

1-1-2005

## Using a discrete choice model to identify consumer meal preferences within a prix fixe menu

Eunha Myung

*University of Nevada, Las Vegas*

Follow this and additional works at: <https://digitalscholarship.unlv.edu/rtds>

---

### Repository Citation

Myung, Eunha, "Using a discrete choice model to identify consumer meal preferences within a prix fixe menu" (2005). *UNLV Retrospective Theses & Dissertations*. 2641.

<http://dx.doi.org/10.25669/dvft-w81a>

This Dissertation is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Dissertation in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Dissertation has been accepted for inclusion in UNLV Retrospective Theses & Dissertations by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact [digitalscholarship@unlv.edu](mailto:digitalscholarship@unlv.edu).

USING A DISCRETE CHOICE MODEL TO IDENTIFY CONSUMER MEAL  
PREFERENCES WITHIN A PRIX FIXE MENU

by

Eunha Myung

Bachelor of Science  
University of Nevada, Las Vegas  
1996

Master of Business Administration  
University of Nevada, Las Vegas  
1998

A dissertation submitted in partial fulfillment  
of the requirements of the

**Doctor of Philosophy in Hotel Administration**  
**William F. Harrah College of Hotel Administration**

**Graduate College**  
**University of Nevada, Las Vegas**  
**December 2005**

UMI Number: 3215883

Copyright 2006 by  
Myung, Eunha

All rights reserved.

#### INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

**UMI<sup>®</sup>**

---

UMI Microform 3215883

Copyright 2006 by ProQuest Information and Learning Company.

All rights reserved. This microform edition is protected against  
unauthorized copying under Title 17, United States Code.

ProQuest Information and Learning Company  
300 North Zeeb Road  
P.O. Box 1346  
Ann Arbor, MI 48106-1346

Copyright by Eunha Myung 2006  
All Right Reserved



## Dissertation Approval

The Graduate College  
University of Nevada, Las Vegas

November 15, 2005

The Dissertation prepared by

Eunha Myung

Entitled

Using a Discrete Model to Identify Consumer Meal Preferences

Within a Prix Fixe Menu.

is approved in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Hotel Administration

Examination Committee Chair

Dean of the Graduate College

Examination Committee Member

Examination Committee Member

Graduate College Faculty Representative

## ABSTRACT

### **Using a Discrete Choice Model to Identify Consumer Meal Preferences Within a Prix Fixe Menu**

by

Eunha Myung

Dr. Andrew Hale Feinstein, Examination Committee Chair  
Associate Professor of Hotel Administration  
University of Nevada, Las Vegas

Reference price theory suggests that consumers create a point of reference for pricing based on multiple factors. A point of reference in turn influences how buyers respond to price. Several studies (e.g., Yadav & Monroe, 1993) examined reference price theory in the bundling context. These studies state that consumers form perceptions of value by comparing the bundle price and the sum of individual prices. These perceptions of value are then directly related to preference or choice; the larger a buyer's perception of value, the more likely the buyer will be to express a preference for the product.

Therefore, the objective of this dissertation is to test the reference price theory by examining whether or not the presence of different à la carte item prices along with a bundle price influences consumers' meal choice decisions.

The conjoint analysis with a rank-ordered logit model was used to estimate utility functions. We also estimated a conditional logit model to compare top choice with full rank.

An actual menu from a restaurant that offers prix fixe menus was used to generate attributes. Each attribute had two price levels, and these were randomized to measure true price influences on meal selection while controlling other factors.

A face-to-face survey was conducted with the general population in a popular tourist attraction in the Southwest. The final 401 surveys were used for data analysis.

We found that the estimates of both a rank-ordered logit model and a conditional logit model provided similar results; overall, there was clear evidence that the price difference among á la carte items influenced consumer bundle (i.e., prix fixe menu) choice decisions.

The results indicate that people are more likely to choose highly-priced appetizer items and entrée items for their prix fixe menus. This is consistent with our hypotheses (H1 and H2) and reference price theory. Furthermore, the results show that consumers have larger utilities with lower bundle prices than with higher ones, supporting the findings of previous studies that a consumer perceives more value from a bundle that provides higher savings than on providing lower savings.

## TABLE OF CONTENTS

|   |      |
|---|------|
| ABSTRACT.....   | iii  |
| LIST OF TABLES .....  | viii |
| LIST OF FIGURES .....   | ix   |
| ACKNOWLEDGEMENTS.....   | x    |
| CHAPTER I     INTRODUCTION.....                                     | 1    |
| Statement of Problem .....  | 6    |
| Significance of the Study .....                                     | 7    |
| Research Questions .....  | 8    |
| Research Objectives.....  | 8    |
| Definitions.....  | 10   |
| Chapter Summary .....   | 11   |
| Organization of the Study .....                                     | 11   |
| CHAPTER II     LITERATURE REVIEW.....                               | 13   |
| Introduction.....   | 13   |
| Overview of Bundling.....   | 13   |
| Product vs. Price Bundling .....                                    | 14   |
| Types of Bundling.....  | 14   |
| Rationale for Bundling.....   | 16   |
| Behavioral Aspects of Bundling .....                                | 17   |
| Bundle Evaluation.....  | 18   |
| Reference Price Theory.....   | 22   |
| Prospect Theory .....   | 26   |
| Transaction Utility Theory.....                                     | 28   |
| Hypotheses Development .....  | 31   |
| The proposed Conceptual Frame Work .....                            | 32   |
| Consumer Choice.....  | 33   |
| Consumer Choice in the Restaurant Context.....                      | 33   |
| Important Bundle Choice Attributes in a Case of Prix Fixe Menu..... | 36   |
| Chapter Summary .....   | 37   |



|   |  |    |
|---|--|----|
| CHAPTER III   | METHODOLOGY .....                              | 38 |
| Introduction.....                                     |  | 38 |
| Conjoint Analysis.....                                |  | 39 |
| Steps Involved in Conjoint Analysis .....             |  | 41 |
| Research Design.....                                  |  | 48 |
| Analysis I .....                                      |  | 48 |
| Objective .....                                       |  | 48 |
| Attributes and Levels .....                           |  | 48 |
| Stimuli.....  |  | 51 |
| Dependent and Independent Variables.....              |  | 51 |
| Analysis II .....                                     |  | 53 |
| Objective .....                                       |  | 53 |
| Attributes and Levels .....                           |  | 53 |
| Stimuli .....   |  | 54 |
| Dependent and Independent Variables.....              |  | 55 |
| Survey Questionnaire Development .....                |  | 56 |
| Data Collection .....                                 |  | 57 |
| Pre-Tests.....  |  | 57 |
| Main Survey .....                                     |  | 57 |
| Empirical Model and Estimation .....                  |  | 58 |
| Random Utility Theory .....                           |  | 59 |
| The Independence of Irrelevant Alternative (IIA)..... |  | 62 |
| Model Specification.....                              |  | 64 |
| Analysis I.....                                       |  | 64 |
| Analysis II.....                                      |  | 65 |
| Chapter Summary .....                                 |  | 65 |
| CHAPTER IV  | FINDINGS OF THE STUDY .....                    | 67 |
| Introduction.....                                     |  | 67 |
| Descriptive Statistics .....                          |  | 68 |
| Demographic Profiles of Respondents.....              |  | 68 |
| Ranking Responses .....                               |  | 70 |
| Estimation Results .....                              |  | 74 |
| Analysis I .....                                      |  | 74 |
| Hypothesis 1 .....                                    |  | 74 |
| Hypothesis 2 .....                                    |  | 75 |
| Hypothesis 3 .....                                    |  | 75 |
| Overall Price .....                                   |  | 75 |
| Conditional Logit Model .....                         |  | 78 |
| Interaction Models .....                              |  | 80 |
| Results for Analysis II .....                         |  | 88 |
| Reliability Tests .....                               |  | 90 |
| Chapter Summary .....                                 |  | 92 |
| CHAPATER V  | SUMMARY, CONCLUSION, AND RECOMMENDATIONS ..... | 93 |
| Introduction .....                                    |  | 93 |

|                                      |     |
|--------------------------------------|-----|
| Discussion .....                     | 93  |
| Theoretical Contributions .....      | 95  |
| Managerial Implications .....        | 96  |
| Study Limitations.....               | 97  |
| Directions for Future Research ..... | 98  |
| APPENDIX I SURVEY QUESTIONNAIRE..... | 99  |
| APPENDIX II INFORMED CONSENT.....    | 104 |
| REFERENCES.....                      | 106 |
| VITA .....                           | 114 |

## LIST OF TABLES

|          |   |    |
|----------|---|----|
| Table 1  | Illustration of customers' willingness to pay for pizza and beer in U.S. dollars..... | 17 |
| Table 2  | Summary of behavioral aspects of bundling studies.....                                | 21 |
| Table 3  | Important consumer meal choice and restaurant selection attributes.....               | 35 |
| Table 4  | Steps involved in conjoint analysis.....  | 47 |
| Table 5  | Attributes and levels for Analysis I.....   | 50 |
| Table 6  | Description of independent variables for Analysis I.....                              | 52 |
| Table 7  | Attributes and levels for Analysis II .....   | 54 |
| Table 8  | Description of independent variables for Analysis II .....                            | 55 |
| Table 9  | Description of Respondents .....  | 69 |
| Table 10 | Meal attributes ranked 1 .....  | 71 |
| Table 11 | Meal attributes ranked 2 .....  | 72 |
| Table 12 | Prix fixe price ranked 1 .....  | 73 |
| Table 13 | Prix fixe price ranked 2 .....  | 73 |
| Table 14 | The important meal choice decision factors .....                                      | 74 |
| Table 15 | Rank-ordered logit model for consumer meal choice .....                               | 76 |
| Table 16 | Rank-ordered logit model for meal category, lowfat, lowcarb, and price .....          | 77 |
| Table 17 | Results for conditional and rank-ordered logit models for consumer meal choice .....  | 78 |
| Table 18 | Results for conditional logit and rank-ordered logit models for meal category.....    | 80 |
| Table 19 | Results for rank-ordered logit interaction model for SEX.....                         | 81 |
| Table 20 | Results for rank-ordered logit interaction model for MARITAL STATUS.....              | 82 |
| Table 21 | Results for rank-ordered logit interaction model for AGE.....                         | 83 |
| Table 22 | Results for rank-ordered logit interaction model for INCOME.....                      | 84 |
| Table 23 | Results for rank-ordered logit interaction model for DINING FREQUENCY.....            | 85 |
| Table 24 | Results for rank-ordered logit interaction model for EDUCATION.....                   | 86 |
| Table 25 | Results for rank-ordered logit model for FEMALE and MALE.....                         | 88 |
| Table 26 | Rank-ordered logit model for meal choice for Analysis II .....                        | 89 |
| Table 27 | Rank-ordered logit model for meal category for Analysis II .....                      | 90 |

## LIST OF FIGURES

|          |   |    |
|----------|---|----|
| Figure 1 | Example of prix fixe menu .....                                       | 3  |
| Figure 2 | Value function of the prospect theory .....                           | 27 |
| Figure 3 | Value function with losses and gains.....                             | 30 |
| Figure 4 | A bundle choice model with price difference of á la carte items ..... | 32 |

## ACKNOWLEDGEMENTS

I would first like to thank my dissertation chair Dr. Andrew Hale Feinstein for his consistent support, time, and commitment throughout my doctoral years. His guidance and valuable suggestions significantly improved the quality of this research.

I would also like to thank my dissertation committee members, Dr. John Stefanelli, Dr. Seyhmus Baloglu, and Dr. Gillian Naylor, for providing support, constructive comments, and suggestions.

I also express my deepest appreciation to Dr. Audrey McCool, my mentor, for her consistent support, advice, and encouragement throughout my doctoral years. Her support and encouragement will be forever appreciated.

My appreciation extends to the faculty members and staff of the College of Hotel Administration at the University of Nevada, Las Vegas.

Special thanks to Dr. Bradley Wimmer and Dr. Mary Riddel from the Department of Economics at the University of Nevada, Las Vegas, for showing me a clear picture of data analysis and adding my knowledge in Econometrics.

Most of all, thanks are due to my family in Korea. Their emotional and financial support and encouragement made this degree possible.

## CHAPTER I

### INTRODUCTION

Bundling is a widespread sales practice used in many areas such as restaurants, hotels, and Internet services. Bundling refers to the practice of selling two or more goods or services in a single package for a special price (Guiltinan, 1987; Janiszewski & Cunha, 2004). For example, Microsoft bundles its “Office” product containing Excel, Word, PowerPoint, Outlook, and Access in a discounted price relative to the sum of the individual items’ prices. Telecommunication companies sell different products and services such as caller ID, three-way calling, unlimited nationwide long-distance calling, and call forwarding in various packages. Travel companies offer packages including the combination of transportation, meals, and hotel accommodation in a single price.

There are many potential benefits of bundling for firms, such as to stimulate demand, achieve economies of scale, and extract consumer surplus by transferring excess consumer surplus from highly valued products to less valued products (Guiltinan, 1987). Monroe (1990) states that bundling is essentially a segmentation strategy based on the theory that different consumer groups value different combinations of products differently. Several studies (Guiltinan, 1987; Naylor & Frank, 2001; Simon & Wuebker, 1999) state that bundling makes sense for services for many reasons. First, service businesses are characterized by a high ratio of fixed to variable costs and by a high degree of cost sharing, for example, using the same facilities, equipment, and personnel. Therefore,

the incremental costs of selling additional units are relatively low compared to the firm's total costs (Monroe, 1990). Second, the services offered by most firms are interdependent in terms of demand (Monroe, 1990). For example, a hair salon customer can be a potential buyer of a range of services that the hair salon provides. A customer who gets her hair permed also may purchase other services such as hair coloring, conditioning treatment, manicures/pedicures, or skin care services. Therefore, the hair salon can offer these interdependent products in a bundle to increase sales.

The restaurant industry also has a long history of bundling. Value meals, combo meals, and prix fixe menus are typical examples of the bundling practices that have been widely used in the restaurant industry (Barth, 2000). Value meals offered by fast food restaurants are composed of a bundle of items and sold at special discounted prices. For example, McDonald's value meal for \$3.99 is composed of the combination of French fries, a hamburger, and a drink. In fine dining restaurants, a prix fixe menu offers a set meal at a flat rate, usually with no choices. However, more and more prix fixe menu restaurants provide customers with a bundle choice that is composed of one appetizer, one entree, and a dessert from various items for a single price. Each category has multiple items from which to choose, each with a different á la carte price. The price of a prix fixe menu is usually lower than the sum of á la carte component prices. Figure 1 shows an example of prix fixe menu.

### **Appetizers**

#### **Seared Sea Scallops**

Sautéed Wild Mushrooms, Fresh Herb Salad, Parmesan Reggiano Shavings,  
Roasted Garlic Beurre Blanc & Drizzles of Truffle Oil ..... \$14.00

#### **Hugo's Texas BBQ Shrimp**

Maytag Blue Cheese Slaw ..... \$10.50

#### **Beef & Maytag Blue Cheese Carpaccio**

Arugula & Granny Smith Apple Salad, Candied Walnuts & Port Wine Drizzles  
..... \$9.00

#### **Salmon Tartar**

Watercress, Saffron Sauce & Caraway Crackers..... \$7.50

#### **Twice Baked Parmesan Souffle**

Wild Mushroom Ragout..... \$8.00

#### **Panko Crusted Crab Boulettes**

Emulsified Ravigote Sauce, Fried Parsley & Grandma's Marinated  
Cucumbers ..... \$11.00

### **Soups & Salads**

#### **Roasted Chestnut Soup**

Crispy Prosciutto, Parmesan Cheese & Chives..... \$7.50

#### **House Salad**

Roasted Onion Vinaigrette & Rosemary Crackers..... \$6.50

#### **Shrimp Remoulade**

Baby Greens, Sonoma Goat Cheese, Oven Roasted Tomatoes & Sliced  
Avocado..... \$9.50

*Figure 1. Example of prix fixe menu*



Figure 1 (Continued)

| <b><u>Entrées</u></b>   |         |
|---|---------|
| <b>Halibut Linguist</b>   |         |
| Seared Alaskan Halibut on a Bed of Garlic Spinach with Buttermilk Onion Crust & a Chive Muscadet Butter Sauce.....                | \$30.00 |
| <b>Parmesan Tossed Angel Hair Pasta</b>   |         |
| Sautéed Green Vegetables, Toasted Pistachios, Basil Pesto & Vodka Tomato Coulis.....  | \$21.00 |
| <b>Brick Chicken</b>  |         |
| Pine Nut Shitake Couscous, Haricot Vert & Dijonaise Sauce.....  | \$20.00 |
| <b>Grilled Veal Tenderloin</b>  |         |
| French Green Lentils, Sizzled Leeks, Apple Smoked Bacon & a Sherry Mustard Butter Sauce.....                                      | \$32.00 |
| <b>Pepper Seared Sea Scallops</b>   |         |
| Wild Mushroom Orzo, Apple Smoked Bacon, French Herb Salad & Black Truffle Emulsion.....   | \$28.00 |
| <b>Honey Creole Mustard Glazed Salmon</b>   |         |
| Watercress Sweet Onion Salad, Spiced Pumpkin Seeds & Butternut Squash Coulis.....   | \$24.00 |
| <b><u>Desserts</u></b>  |         |
| Crème Brulee.....   | \$6.50  |
| Chocolate Flourless Cake with Vanilla Bean Ice Cream & Dark Chocolate Sauce.....  | \$7.25  |
| Seasonal Selection of Homemade Ice Creams & Sorbets.....  | \$6.00  |
| Goat cheese Cheesecake with Scotch Caramel.....   | \$7.00  |
| <b>Prix-Fixe Dinner \$39.95 Per Person</b>  |         |
| <b>All items available for a la carte prices as listed or three courses may be selected for a prix-fixe price of Just \$39.95</b> |         |

Note. This is an actual menu from a Rosemary's Restaurant located in Las Vegas, Nevada.

Today, more and more restaurants offer prix fixe menus (Harral, 1999; Pavesic, 1999). Prix fixe menus are composed of a significant portion of the restaurant's market (Barth, 2000) because of the benefits that prix fixe menu offers to both restaurant operators and customers. One of the benefits that prix fixe menus provide is increasing profitability through efficient management of food and labor costs. Since fewer items are required to be prepared for bundles, restaurants can improve their prediction of the amount of ingredients and inventory needed. This enables restaurants to bulk purchase at low costs (Pavesic, 1999) and require less inventory. Keeping fewer inventories reduces the costs of storing, spoilage, and waste of food items for restaurants. Prix fixe menus also reduce labor requirements by allowing the kitchen to operate at a predetermined pace and flow (The Culinary Institute of America, 2001).

Another benefit that prix fixe menus provide is an increase in the check average by offering an incentive to the customers to buy a full meal at a reduced price (Pavesic, 1999). For example, some customers may not order appetizers and/or desserts from a relatively highly-priced à la carte menu to save money if they consider each item individually, but they may buy the bundle because of the value of a volume discount from the bundle offerings. Further, appetizer and dessert items are known to be generating high contribution margins. Therefore, by bundling these high profit margin items with entrées, restaurants can increase profits. Given that the variable cost in restaurants is relatively high, selling additional items can decrease the variable cost per customer. Therefore, the revenues lost from bundling can be offset with a reduction in costs and sales of additional food items (Harral, 1999).

From a managerial perspective, however, predicting consumers' preferences for

particular meal attributes, providing an attractive selection of menu items, and setting the right price in order to generate a profit becomes important. Thus, it is particularly important for managers to understand consumers' value attachment to particular meal attributes when selecting meals for their prix fixe menus. The ability to predict consumers' utilities on particular meal attributes allows managers to develop effective bundling strategies to gain a competitive advantage.

### Statement of Problem

Previous studies in bundling have examined bundling based on a pre-determined set. In this perspective, consumers' bundle valuations do not depend on the choice context (Russell, Bell, Bodapati, Brown, Chiang, et al., 1997). However, the reverse side- how consumers make choices from particular options among various alternatives when they are allowed to choose their own bundles - has not yet been examined. It has not yet been addressed whether or not customers select highly-priced items when various price ranges are presented for the selection of a bundle, because perceptions of value are directly related to preference or choice; the larger a buyer's perception of value, the more likely the buyer would be to express a willingness to buy or a preference for the product (Dodds & Monroe, 1985). Therefore, there is a need to examine the factors that influence the consumer decision making (i.e., bundle choice) process. The choices consumers make among various options can be examined using conjoint analysis, which is a very popular method used in understanding how consumers state their preferences for products or services.

## Significance of the Study

Given the intensity of competition in the restaurant industry, one of the most important tasks for restaurateurs is to attract and retain customers. In order to be able to attract and retain customers, restaurants must understand what customers think is important in selecting their meals from various alternatives. This is because the development of effective marketing strategies begins with an understanding of the manner in which consumers choose among alternatives (Simonson & Tversky, 1992).

All products and services are considered as a combination of attributes, for example, price, convenience, design, and quality; each attribute has a separate value that can be exchanged with any other attribute that has the same utility (Monroe, 1990). Customers' decisions to select a particular product usually start with a set of attributes that they consider important. Therefore, a major asset of restaurants is their ability to understand attributes that consumers think are important when making decisions. This not only enables restaurants to add new products or modify their existing products to attract and retain customers, but also determines what should be promoted in order to lure these customers from their competitors (Koo, Tao, & Yeung, 1999).

A study of predicting utilities that different customers attach to particular attributes in their prix fixe menu choice decisions is important for several reasons. First, restaurateurs attempting to understand how and why customers choose particular meals to create their prix fixe meals will find this study important. The results of this study will demonstrate what attributes of products are valued by consumers and will estimate the relative perceived value of these attributes.

Second, this study will contribute to the reference price theory by demonstrating

whether or not price differences of á la carte items affect customers' perceptions of value, therefore, affecting their meal choice decisions. Third, this study will contribute to bundling literature by investigating customers' bundle choice decisions and providing a basis for further research. Finally, by demonstrating how and why consumers choose certain options, the findings of this study will offer practical recommendations to restaurant managers on how to enhance the effectiveness of marketing strategies.

### Research Questions

Two following research questions are formulated:

1. Will the presence of each item's á la carte price along with a bundle price (i.e., prix fixe menu price) influence consumers' meal choices; that is, will consumers choose highly-priced á la carte items to be included in their prix fixe menus?
2. What meal attributes do consumers think are important when they choose their bundles (i.e., prix fixe menus)?

### Research Objectives

The goal of this dissertation is to incorporate a behavioral aspect of consumer choice into the traditional economic theory of consumer choice. The study investigates consumers' preferences for selecting a particular meal option among various alternatives in their bundle choice decisions. The context this study employs is a prix fixe menu. In this dissertation, proposed conceptual framework is based on the reference price theory, and theoretical foundation for analyzing consumer choice is the random utility theory.

The reference price theory predicts that the presence of price differences among individual items will influence consumers' bundle creation decisions.

This dissertation has the following objectives:

1. To examine whether the presence of price differences among individual items influences consumers' meal choice decisions when they are selecting a bundle (prix fixe menu)
2. To estimate utilities that different customers attach to different attributes in their bundle (prix fixe meal) choice decisions

Two analyses (Analysis I and Analysis II) are conducted to examine consumers' bundle choice decisions. Analysis I and II examine reference price theory. Specifically, both tests examine whether or not highly-priced á la cart items are more likely to be selected when customers choose a bundle. Analysis I is undertaken to test reference price theory in addition to estimate whether consumers have higher utilities with lower bundle prices, as well as to estimate consumers' willingness to pay for attributes. Therefore, prix fixe price is varied for each choice option to estimate consumers' willingness to pay. Analysis II focuses only on testing reference price theory. Therefore, prix fixe price is fixed for all choice options.

Conjoint analysis with rank-ordered logit estimation is applied to estimate consumers' preferences for particular meals among various alternatives when they choose meals for their prix fixe menus. In addition, a conditional logit model is estimated to compare consumers' top choice to full rank.

## Definitions

À la carte menu: Customers create their own meal from the dishes offered on the full menu. Dishes are individually priced, and customers structure their meals in any way they choose (The Culinary Institute of America, 2001, p. 24).

Bundling: The practice of selling two or more goods or services in a single package for a special price. In this dissertation a bundle and a prix fixe menu are used interchangeably.

Conditional logit: Data are grouped and the likelihood is calculated relative to each group.

Conjoint analysis: Any decompositional method that estimates the structure of a consumer's preferences.

Consumer surplus: The amount by which the value of a consumer's purchase exceeds what he actually paid; willingness to pay minus price.

Ideal point model: It assumes the existence of an ideal manifestation.

Mixed bundling: Products are offered either individually or bundled together in a package.

Part-worth model: It reflects a utility function that defines different utility for each of the levels of a given attributes.

Prix fixe menu: A set meal at a set price, usually no choice. However, today's version of prix fixe menu provides customers with a bundle choice that is composed of one appetizer, one entrée, and a dessert from various items for a single price.

Prospect theory: Consumers do not make decisions in absolute prices but of losses or gains relative to a reference point.

Rank-ordered logit model: It assumes that respondents first choose the one alternative that provides the highest level of utility first and rank it first, then choose the alternative believed most attractive from the remaining alternatives and rank it second, and so on.

Reference price: The price that consumers evaluate comparatively and use against other prices to evaluate the price fairness.

Reservation price: Highest price that consumers are willing to pay

Random utility model: It estimates the probability that an individual will choose an alternative, depending on the characteristics of that alternative.

Transaction utility theory: It is determined by comparing a consumer's reference price to the actual price.

Vector model: It assumes that preferences increases as the quantity of attribute A increases.

Utility: A measure of pleasure or satisfaction.

## Chapter Summary

In this chapter, the summary of the need for this study is presented. In the statement of problem, gaps in previous research are discussed, and areas to be studied are presented. Then several reasons for conducting this research study and how the results of this study will contribute to both academics and industry are discussed in the significance of the study. Finally, research questions and research objectives are presented, followed by the definitions of terms related to this study.

## Organization of the Study

This dissertation is organized into five chapters. Chapter one provides an overview of the bundling practice in the restaurant industry, statement of the research problem, significance of the study, research questions, research objectives, and relevant



definitions of terms used in this study.

In chapter two, the previous studies on bundling, both from economics and consumers behavioral aspects, are detailed. Then the theoretical background supporting the foundation for this study is discussed, followed by a testable hypothesis. Consumer choice behaviors, in general, and in the restaurant context are discussed. Based on the discussion, important consumer choice attributes in the restaurant context are derived. Finally, the conceptual framework is presented.

In chapter three, the research method and design are presented. Conjoint analysis is briefly reviewed as this statistical method is used to accomplish the objectives of the study. Research design, sample, definition of dependent and independent variables, data collection method, and analysis are introduced. Random utility model and rank-ordered logit model are specified for the study.

In chapter four, the results of the analyses for the study are presented. First, the descriptive statistics of the respondents and their meal choice rankings are presented. Next, the rank-ordered logit models for Analysis I and Analysis II are estimated. In order to compare the respondents' top choice and full rank, a conditional logit model is also estimated. In addition, interaction models are estimated to explore consumer meal choice behavior based on their socio-economic characteristics. Finally, reliability and validity tests are conducted to measure the quality of conjoint data.

In chapter five, the findings from the chapter four are discussed, followed by the theoretical contributions and managerial implications of this dissertation are discussed. Finally, the limitations of the study and the directions for future research are discussed.

## CHAPTER II

### LITERATURE REVIEW

#### Introduction

This chapter presents a review of literature. The chapter is divided into five sections. The first section reviews the overview of bundling which includes the distinction between product bundling and price bundling, types of bundling, and the rationales for bundling. The second section reviews behavioral aspects of bundling research: how consumers evaluate bundles and why. The third section discusses the reference price theory, prospect theory, and the transaction utility theory. In the fourth section, three testable hypotheses are generated and a proposed framework is developed. Finally, choice behaviors in general and those in the restaurant context are discussed and important restaurant and meal choice attributes for the study are derived in the fifth section.

#### Overview of Bundling

In this section, the overview of bundling, including the difference between price and product bundling, different types of price bundling, and the rationale for bundling, are addressed.

## Product vs. Price Bundling

Previous studies have used product and price bundling interchangeably. However, Stremersch and Tellis (2002) clearly distinguish the difference between product and price bundling. They argue that this distinction is important because it involves different strategies. For example, whereas product bundling is more strategic, price bundling is used for pricing and as a promotional tool (Stremersch & Tellis, 2002). The authors define product bundling as “the integration and sale of two or more separate products or services at any price” (p. 57). By integrating different components as one bundle, product bundling provides consumers with added values such as convenience and interconnectivity (e.g., PC systems). Managers usually use product bundling strategies for their new product development perspectives (Stremersch & Tellis, 2002).

Price bundling is defined as “the sales of two or more separate products in a package at a discount” (Stremersch & Tellis, 2002, p. 57). In this case, the reservation prices for the price bundle are equal to the price of the sum of the individual components. Price bundling, therefore, does not offer added value to customers, but the discount should motivate customers to buy the bundle. Examples of price bundling include a six pack of beer, a value meal, and a variety pack of cereals. Therefore, the effectiveness of price bundling may be a function of the degree to which it stimulates demand in a way that achieves cost economies (Guiltinan, 1978). Based on the distinction described above, the price bundling concept is used in this study.

## Types of Bundling

Several forms of bundling have been suggested in bundling studies such as pure

bundling, mixed bundling, add-on bundling, and tie-in sales. Pure bundling means that the goods are only available in the package. That is, products cannot be bought separately. An example of pure bundling is block booking in the film industry (Simon & Wuebker, 1999). A following example explains block booking:

Suppose that there are two theaters, A and B. A is willing to pay \$9,000 for film 1, \$3,000 for film 2, and \$12,000 for the package. B is willing to pay \$10,000 for film 1, \$2,000 for film 2, and \$12,000 for the package. Notice that the value of the bundle to each theater is simply the sum of the values of the two films; there are no “interaction effects” in the consumption of the two goods. Suppose that costs are zero, so that the movie rental company is only interested in maximizing revenue. If the rental company rents each film individually, profit maximization requires that it rents film 1 for \$9,000 and film 2 for \$2,000 making a total of \$11,000 from each theater. But if it rents only the bundled package it makes \$12,000 from each theater. Effectively the rental company has managed to price discriminate between two theaters; it is renting film 1 to theater A for \$9,000 and to firm B for \$10,000, and similarly for film 2 (Varian, 1989, p. 626-627).

The pure bundling strategy is applicable only in the rare case in which a firm holds monopoly power over one of the components of the bundle (Guiltinan, 1987).

Mixed bundling means that products are offered either individually or bundled together in a package (Varian, 1989). That is, products are offered in the form of a combination of separate pricing and pure bundling (Simon & Wuebker, 1999). Generally, if a customer buys a bundle, some price incentive for purchasing a bundle is given rather than buying items individually. Value meals, prix fixe menus, and cable TV channel

packages are examples of mixed bundling. Guiltinan (1987) describes the two forms of mixed bundling: mixed-leader bundling and mixed-joint bundling. In mixed-leader bundling, the price of one of the two products is discounted if the first product is purchased at the regular price. In this case, if the company does not give a discount for the second product, it can not sell the first product at a profitable price (Simon & Wuebker, 1999). In mixed-joint bundling, a single price is set for the bundle; for example,  $P_A + P_B$  is set a single price and usually a price for  $P_{A+B} < P_A + P_B$  (Guiltinan, 1987).

Based on the review of types of bundling literature, prix fixe menus with multiple alternatives follow a mixed bundling strategy; therefore, a mixed-bundling concept is applied to this study.

#### Rationale for Bundling

Why do firms use bundling strategy? Many reasons for bundling have been discussed. For example, firms use bundling to reduce transaction or operating costs, expand market share, or to enhance product performance (Eppen, Hanson, & Martin, 1991). However, it has been suggested that the main reason for bundling is to extract consumer surplus (Adams & Yellen, 1976). Adams and Yellen (1976) demonstrate that bundling is profitable for firms because of its ability to segment customers with different reservation price characteristics, and, therefore, extract consumer surplus. For example, suppose that a restaurant offers beer and pizza and there are two customers with their reservation prices for two items (Table 1).

Table 1

*Illustration of customers' willingness to pay for pizza and beer in U.S. dollars*

| Customer | A bottle of beer | Pizza | Bundle (beer and pizza) |
|----------|------------------|-------|-------------------------|
| 1        | 5                | 8     | 13                      |
| 2        | 3                | 10    | 13                      |

Suppose that costs are zero for simplicity. If a restaurant sells items individually, it should charge \$3 for a bottle of beer and \$5 for a pizza. At these prices, the restaurant's total revenue for two customers will be \$22 ( $8 \times 2 + 3 \times 2 = 22$ ). However, if it sells a bundle package of pizza and beer, it can charge a bundle price of \$13 per person. But now the revenue rises to \$26 ( $13 \times 2$ ). Therefore, with bundling, the restaurant effectively discriminates price between two customers; it sells pizza for \$8 for customer 1 and \$10 for customer 2. This bundling example demonstrates that firms can add up the reservation prices and transfer consumer surplus from one product to another (Simon & Wuebker, 1999).

Since consumers vary in the maximum price they are willing to pay, firms can take advantage by bundling products. Therefore, bundling allows the redistribution of consumer surplus, which results in a bundle appealing to a large number of customers. This may reduce consumers' price sensitivity and allow firms to enjoy higher levels of profitability (Estelami, 1999).

### Behavioral Aspects of Bundling

There are two streams of bundling research: economic analysis of bundling and behavioral aspects of bundling. Economic analysis of bundling has focused on the

economic aspects of bundling, such as finding an optimal price for a bundle and firms' profit maximization approach. On the other hand, behavioral aspects of bundling have focused on consumers' bundle evaluations and their psychological processes in evaluating bundles and their choices (Gaeth, Levin, Chakraborty, & Leven, 1990; Johnson, Herrmann, & Bauer, 1999; Yadav & Monroe, 1993).

In this section, the behavioral perspective of bundling is reviewed because this dissertation explores consumers' behavioral aspects of bundling.

### Bundle Evaluation

Yadav and Monroe (1993) provide insight into how consumers evaluate a bundle when the prices of bundle components and a single price of a bundle are presented. They investigate how consumers form perceptions of savings when they evaluate a bundle offer and test the relative effects of savings offered on individual items and of savings offered directly on a bundle of items. The authors hypothesized that consumers perceive savings by comparing the sum of the items' regular prices to the bundle price. Then consumers use the items' regular prices as a standard to evaluate the items' sales prices and a bundle's price. When the bundle's price is lower than the sum of the items' prices, then the consumers form the perception of value from buying the bundle. Their findings suggest that consumers have two separate savings: perceived savings on the bundle itself and additional savings on the individual items. They found that additional savings offered on a bundle significantly influenced consumers' perceptions of value. That is, although savings from individual items was important, additional savings offered by the bundle had a greater impact on buyers' perceptions of saving associated with buying the bundle.

The findings of the study provide insight into understanding consumer bundle evaluation behavior by demonstrating how sellers should present price information to buyers to promote bundle offers as well as the individual items that composed of the bundle.

Johnson, Herrmann, and Bauer (1999) examine whether or not the bundling or presentation of price information influences consumer bundle evaluations. By using automobile offerings, the study presented three levels of a price bundling factor. The subjects were then asked to evaluate an offer. For level one, a bundle price for the basic model and optional extras was presented. For level two, a partially bundled price (composed of individual prices for the base model) and other interior and exterior options as a separate package was offered. For level three, a de-bundled price composed of separate prices for the base model and other optional extras was offered. The findings suggest that when price information is bundled and price discount information is de-bundled, consumers' evaluations in terms of perceived satisfaction, likelihood of recommending the products to other people, and the likelihood of repurchasing increased. The findings of the study suggest that consumers form perceptions of savings when they evaluate individual items prices and their discount information on the bundle.

Will customers evaluate the bundle differently if price information is presented in different forms? If so, will this result influence their purchasing decision even if the bundle components and the total price of a bundle are exactly the same? Chakravarti, Krish, Paul, & Srivastava, (2002) test such conditions and provide answers. They examined partitioned versus consolidated versions of price presentations using refrigerators. For the partitioned version, all features were presented for a single price of \$399.95 with the warranty having a partitioned price of \$100. In the consolidated version,



all features were presented in a single price of \$499.95. The total bundle price was \$499.95 for both versions. The results showed that when price presentation was partitioned with separate price tags, consumers evaluated the bundle more favorably than consolidated price presentation. The findings of the study suggest that when price is presented separately for a bundle, consumers form perceptions of savings by comparing individual prices and a single bundle price. Janiszewski and Cunha (2004) also explored the framing effect of the price and discount presentation in the bundling context and consumer evaluation of the bundle. The authors demonstrated that the framing of price influences bundle evaluation through its differential impact of the perceived value of the components of the bundle. For example, “a pizza could be valued by comparing its individual attribute values on crust, topping quantity, topping quality, and temperature to referents for each of these attributes and then summing these referent based values to arrive at an overall offer evaluation” (p. 544). Through six experimental studies, the authors provide evidence that consumers evaluate each item separately and then arrive at an overall evaluation of the bundle.

Several studies (e.g., Johnson et al., 1999; Kaicker, Bearden, & Manning, 1995; Suri & Monroe, 1999; Yadav & Monroe, 1993) examined reference price in the bundling context. These studies state that consumers form perceptions of value by comparing the bundle price and the sum of individual prices, and these perceptions of value are then directly related to preference or choice; the larger a buyer’s perception of value, the more likely the buyer will be to express a preference for the product (Dodds and Monroe, 1985). Table 2 provides the summary of behavioral aspects of bundling studies.

Table 2

*Summary of behavioral aspects of bundling studies*

| Study                                      | Investigations   | Methodology | Result  |
|--|--|-------------|---|
| Gaeth, Levin Chakraborty, & Levin (1990)   | Consumer evaluations of two different products (a primary product and tie-in product) in a single bundled price              | ANOVA       | Evaluations of the primary product and the tie-in product aggregated when evaluating bundles  |
| Yadav & Monroe (1993)                      | Buyers' perceptions of savings in a bundling offering  | ANOVA       | Consumers perceive savings on the bundle itself and additional savings on the individual items  |
| Wuebker, Mahajan, & Yadav(1999)            | The effect of promotional activity of individual items on consumers' evaluations of bundles                                  | ANOVA       | As promotional activity increased on the individual items, buyers perceived less savings on the bundle  |
| Johnson, Herrmann, & Bauer (1999)          | Consumer evaluations of product offerings in three levels of price information; a bundle, a partially bundled, and debundled | ANOVA       | Positive evaluations increased when price information is bundled price discount information is debundled  |
| Chakravarti, Krish, Paul Srivastava (2002) | Partitioned versus consolidated bundle price presentations and consumers' bundle evaluations and choices                     | ANOVA       | When price presentation was partitioned with separate & price tags, buyers evaluated the bundle more favorably than consolidated price presentation |
| Janiszewski & Cunha (2004)                 | The influence of framing of price presentation on bundle evaluation  | ANOVA       | Buyers evaluate each items separately and then arrive at an overall evaluation of the bundle  |

## Reference Price Theory

A friend of mine was once shopping for a quilted bedspread. She went to a department store and was pleased to find a model she liked on sale. The spreads came in three sizes: double, queen, and king. The usual prices for these quilts were \$200, \$250, and \$300 respectively, but during the sale they were all priced at only \$150. My friend bought the king-size quilt and was quite pleased with her purchase, though the quilt did hang a bit over the sides of her double bed (Thaler, 1999, p.183).

Reference price theory suggests that consumers create a point of reference for pricing based on multiple factors. A point of reference in turn influences how buyers respond to price.

Reference price has been an important concept for marketers because it provides developing and interpreting techniques for obtaining consumers' responses to prices and for influencing consumer purchasing decisions (Kalyanaram & Winer, 1995; Lowengart, 2002; Mayhew & Winer, 1992; Monroe, 1990). The concept of reference price is that consumers evaluate prices comparatively and use any price against other prices to evaluate the price fairness (Kalyanaram & Winer, 1995; Kumar, Karande, & Reinartz, 1998; Monroe, 1990). Reference price anchors in the mind of a consumer and then influences his/her buying decision and willingness to pay.

Although numerous definitions of reference price have been discussed, prior research implies that two broad types of reference price concepts are widely used: internal and external reference prices (Biswas & Blair, 1991; Fraccastoro, Burton, &

Biswas, 1993; Mayhew & Winer, 1992; Mazumdar & Papatla, 2000; Monroe, 1990).

Internal reference price is the price stored in the memory of a consumer on the basis of perceptions of actual, fair, and other price concepts (Mayhew & Winer, 1992). Various definitions of internal prices have been identified such as previously paid price, some weighted average of past price (Rajendran & Tellis, 1994), fair price (Thaler, 1985), or expected price (Monroe, 1990). However, all these studies share the common view that internal standards are influenced by previous experience to prices, and such standards can be changed as a result of exposure to new stimuli (Yadav & Seiders, 1998).

On the other hand, external reference price is explained by observed stimuli presented in the current purchase environment (Mayhew & Winer, 1992) or at the point of purchase such as observed price of another product, advertised price, or regular retail price. External reference price can be a price that is stated by retailers (i.e., reference price is higher than selling price), which consumers use for comparison to judge the value of an offer (Fraccastoro et al., 1993). Previous studies (Mayhew & Winer, 1992; Rajendran & Tells, 1994; Kumar, Karande, & Reomartz, 1998; Kopalle & Mullikin, 2003) have shown that external reference price influences the formation of consumers' price perceptions by comparing a product's actual price to discounted prices.

External reference price is based on price information available in the current purchase environment. Therefore, firms can purposely provide a reference point for comparison or consumers may form an external reference price based on the item's regular price. For example, in some cases, retailers may explicitly provide a reference point for price comparisons. Alternatively, consumers may form an external reference price based on the regular price of a brand at the point of purchase.

It has been suggested that decision variables such as context or framing, comparative pricing, and anchoring effect influence perceptions of value and eventual product choice (Monroe, 1990; Rajendran & Tellis, 1994). These variables then can influence the information that consumers use to form reference points, which affect consumers' purchasing decisions. Contextual effect indicates how prices are presented or framed.

Considerable research (Kahneman & Tversky, 1979; Thaler, 1980) has shown that the framing significantly influences consumer choice and buying decision. Levin and Gaeth (1988)'s study clearly shows how framing affects consumer choice. They tested the framing effect by using hamburgers. They framed ground beef as either "75% lean" or "25% fat." Then the respondents were asked to rate the quality of the ground beef. They found that the subjects rated more favorably the "75% lean" than "25% fat," although the quality of the ground beef for both conditions was the same.

Comparative pricing indicates that actual product prices are compared with higher reference prices. That is, comparative price influences the standards that buyers use to judge the product's price and therefore create the perception of savings on the product (Yadav & Monroe, 1993). All types of stores frequently use this pricing practice to attractively frame price deals (Kopalle & Lindsey-Mullikin, 2003). If a consumer observes that a price is less than his/her reference price, he/she perceives the savings or bargains, which may lead him/her to respond positively to an offer. "Was \$799, now \$599", "Only \$40 with a package for the total value of \$100", or "Compare at \$50, Our price \$25" are good examples of comparative pricing.

Yadav and Monroe (1993) state that comparative price advertising may relocate

internal reference price toward the comparative price, which might create a higher internal reference price than before the advertisement. Furthermore, even though consumers tend to be skeptical about externally provided reference prices, their perceptions of savings are positively influenced by comparative pricing tactics even when the prices are exaggerated (Alford & Biswas, 2002).

Kamins, Dreze, and Folkes (2004) examined both high and low reference prices in an internet auction context. They provided a high starting bid price and a low starting bid price to test whether customers in the higher bid group result in a final higher bid amounts than those of the lower bid group. Their findings suggest that when the seller provided a higher bid price (higher reference price), the final bid amount for the item increased significantly. On the other hand, when the seller provided a low bid amount (a lower reference price), a low final bid amount resulted. Their findings confirmed that reference price influenced consumers' purchasing decisions.

Extensive research in reference price suggests that marketers can influence consumers' reference price by controlling one or more factors that form reference point. In other words, marketers can control consumers' purchasing decisions and their willingness to pay by manipulating the information that consumers use to form reference prices (Fraccastoro et al., 1993; Lowengart, 2002; Monroe, 1990; Rao & Sieben, 1992; Smith & Nagle, 1995; Thaler, 1985).

Fraccastoro et al. (1993) suggest some strategies that marketers can use to influence consumers' reference prices. They are: 1) increasing internal reference price in which the reference price is set high, yet falls within an acceptable price range; 2) emphasizing the low purchase price, for example, highlighting the value of savings; or 3)

increasing perceptions of expected utility associated with the promoted products which may include brand information and some specific attribute information that may be associated with the quality.

It has been suggested that consumers frequently form frames of reference when making buying decisions, and these frames of reference in turn influence how consumers respond to price and product information (Smith & Nagle, 1995). Framing effect of reference price and the evaluation of gain versus loss relative to reference price are fundamental to the Prospect theory (Kahneman & Tversky, 1979).

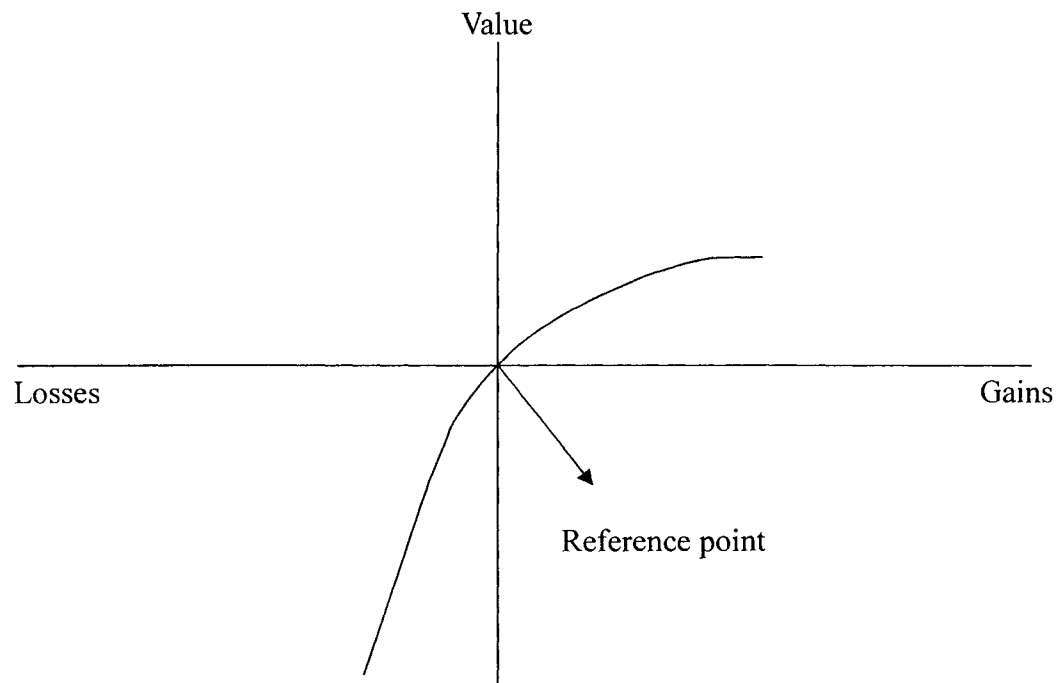
### Prospect Theory

Prospect theory (Kahneman & Tversky, 1979) states that consumers do not make decisions in absolute prices, but of losses or gains relative to a reference point. The theory explains that a customer categorizes gains and losses based on reference point. While economic theory predicts that gains and losses of equal size are evaluated the same, prospect theory predicts that a customer perceives loss more painfully than he/she judges the gain of an equal amount as pleasurable (Smith & Nagle, 1995). Through a series of survey questions, Kahneman and Tversky (1979) empirically generalized that gains were perceived differently than losses even though both gains and losses were the same amounts. The prospect theory states that the way in which the situation is described influences the decision making. This is called “framing” and this framing leads to irrational decision making.

In prospect theory, the value function is created over gains and losses relative to the reference point. Value function is “S” curve and this value function is considered to

be concave for gains and convex for losses relative to the reference point. Therefore, the pain associated with the losses is greater than the pleasure associated with the same amount of gains (Freeservers.com, 2005).

Kahneman and Tversky (1979) state that the shape of value function is based on the psychophysical principal that the “S” shape is considerably steeper for losses than for gains. Therefore, the theory assumes that people respond more to perceived changes rather than the absolute changes (Thaler, 1985). Figure 2 presents the value function of prospect theory.



*Figure 2.* Value function of the prospect theory. Adopted from “Prospect Theory: An analysis of decision under risk, Kahneman & Tversky, 2002, *Econometrica*, 47, p. 279.



## Transaction Utility Theory

The concept of transaction utility is that consumers feel psychological pleasure when they purchase the product or service at a price less than the regular price. Thaler (1985) proposed transaction utility theory, stating that the total utility that consumers consider when they purchase products is divided into two utilities: acquisition utility and transaction utility. Acquisition utility depends on the value that consumers perceive (i.e., benefits of the product) compared to the money they spend to buy that product.

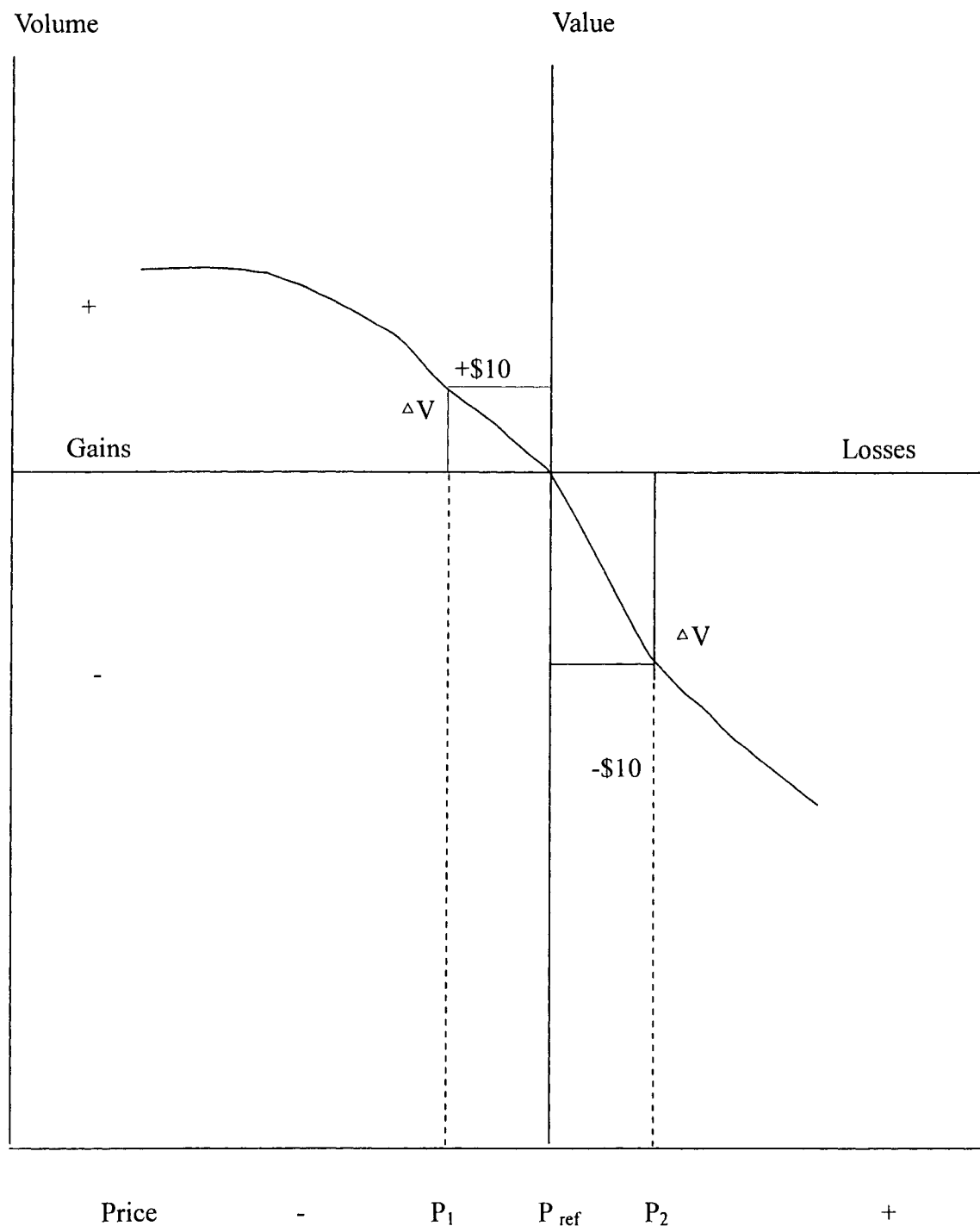
Transaction utility, on the other hand, depends on the perceived merits of the deal (a price lower than expected), such as a good bargain or deal. Transaction utility is determined by comparing a customer's reference price to the actual price: " $P_{\text{ref}} - P_{\text{actual}}$ " (Monroe, 1990). If an actual price is less than the reference price, a consumer has a positive transaction value. Negative transaction value then results when an actual price exceeds the buyer's reference price.

Based on the value function of prospect theory, Thaler (1985) explains how people code the joint outcome (x, y) in the value function (v). He investigated which outcome—joint outcome,  $v(x + y)$ , named *integrated*, or separate outcome,  $v(x) + v(y)$ , named *segregated*—produces greater utility. He found that people perceive more value when gains are segregated while they prefer that losses are integrated, as prospect theory's value function predicted. This means that losses loom larger than the same amount of gains. Therefore, marketers should emphasize separate gains since v is concave:  $v(x) + v(y) > v(x + y)$ . Since several losses are perceived as more painful, marketers should integrate multiple losses:  $v(-x) + v(-y) < v[-(x + y)]$ . Figure 3 shows an example of value function in which a loss in perceived value at price 2 ( $P_2$ ) is greater

than the perceived gain from \$10 price reduction in price 1 ( $P_1$ ).

Since people value a reduction in a loss more than a gain of the same magnitude, emphasizing the reduction in the amount paid for the product may result in a positive transaction value more effectively than a sale price-only presentation would (Monroe, 1990). Therefore, in bundling context, presenting items' á la carte prices along with the bundled price may enhance transaction utility.

As such, transaction utility provides insight into understanding consumer decision making in bundling context, such as, how consumers perceive the value of a bundling offer. Yadav and Monroe (1993) define transaction utility in a bundling situation as a buyer's perception of savings associated with buying the bundle. By comparing the bundle price and what it takes to buy all the items separately, the buyer perceives savings from the bundle, and it may lead him/her to have a positive transaction value.



*Figure 3.* Value function with losses and gains. Adapted from “Price and consumers’ perception of value” Monroe, 1990, *Pricing: Making profitable decisions*, (p. 78). New York: McGraw-Hill, Inc.

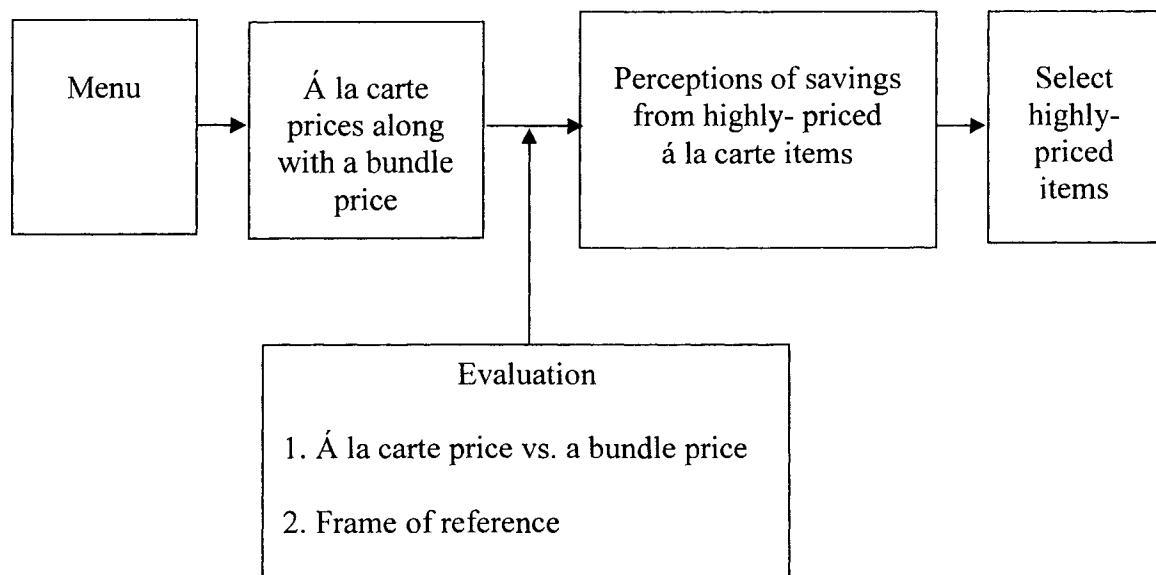
## Hypotheses Development

On the basis of the above discussion, three hypotheses are developed and proposed framework is depicted (Figure 4). In developing the hypotheses, it is assumed that a bundle price is perceived as a relative loss while price discount information is perceived as a relative gain. It is also assumed that by comparing the bundle prices and what it takes to buy all the items separately, a consumer perceives more values from the bundles that provide higher savings than that of lower savings. Therefore, in this study, it is assumed that the sum of different *à la carte* prices serves as a reference point, and this reference point in turn influences consumer meal choice decisions when they select their *prix fixe* menus.

Dodds and Monroe (1985) found that perceptions of value are directly related to preference or choice; that is, the larger a buyer's perception of value, the more likely the buyer will be to express a preference for the product. Therefore, it is hypothesized that when a customer chooses meals for his/her *prix fixe* menu, highly-priced items will influence more positive perceptions of saving and are more likely to be selected than low priced items. Accordingly, it is hypothesized that:

- H1: Given the opportunity to choose his/her own meal combination (one appetizer, one entrée, and one dessert) with a fixed price, a consumer will be more likely to choose the highly-price appetizer item than low-priced ones
- H2: Given the opportunity to choose his/her own meal combination (one appetizer, one entrée, and one dessert) with a fixed price, a consumer will be more likely to choose the highly-price entrée item than low-priced ones
- H3: Given the opportunity to choose his/her own meal combination (one appetizer, one entrée, and one dessert) with a fixed price, a consumer will be more likely to choose the highly-price dessert item than low-priced ones

### The Proposed Conceptual Framework



*Figure 4.* A bundle choice model with price difference of á la carte items

Note. The model assumes that consumers chose prix fixe menus.

## Consumer Choice

Consumers often face the conflict of making a choice between various alternatives. Traditional economic theory of consumer choice states that such conflict plays no role in making a decision because a consumer chooses an option that maximizes his/her utility. However, the psychological aspect of consumer decision-making is more complicated. For example, seeing an ad, the timing of the purchase, and hearing about a brand from a friend all may influence a consumer to treat a particular brand differently than before (Posavac, Sanbonmatsu, & Ho, 2002). Whether his/her choice was based on value maximization or psychological influences, a consumer has reasons for selecting a particular option. Shafir, Simonson, and Tversky (1993) suggest that a consumer's reason-based choice identifies various reasons that are purported to enter into and influence decisions as well as explain choice in terms of the balance of reason for and against the various alternatives.

Different consumers can make different choices when they face the same alternatives because the relative value that they place on each alternative is different. However, whatever the reason, these consumer choice studies share a common view that a consumer makes a choice that provides the highest value (Train, 1993).

### Consumer Choices in the Restaurant Context

Then the question is: how do different consumers make different choices to maximize their utilities? Although many factors influence consumer choices, consumers are thought to approach the market with certain decision-making styles, such as price/product comparison customers or quality seekers (Sproles & Kendall, 1986).

Previous research in consumer choice in the restaurant context has identified a large number of attributes that consumers consider to be important in their restaurant and meal choice decisions. These studies have investigated consumer restaurant choice variables based on their demographic profiles and types of restaurants (Kivela, 1997), information search behavior (Pedraja & Yague, 2001), aspects of restaurant products (Clark & Wood, 1988), or meal purchase behavior (Kivela, Reece, & Inbakaran, 1999).

In a study conducted by Kivela et al. (1999), they found that there were six important food choice variables in theme/ambience restaurants. They were: presentation of food, menu item variety, nutritious food, tastiness of food, freshness of food, and temperature of food.

Auty (1992) examined consumer purchasing behavior in restaurants and developed a restaurant choice model in order to segment customers. Based on a combination of survey questionnaire and open-ended questions, she categorized ten restaurant choice variables. They are food type, food quality, value for money, image and atmosphere, location, speed of service, recommendation, new experience, opening hours, and facilities for children. Then the respondents were asked to rank their restaurant choice variables from the list of these ten. The results showed that food type, food quality, and value for money were ranked as the top three choice variables. Lewis (1981) also conducted a similar study that tested the most important restaurant choice variables. His study found that consumers considered food quality, atmosphere, price, and variety of menu as important when they chose the restaurants.

Clark and Wood (1998) identified important choice factors in restaurant selection. They were: price of food and drink, speed of service, quality of food, friendliness of

staff, and range of food choice.

Schroeder (1985) approached a unique way to identify variables by asking restaurant critics what they thought was important in restaurant evaluations. They were: quality of food, quality of service, pricing, menu variety, nutrition, quantity of food, and so on. Table 3 shows the summary of restaurant choice variables identified in previous studies.

Table 3

*Important consumer meal choice and restaurant selection attributes*

| Author(s)                         | Restaurant Type                             | Attributes   |
|-----------------------------------|---|--|
| Kivela, Reece, & Inbakaran (1999) | Theme/Ambience restaurants                  | Menu item variety<br>Nutritious food<br>Freshness of food<br>Tastiness of food |
| Clark & Wood (1998)               | Unavailable                                 | Price<br>Speed of service<br>Range of food choice<br>Quality of food           |
| Auty (1992)                       | Ethnic restaurant<br>& Fast food restaurant | Value for money<br>Speed of service<br>Recommendation<br>Food quality          |
| Schroedor (1985)                  | Unavailable                                 | Price<br>Menu item variety<br>Nutrition<br>Quality of food/service             |
| Lewis (1981)                      | Gourmet & Atmosphere                        | Food quality<br>Price<br>Variety of menu                                       |



Although most studies of consumer choice in the restaurant context examined the restaurant selection variables, some variables used in these studies can be applicable to food selection context: variables such as price, nutrition, menu variety, speed of service, and quantity of food (e.g., portion size).

### Important Bundle Choice Attributes in a Case of Prix Fixe Menu

Consumer behavioral studies (Pósavac et al., 2002) state that consumer behavioral intention is not completely explained by only a few factors. These studies suggest that other factors such as situational variables can considerably influence consumer decision making.

The main objective of this dissertation is to test the reference prices; therefore, we would like to understand how the presence of each item's á la carte price along with a bundle price (i.e., prix fixe menu price), excluding other behavioral factors, influences consumers' meal choices. However, a few other variables that consumers might think are important in their bundle choices are included in Analysis I, because price may not be an only factor that influences consumers' choices. Since the Analysis I estimates utilities that consumers attach to particular attributes when making choices and their willingness to pay for attributes, no specific hypotheses are developed for the attributes identified in this section.

Two meal choice attributes identified from previous studies are adopted for this study to determine important meal selection attributes and levels. They are: Nutritious food (Healthy food) and Price.

## Chapter Summary

In this chapter, a brief overview of bundling was discussed including details of firms' profit maximization and behavioral perspectives of bundling. Reference price theory, prospect theory, and transaction utility theory were presented to understand the theoretical foundation for the reference price theory which will be tested in this dissertation. Then testable hypotheses were generated. Consumer restaurant/meal choice decisions in the restaurant context were discussed, and important bundle choice attributes in a case of prix fixe menu were derived. Finally, the proposed conceptual framework was developed.

## CHAPTER III

### RESEARCH METHODOLOGY

#### Introduction

The purpose of this dissertation is: 1) to test the reference price theory which predicts that price differences among individual items influence consumers' bundle choice decisions; and 2) to estimate utilities that different customers attach to particular attributes in their bundle choice processes and their willingness to pay for attributes. In order to accomplish these objectives, conjoint analysis is an appropriate tool to use.

Conjoint analysis is an approach to measuring preferences that estimates both overall preferences for a good or service as well as preferences for its specific attributes (Phillips, Maddala, & Johnson, 2002). It assumes that by decomposing the overall judgment of an individual into its basic elements, inferences can be made as to how the consumer evaluates a product's attributes that he/she perceives to be important in the decision making process. Given the complexity of the meal choice process and the many factors affecting the choice decision, conjoint analysis provides a framework in which the researcher can evaluate the influence of several attributes of the meal choice process. Therefore, conjoint analysis fits well in this study.

In this chapter, a brief overview of conjoint analysis is discussed. Next, research design, sample, procedure, and data collection methods are presented.

Then random utility model and rank-ordered logit model for conjoint estimation are discussed. Finally, reliability and validity issues in conjoint analysis are discussed.

### Conjoint Analysis

Conjoint analysis is a research technique for measuring consumer preferences among multiattribute alternatives by modeling how consumers make complex judgments when they are selecting a particular product/service (Hair, Anderson, Tatham, & Black, 1998). It has been widely used in market research (Green & Srinivasan, 1990; Klemz & Gruca, 2003), environmental study (Baarsma, 2003; Layton, 2000), transportation study (Calfee, Winston, & Stempski, 2001), healthcare research (Ryan & Hughes, 1997), and economics (Hanley, Mourato, & Wright, 2001; Holland & Wessells, 1998).

The foundation of conjoint analysis is economic theory. Phillips, Maddala, & Johnson. (2002) state that conjoint analysis is derived from key assumptions of welfare economics-that decision makers, when presented with a choice, will prefer one bundle of goods over another, and that decision makers will attempt to maximize their satisfaction or utility when making choices. This foundation in utility theory allows one to use powerful statistical methods to model preferences and their interrelationship.

Conjoint analysis is carried out at the individual level. The researcher generates a separate model for predicting preference for each respondent (Hair et al., 1998). However, it can be applied at the aggregate level; that is, individual results can then be aggregated to estimate the part-worths (utilities) for the group of respondents as a whole (Hair et al., 1998).

Conjoint analysis consists of several attractive factors. First, the respondents are

asked to make choices between products defined by a unique set of product attributes (Koo et al., 1999) as they normally do when they make purchases in real situations. When consumers shop for products/services, they usually do not have the options of having more desirable characteristics and fewer undesirable characteristics. Instead they must decide to trade-off some characteristics to get others (American Marketing Association, 2000). Therefore, conjoint analysis provides researchers with insight into modeling consumer decision making behavior in a realistic manner.

Second, unlike other research methods which ask the respondent to state importance directly, conjoint analysis indirectly asks the respondents to make choices similar to those they do in the real marketplace. For example, rather than directly asking for willingness to pay, conjoint analysis asks the respondents to rank or rate possible outcomes from most preferred to least preferred, while several attributes of the good/service are varied. This results in a relative value, in the sense that the expressed value depends on the other alternatives that have to be ranked or rated (Baarsma, 2003).

Finally, conjoint analysis provides a composition rule for how the various importance fit together (American Marketing Association, 2000). A composition rule is used to explain how respondents combine part-worths to produce total utility for a product or service (Hair et al., 1998). For example, a respondent rates both price and quality as very important, but from these ratings, the researcher cannot predict how the respondent will trade off price and quality: Will he/she prefer low price and low quality or high price and high quality? Conjoint analysis can address these questions (American Marketing Association, 2000).

North and De Vos (2002) suggest the value of conjoint study as: (a) to gain a

better understanding of consumers' selection criteria when they make purchases; (b) to plan product mixes more efficiently; (c) to plan promotional message and strategies more effectively; and (d) to segment market

Therefore, conjoint analysis is a powerful tool that assists researchers in understanding and modeling the value that consumers attach to particular attributes when they make purchasing decisions.

### Steps Involved in Conjoint Analysis

In order to carry out a conjoint analysis, several steps must be taken. The first step is to identify product/service attributes and levels for each attribute. These attributes can be identified through literature review, focus groups, or individual interviews. Once attributes and levels are identified, a conjoint method should be selected. There are three conjoint methods: traditional conjoint, adaptive conjoint, and choice-based conjoint. Hair et al., (1998) distinguish these three conjoint methods. Traditional conjoint is a simple additive model containing up to nine attributes estimated for each individual. The adaptive conjoint was developed to accommodate a large number of attributes that would not be possible in the traditional conjoint method. The choice-based conjoint uses a unique form of presenting stimuli in sets rather than one-by-one. It also should be analyzed at the aggregate level rather than the individual level and should include interactions.

The next step is selecting the preference model. There are three preference models: the vector model, the ideal point model, and the part-worth model.

The vector model assumes that preference increases as the quantity of attribute

p increase. Preference for the jth attribute is defined as:

$$S_j = \sum_p^t w_p \cdot y_{jp}$$

Where:

$s_j$ =preference for the stimulus object at level j,

$w_p$ = the individual's weights assigned to each of the p attributes.

$y_{jp}$ = level of the pth attribute for the jth stimulus

The ideal point model assumes the existence of an ideal manifestation (Gustafsson, Herrmann, & Huber, 2000). That is, a person may prefer moderate levels of an attribute, such as moderate levels of product features. The ideal model is expressed as:

$$d_j^2 = \sum_p^t (y_{jp} - x_p)^2 * w_p$$

Where:

$d_j^2$ =a weighted distance between the location of the jth stimulus and the individual's  $x_p$

$y_{jp}$ = level of the jth stimulus with respect to the individual's ideal point

$x_p$  = the individual's ideal point, p,

$w_p$ = the individual's weights assigned to each of the p attributes.

The part-worth model is the most flexible of all three models (Green & Srinivasan, 1978). It makes no assumption about the attribute levels and preference ratings. The part-worth model is mainly used as a preference model for conjoint analysis (Green &

Srinivasan, 1978). The part-worth model reflects a utility function that defines a different utility value for each of the  $j$  levels of a given attribute. The part-worth function is expressed as:

$$s_j = \sum_{p=1}^t f_p y_{jp}$$

Where:

$s_j$ =preference for the stimulus object at level  $j$ ,

$f_p$ =the function representing the part worth of each of the  $j$  different levels of the stimulus object,  $y_{jp}$  for the  $p$  th attribute.

$y_{jp}$ =the level of the  $p$  th attribute for the  $j$  th stimulus object.

For example, “part-worths” is simply total utility derived on the part worth for each level. Therefore, if the product/service has  $m$  attributes, each having  $n$  level, the total utility for the product/service can be written as (Hair et al., 1998):

Total worth for product= Part- worth of level  $i$  for factor 1 + Part-worth of level  $j$   
for factor 2 +..... + Part-worth of level  $n$  for factor  $m$ .

The part-worth utility model is used in this study because of its simplicity and flexibility.

After deciding a preference model, a data collection method should be defined. There are many types of data collection methods such as the full-profile method, the two-factor method, self-explicated method, and the hybrid conjoint analysis. In this study, the full-profile method is discussed since this study utilizes this method.



The full-profile method utilizes the complete set of factors (Green & Srinivasan, 1978). Since the full-profile method describes all attributes, this method gives a more realistic description of stimuli by defining the levels of each of the attributes and including all possible combinations of attribute levels. Because of all possible combinations of attributes, it may generate too large a number of profiles if a study has many attributes and levels. For example, based on the selected attributes and levels, the set of possible profiles is constructed. If there are three attributes with five levels and two with two levels, the total number of all possible full profiles is 400 ( $5^3 \times 2^2$ ). This is too a large number of profiles for respondents to rank or rate. Because of this problem, fractional factorial design can be used to reduce the number of combinations.

Fractional factorial design, called orthogonal design, allows a researcher to estimate the main effect, but if there are significant interactions, the estimated parameters represent the combination of main effects and the interaction, rather than pure main effects. The SPSS conjoint software provides fractional factorial designs, which uses a smaller fraction of all possible alternatives. SPSS Conjoint 8.0 (SPSS Conjoint 8.0, 1997) explains the orthogonal design:

An orthogonal array is a subset of all of the possible combinations that still allows estimation of the part-worths for all main effect. Interactions, where the part-worth for a level of one factor depends on the level of another factor, are assumed to be negligible. In an orthogonal array, each level of one factor occurs with each level of another factor with equal or at least proportional frequencies, assuring independence of the main effect. An orthogonal array represents the most parsimonious way to estimate all main effects. Even though it is true that

estimation improves as the number of profiles increase, information is not really lost by omitting some combinations. This is because once you have part-worths (utilities) for each factor level, you can use them in prediction equations for those combinations that subjects did not evaluate (p. 9).

The next step is selecting a measurement scale for the dependent variable.

Respondents are presented with stimuli comprised of alternative profiles of attribute levels and asked to rank or rate these profiles. There are two types of measurement scales: metric and non-metric. Depending on the study, a researcher can choose either rating or ranking scales.

The metric scale is represented by using the rating method, where respondents are asked to rate their preference using interval scales such as the Likert- type scale. Profiles of a product are presented to the respondents, who are asked to rate their likelihood of choosing/purchasing the product. In the rating method, measures can be easily analyzed and administered, but the respondents can be less discriminating in their judgments than when they are ranking (Hair et al., 1998).

On the other hand, there are two types of non-metric measurement of scales: ranking and paired comparisons. In the ranking method, the respondents are asked to rank the stimuli in order of preferences (e.g., 1= most preferred and 8=least preferred). Hair et al. (1998) state that there are two advantages of using the rank-ordering method: (1) it is likely to be more reliable because ranking is easier than rating with a reasonably small number (20 or fewer) of stimuli, and (2) it provides more flexibility in estimating different types of composition rules. Therefore, ranking approach is used in this study.

In the paired-comparisons method, two product profiles are presented to a

respondent at the same time, and the respondent has to choose which of the two he/she prefers. However, Green and Srinivasan (1978) state that the paired-comparison approach is the least efficient of all the methods.

To analyze the collected data, a researcher must select the estimation method. Evaluations for the ranking method require a modified form of analysis of variance specifically designed for ordinal data (Hair et al., 1998). The best-known computer programs are MONANOVA (Kruskal, 1965) and LINMAP (Srinivasan & Shocker, 1973).

If a metric scale (e.g., ratings) is used, Ordinary Least Square (OLS) multiple regression should be used. A method such as multiple regression estimates the part-worths for each level. The overall evaluations then are modeled as functions of the attribute-level code, and regression coefficients result (American Marketing Association 2000). For the paired comparisons method, LOGIT and PROBIT methods are used. Table 4 provides steps involved in conjoint analysis.

Table 4

*Steps involved in conjoint analysis*

| Step  | Alternative Methods   | This Study   |
|---|---|--|
| 1. Selection of a conjoint methodology      | Traditional conjoint  | Traditional conjoint<br>Adaptive conjoint<br>Choice-based conjoint |
| 2. Selection of the preference model        | Part-worth utility model<br>Ideal vector model  | Part-worth utility model   |
| 3. Data collection method                   | Full-profile method   | Full-profile method<br>Two-factor method                           |
| 4. Stimuli creation for full-profile method | Fractional-factorial design   | Fractional-factorial design  |
| 5. Selection of the measurement scale       | <Metric scale><br>Rating: ranking<br>vs.<br><Non-metric scale><br>Ranking                                 | Non-metric scale   |
| 6. Selection of the Estimation method       | <Metric scale><br>Multiple regression<br>vs.<br><Non-metric scale><br>MANANOVA<br>LINMPA<br>LOGIT, PROBIT | Rank-ordered logit<br>Conditional logit                            |

Note. Adapted from “Conjoint analysis in consumer research: Issues and outlook”, Green and Srinivasan ,1978, *Journal of Consumer Research*, 5, p.103-123; “Conjoint Analysis”, Hair, Anderson, Tatham, and Black,1998, *Multivariate data analysis* (p.402). Upper Saddle River, N. J: Prentice-Hall; “Conjoint analysis as an instrument of market research practice”, Gustafsson, Herrmann, & Huber, 2000, *Conjoint measurement: Method and application* (p.9), Mainz, Germany: Springer.

## Research Design

This section discusses the research method, the survey questionnaire development, the sample, the data collection method, and the statistical analysis.

A traditional conjoint method with a part-worth utility model, full-profile approach is used in this study. The full-profile method was selected for the study because it describes all attributes by providing a more realistic description of stimuli, including all possible combinations of attribute levels, and reducing the number of comparisons through the use of fractional factorial designs.

## Analysis I

### Objective

The main objective of this dissertation is to test the reference price theory; therefore, we would like to understand whether the presence of different *à la carte* item prices along with a bundle price (i.e., *prix fixe menu* price) influences consumers' meal choice decisions. We included different levels of *prix fixe* prices to estimate whether consumers have higher utilities with low overall price. Two other variables are also included. They are healthy food and *prix fixe* price.

### Attributes and Levels

In this dissertation, an actual menu from a restaurant that offers *prix fixe* menus is used to generate menu item attributes. Attributes used are: (1) two appetizer items (Shrimp Barbeque and Salad); (2) four entrée items (Pasta, Pork, Veal, and Scallop); (3) two dessert items (Cake and Ice Cream); (4) *prix fixe* price; and (5) healthy food. For

each meal attribute, the price has two levels, and these price levels are randomized to test whether consumers, when selecting their meals, are more likely to choose highly-priced items than low-priced items. For example, one profile can have BBQ Shrimp at \$10.50, Grilled Pork Chop at \$25.95, and Ice Cream at \$5.95, while another profile might have BBQ Shrimp at \$15.50, Grilled Pork Chop at \$30.95, and Ice Cream at \$10.95. By randomizing the prices for each meal attribute, we can measure true price influences on meal selection while controlling other factors. Healthy food attribute and their levels are identified based on a review of literature and a pre-test. Table 5 provides the attributes and levels.

Table 5

*Attributes and levels for Analysis I*

| Attributes                       | Levels                      |
|----------------------------------|-----------------------------|
| <i>Appetizer</i>                 |                             |
| Hugo's Texas BBQ Shrimp          | \$10.50                     |
|                                  | \$15.50                     |
| House Salad                      | \$6.50                      |
|                                  | \$11.50                     |
| <i>Entrée</i>                    |                             |
| Parmesan Tossed Angel Hair Pasta | \$21.95                     |
|                                  | \$26.95                     |
| Grilled Pork Chop                | \$25.95                     |
|                                  | \$30.05                     |
| Pepper Seared Sea Scallop        | \$27.95                     |
|                                  | \$31.95                     |
| Grilled Veal Tenderloin          | \$31.95                     |
|                                  | \$36.95                     |
| <i>Dessert</i>                   |                             |
| Chocolate Flourless Cake         | \$6.95                      |
|                                  | \$11.95                     |
| Homemade Ice Cream               | \$5.95                      |
|                                  | \$10.95                     |
| <i>Healthy Food</i>              | Low-fat<br>Low-carb<br>None |
| <i>Prix Fixe Price</i>           | \$37.95                     |
|                                  | \$39.95                     |
|                                  | \$41.95                     |
|                                  | \$43.95                     |

## Stimuli

Given the various attributes and levels, a large number of description profiles is possible. For this analysis, there are 1,536 possible profiles ( $4^3 \times 8 \times 3$ ) for the respondents to rank. Since this would be too many profiles for the respondent to rank, an orthogonal fractional factorial design is used to reduce the number of profiles. The SPSS Conjoint software version 12.0 package has a tool called ORTHOPLAN which generates only a small number of profiles from all possible profiles. An orthogonal fractional factorial design generated 32 possible ones. Out of 32, three were dropped in order to reflect the fact that the overall price is usually lower than the sum of individual prices. For those three profiles, their overall prices exceeded the sum of individual item prices. Therefore, a total of 29 profiles was used in this analysis.

However, since asking respondents to rank 29 options appeared to be too cognitively demanding and unrealistic, we randomly assigned 29 options to smaller sets of four ranking orders and created 12 versions of a survey questionnaire with two choice sets each.

## Dependent and Independent Variables

The dependent variable is a utility score (ranking score) and the independent variables are the price of appetizer, the price of entrée, the price of dessert, the menu item attributes (shrimp, salad, pasta, pork, veal, scallop, cake and ice cream), the healthy food options (low fat, low carb, and none), the prix fixe prices, and respondents' demographic variables. Table 6 provides a description of the independent variables.



Table 6

*Description of independent variables for Analysis I*

| Variable Name | Variable Description  |
|---------------|---|
| P_APPETIZER   | A continuous variable representing the price of the appetizer   |
| Shrimp        | A dummy variable: 1 if appetizer is shrimp; 0 otherwise   |
| P_ENTREE      | A continuous variable representing the price of the entrée  |
| Pasta         | A dummy variable: 1 if entrée is pasta; 0 otherwise   |
| Pork          | A dummy variable: 1 if entrée is pork; 0 otherwise  |
| Veal          | A dummy variable: 1 if entrée is veal; 0 otherwise  |
| Scallop       | Base category   |
| P_DESSERT     | A continuous variable representing the price of the dessert   |
| Ice Cream     | A dummy variable: 1 if dessert is ice cream; 0 otherwise  |
| Low fat       | A dummy variable: 1 if low fat; 0 otherwise   |
| Low carb      | A dummy variable: 1 if low carb; 0 otherwise  |
| None          | Base category   |
| Price         | A continuous variable representing the price of prix fixe   |
| Sex           | A dummy variable: 1 if female; 0 if male  |
| Marital       | A dummy variable: 1 if married; 0 if not married  |
| Age           | A dummy variable: 1 if 18-23 years old; 0 otherwise<br>A dummy variable: 1 if 24-40 years old; 0 otherwise<br>A dummy variable: 1 if 41-58 years old; 0 otherwise<br>59 or over: Base category  |
| Ethnicity     | White: A dummy variable: 1 if white; 0 otherwise<br>A.A: A dummy variable: 1 if African American; 0 otherwise<br>Hispanic: A dummy variable: 1 if Hispanic; 0 otherwise<br>Asian: A dummy variable: 1 if Asian; 0 otherwise<br>Other: Base category |
| Income        | Income1: A dummy variable: 1 if less than \$30,000; 0 otherwise<br>Income2: A dummy variable: 1 if \$30,000-\$59,999; 0 otherwise<br>Income3: A dummy variable: 1 if \$60,000-\$80,000; 0 otherwise<br>Income4: +\$90,000 (Base category)           |
| Education     | Edu1: High school or less (Base category)<br>Edu2: A dummy variable: 1 if some college; 0 otherwise<br>Edu3: A dummy variable: College: 1 if college; 0 otherwise<br>Edu4: a dummy variable: Graduate College: 1 if graduate college; 0 otherwise   |
| Dine out      | Din1: A dummy variable: 1 if once or less than once a week; 0 otherwise<br>Din2: A dummy variable: 1 if twice a week; 0 otherwise<br>Din3: A dummy variable: 1 if three times a week; 0 otherwise<br>Din4: More than 3 times a week (Base category) |

## Analysis II

### Objective

The purpose of Analysis II is to examine whether or not highly priced á carte items are more likely to be selected when customers choose a prix fixe menu from various alternatives, while controlling other factors that might influence their bundle choices. In this test, a single prix fixe price is applied to every profile.

### Attributes and Levels

Attributes used for this test are: (1) two appetizer items (Shrimp BBQ and Salad); (2) four entrée items (Pasta, Pork, Veal, and Scallop); and (3) two dessert items (Cake and Ice Cream). Like Analysis I, each meal attribute has two price levels, and these price levels are randomized to test whether consumers, when selecting their meals, are more likely to choose highly-priced items than low-priced items. Table 7 provides the attributes and levels.

Table 7

*Attributes and levels for Analysis II*

| Attributes                       | Levels  |
|----------------------------------|---------|
| <i>Appetizer</i>                 |         |
| Hugo's Texas BBQ Shrimp          | \$10.50 |
|                                  | \$15.50 |
| House Salad                      | \$6.50  |
|                                  | \$11.50 |
| <i>Entrée</i>                    |         |
| Parmesan Tossed Angel Hair Pasta | \$21.95 |
|                                  | \$26.95 |
| Grilled Pork Chop                | \$25.95 |
|                                  | \$30.05 |
| Pepper Seared Sea Scallop        | \$27.95 |
|                                  | \$31.95 |
| Grilled Veal Tenderloin          | \$31.95 |
|                                  | \$36.95 |
| <i>Dessert</i>                   |         |
| Chocolate Flourless Cake         | \$6.95  |
|                                  | \$11.95 |
| Homemade Ice Cream               | \$5.95  |
|                                  | \$10.95 |

## Stimuli

This analysis has 128 possible profiles ( $4^2 \times 8$ ) for the respondents to rank. Therefore, an orthogonal fractional factorial design is used to reduce the number of profiles to rank. The SPSS Conjoint software version 12.0 generated 32 profiles to rank. We also randomly assigned 32 options to smaller sets of four ranking orders and created

24 different versions of choice sets (24 sets x 4 ranking orders). In addition, we created 12 versions of a survey questionnaire with two choice sets each.

### Dependent and Independent Variables

The dependent variable is a utility score (ranking score). Independent variables are the price of appetizer, the price of entrée, the price of dessert, and the menu item attributes including shrimp, salad, pasta, pork, veal, scallop, cake and ice cream. Table 8 provides a description of the independent variables.

Table 8

#### *Description of independent variables for Analysis II*

| Variable Name | Variable Description  |
|---------------|---|
| P_APPETIZER   | A continuous variable representing the price of the appetizer |
| Shrimp        | A dummy variable: 1 if appetizer is shrimp; 0 otherwise       |
| P_ENTREE      | A continuous variable representing the price of the entrée    |
| Pasta         | A dummy variable: 1 if entrée is pasta; 0 otherwise           |
| Pork          | A dummy variable: 1 if entrée is pork; 0 otherwise            |
| Veal          | A dummy variable: 1 if entrée is veal; 0 otherwise            |
| Scallop       | Base category   |
| P_DESSERT     | A continuous variable representing the price of the dessert   |
| Ice Cream     | A dummy variable: 1 if dessert is ice cream; 0 otherwise      |

## Survey Questionnaire Development

The survey questionnaire is five pages in length. The first page provided information regarding a prix fixe menu and hypothetical prix fixe menu restaurant. Then, respondents were instructed to rank four different meal choice combinations in order of preferences with a rank of 1 being the most likely to be chosen, continuing with 2, and 3, and finally 4 being the least likely to be chosen. A ranking example was provided at the beginning of the questionnaire so that respondents could become familiar with how to rank each profile. The second and third pages were conjoint sections. The second page was a conjoint section for Analysis I, which contained two conjoint questions including four cards each. The third page was a conjoint section for Analysis II, which also included two conjoint questions including four cards each.

To validate whether price influences meal choice decisions, on the fourth page, we also asked respondents to rate the importance of factors that influenced their decisions, when they considered and ranked the choice options on a seven-point Likert-type scale from 1=least important to 7= most important. These factors were healthy food, price, variety, familiarity of food, and other factors. They were identified from a literature review and semi-structured face-to-face interviews with customers and restaurant managers. The fourth and fifth pages of the survey contained demographic information questions such as age, sex, marital status, income, education, and the dining frequency of respondents. This information was used for testing consumer preferences across individuals in accordance with their socio-economic characteristics. The survey questionnaire and the informed consent form are shown in Appendixes I and II, respectively.

## Data Collection

### Pre-Tests

Two pre-tests were conducted to determine the length and clarity of the survey, and whether the chosen attributes and their levels were appropriate. While most respondents in the first pre-test (N=102) mentioned that the materials were easy to read, some respondents felt that the name of a dessert item prevented them from choosing that particular item. Therefore, the item was dropped from the attributes and a new item was included. Some respondents also commented that price differences between items influenced their meal choices, but only \$2 differences between them did not affect their choice decisions. Based on the first pre-test, the survey questionnaire was revised to answer these concerns.

The second pre-test (N=71) was conducted using the revised survey. Most respondents in the second pre-test found the survey easy to follow.

The pre-tests were completed during June and July, 2005, with a random sample of college students at a state university in the Southwest.

### Main Survey

Since the measures of interests are consumer meal choice decisions, subjects for this study were the general population. Convenience sampling approach was used in this study. A face-to-face survey was conducted during July and August, 2005, in front of the “Fountain Show” at the Bellagio Hotel and Casino in Las Vegas, Nevada. Self-administered survey data were distributed and collected from randomly selected individuals who were spending leisure time or waiting for the next show. The “Fountain

Show” begins every 30 minutes, between 6:00-8:00 P.M., and every 15 minutes, after 8:00 P.M. Therefore, when the researcher approached the respondents, most of them agreed to complete the survey while waiting for the next show. Overall, the response rate was about 90 percent.

The subjects were provided with an informed consent form and a survey questionnaire. The average length of time to complete the survey questionnaire was 10 minutes.

A total of 412 surveys were collected; of them 11 questionnaires were excluded from the data analysis because they did not provide complete responses. The final 401 surveys were used for data analysis. This resulted in 802 sets of choice questions (two sets of choice questions for each respondent:  $401 \times 2$ ) with 3,208 observations (four ranking cards for each choice question:  $802 \times 4$ ) for Analysis I and Analysis II, respectively.

### Empirical Model and Estimation

In this study, the conjoint question asks respondents to rank, in order of preferences; therefore, a rank-ordered logit model is used to estimate consumer preferences for meal choices. This is because the ranks are ordinal, the ranks given by each respondent are not independent, neither OLS, ordered probit, nor ordered logit specification provide consistent parameter estimates (Holland & Wessells, 1998; Mark, Lusk, & Daniel, 2004; Roheim & Donath, 2003). The rank-ordered logit model allows for both the ordinal nature of the data and the lack of independency between observations for each respondent (Rohein, Johnston, Greer, & Donath, 2005).

## Random Utility Theory

A theoretical foundation for the statistical analysis of discrete choices is the random utility theory. The random utility theory provides extensive knowledge regarding consumer choice by introducing a random error component in the utility function that can capture unexplained variance in consumer choice behavior (Dellaert, Brazell, & Louviere, 1999).

Thurstone (1927) first introduced the random utility concept of choice model, suggesting that decision makers, confronted with identical choice situations, do not always make the same choices. Based on the observations of consumer choice behaviors, Thurston proposed a random scale function at the individual level, and concluded that the most common decision rule was the maximization of utility over all choice alternatives (Corstjens & Gaustschi, 1983). Later, McFadden (1974) developed theoretical and econometric insights into discrete choices. McFadden (1974) found that choice alternatives can be arrayed in a preference tree, with similar alternatives clustered together. Choice proceeds by first eliminating primary, then secondary clusters, until the final alternative is reached. Choice probabilities then can be estimated, based on these processes.

The random utility theory estimates the probability that an individual will choose an alternative, depending on the characteristics of that alternative. The better the characteristics of a product, the higher the probability that a consumer will choose that alternative and therefore the higher the utility of that alternative (Sandefur, Johnson, & Fowler, 1996).

The random utility model decomposes overall utility into two components: an



observable deterministic component and a random component. If a consumer  $i$  chooses alternative  $j$ , the utility is represented as:

$$U_{ij} = V_{ij} + \epsilon_{ij} \quad (1)$$

where  $U_{ij}$  = the total utility associated with choice  $j$  for consumer  $i$

$V_{ij}$  = an observable component of utility of option  $j$ , and

$\epsilon_{ij}$  = an unobservable random (random utility) component

Regardless of whether the effects are controlled, uncontrolled, or some combination of both,  $V_{ij}$  is assumed to be a linear function of the variables  $X_{ij}$  (Louviere, Hensher, & Swai, 2000) such that:

$$V_{ij} = \beta X_{ij} \quad (2)$$

where  $\beta$  = utility coefficients to be estimated

$X_{ij}$  = vector of attributes for choice  $j$  for consumer  $i$

Randomness arises because a researcher does not know a product's true utility to each consumer entirely. It is because some aspects of consumer preferences cannot be explained, since all factors that derive preferences cannot be identified. Thus, unreliability is inherent in the measurement procedures that a researcher uses and

preferences may vary at different times or in different situations for the same or different consumers (Louviere et al., 2000). In random utility theory, excluded factors are bundled into the random component  $\varepsilon$  in Equation (1); therefore, the total utility  $U$  is also random, and Equation (1) is called the random utility function (Ida & Sato, 2004). McFadden(1974) found that, if error terms ( $\varepsilon_{ij}$ ) are independent and identically distributed with a type I extreme-value distribution, the choice probability  $P_{ij}$  can be written as a conditional logit form:

$$P_{ij} = \exp(V_{ij}) / \sum_{j=1}^M \exp(V_{ij}) \quad \text{for } j=1, 2, \dots, M \quad (3)$$

The rank-ordered logit model, which was introduced by Beggs, Cardell, and Hausman (1981), extends conditional logit model to rank ordered data. The rank-ordered logit model exploits all rank information by assuming that each rank is made as part of a sequential random utility selection process. It assumes that respondents choose the one alternative that provides the highest level of utility first and rank it first, then choose the alternative believed most attractive from the remaining  $M-1$  alternatives and rank it second, and so on. Therefore, if we assume that a consumer  $i$  prefers profile 1 to profile 2 to profile 3, and so on, until profile  $J$ , this rank order can be presented as:

$$U_1 > U_2 > U_3 > \dots > U_J \quad (4)$$

If customer  $i$ 's ranking of  $J$  choice is expressed as  $R_i (r_1, r_2, \dots, r_J)$ , then, the probability

of the rank order is:

$$\text{Prob}[U(r_1) > U(r_2) > \dots > U(r_J)] = \prod_{h=1}^{J-1} [\exp(\beta X_{ir_h}) / \sum_{m=h}^J \exp(\beta X_{ir_m})] \quad (5)$$

Where  $X_{ir_h}$  is the vector of attributes of the alternative ranked  $h$  by a customer  $i$  in the ordering. For an independent sample of  $N$  individuals, the log-likelihood function to be maximized is:

$$\begin{aligned} L(\beta) &= \sum_{i=1}^N \ln \left[ \prod_{h=1}^{J-1} \exp(\beta X_{ir_h}) / \sum_{m=h}^J \exp(\beta X_{ir_m}) \right] \\ &= \sum_{i=1}^N \sum_{h=1}^{J-1} \beta' X_{ir_h} - \sum_{i=1}^N \sum_{h=1}^{J-1} \left[ \ln \sum_{m=h}^J e^{\beta X_{ir_m}} \right] \end{aligned} \quad (6)$$

The parameters of  $\beta$  are estimated by using the maximum likelihood.

### The Independence of Irrelevant Alternative (IIA)

One assumption held by the Multinomial Logit Model (MNL) and the conditional logit model is that for any two alternatives, the odds ratio of logit probabilities is independent of other alternatives (An, Clapp, & Deng, 2005). This is known as Independence of Irrelevant Alternatives (IIA). In random utility theory, it is assumed that the errors are independent across the alternatives and are identically distributed. It implies

that if a choice set is irrelevant, addition or elimination of an alternative does not affect the parameter estimate obtained. Train (1993) explains the IIA property as:

Suppose there is a traveler who has a choice of going by auto or taking a blue bus and that both alternatives have the same representative utility. Because the representative utilities are equal, the choice probabilities are equal ( $P_a = 1/2 = P_{bb}$ , where  $a$  denotes auto and  $bb$  denotes blue bus) and the ratio of probabilities is one ( $P_a/P_{bb} = 1$ ). Now suppose that a red bus were introduced and that the traveler considered the red bus to be exactly like the blue bus. Consequently, the ratio of probabilities for taking the two differently colored buses is one ( $P_{bb}/P_{rb} = 1$ , where  $rd$  denotes red bus). However, since in the logit model the ratio  $P_a/P_{bb}$  is the same independent of the existence of other alternatives, this ratio remains constant at one. The only probabilities for which  $P_a/P_{bb} = 1$  and  $P_{bb}/P_{rb} = 1$  are  $P_a = P_{bb} = P_{rb} = 1/3$ , which are the probabilities that the logit model predicts. In real life, however, we would expect the probability of taking an auto to remain the same when a new bus is introduced that is essentially the same as the old bus. We would also expect the original probability of taking bus to be split, after the introduction of the new bus, between the two buses. That is, we would expect  $P_a = 1/2$  and  $P_{bb}/P_{rb} = 1/4$ . In this case, the logit model, because of its IIA property, overestimates the probability of taking either of the buses and underestimates the probability of taking an auto (p. 626-627).

Train (1993) states that the IIA property is not as restrictive as it might be, as indicated by the red bus and blue bus problem; the logit specification can be used in situations for which IIA does not hold. This requires that additional variables be added to

representative utility, in particular, variables that relate to alternatives other than the one for which the representative utility is designated. In other words, if proper terms are added to representative utility in the logit model, the red bus and blue bus problem is not a problem at all. This indicates that a researcher should include constants in the representative utility of each alternative. Baarsma (2003) also suggests that one way of dealing with the IIA property is to redefine the choice set so that two or more very close substitutes are modeled as one alternative. Another approach would be to guarantee the independence of the alternatives, as much as possible, through the construction of an approximately orthogonal set of alternatives. For this study, alternatives included each choice set constant in the representative utility of each alternative, IIA property is not a problem.

## Model Specification

### Analysis I

In order to test the proposed hypotheses that highly-priced appetizer, entrée, and dessert items are more likely to be selected than low- priced items, when consumers select their prix fixe menus, the attributes used are: (1) price of appetizer; (2) price of entrée; (3) price of dessert; and (4) prix fixe price. In the main utility model, price of prix fixe menu is randomized to test whether consumers attach higher utilities on low overall price than higher ones. The main utility model to be estimated has the following form:

$$U_{ij} = \alpha_i P\_APPETIZER_j + \beta_i P\_ENTRÉE_j + \gamma_i P\_DESSERT_j + \delta_i PRICE_j + \varepsilon_{ij} \quad (7)$$

We also estimate a separate utility function for meal attributes to find out which meal item has relatively higher utility than others, using the following specification:

$$U_{ij} = \zeta_i \text{ SHRIMP}_j + \mu_i \text{ PASTA}_j + \nu_i \text{ PORK}_j + \xi_i \text{ VEAL}_j + \rho_i \text{ CAKE}_j + \eta_i \text{ LOWFAT}_j + \theta_i \text{ LOWCARB}_j + \delta_i \text{ PRICE}_j + \varepsilon_{ij} \quad (8)$$

### Analysis II

In Analysis II, prix fixe price is fixed to \$39.99. Therefore, attributes used for this test are: (1) price of appetizer, (2) price of entrée, and (3) price of dessert. The main utility model to be estimated has the following form:

$$U_{ij} = \alpha_i P\_APPETIZER_j + \beta_i P\_ENTRÉE_j + \gamma_i P\_DESSERT_j + \varepsilon_{ij} \quad (9)$$

Like Test I, we also estimate a separate utility function for meal attributes to find out which meal item has relatively higher utility than others, using the following specification:

$$U_{ij} = \zeta_i \text{ SHRIMP}_j + \mu_i \text{ PASTA}_j + \nu_i \text{ PORK}_j + \xi_i \text{ VEAL}_j + \rho_i \text{ CAKE}_j + \varepsilon_{ij} \quad (10)$$

## Chapter Summary

In this chapter, a conjoint analysis was discussed in detail. A research design, sample, a survey questionnaire development, and a data collection method were resented. Then, the random utility theory and the rank-ordered logit model were presented for model estimation. Finally, utility models to be estimated were specified.

## CHAPTER IV

### FINDINGS OF THE STUDY

#### Introduction

The purpose of this study is to estimate consumer meal choice decisions in prix fixe menu context. Specifically, the study is : (1) to examine whether the presence of price differences among individual items influences consumers' meal choice decisions when they are choosing a bundle (prix fixe menu); and (2) to estimate utilities that different customers attach to different attributes in their bundle (prix fixe meal) choice decisions. The study addressed the following research questions:

1. Will the presence of each item's á la carte price along with a bundle price (i.e., prix fixe menu price) influences consumers' meal choices; that is, will consumers choose highly-priced á la carte items to be included in their prix fixe menus?
2. What meal attributes do consumers think are important when they choose their bundles (i.e., prix fixe menus)?

The results of the analyses for the study are presented in three sections. The first section presents descriptive statistics for the samples and ranking responses. The second section reports the results for the rank-ordered logit mode. The third section presents the results of reliability and validity tests.



## Descriptive Statistics

This section presents the descriptive statistics of the respondents and their meal choice rankings.

### Demographic Profile of Respondents

The respondents included 165 males (41.1%) and 236 females (58.9%). More than half of the respondents were between 24-40 years old (n=203, 50.5%) and not married (n= 216, 54%). The majority of the respondents were educated (n= 274, 68% attended or graduated from college or graduate college) and were white (n= 303, 75.6%). Nearly 37% (n=147) of respondents dined out once or less than once a week, and 35 %( n=139) of the respondents dined out twice a week. Table 9 provides additional details of the demographic characteristics of respondents.

Table 9

*Description of Respondents*

| Characteristics              | N   | %    |
|------------------------------|-----|------|
| <i>Age</i>                   |     |      |
| 18-23                        | 101 | 25.4 |
| 24-40                        | 203 | 50.6 |
| 41-58                        | 86  | 21.4 |
| Over 59                      | 8   | 2    |
| Missing                      | 3   | .7   |
| <i>Sex</i>                   |     |      |
| Male                         | 165 | 41.1 |
| Female                       | 236 | 58.9 |
| <i>Marital Status</i>        |     |      |
| Married                      | 185 | 46.1 |
| Not married                  | 216 | 53.9 |
| <i>Household Income</i>      |     |      |
| Less than \$30,000           | 68  | 17.5 |
| \$30,000-\$59,999            | 118 | 30.4 |
| \$60,000-\$89,999            | 91  | 23.5 |
| More than \$90,000           | 111 | 28.6 |
| Missing                      | 13  | 3.2  |
| <i>Ethnicity</i>             |     |      |
| White                        | 303 | 75.6 |
| African American             | 29  | 7.2  |
| Hispanic                     | 26  | 6.5  |
| Asian                        | 26  | 6.5  |
| Other                        | 14  | 3.5  |
| Missing                      | 3   | .7   |
| <i>Education</i>             |     |      |
| High school or less          | 25  | 6.2  |
| Some college                 | 93  | 23.2 |
| College                      | 124 | 30.7 |
| Graduate College             | 150 | 37.4 |
| Missing                      | 10  | 2.5  |
| <i>Dine Out</i>              |     |      |
| Less than or once a week     | 147 | 36.7 |
| Twice a week                 | 139 | 34.7 |
| Three times a week           | 68  | 17.0 |
| More than three times a week | 39  | 9.7  |
| Missing                      | 8   | 2.0  |

## Ranking Responses

In general, the respondents preferred the highly-priced meal items to low-price items. For example, while 9% of the respondents ranked low-priced pasta as their most preferred meals, nearly 20% of them ranked highly-priced pasta as their top choices; 15.5% ranked low-priced pork as their first choices while 16.4% ranked highly-priced pork as their top choices. Table 10 and 11 present meal attributes ranked first and second by the respondents, respectively.

Table 10

*Meal attributes ranked 1*

| Meal Attribute   | Low-priced |       | Highly-priced |       |
|------------------|------------|-------|---------------|-------|
|                  | N          | %     | N             | %     |
| <i>Appetizer</i> |            |       |               |       |
| Shrimp           | 182        | 22.75 | 221           | 27.63 |
| Salad            | 171        | 21.38 | 226           | 22.85 |
| <i>Entrée</i>    |            |       |               |       |
| Pasta            | 72         | 9.0   | 158           | 19.75 |
| Pork             | 73         | 9.13  | 85            | 10.63 |
| Veal             | 124        | 15.50 | 131           | 16.38 |
| Scallop          | 67         | 8.38  | 90            | 11.25 |
| <i>Dessert</i>   |            |       |               |       |
| Cake             | 225        | 28.13 | 216           | 27.00 |
| Ice cream        | 178        | 22.25 | 181           | 22.63 |

Table 11

*Meal attributes ranked 2*

| Meal Attribute   | Low-priced |       | Highly-priced |       |
|------------------|------------|-------|---------------|-------|
|                  | N          | %     | N             | %     |
| <i>Appetizer</i> |            |       |               |       |
| Shrimp           | 224        | 27.83 | 242           | 30.06 |
| Salad            | 139        | 17.27 | 200           | 24.84 |
| <i>Entrée</i>    |            |       |               |       |
| Pasta            | 60         | 7.45  | 115           | 14.29 |
| Pork             | 121        | 15.03 | 160           | 19.88 |
| Veal             | 112        | 13.91 | 160           | 19.88 |
| Scallop          | 69         | 8.57  | 77            | 9.57  |
| <i>Dessert</i>   |            |       |               |       |
| Cake             | 240        | 29.81 | 226           | 28.07 |
| Ice cream        | 136        | 16.89 | 203           | 25.22 |

The respondents, however, preferred lower overall price (i.e., prix fixe price) over higher overall price. Table 12 and 13 show the prix fixe prices ranked one and two, respectively.

Table 12

*Prix fixe price ranked 1*

| Prix fixe price | N   | %     |
|-----------------|-----|-------|
| \$37.95         | 258 | 32.25 |
| \$39.95         | 196 | 24.50 |
| \$41.95         | 158 | 19.75 |
| \$43.95         | 188 | 23.50 |

Table 13

*Prix fixe price ranked 2*

| Prix fixe price | N   | %     |
|-----------------|-----|-------|
| \$37.95         | 219 | 27.20 |
| \$39.95         | 192 | 23.85 |
| \$41.95         | 191 | 23.73 |
| \$43.95         | 203 | 25.22 |

To validate whether price influences meal choice decisions, the respondents were asked to rate important factors in their meal choices decisions when they considered and ranked the choice options, on a seven-point Likert-type scale ranged from 1=least important to 7= most important. The result shows that “Price” was the most important factor for their meal choice decisions, followed by “familiarity of food,” “Healthy food,” and “Variety.” Table 14 presents mean value and standard deviation of each factor.

Table 14

*The important meal choice decision factors*

|              | M    | SD   |
|--------------|------|------|
| Price        | 5.21 | 1.63 |
| Familiarity  | 4.88 | 1.69 |
| Healthy food | 4.85 | 1.63 |
| Variety      | 4.04 | 1.66 |

Note: Specified other factors include preferences, speed taste, recommendation, and quality.

## Estimation Results

## Analysis I

The rank-ordered logit model was used to estimate utility functions using Statistics Data Analysis (STATA) 9.0 (STATA, 2005). Table 15 presents the results of the rank-ordered logit model. Three hypotheses were generated concerning whether consumers choose highly-priced á la carte items to be included in their prix fixe menus. The accepted statistical significance level for all analyses was  $p < .05$ .

## Hypothesis 1

H1 predicted that, given the opportunity to choose their own meal combinations, consumers would be more likely to choose highly-priced appetizers than low-priced ones. The coefficient of P\_APPETIZER was not statistically significant, indicating that there is not much different between selecting highly-priced dessert items and selecting low-priced items. Thus, H1 was not supported.

## Hypothesis 2

H2 predicted consumers would be more likely to choose highly-priced entrée items than low-priced ones to be included in their meal combinations. The coefficient of P\_ENTREE was statistically significant and positive. The results indicate that, on average, people attach greater importance on the highly-priced entrée items. In other words, consumers are more likely to choose highly-priced entrée items for their prix fixe menus than those of low-priced entrée items. Therefore, H2 was supported.

## Hypothesis 3

H3 predicted that consumers would be more likely to choose highly priced dessert items when they select their own meal combinations to create a prix fixe menu. The parameter of P\_DESSERT was not statistically significant, indicating that selecting highly-priced dessert items is not much different from selecting low-priced items. Therefore, H3 was not supported.

## Overall Price

We also randomized overall price to test whether or not consumers have higher utilities with low-priced bundles when they evaluate a bundle price and what it takes to buy all the items separately. PRICE coefficient was statistically significant and negative as it was predicted. The findings suggest that people attach considerable importance to low bundle price (i.e., prix fixe price). This means that as the prix fixe price increases, a consumer's utility decreases, indicating that increases in prix fixe price lead to receive lower ranked position while decreases in prix fixe price increase the probability of



receiving a higher ranked position. To summarize, we found that people were more likely to choose highly-priced entrée items (H2) for their prix fixe menus. We further found that consumers had larger utilities with lower bundle prices than with higher bundle prices, which support the findings of previous studies that a consumer perceives more value from a bundle that provides higher savings than lower savings. However, we did not find support for the prediction that consumers were more likely to choose highly- priced appetizer and dessert items to be included in their prix fixe menus (H1 and H3).

Table 15

*Rank-ordered logit model for consumer meal choice*

| Variable    | Coefficient | SE    | z     | p> z  |
|-------------|-------------|-------|-------|-------|
| P_APPETIZER | .0153       | .0079 | 1.94  | 0.052 |
| P_ENTREE    | .0128*      | .0060 | 2.01  | 0.044 |
| P_DESSERT   | .0069       | .0099 | 0.69  | 0.490 |
| PRICE       | - .0249*    | .0100 | -2.49 | 0.013 |

Note: Number of Observations:3,208, Prob>chi2:.0108, and Log Likelihood: -2542.85

\*p<.05

Equation (8) was estimated to determine the relative strength of marginal utility for each meal item. We also included low-fat and low-carbohydrate attributes in this model. All entrée meal coefficients were statistically significant. The positive values of coefficients imply that, on average, PASTA, PORK, and VEAL are preferred to SCALLOPS (the default value). The coefficient estimates of entrée items indicate the

relative effects of marginal utility. VEAL has the relatively higher utility over PORK, PASTA, and SCALLOPS; the utility for PORK is larger than that of PASTA and SCALLOPS; and the utility of PASTA is larger than that of SCALLOPS. For example, based on the results of marginal utility only, the model predicts that consumers would select VEAL over PORK, other things being equal.

Estimated coefficients of SHRIMP and ICE CREAM were insignificant implying that consumers' preference for SHRIMP is not much different from SALAD and their preference for ICE CREAM is not so much different from CAKE. LOWFAT and LOWCARB were also not statistically significant. Table 16 displays the results of rank-ordered logit model for each meal item.

Table 16

*Rank-ordered logit model for meal category, lowfat, lowcarb, and price*

| Variable  | Coefficient | SE    | z      | p> z  |
|-----------|-------------|-------|--------|-------|
| SHRIMP    | -.0797      | .0534 | -1.49  | 0.136 |
| PASTA     | .3378**     | .0700 | 4.82   | 0.000 |
| PORK      | .5052**     | .0632 | 8.00   | 0.000 |
| VEAL      | .5353**     | .0645 | 8.30   | 0.000 |
| ICE CREAM | .0614       | .0561 | 1.09   | 0.274 |
| LOWFAT    | -.0178      | .0549 | - 0.32 | 0.746 |
| LOWCARB   | .1001       | .0621 | 1.61   | 0.107 |
| PRICE     | -.0218*     | .0101 | - 2.15 | 0.032 |

Note: Number of Observations:3,208, Prob>chi2:.000, and Log Likelihood: -2499.64

\*p<.05, \*\*p<.01

## Conditional Logit Model

Hausman and Ruud (1987) state that people pay more attention to their first choices from among the alternatives in a choice set. With a conditional logit model, which was defined in Equation (3), data are grouped and the likelihood is calculated relative to each group (colgit, STATA 8.0 reference manual). Therefore, we also estimate a conditional logit model and the results are compared with those of the rank-ordered logit model. The results of the conditional logit model were the same as those of the rank-ordered logit model. In the top choice, P\_ENTREE was statistically significant and had positive sign, indicating that consumers value expensive entrée items. In addition, overall price was more elastic in the conditional logit than full rank. Table 17 shows the results of the conditional logit estimates of first choice and rank-ordered logit estimates.

Table 17

*Results for conditional and rank-ordered logit models for consumer meal choice*

|             | Conditional logit |       | Rank-ordered logit |       |
|-------------|-------------------|-------|--------------------|-------|
|             | Coefficient       | SE    | Coefficient        | SE    |
| P_APPETIZER | -.0064            | .0123 | .0153              | .0079 |
| P_ENTREE    | .0179*            | .0098 | .0128*             | .0063 |
| P_DESSERT   | -.0234            | .0165 | .0069              | .0099 |
| PRICE       | -.0535**          | .0162 | -.0249*            | .0100 |

Note: \*p<.05, \*\*p<.01

Next, we also estimated the conditional logit model for meal category, lowfat, lowcarb, and price. The results of the conditional logit estimates for the entrée were similar to the results of rank-ordered logit model. However, unlike rank-ordered logit estimates, PORK was not significant. Consequently, this changed the order of preferences for entrée items. The results show that, on average, the utility of VEAL was larger than that of PASTA, PORK, and SCALLOP; the utility of PASTA was higher than that of PORK and SCALLOP, indicating that PASTA was favored over PORK and SCALLOP for the top choice; and PORK was preferred to SCALLOP. Therefore, the order of preference for the conditional logit estimates is VEAL, PASTA, PORK, and SCALLOP.

However, the estimated coefficients of SHRIMP and ICE CREAM were different from those of the rank-ordered logit model. Both SHRIMP and ICE CREAM were statistically significant. The negative coefficient on SHRIMP indicates that utility for SALAD is larger than that of SHRIMP, whereas the positive coefficient on ICE CREAM implies that consumers are more likely to choose ICE CREAM over CAKE. Table 18 displays the results of the conditional logit and rank-ordered logit models.

Table 18

*Results for conditional logit and rank-ordered logit models for meal category*

|          | Conditional logit |       | Rank-ordered logit |       |
|----------|-------------------|-------|--------------------|-------|
|          | Coefficient       | SE    | Coefficient        | SE    |
| SHRIMP   | -.2474*           | .0805 | -.0797             | 0.053 |
| PASTA    | .4352**           | .1085 | .3378**            | 0.070 |
| PORK     | .0345             | .1142 | .5052**            | 0.063 |
| VEAL     | .4988**           | .1026 | .5353**            | 0.064 |
| ICECREAM | .1817*            | .0866 | .0614              | 0.056 |
| LOWFAT   | .0088             | .0924 | -.0178             | 0.055 |
| LOWCARB  | -.0100            | .1023 | .1001              | 0.062 |
| PRICE    | -.0389*           | .0168 | -.0218*            | 0.101 |

Note: \*  $p < .05$ , \*\*  $p < .01$ 

### Interaction Models

By including respondents' demographic variables in the estimation model, we can explore consumer meal choice behavior based on their socio-economic characteristics. Since the above main effects models given in Equations (7) and (8) do not allow preferences to vary across individuals in accordance with their demographic variables (Foster & Mourato, 2005), these individual demographic variables can be entered as interaction terms. This is because the rankings are modeled as a function of differences in the deterministic portion of utility function for each alternative ranked, variables that are constant across alternatives would drop out of the calculation of the likelihood function

(Foster & Mourato, 2005). Therefore, we estimate the main effects models that contain interactive terms between attributes and demographic variables. This allows us to identify segments that have different meal choice behaviors. We estimated several interaction models using respondents' demographic variables, and only accepted those models that are statistically significant. However, ethnicity variable was not estimated, since the majority of the respondents (77%) were White. We then estimated each interaction model, including P\_APPETIZER, P\_ENTREE, P\_DESSERT, and PRICE. Tables 19, 20, 21, 22, 23, and 24 show the results of interaction models.

Table 19

*Results for rank-ordered logit interaction model for SEX*

| Variable           | Coefficient | SE    | z     | p> z   |
|--------------------|-------------|-------|-------|--------|
| P_APPETIZER*female | .0151       | .0099 | 1.52  | 0.129  |
| P_ENTREE*female    | -.0153      | .0077 | -1.98 | 0.048* |
| P_DESSERT*female   | .0091       | .0134 | 0.68  | 0.499  |
| PRICE*female       | -.0328      | .0131 | -2.51 | 0.012* |
| P_APPETIZER*male   | .0150       | .0126 | 1.18  | 0.237  |
| P_ENTREE*male      | .0519       | .0096 | 5.42  | 0.000* |
| P_DESSERT*male     | .0052       | .0160 | 0.33  | 0.745  |
| PRICE*male         | -.0321      | .0135 | -2.38 | 0.017* |

Note: Number of Observations:3,208, Prob>chi2:.0000, and Log Likelihood: -2523.70

\*P<.05

Table 20

*Results for rank-ordered logit interaction model for MARITAL STATUS*

| Variable            | Coefficient | SE    | z     | p> z   |
|---------------------|-------------|-------|-------|--------|
| P_APPETIZER*married | .0253       | .0114 | 2.21  | 0.027* |
| P_ENTREE*married    | .0112       | .0087 | 1.29  | 0.198  |
| P_DESSERT*married   | .0089       | .0150 | 0.59  | 0.554  |
| PRICE*married       | -.0198      | .0147 | -1.35 | 0.177  |
| P_APPETIZER*single  | .0067       | .0107 | 0.62  | 0.532  |
| P_ENTREE*single     | .0135       | .0082 | 1.64  | 0.101  |
| P_DESSERT*single    | .0041       | .0139 | 0.30  | 0.767  |
| PRICE*single        | -.0299      | .0124 | -2.41 | 0.016* |

Note: Number of Observations:3,208, Prob&gt;chi2:.0771, and Log Likelihood: -2532.58

\*P&lt;.05

Table 21

*Results for rank-ordered logit interaction model for AGE*

| Variable                | Coefficient | SE    | z     | p> z   |
|-------------------------|-------------|-------|-------|--------|
| P_APPETIZER*age18-23    | .0297       | .0156 | 1.90  | 0.057  |
| P_ENTREE*age18-23       | .0025       | .0120 | 0.21  | 0.834  |
| P_DESSERT*age18-23      | .0090       | .0203 | 0.44  | 0.657  |
| PRICE*age 18-23         | -.0289      | .0169 | -1.71 | 0.087  |
| P_APPETIZER*age24-40    | .0046       | .0080 | 0.58  | 0.564  |
| P_ENTREE*age 24-40      | .0076       | .0143 | 0.53  | 0.598  |
| P_DESSERT*age24-40      | .0044       | .0142 | 0.31  | 0.759  |
| PRICE*age24-40          | -.0163      | .0142 | -1.15 | 0.251  |
| P_APPETIZER*age41-58    | .0117       | .0178 | 0.66  | 0.511  |
| P-ENTRÉE*age41-58       | .0420       | .0133 | 3.16  | 0.002* |
| P_DESSERT*age41-58      | .0153       | .0226 | 0.68  | 0.498  |
| PRICE *age41-58         | -.0342      | .0217 | -1.57 | 0.116  |
| P_APPETIZER*age over 59 | .0852       | .0727 | 1.17  | 0.242  |
| P-ENTRÉE*age over 59    | .0846       | .0550 | 1.54  | 0.124  |
| P_DESSERT*age over 59   | -.0006      | .0802 | -0.01 | 0.994  |
| PRICE *age over 59      | -.0967      | .0667 | -1.45 | 0.147  |

Note: Number of Observations:3,208, Prob&gt;chi2:.1045, and Log Likelihood: -2535.96

\*P&lt;.05



Table 22

*Results for rank-ordered logit interaction model for INCOME*

| Variable                         | Coefficient | SE    | z     | p> z   |
|----------------------------------|-------------|-------|-------|--------|
| P_APPETIZER*less \$30,000        | -.0260      | .0189 | -1.37 | 0.170  |
| P_ENTREE*less \$30,000           | .0223       | .0146 | 1.53  | 0.126  |
| P_DESSERT* less \$30,000         | -.0172      | .0254 | -0.68 | 0.499  |
| PRICE* less \$30,000             | -.0288      | .0228 | -1.26 | 0.207  |
| P_APPETIZER*\$30,000 to \$59,999 | .0220       | .0139 | 1.59  | 0.113  |
| P_ENTREE*\$30,000 to \$59,999    | .0185       | .0108 | 1.70  | 0.089  |
| P_DESSERT*\$30,000 to \$59,999   | .0163       | .0185 | 0.88  | 0.378  |
| PRICE*\$30,000 to \$59,999       | -.0133      | .0183 | -0.73 | 0.466  |
| P_APPETIZER*\$60,000 to \$89,999 | .0485       | .0173 | 2.81  | 0.005* |
| P-ENTRÉE*\$60,000 to \$89,999    | .0054       | .0126 | 0.43  | 0.666  |
| P_DESSERT*\$60,000 to \$89,999   | .0086       | .0220 | 0.39  | 0.696  |
| PRICE*\$60,000 to \$89,999       | -.0362      | .0219 | -1.65 | 0.099  |
| P_APPETIZER* more than \$90,000  | .0109       | .0151 | 0.72  | 0.470  |
| P-ENTRÉE*more than \$90,000      | .0080       | .0116 | 0.76  | 0.448  |
| P_DESSERT* more than \$90,000    | -.0029      | .0195 | -0.15 | 0.884  |
| PRICE* more than \$90,000        | -.0333      | .0191 | -1.75 | 0.081  |

Note: Number of Observations:3,208, Prob&gt;chi2:.0605, and Log Likelihood: -2533.24

\*P&lt;.05

Table 23

*Results for rank-ordered logit interaction model for DINING FREQUENCY*

| Variable                               | Coefficient | SE    | z     | p> z   |
|--|-------------|-------|-------|--------|
| P_APPETIZER*once/less than once a week | .136        | .0132 | 1.03  | 0.303  |
| P_ENTREE* once/less than once a week   | .0066       | .0010 | 0.66  | 0.512  |
| P_DESSERT* once/less than once a week  | -.0132      | .0173 | -0.76 | 0.446  |
| PRICE* once/less than once a week      | -.0082      | .0168 | -0.49 | 0.625  |
| P_APPETIZER*twice a week               | .0238       | .0128 | 1.85  | 0.064  |
| P_ENTREE*twice a week                  | .0135       | .0101 | 1.34  | 0.180  |
| P_DESSERT*twice a week                 | .0239       | .0127 | 1.89  | 0.059  |
| PRICE*twice a week                     | -.0538      | .0157 | -3.43 | 0.001  |
| P_APPETIZER*three times a week         | .0087       | .0184 | 0.70  | 0.637  |
| P-ENTRÉE *three times a week           | .0327       | .0144 | 2.26  | 0.024* |
| P_DESSERT*three times a week           | .0441       | .0246 | 1.70  | 0.090  |
| PRICE*three times a week               | -.0080      | .0246 | -0.33 | 0.745  |
| P_APPETIZER*over three times a week    | .0126       | .0276 | 0.46  | 0.648  |
| P-ENTRÉE*over three times a week       | .0036       | .0192 | 0.19  | 0.852  |
| P_DESSERT*over three times a week      | .0604       | .0316 | 1.91  | 0.056  |
| PRICE* over three times a week         | -.0036      | .0325 | -0.11 | 0.912  |

Note: Number of Observations:3,208, Prob&gt;chi2:.0771, and Log Likelihood: -2532.58

\*P&lt;.05

After running those models, we only accepted SEX model. First, main effects model for the characteristics of sex was estimated. For this we estimate a model for males and another for females. The utility function for SEX is:

$$U_{ij} = \alpha_i P\_APPETIZER\ j * SEX + \beta_i P\_ENTRÉE\ j * SEX \\ + \gamma_i P\_DESSERT\ j * SEX + \delta_i PRICE\ j * SEX + \varepsilon_{ij} \quad (11)$$

Sex-specific differences were found in P\_ENTREE. The result indicates that men are more likely to choose highly-priced entrée items; on the contrary, females, on average, do not select highly-priced entrée items. This may result from the evidence that more females chose PASTA than males. However, both males and females have higher utilities with low bundle price. Women were more price sensitive for the overall price than males. Table 25 shows the results of rank-ordered logit for SEX.

Table 25

*Results for rank-ordered logit model for FEMALE and MALE*

| Variable   | FEMALE      |       | MALE        |       |
|------------|-------------|-------|-------------|-------|
|            | Coefficient | SE    | Coefficient | SE    |
| P_APPETIZE | .0150       | .0099 | .0151       | .0127 |
| P_ENTRE    | -.01524*    | .0077 | .0517**     | .0096 |
| P_DESSER   | .0089       | .0134 | .0053       | .0159 |
| PRICE      | -.0327*     | .0131 | -.0328*     | .0135 |

\*p&lt;.05

\*\*p&lt;.01

Note: Number of Observations for FEMALE: 3,208, Prob&gt;chi2: .0054, and Log

Likelihood: -2538.68; Number of Observations for MALE: 3,208, Prob&gt;chi2: .0000, and

Log Likelihood: -2531.11

### Analysis II

Now, we estimate main effects models for Analysis II, in which prix fixe price is fixed to \$39.99. We also assume that the respondents may more easily compare the sum of the á la carte prices and the overall price, than when the overall price is varied. The results of the rank-ordered logit show that, although the overall price was fixed, the results of the main effects model for Analysis II are consistent with the main effects model for Analysis I. The P\_ENTREE was statistically significant and had the expected positive signs. The results indicate that consumers prefer highly-priced entrée items, which is consistent with the main effects model for Analysis I, when the overall price was

varied. Like the results of the main model for Analysis I, P\_APPETIZER and P\_DESSERT are insignificant. Table 26 displays the results of the main effects model for Analysis II.

Table 26

*Rank-ordered logit model for meal choice for Analysis II*

| Variable    | Coefficient | SE    | z     | p> z  |
|-------------|-------------|-------|-------|-------|
| P_APPETIZER | .0132       | .0078 | 1.68  | 0.092 |
| P_ENTREE    | .0195**     | .0056 | 3.51  | 0.000 |
| P_DESSERT   | -.0094      | .0079 | -1.19 | 0.235 |
| PRICE       | -.0249**    | .0100 | -2.49 | 0.013 |

Note: Number of Observations:3,168, Prob>chi2: .0011, and Log Likelihood: -2504.86

\*p<.05, \*\*p<.01

We also estimated a utility model for each meal category to identify which meal item is preferred over others. With overall price fixed, SHRIMP was statistically significant and had a positive sign, which indicates that consumers' preference for SHRIMP is significantly different from SALAD. That is, consumers are more likely to choose SHRIMP over SALAD. Like the results of the same model in Analysis I, VEAL has the highest utility, followed by PORK, PASTA, and SCALLOPS. However, ICE CREAM was not significant. Table 27 shows the results of the model.

Table 27

*Rank-ordered logit model for meal category for Analysis II*

| Variable  | Coefficient | SE    | z     | p> z  |
|-----------|-------------|-------|-------|-------|
| SHRIMP    | .1023*      | .0439 | 2.11  | 0.034 |
| PASTA     | .2770**     | .0660 | 4.20  | 0.000 |
| PORK      | .4101**     | .0646 | 6.35  | 0.000 |
| SHRIMP    | .1023*      | .0439 | 2.11  | 0.034 |
| VEAL      | .5724**     | .0641 | 8.94  | 0.000 |
| ICE CREAM | -.0048      | .0520 | -0.09 | 0.927 |

Note: Number of Observations:3,168, Prob>chi2: 0.000, and Log Likelihood: -2466.99

\*p<.05, \*\*p<.01

### Reliability Test

In order to measure the quality of conjoint data, a reliability issue should be addressed. In this section, the definition of reliability is described, and the methods used in conjoint studies are discussed. Finally, the results of reliability is reported

Reliability can be defined as “the degree to which any measuring instrument is consistent or stable and would yield the same values again and again” (Parker & Srinivasan, 1976). This indicates that consumer preferences are assumed to be stable over time.

Reibstein, Bateson, and Boulding (1988) state that a number of different reliability measures have been computed for conjoint analysis. They are:

- 1) *Reliability over time*. It asks: “Would the results be the same at a different point

in time?”

2) *Reliability over different stimulus set*. It asks: “Would the results be the same if a different set of stimuli was used?”

3) *Reliability over attribute set*. It asks: “Would the utilities for a given set of attributes have been the same if these attributes had been included in a study with other attributes?”

4) *Reliability over data collection procedure*. It asks: “Would the results be the same if different data collection methods had been used?”

Green and Srinivasan (1978) suggest that reliability can be tested at the level of input judgments of the respondents. The researcher can ask for preference on a second set of profiles that contain a subset of the original set of profiles. This needs to be done only for a sub-sample of the respondents. The repeated evaluations can be used in determining the *test-retest reliability of the input preference judgments* (Green & Srinivasan, 1978). Parker and Srinivasan (1976) tested reliability using test-retest method although they revisited the respondents after a period of time. They constructed a second set of stimuli and chose eight respondents from the original sample of 177. These eight respondents were revisited two months after their first visits and asked to answer the ranking task. The weights estimated from the second set of stimuli were calculated. Correlations were then computed between the two sets of weights. The findings showed that the correlations between two stimuli were high and statistically significant. Based on the results, the authors state that this evaluation method is highly reliable. Reibstein et al. (1988) also state that while there are various ways to compare two vectors of commonality (reliability), the most commonly used correlation method is the correlation of the two

vectors within individuals.

In this study, we measured reliability by using different stimuli set to test whether estimated utilities obtained from two stimuli are the same. The conjoint survey contained two conjoint questions (stimuli) including four cards each. Reliability was then measured in two ways. First, individual utilities were estimated from two sets of stimuli. Then, these estimated weights from two stimuli were compared, and the correlation between them was computed. The results demonstrate that these two stimuli are correlated and statistically significant, Pearson's Correlation = 0.553 ( $p < .01$ ). Second, importance weights from all attributes were computed, and the correlation between estimates from two stimuli was computed. The result shows that both estimates are highly correlated and statistically significant: Pearson's Correlation = .89 ( $p < .01$ ) Therefore, the results demonstrate that the conjoint survey for this study is reliable.

### Chapter Summary

In this chapter, the results of the data analysis were presented. First, the descriptive statistics of the respondents and their meal choice rankings were presented. Next, the rank-ordered logit models for Analysis I and Analysis II were estimated. In order to compare the respondents' top choice and full rank, a conditional logit model was also estimated and the results were presented. In addition, the results of interaction models were presented to explore consumer meal choice behavior based on their socio-economic characteristics. Finally, the results of reliability and validity tests were presented.



## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### Introduction

The goal of this dissertation was to test the reference price theory in the bundling context using prix fixe menu. The study investigated consumer preference for selecting a particular meal option among various alternatives in their bundle choice decisions. In particular, the study examined whether or not different à la carte item prices along with a bundle price influences consumer meal choice decisions. Consumer preferences on meal choice were estimated based on stated preference data using conjoint analysis.

By investigating whether price matters to consumer meal choice decision, this dissertation not only extends the reference price theory, but also addresses relevant practical implications in understanding consumer value attachment on their meal choice decisions. In this chapter, the findings from the previous chapter are discussed. Then, the theoretical contributions and managerial implications of this dissertation are discussed. Finally, the limitations of the study and the directions for future research are discussed.

#### Discussion

The study tested two different meal choice situations using a rank-ordered logit model; prix fixe price was randomized in Analysis I and was fixed in Analysis II. The study also estimated consumers' top choice using a conditional logit model to examine

whether their first choice would be different from full rank. Finally, interaction utility models were estimated to examine whether consumer meal choice behavior differ based on their socio-economic characteristics.

The study found that the estimates of these models provide similar results. Overall, there was clear evidence that price was the most important factor that influences consumer meal choice decisions for their prix fixe menus.

The results of the study demonstrated that consumers were more likely to choose highly-priced appetizers and entrées when they chose meals for their prix fixe menus. These results were consistent with proposed hypotheses (H2 and overall price) predictions of the reference price theory that higher perceived value enhances purchasing decisions. However, the study did not find that more expensive appetizer and dessert items were preferred over less expensive ones. Although there is no study for why people pay less attention to the choice of an appetizer and a dessert items, one possible explanation for this result would be that the respondents may pay more attention to their entrée items when selecting a prix fixe menu, and pay less attention to appetizer and dessert item since they are not main attractions. Indeed, many respondents stated that their prix fixe menu choice was based on their entrée items.

As predicted, people attached considerable importance to a low overall price. This suggests that consumers may compare the sum of á la carte prices with the overall price and choose a bundle that provides the highest savings.

The study further found different meal selection behaviors between males and females. While males attached greater importance to expensive entrée items, females did not. One possible reason for this result is that more females indicated their preference for

PASTA which is a relatively less expensive meal item. However, the study did find evidence that both males and females valued more low overall prices. Further, the study found some evidence that the low income group was more price sensitive than higher-income groups. Low income group also preferred expensive entrée items to be included in the low overall price, which provides them with higher perceptions of savings.

To further investigate the effect of top choice, a conditional logit model was estimated. We did not find any difference between top choice and full rank. With top choice, people also had greater utilities with expensive entrée items and low overall prices. This pattern of results also mirrored the results of Analysis II, which found evidence that price differences between meal items, in fact, have an effect on consumer meal choice decisions.

### Theoretical Contributions

This dissertation contributes to the understanding of the reference price theory in the bundling context by demonstrating price difference among individual meal items influences consumer bundle choice decisions. The study proposed that consumers compared the sum of á la carte prices and the prix fixe price. The sum of different á la carte prices then serves as a reference point. This reference point in turn influences consumer meal choice decisions when they select their prix fixe menus. It is stated that consumers form perceptions of value by comparing the bundle price and the sum of individual prices, and these perceptions of value are then directly related to preference or choice; the larger a buyer's perception of value, the more likely the buyer will be to express a preference for the product. Therefore, it was hypothesized that consumers were

more likely to choose highly priced appetizer, entrée, and desert to be included in their prix fixe menus. Consistent with the reference price theory and the findings of previous studies, the results of the study support the proposed hypotheses, demonstrating a clear evidence that consumers have considerable value with highest savings, which lead them to indicate the higher purchase intentions.

### Managerial Implications

Decisions to select highly-priced meal items among alternatives may depend on the segment of consumers under consideration. For example, for repeat customers, highly-priced meal items may not be their choice determinants, because they are already familiar with foods in that restaurant. However, the study shows that, on average, people are more likely to choose meal items that provide higher perceived value. Given that higher perceptions of value directly influence choice decisions, it is recommended that restaurants take into account the results of this study for pricing or price promotion approach. The results demonstrate that when given the opportunity to select three courses (one appetizer, one entrée, and one dessert) for their own meal combination, consumers attach greater importance on the highly-priced meal items. Therefore, they are more likely to choose highly-priced meal items for their prix fixe menus than low-priced ones. This implies that restaurateurs should pay more attention when setting the individual meal prices for a prix fixe menu or a bundle. The study suggests that since price is the greatest determinant of an individual's choice, price should be emphasized as one of effective marketing tools to enhance consumers' perceptions of value, and therefore, influence purchasing decisions. For example, restaurants might consider setting particular

meal items relatively expensive, if these items generate high profit margins. This high price can reflect the perception of savings; therefore, they are more likely to be chosen. Given that these meal items generate higher profit margins, using such a suggested pricing tactic may result in substantial profits for a restaurant. Restaurateurs may also use the above pricing approach to certain meal items, if a restaurant desires them to be the restaurant's high profit signature items (i.e., an item that represents the restaurant or must eat).

However, the above implications are only based on the effect of price on consumer meal choice. Therefore, other variables that affect pricing policy should be also considered in making price decisions.

To summarize, the benefit of this study is that it provides some important implications for restaurant managers, particularly those offering meals in the form of bundles. By focusing on behavioral aspects of consumer choice, the study illustrated that price plays a significant role in consumer choice decisions. Accordingly, the study suggests that restaurants should consider pricing as a strategic point of view and should design it carefully.

Overall, the findings of this study provide some empirical support that highly-priced meal items enhance consumer perceptions of value. It also provides an important managerial implication with a better understanding of the consumer meal choice decision.

#### Study Limitations

The results of this study are restricted to bundling context, especially to prix fixe menu. Therefore, the results may not be generalized to other types of product bundles.

Yet, this restriction does not seem overly severe given that this study tested the influence of price on bundle choice decisions using prix fixe menu as a testing tool. Therefore, the robustness of the pricing effects would require extension to other types of bundling.

Another limitation is that the study used hypothetical scenario which do not necessarily reflect their actual purchase behavior. Although, a conjoint analysis is a methodology using a stated preference data, the results may not accurately mirror subjects' actual purchases in real restaurant settings. In addition, this study only tested pricing effect on meal choice. Therefore, other environmental factors might influence choice decisions.

Finally, this study used a convenience sampling approach. Since samples are obtained most conveniently available, respondents may not be representative (Zikmund,2003).

Therefore, the results of this study may not represent the whole consumer population.

#### Directions for future research

Limitations provide opportunities for future research. An extension of research is needed to validate the findings that whether price differences among individual items influence consumer bundle choice decision in other categories. This dissertation focuses on price effects on bundle choice. A number of unexplored factors might affect consumer meal choice: for example, the healthiness of food, the familiarity of the food, and recommendation from a server. Therefore, future research may include these factors and their influences on consumer meal choice in the bundling context.

## APPENDIX I

### APPENDIX A SURVEY QUESTIONNAIRE

Imagine that you are now in a restaurant that offers a prix fixe menu. In prix fixe menu, you can select a menu combination option from one appetizer, one entrée, and a dessert from various meal items and pay **a fixed price.**

There are four different menu combination options; each combination includes an appetizer, an entrée, and a dessert with a fixed price. Please read these menu combination options carefully, and rank them with 1 being the one you are most likely to choose, continue with 2 and 3, and finally 4 being the one you are least likely to choose. **Please do not use the same number twice**

*Example:*

**Option 1**

|                                    |                       |      |          |
|------------------------------------|-----------------------|------|----------|
| Appetizer: Hugo's Texas BBQ Shrimp | \$10.50               | Rank | <u>3</u> |
| Entrée: Grilled Pork Chop          | \$29.00               |      |          |
| Dessert: Cheese Cake               | \$7.00                |      |          |
| Low Carb                           |                       |      |          |
| <b>Prix Fixe price</b>             | <b><u>\$43.95</u></b> |      |          |

**Option 2**

|                                 |                       |      |          |
|---------------------------------|-----------------------|------|----------|
| Appetizer: House salad          | \$7.50                | Rank | <u>1</u> |
| Entree: Grilled Veal Tenderloin | \$35.00               |      |          |
| Dessert: Cheese Cake            | \$7.00                |      |          |
| <b>Prix Fixe price</b>          | <b><u>\$37.95</u></b> |      |          |

**Option 3**

|   |                       |      |          |
|---|-----------------------|------|----------|
| Appetizer: House salad                  | \$9.50                | Rank | <u>4</u> |
| Entrée:Parmesan Tossed Angel Hair Pasta | \$22.00               |      |          |
| Dessert: Homemade Ice Cream             | \$6.00                |      |          |
| <b>Prix Fixe price</b>                  | <b><u>\$41.95</u></b> |      |          |

**Option 4**

|                                    |                       |      |          |
|------------------------------------|-----------------------|------|----------|
| Appetizer: Hugo's Texas BBQ Shrimp | \$12.50               | Rank | <u>2</u> |
| Entrée:Pepper Seared Sea Scallops  | \$28.00               |      |          |
| Dessert: Homemade Ice Cream        | \$8.00                |      |          |
| <b>Prix Fixe price</b>             | <b><u>\$43.95</u></b> |      |          |

Please, go to the next page

1. Please rank these menu combination options with "1" being the one you are most likely to choose, continue with 2 and 3, and finally "4" being the one you are least likely to choose. Please do not use the same number twice. Some options contain "healthy food" that control "Fat" and "Carbohydrate" contents

**Option 1**

|                   |                                  |                       |                       |
|-------------------|----------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp          | \$10.50               | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Parmesan Tossed Angel Hair Pasta | \$26.95               |                       |
| <i>Dessert:</i>   | Homemade Ice Cream               | \$10.95               |                       |
|                   | <i>Low Fat</i>                   |                       |                       |
|                   | <b><u>Prix Fixe Price</u></b>    | <b><u>\$41.95</u></b> |                       |

**Option 2**

|                   |                               |                       |                       |
|-------------------|-------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | House Salad                   | \$11.50               | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Grille Pork Chop              | \$25.95               |                       |
| <i>Dessert:</i>   | Homemade Ice Cream            | \$10.95               |                       |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$37.95</u></b> |                       |

**Option 3**

|                   |                               |                       |                       |
|-------------------|-------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp       | \$10.50               | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Petter Seared Sea Scallops    | \$32.95               |                       |
| <i>Dessert:</i>   | Chocolate Flourless Cake      | \$11.95               |                       |
|                   | <i>Low Carb</i>               |                       |                       |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$43.95</u></b> |                       |

**Option 4**

|                   |                               |                       |                       |
|-------------------|-------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | House Salad                   | \$11.50               | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Grilled Veal Tenderloin       | \$31.95               |                       |
| <i>Dessert:</i>   | Chocolate Flourless Cake      | \$11.95               |                       |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$39.95</u></b> |                       |

Here is another set of menu combination options to rank. Please rank these options where "1" is the option that you are most likely to choose and "4" is the option that you are least likely to choose.

**Option 1**

|                   |                               |                       |                       |
|-------------------|-------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp       | \$10.50               | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Grilled Veal Tenderloin       | \$31.95               |                       |
| <i>Dessert:</i>   | Homemade Ice Cream            | \$10.95               |                       |
|                   | <i>Low Carb</i>               |                       |                       |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$43.95</u></b> |                       |

**Option 2**

|                   |                               |                       |                       |
|-------------------|-------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp       | \$10.50               | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Grilled Pork Chop             | \$30.95               |                       |
| <i>Dessert:</i>   | Homemade Ice Cream            | \$5.95                |                       |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$37.95</u></b> |                       |

**Option 3**

|                   |                               |                       |                       |
|-------------------|-------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | House Salad                   | \$6.50                | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Pepper Seared Sea Scallops    | \$27.95               |                       |
| <i>Dessert:</i>   | Chocolate Flourless Cake      | \$11.95               |                       |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$41.95</u></b> |                       |

**Option 4**

|                   |                                  |                       |                       |
|-------------------|----------------------------------|-----------------------|-----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp          | \$10.50               | <b>RANK: (      )</b> |
| <i>Entrée:</i>    | Parmesan Tossed Angel Hair Pasta | \$21.95               |                       |
| <i>Dessert:</i>   | Chocolate Flourless Cake         | \$11.95               |                       |
|                   | <i>Low Fat</i>                   |                       |                       |
|                   | <b><u>Prix Fixe Price</u></b>    | <b><u>\$39.95</u></b> |                       |



2. Next is a different set of menu combination options that you ranked on the previous page. At this time each prix fixe price is fixed to \$39.95. Please rank these options with "1" being the one you are most likely to choose, continue with 2 and 3, and finally "4" being the one you are least likely to choose. Please do not use the same number twice.

**Option 1**

|                   |                                  |                       |                      |
|-------------------|----------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp          | \$10.50               |                      |
| <i>Entrée:</i>    | Parmesan Tossed Angel Hair Pasta | \$26.95               | <b>RANK: (     )</b> |
| <i>Dessert:</i>   | Homemade Ice Cream               | \$5.95                |                      |
|                   | <b><u>Prix Fixe Price</u></b>    | <b><u>\$39.95</u></b> |                      |

**Option 2**

|                   |                               |                       |                      |
|-------------------|-------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp       | \$15.50               |                      |
| <i>Entrée:</i>    | Grille Pork Chop              | \$25.95               | <b>RANK: (     )</b> |
| <i>Dessert:</i>   | Homemade Ice Cream            | \$10.95               |                      |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$39.95</u></b> |                      |

**Option 3**

|                   |                               |                       |                      |
|-------------------|-------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp       | \$10.50               |                      |
| <i>Entrée:</i>    | Petter Seared Sea Scallops    | \$32.95               | <b>RANK: (     )</b> |
| <i>Dessert:</i>   | Chocolate Flourless Cake      | \$6.95                |                      |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$39.95</u></b> |                      |

**Option 4**

|                   |                               |                       |                      |
|-------------------|-------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | House Salad                   | \$6.50                |                      |
| <i>Entrée:</i>    | Grilled Veal Tenderloin       | \$36.95               | <b>RANK: (     )</b> |
| <i>Dessert:</i>   | Chocolate Flourless Cake      | \$11.95               |                      |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$39.95</u></b> |                      |

Here is another set of menu combination options to rank. Please rank these options where "1" is the option that you are most likely to choose and "4" is the option that you are least likely to choose.

**Option 1**

|                   |                               |                       |                      |
|-------------------|-------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp       | \$10.50               | <b>RANK: (     )</b> |
| <i>Entrée:</i>    | Grilled Veal Tenderloin       | \$31.95               |                      |
| <i>Dessert:</i>   | Chocolate Flourless Cake      | \$6.95                |                      |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$39.95</u></b> |                      |

**Option 2**

|                   |                               |                       |                      |
|-------------------|-------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | House Salad                   | \$11.50               | <b>RANK: (     )</b> |
| <i>Entrée:</i>    | Grilled Pork Chop             | \$30.95               |                      |
| <i>Dessert:</i>   | Homemade Ice Cream            | \$5.95                |                      |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$39.95</u></b> |                      |

**Option 3**

|                   |                               |                       |                      |
|-------------------|-------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | Hugo's Texas BBQ Shrimp       | \$15.50               | <b>RANK: (     )</b> |
| <i>Entrée:</i>    | Pepper Seared Sea Scallops    | \$27.95               |                      |
| <i>Dessert:</i>   | Homemade Ice Cream            | \$5.95                |                      |
|                   | <b><u>Prix Fixe Price</u></b> | <b><u>\$39.95</u></b> |                      |

**Option 4**

|                   |                                  |                       |                      |
|-------------------|----------------------------------|-----------------------|----------------------|
| <i>Appetizer:</i> | House Salad                      | \$6.50                | <b>RANK: (     )</b> |
| <i>Entrée:</i>    | Parmesan Tossed Angel Hair Pasta | \$21.95               |                      |
| <i>Dessert:</i>   | Homemade Ice Cream               | \$10.95               |                      |
|                   | <b><u>Prix Fixe Price</u></b>    | <b><u>\$39.95</u></b> |                      |

3. Please answer the following statements using a scale ranging from 1-7, where 7 means you consider the most important and 1 least important: when you considered meal combination options and ranked, your choice was based on:

| <u>Choice</u>                         | <u>least important &lt;-----&gt; most important</u> |   |   |   |   |   |   |
|---------------------------------------|---|---|---|---|---|---|---|
| a) Healthy food                       | 1   | 2 | 3 | 4 | 5 | 6 | 7 |
| b) Value for the price                | 1   | 2 | 3 | 4 | 5 | 6 | 7 |
| c) Trying new food items              | 1   | 2 | 3 | 4 | 5 | 6 | 7 |
| d) Food items that I am familiar with | 1   | 2 | 3 | 4 | 5 | 6 | 7 |
| e) Other (Please specify: _____ )     |   |   |   |   |   |   |   |

4. Please provide the following information by circling the appropriate number.

- 1) What is your age?
  - a) 18-23 years old
  - b) 24-40 years old
  - c) 41-58 years old
  - d) 59 or over
  
- 2) Are you:
  - a) Female
  - b) Male
  
- 3) Ethnicity
  - a) White
  - b) African American
  - c) Hispanic
  - d) Asian
  - e) Other (please specify: \_\_\_\_\_ )
  
- 4) Are you married?
  - a) Yes
  - b) No

**Please, go to the next page**

- 5) What is your annual house hold income?
- a) Less than \$30,000
  - b) \$30,000 to \$59,999
  - c) \$60,000 to \$89,999
  - d) More than \$90,000
- 6) On average, how often do you dine out per week?
- a) Once or less than once a week
  - b) Twice a week
  - d) Three times a week
  - e) More than three times a week
- 7) Which of these best describes your formal education?
- a) High School or less
  - b) Some college
  - c) College
  - d) Graduate college

**\* THANK YOU for taking the time to complete this survey. Your input is very important and greatly appreciated. Please feel free to make any suggestions or comments regarding this survey:**

---

---

---

---

---

---

## APPENDIX II

### INFORMED CONSENT

#### **University of Nevada, Las Vegas** **William. F. Harrah College of Hotel Administration**

### INFORMED CONSENT

---

**TITLE OF STUDY:** Understanding Consumer Preferences for Meal Choice

**RESEARCHERS:** Eunha Myung (Ph.D. Student)

Andrew Hale Feinstein (Ph.D., Associate professor)

---

#### Purpose of the Study

You are invited to participate in a research study. The purpose of this study is to estimate values that different consumers attach to different attributes in their meal choice decisions and find out the maximum amount that consumers' are willing to pay for them.

#### Participants

You are being asked to participate in the study because as a customer in restaurants, your answer will provide valuable information to restaurant managers to understand factors that consumer think is important; therefore, this will help them improve their products and services.

#### Procedures

If you volunteer to participate in this study, you will be asked to fill out a survey. The expected length of time you may spend for this study is approximately 5-10 minutes.

#### Benefits of Participation

The anticipated benefit of this research is providing practical information to the restaurant manager to better understand the needs of customers. By participating in this study, you may contribute valuable information to restaurateurs enabling them to better understand their customers.

#### Risks of Participation

There are risks involved in all research studies. However, this survey is an anonymous survey, so there is little or no risk involved. You will be asked to fill out a survey only if you consent.

#### Cost/Compensation

You will receive no payment for the time spent (approximately 5-10 minutes) completing this study. Your participation in this study is completely voluntary. You are free to withdraw at any time during the study.

#### Contact Information

For questions concerning this research study, you may contact Eunha Myung at 702-895-5438 or Dr. Andy Feinstein at 702-895-1795. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office for the Protection of Research Subjects at 895-2794.**

#### Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

#### Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility in Beam Hall for at least 3 years after completion of the study. After the storage time the information gathered will be destroyed.

#### Participant Consent:

I have read the above information and agree to participate in this study. I am at least 18 years of age.

---

Signature of Participant

---

Date

## REFERENCES

- Adams, W. J., & Yellen, J. L. (1976). Commodity bundling and the burden of monopoly. *Quarterly Journal of Economics*, 90, 475-98.
- Alford, B. L., & Biswas, A. (2002). The effects of discount level, price consciousness and sale proneness on consumers' price perception and behavioral intention. *Journal of Business Research*, 55, 775-783.
- An, X., Clapp, J., & Deng, Y. (2005) Mortgage termination and omitted mobility characteristics: Nested versus multinomial logit models. Retrieved November 16, 2005 from [http://www.usc.edu/schools/sppd/lusk/research/phd/wp\\_2005-1007.pdf](http://www.usc.edu/schools/sppd/lusk/research/phd/wp_2005-1007.pdf)
- Auty, S. (1992). Consumer choice and segmentation in the restaurant industry. *The Service Industries Journal*, 12 (3), 324-339.
- American Marketing Association. (2000). *Preference structure measurement: Conjoint analysis and related techniques*. Austin, TX: Intelliquest.
- Baarsma, B. E. (2003). The valuation of the IJmeer Nature Reserve using conjoint analysis. *Environmental and Resource Economics*, 25(3), 343-356.
- Barth, J. E. (2000). Application of a balanced attribute satiation model to predict consumer utility for multiple item meal bundles in restaurants. Doctoral dissertation, Cornell University.
- Beggs, S., Cardell, S., & Hausman, J. (1981). Assessing the potential demand for electric cars. *Journal of Econometrics*, 16, 1-19.
- Biswas, A., & Blair, E. A. (1991). Contextual effects of reference prices in retail advertisements. *Journal of Marketing*, 55 (3), 1-12.
- Calfee, J., Winston, C., & Stempski, R. (2001). Econometric issues in estimating consumer preferences from stated preference data: A case study of the value of automobile travel time. *The Review of Economics and Statistics*, 83 (4), 699-707.
- Chakravarti, D., Krish, R., Paul, P., & Srivastava, J. (2002). Partitioned presentation of multicomponent bundle prices: Evaluations, choice and underlying processing effects. *Journal of Consumer Psychology*, 12 (3), 215-229.

- Chezum, B., & Wimmer, B. S. (2000). Evidence of adverse selection from thoroughbred wagering. *Southern Economic Journal*, 66 (3), 700-714.
- Clark, M. A., & Wood, R. C. (1998). Consumer loyalty in the restaurant industry: A preliminary exploration of the issues. *International Journal of Contemporary Hospitality Management*, 10 (4), 139-144.
- Corstjens, M. L., & Gaustschi, D. A. (1983). Formal choice models in marketing. *Marketing Science*, 2 (1), 19-56.
- Dellaert, B. G. C., Brazell, J. D., & Louviere J. J. (1999). The effect of attribute variation on consumer choice consistency. *Marketing Letters*, 10 (2), 137-147.
- Dodds, W. B., & Monroe, K. B. (1985). The effect of brand and price information on subjective product evaluations. *Advances in Consumer Research*, 12(1), 85-90.
- Eppen, G. D., Hanson, W. A., & Martin, R. K. (1991). Bundling-new products, new markets, low risk. *Sloan Management Review*, 32 (4), 7-14.
- Estelami, H. (1999). Consumer savings in complementary product bundles. *Journal of Marketing Theory and Practice*, 7 (3), 107-114.
- Foster, V., & Mourato, S. (2005). Behavioral consistency, statistical specification and validity in the contingent ranking method: Evidence from a survey on the impacts of pesticide use in the U.K., Retrieved August 25, 2005 from [http://www.uea.ac.uk/env/cserge/pub/wp/gec/gec\\_1997\\_09.pdf](http://www.uea.ac.uk/env/cserge/pub/wp/gec/gec_1997_09.pdf)
- Fraccastoro, K., Burton, S., & Biswas, A. (1993). Effective use of advertisements promoting sales price. *Journal of Consumer Marketing*, 10 (1), 61-70.
- Freeservers.com, Prospect theory, Retrieved February 27, 2005 from [http://epse501.freeservers.com/prospect\\_theory.htm](http://epse501.freeservers.com/prospect_theory.htm).
- Gaeth, G. J., Levin, I. P., Chakraborty, G., & Leven, A. M. (1990). Consumer evaluation of multi-product bundles: An information integration analysis. *Marketing Letters*, 2 (1), 47-57.
- Green, P. E., Krieger, A. M., & Wind, Y. (2001). Thirty years of conjoint analysis: reflections and prospects. *Interfaces*, 31 (3), S 56-73.
- Green, P. E., & Srinivasan, V. (1978). Conjoint analysis in consumer research: Issues and outlook. *Journal of Consumer Research*, 5, 103-123.
- Green, P. E., & Srinivasan, V. (1990). Conjoint analysis in marketing: New developments with implications for research and practice. *Journal of Marketing*, 54, 3-19.

- Guiltnan, J. P. (1987). The price bundling of services: A normative framework. *Journal of Marketing*, 51, 74-85.
- Gustafsson, A., Herrmann, A., & Huber, F. (2000). Conjoint analysis as an instrument of market research practice. Gustafsson, Herrmann, & Huber (Eds.), *Conjoint measurement: Method and application* (pp.9), Mainz, Germany: Springer.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). Conjoint Analysis. *Multivariate data analysis*. Upper Saddle River, NJ: Prentice-Hall.
- Hanley, N., Mourato, S., & Wright, R. E. (2001). Choice modeling approaches: A superior alternative for environmental valuation? *Journal of Economic Surveys*, 15 (3), 435-459.
- Harral, A. (1999, October 15). The fixe is in. *Restaurant Business*. 98 (20), 45-46.
- Hausman, J. A., & Rudd, P. A. (1987). Specifying and testing econometric models for rank-ordered data. *Journal of Econometrics*, 34, 83-104.
- Holland, D., & Wessells, C. R. (1998). Predicting consumer preferences for fresh salmon: The influence of safety inspection and production method attributes. *Agricultural and Resources Economics Review*, 27 (4), 1-14.
- Ida, T., & Sato, M. (2004). Conjoint analysis of consumer preferences for broadband services in Japan. Retrieved March 15, 2005 from [http:// www.econ.kyoto-u.ac.jp/~ida/3Kenkyuukatudou/ 3Workingpaper/WPfile/2004/Ida-Sato\(E\).pdf](http://www.econ.kyoto-u.ac.jp/~ida/3Kenkyuukatudou/3Workingpaper/WPfile/2004/Ida-Sato(E).pdf)
- Janiszewski, C., & Cunha, M. (2004, March). The influence of price discount framing on the evaluation of a product bundle. *Journal of Consumer Research*, 30, 534-546.
- Johnson, M. D., Herrmann, A., & Bauer, H. H. (1999). The effects of price bundling on consumer evaluations of product offerings. *International Journal of Research in Marketing*, 16, 129-142.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263-91.
- Kaicker, A., Bearden, W. O., & Manning, K. C. (1995). Component versus bundle pricing: The role of selling price deviations from price expectations. *Journal of Business Research*, 33, 231-239.
- Kalyanaram, G., & Winer, R. S. (1995). Empirical generalization from reference price research. *Marketing Science*, 14 (3), 161-169.



- Kamins, J. A., Dreze, X., & Folkes, V. S. (2004, March). Effects of seller-supplied prices on buyers' product evaluations: Reference prices in an internet auction context. *Journal of Consumer Research*, 30, 622-628.
- Kivela, J. J. (1997). Restaurant marketing: Selection and segmentation in Hong Kong. *International Journal of Contemporary Hospitality Management*, 9 (3), 116-123.
- Kivela, J. J., Reece, J., & Inbakaran, R. (1999). Consumer research in the restaurant environment: Part 2: Research design and analytical method. *International Journal of Contemporary Hospitality Management*, 11 (6), 269-286.
- Klemz, R. R., & Gruca, T. S. (2003). Dueling or the battle royale?: The impact of task complexity on the valuation of entry treat. *Psychology & Marketing*, 20 (11), 999-1016.
- Koo, L. C., Tao, F. K. C., & Yeung, J. H. C. (1999). Preferential segmentation of restaurant attributes through conjoint analysis. *International Journal of Contemporary Hospitality Management*, 11 (5), 242-250.
- Kopalle, P. K., & Lindsey-Mullikin, J. (2003). The impact of external reference price on consumer price expectations. *Journal of Retailing*, 79, 225-236.
- Kruskal, J. B. (1965). Analysis of factorial experiments by estimating monotone transformations of the data. *Journal of the Royal Statistical Society, Series B*, 27, 251-263.
- Kumar, V., Karande, K., & Reinartz, W. J. (1998). The impact of internal and external reference prices on brand choice: The moderating role of contextual variables. *Journal of Retailing*, 74 (3), 401-426.
- Layton, D. F. (2000). Random coefficient models for stated preference surveys. *Journal of Environmental Economics and Management*, 40, 21-36.
- Levin, J. P., & Gaeth, G. J. (1988). How consumers are affected by the framing of attributes information before and after consuming the product. *Journal of Consumer Research*, 15, 374-378.
- Lewis, R. (1981). Restaurant advertising: Appeals and consumers' intentions. *Journal of Advertising Research*, 21 (5), 69-74.
- Louviere, J. J., Hensher, D., & Swai, J. (2000). Conjoint preference elicitation methods in the broader context of random utility theory preference elicitation methods. In Gustafsson, Herrmann, & Huber (Eds.), *Conjoint measurement: Method and application* (p.280-286). Mainz, Germany: Springer.

- Lowengart, O. (2002). Reference price conceptualizations: An integrative framework of analysis. *Journal of Marketing Management*, 18, 145-171.
- Mark, D. R., Lusk, J. L., & Daniel, M. S. (2004). Recruiting agricultural economics graduate students: Student demand for program attributes. *American Journal of Agricultural Economics*, 86 (1), 175-184.
- Mayhew, G. E., & Winer, R. S. (1992, June). An empirical analysis of internal and external reference prices using scanner data. *Journal of Consumer Research*, 19, 62-70.
- Mazumdar, T. & Papatla, P. (2000). An investigation of reference price segments. *Journal of Marketing Research*, 37, 246-258.
- McFadden, D. (1974). Conditional logit analysis of qualitative choice behavior. In P. Zarembka (Ed.), *Frontiers in Econometrics* (105-142). New York: Academic Press.
- Monroe, K. B. (1990). Economics of price determination. *Pricing: Making profitable decisions*. (p. 30). New York: McGraw-Hill, Inc.
- Naylor, G., & Frank, K. E. (2001). The effect of price bundling on consumer perceptions of value. *Journal of Service Marketing*, 15 (4), 270-281.
- North, E., & De Vos, R. (2002). The use of conjoint analysis to determine consumer buying preferences: A literature review. *Journal of Family Ecology and Consumer Sciences*, 30, 32-39.
- Parker, B. R., & Srinivasan, V. (1976). A consumer preference approach to the planning of rural primary health-care facilities. *Operations Research*, 24 (5), 991-1025.
- Pavesic D. V. (1999, November 22). History repeats itself as prix-fixe menus make a comeback in many restaurants. *Nation's Restaurant News*, 33(47), 22-24.
- Pedraja, M., & Yague, J. (2001). What information do customers use when choosing a restaurant? *International Journal of Contemporary Hospitality Management*, 13 (6), 316-318.
- Phillips, K. A., Maddala, T., & Johnson, F. R. (2002). Measuring preferences for health care interventions using conjoint analysis: an application to HIV testing, *Health Services Research*, 37 (6), 1681-1692.
- Posavac, S. S., Sanbonmatsu, D. M., & Ho, E. A. (2002). The effect of the selective consideration of alternatives on consumer choice and attitude-decision consistency. *Journal of Consumer Psychology*, 12 (3), 203-213.

- Rajendran, K. N., & Tellis, G. J. (1994). Contextual and Temporal Components of Reference Prices. *Journal of Marketing*, 58 (1), 22-34.
- Rao, A. R., & Sieben, W. A. (1992). The effect of prior knowledge on price acceptability and the type of information examined. *Journal of Consumer Research*, 19, 256-270.
- Reibstein, D., Bateson, J. E. G., & Boulding, W. (1988). Conjoint analysis reliability: empirical findings. *Marketing Science*, 7 (3), 271-286.
- Roheim, C. A., Johnston, R. J., Greer, J., & Donath, H. (2005). Consumer preferences for ecolabeled seafood: Results of a Connecticut survey. Retrieved March 7, 2005, from <http://www.fmhc.uconn.edu/other/Connecticut%20Final%20Ecolabel%20Report%2012%2020%2004.pdf>
- Roheim, C. A., & Donath, H. (2003). The battle of taste buds and environmental convictions: Which one wins. Retrieved March 7, 2005, from <http://www.farmfoundation.org/projects/documents/Roheim.pdf>
- Russell, G. J., Bell, D., Bodapati, A., Brown, C., L., Chiang, J., Gaeth, G., Gupta S., & Manchanda P. (1997). Perspectives on multiple category choice. *Marketing Letters*, 8 (3), 297-305.
- Ryan, M., & Hughes, J. (1997). Using conjoint analysis to assess women's preferences for miscarriage management. *Health Economics*, 6, 261-273.
- Schroeder, J. J. (1985). Restaurant critics respond: We're doing our job. *Cornell Hotel and Restaurant Administration Quarterly*, 25 (4), 57-63.
- Shafir, E., Simonson I., & Tversky A. (1993). Reason-based choice. *Reasoning & Decision making Cognition*, 49 (1-2), 11-30.
- Sandefur, R. A., Johnson, F. R., & Fowler, R. B. (1996). An introduction to the random utility model. *Triangle Economic Research*. Retrieved March 2, 2005, from <http://www.ter.com/ter/Papers/General/G-9602.pdf>
- Simonson, I., & Tversky, A. (1992) Choice in context: Tradeoff contrast and extremeness aversion. *Journal of Marketing Research*, 29, 281-95.
- Simon, H., & Wuebker, G. (1999). Bundling-A powerful method to better exploit profit potential. In Fuerderer, Herrmann, & Wuebker (Eds.), *Optimal bundling: Marketing strategies for improving economic performance* (pp.8-28). Mainz, Germany: Springer.

- Smith, G. E., & Nagle, T. T. (1995). Frames of reference and buyers' perception of price and value. *California Management Review*, 38 (1), 98-116.
- Suri, R., & Monroe, K. B. (1999). Consumers prior purchase intentions and their evaluation of savings on product bundles. In Fuerderer, Herrmann, & Wuebker (Eds.), *Optimal bundling: Marketing strategies for improving economic performance* (pp.177-194). Mainz, Germany: Springer.
- Sproles, G. B., & Kendall, E. L. (1986). A methodology for profiling consumers' decision-making styles. *The Journal of Consumer Affairs*, 20 (2), 267-279.
- SPSS Conjoint 8.0, 1997, SPSS Inc, Chicago
- Srinivasan, V., & Shocker, A. D. (1973). Linear programming techniques for multidimensional analysis of preferences. *Psychometrika*, 38, 337-369.
- STATA version 9.0, 2005, Stata Corporation, College Station, Texas.
- STATA(2004) version 8.0, 2004, clogit, p.172
- Stremersch S., & Tellis G. J. (2002). Strategic bundling of products and prices: A new synthesis for marketing. *Journal of Marketing*, 66, 55-72.
- Thaler, R. (1980). Toward a positive theory of consumer choice. *Journal of Economic behavior and organization*, 39, 36-90.
- Thaler, R. (1985). Mental accounting and consumer choice. *Marketing Science*, 3, 199-214.
- Thaler, R. (1999). Mental accounting matters. *Journal of Behavioral Decision Making*, 12 (3), 183-206.
- The Culinary Institute of America. (2001). The modern menu. *Remarkable service*. New York: John Wiley & Sons, Inc.
- Thurstone, L. (1927). A law of comparative judgment. *Psychological Review*, 34, 273-286.
- Train, K. (1993). Theory and econometrics of qualitative choice models. *Qualitative choice analysis: Theory, econometrics, and an application to automobile demand*. (p.77), Cambridge, MA: The MIT Press.
- Varian, H. R. (1989). Bundling. In Schmalensee & Willig (Eds.), *Handbook of industrial organization* (p. 626-630), New York: Elsevier Science Pub. Co.

- Wiener, J. L. (1993). Alternative conjoint analysis technique: Implications for marketing research. Doctoral dissertation, The University of Texas, Arlington.
- Wuebker, G., Mahajan, V., & Yadav, M. S. (1999). Buyers' evaluations of mixed bundling strategies in price-promoted markets. In Fuerderer, Herrmann, & Wuebker (Eds.), *Optimal bundling: Marketing strategies for improving economic performance* (p.196-208). Mainz, Germany: Springer.
- Yadav, M. S., & Monroe, K. B. (1993, August). How buyers perceive savings in a bundle price: An examination of a bundle's transaction value. *Journal of Marketing Research*, 30, 350-358.
- Yadav, M. S., & Seiders, K. (1998). Is the price right: Understanding contingent procession in reference price formation. *Journal of Retailing*, 74 (3), 311-329.
- Zikmund, W. G. (2003). Issues of experimental validity. *Business Research Methods*. Mason, Ohio: South-Western College Press.

VITA

Graduate College  
University of Nevada, Las Vegas

Eunha Myung

Local Address:

4441 Escondido Street #3202  
Las Vegas, NV 89119

Home Address:

613-201 Hyoja-chon, Bundang Ku, Sungnam City  
South Korea

Degrees:

Bachelor of Science, Hotel Administration, 1996  
University of Nevada, Las Vegas

Master of Business Administration, 1998  
University of Nevada, Las Vegas

Publications:

McCool, A.C., Myung E., & Chien, T. (2005). Modification of the form in which fresh fruit is served as a possible means of increasing the consumption of fruit offered to elementary and middle school students. *Journal of Food Service Business Research*, 8(2).

Myung E., & Lee, S. Loyalty Circle (2005). *International Encyclopedia of Hospitality Management*, Oxford: Butterworth Heinemann.

Myung E. Product Life Cycle (2005). *International Encyclopedia of Hospitality Management*, Oxford: Butterworth Heinemann.

Myung E. Reference Group(2005). *International Encyclopedia of Hospitality Management*, Oxford:Butterworth Heinemann.

Myung, E., & Chien, T., & McCool, A. (2004). Can Fresh Fruit Consumption be improved among elementary and middle school students? *Journal of Child Nutrition and Management*, Issue 2, fall, 2004.

Dissertation Title: Using a Discrete Choice Model to Identify Consumer Meal Preferences Within a Prix Fixe Menu

Dissertation Examination Committee:  
Chairperson, Dr. Andrew Hale Feinstein, Ph.D.  
Committee Member, Dr. John Stefanelli, Ph.D.  
Committee Member, Dr. Seyhmus Baloglu, Ph.D.  
Graduate Faculty Representative, Dr. Gillian Naylor, Ph.D.