Additional skills learned from biostatistics were also used to create descriptive statistics for my research question.

- **Epidemiology**
  
  In regards to the diabetes stigma study, type 2 diabetes can cause many problems. It can also be reversed through a healthy diet and physical activity. Within epidemiology, diet can be a determinant of disease which nutrition education can help prevent and control this disease.
Core Competencies Cont.

- Social and Behavioral Science
  While investigating child feeding in a virtual reality buffet and the influences of message framing and parent emotion, I was able to see how different emotional behaviors such as anger or fear impacts the amount of fruits and vegetables served while receiving a certain health message.

- Environmental Health
  Within Dr. Persky’s line of work with virtual reality buffet simulations and regards to my capstone project, environmental health was related in relation to the use of the virtual reality buffet reducing food waste that could have potentially existed if a real buffet was present in the NTECH study.
Core Competencies cont.

- **Health Services Administration**

  Health service administration could be related to my field experience by researchers lobbying to health insurance companies to pay for patients to participate in virtual reality patient research.
Acknowledgements

• National Institutes of Health:
  – Dr. Susan J. Persky PhD

• Kansas State University:
  – MPH Program
  – Dr. Ellyn Mulcahy
  – Barta Stevenson

• Committee Members:
  – Dr. Tandalayo Kidd, Major Professor
  – Dr. Nancy Muturi
  – Dr. Mark Haub

• 249ers:
  – Erika Lindshield
  – Audrey Opoku-Acheampong
  – Yijing Li
  – Yanli Wang

• Family
QUESTIONS?