

DISSERTATION

CHALLENGING THE STATUS QUO: EXPLORING THE USE OF STRATEGIES
FROM BEHAVIORAL ECONOMICS TO SHAPE CHILDREN'S MENUS IN
RESTAURANTS

Submitted by

Mackenzie Jayne Ferrante

Department of Food Science and Human Nutrition

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer 2020

Doctoral Committee:

Advisor: Laura L. Bellows

Susan L. Johnson

Gina Slejko

Jeffrey Miller

Copyright by Mackenzie Jayne Ferrante 2020

All Rights Reserved

ABSTRACT

CHALLENGING THE STATUS QUO: EXPLORING THE USE OF STRATEGIES FROM BEHAVIORAL ECONOMICS TO SHAPE CHILDREN'S MENUS IN RESTAURANTS

Introduction: The poor diet quality of US children has been partially attributed to low fruit and vegetable intake and frequent consumption of restaurant food. Strategies from behavioral economics are acceptable to both parents and children and have increased children's orders of healthful foods in restaurants. However, there are still missing pieces related to parent acceptance and children's consumption of healthful foods.

Therefore, the overarching goal of this dissertation is to investigate the feasibility and acceptability of using behavioral economic strategies in restaurants to alter children's consumption to be more healthful. This goal was addressed using two research objectives:

1a) To examine parent derived and stated preferences for selected attributes of children's restaurant menus, which included behavioral economic strategies, using a conjoint design and, 1b) to segment the participants by derived menu attribute preference to identify patterns in preference for individual menu attributes and overall stated and derived menu choice by participant characteristics, beliefs, health concern, and food practices.

2) To investigate whether altering the choice architecture of children's meals by restructuring the menu using optimal defaults and vice-virtue bundles, will impact ordering of side dishes and consumption of vegetable sides during a restaurant meal.

Study 1: Eight children's menus were designed and integrated into a survey using conjoint design to gather parent appeal to various attributes and the overall menu. Parents of children (4-10 y; n=500) were recruited using Amazon's TurkPrime. A conjoint analysis was conducted to discern parent preference for each of the individual attributes. It revealed parents had a strong preference for choice on side dishes ($\beta=0.73$) and low-priced menus ($\beta=0.51$), and the weakest preference for inclusion of healthful entrees ($\beta=0.04$).

Study 2: Families with 4-8 year old children were recruited to attend three dinner meals. Children's meals consisted of macaroni-and-cheese or chicken tenders and a default side dish [all carrots (150g; Menu-1), small fries (50g)/ large carrots (100g; Menu-2), and small carrots (50g)/ large fries (100g; Menu-3)]. Children could opt out of the default side. Foods offered to children were pre- and post-weighed to determine consumption. Descriptive statistics examined children's ordering behavior and consumption. Repeated measures ANOVA examined the effects on carrot consumption (g) and a paired samples t-test was conducted to test for differences in french fry consumption (g). A majority of children remained with the default side during each of the Menus: Menu 1, 90.2%; Menu 2, 97.6%; Menu 3, 87.8%. Significant differences occurred in children's french fry consumption, ($t = -2.57, p = .014$). No significant differences in children's carrot consumption occurred.

Conclusions: Parents, like most consumers, value choice and options. The use of optimal, vice-virtue bundles was confirmed, showing that not only do children order more healthfully when they are in place, but that children will eat the healthful foods when present. Taken together, results from these two studies show that all stakeholders – children, parents, and restaurateurs - may be able to find a solution that offers both health and taste as a part of children's restaurant meals.

ACKNOWLEDGEMENTS

I will begin by thanking Drs. Laura Bellows and Susan Johnson. I couldn't have asked for better mentors. Dr. Bellows has been instrumental throughout this whole process, trusting me to take on more and given me opportunities to grow as a leader and mentor. Dr. Johnson has challenged me to think critically, allowing me to be a part of her work, and has always been ready with sage advice. You are both one in a million and without you I wouldn't have made it here. I am also very lucky to have the best committee members in Drs. Jeff Miller and Gina Slejko. I would like to thank Dr. Miller for his expertise, positive attitude, and for always bringing treats to meetings. I am forever grateful to Dr. Slejko for teaching me new techniques and for being so supportive.

Thank you to Ken Symsack and Josh Olson for their willingness to be a part of this research. I would like to give a huge thank you to all the students that volunteered to help with the Aspen Grille Research projects. There's no way I could've done any of this without their enthusiasm and hard work. I am also incredibly grateful to the team of the Health Behaviors Lab. Over the past four years I have been surrounded by the most intelligent, hard-working, and wonderful colleagues, who have made the HBL the best place to work. And while she's not a part of the HBL, I'd like to express my gratitude to Dr. Kameron Moding. Dr. Moding has been an incredible cheerleader from day one and has taught me so much about statistics and research.

Thank you to Jennie Davis, Lauren Keeney, and Samantha Brooks for being the most amazing and supportive research cohort, and to Dr. Samantha Ramsay, I am so grateful for your guidance and hope that I've made you proud. I am also incredibly grateful to Renee Herman, Stacy Jeremiah, Liz Sugiura, Jensine Mittet, and Bethany DeBlander for being the best friends a

girl could ask for. You all believed I could get here, even when I didn't, and I will be forever grateful to you for that. To my amazing family, Sherri, Joseph, and Alex Ferrante, your unending support and love is more than I could've hoped for. And finally, to my incredible husband Michael Benedict, there are no words to express how appreciative I am of you. Your constant love and belief in my ability is more than I deserve. I am so grateful to you for your unwavering support of every crazy idea I get in my head. Thank you for everything.

TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
CHAPTER 1: INTRODUCTION.....	1
Overview.....	1
U.S. Children’s Poor Eating Behaviors.....	1
Major Influences: Parents and the Food Environment.....	2
Interventions Aimed at Improving Children’s Intake in Restaurants.....	2
Behavioral Economics: Biases and Leveraging Strategies.....	3
Dissertation Goals and Objectives.....	4
REFERENCES.....	5
CHAPTER 2: LITERATURE REVIEW.....	9
Overview.....	9
The Problem: The poor dining habits of American Children.....	10
Influences On Children’s Dining Habits: Parents And The Food Environment.....	14
Interventions Aimed At Improving Children’s Intake.....	18
Behavioral Economics and Other Novel Tools.....	21
Biases Affecting A Person’s Decision Making And The Strategies That Can Help.....	22
Use Of Behavioral Economic Strategies In Research.....	26
Other Novel Methodologies in the Field of Nutrition: Conjoint Analysis & Crowdsourcing.....	27
Using Behavioral Economics - Dissertation Project Goals.....	28
REFERENCES.....	30
CHAPTER 3: WHAT DO MOM AND DAD THINK? EXAMINING PARENT PREFERENCES FOR BEHAVIORAL ECONOMIC STRATEGIES ON CHILDREN’S MENUS IN RESTAURANTS.....	41
Summary.....	41
Introduction.....	42
Materials and Methods.....	44
Results.....	52
Discussion.....	60
Conclusions.....	63
REFERENCES.....	64
CHAPTER 4: SWITCHING UP SIDES: USING CHOICE ARCHITECTURE TO ALTER CHILDREN’S MENUS IN RESTAURANTS.....	68

Summary	68
Introduction.....	69
Methods.....	71
Results.....	77
Discussion	82
Conclusion	84
REFERENCES	86
CHAPTER 5: DISCUSSION.....	90
Policy Implications	92
Future Research Directions.....	93
Overall Conclusions.....	94
REFERENCES	95
APPENDIX I: IRB APPROVAL – EXAMINING PARENT PREFERENCES FOR THE USE OF BEHAVIORAL ECONOMIC STRATEGIES ON CHILDREN’S RESTAURANT MENUS	98
APPENDIX II: THE FINAL EIGHT MENUS AFTER OPTIMIZATION AND EXPERT REVIEW	100
APPENDIX III: RECRUITMENT DOCUMENTS –TURKPRIME POSTING, STUDY OVERVIEW, AND PARTICIPANT SETTINGS.....	104
APPENDIX IV: QUALTRICS SURVEY INCLUDING PARTICIPANT CONSENT – ABBRIDGED: INTRO, MENU A, DEMOGRAPHICS.....	111
APPENDIX V: ASPEN GRILLE STUDY REVRUITMENT FLYER AND ELIGIBILITY SCREENING QUESTIONNAIRE.....	128
APPENDIX VI: ASPEN GRILLE PARENT PACKET INCLUDING FAMILY CONSENT AND CHILD ASSENT FORMS.....	140
APPENDIX VIII: IRB APPROVAL – HEALTHY BITES: IMPROVING CHILDREN’S MEALS AND DIETARY QUALITY IN THE RESTAURANT SETTING.....	146
APPENDIX IX: ALL MENUS FOR PARENTS AND CHILDREN DURING THE ASPEN GRILLE STUDY	148
APPENDIX X: ASPEN GRILLE CHILD HEIGHT AND WEIGHT COLLECTION FORM	151
APPENDIX XI: ASPEN GRILLE SERVER, BACK-OF-HOUSE, AND OBSERVER TRAINING DOCUMENTS – BASIC TRAINING DOCUMENT AND BACK-OF-HOUSE PLATE WASTE TRAINING PROTOCOL.....	152
APPENDIX XII: ASPEN GRILLE SERVER AND OBSERVER DAILY PROTOCOLS AND FORMS.....	159
APPENDIX XIII: ASPEN GRILLE BACK OF HOUSE FOOD PRE- AND POST-WEIGHT RECORD FORMS.....	163

LIST OF TABLES

Table 1. Attributes, attribute levels, and definitions of attributes used to create menus.	46
Table 2. Optimal array of attribute levels for each of the eight menus	47
Table 3. Survey questions asked according to attribute levels on the presented menu	49
Table 4. Participant characteristics for study sample (n=463).....	53
Table 5. Overall and cluster-separated participant utility scores* for menu attribute levels.....	57
Table 6. Overall stated and derived menu choice and participant beliefs, health concern, and food practices by cluster assignment.....	59
Table 7. Order of Meal Conditions, Meal components offered to parents and children during each condition and amount offered to children	74
Table 8. Participating Families characteristics (n=40)	78
Table 9. Average gram consumption of foods served by Menu condition for participating children.....	81

LIST OF FIGURES

Figure 1. Menu C: Example of the children’s menus used to assess parent preferences and most preferred menu by a majority of participants.....	55
Figure 2. Example of children’s menu used during study: Menu 2.....	75
Figure 3. Children’s Menu Ordering Data for each Menu Condition.....	80

CHAPTER 1: INTRODUCTION

Overview

American children have particularly poor diet quality, which has been partially attributed to low fruit and vegetable intake^{1,2} and frequent consumption of food away from home^{3,4}. Since the 1970's families have been steadily increasing their consumption of food away from home, specifically restaurant foods⁴⁻⁷. Unfortunately children's meals in restaurants are high in fat, saturated fat, sodium, and calories⁶⁻⁸, somewhat due to their large portion sizes^{9,10}, and contain few fruits and vegetables⁷. Myriad strategies to combat the poor nutritional profile of children's meals in restaurants have been enacted, many information-based, but have seen little results^{11,12}. However, the field of behavioral economics has come into the spotlight in recent years and offers a few strategies aimed at impacting children's ordering and consumption in restaurants. Recent studies have shown that the use of behavioral economic strategies (namely optimal defaults) are acceptable to both parents and children¹³⁻¹⁶ and have been able to increase children's orders of healthful foods in restaurants¹⁷⁻²⁰. However, there are still missing pieces related to parents' acceptance of these strategies and children's consumption of healthful foods once presented.

U.S. Children's Poor Eating Behaviors

The Dietary Guidelines for Americans recommend high intakes of fruits and vegetables and reduced intake of sodium, saturated fat, and added sugars²¹ (USDA, 2015). A majority of children, unfortunately, do not meet these goals, consuming little to no fruits or vegetables^{1,2}. While few children meet fruit and vegetable recommendations, there have been large increases in children's consumption of energy-dense foods such as pizza and juice²². Part of this marked

increase in energy-dense foods and poor diet quality may be attributed to children's increased frequency of dining out^{3,5}. Families are now spending almost half of their food dollars in restaurants^{6,23}, and this has major implications for children's diet quality.

Major Influences: Parents and the Food Environment

There are many influences on children's food preferences and eating behaviors, two of the largest being parents and the food environment^{24,25}. Parents are nutritional gatekeepers, and play an immense role in children's frequency of dining out^{14,26,27}. Additionally, parents can have influence over what children order and eat in restaurants^{16,28-30}. While many parents care about health³¹, dining out may also be thought of as special and families may eat less healthful foods during these occasions^{8,28,29}.

The food environment also influences eating behaviors and preferences²⁵. Portion sizes in restaurants have increased substantially since the 1970's^{9,10}, and portion size can affect how much a child eats^{9,32-34}. Children's meals in restaurants are energy dense, and have higher fat, sodium, and more calories compared to meals from home or school^{5-8,35}. Recently, there has been an increase in demand for healthful children's meals in restaurants (CSPI) and restaurants have responded by increasing the number of fruit and vegetable side dishes and offering low-fat milk or water in place of soda^{36,37}. Unfortunately, restaurant executives state that these changes are still unpopular and can lead to food waste¹⁶. The poor nutritional quality of children's restaurant foods has led to a number of interventions aimed at improving children's intake.

Interventions Aimed at Improving Children's Intake in Restaurants

To improve the food environment for children in restaurants, a number of interventions have been employed, many of which are information-based^{11,12,30}. Most notable are the menu

labeling regulations requiring restaurants to post the calories of the various foods offered³⁸.

These information-based strategies have been mildly successful at improving children's intake in restaurants^{11,12,39-41}, illustrating the need for novel and innovative strategies to improve children's consumption in restaurants. The field of behavioral economics offers strategies which may help this cause.

Behavioral Economics: Biases and Leveraging Strategies

Behavioral economics blends insights from psychology with economic theory to help individuals make the best decisions for themselves⁴². Specifically, behavioral economics seeks to leverage the innate biases that make decision making typically difficult⁴², which is helpful in the realm of food and nutrition where individuals make hundreds of food decisions in a day^{43,44}. Two strategies that stand out are the use of optimal defaults (which seek to replace unhealthful defaults with healthful ones)^{45,46} and vice-virtue bundles (which combine healthful and unhealthful foods)⁴⁷. While vice-virtue bundles have yet to be tested on children's meals in restaurants, optimal defaults have gained traction.

Optimal defaults have been shown to alter people's decisions in a wide variety of settings⁴². Recently, they have been used to change children's menu defaults to be more healthful and have resulted in increases in orders of healthful default sides and beverages in restaurant chains^{18,19} and at theme park restaurants¹⁷. However, it is still unknown how optimal defaults may change children's consumption in restaurants. Additionally, parents and children surveyed have said they would be accepting of fruits and vegetable sides with children's meals¹³⁻¹⁶. There is a need for more information from parents related to their preferences for the use of optimal defaults and vice-virtue bundles on children's menus as strategies to deliver those fruit and

vegetable sides to children. These two gaps in the literature will be addressed by this dissertation through two separate, and related projects.

Dissertation Goals and Objectives

The overarching goal of this dissertation is to investigate the feasibility and acceptability of using behavioral economic strategies in restaurants to alter children's consumption to be more healthful. This goal will be addressed via two research objectives:

Objective 1 (Conjoint Study) – 1a) To examine parent derived and stated preferences for selected attributes of children's restaurant menus, which include behavioral economic strategies, using a conjoint design. 1b) To segment the participants by derived menu attribute preference to identify patterns in preference for individual menu attributes and overall stated and derived menu choice and to characterize segments on participant characteristics, beliefs, health concern, and food practices. (Chapter 3)

Objective 2 (Aspen Grille Study) - To investigate whether altering the choice architecture of children's meals by restructuring the menu using optimal defaults and vice-virtue bundles, will impact ordering of side dishes and children's consumption of vegetable sides during a restaurant meal. (Chapter 4)

REFERENCES

1. Banfield EC, Liu Y, Davis JS, Chang S, Frazier-Wood AC. Poor adherence to US dietary guidelines for children and adolescents in the national health and nutrition examination survey population. *J Acad Nutr Diet*. 2016;116(1):21-27.
2. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. *J Nutr*. 2010;140(10):1832-1838.
3. Wootan MG. Children's Meals in Restaurants: Families Need More Help To Make Healthy Choices. *Child Obes*. 2012;8(1):31-33.
4. Poti JM, Popkin BM. Trends in Energy Intake among US Children by Eating Location and Food Source, 1977-2006. *J Acad Nutr Diet*. 2011;111(8):1156-1164.
5. Guthrie JF, Lin B-H, Frazao E. Role of Food Prepared Away from Home in the American Diet, 1977-78 versus 1994-96: Changes and Consequences. *J Nutr Educ Behav*. 2002;34(3):140-150.
6. Saksena MJ, Okrent AM, Anekwe TD, et al. *America's Eating Habits: Food Away From Home, EIB-196*. United States Department of Agriculture, Economic Research Service Economic Information Bulletin. September 2018.
7. Lin B-H, Morrison RM. Food and nutrient intake data: taking a look at the nutritional quality of foods eaten at home and away from home. *Amber Waves*. 2012;10(2):1C.
8. Zoumas-Morse C, Rock CL, Sobo EJ, Neuhaus ML. Children's patterns of macronutrient intake and associations with restaurant and home eating. *J Acad Nutr Diet*. 2001;101(8):923-925.
9. Young LR, Nestle M. The Contribution of Expanding Portion Sizes to the US Obesity Epidemic. *Am J Public Health*. 2002;92(2):246-249.
10. Nielsen SJ, Siega-Riz AM, Popkin BM. Trends in food locations and sources among adolescents and young adults. *Prev med*. 2002;35(2):107-113.
11. Espino JNV, Guerrero N, Rhoads N, et al. Community-Based Restaurant Interventions to Promote Healthy Eating: A Systematic Review. *Prev Chronic Dis*. 2015;12.
12. Glanz K, Hoelscher D. Increasing fruit and vegetable intake by changing environments, policy and pricing: restaurant-based research, strategies, and recommendations. *Prev Med*. 2004;39:88-93.
13. Shonkoff ET, Anzman-Frasca S, Lynskey VM, Chan G, Glenn ME, Economos CD. Child and parent perspectives on healthier side dishes and beverages in restaurant kids' meals: results from a national survey in the United States. *BMC Public Health*. 2018;18(1):56.

14. Henry HKM, Borzekowski DLG. Well, that's what came with it. A qualitative study of US mothers' perceptions of healthier default options for children's meals at fast-food restaurants. *Appetite*. 2015;87:108-115.
15. Anzman-Frasca S, Dawes F, Sliwa S, et al. Healthier side dishes at restaurants: an analysis of children's perspectives, menu content, and energy impacts. *Int J Behav Nutr Phys Act*. 2014;11.
16. Anzman-Frasca S, Folta SC, Glenn ME, et al. Healthier Children's Meals in Restaurants: An Exploratory Study to Inform Approaches That Are Acceptable Across Stakeholders. *J Nutr Educ Behav*. 2017;49(4):285-295.
17. Peters J, Beck J, Lande J, et al. Using healthy defaults in Walt Disney World restaurants to improve nutritional choices. *Journal of the Association for Consumer Research*. 2016;1(1):92-103.
18. Anzman-Frasca S, Mueller MP, Sliwa S, et al. Changes in Children's Meal Orders Following Healthy Menu Modifications at a Regional US Restaurant Chain. *Obesity*. 2015;23(5):1055-1062.
19. McCluskey JJ, Mittelhammer RC, Asiseh F. From Default to Choice: Adding Healthy Options to Kids' Menus. *Am J Ag Econ*. 2012;94(2):338-343.
20. Lopez NV, Folta SC, Glenn ME, Lynskey VM, Patel AA, Anzman-Frasca S. Promoting healthier children's meals at quick-service and full-service restaurants: Results from a pilot and feasibility study. *Appetite*. 2017;117:91-97.
21. U.S. Department of Health and Human Services and U.S. Department of Agriculture. Dietary guidelines for Americans 2015-2020. 8th Edition. Government Printing Office; 2015.
22. Kim SA, Moore LV, Galuska D, et al. Vital signs: fruit and vegetable intake among children-United States, 2003-2010. *MMWR Surveill Summ*.. 2014;63(31):671-676.
23. United States Department of Agriculture, Economic Research Service. Food expenditures, Table 3 – Food away from home: Total expenditures. 2016.
24. Birch L, Savage JS, Ventura A. Influences on the Development of Children's Eating Behaviours: From Infancy to Adolescence. *Can J Diet Pract Res*. 2007;68(1):s1-s56.
25. Sallis JF, Glanz K. The Role of Built Environments in Physical Activity, Eating, and Obesity in Childhood. *The Future of Children*. 2006;16(1):89-108.
26. Lorson BA, Melgar-Quinonez HR, Taylor CA. Correlates of Fruit and Vegetable Intakes in US Children. *J Acad Nutr Diet*. 2009;109(3):474-478.
27. Savage JS, Fisher JO, Birch LL. Parental Influence on Eating Behavior: Conception to Adolescence. *J Law Med Ethics*. 2007;35(1):22-34.

28. McGuffin LE, Price RK, McCaffrey TA, et al. Parent and child perspectives on family out-of-home eating: a qualitative analysis. *Public Health Nutrition*. 2015;18(1):100-111.
29. Pinard CA, Byker C, Harden SM, et al. Influences on Food Away from Home Feeding Practices Among English and Spanish Speaking Parent-Child Dyads. *Journal of Child and Family Studies*. 2015;24(7):2099-2106.
30. Castro IA, Williams CB, Madanat H, et al. Food ordering for children in restaurants: multiple sources of influence on decision making. *Public Health Nutr*. 2016;19(13):2404-2409.
31. McIntosh A, Kubena KS, Tolle G, et al. Determinants of Children's Use of and Time Spent in Fast-food and Full-service Restaurants. *J Nutr Educ Behav*. 2011;43(3):142-149.
32. Kral TVE, Kabay AC, Roe LS, Rolls BJ. Effects of Doubling the Portion Size of Fruit and Vegetable Side Dishes on Children's Intake at a Meal. *Obesity*. 2010;18(3):521-527.
33. Spill MK, Birch LL, Roe LS, Rolls BJ. Eating vegetables first: the use of portion size to increase vegetable intake in preschool children. *Am J Clin Nutr*. 2010;91(5):1237-1243.
34. Benton D. Portion Size: What We Know and What We Need to Know. *Crit Rev Food Sci Nutr*. 2015;55(7):988-1004.
35. Mancino L, Todd JE, Guthrie J, Lin B-H. Food away from home and childhood obesity. *Curr Obes Rep*. 2014;3(4):459-469.
36. Mueller MP, Wilde P, Folta SC, Anzman-Frasca S, Economos CD. Availability of Healthier Children's Menu Items in the Top Selling Quick Service Restaurant Chains (2004–2015). *Am J Public Health*. 2019;109(2):267-269.
37. Batada A, Bruening M, Marchlewicz EH, Story M, Wootan MG. Poor Nutrition on the Menu: Children's Meals at America's Top Chain Restaurants. *Child Obes*. 2012;8(3):251-254.
38. Food, Drug Administration H. Food labeling; nutrition labeling of standard menu items in restaurants and similar retail food establishments. Final rule. *Federal register*. 2014;79(230):71155.
39. Elbel B, Gyamfi J, Kersh R. Child and adolescent fast-food choice and the influence of calorie labeling: a natural experiment. *Int J Obes*. 2011;35(4):493-500.
40. Tandon PS, Zhou C, Chan NL, et al. The Impact of Menu Labeling on Fast-Food Purchases for Children and Parents. *Am J Prev Med*. 2011;41(4):434-438.
41. Sacco J, Lillico HG, Chen E, Hobin E. The influence of menu labelling on food choices among children and adolescents: a systematic review of the literature. *Perspect Public Health*. 2017;137(3):173-181.

42. Thaler RH. *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press New Haven & London; 2008.
43. Guthrie JF. Integrating Behavioral Economics into Nutrition Education Research and Practice. *J Nutr Educ Behav*. 2017;49(8):700-705.
44. Wansink B, Sobal J. Mindless eating: The 200 daily food decisions we overlook. *Environ Behav*. 2007;39(1):106-123.
45. Brownell KD. Thinking forward: the quicksand of appeasing the food industry. *PLoS Med*. 2012;9(7):e1001254.
46. Liu PJ, Wisdom J, Roberto CA, Liu LJ, Ubel PA. Using Behavioral Economics to Design More Effective Food Policies to Address Obesity. *Appl Econ Perspect P*. 2013;36(1):6-24.
47. Liu PJ, Haws KL, Lambertson C, Campbell TH, Fitzsimons GJ. Vice-Virtue Bundles. *Manag Sci*. 2015;61(1):204-228.

CHAPTER 2: LITERATURE REVIEW

Overview

Today, children in the United States (U.S.) have poor eating habits, characterized by little to no fruit or vegetable intake. Further, children's intake of foods away from home (FAFH), specifically at restaurants, has significantly increased over the past few decades. Parents and restaurants are part of the food environment, and have strong influences over foods offered to children during restaurant meals. The food environment has been changing and restaurant foods offered as part of children's meals are characterized by poor nutritional quality. A plethora of behavioral and informational strategies have been used to address children's poor eating behaviors, however interventions aimed at restaurants have been less successful in their attempts. This illustrates the need for novel and innovative methods to address children's restaurant meals.

Nutrition and economics have always gone hand-in-hand, conceptualizing individuals as rational and aiming to give individuals complete information. The novel field of behavioral economics is no exception. Behavioral economics blends economic theory with insights from psychology to address individuals' innate biases. Strategies born from behavioral economic research seek to leverage these biases to make them work for individuals, making healthful choices easier. These strategies, such as optimal defaults and vice-virtue bundles, may be particularly useful in addressing the poor nutritional quality of children's intake in restaurants. Already, these strategies have been shown to improve children's ordering, however questions about their ability to change children's consumption and parents preferences for the use of various strategies remain. The following literature review addresses the relevant topics related

to examining the feasibility and acceptability of using behavioral economic strategies in restaurants to alter children's consumption to be more healthful.

The Problem: The poor dining habits of American Children

Children in the U.S. have notoriously poor eating habits^{1,2}. The Dietary Guidelines for Americans (DGA) recommend that in order to reduce the risk for chronic disease and obesity, individuals should eat meals with at least half the plate containing fruits and vegetables and decrease consumption of sodium, saturated fat, and added sugars³. Unfortunately, children today do not meet these recommendations. Children's low intake of healthful foods, such as fruits and vegetables, has resulted in poor diet quality. Adherence to the DGAs is measured using the Healthy Eating Index (HEI), a way of assessing dietary intake in which higher scores indicate higher adherence to healthful food patterns⁴. Currently, the average HEI score for children is 52 out of 100, and decreases as children age^{1,5}. Children 2 – 18 years are consuming significantly more calories compared to the 1970's (255 more calories each day)^{6,7} and consuming low amounts of healthful foods like vegetables, fruits, and whole grains.^{1,2,8}

Often, the fruit and vegetables children are consuming are in the form of fried potatoes and juice^{2,9}. Children, especially younger ones, consume little to no nutrient-dense vegetables like dark leafy greens and legumes¹, but starchy, potato products² comprise approximately 30% of their total vegetable intake. In fact, the leading vegetable consumed by children is potatoes, in the form of french fries and potato chips⁸. While all children consume adequate amounts of dairy and protein, younger children's diets include foods from the total fruit and whole fruit categories¹. And while children do eat more fruit than vegetables, they still do not meet recommendations for fruit intake⁹. Additionally, children in the US are consuming high amounts of added sugars and fat^{1,2}. Since 1989 there have been marked increases in children's

consumption of energy dense foods like candy, pizza, and fruit juice¹⁰, which all contribute to their poor dietary patterns.

Childhood Overweight And Obesity

The poor dietary habits of children in the US are concerning as they have been identified as a contributing factor to childhood overweight and obesity^{11,12}. Approximately 17% of children in the US between 2 – 18 years are obese¹³, triple that of the number of obese children in 1970¹⁴. Obesity in childhood is likely to continue into adulthood¹⁵ and is associated with several adverse health issues such as metabolic syndrome, cardiovascular disease, diabetes, and increased cancer risk/prevalence¹² and poor psychosocial outcomes including behavior and emotion-regulation issues¹⁶. Poor dietary habits, especially low intake of nutrient dense fruits and vegetables, have also been linked to many cancers, cardiovascular disease, and diabetes^{17,18}. A yearly cost of \$50 Billion has been associated with the health conditions associated with poor dietary behavior¹⁹. The increase in poor dietary habits and obesity in children has been partially attributed to the changing food environment and the increase in eating FAFH⁵.

Children's Food Preferences

Food preferences and eating habits and behaviors are formed early in life and can play a role in childhood obesity^{20,21}. It is well documented that repeated exposure generates liking in children²⁰. In fact, early exposure to foods, like vegetables, leads to greater liking of these foods in adulthood²². Unfortunately, in the US people prefer to eat food that promotes overweight and obesity in place of healthful, nutrient dense foods²¹. For children, taste and preference reign supreme and children prefer foods that are energy dense²¹. Food preferences track into

adulthood, which is why it is important to affect them early²³. Birch (1999) stated that “food preferences influence food selection which promote overweight and obese[ity]” articulating the notion that the food environment today is fantastically different from that of 100 years ago when energy dense foods were scarce²¹. This is concerning as the increased frequency of, FAFH leads to increased frequency of intake of energy-dense, unhealthful foods. This may lead to more normative intake of, and preferences for, these unhealthful foods as they become part of a child’s typical diet.

Children’s Frequency Of Dining Out And Diet Quality

American children are eating at restaurants more frequently, which contributes to their poor dietary quality²⁴. It has been suggested that the increased energy intake and poor dietary quality of US children is partially due to the increase in restaurant foods⁶. Restaurant food is typically comprised of either fast-food/fast-casual food (quick, cheap, and typically ordered and collected from a counter) or full-service (includes a waiter/server and is typically more expensive and a longer dining experience)^{25,26}.

Children’s daily consumption of food has changed such that the largest contributor of food outside the home has shifted away from schools towards restaurants and, in particular, fast food⁶. In the 1970’s fast food provided less than 4% of the daily calories for children 2 – 18 years, whereas currently fast food provides over 16% of a child’s daily calorie intake²⁵. Children’s restaurant consumption is associated with as much as a 55% increase in energy intake, up to an extra 310 calories each day, and a decrease in diet quality (HEI score)^{5,27,28}. Children’s consumption of restaurant foods is exacerbated on the weekends as children are more likely to consume food from a full-service restaurant on the weekend, and fast food on

weekdays²⁶. Additionally, the number of children under the age of 18 consuming fast food has increased since 1999, from approximately 15% to over 30% of children eating fast food at least three times each week²⁹. These trends are even more prevalent among lower socio-economic status (SES) children, increasing from 21% to 43%²⁹.

During 2007 – 2008, almost one-third of children 2 – 11 years were consuming fast food daily²⁶. Increases in FAFH results in displacement of healthful foods such as fruit, whole grains, and vegetables⁵ and lower consumption of healthful nutrients, like fiber³⁰. Increased consumption of FAFH results in higher Sugar Sweetened Beverage (SSB) consumption, and overall increases in sugar, fat, sodium, and saturated fat²⁷, all of which have been indicated in higher risk for chronic diseases and overweight/obesity^{12,13}. These increases in FAFH may be partially due to shifts in American work patterns which have affected eating patterns.

Shifts In American Work Patterns And The Effect On Consumption

Since the early 20th century, there have been significant shifts in the way Americans live, which has affected how they eat^{25,31}. A steadily increasing number of restaurants in the United States paralleled an expanding and travelling workforce^{25,31}. It is common today for both parents in any family to be a part of the workforce, where in the 1970's less than half of families saw dual-parent employment³². Mirroring this shift since the 1970's, there has been a substantial increase in consumption of FAFH, from under 20% of daily calories from foods eaten away from home to now 34% of total daily calories from FAFH^{6,7,25,30}. Further, families have increased the amount of money spent on food outside the home since the 1980's to almost 50% of their total food dollars^{25,33}.

While these trends are nationwide, it is important to note the demographic differences related to families consumption of FAFH, specifically restaurant foods. Those from middle- and high-income, non-Hispanic-white, and high-education families spend the most money on FAFH and eat out more frequently^{25,30,33}. Higher income, high-education families also tend to eat at full-service restaurants more frequently and fast food less frequently than those from low-income families²⁶, however it is unknown if there are differences in diet quality between these groups.

Influences On Children's Dining Habits: Parents And The Food Environment

Influences On Children's Dining Habits: Parents

Children's eating behaviors and preferences are guided by external influences from family and the environment, many of which promote overweight and obesity^{20,34}. Links between childhood obesity and increased frequency of eating out have been identified³⁵. The role of parents cannot be understated as they are nutritional gatekeepers and have immense influence over what children eat both at home and away from home^{8,36,37}. Working parents use FAFH as a coping strategy for busy work schedules³⁸. Parents make the decision to eat out with their families, seeing it as a way to spend quality time with their families^{39,40}. And while fathers' work schedules are an important indicator of a family's use of restaurants, mothers state that children's busy schedules are the biggest reason for the family decision to eat out^{40,41}.

In restaurants, parents have influence over their children's orders, particularly for younger children^{39,42-44}, but parents still allow more autonomy over food choice in restaurants compared to the home setting⁴³. Families may perceive eating out as "special occasions" and

indulge in less healthful foods on these occasions^{28,39,43}. When dining at a restaurant, everyone can choose what they would like to eat, avoiding food rejection and conflict with children^{39,40}.

Health is still an important factor for parents when dining out^{39,41}. Parents view the children's menu as unhealthy, providing foods of lower nutritional quality^{39,41}, but restaurants who put healthful foods and entrees on menus, are perceived to be more socially conscious and parents are more willing to patronize these restaurants⁴⁵. For parents, the automatic pairing of healthful side dishes, such as fruits and vegetables, with the child's entrée during a restaurant meal could be ideal, as it would allow parents to avoid conflict with children during the meal^{37,42,46,47}.

In addition to parents, children also play a central role in their food selection at restaurants. While parents may make the decision to eat out with their children, children are given input on where the family decides to eat out^{39,40} and they typically know what they plan to order during a restaurant meal^{42,44}. When it comes to ordering, younger children typically order their meals from the children's menu, while older children (10 years and up) begin ordering from the adult menu^{42,48}. Liking and preference are important to children, and typically dictate what children decide to eat in a restaurant⁴⁷. Children who regularly eat fruits and vegetables are more receptive to seeing a fruit or vegetable side dish in a restaurant children's meal, as are younger children⁴⁷.

Influences On Children's Dining Habits: The Food Environment

The food environment influences food choice, food acceptance, and obesity^{8,49-51}. Altering the food environment in restaurants may be one way to improve food choice and have a positive influence on children's health^{42,48}. However, restaurant executives say that profit is

the most important factor in making any changes to the food environment^{42,48}. Serving more healthful foods, such as fresh fruits and vegetables and lower calorie foods, is more likely if restaurants can generate higher sales and labor is approximately the same^{42,48}. Unfortunately, children's meals are not profit drivers in restaurants and executives have stated there are low incentives to modify them⁴².

Restaurant executives have indicated that if demand for healthful foods exists, restaurants will offer them, but do not view their job to create demand^{42,48}. However, many executives also believe that consumers may think they want more healthful options but actually prefer to indulge when eating out^{42,48}. Efforts to improve children's menus have demonstrated little proof that they work^{52,53}. Recently, demand for healthful foods on children's menus has increased and there have been a number of healthful options added to children's menus, including options for fruit and vegetable side dishes^{54,55}. But these options are less popular than more traditional children's meals⁴² and a recent review of the improved offerings shows that progress in this area is still limited⁵⁶. This information indicates that restaurant executives feel that any improvements to the consumer diet may fall outside of the purview of the restaurant industry, elevating policy as an important factor. However, it is important to note that restaurants are part of the larger food environment and can have a substantial effect on children's eating behaviors.

Changes in the Food Environment

The food environment has changed substantially, which in turn has affected how much, and what, children are eating⁵⁷. FAFH is now a significant part of modern children's diets⁵⁸ as there has been a steep increase in families' consumption of FAFH since the 1970's³⁰.

Community nutrition environments, like restaurants, are numerous³⁴ and contain myriad poor food choices³⁴. Individuals are more likely to eat out in areas with increased numbers of fast food and sit-down restaurants, illustrating the link between the food environment and restaurant food consumption²⁵.

The food environment is important as it influences eating behaviors³⁴. Portion sizes have increased substantially, and studies have shown that increasing portion sizes will increase children's intake^{57,59-61}. Portion sizes served in restaurants influence what people perceive to be a typical portion size in daily life⁶², affecting not only what's eaten in restaurants, but how much is eaten outside of the restaurant experience⁶³. Foods such as pizza, hamburgers, french fries, and SSB (all commonly served in restaurants) are 2 – 5 times larger than they were in the 1970's and children's intake of these foods has increased substantially^{61,64}. Together, the increases in portion size, number of restaurants, and proliferation of energy-dense foods contribute to an energy-dense food environment resulting in unhealthy food consumption among children.

The Poor Nutritional Quality Of Children's Restaurant Meals

Children's meals in restaurants are of poor nutritional quality⁶⁵. Restaurant meals may make up a small proportion of children's intake, but they offer significantly more calories in each meal compared to school or home foods^{28,66,67}. Restaurant foods contain more calories, are served in larger portions, and are less nutrient-dense than meals from home^{5,30}. Restaurant meals have significantly higher fat, saturated fat, sodium, and cholesterol compared to home meals^{7,25,28}. Restaurant foods are low in fruit, whole grains, dark-green, and red orange

vegetables and when they do contain vegetables, they are less nutrient dense vegetable varieties like potatoes (as fries and chips) and tomatoes (as sauces)⁷.

Of the top 50 restaurant chains in the US, only 22 had children's meals and 99% of those meals were of poor nutritional quality⁶⁵. Menu items ranged between 200 and 1580 calories in a single meal and exceeded recommendations for sodium, total fat, saturated fat, and trans fat⁶⁵. Full-service restaurants and fast food menu items paired with unhealthful sides (e.g., fried potatoes) are more likely to provide greater than 600 calories in a single meal, exceeding recommended amounts for children^{55,63,68}.

In restaurants, children's meals are typically bundled, containing an entrée, at least one side dish, and a beverage⁵⁵. Typical children's entrees are composed of energy-dense, but highly palatable and readily accepted, foods such as burgers, chicken tenders, mac and cheese, grilled cheese, and pizza^{37,42,63,68}. These entrees are then paired, or bundled, with side dishes containing predominantly fried potatoes or fruits and contain a beverage, typically a SSB^{37,63,68}. While a handful of fast food restaurants have made efforts to improve children's meals, such as adding low-fat milk and options for fruits as side dishes, full-service and fast casual restaurants have yet to follow suit⁶⁵. However, there have been no substantive changes in calories, sodium, or saturated fat offered in children's meals, even with these changes⁶⁹. Because of the rise in consumption of restaurant foods, coupled with children's poor eating habits, a number of interventions have been aimed at improving children's vegetable intake.

Interventions Aimed At Improving Children's Intake

Addressing children's inadequate intake of healthful foods, such as vegetables and fruits, is important and has been the focus of myriad intervention strategies^{70,71}. Many different

behavioral and informational strategies have focused on improving children's eating behaviors, specifically aimed at increasing their intake of healthful foods such as fruits and vegetables. Repeated exposure^{72,73}, associative conditioning^{73,74}, decreasing competition for vegetables^{60,75-77}, increasing portion sizes^{59,60,78}, and giving children autonomy in selection^{79,80} are all widely used strategies which have improved children's intake of vegetables. While these methods are promising, they have all been conducted in schools, labs, and homes; however, because of the increased frequency of families dining out it is important to examine the studies that have been conducted in restaurants.

Few of these behavioral strategies have been used in restaurants, instead information-based strategies have been employed. One of the most visible and recent restaurant-based interventions is the public policy enactment of calorie labeling on restaurant menus⁸¹. Menu-labeling regulations started in 2008 in New York City and spread to other municipalities throughout the US, becoming a national policy in 2018^{25,81}. This information-based approach focuses on employing visible calorie counts for food items at the point-of-purchase and relies on consumers becoming more aware of their food decisions and subsequently making healthful choices once they have the necessary information^{25,81,82}. Parents may feel more empowered over their choices and children's choices when restaurants display calorie information, but this has no implications for parents' intent to patronize said restaurants⁴⁵. Studies focused on measuring the effectiveness of menu labeling policy have shown mixed effects⁸³⁻⁸⁷. Specifically related to children's meals, the evidence is much weaker as real-world studies show fewer than 15% of children and parents ordering for children are influenced by menu labeling policy^{83,84,87}, though this may be partially attributed to parents having little knowledge about their children's daily caloric needs⁸⁸.

Other restaurant-based interventions have focused efforts on increasing the availability of healthier foods, promotion of healthier foods, training restaurant staff, and decreasing the prices of healthier foods^{44,89,90}. Typically, these interventions use multiple strategies at the same time to affect change⁸⁹. Studies have combined increased availability with promotion, promotion with increased point-of-purchase information, or staff training with promotion to attempt to improve food choice in restaurants⁸⁹⁻⁹⁵. Reviews of these interventions have revealed an inability to produce beneficial results from the use of these types of informational campaigns^{89,90}.

Restaurant-based interventions to improve children's menus have used similar techniques with similar results^{53,96}. Studies using promotion and increased availability of more healthful children's meals showed initial sales increases, but show subsequent drops in purchases of healthful menu items at 8- and 12-weeks post-intervention^{53,96}. These studies also discuss difficulty recruiting and retaining restaurants due to the substantive menu changes necessary^{53,96}. The decrease in healthful meals purchases and recruitment issues may be reasons why restaurants are reluctant to increase children's menu prices, train servers on promotion of healthful menus, and offer healthful meals due to waste^{53,96}. While promising behavioral strategies to improve children's intake of healthful foods exist, interventions conducted in restaurants have shown little effectiveness. Collectively, the increase in dining away from home, poor nutritional quality of foods, influences from the environment, and lack of sufficient interventions to improve children's meals illustrates the need for novel and innovative approaches to improve children's restaurant meals. One such approach is to use strategies from behavioral economics.

Behavioral Economics and Other Novel Tools

Nutrition and economics have always been linked⁹⁷. Traditional economic theory is grounded in the idea that humans are rational beings and, given complete information, they will make decisions that are in their best interest and maximize utility^{98,99}. Traditional nutrition education and practice is much like traditional economic theory in that it conceptualizes the person as a rational being and seeks to give that person complete nutrition information so that they will make the best, most healthful choices for themselves and their families⁹⁷.

Unfortunately, consumer behavior and decision-making research has shown that people do not always act rationally or in their best interest, especially related to food decisions^{98,100}. This has spawned a new field, behavioral economics, which focuses on people's decision making.

Strategies and insights generated from behavioral economic research may be helpful in the field of nutrition where individuals make hundreds of complex food decisions on a daily basis⁹⁹⁻¹⁰¹.

Behavioral economics is a blend of psychology and economic theory, based on the premise that a number of biases affect a person's ability to make a rational choice in the face of a decision^{98,102,103}. Decisions in today's world are quite complex and any product, be it a box of macaroni and cheese or a new car, comes with a hoard of options and characteristics⁹⁸. These characteristics may influence a person's decisions, even if that person has pre-defined preferences^{98,103,104}, and is especially true when it comes to decision making in food and nutrition, where there are a multitude of food characteristics that may sway a person's food-related decisions¹⁰⁰. One way to help an individual make a decision is to alter the *choice architecture*⁹⁸. This entails rearranging or altering the environment, setting, or context in which a person makes the decision to nudge the person toward one decision or another⁹⁸. To use choice architecture, one would employ various strategies to avoid any pitfalls stemming from

the biases affecting a person's decision making^{98,105}. The following paragraphs will outline the biases that can affect a person's ability to make a rational, or in this case more healthful, decision as well as the strategies proposed by behavioral economics to overcome those biases by altering the choice architecture.

Biases Affecting A Person's Decision Making And The Strategies That Can Help

The following paragraphs will discuss two biases (the status quo bias and present-biased preferences) and five possible strategies to work in tandem with these biases and nudge people toward health (optimal defaults, pre-commitment devices, incentives, positive stimuli, and vice-virtue bundles). To understand these biases it is important to understand how psychologists and behavioral economists view people's thinking. A person has two systems controlling thinking: the hot system and the cool system^{99,102}. The hot system is fast and automatic, operating with no control or oversight¹⁰². The cool system is slow and logical, associated with reasoning and concentration¹⁰². Many of the biases presented below are the result of the hot system helping a person to simplify decisions and negotiate in an overwhelming sea of choices¹⁰⁰. The hot system helps a person reduce the cognitive burden of choice, but, the hot system does not always help a person make the most healthful choice^{99,100}. It is the hot system acting up that can lead to a person's biases in decision-making.

The Status Quo Bias And Optimal Defaults

The *status quo bias* posits that people have a tendency to stick to the current path and remain with whatever pre-existing, or default, option is in place instead of seeking out available alternatives^{98,99,106}. This bias puts organizations and choice architects in a position of power, as

people tend to view the default option as the recommended, popular choice and companies may exploit this^{98,103}. When it comes to food, defaults are typically set at a sub-optimal nutrition level and effect the quantity and quality of food consumed¹⁰⁶. For example, french fries are typically the default side dish on a children's menu at a restaurant, paired with the child's choice of entrée. While healthful options may exist (vegetable and fruit sides), because of people's tendency to remain with the default, the unhealthful choice will end up on the child's plate. Optimal defaults may be one way to for choice architects to leverage this bias^{98,103}.

Optimal defaults refer to restructuring the default options available such that default choices are more healthful^{99,107}. In the previous example, this might mean altering the default on a children's menu so that healthful orange slices are now the default, taking the place of unhealthful french fries. In other forms this might mean having the default portion size of unhealthful foods be smaller than a typical portion, or increasing the portion sizes of healthful foods^{100,108}. This strategy has been tested in a wide variety of settings⁹⁸. Use of optimal defaults in nutrition has led to children's increased consumption of vegetables¹⁰⁹, selection of more healthful sandwiches^{110,111}, and parent's selection of a more healthful breakfast for their child¹¹². Optimal defaults have also been a part of a wide implementation of beverage policy related to children's meals in the U.S.¹¹³.

Present-Biased Preferences, Pre-Commitment Devices, And Incentives

The *present-biased preference* occurs when a person's tendency to favor immediate benefits over any delayed or future benefits is enacted^{99,103,110} and can affect a person's food decisions. People believe they will have greater self-control over their future-selves and therefore can indulge in the present moment⁹⁹. When it comes to food, the immediate taste,

convenience, and satisfaction of eating something palatable, but unhealthy, unfortunately outweighs the long-term satisfaction of eating something healthful^{99,103}. This is partially due to the visceral factors of food, which can enact the hot system and cause individuals to be impulsive^{99,100}. Increasing the convenience of healthful foods may be one way to avoid these pitfalls⁹⁹. Another is the use of *pre-commitment devices*, the act of choosing a food or snack well before the meal or hunger sets in, when a person is more likely to have greater self-control^{99,103}. A pre-commitment device might be used to have a person select their afternoon snack in the morning, just after breakfast, so the person is satiated and the decision may come from the cool-system.

Strategies which play on people's bias toward convenience in the present moment and ability to impose control on their future self may help people avoid their present-biased preferences^{99,103}. Increasing the convenience of health has been shown to increase orders of healthful sandwiches by making them more easily accessible^{110,114}. Pre-commitment devices have also been beneficial as people given the chance to pre order snacks at work¹⁰³ and entrees and vegetables for lunch^{79,80} ate more healthfully when the meals actually occurred.

Incentives are another strategy, which may help to counterbalance a person's present-biased preferences. Incentives are pervasive in the traditional economic literature⁹⁸, but when it comes to behavioral economics, incentives take on a slightly different meaning. *Incentives* seek to modify long-term behavior using nonfood-based rewards that are small and tangible to help people make healthful choices in the present moment¹¹⁵. Incentives are the most controversial, especially with children, as some opponents see it as "bribing"¹¹⁶, however they have been widely tested with children and have resulted in increased choice^{117,118} and consumption of

fruits and vegetables^{116,119} in a school setting. Parents also believe that incentives work and state that their child's only reason for wanting a meal is the toy incentive³⁷.

Positive Stimuli And Vice-Virtue Bundles

The final two strategies, while not directly tied to any biases, are positive stimuli and vice virtue bundles. Use of *positive stimuli* is geared towards increasing the appeal of healthier foods, such as fruits and vegetables, through the use of fun characters, bright images, or messaging that makes the foods more attractive and enhance their appeal^{74,109}. Positive stimuli are widely used in marketing⁸². There has been significant use of character licensing and branding to improve sales of commercial products such as fruits snacks and cereals^{74,82}. However, positive stimuli may also be used to market healthful foods⁸². Use of positive stimuli with children has been shown to enhance vegetable consumption and improve taste ratings of foods^{74,82,109}. This strategy may be one that can enhance the use of other strategies and might be best used in tandem with other strategies outlined above¹⁰⁹.

Vice-virtue bundles are another way to design the choice environment to benefit the individual. Vice-virtue bundles combine a vice, an unhealthful food such as french fries, with a virtue, a healthful food such as a salad^{120,121}. The salience of food and people's innate biases toward convenience are previously mentioned issues that arise in food selection^{100,103,120}. Vice-virtue bundles may help by allowing people to satisfy both the long-term health goal and the instant satisfaction of a less healthful choice^{120,121}. The key is to find the proportion of each that satisfies the consumer, but still benefits them¹²⁰. Vice-virtue bundles are still relatively new in the literature, however preliminary studies show that people prefer smaller proportions of vice ($\frac{1}{4}$ and $\frac{1}{2}$) and warrant further investigation¹²⁰.

Use Of Behavioral Economic Strategies In Research

Optimal defaults, pre-commitment devices, incentives, positive stimuli, and vice-virtue bundles are all possible behavioral economic strategies that can help to make complicated food choices much easier by altering the choice environment. These strategies have been shown to improve children's selection of vegetables and vegetable consumption in schools^{79,80,82,111,116-119}, community settings^{74,112}, and home environments^{109,122}. However, only a few studies have examined the use of these strategies in restaurants. Specifically, these studies have examined the acceptability and use of optimal defaults¹²³⁻¹²⁵.

When it comes to acceptability, both parents and children have stated they would be open to pairing fruits and vegetables with children's entrees in restaurant children's meals^{37,42,46,47}. Children are more willing to accept this if they like the fruits and vegetables being offered⁴⁷. While these results are positive and support the use of optimal defaults, they are limited by social desirability bias^{37,46,47}. Use of techniques to gather perspective on the use of these strategies on restaurant children's menus which alleviate social desirability bias should be explored.

In the case of use, large-scale studies have enacted optimal defaults at theme parks¹²³ and in smaller restaurant chains^{124,125} as part of the children's menu. In each of these studies, the optimal default was put into place as an optimal side dish, replacing unhealthful sides like tater tots and french fries with healthful sides like fruits and vegetables¹²⁵, and an optimal beverage, replacing sugar sweetened beverages with water, milk, or 100% juice^{53,123-125}. Optimal defaults in each of these studies improved children's ordering of healthful options to improve the nutritional quality of children's meals in both quick-service and full-service restaurants^{123,124}.

This included decreasing the calories offered to children by 20 – 170 calories per meal^{46,123}.

Those that have looked at the use of these strategies in restaurants have examined altering the overall choice structure using optimal defaults and incentives but have been limited to examining ordering behavior and have not examined children's consumption.

Other Novel Methodologies in the Field of Nutrition: Conjoint Analysis & Crowdsourcing

In addition to behavioral economic strategies, there are tools, novel to nutrition, which can be used to help researchers observe the restaurant environment and examine the use of behavioral economic strategies in restaurants. Issues of social desirability can arise when using traditional survey methods. A conjoint analysis can alleviate such issues by estimating, or deriving, a person's preferences using an overall evaluation technique, typically rating or choice, in place of using the person's stated, possibly biased initial response^{126,127}. Conjoint analyses are widely used in marketing and related fields¹²⁶⁻¹²⁸ to understand consumer behaviors but are less used in the field of nutrition¹²⁹. One of many psychometric methods, a conjoint analysis uses statistics to derive participant preferences for individual attributes of a product or service^{127,128}. For example, a product like a cheeseburger has various attributes that make it attractive to the customer. Attributes such as the bun (potato or brioche), the cheese (blue, cheddar, or American), the number of patties (1 or 2), and others play a role in a person's preference for that specific burger. A conjoint analysis can discern which attributes matter the most to a person or group of people, simply by having the person rate or choose the overall burger from a set of burgers¹²⁸. Use of this technique may help to deepen understanding of preferences and behavior in the field of nutrition and alleviate social desirability issues.

Another tool novel to the field of nutrition is the use of a crowdsourcing platform, Amazon's Mechanical Turk¹³⁰. Crowdsourcing is a way of collecting information from a large group of people using an online platform¹³¹. Amazon created its platform Mechanical Turk (mTurk) to provide organizations a way to connect to people to complete tasks, or jobs, for money^{130,131}. Recently, social scientists have found substantial benefit to crowdsourcing as it is faster and cheaper for participant recruitment^{130,132}. Using mTurk to crowdsource participants can help to streamline the recruitment process as workers can be prescreened using specific settings on mTurk and payment can be made entirely through Amazon^{130,131}. There are a few biases to be aware of, namely "satisficing" and selection bias. Satisficing is the act of providing "good enough" answers instead of well-thought-out answers, though this is typical of any survey method and can be alleviated through survey design¹³⁰. Selection bias may occur based on the platform's algorithms, which reward workers with a high completion rating^{130,132,133}. This might be alleviated by validating findings through recruitment of other populations using more conventional recruitment methods¹³⁰. Use of crowdsourcing through mTurk in the field of nutrition is promising as long as sound methodology is followed¹³⁰.

Using Behavioral Economics - Dissertation Project Goals

The increase in families eating out and the poor nutrition quality of foods offered to children in restaurants demonstrate the need for strategies to improve the quality of children's consumption in restaurants. There are strategies derived from behavioral economics, which may be of use in restaurants to improve the nutritional quality of children's consumption. Therefore the overarching goal of this dissertation is to investigate the feasibility and acceptability of

using behavioral economic strategies in restaurants to alter children's consumption to be more healthful. This goal was addressed using two research objectives:

Objective 1 (Conjoint Study) – 1a) To examine parent derived and stated preferences for selected attributes of children's restaurant menus, which included behavioral economic strategies, using a conjoint design. 1b) To segment the participants by derived menu attribute preference to identify patterns in preference for individual menu attributes and overall stated and derived menu choice and to characterize segments on participant characteristics, beliefs, health concern, and food practices. (Chapter 3)

Objective 2 (Aspen Grille Study) - To investigate whether altering the choice architecture of children's meals by restructuring the menu using optimal defaults and vice-virtue bundles, will impact ordering of side dishes and children's consumption of vegetable sides during a restaurant meal. (Chapter 4).

REFERENCES

1. Banfield EC, Liu Y, Davis JS, Chang S, Frazier-Wood AC. Poor adherence to US dietary guidelines for children and adolescents in the national health and nutrition examination survey population. *J Acad Nutr Diet.* 2016;116(1):21-27.
2. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. *J Nutr.* 2010;140(10):1832-1838.
3. U.S. Department of Health and Human Services and U.S. Department of Agriculture. Dietary guidelines for Americans 2015-2020. 8th Edition. Government Printing Office; 2015.
4. Liese AD, Krebs-Smith SM, Subar AF, et al. The Dietary Patterns Methods Project: synthesis of findings across cohorts and relevance to dietary guidance. *J Nutr.* 2015;145(3):393-402.
5. Mancino L, Todd JE, Guthrie J, Lin B-H. How food away from home affects children's diet quality. US Department of Agriculture, Economic Research Service (No ERR-104) Washington, DC. 2010.
6. Poti JM, Popkin BM. Trends in Energy Intake among US Children by Eating Location and Food Source, 1977-2006. *J Acad Nutr Diet.* 2011;111(8):1156-1164.
7. Lin B-H, Morrison RM. Food and nutrient intake data: taking a look at the nutritional quality of foods eaten at home and away from home. *Amber Waves.* 2012;10(2):1C.
8. Lorson BA, Melgar-Quinonez HR, Taylor CA. Correlates of Fruit and Vegetable Intakes in US Children. *J Acad Nutr Diet.* 2009;109(3):474-478.
9. Kim SA, Moore LV, Galuska D, et al. Vital signs: fruit and vegetable intake among children-United States, 2003-2010. *MMWR Surveill Summ.* 2014;63(31):671-676.
10. Ford CN, Slining MM, Popkin BM. Trends in dietary intake among US 2-to 6-year-old children, 1989-2008. *J Acad Nutr Diet.* 2013;113(1):35-42. e36.
11. Ogata BN, Hayes D. Position of the Academy of Nutrition and Dietetics: Nutrition Guidance for Healthy Children Ages 2 to 11 Years. *J Acad Nutr Diet.* 2014;114(8):1257-1276.
12. Biro FM, Wien M. Childhood obesity and adult morbidities. *Am J Clin Nutr.* 2010;91(5):1499S-1505S.

13. Ogden CL, Carroll MD, Lawman HG, et al. Trends in Obesity Prevalence Among Children and Adolescents in the United States, 1988-1994 Through 2013-2014. *JAMA*. 2016;315(21):2292-2299.
14. Centers for Disease Control and Prevention, National Center for Health Statistics. Prevalence of childhood obesity in the United States. <https://www.cdc.gov/obesity/data/childhood.html>. 2018.
15. Gordon-Larsen P, The NS, Adair LS. Longitudinal Trends in Obesity in the United States From Adolescence to the Third Decade of Life. *Obesity*. 2010;18(9):1801-1804.
16. Puder JJ, Munsch S. Psychological correlates of childhood obesity. *Int J Obes*. 2010;34:S37-S43.
17. Cooke LJ, Wardle J, Gibson EL, Sapochnik M, Sheiham A, Lawson M. Demographic, familial and trait predictors of fruit and vegetable consumption by pre-school children. *Public Health Nutr*. 2007;7(2):295-302.
18. Steinmetz KA, Potter JD. Vegetables, Fruit, and Cancer Prevention: A Review. *J Acad Nutr Diet*. 1996;96(10):1027-1039.
19. Jardim TV, Mozaffarian D, Abrahams-Gessel S, et al. Cardiometabolic disease costs associated with suboptimal diet in the United States: A cost analysis based on a microsimulation model. *PLoS Med*. 2019;16(12):1-15.
20. Birch L, Savage JS, Ventura A. Influences on the Development of Children's Eating Behaviours: From Infancy to Adolescence. *Can J Diet Pract Res*. 2007;68(1):s1-s56.
21. Birch LL. Development of food preferences. *Annu Rev Nutr*. 1999;19(1):41-62.
22. Wadhwa D, Phillips EDC, Wilkie LM. Teaching children to like and eat vegetables. *Appetite*. 2015;93:75-84.
23. Anzman-Frasca S, Ventura AK, Ehrenberg S, Myers KP. Promoting healthy food preferences from the start: a narrative review of food preference learning from the prenatal period through early childhood. *Obes Rev*. 2018;19(4):576-604.
24. Wootan MG. Children's Meals in Restaurants: Families Need More Help To Make Healthy Choices. *Child Obes*. 2012;8(1):31-33.
25. Saksena MJ, Okrent AM, Anekwe TD, et al. *America's Eating Habits: Food Away From Home, EIB-196*. United States Department of Agriculture, Economic Research Service Economic Information Bulletin. September 2018.
26. Powell LM, Nguyen BT, Han E. Energy Intake from Restaurants Demographics and Socioeconomics, 2003-2008. *Am J Prev Med*. 2012;43(5):498-504.

27. Powell LM, Nguyen BT. Fast-Food and Full-Service Restaurant Consumption Among Children and Adolescents Effect on Energy, Beverage, and Nutrient Intake. *JAMA Pediatr.* 2013;167(1):14-20.
28. Zoumas-Morse C, Rock CL, Sobo EJ, Neuhouser ML. Children's patterns of macronutrient intake and associations with restaurant and home eating. *J Acad Nutr Diet.* 2001;101(8):923-925.
29. Bauer KW, Larson NI, Nelson MC, Story M, Neumark-Sztainer D. Fast food intake among adolescents: Secular and longitudinal trends from 1999 to 2004. *Prev Med.* 2009;48(3):284-287.
30. Guthrie JF, Lin B-H, Frazao E. Role of Food Prepared Away from Home in the American Diet, 1977-78 versus 1994-96: Changes and Consequences. *J Nutr Educ Behav.* 2002;34(3):140-150.
31. Jabs J, Devine CM. Time scarcity and food choices: an overview. *Appetite.* 2006;47(2):196-204.
32. Fullerton HN, Jr. Labor Force Participation: 75 Years of Change, 1950-98 and 1998-2025 Women in the Workforce. *Monthly Labor Review.* 1999(12):3-12.
33. United States Department of Agriculture, Economic Research Service. Food expenditures, Table 3 – Food away from home: Total expenditures. 2016.
34. Sallis JF, Glanz K. The Role of Built Environments in Physical Activity, Eating, and Obesity in Childhood. *The Future of Children.* 2006;16(1):89-108.
35. Gillis LJ, Bar-Or O. Food Away from Home, Sugar-Sweetened Drink Consumption and Juvenile Obesity. *J Am Coll Nutr.* 2003;22(6):539-545.
36. Savage JS, Fisher JO, Birch LL. Parental Influence on Eating Behavior: Conception to Adolescence. *J Law Med Ethics.* 2007;35(1):22-34.
37. Henry HKM, Borzekowski DLG. Well, that's what came with it. A qualitative study of US mothers' perceptions of healthier default options for children's meals at fast-food restaurants. *Appetite.* 2015;87:108-115.
38. Devine CM, Farrell TJ, Blake CE, Jastran M, Wethington E, Bisogni CA. Work conditions and the food choice coping strategies of employed parents. *J Nutr Educ Behav.* 2009;41(5):365-370.
39. McGuffin LE, Price RK, McCaffrey TA, et al. Parent and child perspectives on family out-of-home eating: a qualitative analysis. *Public Health Nutr.* 2015;18(1):100-111.

40. Robson SM, Crosby LE, Stark LJ. Eating dinner away from home: Perspectives of middle-to high-income parents. *Appetite*. 2016;96:147-153.
41. McIntosh A, Kubena KS, Tolle G, et al. Determinants of Children's Use of and Time Spent in Fast-food and Full-service Restaurants. *J Nutr Educ Behav*. 2011;43(3):142-149.
42. Anzman-Frasca S, Folta SC, Glenn ME, et al. Healthier Children's Meals in Restaurants: An Exploratory Study to Inform Approaches That Are Acceptable Across Stakeholders. *J Nutr Educ Behav*. 2017;49(4):285-295.
43. Pinard CA, Byker C, Harden SM, et al. Influences on Food Away from Home Feeding Practices Among English and Spanish Speaking Parent-Child Dyads. *J Child Fam Stud*. 2015;24(7):2099-2106.
44. Castro IA, Williams CB, Madanat H, et al. Food ordering for children in restaurants: multiple sources of influence on decision making. *Public Health Nutr*. 2016;19(13):2404-2409.
45. Lee K, Conklin M, Bordi P, Cranage D. Restaurants' healthy eating initiatives for children increase parents' perceptions of CSR, empowerment, and visit intentions. *Int J Hos Manag*. 2016;59:60-71.
46. Anzman-Frasca S, Dawes F, Sliwa S, et al. Healthier side dishes at restaurants: an analysis of children's perspectives, menu content, and energy impacts. *Int J Behav Nutr Phys Act*. 2014;11.
47. Shonkoff ET, Anzman-Frasca S, Lynskey VM, Chan G, Glenn ME, Economos CD. Child and parent perspectives on healthier side dishes and beverages in restaurant kids' meals: results from a national survey in the United States. *BMC Public Health*. 2018;18(1):56.
48. Glanz K, Resnicow K, Seymour J, et al. How major restaurant chains plan their menus - The role of profit, demand, and health. *Am J Prev Med*. 2007;32(5):383-388.
49. Glanz K, Basil M, Maibach E, Goldberg J, Snyder D. Why Americans eat what they do: taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption. *J Acad Nutr Diet*. 1998;98(10):1118-1126.
50. Hill JO, Wyatt HR, Reed GW, Peters JC. Obesity and the Environment: Where Do We Go from Here? *Science*. 2003;299(5608):853.
51. King SC, Weber AJ, Meiselman HL, Lv N. The effect of meal situation, social interaction, physical environment and choice on food acceptability. *Food Qual Prefer*. 2004;15(7-8):645-653.

52. Ayala GX, Castro IA, Pickrel JL, et al. A Cluster Randomized Trial to Promote Healthy Menu Items for Children: The Kids' Choice Restaurant Program. *Int J Environ Res Public Health*. 2017;14(12).
53. Lopez NV, Folta SC, Glenn ME, Lynskey VM, Patel AA, Anzman-Frasca S. Promoting healthier children's meals at quick-service and full-service restaurants: Results from a pilot and feasibility study. *Appetite*. 2017;117:91-97.
54. Mueller MP, Wilde P, Folta SC, Anzman-Frasca S, Economos CD. Availability of Healthier Children's Menu Items in the Top Selling Quick Service Restaurant Chains (2004–2015). *Am J Public Health*. 2019;109(2):267-269.
55. Sliwa S, Anzman-Frasca S, Lynskey V, Washburn K, Economos C. Assessing the Availability of Healthier Children's Meals at Leading Quick-Service and Full-Service Restaurants. *J Nutr Educ Behav*. 2016;48(4):242-+.
56. Kraak V, Englund T, Misyak S, Serrano E. Progress Evaluation for the Restaurant Industry Assessed by a Voluntary Marketing-Mix and Choice-Architecture Framework That Offers Strategies to Nudge American Customers toward Healthy Food Environments, 2006-2017. *Int J Environ Res Public Health*. 2017;14(7).
57. Benton D. Portion Size: What We Know and What We Need to Know. *Crit Rev Food Sci Nutr*. 2015;55(7):988-1004.
58. Mancino L, Todd JE, Guthrie J, Lin B-H. Food away from home and childhood obesity. *Curr Obes Rep*. 2014;3(4):459-469.
59. Kral TVE, Kabay AC, Roe LS, Rolls BJ. Effects of Doubling the Portion Size of Fruit and Vegetable Side Dishes on Children's Intake at a Meal. *Obesity*. 2010;18(3):521-527.
60. Spill MK, Birch LL, Roe LS, Rolls BJ. Eating vegetables first: the use of portion size to increase vegetable intake in preschool children. *Am J Clin Nutr*. 2010;91(5):1237-1243.
61. Young LR, Nestle M. The Contribution of Expanding Portion Sizes to the US Obesity Epidemic. *Am J Public Health*. 2002;92(2):246-249.
62. Schwartz MB, O'Connell M, Henderson KE, Middleton AE, Scarmo S. Testing Variations on Family-Style Feeding To Increase Whole Fruit and Vegetable Consumption among Preschoolers in Child Care. *Child Obes*. 2015;11(5):499-505.
63. Cohen DA, Lesser LI, Wright C, Story M, Economos CD. Kid's Menu Portion Sizes: How Much Should Children Be Served? *Nutr Today*. 2016;51(6):273-280.
64. Nielsen SJ, Siega-Riz AM, Popkin BM. Trends in food locations and sources among adolescents and young adults. *Prev med*. 2002;35(2):107-113.

65. Batada A, Bruening M, Marchlewicz EH, Story M, Wootan MG. Poor Nutrition on the Menu: Children's Meals at America's Top Chain Restaurants. *Child Obes.* 2012;8(3):251-254.
66. Urban LE, Weber JL, Heyman MB, et al. Energy contents of frequently ordered restaurant meals and comparison with human energy requirements and US Department of Agriculture database information: a multisite randomized study. *J Acad Nutr Diet.* 2016;116(4):590-598. e596.
67. Schoffman DE, Davidson CR, Hales SB, Crimarco AE, Dahl AA, Turner-McGrievy GM. The fast-casual conundrum: Fast-casual restaurant entrees are higher in calories than fast food. *J Acad Nutr Diet.* 2016;116(10):1606-1612.
68. Mueller MP, Anzman-Frasca S, Blakeley CE, Folta SC, Wilde P, Economos CD. Ordering patterns following the implementation of a healthier children's restaurant menu: A latent class analysis. *Obesity.* 2017;25(1):192-199.
69. Moran AJ, Block JP, Goshev SG, Bleich SN, Roberto CA. Trends in Nutrient Content of Children's Menu Items in US Chain Restaurants. *Am J Prev Med.* 2017;52(3):284-291.
70. DeCosta P, Møller P, Frøst MB, Olsen A. Changing children's eating behaviour - A review of experimental research. *Appetite.* 2017;113:327-357.
71. Hendrie GA, Lease HJ, Bowen J, Baird DL, Cox DN. Strategies to increase children's vegetable intake in home and community settings: a systematic review of literature. *Matern Child Nutr.* 2017;13(1):e12276.
72. Wardle J, Cooke LJ, Gibson EL, Sapochnik M, Sheiham A, Lawson M. Increasing children's acceptance of vegetables; a randomized trial of parent-led exposure. *Appetite.* 2003;40(2):155-162.
73. Anzman-Frasca S, Savage JS, Marini ME, Fisher JO, Birch LL. Repeated exposure and associative conditioning promote preschool children's liking of vegetables. *Appetite.* 2012;58(2):543-553.
74. Keller KL, Kuilema LG, Lee N, et al. The impact of food branding on children's eating behavior and obesity. *Physiol Behav.* 2012;106(3):379-386.
75. Redden JP, Mann T, Vickers Z, Mykerezzi E, Reicks M, Elsbernd S. Serving First in Isolation Increases Vegetable Intake among Elementary Schoolchildren. *PloS One.* 2015;10(4).
76. Zellner DA, Cobuzzi JL. Just dessert: Serving fruit as a separate "dessert" course increases vegetable consumption in a school lunch. *Food Qual Prefer.* 2016;48:195-198.

77. Elsbernd SL, Reicks MM, Mann TL, Redden JP, Mykerezi E, Vickers ZM. Serving vegetables first: A strategy to increase vegetable consumption in elementary school cafeterias. *Appetite*. 2016;96:111-115.
78. Mathias KC, Rolls BJ, Birch LL, et al. Serving Larger Portions of Fruits and Vegetables Together at Dinner Promotes Intake of Both Foods among Young Children. *J Acad Nutr Diet*. 2012;112(2):266-270.
79. Rohlfs Domínguez P, Gámiz F, Gil M, et al. Providing choice increases children's vegetable intake. *Food Qual Prefer*. 2013;30(2):108-113.
80. Hanks AS, Just DR, Wansink B. Preordering School Lunch Encourages Better Food Choices by Children. *JAMA Pediatr*. 2013;167(7):673-674.
81. Food, Drug Administration H. Food labeling; nutrition labeling of standard menu items in restaurants and similar retail food establishments. Final rule. *Federal register*. 2014;79(230):71155.
82. Roberto CA, Baik J, Harris JL, Brownell KD. Influence of Licensed Characters on Children's Taste and Snack Preferences. *Pediatrics*. 2010;126(1):88.
83. Elbel B, Gyamfi J, Kersh R. Child and adolescent fast-food choice and the influence of calorie labeling: a natural experiment. *Int J Obes*. 2011;35(4):493-500.
84. Tandon PS, Zhou C, Chan NL, et al. The Impact of Menu Labeling on Fast-Food Purchases for Children and Parents. *Am J Prev Med*. 2011;41(4):434-438.
85. Cohn EG, Larson EL, Araujo C, Sawyer V, Williams O. Calorie Postings in Chain Restaurants in a Low-Income Urban Neighborhood: Measuring Practical Utility and Policy Compliance. *J Urban Health*. 2012;89(4):587-597.
86. Long MW, Tobias DK, Cradock AL, Batchelder H, Gortmaker SL. Systematic Review and Meta-analysis of the Impact of Restaurant Menu Calorie Labeling. *Am J Public Health*. 2015;105(5):e11-e24.
87. Sacco J, Lillico HG, Chen E, Hobin E. The influence of menu labelling on food choices among children and adolescents: a systematic review of the literature. *Perspect Public Health*. 2017;137(3):173-181.
88. Lynskey VM, Anzman-Frasca S, Harellick L, et al. Low parental awareness about energy (calorie) recommendations for children's restaurant meals: findings from a national survey in the USA. *Public Health Nutr*. 2017;20(11):1921-1927.
89. Espino JNV, Guerrero N, Rhoads N, et al. Community-Based Restaurant Interventions to Promote Healthy Eating: A Systematic Review. *Prev Chronic Dis*. 2015;12.

90. Glanz K, Hoelscher D. Increasing fruit and vegetable intake by changing environments, policy and pricing: restaurant-based research, strategies, and recommendations. *Prev Med.* 2004;39:88-93.
91. Economos CD, Folta SC, Goldberg J, et al. A community-based restaurant initiative to increase availability of healthy menu options in Somerville, Massachusetts: Shape Up Somerville. *Prev Chronic Dis.* 2009;6(3):A102-A102.
92. Colby JJ, Elder JP, Peterson G, Knisley PM, Carleton RA. Promoting the selection of healthy food through menu item description in a family-style restaurant. *Am J Prev Med.* 1987;3(3):171-177.
93. Horgen KB, Brownell KD. Comparison of price change and health message interventions in promoting healthy food choices. *Health Psychol.* 2002;21(5):505-512.
94. Fitzgerald CM, Kannan S, Sheldon S, Eagle KA. Effect of a promotional campaign on heart-healthy menu choices in community restaurants. *J Acad Nutr Diet.* 2004;104(3):429-432.
95. Nothwehr FK, Snetselaar L, Dawson J, Schultz U. Promoting healthy choices in non-chain restaurants: effects of a simple cue to customers. *Health Promot Pract.* 2013;14(1):132-138.
96. Ayala GX, Castro IA, Pickrel JL, et al. A restaurant-based intervention to promote sales of healthy children's menu items: the Kids' Choice Restaurant Program cluster randomized trial. *BMC Public Health.* 2016;16.
97. Guthrie JF. Integrating Behavioral Economics into Nutrition Education Research and Practice. *J Nutr Educ Behav.* 2017;49(8):700-705.e701.
98. Thaler RH. *Nudge: Improving decisions about health, wealth, and happiness.* Yale University Press New Haven & London; 2008.
99. Liu PJ, Wisdom J, Roberto CA, Liu LJ, Ubel PA. Using Behavioral Economics to Design More Effective Food Policies to Address Obesity. *Appl Econ Perspect P.* 2013;36(1):6-24.
100. Guthrie JF. Integrating Behavioral Economics into Nutrition Education Research and Practice. *J Nutr Educ Behav.* 2017;49(8):700-705.
101. Wansink B, Sobal J. Mindless eating: The 200 daily food decisions we overlook. *Environ Behav.* 2007;39(1):106-123.
102. Kahneman D. *Thinking, fast and slow.* Macmillan; 2011.

103. Lee MK, Kiesler S, Forlizzi J. Mining Behavioral Economics to Design Persuasive Technology for Healthy Choices. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. 2011.
104. Samson A. The Behavioral Economics Guide 2015 (with an introduction by Dan Ariely). BehavioralEconomics.com; 2015. Accessed May 10, 2020.
105. Johnson EJ, Shu SB, Dellaert BG, et al. Beyond nudges: Tools of a choice architecture. *Mark Let.* 2012;23(2):487-504.
106. Radnitz C, Loeb KL, DiMatteo J, Keller KL, Zucker N, Schwartz MB. Optimal defaults in the prevention of pediatric obesity: from platform to practice. *J Food Nutr Disord.* 2013;2(5):1.
107. Brownell KD. Thinking forward: the quicksand of appeasing the food industry. *PLoS Med.* 2012;9(7):e1001254.
108. Reinders MJ, Huitink M, Dijkstra SC, Maaskant AJ, Heijnen J. Menu-engineering in restaurants - adapting portion sizes on plates to enhance vegetable consumption: a real-life experiment. *Int J Behav Nutr Phys Act.* 2017;14.
109. Cravener TL, Schlechter H, Loeb KL, et al. Feeding Strategies Derived from Behavioral Economics and Psychology Can Increase Vegetable Intake in Children as Part of a Home-Based Intervention: Results of a Pilot Study. *J Acad Nutr Diet.* 2015;115(11):1798-1807.
110. Downs JS, Loewenstein G, Wisdom J. Strategies for Promoting Healthier Food Choices. *Am Econ Rev.* 2009;99(2):159-164.
111. van Kleef E, Seijdell K, Vingerhoeds MH, de Wijk RA, van Trijp HC. The effect of a default-based nudge on the choice of whole wheat bread. *Appetite.* 2018;121:179-185.
112. Loeb KL, Radnitz C, Keller K, et al. The application of defaults to optimize parents' health-based choices for children. *Appetite.* 2017;113:368-375.
113. Mancini S. *Policy changes to reduce unhealthy food and beverage marketing to children in 2016 and 2017.* Rudd Center for Food Policy and Obesity. 2018.
114. Wisdom J, Downs JS, Loewenstein G. Promoting Healthy Choices: Information versus Convenience. *Am Econ J.* 2010;2(2):164-178.
115. Redfern J, Enright G. Summary of the evidence for the role of incentives in health-related behavior change: Implications for addressing childhood obesity. *Annals of Public Health and Research.* 2016;3(3):1042-1046.

116. Just D, Price J. Default options, incentives and food choices: evidence from elementary-school children. *Public Health Nutr.* 2013;16(12):2281-2288.
117. Madden GJ, Price J, Sosa FA. Behavioral economic approaches to influencing children's dietary decision making at school. *Policy Insights Behav Brain Sci.* 2017;4(1):41-48.
118. List JA, Samek AS. The behavioralist as nutritionist: Leveraging behavioral economics to improve child food choice and consumption. *J Health Econ.* 2015;39:135-146.
119. Loewenstein G, Price J, Volpp K. Habit formation in children: Evidence from incentives for healthy eating. *J Health Econ.* 2016;45:47-54.
120. Liu PJ, Haws KL, Lambertson C, Campbell TH, Fitzsimons GJ. Vice-Virtue Bundles. *Manag Sci.* 2015;61(1):204-228.
121. Haws KL, Liu PJ. Combining food type(s) and food quantity choice in a new food choice paradigm based on vice-virtue bundles. *Appetite.* 2016;103:441-449.
122. Leak TM, Swenson A, Vickers Z, et al. Testing the Effectiveness of In-Home Behavioral Economics Strategies to Increase Vegetable Intake, Liking, and Variety Among Children Residing in Households That Receive Food Assistance. *J Nutr Educ Behav.* 2015;47(2):E1-E9.
123. Peters J, Beck J, Lande J, et al. Using healthy defaults in Walt Disney World restaurants to improve nutritional choices. *Journal of the Association for Consumer Research.* 2016;1(1):92-103.
124. Anzman-Frasca S, Mueller MP, Sliwa S, et al. Changes in Children's Meal Orders Following Healthy Menu Modifications at a Regional US Restaurant Chain. *Obesity.* 2015;23(5):1055-1062.
125. McCluskey JJ, Mittelhammer RC, Asiseh F. FROM DEFAULT TO CHOICE: ADDING HEALTHY OPTIONS TO KIDS' MENUS. *Am J Ag Econ.* 2012;94(2):338-343.
126. Lee SJ, Cranage DA. The relative importance of menu attributes at point of menu selection through conjoint analysis: Focused on adolescents. *J Foodserv Bus Res.* 2007;10(2):3-18.
127. Carroll JD, Green PE. Psychometric methods in marketing research: Part I, conjoint analysis. *J Mark.* 1995;32(4):385-391.
128. Hauser JR. Note on conjoint analysis. *Unpublished manuscript, MITSloan Management* Retrieved from <http://www.mit.edu/~hauser/Papers/NoteonConjointAnalysis.pdf>. 2007.

129. Drewnowski A, Moskowitz H, Reisner M, Krieger B. Testing consumer perception of nutrient content claims using conjoint analysis. *Public Health Nutr.* 2010;13(5):688-694.
130. Beto JA, Metallinos-Katsaras E, Leung C. Crowdsourcing: A Critical Reflection on This New Frontier of Participant Recruiting in Nutrition and Dietetics Research. *J Acad Nutr Diet.* 2020;120(2):193-196.
131. Litman L, Robinson J, Abberbock T. TurkPrime.com: A versatile crowdsourcing data acquisition platform for the behavioral sciences. *Behav Res Methods.* 2017;49(2):433-442.
132. Mason W, Suri S. Conducting behavioral research on Amazon's Mechanical Turk. *Behav Res Methods.* 2012;44(1):1-23.
133. Paolacci G, Chandler J, Ipeirotis PG. Running experiments on amazon mechanical turk. *Judgment and Decision making.* 2010;5(5):411-419.

CHAPTER 3: WHAT DO MOM AND DAD THINK? EXAMINING PARENT
PREFERENCES FOR BEHAVIORAL ECONOMIC STRATEGIES ON CHILDREN'S
MENUS IN RESTAURANTS¹

Summary

Background: A majority of children's restaurant meals are nutritionally deficient; use of behavioral economic strategies may improve healthfulness. Parents play a role in children's restaurant meal selection, thus understanding parent preferences and potential behavioral economic strategies for healthful children menu options is warranted. **Objective:** To examine parent derived and stated preferences for selected attributes of children's restaurant menus, which included behavioral economic strategies, using a conjoint design. **Study Design:** A descriptive, cross-sectional survey integrating a conjoint design was developed along with 8 children's menus. Menus were manipulated by varying levels of attributes [meal price, healthful side dishes, number of side dish items, healthful entrees, and cost for sugar-sweetened beverages (SSB)]. Parents with children 4–10 years were recruited via Amazon's Mechanical Turk and asked to rate menus using an 11-point Likert scale (0=Not at all appealing, 10=Very appealing). **Analysis:** A conjoint (regression) analysis was conducted to discern parent preference for each attribute and an overall menu preference. Descriptive statistics (means) were used to describe overall parent menu preferences and ratings. Cluster analysis was used to segment participants into groups with similar preferences. **Results:** Ratings were generally high for the menus ($\mu=6.7$, $SD=2.4$). Parents ($n=463$) had the strongest preference for choice on side dishes ($\beta=0.73$) and low-priced menus ($\beta=0.51$). Parents reported the weakest preference for inclusion of healthful

¹ The contents of this chapter will be submitted for publication as a manuscript.

entrees ($\beta=0.04$) and SSB ($\beta=0.18$). The most preferred menu selected (60.7%, $n=281$) included a low price, no bundled side (choice of side dish from multiple options), choice of two sides, healthful entrée present, and an additional \$1 for SSB. Cluster analysis revealed some parents who prefer more healthful menus and some parents who prefer less healthful, more conventional menus. **Conclusion:** Parents selected a socially desirable menu with healthful options and cost for SSB, contrary to the conjoint derived menu preferences. This discrepancy, along with derived preferences for multiple side dish options, could have implications for which behavioral economic strategies may be effective to improve quality of children's meals in restaurants, as parents' true interest in healthful entrees is undetermined.

Introduction

Parents are nutritional gatekeepers for children, playing an important role in providing food for children both at home and away from home¹. Food consumed away from home has become part of the normal routine for children and families in the United States (US) as families are eating out more than ever². Unfortunately, the diet quality of US children is poor^{3,4} and increased frequency of dining out has been associated with increased calorie intake⁵ and decreased fruit and vegetable intake^{6,7}. Children's restaurant meals are of particularly poor quality as they are high in calories, fat and sodium⁸.

The increase in dining out and consumer desire for a multitude of choices⁹, has led to an uptick in the number of foods offered in restaurants¹⁰. Foods are typically presented as part of a menu, used to display what and how children can order foods. Menus have various attributes (i.e., particular aspects or features) such as side dishes, menu price, and featured entrees, which may, or may not make a menu appealing to children and parents. It is common to see children's

entrees combined with highly palatable, energy-dense sides, such as french fries or tater tots, and sugar-sweetened beverages (SSB)¹¹⁻¹⁴. Large numbers of foods, displayed within these attributes, can cause decision-making to be challenging for parents and children¹⁵. A wide variety of interventions and policies have attempted to improve the nutrition environment for children in restaurants¹⁶⁻¹⁸. These interventions, which seek to nudge children in the right direction using behavioral economics and choice architecture to alter the attributes of children's menus, show promise.

Behavioral economic and other interventions aimed at nudging healthier food choice include: (1) use of optimal defaults, which switch out unhealthful sides and beverages with healthful ones^{12,13,17}; (2) a decrease in the portion sizes offered¹⁹; (3) the addition of healthful entrees^{8,12,13,19}; and (4) use of vice-virtue bundles to pair more palatable, energy-dense foods with more healthful foods^{20,21}. Optimal defaults and other behavioral economic strategies have been shown to improve orders of healthful children's meals in restaurants^{12,13} as well as consumption of healthful foods²². Further, surveyed parents liked the idea of bundling healthful sides with their child's entrée, but wanted to be able to choose the side dish²³. Previous studies have also indicated that children would be open to fruit or vegetable side dishes^{24,25}. Liu et al. (2015) found that use of vice-virtue bundles was satisfying to consumers for the ability to pair taste with health²⁰.

Parents have influence over what children order in restaurants, especially with younger children²⁶⁻²⁸. Since parents are nutritional gatekeepers, playing an important role in children's consumption and food choice in restaurants, it is important to understand their preferences for the use of the aforementioned strategies on children's menus. Use of marketing-based techniques can help to gather information related to consumer preferences by having participants make real-

world assessments²⁹; thus gleaning a deeper understanding of underlying preferences that consumers themselves may not be aware of³⁰. Previous research in this area has been largely qualitative in nature^{23,27,31}. Traditional survey methods may help to understand some aspects of parent preferences, but as with self-reported data, social desirability may be an issue. One method to overcome this issue is use of conjoint analysis, which derives preferences (i.e., estimates underlying preferences using statistics) instead of only using stated preferences (i.e., judgments from direct questions)²⁹. Conjoint analysis, a statistical technique widely used in marketing, determines how much a person values various attributes of a product or service and how much those attributes might contribute to overall preference²⁹.

Because many interventions and policies are aimed at changing children's menu attributes, it is important to understand parent preferences related to children's menus as they influence children's food intake. Therefore, the aim of this research was to examine parent derived and stated preferences for selected attributes of children's restaurant menus, which included behavioral economic strategies, using a conjoint design. The secondary aim sought to segment the participants by derived menu attribute preference to identify patterns in preference for individual menu attributes and overall stated and derived menu choice by participant characteristics, beliefs, health concern, and food practices.

Materials and Methods

Study design. A descriptive, cross-sectional online survey targeting parents in the US with at least one child between 4 – 10 years of age was created using a conjoint design. Participants were recruited using Amazon's TurkPrime, a crowdsourcing, data collection tool, to complete the survey administered via Qualtrics (Qualtrics Labs Inc, Provo, UT, USA), a survey-building and administration software. Participants were paid \$1.00 for their participation in the

study and the survey took approximately 15 minutes to complete. This study was approved by Colorado State University Institutional Review Board (Appendix I).

Development of menu attributes and attribute levels. A review of children's menus from local restaurants and top chain restaurants and an examination of relevant literature informed the selection of menu attributes for use on the children's menus. Selected attributes included: bundled side dishes (optimal defaults, suboptimal defaults, and active choices), menu price (high and low), presence or absence of a healthful entrée, presence or absence of vice-virtue bundles, and an increased price for sugar-sweetened beverages (\$1 or \$0; SSB), and are defined in Table 1. A full-profile conjoint design was developed from the five attributes. Children's menus featured all five attributes at various levels yielding 48 possible menu combinations ($3 \times 2 \times 2 \times 2 \times 2 = 48$). An optimal array of 8 menus, in place of the 48 possible menus, was created using SPSS v. 26 (Armonk, NY: IBM Corp., 2017) to reduce participant burden (Table 2; Appendix II).

Table 1. Attributes, attribute levels, and definitions of attributes used to create menus.

Attributes	Attribute Levels
<p>Bundled Side Dish</p> <p>Whether or not the side dish is presented as a pre-chosen combination with the entrée or as a separate choice the consumers must make themselves.</p>	<p>a. Optimal Default: The side dish presented with the entrée was an optimal, or more healthful side dish (e.g., vegetables or fruits).</p> <p>b. Suboptimal Default: The side dish presented with the entrée was sub-optimal, or what is typically found on children’s menus (e.g., french fries or chips).</p> <p>c. Active Choice: The side dishes were not be presented in combination with the entrée but as a separate choice the consumer must make on top of choosing their entrée.</p>
<p>Healthful Entrée</p> <p>The inclusion or exclusion of an entrée considered more healthful (lower fat, lower calories, mimicking what meets Kids LiveWell standards).</p>	<p>a. Present: There was a healthful entrée (one that is commonly found on Kids LiveWell menus and is likely lower in calories, fat, and sodium) featured with a graphic or text to indicate this entrée was more healthful than the others (e.g., a banner or stamp).</p> <p>b. Absent: No healthful entrée was presented on the menu as an option. The menu only had typical entrée options (e.g., burger, pizza, macaroni).</p>
<p>Vice-Virtue Combinations</p> <p>Combination of two side dishes, one healthful and one unhealthy in varying proportions</p>	<p>a. Two Side Options: The vice-virtue combination appeared, indicating two side dish options were present, one being more healthful than the other.</p> <p>b. One Side Option: The vice-virtue combination was not present, indicating only one side dish option was present.</p>
<p>Menu Price</p> <p>The price of the given children’s menu</p>	<p>a. High – \$7.99</p> <p>b. Low - \$5.99</p>
<p>Beverage (Increased SSB Price)</p> <p>The addition of Sugar Sweetened Beverages and the cost of that beverage (if any).</p>	<p>a. \$0 – Included in Choice: The SSB (sodas and lemonade) was included in the beverage choice for the meal and did not require additional money.</p> <p>b. \$1 – Must be added: The SSB (sodas and lemonade) was not included in the meal and required an additional payment of \$1.00 to purchase.</p>

Table 2. Optimal array of attribute levels for each of the eight menus

Menu	Bundled Side Dish ^a			Healthful Entrée		Vice-Virtue		Price		Beverage (SSB Price)	
	Optimal	Suboptimal	Active	Absent	Present	One	Two	High	Low	\$1	\$0
	Default	Default	Choice			Option	Options				
A	X			X			X		X		X
B	X			X		X			X	X	
C			X		X		X		X	X	
D	X				X		X	X			X
E	X				X	X		X		X	
F		X			X	X			X		X
G			X	X		X		X			X
H		X		X			X	X		X	

^aBundled side dish definitions: Optimal - The side dish presented with the entrée will be a more healthful side dish (e.g., vegetables or fruits). Suboptimal Default - The side dish presented with the entrée will be what is typically found on children’s menus (e.g., french fries or chips). Active - The side dishes will not be presented in combination with the entrée but as a separate choice the consumer must make on top of choosing their entrée.

^bVice Virtue definition: Combination of two side dishes, one healthful and one unhealthy in varying proportions

The initial 8 menus underwent review by experts in nutrition, marketing, and hospitality management (n=3) as well as parents (n=3) with children in the intended age range to establish content validity. After this review, minor changes were made to the menu prices, listed side dishes, menu formatting, and entrée descriptions. The final menus were then added into the online survey (Figure 1) accompanied by liking and satisfaction Likert scales and an overall appeal scale as essential for a conjoint design. The survey, in its entirety, was then reviewed by the same expert panel. Questions were reorganized for clarity and Likert ranking scales for the individual attributes were added for each menu. Prior to dissemination, cognitive interviews were conducted with a convenience sample of parents (n=5) to establish face validity of the survey.

After the cognitive interviews, no questions were changed or removed as participants confirmed the clarity of the questions and menus.

Online survey procedures and participants. A power calculation using Qualtrics Sample Size Calculator (Qualtrics, Provo, UT, 2019) conducted with a sample of 37,000,000 million families (an approximate population size of US families), a 95% confidence level, and 5% margin of error suggested a sample size for the survey of 385 participants. The TurkPrime parameters were set to 500 participants to account for participants with missing or incomplete data. Inclusion criteria set using TurkPrime and Qualtrics were as follows: participants had to be over 18 years, live in the US, and have at least one child between 4 – 10 years of age (Appendix III).

The survey was conducted in three parts (Appendix IV). Part one, consisted of an orientation page that briefly described the survey. Then participants were asked to answer two questions about their children's ages. These two questions acted as an attention check to help ensure participants were engaged with the survey purpose and procedures. In part two, the main conjoint portion of the survey, each of the 8 optimized menus were presented in a random order followed by a series of Likert scale questions including: individual attribute rankings, various liking and satisfaction scales, and an overall appeal scale (Table 3). As the last question of part two, participants were asked to select their overall preferred menu from the eight children's menus. Part three of the survey assessed participant characteristics, including health concern³¹, frequency of dining out by restaurant type (fast food, fast-casual, delivery, and sit-down), children's frequency of ordering off the children's menu, and importance of health at home and away from home. Finally, participants were asked a series of demographic questions including age, relationship to child, income, and education.

Table 3. Survey questions asked according to attribute levels on the presented menu

Attribute	Level	Question	Scale
Bundled side dish ^a	Active	How appealing is the INCLUDED SIDE DISH (Choice of side/Choice of two sides) on the menu?	1 = Very unappealing, 5 = Very appealing
	Optimal	How appealing is the INCLUDED SIDE DISH (Carrot sticks/large side carrot sticks and a small fry) on the menu?	1 = Very unappealing, 5 = Very appealing
		If your child were to receive the included side dish with their entrée, approximately how of the CARROT portion of the side dish would they eat?	1 = None of the carrots, 5 = All of the carrots
		How likely would you be to order, or allow your child to order, a side dish that is not included with the meal?	1 = Very unlikely, 5 = Very likely
	Sub-optimal	How appealing is the included side dish (French fries) on the menu?	1 = Very unappealing, 5 = Very appealing
		If your child were to receive the included side dish with their entrée, approximately how of the FRENCH FRY portion of the side dish would they eat?	1 = None of the fries, 5 = All of the fries
How likely would you be to order, or allow your child to order, a side dish that is not included with the meal?		1 = Very unlikely, 5 = Very likely	
Price	High	How appealing is the PRICE (\$7.99) of the menu?	1 = Very unappealing, 5 = Very appealing
	Low	How appealing is the PRICE (\$5.99) of the menu?	1 = Very unappealing, 5 = Very appealing
Vice Virtue	Absent	How appealing is the included side dish (Choice of side/Carrot sticks/French fries) on the menu?	1 = Very unappealing, 5 = Very appealing
	Present	How appealing is the included side dish (Choice of two sides/Large side carrot sticks and small side french fries/Large side french fries and small side carrot sticks) on the menu?	1 = Very unappealing, 5 = Very appealing
Price for SSB	\$1	How appealing are the DRINKS included (water, milk, or 100% fruit juice) included on the menu?	1 = Very unappealing, 5 = Very appealing
		How likely would you be to order, or allow your child to order, a drink that is not included	1 = Very unlikely,

		with the meal (soda or lemonade)?	5 = Very likely
	\$0	How appealing are the DRINKS included (soda, lemonade, milk, or 100% fruit juice) of the menu?	1 = Very unappealing, 5 = Very appealing
Healthy entree	Absent	How appealing is the selection of CHILDREN'S ENTREES included on the menu?	1 = Very unappealing, 5 = Very appealing
	Present	How appealing is the selection of CHILDREN'S ENTREES included on the menu?	1 = Very unappealing, 5 = Very appealing
All Menus		How satisfied would YOU be if this menu were presented at your local, family restaurant?	1 = Very dissatisfied, 5 = Very satisfied
		How satisfied would YOUR CHILD be if this menu were presented at your local, family restaurant?	1 = Very dissatisfied, 5 = Very satisfied
		Overall, how appealing is this children's menu to you as a parent?	0 = Not at all appealing, 10 = Very appealing

^aBundled side dish definitions: Optimal - The side dish presented with the entrée will be a more healthful side dish (e.g., vegetables or fruits). Suboptimal Default - The side dish presented with the entrée will be what is typically found on children's menus (e.g., french fries or chips). Active - The side dishes will not be presented in combination with the entrée but as a separate choice the consumer must make on top of choosing their entrée.

^bVice Virtue definition: Combination of two side dishes, one healthful and one unhealthful in varying proportions

*SSB – Sugar Sweetened Beverages

Statistical analysis. Visual examination of the data determined normality prior to data analysis. Descriptive statistics (means, percent, frequencies) were used to calculate demographic information. A conjoint analysis was conducted to examine participant preference for each attribute and attribute level of the children's menus. Participant responses to each menu's overall appeal was used as the dependent variable and attribute levels for each menu were used as the independent variables, as in the following model:

$$Y = \text{intercept} + b_1\text{Price}_{\text{high}} + b_2\text{Price}_{\text{low}} + b_3\text{Side}_{\text{active}} + b_4\text{Side}_{\text{optimal}} + b_5\text{Side}_{\text{suboptimal}} + b_6\text{ViceVirtue}_{\text{present}} + b_7\text{ViceVirtue}_{\text{absent}} + b_8\text{HealthyEntree}_{\text{present}} + b_9\text{HealthyEntree}_{\text{absent}} + b_{10}\text{SSBPrice}_{\text{high}} + b_{11}\text{SSBPrice}_{\text{low}}$$

The conjoint analysis calculated the individual participant's derived preference as a utility score (similar to beta weights in regression analysis) for each level of the five menu attributes²⁹. The conjoint analysis also calculated the overall utility for each attribute level from all participants. Derived menu preference for the overall participant sample was calculated using overall utility scores. By adding the overall utility scores together for each menu based on the presence of the various attribute levels, overall derived menu preference was calculated. The highest scored menu indicated the highest preferred menu.

Descriptive statistics (means, percent, frequencies) were used to calculate participant responses to overall menu preference, individual menu attribute appeal, children's approximate intake of side dishes, likelihood of ordering an alternate side dish, and remaining survey information.

A k-means cluster analysis was performed using individual participant utility scores for menu attributes to segment participants into groups with similar derived preferences and answer the second aim. To select the final cluster set, all cluster information was examined for

meaningful separation of data and scree plots were assessed for group separation. A 4-cluster set was selected as the best representation based on data separation and scree plots. Using a smaller number of clusters facilitated the ease of data interpretation³². The final clusters resulted in each participant belonging to a cluster and each cluster's overall utility scores for the attribute levels. Cluster names reflect the strongest preferences in that cluster.

To identify trends in utility scores and participant characteristics for each of the 4 clusters, descriptive statistics (means, percent, and frequencies) were used. To identify differences in menu preferences and survey responses among clusters, Kruskal-Wallis tests were conducted and significance was set at $p \leq 0.05$. Pairwise comparisons further analyzed differences between clusters, significance was set at $p \leq 0.05$ and adjusted using the Bonferroni correction for multiple tests. SPSS v26.0 (Armonk, NY: IBM Corp., 2017) was used for all statistical calculations.

Results

Four-hundred and ninety-five participants responded to the TurkPrime posting. A total of 32 participants were excluded from analysis as their responses revealed a lack of engagement (e.g., responded with 0's on every question; $n=21$) or the inability to pass the attention check ($n=11$); leaving 463 participants. Participant characteristics are provided in Table 4.

Table 4. Participant characteristics for study sample (n=463)

	% (n)
Relationship to child	
Mother	63.9 (296)
Father	34.8 (161)
Marital Status	
Now Married or committed	80.1 (371)
Single	11.4 (53)
Age (y)	
25 – 34	41.3 (191)
35 – 44	46.2 (214)
45 – 55	10.8 (50)
Highest level of Education completed	
≤ High School/GED	8.2 (38)
Some college/Tech/Associates	43.8 (203)
College Degree	37.4 (173)
≥ Graduate Degree	10.5 (49)
Current Employment Status	
Employed Full Time	64.4 (298)
Employed Part Time	12.1 (56)
Homemaker	13.8 (64)
Family Income (per y)	
< \$24, 999	7.3 (34)
\$25,000 – \$47,000	22.5 (104)
\$47,001 – \$77,000	34.3 (159)
> \$77,001	35.2 (163)
	Mean (SD)
Number of children in the household	2.1 (2.0)
Age of youngest child between 4 – 10 y	6.3 (2.0)

Conjoint analysis: participant derived menu preferences. Participants displayed a strong preference for menus featuring an active choice side dish ($\beta=0.73$) and a low menu price ($\beta=0.51$). The weakest preference was for menus with a healthful entrée present ($\beta=0.04$). The various levels of the 5 attributes, sorted by their overall utility score from highest to lowest, are displayed in Table 5. Derived menu preference from the overall participant sample, using the overall participant utility scores, was for Menu C (Figure 1). The attributes from Menu C included: a low price, active choice side, vice-virtue, healthful entrée present, and an additional \$1 for SSB.

KIDS MENU

For our guests 10 years and under

All kids meals come with choice of two sides:
French Fries, Potato Chips, Applesauce,
Fresh Carrot Sticks, Fresh Fruit, or Steamed Broccoli.

*Choice of drink: Milk, Water, or 100% Fruit Juice

Choose from the following options

\$5.99

HEALTHY
CHOICE!

GRILLED CHICKEN

Chicken breast, grilled and cut into strips served w/ choice of sauce

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Soda or Lemonade may be substituted for \$1.00 more

Figure 1. Menu C: Example of the children's menus used to assess parent preferences and most preferred menu by a majority of participants

Participant stated preferences for children's menu attributes. Ratings were generally high for the menus ($\bar{x}=6.72$, $SD=2.4$, with 10 being the highest possible rating). The highest rated menu was Menu C ($\bar{x}=8.18$, $SD=1.95$). The lowest rated menu was Menu E ($\bar{x}=5.54$, $SD=2.45$), which included: a high price, an optimal default side dish, one side option, healthful entrée, and an additional \$1 for SSB. A majority of participants chose Menu C as their most preferred menu (60.7%, $n=281$).

Participants rated menu entrees ($\bar{x}=3.94$, $SD=0.87$) and drink choices ($\bar{x}=3.95$, $SD=0.92$) as generally appealing. The prices of the menus were seen as slightly less appealing ($\bar{x}=3.49$, $SD=1.26$) as were side dishes ($\bar{x}=3.67$, $SD=1.12$). Parents stated their children would eat most or all of the french fries bundled (71.2%) with an entrée (Menus A, D, F, and H) and just over one-third of parents (34.1%) stated their child would eat most or all of the carrots bundled with the entrée (Menus A, B, D, E, and H). Just over one-third of parents were likely or very likely (34.2%) to order an alternate drink when SSB cost \$1 (Menus B, C, E, and H) and some parents were likely to order an alternate side dish (29.6%) when carrots or carrots and french fries were bundled with their child's entrée (Menus A, B, D, E, F, and H).

Participant segmentation using cluster analysis. A 4-cluster analysis resulted in the most appropriate division of participants (Table 5). Cluster 1 ($n=225$), the "majority" cluster, is defined by weak preferences for all attributes, where the strongest preference was for a low-priced menu ($Price_{low}=0.38$) followed by the availability of choice ($Side_{active}=0.19$, $ViceVirtue_{present}=0.13$). Compared to the remaining clusters, the preferences of the majority cluster were not strongly defined by any single attribute. Cluster 2 ($n=80$), the "choice" cluster, was more strongly in line with choice ($Side_{active}=1.51$). Cluster 3 ($n=77$), the "health" cluster, is strongly defined by dislike for unhealthful side dishes ($Side_{suboptimal}=-1.53$), preference for the

presence of healthful entrees ($\text{HealthyEntree}_{\text{present}}=0.22$), and willingness to incur an additional cost for SSB ($\text{SSBPrice}_{\text{high}}=0.27$). Cluster 4 ($n=81$), the “kid food” cluster, has a strong preference for a low-priced menu ($\text{Price}_{\text{low}}=0.93$), included SSB ($\text{SSBPrice}_{\text{low}}=0.85$), and a strong preference against healthful side dishes ($\text{Side}_{\text{optimal}}=-1.66$).

Table 5. Overall and cluster-separated participant utility scores* for menu attribute levels

Menu Attribute	Level	Utility				
		Overall Sample (n=463)	Cluster 1 (n=225)	Cluster 2 (n=80)	Cluster 3 (n=77)	Cluster 4 (n=81)
			<i>Majority</i>	<i>Choice</i>	<i>Health</i>	<i>Kid Food</i>
	Intercept	6.83				
Bundled side dish ^a	Active	0.73	0.19	1.51	1.00	1.18
	Optimal	-0.42	-0.22	-0.66	0.54	-1.66
	Suboptimal	-0.30	0.03	-0.85	-1.53	0.48
Price	High – \$7.99	-0.51	-0.38	-0.55	-0.39	-0.93
	Low – \$5.99	0.51	0.38	0.55	0.39	0.93
Vice Virtue ^b	Absent	-0.25	-0.13	0.57	-0.07	-0.47
	Present	0.25	0.13	-0.57	0.07	0.47
Increased price for SSB	\$1	-0.18	-0.08	-0.20	0.27	-0.85
	\$0	0.18	0.08	0.20	-0.27	0.85
Healthy entree	Absent	-0.04	.00	0.07	-0.22	-0.09
	Present	0.04	.00	-0.07	0.22	0.09

*Interpreted similarly to beta weights in a regression analysis²⁹

^aBundled side dish definitions: Optimal - The side dish presented with the entrée was a more healthful side dish (e.g., vegetables or fruits). Suboptimal Default - The side dish presented with the entrée was what is typically found on children’s menus (e.g., french fries or chips). Active - The side dishes were not presented in combination with the entrée but as a separate choice the consumer must make on top of choosing their entrée.

^bVice Virtue definition: Combination of two side dishes, one healthful and one unhealthful in varying proportions

*SSB- Sugar Sweetened Beverage

Survey questions by cluster analysis. Participant menu preferences (derived and stated), beliefs, health concern, and food practices, separated by cluster, are displayed in Table 6. The majority cluster, health cluster, and choice cluster displayed a derived menu preference that matched that of the entire participant pool's stated and derived menu preference, preferring Menu C. However, the kid food cluster's derived menu preference was for Menu F, which included: a low price, a suboptimal default side dish, a single side dish option, a healthful entrée present, and inclusion of SSB in the meal. Participant stated menu choices were not significantly different, with all clusters stating preference for Menu C. Participant socio-demographic characteristics were not significantly different among clusters. A Kruskal-Wallis test revealed significant differences in the frequency of fast food consumption by cluster, $H(3)=16.6, p \leq .001$. Pairwise comparisons with adjusted p-values revealed significantly fewer occasions of fast food consumption each week in the health cluster ($\bar{x}=1.9$) compared to the majority cluster ($\bar{x}=2.3$), $p=.006$, or the kid food cluster ($\bar{x}=2.3$), $p \leq .001$. Significant differences in parent-reported children's frequency of ordering from the children's menu by cluster, $H(3)=8.2, p=.042$ were found. Pairwise comparisons with adjusted p-values revealed significantly higher parent-reported frequency of children's ordering from the children's menu in the kid food cluster ($\bar{x}=4.5$) compared to the majority cluster ($\bar{x}=4.1$), $p=.026$. Significant differences in parent report of the importance of health for food consumed away from home $H(3)=16.5, p \leq .001$ were found. Pairwise comparisons with adjusted p-values revealed significantly higher report of importance of health for food consumed at home in the health cluster ($\bar{x}=4.3$) compared to the majority cluster ($\bar{x}=3.9$), $p=.009$, and the kid food cluster ($\bar{x}=3.8$), $p=.002$. Significant differences in parent report of the importance of food consumed away from home by Cluster $H(3)=23.7, p \leq .001$ were found. Pairwise comparisons with adjusted p-values revealed that there were

significant differences between the kid food cluster (\bar{x} =2.9, SD=1.3) and the choice cluster (\bar{x} =3.5, SD=1.0), p =.002 as well as the kid food cluster and the health cluster (\bar{x} =3.7, SD=1.0), p ≤.001. Pairwise comparisons for parent report of the importance of food consumed away from home also showed a significant difference between the majority cluster (\bar{x} =2.0, SD=0.7) and the health cluster (\bar{x} =3.7, SD=1.0), p =.007.

Table 6. Overall stated and derived menu choice and participant beliefs, health concern, and food practices by cluster assignment

	Cluster 1 (n=225) <i>Neutral</i>	Cluster 2 (n=80) <i>Choice</i>	Cluster 3 (n=77) <i>Health</i>	Cluster 4 (n=81) <i>Kid Food</i>
	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$
Menu Choice - Stated	C	C	C	C
Menu Choice - Derived	C	C	C	F
Frequency of Dining Out (1 = Never or Rarely, 6 = 1+ times/day)				
Fast Food	2.2 ± 0.9 ^{a,b}	2.1 ± 0.8 ^{a,b}	1.9 ± 0.7 ^a	2.3 ± 0.7 ^b
Delivery	2.1 ± 0.6 ^a	2.0 ± 0.7 ^a	2.0 ± 0.6 ^a	2.1 ± 0.5 ^a
Sit-down	2.0 ± 0.7 ^a	2.0 ± 0.8 ^a	2.0 ± 0.7 ^a	1.9 ± 0.6 ^a
Fast-casual	1.9 ± 0.8 ^a	1.9 ± 0.8 ^a	1.8 ± 0.7 ^a	1.8 ± 0.6 ^a
Health Concern Composite Score (25 = Maximum health concern score)	19.5 ± 3.4 ^a	19.2 ± 3.4 ^{a,b}	19.2 ± 3.6 ^{a,b}	17.7 ± 4.7 ^b
Child Frequency of ordering from children's menu	4.1 ± 0.9 ^a	4.2 ± 0.9 ^{a,b}	4.3 ± 0.9 ^{a,b}	4.5 ± 0.7 ^b
Importance of Healthfulness of food (1 = Not important, 5 = Very important)				
At home	3.9 ± 0.9 ^a	4.2 ± 0.7 ^{a,b}	4.3 ± 0.8 ^b	3.8 ± 1.0 ^a
Away from home	3.2 ± 1.0 ^{a,c}	3.5 ± 1.0 ^{b,c}	3.7 ± 1.0 ^b	2.9 ± 1.3 ^a

^{a, b, c} Means sharing the same letter are not significantly different from other means within the same row based on Kruskal-Wallis test with post-hoc pairwise comparisons, p ≤.05

Discussion

Understanding parent preferences is a critical part of addressing the poor dietary environment and eating habits of children in restaurants, as parents are partially responsible for what children eat in restaurants²⁶⁻²⁸. The present study reveals insights into the features of children's menus that drive parent preferences. Parents, like most consumers⁹, prefer menus with choices, and side dish choice was more important than beverage choice for many. Contrary to previous research²⁷, the appearance of a healthful entrée was unimportant for a majority of parents. There were, however, subsets parents who preferred healthful entrees and healthful side dish choices and subsets of parents who preferred more conventional and "kid-friendly" children's meals. Understanding parent perspectives may help to guide policy makers, dietitians, public health advocates, and researchers working to address the poor dietary environment in restaurants.

The leading parent preference for children's menus was the presence of multiple options for side dishes and parents seemed to care less about the inclusion of healthful entrees and SSB. Parent inclination for side dish choice aligns with previous work²³; however, too many choices can be overwhelming and people may make either a poor decision¹⁵ or no decision at all³⁵. This may partially explain why use of optimal default strategies may be beneficial for children's meals, though parents in the current study were averse to the inclusion of optimal default side dishes. Previous research has shown that use of optimal defaults are promising for improving orders of healthful sides^{12,13}, are liked by parents and children^{23,25}, and have led to improved intake of healthful sides²². Many of the interventions aimed at altering or improving children's menus have focused efforts on adding healthful entrees or reformulating existing ones to be more healthful^{8,12,13,16-19}. Parents in previous studies have said they would like to see healthful entrée

options²⁷; however, this study found parents indifferent to the presence of a healthful entrée, but strongly preferring a choice of side dish. The contradictory findings between this study and previous studies²⁷ warrant qualitative investigation to ascertain insights on both healthful entrees and side dishes. The substitution of a fruit or vegetable side dish for french fries can decrease the calories offered to children by over 170 calories per meal²⁴. Additionally, healthful entrees are expensive for restaurants and can lead to food waste³⁶. Use of vice-virtue bundles may provide another way to get more healthful foods into a child's meal and appease parents who hold this as a priority.

Cluster separation of parents depicts two groups who have discrepant preferences concerning children's menu preferences: one group prefers a more healthful children's menu, the other prefers a less healthful, more traditional children's menu. While some parents place importance on the health of the children's menu^{23,27}, in this study there was a subgroup of parents who preferred unhealthy children's meals. Parents who eat out with children view restaurant meals as a treat^{27,31} and have stated they try to avoid conflict with children during these meals^{28,37}. In fact, parents state they are more lenient about children's consumption in restaurants³⁷. Parents also place the burden of healthful children's meals on the restaurant, and not themselves²⁷. However, restaurants have said changes are not likely to happen until they see demand and the ability to profit^{28,36}. Parents who see healthful options on children's menus in restaurant perceive those restaurants to be more socially responsible and have higher intention of frequenting those restaurants³⁸. Restaurants may want to improve their social image and the addition of healthful children's meals may help. Further, enacting and supporting policy related to children's meals may be an important and influential way to begin to make substantive changes²⁸. The increase of families eating meals away from home and parent indifference to

healthful restaurant meals indicates a need for education, intervention, and policy aimed at improving the food environment as well as parent and children's eating behaviors at restaurants.

Use of healthful, default sides, vice-virtue bundles, and removal of SSB in legislation aimed at improving children's menus may provide a good stepping-stone that would appease parents, restaurants, and children^{17,28} and is in line with current policies being enacted to address the nutritional profile of children's meals³⁹. While there may be a small subset of parents who oppose recent policies enacted to remove SSB as the default beverage in children's menus³⁹, results from this study, and previous work²³, indicate that a majority of parents would likely accept the context of such legislation.

Strengths & Limitations. The present study is not free from limitations. Children's menus were built based on what is currently available in top-chain restaurants in the US and menu items stated in the literature. Pre-testing the children's menus with the target audience as well as experts in diverse, but related fields, bolsters the validity of the study. Additionally, using the conjoint design, a marketing-based technique, allowed this study to gather more accurate information related to consumer preferences, by having participants make real-world assessments²⁸. There is always a risk for social desirability in surveys such as this. Use of a conjoint design can help to alleviate social desirability by deriving preferences instead of only using stated preferences²⁸.

Amazon's TurkPrime is a recent tool for researchers, allowing access to new, possibly untapped populations⁴¹. Unfortunately, this platform does have potential for selection bias⁴² by using algorithms, skewing towards individuals performing more TurkPrime tasks than others, which could increase the homogeneity of the data⁴¹. There is still risk for non-response error in TurkPrime⁴², but checking the data prior to compensating the participants diminishes this risk.

TurkPrime is a novel and useful internet-based platform, set-up for social scientists to quickly and easily to crowdsource diverse participants^{42,43}.

Conclusions

Results from this study provide insight into the preferences of an important group of restaurant consumers: parents. The present study highlights the opportunity for various strategies, including behavioral economics, to address the poor nutritional offerings of children's menus in restaurants. Parents have influence over what children order in restaurants, especially with younger children²⁶⁻²⁸. Parents preferred to see choices for side dishes and were less concerned with the inclusion of healthy entrees. There are subgroups of parents for whom health is important as well as those who don't see health as a factor in children's restaurant menus. Families continue to eat out frequently, and so it is important to understand preferences of various family members. Understanding parent preferences may help guide nutrition professionals working to build a more healthful food environment and improve children's eating behaviors. Moreover, demonstrating the power and flexibility of behavioral economics strategies may be key to building further acceptance for the use of these strategies by restaurants.

REFERENCES

1. Savage JS, Fisher JO, Birch LL. Parental Influence On Eating Behavior: Conception To Adolescence. *J Law Med Ethics*. 2007;35(1):22-34.
2. Saksena MJ, Okrent AM, Anekwe TD, et al. *America's Eating Habits: Food Away From Home, EIB-196*. United States Department of Agriculture, Economic Research Service Economic Information Bulletin. September 2018.
3. Banfield EC, Liu Y, Davis JS, Chang S, Frazier-Wood AC. Poor adherence to US dietary guidelines for children and adolescents in the national health and nutrition examination survey population. *J Acad Nutr Diet*. 2016;116(1):21-27.
4. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. *J Nutr*. 2010;140(10):1832-1838.
5. Powell LM, Nguyen BT. Fast-Food and Full-Service Restaurant Consumption Among Children and Adolescents Effect on Energy, Beverage, and Nutrient Intake. *JAMA Pediatr*. 2013;167(1):14-20.
6. Mancino L, Todd JE, Guthrie J, Lin B-H. Food away from home and childhood obesity. *Curr Obes Rep*. 2014;3(4):459-469.
7. Bowman SA, Gortmaker SL, Ebbeling CB, Pereira MA, Ludwig DS. Effects Of Fast-Food Consumption On Energy Intake And Diet Quality Among Children In A National Household Survey. *Pediatrics*. 2004;113(1):112-118.
8. Batada A, Bruening M, Marchlewicz EH, Story M, Wootan MG. Poor Nutrition on the Menu: Children's Meals at America's Top Chain Restaurants. *Child Obes*. 2012;8(3):251-254.
9. Huffman C, Kahn BE. Variety For Sale: Mass Customization Or Mass Confusion? *Journal Of Retailing*. 1998;74(4):491-513.
10. Mccrory MA, Harbaugh AG, Appeadu S, Roberts SB. Fast-Food Offerings In The United States In 1986, 1991, And 2016 Show Large Increases In Food Variety, Portion Size, Dietary Energy, And Selected Micronutrients. *J Acad Nutr Diet*. 2019;119(6):923-933.
11. McCluskey JJ, Mittelhammer RC, Asiseh F. From Default To Choice: Adding Healthy Options To Kids' Menus. *Am J Ag Econ*. 2012;94(2):338-343.
12. Peters J, Beck J, Lande J, Et Al. Using Healthy Defaults In Walt Disney World Restaurants To Improve Nutritional Choices. *Journal Of The Association For Consumer Research*. 2016;1(1):92-103.

13. Anzman-Frasca S, Mueller MP, Sliwa S, et al. Changes in Children's Meal Orders Following Healthy Menu Modifications at a Regional US Restaurant Chain. *Obesity*. 2015;23(5):1055-1062.
14. Ribakove S, Almy J, Wootan M. Soda On The Menu: Improvements Seen But More Change Needed For Beverages On Restaurant Children's Menus. Center For Science In The Public Interest. 2017.
15. Vohs KD, Baumeister RF, Schmeichel BJ, Twenge JM, Nelson NM, Tice DM. Making Choices Impairs Subsequent Self-Control: A Limited-Resource Account Of Decision Making, Self-Regulation, And Active Initiative. *J Pers Soc Psychol*. 2008 May;94(5):883-98
16. Espino JNV, Guerrero N, Rhoads N, et al. Community-Based Restaurant Interventions to Promote Healthy Eating: A Systematic Review. *Prev Chronic Dis*. 2015;12.
17. Wootan MG. Children's Meals in Restaurants: Families Need More Help To Make Healthy Choices. *Child Obes*. 2012;8(1):31-33.
18. Sacco J, Lillico HG, Chen E, Hobin E. The influence of menu labelling on food choices among children and adolescents: a systematic review of the literature. *Perspect Public Health*. 2017;137(3):173-181.
19. Ayala GX, Castro IA, Pickrel JL, et al. A restaurant-based intervention to promote sales of healthy children's menu items: the Kids' Choice Restaurant Program cluster randomized trial. *BMC Public Health*. 2016;16.
20. Haws KL, Liu PJ. Combining food type(s) and food quantity choice in a new food choice paradigm based on vice-virtue bundles. *Appetite*. 2016;103:441-449.
21. Liu PJ, Haws KL, Lambertson C, Campbell TH, Fitzsimons GJ. Vice-Virtue Bundles. *Manag Sci*. 2015;61(1):204-228.
22. Ferrante MJ, Johnson SL, Miller J, Moding KJ, Bellows LL. Does A Vegetable-First, Optimal Default Strategy Improve Children's Vegetable Intake? A Restaurant-Based Study. *Food Qual Prefer*. 2019;74:112-117
23. Henry HKM, Borzekowski DLG. Well, that's what came with it. A qualitative study of US mothers' perceptions of healthier default options for children's meals at fast-food restaurants. *Appetite*. 2015;87:108-115.
24. Anzman-Frasca S, Dawes F, Sliwa S, et al. Healthier side dishes at restaurants: an analysis of children's perspectives, menu content, and energy impacts. *Int J Behav Nutr Phys Act*. 2014;11.

25. Shonkoff ET, Anzman-Frasca S, Lynskey VM, Chan G, Glenn ME, Economos CD. Child and parent perspectives on healthier side dishes and beverages in restaurant kids' meals: results from a national survey in the United States. *BMC Public Health*. 2018;18(1):56.
26. Castro IA, Williams CB, Madanat H, et al. Food ordering for children in restaurants: multiple sources of influence on decision making. *Public Health Nutr*. 2016;19(13):2404-2409.
27. McGuffin LE, Price RK, McCaffrey TA, et al. Parent and child perspectives on family out-of-home eating: a qualitative analysis. *Public Health Nutr*. 2015;18(1):100-111.
28. Anzman-Frasca S, Folta SC, Glenn ME, et al. Healthier Children's Meals in Restaurants: An Exploratory Study to Inform Approaches That Are Acceptable Across Stakeholders. *J Nutr Educ Behav*. 2017;49(4):285-295.
29. Hauser JR. Note on conjoint analysis. *Unpublished manuscript, MIT Sloan Management* Retrieved from <http://www.mit.edu/~hauser/Papers/NoteonConjointAnalysis.pdf>. 2007.
30. Drewnowski A, Moskowitz H, Reisner M, Krieger B. Testing consumer perception of nutrient content claims using conjoint analysis. *Public Health Nutr*. 2010;13(5):688-694.
31. Robson SM, Crosby LE, Stark LJ. Eating dinner away from home: Perspectives of middle-to high-income parents. *Appetite*. 2016;96:147-153.
32. Pryer JA, Nichols R, Elliott P, Thakrar B, Brunner E, Marmot M. Dietary Patterns Among A National Random Sample Of British Adults. *J Epidemiol Community Health*. 2001; 55(1), 29-37.
33. Lundeberg PJ, Graham DJ, Mohr GS. Comparison Of Two Front-Of-Package Nutrition Labeling Schemes, And Their Explanation, On Consumers' Perception Of Product Healthfulness And Food Choice. *Appetite*. 2018;125:548-556.
34. Vohs KD, Baumeister RF, Schmeichel BJ, Twenge JM, Nelson NM, Tice DM. Making Choices Impairs Subsequent Self-Control: A Limited-Resource Account Of Decision Making, Self-Regulation, And Active Initiative. *J Pers Soc Psychol*. 2008 May;94(5):883-98
35. Herrmann A, Heitmann M, Morgan R, Henneberg SC, Landwehr J. Consumer Decision Making And Variety Of Offerings: The Effect Of Attribute Alignability. *Psychol Mark*. 2009;26(4):333-358.
36. Glanz K, Resnicow K, Seymour J, et al. How major restaurant chains plan their menus - The role of profit, demand, and health. *Am J Prev Med*. 2007;32(5):383-388.

37. Kasparian M, Mann G, Serrano EL, Farris AR. Parenting Practices Toward Food And Children's Behavior: Eating Away From Home Versus At Home. *Appetite*. 2017;114:194-199.
38. Lee K, Conklin M, Bordi P, Cranage D. Restaurants' Healthy Eating Initiatives For Children Increase Parents' Perceptions Of Csr, Empowerment, And Visit Intentions. *Int J Hosp Manag*, 2016;59, 60-71.
39. Mancini S. *Policy Changes To Reduce Unhealthy Food And Beverage Marketing To Children In 2016 And 2017*. Rudd Center for Food Policy and Obesity. 2018.
40. Springer VA, Martini PJ, Lindsey SC, Vezich IS. Practice-Based Considerations For Using Multi-Stage Survey Design To Reach Special Populations On Amazon's Mechanical Turk. *Survey Practice*. 2016;9(5):1-8.
41. Paolacci G, Chandler J, Ipeirotis PG. Running Experiments On Amazon Mechanical Turk. *Judgment And Decision Making*. 2010;5(5):411-419.
42. Beto JA, Metallinos-Katsaras E, Leung C. Crowdsourcing: A Critical Reflection On This New Frontier Of Participant Recruiting In Nutrition And Dietetics Research. *J Acad Nutr Diet*. 2020;120(2):193-196.
43. Litman L, Robinson J, Abberbock T. TurkPrime.com: A versatile crowdsourcing data acquisition platform for the behavioral sciences. *Behav Res Methods*. 2017;49(2):433-442.

CHAPTER 4: SWITCHING UP SIDES: USING CHOICE ARCHITECTURE TO ALTER CHILDREN'S MENUS IN RESTAURANTS²

Summary

Background: Children in the US frequently eat in restaurants, a practice associated with decreased vegetable intake and poor diet quality. Optimal defaults, a strategy from behavioral economics, has been used to increase children's orders of healthful sides, but what children consume when healthful sides are present is unexplored. **Objective:** To investigate whether altering the choice architecture of children's meals by restructuring the menu using optimal defaults and vice-virtue bundles, will impact ordering of side dishes and consumption of vegetable sides during a restaurant meal. **Design:** Families with 4-8 year children from the university community attended 3 dinners at a university-based, sit-down restaurant. Children's meals included 2 entree choices (macaroni-and-cheese or chicken tenders) and a default side: all carrots (150g; Meal-1), small fries (50g)/ large carrots (100g; Meal-2), and small carrots (50g)/ large fries (100g; Meal-3). Children could opt-out of the default side for a choice of: only fries (Meal-1) or only fries or carrots (Meals-2/3). Foods offered to children were weighed pre- and post-meal to determine consumption. **Analysis:** Descriptive statistics examined children's ordering behavior. Repeated measures analysis of covariance examined the effects on carrot consumption (g) and paired samples t-tests examined differences in french fry consumption (g). **Results:** Forty-eight children (6.2±1.3 years; 25 male) participated. Children's menu choices largely remained with the default side (Menu-1: 90.2%; Menu-2: 97.6%; Menu-3: 87.8%). There were no significant differences in carrot consumption by Menu condition. Children ate

² The contents of this chapter will be submitted for publication as a manuscript.

significantly more french fries ($t = -2.57, p = .014$) during Menu 3 ($\bar{x} = 52.7$ g) than during Menu 2 ($\bar{x} = 41.0$ g). **Conclusion:** Use of optimal defaults leads to increased orders of healthful sides. Children consumed the healthful side dish of carrots, regardless of the presence of a competitive food, french fries.

Introduction

Children in the United States (U.S.) are eating out frequently evidenced by families spending almost 50% of their food dollars on restaurant foods¹⁻³. Restaurant foods, especially those offered to children, are high in fat, saturated fat, sodium, and calories^{4,5}. Portions offered as part of children's meals in restaurants are typically larger than needed^{1,6-8}, offering upwards of 1,000 calories in a single meal⁹. Additionally, children's meals offer few fruits and vegetables⁵ and U.S. children already do not eat enough fruits and vegetables¹⁰⁻¹².

Interventions aimed at improving children's intake of fruits and vegetables in restaurants, predominantly using information-based strategies, have been enacted, however few show substantial results^{13,14}. Recently, demand for healthful children's meals has increased¹⁵, which has led some restaurants to provide fruit and vegetable side dishes as options on children's menus, however, these options are not widely selected¹⁶⁻¹⁸. The field of behavioral economics offers potential strategies, which make healthful choices easier, simply by altering the choice architecture in the restaurant setting¹⁹⁻²¹. Altering the choice architecture by making small structural shifts in the children's menu would make selecting healthful options easier²². An optimal default is one such strategy which restructures the children's menu so the default, or included, side dish is a healthful one.

Default side dishes in restaurants are typically sub-optimal, pairing foods like french fries with an entrée, which negatively affects the nutritional quality of the meal²³. People have a tendency to remain with whatever default option is in place instead of seeking out alternatives¹⁹. Leveraging this tendency by changing the choice architecture to include an optimal default could have positive effects on foods children order and consume in restaurants. Something as simple as swapping the default side from the suboptimal default french fries to an optimal default of a fruit or vegetable can decrease calories offered to children by approximately 170 calories²⁴. This is an example of an optimal default strategy that could be a promising approach to improve the nutritional quality of children's meals in restaurants^{22,25-27}.

Use of optimal defaults, offering fruit and vegetable sides with meals have been found to be acceptable by both children and parents^{24,28,29}. When optimal defaults are enacted as a part of children's restaurant meals they have led to increased orders of healthful fruit and vegetable side dishes^{22,25,26}, but these studies are limited to children's *ordering* behavior. Children's consumption of specific foods when defaults are offered has yet to be examined.

It is important to note that optimal defaults may have their limits when it comes to children's food preferences³⁰, especially because preferences are major determinants of intake³¹. Shonkoff et al.'s (2018) study demonstrated that fruit and vegetable optimal defaults are more acceptable for children who prefer to eat fruits and vegetables. Further, parents eating out with children appreciate that restaurants offer the ability for children to order what they want and avoid any conflict or food rejection^{32,33}. While health is still important for these parents^{29,32,34}, there may be other strategies that can be enacted to both increase healthful foods and offer children a preferred side dish.

Offering children both a healthful and unhealthy side as part of a children's meal may be one way to satisfy both parents and children³⁰. Recently, McDonalds changed their happy meal such that the default side dish is a small serving of french fries as well as apple slices³⁵. This pairing, also called a vice-virtue bundle, may be another way to alter the choice architecture of children's meals in restaurants. Vice-virtue bundles combine an unhealthy food, like french fries, with a healthful food, such as apple slices, in varying proportions^{36,37}. The key with a vice-virtue bundle is to determine what proportion of vice to virtue is the most satisfying to the person, while still being beneficial³⁶. Vice-virtue bundles have yet to be studied with children's restaurant meals. Examining the use of both optimal defaults and vice-virtue bundles is important to understand how children's menus may be used to alter children's consumption of healthful foods in restaurants. Therefore, the objective of this study was to investigate whether altering the choice architecture of children's meals by restructuring the menu using optimal defaults and vice-virtue bundles, will impact ordering of side dishes and consumption of vegetable sides during a restaurant meal.

Methods

Study Design, Settings, and Participants. A within-subjects, counterbalanced design was used to test the effects of using optimal defaults and vice-virtue bundles strategies as a part of children's menus on ordering of side dishes and consumption of vegetable side dishes during a sit-down, casual dining restaurant meal. The study was conducted at a university, student-run restaurant over the course of nine weeks. The restaurant mimicked a typical casual dining, sit-down restaurant and allowed for research procedures (e.g., food weighing) to occur with limited disruption.

A power calculation using G*Power 3.1.9.5 (2010, Heinrich Heine University-Dusseldorf) conducted with vegetable consumption data from a previous restaurant-based study³⁸, and a 95% confidence level, revealed a sample size of n=42 children would detect significant differences in consumption between experimental conditions with 90% power. To account for attrition, a total of 45 families were recruited into one of three cohorts (n=15/cohort). Families with at least one child between the ages of 4 and 8 years were recruited using university listservs to participate in three dinner meals per cohort. Interested parties (n=183) were prescreened for eligibility (Appendix V).

Screening included questions regarding children's liking and consumption of study foods (chicken tenders, macaroni and cheese, french fries, carrots, and milk) and the family's frequency of dining out. Families were excluded from participation if the child had any food allergies or restrictions, they were unavailable on study dates, they never or rarely ate dinner outside of the home, or the child was outside the 4- to 8- year old age range. Families meeting criteria were entered into a numbered spreadsheet and systematic sampling randomly generated a starting number from which every third family was contacted. Families who were contacted to confirm study dates, times, and the number of family members attending the dinners. If a family did not respond within 48 hours the next family was selected. A total of 15 families were put on the waiting list.

Prior to the start of each study cohort, written consent from parents and verbal assent from all children was collected (Appendix VI). Adults who served as the main contact for each family completed a demographic questionnaire to ascertain family income, parent education levels, child age, and ethnicity (Appendix VII). This study was approved by the Colorado State University Institutional Review Board (Appendix VIII).

Menu Conditions and Meals. The three menu conditions were counterbalanced so that each cohort received the same three menus, but in three different orders, in efforts to avoid order effects (Table 7). Children's meals included 2 entree choices (macaroni and cheese or chicken tenders) and a default side. Default side dishes and portions differed by menu condition: Menu 1 served an optimal default [all carrots (150g)]; Menu 2 served an optimal, vice-virtue default [large carrots (100g) /small french fries (50g)]; Menu 3 served a suboptimal, vice-virtue default [small carrots (50g) /large french fries (100g)]. Participants could opt-out of the default side and instead choose an alternate side dish of only fries (Menu 1) or only fries or only carrots (Menus 2 and 3). Each menu condition required children to choose their entrée and then either remain with the default side dish or actively choose to opt-out of the default and select the alternate side dish. Children who wanted additional side dish foods were able to order more of any available sides. Table 1 further describes the Menu conditions as well as foods and amounts offered to children. A sample Menu is displayed in Figure 2 (Appendix VIII).

Table 7. Order of meal conditions and meal components offered to parents and children during each condition when children’s menus were varied

Children’s meals			
	Menu 1 <i>Optimal Default</i>	Menu 2 <i>Optimal, Vice-Virtue Bundle</i>	Menu 3 <i>Sub-optimal, Vice-Virtue Bundle</i>
Order by Cohort			
A (n=16)	Dinner 1	Dinner 2	Dinner 3
B (n=18)	Dinner 3	Dinner 1	Dinner 2
C (n=14)	Dinner 2	Dinner 3	Dinner 1
Entrée	Chicken Tenders (200 ± 5g)	Chicken Tenders (200 ± 5g)	Chicken Tenders (200 ± 5g)
Options	or Mac and Cheese (225 ± 5g)	or Mac and Cheese (225 ± 5g)	or Mac and Cheese (225 ± 5g)
Default Sides	Carrot Sticks (150 g)	2/3 Carrot Sticks (100 g) 1/3 french fries (50 g) French Fries (150 g)	1/3 Carrot Sticks (50 g) 2/3 french fries (100 g) French Fries (150 g)
Opt-out Side choice	French Fries (150 g)	or Carrot Sticks (150 g)	or Carrot Sticks (150 g)
Beverage	2% Milk (8 oz)	2% Milk (8 oz)	2% Milk (8 oz)
Parent Meals			
Entrée	Cheese & Onion Enchiladas Salad	Vegetable Quiche Salad	Vegetable Lasagna Salad
Beverage	Water Iced Tea	Water Iced Tea	Water Iced Tea

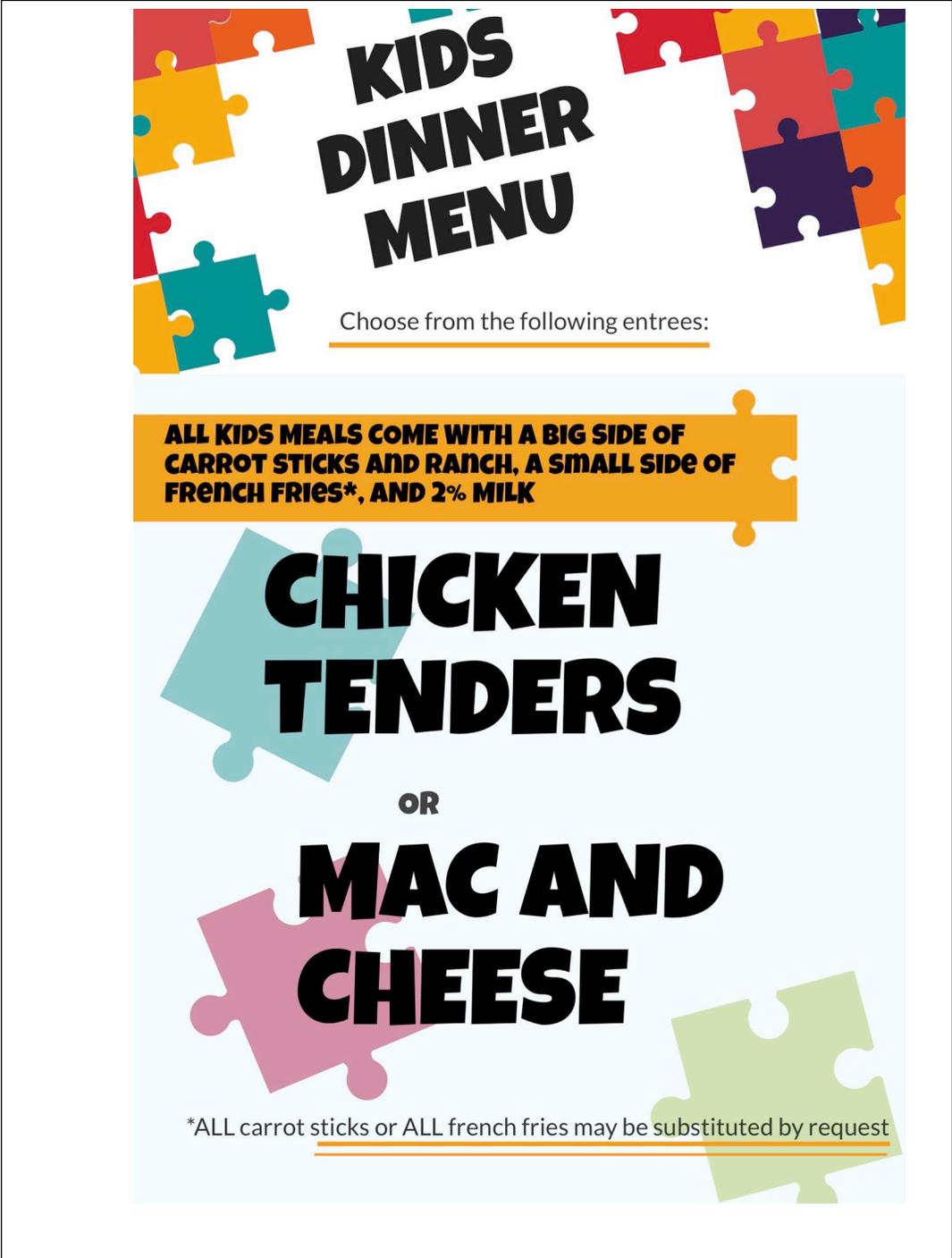


Figure 2. Example of children’s menu used during study: Menu 2

Portion sizes served to children were consistent with standard restaurant portions determined from three casual, sit-down restaurants in nearby communities (Ferrante, 2019). Children's entrees (chicken tenders and macaroni and cheese) were calorie-matched which resulted in a larger portion of macaroni and cheese. The macaroni and cheese was altered with butter to be more calorically dense³⁹ to match the 370 kcals/serving of the chicken tenders entree. Parents were provided a standard meal of enchiladas, lasagna, and quiche, for Meals 1-3 respectively, with a green salad.

Procedures. Families attended three dinners, one week apart at a pre-set time close to their typical mealtime, between 5:30 pm and 6:30 pm, in the Fall of 2019. Prior to the start of their first meal, participating children were measured for height (without shoes) to the nearest 0.1 cm using a portable stadiometer (Seca Corp, Hamburg, Germany). Weight (without shoes) was assessed using a portable, digital scale (Lifesource ProFit UC321; Milpitas, CA; Appendix X).

Research assistants were trained to act as restaurant staff and observers (Appendix XI). Normal restaurant practices (i.e., seating, menus, drink orders) were followed. At time of order, servers prompted each family member about their meal choice and unless children explicitly specified what they would like their side dish to be, they received the default side. If a child specified the alternate side dish, the server would confirm by stating, "the side dish that comes with the meal is X, you'd like to order Y instead?" such that the child would have to confirm that they are opting-out of the default side dish. Meal orders were put into an online ordering system, allowing for all children's meal and side dish orders to be collected (Appendix XII).

Prior to serving the children's meals all foods were weighed by trained research assistants to a specific gram amount using an industrial, digital bench scale (Ohaus Ranger 3000; Table 1; Appendix XII). All food weights were recorded to the nearest 0.1 g. Once the meal was served,

families were allowed to consume their meal *ad libitum*. Families were instructed not to eat off one another's plates and this was monitored by observers in the restaurant. Upon completion of the meal, servers removed children's plates so that food could be post-weighed to the nearest 0.1 g. The observers and servers collected any dropped food to ensure it was counted in the child's post-food weights.

Data Analysis. Descriptive statistics (frequency, mean, and standard deviation) examined families' demographic information and children's menu ordering behavior. Children's body mass index (BMI) and sex-specific BMI-for-age percentiles were calculated⁴⁰. Repeated measures analysis of covariance (ANOVA) was used to examine differences in consumption (difference between pre- and post-weights) of carrots, milk, ranch, and ketchup and entrée calories and total calorie intake. Because french fries were only offered as part of the default for Menu 2 and Menu 3, a paired samples t-test was conducted to test for differences in consumption. A two-way, mixed ANOVA was used to examine any order effects on consumption. All data were analyzed with SPSS version 26.6 (IBM Corporation, Armonk, NY).

Results

A total of 45 families participated with 54 children. Five families were unable to complete all three study dates (12% attrition), resulting in 40 families with 48 total children between 4 and 8 years of age [$\bar{x} = 6.2 \pm 1.3$ years, 52.1% male (n=25)] in the final sample. Family demographic information is described in Table 8.

Table 8. Participating Families characteristics (n=40)

	<u>% (n)</u>
Relationship to child	
Mother	75 (30)
Father	25 (10)
Household	
Single parent	7.5 (3)
Two Parent	92.5 (37)
Age – Parent completing form	
25 – 34 years	20.0 (8)
35 – 44 years	77.5 (31)
45 – 55 years	2.5 (1)
Ethnicity of Participating Children	
White/Caucasian	68.8 (33)
American Indian or Alaskan	2.1 (1)
Asian	6.3 (3)
Black or African American	2.1 (1)
Hispanic or Latino	10.4 (5)
Prefer not to answer	1.9 (1)
Highest level of Education completed – Parent completing form	
≤ High School/GED	2.5 (1)
Some college	5.0 (2)
College Degree	27.5 (11)
≥ Graduate Degree	65.0 (26)
Highest level of Education completed – Spouse	
≤ High School/GED	2.6 (1)
Some college	5.1 (2)
College Degree	33.3 (13)
≥ Graduate Degree	53.8 (21)
Current Employment Status – Parent completing form	
Employed Full Time	75 (30)
Employed Part Time	17.5 (7)
Homemaker	7.5 (3)
Current Employment Status – Spouse	
Employed Full Time	77.5 (31)
Employed Part Time	12.5 (5)
Homemaker	2.5 (1)
Family Income	
\$45,001 – \$60,000/year	10.0 (4)
\$60,001 - \$99,999/year	32.5 (13)
> \$100,000/year	55.0 (22)
Prefer not to answer	2.5 (1)
Number of children in the household	
1 child	30 (12)

2 children	50 (20)
3 children	20 (8)
Children's BMI Percentile for Age	
5 th – 84.9 th (normal weight)	54.2 (37)
85 th - 94 th (overweight)	27.1 (6)
≥95 th (obese)	10.4 (5)

A majority of children's menu choices remained with the default side dish during each of the meals (Menu 1: 89.6%; Menu 2: 87.5%; Menu 3: 85.4%). Some percentage of children who remained with the default side ordered additional french fries after receiving their meal (Menu 1: 27.1%, n=13; Menu 2: 10.4%, n=5; Menu 3: 2.1%, n=1). Figure 3 illustrates the ordering patterns of all children during each Menu condition. One child initially ordered the default and then ordered additional french fries during all three Menu conditions. During the Menu 1 condition, a larger number of children from cohort 2 (44.4%, n=8) ordered additional sides of french fries compared to cohort 1 (12.5%, n=2) and cohort 3 (21.4%, n=3).

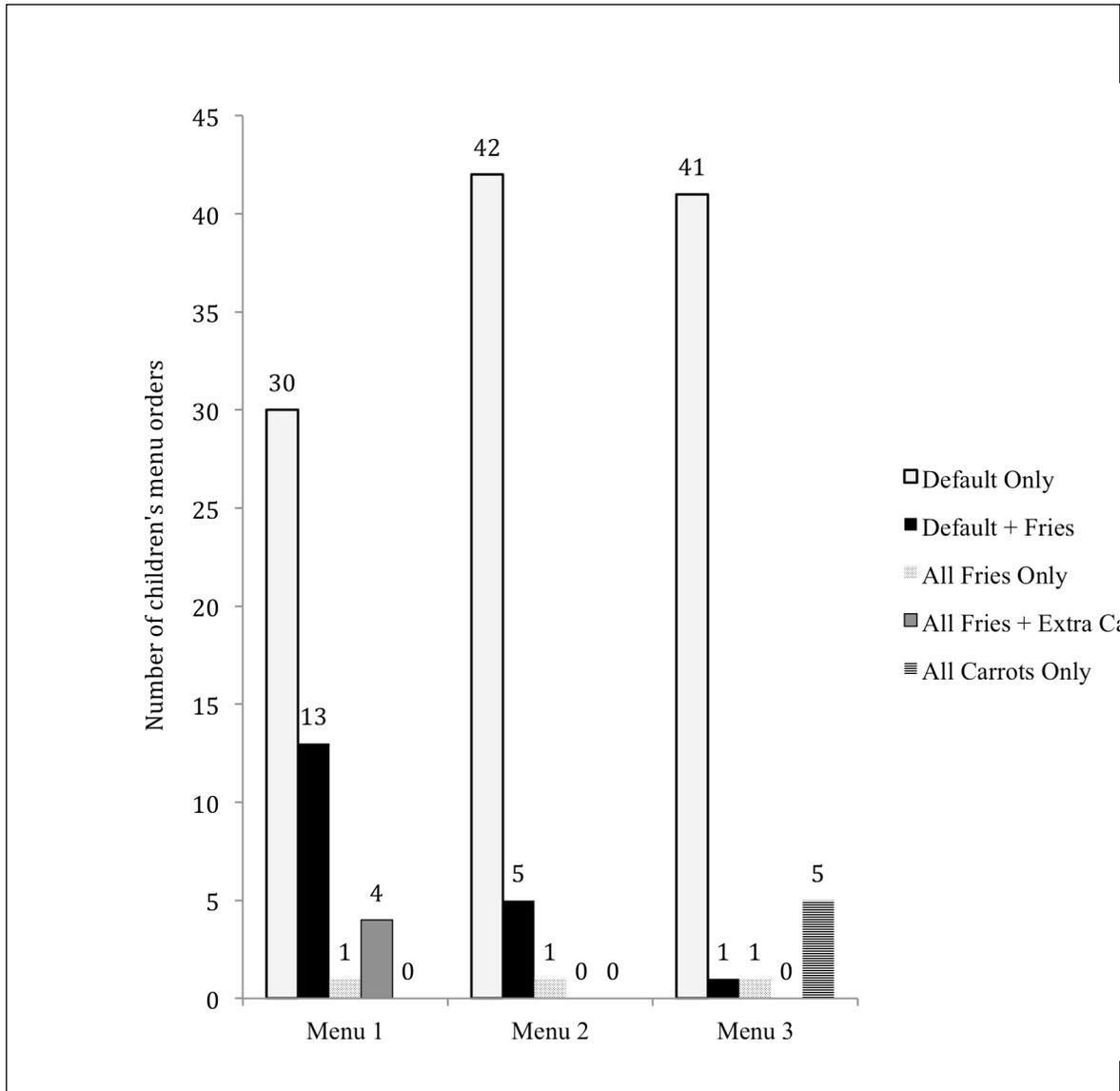


Figure 3. Children's Menu Ordering Data for each Menu Condition

There were significant differences in children's french fry ($t = -2.57, p = .014$) consumption where children consumed more french fries during Menu 3 ($\bar{x} = 52.7$ g) than during Menu 2 ($\bar{x} = 41.0$ g). No significant differences in children's carrot consumption ($p = .132$) were observed. There was a significant difference in ketchup consumption [$F(2, 94) = 5.59, p = .005, \eta^2 = .11$] which mirrored french fry consumption. There were no significant differences in consumption of any of the other study foods: ranch ($p = .123$), milk ($p = .562$), entrée calories ($p = .703$), or total meal calories ($p = .379$). Table 9 details average consumption of all study foods during each Menu condition. No significant difference in consumption of study foods was observed by Menu condition order.

Table 9. Average gram consumption of foods served by Menu condition for participating children

Item	Menu 1 <i>Optimal Default</i>	Menu 2 <i>Optimal, Vice-Virtue Bundle</i>	Menu 3 <i>Sub-optimal, Vice-Virtue Bundle</i>
	Mean (SD)	Mean (SD)	Mean (SD)
Carrot Sticks	37.7 (31.6)	35.2 (28.1)	29.3 (21.3)
French Fries	67.4 ^{a*}	41.0 (3.9) ^a	52.7 (37.4) ^b
Entrée Calories	245.1 (156.5)	233.7 (149.4)	232.6 (133.5)
Ranch Dressing	6.7 (19.2)	10.2 (14.4)	8.0 (10.8)
Ketchup	7.5 (11.9) ^c	12.8 (12.4) ^d	13.2 (13.5) ^d
Milk	161.4 (17.0)	154.0 (115.4)	168.2 (120.4)
Total Meal Calories	408.4 (203.3)	437.1 (216.7)	447.2 (190.7)

a,b,c,d Numbers with differing letters indicate significant differences from others in the same row - Significant differences were found at $p < 0.05$

*n=18, children who ordered french fries during Menu 1

Discussion

Optimal defaults have become a promising strategy to improve children's consumption of healthful foods in the restaurant setting. The present study provides further evidence that optimal defaults can positively influence children's menu ordering behavior. Specifically, the use of an optimal, vice-virtue bundle decreased children's additional orders and consumption of french fries (12 g, a 22% reduction) and resulted in the highest orders of the default side dish containing a large portion of carrot sticks. Currently, most restaurant children's meals do not include healthful fruit and vegetable sides¹⁷, results from this study show that children presented with an optimal default menu will order vegetable sides as well consume them.

The two optimal default Menus (1 & 2) resulted in a majority of children ordering the healthful, default side, presenting them with a large portion of carrots as a side dish with their entrée. This is in line with previous work showing a majority of children will accept optimal defaults when they are in place^{24,26,27}. During the traditional optimal default condition (Menu 1) over one quarter of children ordered additional french fries once they received their meal. However, when the optimal, vice-virtue side was the default in Menu 2, the small handful of children who had ordered additional french fries during the optimal default condition subsided from 13 children to 5 children. This condition had the highest number of children who remained with the default and opted to not order additional french fries or opt out of the default for all fries. Moreover, carrot consumption did not significantly decrease in the face of a competitive food, french fries, but remained steady. Families dining out may see restaurant meals as special and separate from typical eating occasions, allowing them to indulge in foods they may not typically indulge in^{4,32,41}. Even when french fries were completely removed from one children's menu, they were still ordered as a side dish²². Parents like that dining at a restaurant means

everyone can choose their meal, which avoids food rejection and conflict with children^{32,33}.

However, parents also care about the health of their children^{32,34} and use of optimal, vice-virtue bundles may appease the whole family.

When offered a larger portion of french fries, children in the present study ate significantly more french fries. Foods like french fries are considered competitive with healthful foods, like carrots, whereas children presented with competing foods may eat more of the highly preferred food⁴². Children in this study continued to consume the carrots, even when offered in a smaller portion, further emphasizing that offering healthful sides as a part of the children's meal will lead to consumption of those healthful foods, even in the face of competitive foods. Portion sizes have been shown to influence intake⁴²⁻⁴⁴, and restaurants typically serve portion sizes that are well beyond what is needed in a single meal^{45,46}. Knowing that children's menus can be used to positively influence menu ordering behavior, restaurants looking to implement optimal defaults and vice-virtue bundles should be aware that portion sizes matter, especially with more energy-dense, palatable foods.

There has been an increase in demand for healthful children's meals¹⁵. Restaurants have increased the number of healthful options that are available as a part of children's meals, but few have made these options the default¹⁷. The present study illustrates that not only do children order the healthful defaults when they are in place, but they eat them as well. While optimal defaults alone may have their limits³⁰, use of optimal, vice-virtue bundles may be a way to improve children's consumption in restaurants. Children's menus are typically built from what is available, made up of foods widely accepted by children^{16,47}. This study demonstrates that the design of the children's menu can have implications for children's intake. Restaurants striving to

meet the demand for more healthful meals and still appease all their clientele might find the optimal, vice-virtue bundles valuable.

The present study had several limitations including the use of a convenience sample of participants. Parents in this study were highly educated and had above-average income levels. Data from the Food Acquisition and Purchasing Survey as well as a recent USDA Economic Research Service Report illustrate that families dining out at sit-down restaurants like the one used in this study are typically higher income and higher education^{48,49}. Participating children may have fatigued on the three similar meals offered one week apart. This timeline was chosen to avoid attrition and children were offered two choices of entrees to help alleviate fatigue, however offering a full menu was beyond the resources of this study. The present study was conducted in a university-run sit-down restaurant. This is a unique strength of the study as use of this restaurant allowed for lab-like data collection while appearing to the participants as a real restaurant, improving the potential of these results to translate to a real-world setting with high ecological validity. Future research in this area might consider the use of a naturalistic study, measuring consumption in an actual restaurant outside of the University setting.

Conclusion

Restructuring the choice architecture of children's menus using optimal defaults and vice-virtue bundles can improve children's menu ordering behavior. Optimal, vice-virtue bundles provide an approach to influence children's behaviors while eating out for varied reasons (convenience vs. special occasion) and may increase the healthfulness of a meal while appeasing all parties involved. Results from this study illustrate that careful use of choice architecture to restructure the children's menu can have beneficial influences on children's ordering and

consumption of energy dense foods like french fries, providing restaurateurs with novel tools to meet the increased demand for healthful children's meals.

REFERENCES

1. Mancino L, Todd JE, Guthrie J, Lin B-H. How food away from home affects children's diet quality. US Department of Agriculture, Economic Research Service (No ERR-104) Washington, DC. 2010.
2. Saksena MJ, Okrent AM, Anekwe TD, et al. *America's Eating Habits: Food Away From Home, EIB-196*. United States Department of Agriculture, Economic Research Service Economic Information Bulletin. September 2018.
3. United States Department of Agriculture, Economic Research Service. Food expenditures, Table 3 – Food away from home: Total expenditures. 2016.
4. Zoumas-Morse C, Rock CL, Sobo EJ, Neuhouser ML. Children's patterns of macronutrient intake and associations with restaurant and home eating. *J Acad Nutr Diet*. 2001;101(8):923-925.
5. Lin B-H, Morrison RM. Food and nutrient intake data: taking a look at the nutritional quality of foods eaten at home and away from home. *Amber Waves*. 2012;10(2):1C.
6. Cohen DA, Lesser LI, Wright C, Story M, Economos CD. Kid's Menu Portion Sizes: How Much Should Children Be Served? *Nutr Today*. 2016;51(6):273-280.
7. Urban LE, Weber JL, Heyman MB, et al. Energy contents of frequently ordered restaurant meals and comparison with human energy requirements and US Department of Agriculture database information: a multisite randomized study. *J Acad Nutr Diet*. 2016;116(4):590-598. e596.
8. Schoffman DE, Davidson CR, Hales SB, Crimarco AE, Dahl AA, Turner-McGrievy GM. The fast-casual conundrum: Fast-casual restaurant entrees are higher in calories than fast food. *J Acad Nutr Diet*. 2016;116(10):1606-1612.
9. Batada A, Bruening M, Marchlewicz EH, Story M, Wootan MG. Poor Nutrition on the Menu: Children's Meals at America's Top Chain Restaurants. *Child Obes*. 2012;8(3):251-254.
10. Banfield EC, Liu Y, Davis JS, Chang S, Frazier-Wood AC. Poor adherence to US dietary guidelines for children and adolescents in the national health and nutrition examination survey population. *J Acad Nutr Diet*. 2016;116(1):21-27.
11. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. *J Nutr*. 2010;140(10):1832-1838.

12. Lorson BA, Melgar-Quinonez HR, Taylor CA. Correlates of Fruit and Vegetable Intakes in US Children. *J Acad Nutr Diet*. 2009;109(3):474-478.
13. Espino JNV, Guerrero N, Rhoads N, et al. Community-Based Restaurant Interventions to Promote Healthy Eating: A Systematic Review. *Prev Chronic Dis*. 2015;12.
14. Glanz K, Hoelscher D. Increasing fruit and vegetable intake by changing environments, policy and pricing: restaurant-based research, strategies, and recommendations. *Prev Med*. 2004;39:88-93.
15. Center for Science in the Public Interest. (2013). *Kids' meals II: Obesity and poor nutrition on the menu*. Retrieved from <https://cspinet.org/sites/default/files/attachment/cspi-kids-meals-2013.pdf>.
16. Glanz K, Resnicow K, Seymour J, et al. How major restaurant chains plan their menus - The role of profit, demand, and health. *Am J Prev Med*. 2007;32(5):383-388.
17. Mueller MP, Wilde P, Folta SC, Anzman-Frasca S, Economos CD. Availability of Healthier Children's Menu Items in the Top Selling Quick Service Restaurant Chains (2004–2015). *Am J Public Health*. 2019;109(2):267-269.
18. Sliwa S, Anzman-Frasca S, Lynskey V, Washburn K, Economos C. Assessing the Availability of Healthier Children's Meals at Leading Quick-Service and Full-Service Restaurants. *J Nutr Educ Behav*. 2016;48(4):242-+.
19. Thaler RH. *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press New Haven & London; 2008.
20. Cravener TL, Schlechter H, Loeb KL, et al. Feeding Strategies Derived from Behavioral Economics and Psychology Can Increase Vegetable Intake in Children as Part of a Home-Based Intervention: Results of a Pilot Study. *J Acad Nutr Diet*. 2015;115(11):1798-1807.
21. Guthrie JF. Integrating Behavioral Economics into Nutrition Education Research and Practice. *J Nutr Educ Behav*. 2017;49(8):700-705.e701.
22. Anzman-Frasca S, Mueller MP, Sliwa S, et al. Changes in Children's Meal Orders Following Healthy Menu Modifications at a Regional US Restaurant Chain. *Obesity*. 2015;23(5):1055-1062.
23. Radnitz C, Loeb KL, DiMatteo J, Keller KL, Zucker N, Schwartz MB. Optimal defaults in the prevention of pediatric obesity: from platform to practice. *J Food Nutr Disord*. 2013;2(5):1.

24. Anzman-Frasca S, Dawes F, Sliwa S, et al. Healthier side dishes at restaurants: an analysis of children's perspectives, menu content, and energy impacts. *Int J Behav Nutr Phys Act.* 2014;11.
25. McCluskey JJ, Mittelhammer RC, Asiseh F. From Default To Choice: Adding Healthy Options To Kids' Menus. *Am J Ag Econ.* 2012;94(2):338-343.
26. Peters J, Beck J, Lande J, et al. Using healthy defaults in Walt Disney World restaurants to improve nutritional choices. *Journal of the Association for Consumer Research.* 2016;1(1):92-103.
27. Loeb KL, Radnitz C, Keller K, et al. The application of defaults to optimize parents' health-based choices for children. *Appetite.* 2017;113:368-375.
28. Shonkoff ET, Anzman-Frasca S, Lynskey VM, Chan G, Glenn ME, Economos CD. Child and parent perspectives on healthier side dishes and beverages in restaurant kids' meals: results from a national survey in the United States. *BMC Public Health.* 2018;18(1):56.
29. Henry HKM, Borzekowski DLG. Well, that's what came with it. A qualitative study of US mothers' perceptions of healthier default options for children's meals at fast-food restaurants. *Appetite.* 2015;87:108-115.
30. Wansink, B., & Just, D. R. (2016). The limits of defaults: why french fries trump apple slices. *BMC Res Notes*, 9(1), 263.
31. Birch LL. Development of Food Preferences. *Annu Rev Nutr.* 1999;19(1):41-62.
32. McGuffin LE, Price RK, McCaffrey TA, et al. Parent and child perspectives on family out-of-home eating: a qualitative analysis. *Public Health Nutr.* 2015;18(1):100-111.
33. Robson SM, Crosby LE, Stark LJ. Eating dinner away from home: Perspectives of middle-to high-income parents. *Appetite.* 2016;96:147-153.
34. McIntosh A, Kubena KS, Tolle G, et al. Determinants of Children's Use of and Time Spent in Fast-food and Full-service Restaurants. *J Nutr Educ Behav.* 2011;43(3):142-149.
35. *McDonald's USA: Commitments to Offer Improved Nutrition Choices.* McDonalds.com/news-releases/ - <https://news.mcdonalds.com/news-releases/news-release-details/mcdonalds-usa-commitments-offer-improved-nutrition-choices>. Published July 26, 2011. Accessed May 9, 2020.
36. Liu PJ, Haws KL, Lambertson C, Campbell TH, Fitzsimons GJ. Vice-Virtue Bundles. *Manag Sci.* 2015;61(1):204-228.
37. Haws KL, Liu PJ. Combining food type(s) and food quantity choice in a new food choice paradigm based on vice-virtue bundles. *Appetite.* 2016;103:441-449.

38. Ferrante MJ, Johnson SL, Miller J, Moding KJ, Bellows LL. Does a vegetable-first, optimal default strategy improve children's vegetable intake? A restaurant-based study. *Food Qual Prefer.* 2019;74:112-117.
39. Fisher JO, Liu Y, Birch LL, Rolls BJ. Effects of portion size and energy density on young children's intake at a meal. *Am J Clin Nutr.* 2007;86(1), 174-179.
40. Centers for Disease Control and Prevention, National Center for Health Statistics. *CDC growth charts: United States.* <http://www.cdc.gov/growthcharts/>. May 30, 2000. Accessed May 9, 2020.
41. Pinard CA, Byker C, Harden SM, et al. Influences on Food Away from Home Feeding Practices Among English and Spanish Speaking Parent-Child Dyads. *J Child Fam Stud.* 2015;24(7):2099-2106.
42. Kral TVE, Kabay AC, Roe LS, Rolls BJ. Effects of Doubling the Portion Size of Fruit and Vegetable Side Dishes on Children's Intake at a Meal. *Obesity.* 2010;18(3):521-527.
43. Spill MK, Birch LL, Roe LS, Rolls BJ. Eating vegetables first: the use of portion size to increase vegetable intake in preschool children. *Am J Clin Nutr.* 2010;91(5):1237-1243.
44. Benton D. Portion Size: What We Know and What We Need to Know. *Crit Rev Food Sci Nutr.* 2015;55(7):988-1004.
45. Young LR, Nestle M. The Contribution of Expanding Portion Sizes to the US Obesity Epidemic. *Am J Public Health.* 2002;92(2):246-249.
46. Nielsen SJ, Siega-Riz AM, Popkin BM. Trends in food locations and sources among adolescents and young adults. *Prev med.* 2002;35(2):107-113.
47. Anzman-Frasca S, Folta SC, Glenn ME, et al. Healthier Children's Meals in Restaurants: An Exploratory Study to Inform Approaches That Are Acceptable Across Stakeholders. *J Nutr Educ Behav.* 2017;49(4):285-295.
48. United States Department of Agriculture, Economic Research Service. Food expenditures, Table 3 – Food away from home: Total expenditures. 2016.
49. Saksena MJ, Okrent AM, Anekwe TD, et al. *America's Eating Habits: Food Away From Home, EIB-196.* United States Department of Agriculture, Economic Research Service Economic Information Bulletin. September 2018.

CHAPTER 5: DISCUSSION

The two research projects presented in this dissertation (The Conjoint Study and The Aspen Grille Study), while separate, are linked by a common goal: to examine the feasibility and acceptability of behavioral economic strategies as a part of children's meals in restaurants. Parents and children each play a critical role in the eating habits of children, especially related to dining out¹⁻³. The increase in families dining out⁴ and the poor nutritional quality of children's meals in restaurants⁵⁻⁷ highlight the importance of finding strategies that work for all stakeholders involved in children's restaurant meals. Results from this work demonstrate that use of these strategies is feasible and can be beneficial for children's ordering and consumption of restaurant foods, however there may be some complexity to the acceptability of these strategies. Within that complexity is the importance of parent preference for choice and the importance on focusing on side dishes as a way of improving children's intake in restaurants. Demonstrating the power and flexibility of behavioral economics strategies may be key to building further acceptance for the use of these strategies in restaurants.

Children in the Aspen Grille study remained with the default side dish during each of the menu conditions. When optimal defaults and optimal, vice-virtue defaults were in place, featuring large portions of a healthful carrot side dish, children's menu orders continued to include default sides. In the conjoint study, while a majority of parents preferred to have choice, there was a contingent of parents whose preference was not only for choice, but also for optimal defaults. Previous studies have illustrated the benefits of using optimal defaults in regional chain restaurants⁸ and large theme parks⁹. Taken together, this work supports the feasibility of using behavioral economic strategies on children's menus in restaurants. However, the majority of

parents in the Conjoint Study preferred to have choice and in the Aspen Grille Study some children ordered french fries after receiving an optimal default of all carrots, which also indicates there may be some nuance to the acceptability of behavioral economic strategies.

Parents and children both have important roles in children's consumption of food away from home¹⁻³. The information gathered from the Conjoint Study and the Aspen Grille study capture the responses to the use of behavioral economic strategies. Previous research has shown that many parents see dining out as a "treat" or a "special occasion," and therefore may be more willing to accept unhealthful food options^{2,15,16}. While parents enjoy dining out with their children, they also use dining out to avoid any food rejection and conflict with children during a meal^{2,17}. Parents displayed strong preferences for abundant and apparent choice in side dishes in the Conjoint Study and many were averse to optimal defaults. Results from The Aspen Grille Study illustrate children's willingness to go along with the default side dish, even when it is a more healthful vegetable side dish, which may help parents to see the benefit of these strategies. It is notable that results from these studies point to an important reason behavioral economics exists. Constant decision-making and increased choices in the marketplace can be overwhelming¹⁰⁻¹², but consumers typically want to see a plethora of choices¹³. When too many choices exist, a person's hot system (the automatic, reactive system) can kick in and people may make a poor decision⁹ or refrain from deciding at all, accepting whatever defaults are in place¹⁴, which is why optimal defaults exist. Demonstrating the power of an optimal default to parents and restaurateurs may be important to helping shape children's menus to be more healthful.

Previous studies aiming to increase the availability of healthful entrees or promote healthful choices have been met with resistance from restaurants¹⁸ and have been limited in their ability to produce any substantial changes^{19,20}. When asked, restaurant executives have stated

that putting healthful options on children's menus is met with limited enthusiasm from patrons and increases food waste in the restaurant^{3,18,21,22}. In The Conjoint Study the majority of parents were indifferent to the presence of healthful entrees, and in The Aspen Grille Study the focus was on the side dish, not on providing healthful entrees. Recent increased demand for healthful foods on children's menus has caused many restaurants to add healthful fruit and vegetable sides to their menus^{6,23}. Results from the studies presented in this dissertation illustrate the benefits of focusing on side dishes. Parents emphasized the side dish portion of the menu and children's menu ordering and subsequent intake illustrate the benefit of altering side dishes to be more healthful. Altering side dishes to feature fruits and vegetables has the potential to decrease calories offered to children by over 170 calories per meal²⁴. Focusing on side dishes may be an important way to impact children's intake in restaurants that is also acceptable to all stakeholders.

Policy Implications

Behavioral economics is steadily becoming a part of both public and corporate policy related to children's menus. Legislation in California, Vermont, New York, and Colorado has passed which features use of optimal default strategies²⁵. This legislation removed unhealthy, default sugar-sweetened beverages (SSB) from children's menus and replaced them with healthful, default beverages such as low-fat milk, water, and 100% juice²⁵. In 2010, Santa Clara County became the first in the U.S. to ban toys included in children's meals which contained over 485 calories²⁶. This goal was to remove the incentive for eating unhealthy foods²⁶.

Corporate policy has also seen recent shifts that use behavioral economic strategies. In 2011, McDonalds switched their default side on a children's meal to be an optimal, vice-virtue default of apple slices and a small side of french fries²⁷. They also removed the default SSB and

replaced it with low-fat milk as the default beverage²⁷. Results from both the Conjoint Study and the Aspen Grille Study may lend credence to future use of policies focusing on side dishes or use of behavioral economic strategies. The increases in demand for healthful children's meals²⁸ paired with research showing that consumer's view healthful items on children's meals in restaurants as socially responsible²⁹ may mean that more behavioral economic strategies begin appearing on children's menus. Demonstrating that various behavioral economic strategies are feasible may help restaurants with implementation of these strategies.

Future Research Directions

Results from both studies improved knowledge in important gaps in the literature related to the feasibility and acceptability of behavioral economic strategies. Future research stemming from these two projects may provide further evidence for the use of behavioral economic strategies to improve children's meals in restaurants. Findings outlined in Chapter 3 (The Conjoint Study) divulged two groups of parents with opposing preferences related to the features of restaurant children's menus: One group that valued healthful entrees and side dishes and another that valued more traditional, less healthful children's meals. These two groups warrant further exploration, as they are important stakeholders. The addition of qualitative data gathered via focus groups or interviews with parents may help to gather insights into these groups and their perceptions of children's restaurant menus.

Use of a campus-based restaurant in The Aspen Grille Study (Chapter 4) allowed researchers to gather important consumption data while maintaining the façade of a sit-down, casual dining restaurant. This study also used a convenience sample of University employees and their families to take part in the study. Future research in this area would further bolster this

research by conducting a naturalistic study in a sit-down casual dining restaurant that is off-campus, recruiting from the families that typically frequent the restaurant. This would help to improve the ecological validity of using behavioral economic strategies in restaurants. Recent research has collected consumption data from patrons at a fast-casual restaurant³⁰, illustrating that this type of data collection can be done in working restaurants. Lastly, this study was conducted in a sit-down restaurant and examination of these strategies in fast food or quick-service restaurants would be beneficial as would examination of these strategies using a variety of fruits or vegetables with various taste profiles such as sweet (e.g., orange slices, strawberries, etc.) or bitter (e.g., broccoli).

Overall Conclusions

Results from these two studies provide insight into the acceptability and feasibility of using behavioral economic strategies in restaurants. The various preferences and needs of the three major stakeholders – parents, children, and restaurants – are important and having a variety of strategies that may meet people’s needs while improving children’s consumption in restaurants is important. Results from these two studies may be beneficial for nutrition professionals and restaurateurs working toward improving children’s consumption in restaurants.

REFERENCES

1. Castro IA, Williams CB, Madanat H, et al. Food ordering for children in restaurants: multiple sources of influence on decision making. *Public Health Nutrition*. 2016;19(13):2404-2409.
2. McGuffin LE, Price RK, McCaffrey TA, et al. Parent and child perspectives on family out-of-home eating: a qualitative analysis. *Public Health Nutrition*. 2015;18(1):100-111.
3. Anzman-Frasca S, Folta SC, Glenn ME, et al. Healthier Children's Meals in Restaurants: An Exploratory Study to Inform Approaches That Are Acceptable Across Stakeholders. *Journal of Nutrition Education and Behavior*. 2017;49(4):285-295.
4. Wootan MG. Children's Meals in Restaurants: Families Need More Help To Make Healthy Choices. *Childhood Obesity*. 2012;8(1):31-33.
5. Guthrie JF, Lin B-H, Frazao E. Role of Food Prepared Away from Home in the American Diet, 1977-78 versus 1994-96: Changes and Consequences. *Journal of Nutrition Education and Behavior*. 2002;34(3):140-150.
6. Batada A, Bruening M, Marchlewicz EH, Story M, Wootan MG. Poor Nutrition on the Menu: Children's Meals at America's Top Chain Restaurants. *Childhood Obesity*. 2012;8(3):251-254.
7. Mancino L, Todd JE, Guthrie J, Lin B-H. How food away from home affects children's diet quality. *US Department of Agriculture, Economic Research Service(No ERR-104) Washington, DC: US Department of Agriculture, Economic Research Service*. 2010.
8. Anzman-Frasca S, Mueller MP, Sliwa S, et al. Changes in Children's Meal Orders Following Healthy Menu Modifications at a Regional US Restaurant Chain. *Obesity*. 2015;23(5):1055-1062.
9. Peters J, Beck J, Lande J, et al. Using healthy defaults in Walt Disney World restaurants to improve nutritional choices. *Journal of the Association for Consumer Research*. 2016;1(1):92-103.
10. Vohs KD, Baumeister RF, Schmeichel BJ, Twenge JM, Nelson NM, Tice DM. Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Self-regulation and self-control: Routledge*; 2008:45-77.
11. Thaler RH. *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press New Haven & London; 2008.

12. Kahneman D. *Thinking, fast and slow*. Macmillan; 2011.
13. Henry HKM, Borzekowski DLG. Well, that's what came with it. A qualitative study of US mothers' perceptions of healthier default options for children's meals at fast-food restaurants. *Appetite*. 2015;87:108-115.
14. Herrmann A, Heitmann M, Morgan R, Henneberg SC, Landwehr J. Consumer decision making and variety of offerings: The effect of attribute alignability. *Psychology & Marketing*. 2009;26(4):333-358.
15. Zoumas-Morse C, Rock CL, Sobo EJ, Neuhouser ML. Children's patterns of macronutrient intake and associations with restaurant and home eating. *Journal of the American Dietetic Association*. 2001;101(8):923-925.
16. Pinard CA, Byker C, Harden SM, et al. Influences on Food Away from Home Feeding Practices Among English and Spanish Speaking Parent-Child Dyads. *Journal of Child and Family Studies*. 2015;24(7):2099-2106.
17. Robson SM, Crosby LE, Stark LJ. Eating dinner away from home: Perspectives of middle-to high-income parents. *Appetite*. 2016;96:147-153.
18. Ayala GX, Castro IA, Pickrel JL, et al. A Cluster Randomized Trial to Promote Healthy Menu Items for Children: The Kids' Choice Restaurant Program. *International Journal of Environmental Research and Public Health*. 2017;14(12).
19. Espino JNV, Guerrero N, Rhoads N, et al. Community-Based Restaurant Interventions to Promote Healthy Eating: A Systematic Review. *Preventing Chronic Disease*. 2015;12.
20. Glanz K, Hoelscher D. Increasing fruit and vegetable intake by changing environments, policy and pricing: restaurant-based research, strategies, and recommendations. *Preventive Medicine*. 2004;39:88-93.
21. Glanz K, Resnicow K, Seymour J, et al. How major restaurant chains plan their menus - The role of profit, demand, and health. *American Journal of Preventive Medicine*. 2007;32(5):383-388.
22. Lopez NV, Folta SC, Glenn ME, Lynskey VM, Patel AA, Anzman-Frasca S. Promoting healthier children's meals at quick-service and full-service restaurants: Results from a pilot and feasibility study. *Appetite*. 2017;117:91-97.
23. Mueller MP, Wilde P, Folta SC, Anzman-Frasca S, Economos CD. Availability of Healthier Children's Menu Items in the Top Selling Quick Service Restaurant Chains (2004–2015). *American journal of public health*. 2019;109(2):267-269.

24. Anzman-Frasca S, Dawes F, Sliwa S, et al. Healthier side dishes at restaurants: an analysis of children's perspectives, menu content, and energy impacts. *International Journal of Behavioral Nutrition and Physical Activity*. 2014;11.
25. Mancini S, Harris J. Policy changes to reduce unhealthy food and beverage marketing to children in 2016 and 2017. Rudd Center Brief. 2018.
26. Peddycord D. Report regarding public health ordinance on childhood obesity. Santa Clara County Department of Public Health, April 27, 2010:1–6.
27. *McDonald's USA: Commitments to Offer Improved Nutrition Choices*. McDonalds.com/news-releases/ - <https://news.mcdonalds.com/news-releases/news-release-details/mcdonalds-usa-commitments-offer-improved-nutrition-choices>. Published July 26, 2011. Accessed May 9, 2020.
28. Center for Science in the Public Interest. (2013). *Kids' meals II: Obesity and poor nutrition on the menu*. Retrieved from <https://cspinet.org/sites/default/files/attachment/cspi-kids-meals-2013.pdf>.
29. Lee K, Conklin M, Bordi P, Cranage D. Restaurants' Healthy Eating Initiatives For Children Increase Parents' Perceptions Of CSR, Empowerment, And Visit Intentions. *Int J Hosp Manag*, 2016:59, 60-71.
30. Cohen JF, Roberts SB, Anzman-Frasca S, et al. (2017). A pilot and feasibility study to assess children's consumption in quick-service restaurants using plate waste methodology. *BMC public health*. 2017;17(1), 259.

APPENDIX I: IRB APPROVAL – EXAMINING PARENT PREFERENCES FOR THE USE OF BEHAVIORAL ECONOMIC STRATEGIES ON CHILDREN’S RESTAURANT MENUS



eProtocol
Office of the Vice President for Research
321 General Services Building - Campus Delivery 2011 eprotocol
TEL: (970) 491-1553
FAX:

NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE: April 30, 2019
TO: Bellows, Laura, Food Science & Human Nutrition
Ferrante, Mackenzie, Food Science & Human Nutrition, Pagliassotti, Michael
FROM: Felton-Noyle, Tammy, Senior IRB Coordinator, BMR, CSU IRB Exempt
PROTOCOL TITLE: Examination of Parent preferences for children's menus using behavioral economic strategies
FUNDING SOURCE: NONE
PROTOCOL NUMBER: 19-8809H

The CSU Institutional Review Board (IRB) for the protection of human subjects has reviewed the protocol entitled: Examination of Parent preferences for children's menus using behavioral economic strategies. The project has been approved for the procedures and subjects described in the protocol.

Full Board Review: This protocol must be reviewed for renewal at least annually for as long as the research remains active. Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

Expedited Review: This protocol is approved for a duration of three years, unless otherwise notified. You remain obligated to submit amendments, deviations, unanticipated problems per policy.

Exempt Review: This protocol is approved for a duration of five years. You remain obligated to submit amendments, deviations, unanticipated problems per policy.

Important Reminder: If you will consent your participants with a signed consent document, it is your responsibility to use the consent form that has been finalized and uploaded into the consent section of eProtocol by the IRB coordinators. Failure to use the finalized consent form available to you in eProtocol is a reportable protocol violation.

If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.

This approval is issued under Colorado State University's Federal Wide Assurance 00000647 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under CSU's Assurance, please do not hesitate to contact us.

Please direct any questions about the IRB's actions on this project to:

IRB Office - (970) 491-1553; IRB@mail.Colostate.edu

Evelyn Swiss, Senior IRB Coordinator - (970) 491-1381; Evelyn.Swiss@Colostate.edu

Tammy Felton-Noyle, IRB Biomedical Coordinator - (970) 491-1655; Tammy.Felton-Noyle@Colostate.edu

Felton-Noyle, Tammy

Initial exempt determination has been granted April 30, 2019 to recruit healthy participants with the approved recruitment and consent procedures. The above-referenced research activity has been reviewed and determined to meet exempt review by the Institutional Review Board under exempt category 2(i) of the 2018 Requirements. Approved documents include: mTurk Consent Document FINAL; CBCA Survey 2019 FINAL IRB.

Review Type: EXEMPT
IRB Number: 00010468 or 00000202

APPENDIX II: THE FINAL EIGHT MENUS AFTER OPTIMIZATION AND EXPERT REVIEW

MENU A

KIDS MENU
For our guests 10 years and under

All kids meals come with a big side of Fresh Carrot Sticks & Ranch and a small side of French Fries*

Choice of drink: Soda, Lemonade, Milk, or 100% Fruit Juice

Choose from the following options

\$5.99

CHICKEN TENDERS

Fried, crispy, all-white-meat chicken tenders

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheddar cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Alternate side dishes are available upon request

Enjoy your meal!

MENU B

KIDS MENU
For our guests 10 years and under

All kids meals come with Fresh Carrot Sticks & Ranch*

*Choice of drink: Milk, Water, or 100% Juice

Choose from the following options

\$5.99

CHICKEN TENDERS

Fried, crispy, all-white-meat chicken tenders

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Alternate side dishes are available upon request

*Soda or Lemonade may be substituted for \$1.00 more

MENU C

KIDS MENU

For our guests 10 years and under

All kids meals come with choice of two sides:
French Fries, Potato Chips, Applesauce,
Fresh Carrot Sticks, Fresh Fruit, or Steamed Broccoli.

*Choice of drink: Milk, Water, or 100% Fruit Juice

Choose from the following options

\$5.99

HEALTHY
CHOICE!

GRILLED CHICKEN

Chicken breast, grilled and cut into strips served w/ choice of sauce

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Soda or Lemonade may be substituted for \$1.00 more

MENU D

KIDS MENU

For our guests 10 years and under

All kids meals come with a big side of Fresh Carrot Sticks and Ranch
and a small side of French Fries*

Choice of drink: Soda, Lemonade, Milk, or 100% Fruit Juice

Choose from the following options

\$7.99

HEALTHY
CHOICE!

GRILLED CHICKEN

Chicken breast, grilled and cut into strips served w/ choice of sauce

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla w/ salsa

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Alternate side dishes are available upon request

Enjoy your meal!

MENU E

KIDS MENU

For our guests 10 years and under

All kids meals come with Fresh Carrot Sticks and Ranch*

*Choice of drink: Milk, Water, or 100% Fruit Juice

Choose from the following options

\$7.99

HEALTHY CHOICE!

GRILLED CHICKEN

Chicken breast, grilled and cut into strips served w/ choice of sauce

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Alternate side dishes are available upon request

*Soda or Lemonade may be substituted for \$1.00 more

MENU F

KIDS MENU

For our guests 10 years and under

All kids meals come with French Fries*

Choice of drink: Soda, Lemonade, Milk, or 100% Fruit Juice

Choose from the following options

\$5.99

HEALTHY CHOICE!

GRILLED CHICKEN

Chicken breast, grilled and cut into strips served w/ choice of sauce

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Alternate side dishes are available upon request

Enjoy your meal!

MENU G

KIDS MENU

For our guests 10 years and under

All kids meals come with choice of one side:
French Fries, Potato Chips, Applesauce,
Fresh Carrot Sticks, Fresh Fruit, or Steamed Broccoli.

Choice of drink: Soda, Lemonade, Milk, or 100% Fruit Juice

Choose from the following options

\$7.99

CHICKEN TENDERS

Fried, crispy, all white meat chicken tenders

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

Enjoy your meal!

MENU H

KIDS MENU

For our guests 10 years and under

All kids meals come with a big side of French Fries and a small side of Fresh Carrot Sticks and Ranch*

*Choice of drink: Milk, Water, or 100% Fruit Juice

Choose from the following options

\$7.99

CHICKEN TENDERS

Fried, crispy, all white meat chicken tenders

KID'S BURGER

A smaller version of our house burger, w/ or w/o cheese

MAC AND CHEESE

Creamy, home-style macaroni noodles in cheddar cheese sauce

CHEESE QUESADILLA

Melted cheddar cheese in a flour tortilla

KID'S PIZZA

6" cheese pizza w/ tomato sauce

*Alternate side dishes are available upon request

*Soda or Lemonade may be substituted for \$1.00 more

APPENDIX III: RECRUITMENT DOCUMENTS –TURKPRIME POSTING, STUDY OVERVIEW, AND PARTICIPANT SETTINGS

Parents of 4-10 year olds - Preferences for children's restaurant menus(~ 20 minutes)

Description: \$1.00 - Preferences of parents of 4 - 10 year old children

Instructions

Go to [Link](#) and follow the study instructions. Note the secret key found at the end of the study which you will need to complete the HIT.

* 1. Enter the **SECRET KEY** (not your Worker ID) found at the end of the linked survey. Do not add any comment or text here

Powered by CloudResearch.com

<p>Project: Children Restaurant Menus- Mohr Title: Parents of 4-10 year olds - Preferences for children's restaurant menus Survey ID: 169343 MTurk Toolkit Study Tags +</p>	Archived	<div style="background-color: #008000; color: white; padding: 2px; border: 1px solid #008000;">498 / 500</div> <p>Elapsed Time: 0 days 3 hours</p>	<div style="background-color: #008000; color: white; padding: 2px; border: 1px solid #008000; display: inline-block;">Grant Bonuses</div> <div style="background-color: #008000; color: white; padding: 2px; border: 1px solid #008000; display: inline-block;">Copy HIT</div>	<p style="text-align: right;">Approval Rate: 90+ Only: United States Childrennumber: 1,2,3,4,5,More than 5 Children: I have children younger than 8 years old, I have children between 9 and 19 years old View Study Demographics</p>
<p>External Survey Link CloudResearch Survey Preview Secret Code: Custom Code Assignment Approval: Manually Average Time: 15.6 min Median Time: 12.4 min Expected Time: 20 min Maximum Time: 60 min Completion Rate: 87 % Bounce Rate: 14 % Run Time (UTC): 09/11/19 7:35PM - 10/11/19 7:35PM Completed Time (UTC): 9/11/2019 11:29:57 PM Survey Group: Menus [Group ID: 2780 Owner: researchadministrator@business.colostate.edu]</p>		<p style="text-align: center;">👁 See Survey Specs</p> <p>Pending: 0 Approved: 498 Rejected: 0 Download CSV Download Study Stats CSV</p> <p>Worker Payment: \$1.00 Cost: Amazon Estimated Cost: \$600.00 = \$1.00 x 500 workers + 20% Amazon Fee Pro Features Fee: \$34.86 Panel Fee: \$249.00 Total CloudResearch Cost: \$283.86</p> <p>Description: \$1.00 - Preferences of parents of 4 - 10 year old children HIT ID (Worker emails specify this): 31N9JPQXIPNOA8Y3SUU4YP4AQQHNHX All 56 HIT IDs: <small>3K3G48TR9D8XCR07L1CDMWPQSD2GL_38V58W9K200YUJKQVM7G769V9EIBW_3N5Y55YXG8L0LQPMK0KCHSHDVRAN9_3LQJF4B0XIKQMB9LJFC843DK9_3EHMLB7F7471BZMSLGSF1V8IHU_37J0SLCSAXONF2ZGRUMEX8VPELIDA_3NVTQKULSUHAEKAZ488RTTYSEH_3HKP5DFBYFLAZZYETHXDP9IN98S_35DKNCDZDL2HUSRFLSDFCGOGLN1VX_3V0K6S8AFY175Z29AN3N3SEDFM5G3_38KYG06AFPRQJEMW531YFK6C1N6W_3EFS3G2SLKXV0DOL786CHFLJWRFRU_375WMBD4JQRKRA9Y2WVYVZLUDY_3VDBS8XAFY176GZMNV5ZEMV98GV_3MA5NDGTCG4Z8SPQD07DXTBLPKWFP_3ZJRE8NE8AFKTRKHLD7ZL059FW_32ULIEJOC28YNAQZMCLUC826V987_3HWRWHS5G0U0UP85T5Y9S1KLH2H5G_35SHHSXCDAR0W7Q3G51K5SGCMFDH_3PZDSVZL38M8YWA6DNAL46WLLN48_3K1H3NEVY14D0CCFJUYRKHGFM2GG6_3BDNECQDMTKPYP8KVLPRWXA1_3HY429RH013NPK0WXPVPH29FQ8EE_3HWRALCTDF3WJUMJAN64FU18XIB_324N5F8X6G8K90L5EFAANFV_38P8C8LKYWDR2XZC0YHNA76J37L_3Q7R6AP07FASQJLZLCLAT3DGL_30EWW2KGGIG1GDT07DBRMTPH0C8TDT_3P8BJK0C1Q1KNIHTJFM8VXK55VF_3U95K7NDX4MAC3S8OCDF5982G4NGY_3A88CN8P8LX3P8H6CS9MRPKY0_31N9JPQXIPNOA8Y3SUU4YP4AQQHNHX_35SN80MUBCTWCDFDLKAB80KLR0L_3KDD253Q85HFZCWR8M58Q8P2CCL_3U1YRW2K1YH0A8P2NCLCB8NFR8M_3HWRALCTDF3WJUMJAN64FU18XIB_3538JYQ1FZ98ENFLMPAQUR5UD3Z_3G5RLKNEZCRV2G0KJ8CL8M7D9N7_35XAX51T86E3M61N3KPV8H835WAOO_373CZJ29KY9D0RZAC0LMEFSRM_3NCN4N1H1GMQJYH58K8CE1CVD0CN8_31MCUE398RPR8A8G554B3993G0Y_3ZJRE8NE8AFKTRKHLD7ZL059FW_3UMQZ0LZAZAY18Y8E7FCYQDNE_3V8Z74K7GL3J8L1F08K8YK6G5G3_375WMBD4JQRKRA9Y2WVYVZLUD_3B0MCRZMBR25A4RMF18NBWCWSPD_3U18MJL1UR8TON623N7UDYCNCO_3HE8BMA8H8DQMJRZLQ8518HSEPR_3Y7Z3Y9HRYL4S6DZDAH8M8GQY95A_3UMQZ0LZAZAY18Y8E7FCYQDNE_3U1UJ8G5AMP8550CFR1QAZQZT_344M16Z0K0Z07127K0Y0XV4PNE4_3P829YKCH81P9YH0TSHNNT2TJULG_3M0568243SPGWC7X0464V45XAB4NFZ_3K3X1W456W182223X4LSM1DASAP5</small></p>		
<p>MicroBatch: <input type="checkbox"/> HyperBatch: <input checked="" type="checkbox"/></p>		<div style="background-color: #00AEEF; color: white; padding: 5px; border-radius: 5px; display: inline-block;"> ? Support </div>		



Account: Academic
MTurk Balance: \$95.59
Lab Balance: \$135.66
researchadministrator@business.colostate.edu

Design a Linked Survey

Design your survey and copy the link here for MTurk workers

Project Name

Children Restaurant Menus- Mohr

This name is not displayed to Workers

Email Address

Add an email

Email address to update you on your HIT's launch and completion

Describe your HIT to Workers

* Title

Parents of 4-10 year olds - Preferences for children's restaurant menus(~ 20 minutes)

Title of the survey that will be displayed to workers

Description

\$1.00 - Preferences of parents of 4 - 10 year old children

A Description of your survey

Custom Instructions

(Optional) It is best to include instructions on your survey landing page. Nevertheless, you may include Custom instructions to display to workers.

Standard instructions that workers should follow the hyperlink and submit a secret code (if set) are always included and will follow the custom instructions, if specified.

Keywords

Parents, restaurants, children's menus, children

Keywords associated with your HIT

This project may contain potentially explicit or offensive content, for example, nudity

Support

Set up your HIT

Worker Payment Per Survey

\$ **1.00**

Amount you will pay each worker who completes your HIT

Total Number of Survey Participants

The number of participants you want to take your HIT

Expected time to complete HIT

Minutes

The estimated amount of time for Worker to complete HIT. This will be appended to your HIT description.

Time allotted per assignment

Hours

Maximum time allowed for a Worker to complete the HIT

HIT expires in

Days

The amount of time you want your HIT to be active for

* Survey Hyperlink

http://colostate.az1.qualtrics.com/jfe/form/SV_392tUinzOzrVaxn

The URL of your survey

Query String Parameters

CloudResearch will automatically add the following query string parameters to your url so you can take advantage of them in your data collection. The parameters are: workerId, assignmentId, and hitId.

- workerId -The worker's MTurk id
- assignmentId -A unique id that Amazon generates for a worker taking your HIT
- hitId -The id of your HIT

For example, if your Survey Link is <https://www.example.com>, we will put the above parameters in your url so the final url might look like <https://www.example.com?workerId=ABC01435&hitId=35hgfsbdu&assignmentId=vvwjebwufg>. You can then take advantage of these parameters by setting up Qualtrics Embedded data (<http://www.qualtrics.com/university/researchsuite/advanced-building/survey-flow/embedded-data/>).

Scheduled Launch Time (UTC) (UTC Time)

Automatic Worker Bonus

\$ **0.00**

Amount you will bonus each worker who is approved

The HIT will only be visible to workers who qualify. This must be checked to accurately measure the Bounce rate.

Display the Median Hourly Rate (including Guaranteed Bonus) to Workers

How Workers are Approved and Rejected

Fixed Secret Key for all Workers

Support

(optional) Secret Code that workers must enter to complete the HIT. (Alphanumeric characters excluding numbers 1, 0 and letters I, O, l)

If you are not using a fixed secret code and also not using "Dynamic Secret Key For Qualtrics" below, but, instead are managing your own secret code, enter the word "dummy" here and check the "Manual Assignment Management" checkbox below.

Note: Your External Secret Code must be prominently displayed on the last page of your survey and without ANY punctuation before or after it like this:

Secret Code: AJFHBG897

Dynamic Secret Key For Qualtrics

Each worker will have a unique secret key. Your HIT can either be auto-approved or manually approved.

Setting up the dynamic code by definition means each individual worker will get a unique completion code. To do this on Qualtrics:

1. Create or Edit a Survey
2. Go to the End of Survey section, located after the final block in the survey, and click the "Survey Termination Options"

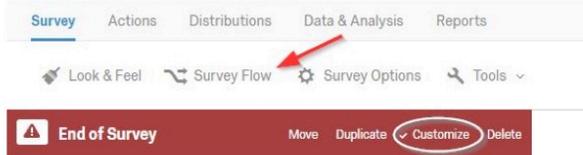


3. In the Survey Termination Section: Click on Custom end of survey message...

Survey Termination

- Default end of survey message.
- Custom end of survey message...
 - Secret Key
- Show Response Summary.
- Redirect to a full URL, ex. "https://www.qualtrics.com":
- Send additional thank you email from a library... When distributed via the Survey Mailer.
- Anonymize Response. Do NOT record any personal information and remove contact association (not recommended).

**This can also be accessed from Survey Flow



4. Go to Custom End of Survey Message and click new message

Survey Termination

- Default end of survey message.
- Custom end of survey message...
 - Secret Key
- Show Response Summary.
- Redirect to a full URL, ex. "https://www.qualtrics.com":
- Send additional thank you email from a library... When distributed via the Survey Mailer.
- Anonymize Response. Do NOT record any personal information and remove contact association (not recommended).

**In Survey Flow

Customize End Of Survey

- Override Survey Options
 - Default end of survey message.
 - Custom end of survey message...
 - Secret Key ▾
 - Redirect to a URL ...
- Send additional thank you email from the library...
- Do not increment quota counts.
- Show Response Summary.
- Do NOT record any personal information and remove panel association (not recommended).
- Flag Response As Screened-Out ▾
- Do NOT record survey response (not recommended).

5. Enter Secret Key in the Description field. (Next time you can select this message.)

6. Click the Source  button

7. Paste the following text exactly into the window as shown

```
<iframe src='https://app.cloudresearch.com/TakeLaunchedSurvey/DynamicKey' width='100%' height='200'></iframe>
```

Create a New Message

Category End of Survey Messages ▾

Description Secret Key



```
<iframe src='https://app.cloudresearch.com/TakeLaunchedSurvey/DynamicKey' width='100%' height='200'></iframe>
```

8. Click Save

Manual Assignment Management

You will manually approve the HIT assignments and it will NOT be auto-approved / rejected based on the secret key.

Auto pay workers in

Days ▾

The time before workers are automatically approved for work (Useful only if no Secret Code is specified and HIT is manually approved)

a few demographic questions will be added to your HIT. This helps maintain worker quality.

Advanced <<

Advanced

MicroBatch HITs

Please be advised that MicroBatch HITs take longer to complete. The average study takes 1 hour per 7 workers, but times may vary.

MicroBatch

Support

The survey will be batched into small HITs
(Duration for survey must be 90 minutes or less for this to be effective)

Auto Restart Time In Minutes

The time delay between successive MicroBatch HITs.
If left blank, the value will be system optimized.

Number Participants Per Batch

The number of participants per MicroBatch HIT. Value of 9 or less will save 50% off MTurk fees.

Exclude Workers Who Completed These Surveys

Press **Ctrl** and click to select/deselect.

Allow only Workers Who Completed and Were Approved

of These Surveys

Press **Ctrl** and click to select/deselect.

Exclude Workers with These Worker IDs. Enter each on a separate line (Maximum 2000)

Include Workers with These Worker IDs. Enter each on a separate line (Maximum 2000)

Worker Qualifications

Worker Level

- Any Level
- Master
- Photo Moderation Master
- Categorization Master

Location

Press **Ctrl** to select/deselect up to 15 countries.

Locations you selected:

Support

Note Regarding HIT Approval Rate
 When you set **HIT Approval Rate** (e.g. 80-100%) CloudResearch automatically sets **Number of HITs Approved** to be at least 100 since MTurk assigns an Approval Rate of 100% to Workers who have completed less than 100 HITs (MTurk API Reference (http://docs.aws.amazon.com/AWSMechTurk/latest/AWSMturkAPI/ApiReference_RequirementRequirementDataStructureArticle.html#ApiReference_RequirementTypeIds)).

HIT Approval Rate (%) for all Requested HITs

HIT Approval Rating: 90-100%

Number of HITs Approved 1,000,000

Worker needs to have completed between 0-1,000,000 HITs

Group Requirements
 Create a new Worker Group here (/Qualification/CreateQualification)

Select Group Requirements (up to 5)

Press **Ctrl** and click to select/deselect.

You can review and launch your HIT after you Save

Why CloudResearch?

Products

- MTurk Toolkit
- Prime Panels
- Managed Research

Industries

- Academia
- Marketing
- Government
- Nonprofit

Resources

- Guides
- Blog
- Polls
- Pricing

Support

- Contact Us
- Knowledge Base

Support

Survey on parent preferences for children's menus

Start of Block: Introduction

We hope to learn more about the preferences of parents of 4 - 10 year old children as they relate to menu options available to children in restaurants.

If you decide to participate, you will be asked to complete a short online survey to assess your preferences for different children's menus. This survey is anonymous and will take approximately 15-20 minutes to complete. Your participation in all parts of this study is voluntary. You may withdraw and stop participation at any time.

Upon **successful** completion of the survey, you will be compensated \$1.00 for your time.

AMAZON'S STATEMENT: Please be aware that any work performed on Amazon mTurk can potentially be linked to information about you on your Amazon public profile page, depending on the settings you have for your Amazon profile. We will not be accessing any personally identifying information about you that you may have put on your Amazon public profile page. We will store your mTurk worker ID separately from the other information you provide to us. Note that Amazon Mechanical Turk, Qualtrics, and Inquisit have specific privacy policies of their own. You should be aware that these web services may be able to link your responses to your ID in ways that are not bound by this consent form and the data confidentiality procedures used in this study, and if you have concerns you should consult these services directly.

COLORADO STATE UNIVERSITY: While there are no direct benefits to you, we hope to gain more knowledge on parent preferences as they relate to menu options available to children in sit-down restaurants. It is not possible to identify all potential risks in a research study, however researchers have taken all reasonable safeguards to minimize any known or potential (but unknown) risks to participating in this survey. Being an anonymous online survey, we will not collect your name or any identifying personal information. When we report and share the data with others, we will combine your answers with everyone else's who took the survey. For maximum confidentiality, please clear your browser history and close the browser before leaving the computer.

This research is being conducted by Drs. Gina Mohr and Laura Bellows at Colorado State University. If you have any questions about the content of the survey please contact Gina Mohr at Gina.Mohr@colostate.edu or Laura Bellows at laura.bellows@colostate.edu or if you have

questions about your rights as a volunteer in this research, contact the CSU International Review Board (IRB) at: RICRO_IRB@mail.colostate.edu; 970-491-1553.

Please click the blue arrow below to be taken to the survey.

End of Block: Introduction

Start of Block: MTurk Info

When you have completed the survey in its entirety, you will be given a unique code. This code should be copied into the space provided in mTurk so we can give you credit for your work. In addition to the unique code we will ask for your mTurk worker ID.

We ask that you please take your time in answering the questions. Please do not click randomly through the survey, we will not give you credit if this occurs.

Thank you for your decision to participate in this study. Please click the blue arrow to continue with the survey.

End of Block: MTurk Info

Start of Block: Survey Info

The following survey aims to gather information about your preferences for restaurant children's menus.

You will be shown 8 children's menus which vary slightly and asked to answer a series of questions about each of those menus, one at a time. After the 8 menus, we will ask you a few questions about yourself and your family.

This survey should take approximately 15-20 minutes to complete.

Please click the blue continue button below to begin your survey.

End of Block: Survey Info

Start of Block: Child's Age

Q26 What are the ages of the children living with you, starting with the youngest?

	3 years and under (1)	4 - 6 years (2)	7 - 10 years (3)	11 years and older (5)	N/A (7)
Child 1 (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Child 2 (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Child 3 (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Child 4 (4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Child 5 (5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Child 6 (6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End of Block: Child's Age

Start of Block: Youngest Child's age

Q34 You may have more than one child that is between 4 and 10 years old. For this survey, we ask that you answer questions thinking of your youngest child in that age range.

How old is your youngest child between 4 and 10 years?

- 4 years (4)
- 5 years (5)
- 6 years (6)
- 7 years (7)
- 8 years (8)
- 9 years (9)
- 10 years (10)
- I do not have a child between 4 - 10 years of age (12)

Skip To: End of Survey If You may have more than one child that is between 4 and 10 years old. For this survey, we ask that... = I do not have a child between 4 - 10 years of age

End of Block: Youngest Child's age

Start of Block: Menu A

Q48 Please read carefully through the menu pictured below and then answer the following questions.

[IMAGE MENU A]

Q105 How appealing is the selection of CHILDREN'S ENTREES included on the menu?

- Very appealing (1)
 - Appealing (2)
 - Neither appealing nor unappealing (3)
 - Unappealing (4)
 - Very unappealing (5)
-

Q102 How appealing is the PRICE (\$5.99) of the menu?

- Very appealing (1)
 - Appealing (2)
 - Neither appealing nor unappealing (3)
 - Unappealing (4)
 - Very unappealing (5)
-

Q109 How appealing is the INCLUDED SIDE DISH (a big side of carrot sticks and a small side of french fries) on the menu?

- Very appealing (1)
 - Appealing (2)
 - Neither appealing nor unappealing (3)
 - Unappealing (4)
 - Very unappealing (5)
-

Q110 How appealing are the DRINKS included on the menu (soda, lemonade, milk, or 100% fruit juice)?

- Very appealing (1)
 - Appealing (2)
 - Neither appealing nor unappealing (3)
 - Unappealing (4)
 - Very unappealing (5)
-

Q54 If your child were to receive the included side dish with their entree, approximately how much of the CARROT portion of the side dish would your child eat?

- ALL of the carrots (1)
 - MOST of the carrots (2)
 - SOME of the carrots (3)
 - A LITTLE of the carrots (4)
 - NONE of the carrots (5)
-

Q107 If your child were to receive the included side dish with their entree, approximately how much of the FRENCH FRY portion of the side dish would your child eat?

- ALL of the french fries (1)
 - MOST of the french fries (2)
 - SOME of the french fries (3)
 - A LITTLE of the french fries (4)
 - NONE of the french fries (5)
-

Q56 How likely would you be to order, or allow your child to order, an ALTERNATE SIDE DISH that is not included with the meal?

- Very likely (1)
 - Likely (2)
 - Neutral (3)
 - Unlikely (4)
 - Very unlikely (5)
-

Q40 How satisfied would YOU be if this menu were presented at your local family restaurant.

- Very satisfied (1)
 - Satisfied (2)
 - Neutral: neither satisfied or dissatisfied (4)
 - Dissatisfied (6)
 - Very dissatisfied (7)
-

Q111 How satisfied would YOUR CHILD be if this menu were presented at your local family restaurant.

- Very satisfied (1)
 - Satisfied (2)
 - Neutral: neither satisfied or dissatisfied (4)
 - Dissatisfied (6)
 - Very dissatisfied (7)
-

Q49 Overall, how appealing is this children's menu to you as a parent?

- Very appealing 10 (1)
- 9 (23)
- 8 (24)
- 7 (25)
- 6 (26)
- Neither appealing nor unappealing 5 (27)
- 4 (28)
- 3 (29)
- 2 (30)
- 1 (31)
- Not at all appealing 0 (33)

End of Block: Menu A

Start of Block: Menu B

Q152 Of the 8 menus, which children's menu would you MOST PREFER to see in your local casual-dining restaurant?

- Image:MENU A (1)
- Image:MENU B (2)
- Image:MENU C (3)
- Image:MENU D (4)
- Image:MENU E (5)
- Image:MENU F (6)
- Image:MENU G (7)
- Image:MENU H (8)

End of Block: ALL MENUS

Start of Block: DEMO: Dining Habits

Q47 Please answer the following questions about you and your family's dining habits.

Q30 In the past month, how often did you and your family eat a meal (breakfast, lunch, or dinner) from the following types of restaurants?

	Never or Rarely (1)	1 - 3 times per month (2)	1 - 2 times per week (3)	3 - 4 times per week (4)	5 - 6 times per week (5)	1+ times per day (6)
1. Fast food restaurant (such as McDonald's, Wendy's, Taco Bell) (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Delivery or carry out (pizza, Chinese, other cuisines) (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Fast-Casual restaurant (where you order at counter and food is custom prepared; such as Chipotle, Subway, or Noodles & Co.) (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Sit-down restaurant (where wait staff takes order and brings food to your table; such as Applebees, Texas Roadhouse, or Olive Garden) (4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q94 When you and your child go out to a restaurant to eat, how often does your child order from the children's menu?

- Always (1)
 - Very often (2)
 - Sometimes (3)
 - Rarely (4)
 - Never (5)
-

Q42 How important is it that your child's meal PREPARED AT HOME be healthy?

- Very important (1)
 - Important (2)
 - Moderately important (3)
 - Slightly important (4)
 - Not important (5)
-

Q41 How important is it that your child's meal FROM A RESTAURANT be healthy?

- Very important (1)
- Important (2)
- Moderately important (3)
- Slightly important (4)
- Not important (5)

End of Block: DEMO: Dining Habits

Start of Block: DEMO: Self

Q204 Please answer the following questions about yourself.

Q95 I pay close attention to nutrition information

- Strongly Agree (1)
 - Agree (2)
 - Neither agree nor disagree (4)
 - Disagree (6)
 - Strongly disagree (7)
-

Q97 I reflect a lot about my health

- Strongly Agree (1)
 - Agree (2)
 - Neither agree nor disagree (4)
 - Disagree (6)
 - Strongly disagree (7)
-

Q98 I'm self-conscious about my weight

- Strongly Agree (1)
 - Agree (2)
 - Neither agree nor disagree (4)
 - Disagree (6)
 - Strongly disagree (7)
-

Q99 I'm very involved with my health

- Strongly Agree (1)
 - Agree (2)
 - Neither agree nor disagree (4)
 - Disagree (6)
 - Strongly disagree (7)
-

Q100 I'm constantly examining my health

- Strongly Agree (1)
 - Agree (2)
 - Neither agree nor disagree (4)
 - Disagree (6)
 - Strongly disagree (7)
-

Q22 My age is between

- 18 - 24 years (1)
 - 25 - 34 years (2)
 - 35 - 44 years (3)
 - 45 - 55 years (4)
 - 56 years and over (5)
-

Q25 What is your relationship to your child/children?

- Mother (1)
 - Father (2)
 - Grandparent (3)
 - Legal Guardian (4)
 - Other (5)
-

Q140 What is your marital status?

- Now married, or in a domestic partnership (1)
- Widowed (2)
- Divorced or separated (3)
- Single, never married (4)

Display This Question:

If What is your marital status? = Divorced or separated

Q144 If divorced or separated, what percent of the time are your children living with you?

- 100% of the time (1)
- 50% - 99% of the time (2)
- Less than 50% of the time (3)

Q136 What is the highest grade level you have completed?

- Grade 12 or less (1)
- High school diploma or GED (2)
- Some college, no degree (3)
- Occupational/technical or vocational certificate (8)
- Associates degree (4)
- Bachelor Degree (5)
- Graduate or professional degree (9)

Q137 Are you currently...?

- Employed FULL time for wages (4)
- Employed PART time for wages (5)
- Self-employed (if self-employed, how many hours each week?) (6)

- Out of work (7)
- Homemaker (8)
- Student (9)
- Retired (10)
- Unable to work (11)

End of Block: DEMO: Self

Start of Block: DEMO: Family

Q203 Please answer the following questions about your household and family members.

Q207 What is your approximate household annual income before taxes, from all sources: wages, salary, unemployment, etc?

- Less than \$25,750 (1)
 - \$25,751 - \$47,638 (4)
 - \$47,639 - \$77,250 (2)
 - \$77,251 - \$103,000 (3)
 - More than \$103,000 (5)
 - Prefer not to answer (6)
-

Display This Question:

If What is your marital status? = Now married, or in a domestic partnership

Q141 Is your PARTNER/SPOUSE currently...?

- Employed FULL time for wages (4)
- Employed PART time for wages (5)
- Self-employed (6)
- Out of work (7)
- Homemaker (8)
- Student (9)
- Retired (10)
- Unable to work (11)

End of Block: DEMO: Family

Start of Block: mTurk Code and worker ID

Q36 Thank you for your participation in this study. Researchers are working on a project to understand parent preferences for different children's menus from a casual dining restaurant. We hope to learn more about the preferences of parents as they relate to menu options available to children in sit-down restaurants.

In this study, you were asked to choose between children's menus. Although the menus are similar to others you might see in restaurants, they are not real. We created them for the purposes of the study. The information has been collected without any personally identifiable information to protect the privacy of participants. If you have any further questions about the research, please contact Laura Bellows (970-491-1305).

Q43 In the space below, please enter your mTurk worker ID. This is needed for us to reimburse you for your participation.

APPENDIX V: ASPEN GRILLE STUDY REVRUITMENT FLYER AND ELIGIBILITY
SCREENING QUESTIONNAIRE

The Aspen Grille Restaurant Project
Improving Children's Meals in Restaurants



**CSU invites you to
participate in a
research project!**

Come have dinner with your family at the Aspen Grille! We are interested in understanding how children respond to different foods served in a restaurant setting.

Who: If you have a child between the ages of 4 - 8, we would greatly appreciate your family's participation in our study.

What: To participate, we invite you and your children to dine at the Aspen Grille Restaurant one day per week, for three weeks. Your family's dinner for the three meals you dine at Aspen Grille will be free.

Where: The Aspen Grille, located on the upper level of the Lory Student Center at CSU

When: Study 1: Mondays, September 16th, 23rd, and 30th
Study 2: Mondays, October 7th, 21st, and 28th
Study 3: Tuesdays, October 29th, November 5th and 12th

If you are interested in participating, please email Mackenzie Ferrante at mackenzie.ferrante@colostate.edu or call:

Office: 970-491-2641

Cell: 206-619-4462



This study has been approved by CSU IRB: 16-6956H

Aspen Grille Restaurant Project Participation

Thank you for your interest in participating in the Aspen Grille Restaurant Project! For this project we are interested in understanding how children respond to different foods served in a restaurant setting. We are inviting families with at least one child between the ages of 4 - 8 years, but all children in the family are welcome to participate.

We need to gather a bit more information about you and your family. Please fill out the following form and I (Mackenzie) will be in touch.

First Name

Your answer

Last Name

Your answer

Email

Your answer



We are looking to recruit families with at least one child aged 4 - 8 years. Please confirm how many children you have between the ages 4 - 8 years:

- 1 child
- 2 children
- 3 children
- 4 children
- > 4 children

The study will take place at the Aspen Grille in the Lory Student Center (LSC) over three evenings. Please indicate which dates you and your family would prefer to participate (first choice of dates):

- Mondays: September 16th, September 23rd, and September 30th
- Mondays: October 7th, October 21st, and October 28th
- Tuesdays: October 29th, November 5th, and November 12th

Please indicate your second choice of dates:

- Mondays: September 16th, September 23rd, and September 30th
- Mondays: October 7th, October 21st, and October 28th
- Tuesdays: October 29th, November 5th, and November 12th



We are asking families to arrive for dinner between 5:30 pm and 6:30 pm on their scheduled evenings. What time would work best for you and your family?

- 5:30 PM
- 6:00 PM
- 6:30 PM
- Other:

How often do you and your family eat a meal (breakfast, lunch, or dinner) outside of the home (i.e., at a sit-down, fast-casual, or fast food restaurant or order delivery or carry out)?

- Never or rarely
- 1 - 3 times each month
- 1 - 2 times each week
- 3 - 4 times each week
- More than once each day

We would like to know if your children like certain foods and whether or not they have any food allergies or dietary restrictions. Please answer the following questions for each of your children:

Please answer for ALL children in your family.

* If you have more than 4 children, please answer for any children that are between 4 - 8 years and we will contact you to gather further information on the children outside of this age range.

Child 1: First name

Your answer



Child 1: Age

Your answer

Child 1: Food allergies or restrictions

- No Allergies or Restrictions
- Vegetarian/Vegan
- Gluten Free
- Dairy Free
- Peanut Allergy
- Other:



Child 1: Please indicate if your child likes or typically eats the following foods

	Yes	No
Chicken nuggets/tenders	<input type="checkbox"/>	<input type="checkbox"/>
Hamburgers or cheeseburgers	<input type="checkbox"/>	<input type="checkbox"/>
Grilled cheese	<input type="checkbox"/>	<input type="checkbox"/>
Macaroni and cheese	<input type="checkbox"/>	<input type="checkbox"/>
Tater tots	<input type="checkbox"/>	<input type="checkbox"/>
French fries	<input type="checkbox"/>	<input type="checkbox"/>
Raw carrot sticks	<input type="checkbox"/>	<input type="checkbox"/>
Raw broccoli	<input type="checkbox"/>	<input type="checkbox"/>
Raw tomatoes	<input type="checkbox"/>	<input type="checkbox"/>
Milk	<input type="checkbox"/>	<input type="checkbox"/>

Child 2: First name

Your answer



Child 2: Age

Your answer

Child 2: Food allergies or restrictions

- No Allergies or Restrictions
- Vegetarian/Vegan
- Gluten Free
- Dairy Free
- Peanut Allergy
- Other:



Child 2: Please indicate if your child likes or typically eats the following foods

	Yes	No
Chicken nuggets/tenders	<input type="checkbox"/>	<input type="checkbox"/>
Hamburgers or cheeseburgers	<input type="checkbox"/>	<input type="checkbox"/>
Grilled cheese	<input type="checkbox"/>	<input type="checkbox"/>
Macaroni and cheese	<input type="checkbox"/>	<input type="checkbox"/>
Tater tots	<input type="checkbox"/>	<input type="checkbox"/>
French fries	<input type="checkbox"/>	<input type="checkbox"/>
Raw carrot sticks	<input type="checkbox"/>	<input type="checkbox"/>
Raw broccoli	<input type="checkbox"/>	<input type="checkbox"/>
Raw tomatoes	<input type="checkbox"/>	<input type="checkbox"/>
Milk	<input type="checkbox"/>	<input type="checkbox"/>

Child 3: First name

Your answer



Child 3: Age

Your answer

Child 3: Food allergies or restrictions

- No Allergies or Restrictions
- Vegetarian/Vegan
- Gluten Free
- Dairy Free
- Peanut Allergy
- Other:



Child 3: Please indicate if your child likes or typically eats the following foods

	Yes	No
Chicken nuggets/tenders	<input type="checkbox"/>	<input type="checkbox"/>
Hamburgers or cheeseburgers	<input type="checkbox"/>	<input type="checkbox"/>
Grilled cheese	<input type="checkbox"/>	<input type="checkbox"/>
Macaroni and cheese	<input type="checkbox"/>	<input type="checkbox"/>
Tater tots	<input type="checkbox"/>	<input type="checkbox"/>
French fries	<input type="checkbox"/>	<input type="checkbox"/>
Raw carrot sticks	<input type="checkbox"/>	<input type="checkbox"/>
Raw broccoli	<input type="checkbox"/>	<input type="checkbox"/>
Raw tomatoes	<input type="checkbox"/>	<input type="checkbox"/>
Milk	<input type="checkbox"/>	<input type="checkbox"/>

Child 4: First name

Your answer



Child 4: Age

Your answer

Child 4: Food allergies or restrictions

- No Allergies or Restrictions
- Vegetarian/Vegan
- Gluten Free
- Dairy Free
- Peanut Allergy
- Other:



Child 4: Please indicate if your child likes or typically eats the following foods

	Yes	No
Chicken nuggets/tenders	<input type="checkbox"/>	<input type="checkbox"/>
Hamburgers or cheeseburgers	<input type="checkbox"/>	<input type="checkbox"/>
Grilled cheese	<input type="checkbox"/>	<input type="checkbox"/>
Macaroni and cheese	<input type="checkbox"/>	<input type="checkbox"/>
Tater tots	<input type="checkbox"/>	<input type="checkbox"/>
French fries	<input type="checkbox"/>	<input type="checkbox"/>
Raw carrot sticks	<input type="checkbox"/>	<input type="checkbox"/>
Raw broccoli	<input type="checkbox"/>	<input type="checkbox"/>
Raw tomatoes	<input type="checkbox"/>	<input type="checkbox"/>
Milk	<input type="checkbox"/>	<input type="checkbox"/>

Again, thank you for your interest in the Aspen Grille Restaurant Project. A researcher will contact you about participation in the next few days.

Submit

Never submit passwords through Google Forms.

This content is neither created nor endorsed by Google. [Report Abuse](#) - [Terms of Service](#) - [Privacy Policy](#)



APPENDIX VI: ASPEN GRILLE PARENT PACKET INCLUDING FAMILY CONSENT
AND CHILD ASSENT FORMS

The Aspen Grille Restaurant Project
Improving Children's Meals in Restaurants

Hello!

Thank you again for participating in the Aspen Grille Restaurant Project. We are excited to meet you and your family and hope you enjoy your experience at the Aspen Grille.

For this study, there are a few important things for you and your family to know. First, the purpose of this study is to gain insights to improve children's meals in restaurants. More specifically are interested in understanding how children respond to different foods served in a restaurant setting. Therefore, it is important that children and parents **do not eat foods off each other's plates** (i.e., no sharing of food please).



It is also important to note that the meal options for both adults and children is pre-set; children will have two options for entrees at the meal and parents will have a set entrée at each meal. Please let your children know that they won't be able to order a different meal or drink during the three dinners you are with us at the Aspen Grille.

Finally, enclosed in this packet are the following important items (two of which need to be completed and brought with you in order to participate in the study):

- **Participant Survey:** This brief demographic survey helps us learn a little more about you and your family. **Please fill out this survey and bring it with you on the first day of the study.**
- **Consent forms:** Consent forms are required for each person participating in the study, which includes parents/guardians. Children will be asked for their assent on each day of the study. **Please complete the enclosed consent forms and bring them with you on the first day of the study.**
- **Map of the Lory Student Center:** The Aspen Grille is located in the University Club, on the upper level of the Lory Student Center. (236E Upper Level on the enclosed map)

We will send you a reminder email the day before you are scheduled to dine at the Aspen Grille. If you have any questions or have an emergency that will prevent you from arriving on time at your scheduled dining time each week, please contact **Mackenzie at 206-619-4462** or **mackenzie.ferrante@colostate.edu** as soon as possible.

Thank you again for participating in this study.

Sincerely,

Mackenzie Ferrante, MS, RDN
PhD Candidate
Project Coordinator

Laura Bellows, PhD
Associate Professor
Project Director



ID _____ (Office Use Only)

**COLORADO STATE UNIVERSITY
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT
(Pilot Study)**

TITLE OF PROJECT: *The Aspen Grille Restaurant Project: Improving Children's Meals in the Restaurant Setting*

NAME OF PRINCIPAL INVESTIGATOR: Laura Bellows, PhD, MPH, RD

CO-INVESTIGATORS: Jeffrey Miller, PhD, CEC, CCE

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS: Laura Bellows, 970-491-1305

SPONSOR OF PROJECT: CSU College of Health and Human Sciences

Researchers at Colorado State University are working on a project to understand food intake of children during different meal options in a casual dining restaurant.

If you choose to be part of the study, your family will be asked to dine 3 times at the Aspen Grille (a sit-down restaurant located in Lory Student Center), where you and your children will be provided pre-determined meals served by Aspen Grille staff. The entire dining experience for you and your children will last approximately 1 hour to 1.5 hours, and your family's meal for each of the three days you participate in the study will be compensated.

This study is approximately 3 weeks long, and each week you will dine at the Aspen Grille on the same day of the week, 3 weeks in a row. Prior to the first meal, you will be given a short survey to help our Colorado State University researchers learn a little more about you and your family. The survey should not take more than 15 minutes to complete. Additionally, your child's height and weight will be collected on the first day of the study. Your participation in all parts of this study are voluntary.

One potential risk of participating in this study is for those who are allergic or sensitive to the foods served during the Aspen Grille dinners. Children may not participate in the study if they are allergic or sensitive to any of the study foods. Researchers will take steps to avoid serving foods to adults when there is a known allergy or sensitivity. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks. A potential benefit of participating in the study is that you will become more aware of ideas for serving healthy meals to children.

All information provided by you will be fully confidential and used for research purposes only. Your information will be assigned a number instead of using your name. The only exceptions to this are if we are asked to share the research files for audit purposes with the CSU Institutional Review Board ethics committee, if necessary. In addition, for funded studies, the CSU financial management team may also request an audit of research expenditures. For financial audits, only the fact that you participated would be shared, not any research data.

The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

If you agree to take part in this study, it is your choice. You may stop participating at any time without penalty or loss of benefits. Your signature means that you have read and understand this consent form, you have willingly signed it, and you have received a copy of this form. If you have questions about the study, you can contact the investigator, Laura Bellows, at 970.491.1305. If you have any questions about your rights as a volunteer in this research, *contact the IRB Coordinator at:* the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553.

Adult Participant's name (printed)

Phone Number

Adult Participant's signature

Investigator or co-investigator's signature

Date

ID _____ (Office Use Only)

Title of Project: The Aspen Grille Research Project

Name of Principal Investigators: Dr. Laura Bellows and Dr. Jeffrey Miller

Children aged 4-6 years of age

Hi,

My name is ____ and I work here at this restaurant. Today we are going to serve you and your family some different foods for dinner. My friends and I will be watching your family to see how you eat dinner. We also want to weigh you really quickly. Is it ok if we do this?

Verbal: Yes No

Title of Project: The Aspen Grille Research Project

Name of Principal Investigators: Dr. Laura Bellows and Dr. Jeffrey Miller

Children 7 years of age and older

Hello. We work at CSU and we are doing a research study called the Restaurant Project. A research study is a way to learn more about people. We are doing this study to learn about what foods kids like to eat when at a restaurant. For this study, we would like you to have dinner with your parent(s) 3 times here at this restaurant [Aspen Grille].

There are some things about this study that we want you to know. First, we only have two meal options for you. You can't order a different meal or drink during these three meals. Next, we don't want kids or parents eating foods off each other's plates. So, while eating at this restaurant please don't share your food. Also, we may be getting your height and weight. Last, your parents know about this study and they think its ok for you to be part of it.

When we are done with this study, we will write a report about what was learned. This report will not say your name or that you were in the study.

Agreeing to be in this research study cannot hurt you. It won't help you, either. You won't get any gift for doing it. You don't have to do it. If you say 'yes' now but later change your mind, you can stop being in the research study any time by just by telling me or one of my friends.

If you want to be in this research study, please sign your name and write today's date on the line below.

Child Participant: _____ Date: _____

Researcher: _____ Date: _____

APPENDIX VII: ASPEN GRILLE FAMILY DEMOGRAPHIC QUESTIONNAIRE

ID _____ (Office Use Only)

Aspen Grille Restaurant Project Participant Survey

Please fill out the following information about you and your family. We ask these questions because we are interested in hearing opinions from families of different backgrounds.

Please tell us about you and your children:

1. In the past month, how often did you and your family eat a meal (breakfast, lunch, or dinner) from the following types of restaurants?

	Never or Rarely	1 - 3 times per month	1 - 2 times per week	3 - 4 times per week	5 - 6 times per week
1. Fast food restaurant (such as McDonald's, Wendy's, Taco Bell)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Delivery or carry out (pizza, Chinese, other cuisines)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Fast-Casual restaurant (where you order at counter and food is custom prepared; such as Chipotle, Subway, or Noodles & Co.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Sit-down restaurant (where wait staff takes order and brings food to your table; such as Applebees, Texas Roadhouse, or Olive Garden)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. When you and your family go out to eat, how often does your 4-8 year old order from the children's menu?

Always
 Often
 Sometimes
 Rarely
 Never

ID _____ (Office Use Only)

3. My age is between:

- 18-24 25-34 35-44 45-55 56 years and over

4. Race and/or ethnicity (select all that apply):

- American Indian or Alaskan native
 Asian
 Black or African American
 Hispanic or Latino
 Native Hawaiian or Other Pacific Islander
 White
 Prefer not to answer
 Other (please list): _____

5. My household includes:

- 1 parent 2 parents

6. What is your relationship to your child(ren)?

- Mother Father Grandparent Legal Guardian Other

7. How many children live with you?

- 1 2 3 4 5 More than 5 children

ID _____ (Office Use Only)

8. What is the highest level of education completed by you and your spouse/partner?

	High School/GED	Trade/ Technical/ Vocational training	Some College	College Degree	Graduate Degree or Higher	Not Applicable
You	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your Spouse/Partner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. What is **your** work status?

- Stay at home Work part-time Work full-time

10. What is **your spouse/partner's** work status?

- Stay at home Work part-time Work full-time Not Applicable

11. Please check your approximate household annual income:

- Less than \$24,300 \$60,001 - \$99,999
 \$24,301 - \$45,000 \$100,000 or more
 \$45,001 - \$60,000 Prefer not to answer

Thank you for your participation in the Aspen Grille Restaurant Project!

APPENDIX VIII: IRB APPROVAL – HEALTHY BITES: IMPROVING CHILDREN’S
MEALS AND DIETARY QUALITY IN THE RESTAURANT SETTING



eProtocol
Office of the Vice President for Research
321 General Services Building - Campus Delivery 2011 eprotocol
TEL: (970) 491-1553
FAX:

NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE: March 25, 2019
TO: Bellows, Laura, 1571 Food Sci and Human Nutrition
Miller, Jeffrey, 1571 Food Sci and Human Nutrition, Pagliassotti, Michael
FROM: Felton-Noyle, Tammy, Senior IRB Coordinator, BMR, CSU IRB 1
PROTOCOL TITLE: Healthy Bites: Improving Children's Meals and Dietary Quality in the Restaurant Setting
FUNDING SOURCE: Funding - Grants/Contracts
PROTOCOL NUMBER: 16-6956H
APPROVAL PERIOD: Approval Date: March 20, 2019 Expiration Date: January 13, 2020

The CSU Institutional Review Board (IRB) for the protection of human subjects has reviewed the protocol entitled: Healthy Bites: Improving Children's Meals and Dietary Quality in the Restaurant Setting. The project has been approved for the procedures and subjects described in the protocol.

Full Board Review: This protocol must be reviewed for renewal at least annually for as long as the research remains active. Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

Expedited Review: This protocol is approved for a duration of three years, unless otherwise notified. You remain obligated to submit amendments, deviations, unanticipated problems per policy.

Exempt Review: This protocol is approved for a duration of five years. You remain obligated to submit amendments, deviations, unanticipated problems per policy.

Important Reminder: If you will consent your participants with a signed consent document, it is your responsibility to use the consent form that has been finalized and uploaded into the consent section of eProtocol by the IRB coordinators. Failure to use the finalized consent form available to you in eProtocol is a reportable protocol violation.

If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.

This approval is issued under Colorado State University's Federal Wide Assurance 00000647 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under CSU's Assurance, please do not hesitate to contact us.

Please direct any questions about the IRB's actions on this project to:

IRB Office - (970) 491-1553; RICRO_IRB@mail.Colostate.edu

Evelyn Swiss, Senior IRB Coordinator - (970) 491-1381; Evelyn.Swiss@Colostate.edu

Tammy Felton-Noyle, IRB Biomedical Coordinator - (970) 491-1655; Tammy.Felton-Noyle@Colostate.edu

Felton-Noyle, Tammy

Amendment 5 has been reviewed and granted approval by expedited review (§46.110(b)(2)) of minor changes on March 20, 2019. This protocol was previously assessed as qualifying for expedited review, categories 7. This amendment



Knowledge to Go Places

eProtocol
Office of the Vice President for Research
321 General Services Building - Campus Delivery 2011 eprotocol
TEL: (970) 491-1553
FAX:

includes updated procedures enter into the second pilot study, Part C and increase of participant numbers. The IRB has determined that the risk level remains no more than minimal and the safeguards for participants is appropriate. The study was assessed as being in accordance with 45 CFR 46.111 of the pre-2018 Requirements. Approved documents include: Parent Consent Form, Pilot 2; Assent Form.

Approval Period:	March 20, 2019 through January 13, 2020
Review Type:	EXPEDITED
IRB Number:	00010468
Funding:	Department Of Health and Human

APPENDIX IX: ALL MENUS FOR PARENTS AND CHILDREN DURING THE ASPEN GRILLE STUDY

Menu 1 Front



KIDS DINNER MENU

Choose from the following entrees:

ALL KIDS MEALS COME WITH A SIDE OF CARROT STICKS & RANCH* AND 2% MILK

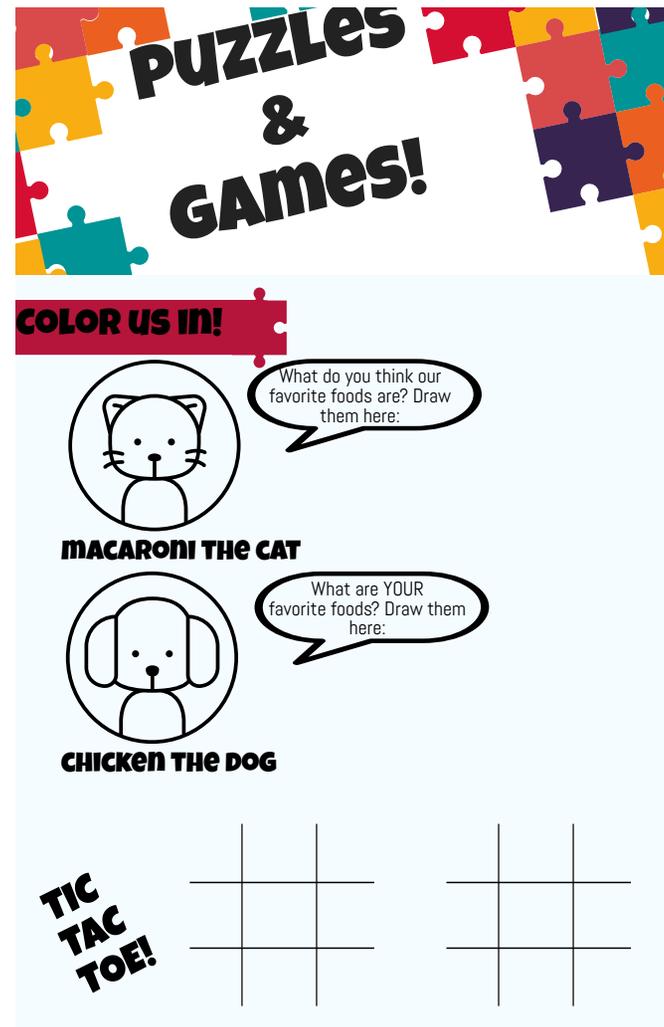
CHICKEN TENDERS

OR

MAC AND CHEESE

*French fries may be substituted by request

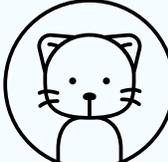
Kids Menu Back – Menus 1, 2, & 3



PUZZLES & GAMES!

COLOR US IN!

What do you think our favorite foods are? Draw them here:



MACARONI THE CAT

What are YOUR favorite foods? Draw them here:



CHICKEN THE DOG

TIC TAC TOE!

Menu 2 Front



KIDS DINNER MENU

Choose from the following entrees:

ALL KIDS MEALS COME WITH A BIG SIDE OF CARROT STICKS AND RANCH, A SMALL SIDE OF FRENCH FRIES*, AND 2% MILK

CHICKEN TENDERS

OR

MAC AND CHEESE

*ALL carrot sticks or ALL french fries may be substituted by request

Menu 3 Front



KIDS DINNER MENU

Choose from the following entrees:

ALL KIDS MEALS COME WITH A BIG SIDE OF FRENCH FRIES, A SMALL SIDE OF CARROT STICKS AND RANCH*, AND 2% MILK

CHICKEN TENDERS

OR

MAC AND CHEESE

*ALL carrot sticks or ALL french fries may be substituted by request

Parent Menu 1



Welcome to the Aspen Grille

Dinner Menu

entree

Vegetarian Enchiladas

side

Green Salad

dressing choices:
Ranch, Blue Cheese,
or Balsamic

A large green salad is also available as an entree.

Enjoy!

Parent Menu 2



Welcome to the Aspen Grille

Dinner Menu

entree

Vegetarian Lasagna

side

Green Salad

dressing choices:
Ranch, Blue Cheese,
or Balsamic

A large green salad is also available as an entree.

Enjoy!

Parent Menu 3



Welcome to the Aspen Grille

Dinner Menu

entree

Broccoli-Cheddar Quiche

side

Green Salad

dressing choices:
Ranch, Blue Cheese,
or Balsamic

A large green salad is also available as an entree.

Enjoy!

APPENDIX X: ASPEN GRILLE CHILD HEIGHT AND WEIGHT COLLECTION FORM

COHORT 1: 09/16/2019 FAMILY: **EXAMPLE 1**

DO WE HAVE THIS ITEM?			
<input type="checkbox"/>	Family demographic survey	<input type="checkbox"/>	Server order form
<input type="checkbox"/>	Photography consent	<input type="checkbox"/>	Observer form
<input type="checkbox"/>	Family participation consent	<input type="checkbox"/>	Height/weight
<input type="checkbox"/>	Child/children assent(s)	<input type="checkbox"/>	

CALEB	01-03
--------------	--------------

- Weight _____
- Height 1 _____
- Height 2 _____
- Average _____

COHORT 1: 09/16/2019 FAMILY: **EXAMPLE 2**

DO WE HAVE THIS ITEM?			
<input type="checkbox"/>	Family demographic survey	<input type="checkbox"/>	Server order form
<input type="checkbox"/>	Photography consent	<input type="checkbox"/>	Observer form
<input type="checkbox"/>	Family participation consent	<input type="checkbox"/>	Height/weight
<input type="checkbox"/>	Child/children assent(s)	<input type="checkbox"/>	

JAMES	02-03
--------------	--------------

- Weight _____
- Height 1 _____
- Height 2 _____
- Average _____

APPENDIX XI: ASPEN GRILLE SERVER, BACK-OF-HOUSE, AND OBSERVER
 TRAINING DOCUMENTS – BASIC TRAINING DOCUMENT AND BACK-OF-HOUSE
 PLATE WASTE TRAINING PROTOCOL

The Aspen Grille Restaurant Project – Training Fall 2019

Hello!

Thank you for your willingness to help out with this research project. We’re really excited to get this project started and couldn’t do it without you.

Goals:

1. Introduce everyone
2. Familiarize everyone with the study and the protocol for the study.

Agenda

1. Introductions
2. Run-through of the Aspen Grille Study
3. Go over forms/documents/POS
4. Practice the AG study

The Aspen Grille Pilot Study - Details

Aspen Grille			
	Meal 1	Meal 2	Meal 3
Cohort 1 (n=15)	Sept 16 Default: All Carrots	Sept 23 Default: 2/3 Carrots, 1/3 French Fries	Sept 30 Default: 1/3 Carrots, 2/3 French Fries
Cohort 2 (n=15)	October 7 Default: 2/3 Carrots, 1/3 French Fries	October 21 Default: All Carrots	October 28 Default: 1/3 Carrots, 2/3 French Fries
Cohort 3 (n=15)	October 29 Default: 1/3 Carrots, 2/3 French Fries	November 5 Default: 2/3 Carrots, 1/3 French Fries	November 12 Default: All Carrots

	Kids Meals	Adult Meals
Entrees Offered	<ul style="list-style-type: none"> • Chicken Tenders • Mac and Cheese 	<ul style="list-style-type: none"> • Enchiladas or Salad (Night 1) • Lasagna or Salad (Night 2) • Quiche or Salad (Night 3)
Drink	Milk/Water	Iced Tea/Water
Default Side	Carrots, French Fries, or Combo	Salad
Opt-in Side	All FF or All Carrots	N/A

The Aspen Grille Restaurant Project – Training Fall 2019

Btwn 10:00 AM and 3:00 PM Prep People/Mackenzie to Kitchen – Set-up

- Weigh:
 - Carrots
 - Dip – Ranch/Ketchup
 - Milk
- Set-up speed rack
- Set up spilled food area
- Set-up dining room (place cards)

4:45 PM Research Assistants Arrive

- Set-up dining room (waters, iced tea, cookies, etc.)
- Set-up Anthropometric Station

5:15 PM Pre-study Meeting – All Research Assistants

5:30 - 6:30 PM Families Arrive & Seated

- FIRST DAY ONLY: Gather weight/height
- FIRST DAY ONLY: Gather Consent/Survey
- FIRST DAY ONLY: Get long-form assent for children
- Host seats family at proper table

Observer gathers assent from children, reminds not to share food

Server greets – gets drink order

- Water/Iced Tea for Parents
- Water/Milk for kids

**Families have approximately 3-5 minutes to look over menus*

Server gets food order

- Enter order into POS

Ticket back to kitchen

- Expo/Lead informs Jeff/Ken how many adults
- Grabs plates for children and hands to intake team with ticket
- Intake team puts together order
- Expo checks entire ticket – adds parent dressing

Runner/BOH Assistant and Server take order to table

Food Served to Family

- Match kid ID/name to plate name
- Remind family not to share food

The Aspen Grille Restaurant Project – Training Fall 2019

- Watch for spills

Family finished w/ Meal

- Children's plates with remaining food go back to kitchen
- FOH/Server Lead drops cookies w/ thank you note
- Verbally thank the family for coming

Plates from children go in Speed rack

- Hand to Expo to organize
- Parent plates to dish pit
- Observers check for spilled food – make notes, any spilled food goes in spill cup for child

7:30 PM

Clean up – take dishes to dish pit in basement, garbage out to dumpster, organize leftover dips/carrots

BOH team to finish intake weights

FOOD! Eat all the leftovers, take them home, etc. Extra food will be made for you guys!

Direct Plate Waste Procedures

Objective – To serve as a procedural guide for direct weighing and measuring of individual foods.

Overview – This protocol is designed to serve as a guide for all plate waste procedures. While there are both direct and indirect methods to measure plate waste, this document will outline steps to use direct measurement only. All steps involved in this are general and may be applied to many different plate waste situations. All weighing should be done in a controlled environment so as to achieve the most accurate weights. Refer to the user manual of the specific scale intended for use.

Verifying scale calibration

Many scales have specific calibration procedures detailed in their manuals. To verify the internal calibration of the scale, follow the procedures below.

Materials Needed

- Scale
- 3 + stainless steel calibration weight(s)
 - Gram amounts vary based on intended weight capture: If measurements will be made to the 100th decimal place, weights must range from 0.001 g to 10.00 g
- Calibration weight cleaning cloth

1. Ensure the scale is plugged in or has a full battery.
2. Wash hands thoroughly.
3. A level surface is necessary for proper weighing.
 - a. The scale has a built in level – if the bubble is not in the center of the level, adjust the feet on the scale by turning them accordingly until the bubble indicates the scale is level.
4. Ensure the room/area is not windy or does not have a strong draft as this can affect sensitive scales.
5. Turn the scale on and wait for the scale to read 0.00.
 - a. Many scales need a warm-up period. Wait approximately 60 seconds until the scale is ready to weigh.
6. Use the left-hand button (inset button name here) to shift the weight to grams (g). Once the scale is ready to measure in grams and is showing 0.00, it is time to verify the calibration.
7. Place the smallest calibration weight available on the scale.
 - a. Do not touch the weights with bare hands. The cleaning cloth functions as an appropriate barrier.
8. Wait for the scale to indicate stability (typically shown by an * on the center left side of the display).
9. If scale is properly measuring weights, the unit weight of the calibration weight should match the weight output on the scale. (For example: if a 50.00 g calibration weight is placed on the scale, the scale should read 50.00 g.)

10. Remove the first weight (using cleaning cloth and/or gloves) and continue with the next size weight, repeating the procedure. Complete this with at least 3 weights, measuring different decimal places, to ensure that there are no differences in the scale's measurements and the weights of the calibration scales.

If there are discrepancies:

1. Check that the scale is still level
2. Clean the calibration weight with the cleaning cloth (be sure not to touch with bare hands)
3. Clean the scale, ensure there is no debris or dirt on the scale.
4. Reweigh the first calibration weight.
5. Make sure the difference in grams is recorded. If this difference is consistent between the different weights, you may continue with the measurements, but make note of each measurement and the weight discrepancy.
6. If the discrepancy is inconsistent, the scale may need to be recalibrated by the manufacturer or a certified calibration technician.

Direct Weighing procedures for Foods

Measurements may be done with each item weighed separately as well as the plate as a whole. There are two methods to collect the weight of food:

1. Individual: Involves the specific measure of each individual plate (and/or individual food portion) individually using a calibrated scale pre and post consumption.
 - a. An average of 3 to 5 portions/plates can be weighed and then the gram weight of each plate/food is averaged to get a mean plate weight as the initial weight of the food.
2. Aggregate: The collective weight of all food served is measured.
 - a. Pre: The total weight of all individual food products are weighed prior to service
 - b. Post: All food scraps are collected and sorted into food groupings. The entire food waste for a particular grouping is then obtained after the meal. This is added to any unserved portion of food.

The following procedure is specific to an individual, direct method of weighing foods. Aggregate measurements may be similar, but require slightly different methods. All plates/food products may be photographed both pre-and post-consumption if necessary. Be careful not to bump, lean on, or shake the weighing surface, doing so may cause inaccurate readings.

Once the scale is set-up and calibration is verified, it is advised not to move it. Constant moving may change the internal calibration.

Materials Needed

- Scale
- Container (weigh boat, plate, or other container)
- Barrier (wax paper, chem wipes, etc.)

- Gloves
- Trash bag/can for waste
- Pens
- Record log for weights

Methods

1. Turn the scale on.
2. Switch the mode to the appropriate unit for your protocol (grams/oz)
3. Place a barrier on the scale to catch crumbs/food particles
4. Note weight of the barrier.
5. Adjust to 0.00 using the tare/zero button.
6. If needed, place a container in the center of the scale.
 - a. Note the weight of the container
7. DO NOT PUT FOOD DIRECTLY ON THE SCALE.
8. Place the food item on the barrier.
 - a. Place the food item in the center of the scale to gain the most accurate reading.
9. Wait for 2-3 seconds until the weight has stabilized.
 - a. Some scales will indicate this with an (*)
10. Record the weight.
 - a. Typically weight is recorded to two or three decimal points (i.e. 0.00 or 0.000)
11. Using the barrier, remove the food item from the scale.
12. If your protocol requires multiple measures, use the barrier to place the food item back on the scale and record the weight.
13. Repeat as necessary, per your protocol.
 - a. A single barrier may be used for multiple measures of the same food item. It is important that the barrier's weight be noted and tare/zero is not pressed in between weights.

While only a single weight may be necessary, some studies require multiple weights be assessed to ensure accuracy of measurement.

Weighing procedures for standardizing container weight for later subtraction

Materials Needed

- Scale
- Container (5-10 each)
- Pen
- Record log for weights

Methods

1. Turn the scale on.
2. Switch the mode to the appropriate unit for your protocol (grams/oz)
3. Place the first container on the scale
4. Note weight.

5. Remove container.
6. Repeat until 5-10 separate containers have been weighed.
7. Average the weight of the containers
 - a. (Add the weights of all together and then divide by the number of containers weighed)
8. Weighing foods in the standardized containers may now be done and the weight of the food obtained by subtracting the standardized weight of the container.

Once the average weight of containers has been achieved, this is considered that standard weight of a container. Any foods that need to be presented in a container (i.e. sauces, dips, liquids) can be weighed following the protocol above in their container. The weight may then be subtracted to obtain the weight of the food in the container.

Recording of weights

A weight log should be used to record all weights. Legible and clear handwriting is important as data entry may be done at a different time and by different individuals. All numerals must be written legibly and in Roman formatting:

1 2 3 4 5 6 7 8 9 0

APPENDIX XII: ASPEN GRILLE SERVER AND OBSERVER DAILY PROTOCOLS AND
FORMS

Server: _____

Date: **09/16/2019** Day: **MONDAY**

Tables	
1	FAMILY 1: KID 1 5:30 pm
2	FAMILY 2: KID 1, KID 2 6:00 pm
3	FAMILY 3: KID 1, KID 2 6:00 pm

Water Table & Introduction:
"Hi my name is _____ and I'll be your server this evening."

*"I'm going to grab milk for **CHILD(REN) NAME's**, [to parent(s)] would you like iced tea?"*

- GET BEVERAGES –

"Now that you've had a chance to look at the menu, what can I get for you dinner this evening?"

- PROMPT PARENTS FOR SALAD DRESSING -

- PROMPT CHILDREN FOR ENTRÉE ORDER –
"And what would you like for dinner?"

*If the child doesn't specify a side dish, circle DEFAULT on menu

*If the child says "French fries" respond:
"The meal comes with Carrots, would you like French fries instead?"

Remind family to not share food
 Watch for spills
 End of meal: Give cookies and thank them for coming in!

Server: _____

Date: **09/16/2019** Day: **MONDAY**

Tables	
1	FAMILY 1: KID 1, KID 2 5:30 pm
2	FAMILY 2: KID 1, KID 2 6:00 pm
3	FAMILY 3: KID 1, KID 2, KID 3 6:00 pm

TO DO:

- Introduce yourself**

"Hi my name is _____ and I'll be hanging out with you tonight."

- Assent the Children**

"Is it ok if my friends and I are here while you and your family eat dinner?"

- Remind family to not share food**

- DURING THE STUDY -

- Watch for spills**
 Watch for people sharing food
 End of meal: Give cookies and thank them for coming in!

Observer: _____ MONDAY Date: 09-16-2019

Time: Family Sat: _____ Meal Served: _____ Meal Completed: _____

FAMILY: example 1

Child	Name	Assent
1	KID 1 (7)	<input type="checkbox"/>
2	KID 2 (11)	<input type="checkbox"/>

- Reminded family to please not share food
- Reminded family to please not remove any foods from the restaurant

CHILD BEHAVIORS

KID 1	
<input type="checkbox"/>	Ordered independently – No parent influence
<input type="checkbox"/>	Specified side dish
<input type="checkbox"/>	Did not specify side
After waiter prompts side dish	
<input type="checkbox"/>	Sticks w/ original choice
<input type="checkbox"/>	Changes to default

PARENT BEHAVIORS

PRE-ORDERING: PARENT	CHILD
<input type="checkbox"/> Read menu to child Mom Dad Sibling	KID 1
<input type="checkbox"/> Omitted choices from menu Mom Dad Sibling	KID 1
<input type="checkbox"/> Asked child what they want Mom Dad Sibling	KID 1

DURING ORDERING	CHILD
<input type="checkbox"/> Orders meal for child Mom Dad Sibling	KID 1
<input type="checkbox"/> Corrected child's choice Mom Dad Sibling	KID 1
<input type="checkbox"/> Prompted child on side dish Mom Dad Sibling	KID 1

Spills/Drops: [Note child, food, and approx. amount of food (i.e., Annie - 1 carrot stick or Timmy - ½ fry)]

Other Notes: Parent-Child Communication about Food, Food related behaviors, etc.

Server: _____

Date: **09/16/2019** Day: **MONDAY**

Family	1
Children	KID 1, KID 2

MOM		DAD	
<input type="checkbox"/>	ENTRÉE	<input type="checkbox"/>	ENTREE
<input type="checkbox"/>	BIG SALAD	<input type="checkbox"/>	BIG SALAD
<input type="checkbox"/>	BALSAMIC	<input type="checkbox"/>	BALSAMIC
<input type="checkbox"/>	RANCH	<input type="checkbox"/>	RANCH
<input type="checkbox"/>	BLUE CHEESE	<input type="checkbox"/>	BLUE CHEESE

KID 1		KID 2	
<input type="checkbox"/>	MAC AND CHEESE	<input type="checkbox"/>	MAC AND CHEESE
<input type="checkbox"/>	CHICKEN TENDERS	<input type="checkbox"/>	CHICKEN TENDERS
CIRCLE: DEFAULT ALL FRIES		CIRCLE: DEFAULT ALL FRIES	

APPENDIX XIII: ASPEN GRILLE BACK OF HOUSE FOOD PRE- AND POST-WEIGHT
RECORD FORMS

Participant NAME: _____
Participant ID: 01-03

Day: MONDAY

Date: 09/16/2019

DEFAULT: ALL CARROTS

ITEM	PRE-WEIGHT (g)	INITIALS	POST-WEIGHT (g)	INITIALS
Milk 8 oz	1. _____	_____	1. _____	_____
	2. _____	_____	2. _____	_____
Carrots 150.0 g ± 2.0 g	1. _____	_____	1. _____	_____
	2. _____	_____	2. _____	_____
Ranch 1.5 oz # _____	1. _____	_____	1. _____	_____
	2. _____	_____	2. _____	_____
Ketchup 1.5 oz # _____	1. _____	_____	1. _____	_____
	2. _____	_____	2. _____	_____
Chicken Tenders 200.0 g ± 5.0 g	1. _____	_____	1. _____	_____
	2. _____	_____	2. _____	_____
Mac and Cheese 225.0 g ± 5.0 g	1. _____	_____	1. _____	_____
	2. _____	_____	2. _____	_____
French Fries* 150.0 g ± 2.0 g	1. _____	_____	1. _____	_____
	2. _____	_____	2. _____	_____

*If a child would like **seconds** of a side dish – the side is weighed to 100.0 g ± 2.0 g

Notes (spills, drops, kitchen issues, etc.):

EXTRAS

Day: _____

Date: _____

Carrots	Wt (g)	Initials	Milk	Wt (g)	Initials
C1	_____	_____	M1	_____	_____
C2	_____	_____	M2	_____	_____
C3	_____	_____	M3	_____	_____
C4	_____	_____	M4	_____	_____
C5	_____	_____	M5	_____	_____
C6	_____	_____	M6	_____	_____
C7	_____	_____	M7	_____	_____
C8	_____	_____	M8	_____	_____
C9	_____	_____	M9	_____	_____
C10	_____	_____	M10	_____	_____
C11	_____	_____		_____	_____
C12	_____	_____		_____	_____
C13	_____	_____		_____	_____
C14	_____	_____		_____	_____