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Meal Duration: Implications for Restaurant Revenue Management

Dale F. Billings

MEAL DURATION: IMPLICATIONS FOR RESTAURANT REVENUE MANAGEMENT

By

Dale Billings

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Dale Billings

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Chih-Chien Chen, Ph.D.
Examination Committee Chair

Kathryn Hausbeck Korgan, Ph.D.
Graduate College Dean

Anthony Gatling, Ph.D.
Examination Committee Member

Carl Braunlich, D.B.A.
Examination Committee Member

Han-Fen Hu, Ph.D.
Graduate College Faculty Representative

ABSTRACT

A comprehensive revenue management strategy addressing space, product, price and time, has been shown to increase profits within the hospitality sector. While the literature shows that the restaurant industry has frequently addressed space, product, and price when looking at financial strategy, the effect of the variable of time on revenue generation has not been adequately studied. Restaurants shy away from the practice of using time as a commodity, particularly regarding meal duration, due to fears of reducing customer satisfaction.

This project explores the use of time as a commodity in restaurant revenue management. In particular, it examines consumers' feelings about meal duration and their willingness to accept parameters around time spent at the table. This project shows that consumers have neutral to positive feelings about a fixed meal duration. Triangulating the existing research with this project's findings, a 60-minute fixed meal duration could be a viable, financially-sound strategy for restaurant revenue management.

DEDICATION

To our daughter Ysabeau, you arrived in the middle of this process, but I believe you were with us long before that. This work is for you. You can do anything you set your heart and your mind to.

To Dale and Linda Billings and Dr. Michael and Valerie Krahe, thank you for your love and support. Thank you, Dr. Chih-Chien Chen, for your guidance.

To my wife, Dr. Eve Billings, without you, none of this is possible.

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CHAPTER ONE

Introduction

A comprehensive revenue management strategy has been shown to increase profits in restaurants by 2-5% (Kimes, Wirtz & Noone, 2002). In fact, presenting a hypothetical exemplar demonstrating the importance of time to revenue, Kimes et al., (2002), asserted the following: if a 100-seat restaurant with a $20 average check reduced customers' dining times by just 10 minutes, the restaurant could see a potential revenue increase of 20%. In a mid-size restaurant, this small shift could equal a profit increase of hundreds of thousands of dollars a year. In larger restaurant conglomerates, the number could be in the millions of dollars (Darden Investor Report, 2018.).

The definition of revenue management (RM) has evolved over the years. Smith, Leimkuhler, and Darrow defined RM as "the business practice of selling the right inventory to the right customer at the right price at the right time so as to maximize total revenue, profit, and market share" (1992, p. 8). Talluri and Van Ryzin furthered this definition as "the wide range of techniques, decisions, methods, processes, and technologies involved in demand management" (2004, p. 2). Maier and Intrevado (2018) then added the concept of capacity or space.

These definitions are driven by four variables: space, product, price, and time. While the literature shows that the restaurant industry has frequently addressed space, product, and price when looking at financial strategy, the effect of the variable of time on revenue generation has not been adequately studied.

This project explores the effect that manipulation of the variable of time has on revenue generation. Through this exploration, it seeks to uncover successful models and untapped opportunities in RM for restaurants.

Much of the scholarship and practice of revenue management emerged from the airline industry, following the deregulation of the airline industry under President Jimmy Carter in the 1970s. According to Weatherford (2016), the airline sector faced then and continues to face several challenging factors that have pushed the industry to not only think about RM, but to think about it differently. These factors are: "seasonality, including time-of-day, day-of-week and week-of-year variability; sensitivity to pricing actions in a hypercompetitive industry; demand volatility; truncation of historical demand data; and reservation system limitations (Weatherford, 2016, p. 214). Responding to these complexities, the airline industry designed and implemented sophisticated forecasting models to drive comprehensive RM strategies.

The next group to truly catch on to the benefits of RM was the hotel industry. This occurred in the early 1980's, with a publication by Yesawich (1984) believed to mark the beginning of the conversation. Yesawich looked specifically at hotels in regards to market demand. He was interested in how full properties were at any given time, looked at strategies across hotels in driving penetration rate, and then explored the degree of marketing effort necessary for a positive return. Kimes (1989) was the first to apply RM techniques to the hotel industry within academic research. The research continues, now using sophisticated data modeling and forecasting similar to what is seen in the airline industry.

Purpose

The purpose of this paper is to examine the utility of customer time at table as a driver of revenue in restaurants through surveying to better understand whether time constraints would be

acceptable to the general population. Using this insight, this project hopes to provide strategies wherein restaurants could manipulate the variable of time more effectively in RM.

Problem Statement

Following the lead of the airlines, the hotel industry has begun to take steps toward operationalizing revenue management in a variety of comprehensive ways. The restaurant industry, however, has not. Opportunity exists in the restaurant sector to generate and thus manage revenue in new ways by manipulating the variable of time.

Justification

Research and practice show positive financial implications when revenue management is employed effectively. An opportunity space exists in restaurant revenue management to apply what others within have learned regarding strategically manipulating the variable of time. Historically, restaurants have concentrated on three of the four variables listed above: the amount of space (seating) in the restaurant, the product being sold (meal or entrée), and the price point at which the product is sold. The implementation of RM in restaurants consistently runs into one problem: restaurants' reluctance to look at time as a commodity. Research shows that restaurants instead look at time through the lens of efficiency (Hummel & Murphy, 2011) Many standard operating procedures exist in terms of efficiency, but efficiency cannot be translated to time as a commodity. Hwang and Lambert (2009) conducted a survey on restaurant efficiency examining customers' expectations of service standards. In the study, efficiency in a restaurant was found to be defined as getting the guest to the table within 16 minutes. Server standards expect a server to have greeted the guest, get and deliver the guest drinks, and take the order for an appetizer within four minutes. Once the guest's order has been taken and the food has been prepared, the server

has 15 minutes in which the food must be taken to the table. After the guest has finished eating, customers expect the check to be brought to them within five minutes and their payment to be processed in just under five minutes.

Nevertheless, even with such surveys, the restaurant industry as a whole seems to disregard the actual amount of time the customer spends occupying the table. Other parts of the hospitality sector like the airline and hotel industries sell their services for a contracted amount of time, i.e. an airline seat for the duration of a flight, a hotel room for one night, a show ticket, or a scheduled spa service. Entire forecasting models for revenue management in these areas are built upon the manipulation of time as a generator of revenue. Restaurants are understandably reluctant to raise this issue of time with their patrons because dining is not perceived as a time-bound activity in the United States (see Kimes et. al, 2002). Perhaps, in order to implement RM effectively in the restaurant industry, time or duration of the customer occupying the table, needs to be examined more closely. In order to begin to address time as a commodity in the restaurant industry that can shape revenue generation and thus drive revenue management, it is important to standardize foundational concepts upon which such an examination can occur. This project proposes that a viable inroad to addressing the variable of time within RM for restaurants could come from the re-evaluation customer time at table.

Constraints

There are several constraints to this study. First, utilizing revenue management frameworks from other sectors within hospitality may not be an exact fit for restaurants. Second, the restaurant sector sometimes stumbles into revenue management, “cherry picking” strategies without an eye to a larger, more cohesive model. Successes from cherry-picked strategies could confound the results of this study.

CHAPTER TWO

Literature Review

Introduction

The utility of revenue management in driving operational excellence has been demonstrated in several sectors across the last 40 years or so. A review of the literature shows that revenue management is operationalized in slightly different ways across sectors, but its foundational tenets often remain the same, focused on the four variables of time, space, product, and price. This literature review explores selected aspects of revenue management relevant to this study in a thematic way, moving through an overview of revenue management itself, its past and current state as well as challenges and opportunities. Following this, a discussion of scholarship covering the three variables and associated scholarship central to this study, price, space, and time, will be presented. A last section from seminal work by Kimes (1999) presents a summation of the complexities of manipulating time and price within a restaurant context. At the conclusion of the review, a brief synthesis and discussion of findings is provided.

Revenue Management

As mentioned at the outset of this paper, Talluri and van Ryzin (2005) define revenue management (RM) as sales decisions, "decisions on where and when to sell and to whom and at what price" or demand-management decisions, "estimating demand and its characteristics and using price and capacity control to manage demand" (p. 2). They posit that companies use these decisions to "interface with the market" with "the objective of increasing revenues" (Talluri & van Ryzin, 2005, p. 2).

Historical context

The airline industry was the first sector in the service industry to introduce RM, or as they called it, "yield management," as a way to forecast passenger cancellations and no shows (McGill & van Ryzin, 1999). With success in forecasting and controlled overbooking, the airline industry was able to expand its RM practices in discounted fares to fill seats that would otherwise not be filled (McGill & van Ryzin, 1999; Yeoman, 2016). Littlewood (1972) and Belobaba (1987) introduced new RM models that included such variables as market segmentation, historical demand, pricing knowledge, overbooking policy and information systems using rate controls, availability controls or allocation approaches.

The hotel sector of the service industry was the next to adopt the practices of RM in the early 1980s. Having products that mimicked the airline industry, the hotel sector used RM to help manage "perishability, fixed capacity and the need for segmentation based on customers' levels of price sensitivity" (Yeoman, 2016, p. 191). The evolution of RM continues; RM is moving beyond the traditional operational approach and giving the industry more sophisticated models, like "price analytics [that] enable better understanding of elasticity and behavioral economics" (Yeoman, 2016, p. 192).

RM in restaurants

As stated earlier in this project, restaurants have not quite caught on to the benefits of revenue management as a driver of growth and financial benefit. Heo (2017) asserts that for restaurants to maximize profitability, they must sell not only sell items which are profitable, but also sell them during peak dining periods.

Current state

There is not much literature which talks about the current tools and practices of restaurant RM, but the findings from Kimes and Beard (2013) are still mostly true. Their research mentions few business intelligence tools exist which use point of sale (POS) data to help managers make better decisions on how to improve performance across several sectors of the restaurant including product mix, fraud, and server performance. With no systems able to integrate directly into the restaurant POS, most restaurant operators still rely on Microsoft Excel to see their data and manage their key performance indicators (KPI's). As other sectors in the hospitality industry develop systems that can be integrated, such as customer relationship management (CRM) systems interrogating with POS and RM systems. The hotel sector is using these systems together to be able to make better decisions regarding customer behaviors (Kimes & Beard, 2013). Restaurant operators could also benefit from this collection of data to make better pricing decision by knowing the frequency of when customers are coming in, which items these customers are ordering, and how much they are spending each visit (Kimes & Beard, 2013). Knowing this information would also help inform restaurant operators on how to develop new pricing strategies, design promotions, and make better reservation decisions (Kimes & Beard, 2013).

Challenges

Many sectors within hospitality have proven that customers are willing to except variable pricing, even though the customer views this practice as unfair (Kimes & Wirtz, 2003). Restaurants have been reluctant to implement RM as restaurant customers seem to be very sensitive to variable pricing and can lead to poor customer satisfaction (Kimes & Wirtz, 2003). Discounted pricing during nonpeak dining times will influence the customers perception of the

price of items, price anchoring, and thus leads the customer to feel that higher pricing during peak dining times to be unfair or gouging (Kimes & Wirtz, 2003). This idea of unfair pricing is slowly being changed within the hospitality industry. Airlines and hotels use of higher pricing during peak times has now become the norm, with the golf industry following suit in varying prices for different tee times (Kimes & Wirtz. 2003). Kimes and Wirtz (2003) suggest that since these practices of variable pricing exist within different areas of the hospitality sector, restaurant customers will also come to except these practices within the restaurant, as long customers have a clear view and understand of what is happening. Educating the consumer and the frontline employees will help make the transition into variable or demand pricing much easier as explaining how the pricing structure is a benefit to the customer (Kimes & Wirtz, 2003).

Price, Space, and Time

When beginning the discussion of price, space, and time, there are three key concepts that must first be discussed. A restraint has a relatively fixed capacity, predictable demand, and perishable inventory (Kimes et al., 1998). Capacity within a restaurant can measured in four ways, seating, kitchen size, menu items, and staffing levels (Kimes et al., 1998). The research done by Kimes et al. (1998) describes how restaurants try to manage seating capacity by seating as many people at once and turning the tables as quickly as possible. Though this approach to capacity control can be limited by several things such as slow kitchen processes, poor menu design, and limited capabilities of staff members (Kimes et al., 1998). These limiting factors can be managed effectively to improve efficiency. If needed and or possible, more kitchen equipment can be purchased to make the kitchen more efficient and staff training can also improve efficiency (Kimes et al., 1998).

For any restaurant that has been in business for any amount of time should be able to predict demand based on historical data. Knowing the percentage of reservations and walk-in guest that are typical for the day and time period will help a restaurant forecast demand (Kimes et al., 1998). Being able to determine a customer's average meal duration will also help forecast appropriate staffing levels and food and beverage inventory to have on hand.

When the literature is discussing perishable inventory, it does not mean food or beverage inventory. In this instance, inventory is thought of as time (Kimes et al., 1998). Kimes et al. (1998) suggests that when a table or seat is not occupied during a period of time, then the use of that seat has perished, meaning revenue cannot be made or is lost from that table or seat. The discussion in Kimes et al. (1998) paper of perishable inventory was described as "the element we believe has been missing in most approaches to restaurants revenue management" (p. 33), which this study still believes to be true when implementing RM in restaurants.

Rate control

Price from the customers perspective is "what the customer must give up to purchase the product or service" (Abbey, 1983). For a reduction in either transaction time and or cognitive effort, customers will often pay more (Shoemaker, Lewis, & Yesawich, 2006). As pricing models continue to evolve, revenue per available customer will continue to be examined. Customers that provide "the most long-term economic value" to the establishment will be given fist consideration as the days of "first come, first serve are slowly going away" (Shoemaker, et al., 2006). In the era of mass data collection, getting to know your customer will give the establishment the upper hand. By "designing products that meet their needs of the customers", the establishment will be able to better meet the needs of their customers (Shoemaker, et al., 2006). When developing pricing models, restaurants must also take into consideration that

customers are not receptive to paying premium prices during peak periods, but they are receptive to receiving discounts in times do nonpeak times (Wirtz & Kimes, 2007).

Capacity control

> Tell me when you want it, and I will tell you what you need to pay.
>
> Tell me what you want to pay and I will tell you when you can have it…"
>
> Shoemaker, et al., 2006 p.378

Kimes et al., (1989) starts the conversation around capacity control by defining six variables that effect yield management. Restaurants have a relatively fixed capacity, ability to segment markets, perishable inventory, product sold in advance, fluctuating demand, and low marginal sales cost/high marginal capacity change costs. These variables have also led to the introduction of revenue per available seat hour (RevPASH). RevPASH looks at the relationship between the number of table turns and the meal duration (Kimes, 1999). When analyzing RevPASH, "as the number of turns increases and the meal length decreases, the RevPASH increases" (Kimes, 1999, p. 19). A decrease in meal duration would have two effects on revenue, the first being a drop in average check and two being an increase in volume (Kimes, 1999), which would result in increased revenue. RevPASH focuses on what this project asserts are the core element of RM, time.

In this case, which is to "charge premium prices during high-demand periods based on capacity" (Heo, Lee, Mattila, & Hu, 2013, p. 317). By meeting or exceeding customer expectations in the delivery of ambience, food, service, and price will create a demand that can exceed capacity during peak times (Thompson, 2015). This period of high demand for seating capacity is where RM is most applicable to restaurants (Heo et al., 2013) since revenue is lost when tables are unoccupied (Heo, 2016). Restaurants must find the balance between reducing

meal duration without upsetting the customer (Kimes et al., 2002; Noone, Kimes, Mattila, and Wirtz, 2007). The results from a study performed by Kimes et al. (2002) shows that the average customer of a casual restaurant expects their dining experience to take approximately 60 minutes. This experience was defined by three elements: Wait time, service time, and consumption time (Kimes et al., 2002). A decrease in meal duration by 20 percent was shown to not have an impact in customer satisfaction (Kimes et al., 2002). The implications of this could lead to a 25 percent increase in revenue for restaurants during peak dining period (Kimes et al., 2002).

Using RevPASH can help a restaurant monitor the turnover of tables and the length of seating duration (Kimes et al., 1998) so that restaurants can "try to minimize the number and duration of unoccupied tables as well as to sell the largest number of tables within a given time period" (Heo, 2016, p. 154). Just as hotels cannot solely look at RevPAR (revenue per available room) as an indicator of success, restaurants must also rely on other tools other than RevPASH (Kimes, 1999; Heo, 2017).

Seat duration, or duration of a meal, is an important aspect of RM that restaurants do not control well. Most restaurant managers are anxious about providing a patron with a fixed meal duration - and enforcing this duration - as this is not a common practice in the industry (Kimes, 1999; Heo, 2016). If restaurant managers and operators can reduce and control variations in the duration of a patron's meal, they will be able to manage reservations and seating decisions more effectively (Kimes et al., 1998). By controlling patrons' seating duration, restaurants can better apply RM techniques, which can lead to increased revenue (Heo et al., 2013).

Thompson (2008) ran several simulations showing that decreasing meal duration would have an impact on a restaurant's revenue model. He counters these claims of potential increased revenue by suggesting other avenues of efficiency that he believed to be more effective in

operationally delivering faster service to customers, such as hiring more employees and train them to move through the dining experience faster without hurting customer satisfaction. This view of hurting customer satisfaction comes from Noone et al., (2007) where they discuss how the reduction of meal duration has a direct correlation to the customers satisfaction. Too fast of service during a customer's meal can diminish the customers satisfaction in the experience at the restaurant (Noone et al., 2007). Restaurant operators must also take into consideration of a customer staying too long. Customers who linger at the table with a low check do not generate a desirable revenue (Kimes & Robson, 2004). While customers who linger but have a high check, disrupt the restaurants ability to turn the table (Kimes & Robson, 2004).

Capacity management science was introduced in 1999 by Still and Decker as a way to evaluate the capacity potential of a restaurant through process efficiency. Quain, Sansbury, and LeBruto (1999) and Muller (1999) described how restaurants could improve revenues by decreasing service times and improving efficiency. Thompson (2002, 2003) discusses how restaurants can also increase revenue by having a flexible floor plan where tables are able to be repositioned to better suit parties of different sizes. A restaurant's popularity can also have an effect when it comes to capacity management. "Customers who perceive a restaurant's capacity as very scarce consider that restaurant's offerings more valuable compared to customers who perceive a restaurant's capacity as less scarce when the restaurant provides a 40% discount during weekdays" (Heo et al., 2013, p.324). The study by Heo et al. (2013) suggest that scarcity of capacity may play a significant factor when it comes to pricing during high and low demand periods. Because a restaurants capacity is typically fixed, RM tries to balance demand and revenue by charging customers different prices (Kimes et. al., 1989, McGill & van Ryzin, 1999, Heo et. al., 2013).

Price discrimination based on time

Price discrimination occurs when two similar products are sold different prices (Stigler, 1946). If a business can implement price discrimination, considering all things equal, a business can raise revenues by implementing price discrimination models (Graddy & Hall, 2011). When time of purchase considered when the product is purchased, then the products may not be identical (Talluri & van Ryzin, 2005). The most common example of this in hospitality is movie theaters and golf courses. These sectors within hospitality rely heavily on pricing models that modify prices slightly based on time to be able to enhance that their product or service is selling for the highest price point (Shoemaker et al., 2006). This variable pricing is made possible because different customer segments have different needs and are willing to pay different prices (Shoemaker et al., 2006)

Research conducted by Li, Granados, and Netessine's (2014) shows that price discrimination is not always favorable with customers. Strategic consumers play a significant factor in how price discrimination affects revenues. In markets where customers are less sensitive to price, strategic customers can hurt revenues as they search and buy at the lowest prices (Li et al., 2014). By removing these strategic customers from the clientele base, businesses can generate higher prices with only a small reduction in demand (Li et al., 2014). In leisure markets, these strategic customers are desired as they bring more demand into the market, which also increases revenue (Li et al., 2014).

When looking into how restaurants implement RM, traditional strategies focus on happy hour and early bird specials. Susskind, Reynolds, and Tschiya's (2004) research showed that ‘‘many restaurant patrons would accept discounts as an incentive for changing their dining time to off-peak hours" (p.78). The belief is that the customers who patronize the restaurant during

these discounted time periods will stay long enough to purchase items after the discounted time has expired (Kimes & Wirtz, 2003; Thompson, 2015). These strategies that only focus on nonpeak times can run into the concept of cannibalization. This can occur when a price discount drives a customer, who would normally patronize the restaurant during non-discounted times, to come in during a time when a discount is offered (Kimes & Wirtz, 2003; Thompson, 2015). Not paying attention or examining the effects of these nonpeak specials, can impact revenue (Kimes & Wirtz, 2003; Thompson, 2015). Only focusing on low-demand periods misses the core elements of RM which is to charge premium prices during high demand periods (Heo et al., 2013). This is especially true for restaurants when a restaurants limited capacity comes into consideration (Heo, et al., 2013).

Dynamic pricing

Dynamic pricing is a tool that allows businesses to vary the pricing of its products to help maximize profits collected during different time periods (Chen, Hu, P., & Hu, Z., 2017). The business must be able to control the relationship between demand and price to be able to take advantage of how dynamic pricing looks to maximize profit (Chen et al., 2017). Efficiency and seasonality must also be taken into consideration when dynamic pricing algorithms are being created (Chen et al., 2017). Businesses must also take into consideration the actions of their competitors into account when making decisions to change price as well as be able to make changes based on the elasticity of demand (Kimes et al., 1989).

Research in dynamic pricing indicates that a customer's memory of past pricing (price reference) plays s significant role the customers willingness to pay (Nasiry & Popescu, 2011). Lowengart (2002) suggests that a constant price strategy should be used "to avoid establishing a low reference price in customers minds" (p. 163). Exposing customers to a lower price, is

referred to an anchoring process. This along with a customer's memory should play an important role on how a business should manage they dynamic pricing (Nasiry & Popescu, 2011). In markets where the customer base is more loss averse, the customer tends to anchor on to the lowest price and supports the pricing strategies of constant pricing (Nasiry & Popescu, 2011). With customers relying on past experiences when it comes to purchasing (Lowengart, 2002), the benefits of dynamic pricing are limited (Nasiry & Popescu, 2011). Kimes et al. (1989) suggests that in markets where there is less competition, dynamic pricing may be more successful, but in markets where there is more competition, customers who do not like the idea of paying different prices for the same product, may decide to shop elsewhere. Education the consumer about why the pricing is different at different times may be the only way for the customer to understand why the price change is happening, to avoid the customer going elsewhere (Kimes et. al., 1989).

Considerations for practice

Restaurants currently use simple forms of RM whether they are doing it purposefully or not. Price is the most common focus for manipulation through early-bird specials or reverse happy hour. Coupons and promotions are often used to shift peak demand to nonpeak dining times (Kimes, 1999). Some restaurants even practice more complex manipulations of price to include time of day and or day of week, such as lunch specials or special brunch promotions (Kimes, 1999).

Meal duration is much more difficult for restaurants to manipulate. Restaurant operators have to understand how to best make their operations efficient, understand their customer demand, as well as knowing how to influence their customers meal duration (Kimes, 1999). Kimes (1999) brings forth an interesting paradigm when looking at what a restaurant is truly selling; is the restaurant selling a meal or event, or are they selling an amount of time? Looking

at time in this aspect is especially hard for restaurants since it can be very difficult to estimate meal duration (Kimes, 1999). Other sectors within hospitality, such as hotels, airlines, cruise-lines, and car-rental, who are successful with their RM practices have firm control over the duration their customer is with them (Kimes, 1999).

As restaurant operators and managers evaluate their business, they most commonly focus on check average, food and beverage cost, and labor cost (Kimes, 1999). When looking at check average, the industry normally considers that a higher check average is better. To compare this to the hotel industry, for a hotel to only take into consideration high occupancy rates as an evaluation for success (Kimes et al., 1998). High occupancy does not translate into high revenue (Kimes et al., 1998), just as high check average does not translate into high revenue (Kimes, 1999). "Without information on the percentage of capacity use or occupancy of the restaurant, revenue performance cannot be evaluated" (Kimes ,1999, p. 18). When occupancy is taken into consideration during peak dining times, "a high average check may even be detrimental in times of strong demand if" (Kimes, 1999, p. 18). Customers lingering at the table after they have finished their meal, even when desert and drinks are ordered, do not replace the revenue from customers waiting for tables (Kimes, 1999).

Conclusion

As the hospitality industry continues to be successful in RM practices, the restaurant sector must learn from the air-line and hotel industries. A change on how restaurants worry about customer satisfaction is necessary. The literature shows that the restaurant industry can introduce ways to implement RM by controlling meal duration, without impacting customer satisfaction. Customer acceptance to these RM practices are likely to be acceptable to customers as the other industries within hospitality have already introduced RM models into their business (Kimes &

Wirtz, 2003). Building demand-based RM models can be beneficial to both the restaurant and its customers. These models will help restaurant operators and managers make better pricing decisions to generate higher revenue, which in turn should entice more customers to patronize the restaurant without cannibalizing revenues (Kimes & Wirtz, 2003; Thompson, 2015).

Theoretical Framework

The theoretical framework for this project is provided by two theories: Commodity Theory and Prospect Theory. Provided below is a discussion of each theory and their associated hypotheses. Several experimental hypotheses are then proposed.

Commodity Theory

Commodity theory was introduced by Brock (1968) and describes how individuals respond to products with limited or scarce supply. The foundational assertion of this theory is that an individual will perceive of a product with limited supply as valuable or attractive (Brock & Brannon, 1992). In the context of this project, the assumption is that a restaurant at peak dining times will be understood by the customer as having a limited and perishable supply of tables and chairs in keeping with the tenets of Commodity Theory, will be perceived as more desirable. Using Commodity Theory, this study proposes these hypotheses:

H_{1a}: A patron's perception of the restaurant will affect the minimum discount that would they would consider to make them want to finish their meal early.

H_{1b}: A patron's perception of the restaurant will affect the minimum discount that would definitely make them want to finish their meal early

Prospect Theory

The second theory informing this project is Prospect Theory, introduced by Kahneman and Tversky (1979). Kahneman and Tversky discuss how individuals perceive of discounts and

premiums or surcharges. People consider discounts fairer than premiums or surcharges (Kahneman and Tversky, 1979). For this project, in keeping with Prospect Theory, the assumption will be that the customer will make a decision to either take a discount to leave early or pay a surcharge to stay later based on which scenario is best suited for them.

Therefore, this study proposes these hypotheses:

H_2: The participant's perception of the reasonability of a fixed meal duration will impact the discount they will need in order to finish their meal earlier than the fixed meal duration time.

H_3: Restaurant patrons with different socioeconomic status (i.e. household income) will have different opinions regarding a fixed meal duration and their willingness to take a discount to leave early or pay a surcharge to stay longer.

Conceptual Model

A conceptual model has been generated to frame this project. A conceptual model "explains, either graphically or in narrative form, the main things to be studied—the key factors, concepts, or variables—and the presumed relationships among them" (Miles & Huberman, 1994, p. 18). For this particular study, the conceptual model describes how the hypotheses influence the customer's perception of scarcity (commodity theory) and how that affects the customer's perception of meal duration (prospect theory) (see Figure 1).

Hypothesis 1 takes into consideration a customer's perception of scarcity and how a discount or a surcharge will influence the meal duration. Hypothesis 2 influences the model by taking into consideration the customer's perception of a fixed meal duration. Hypothesis 3 infers that a customer's socioeconomical status will also affect the customer's meal duration.

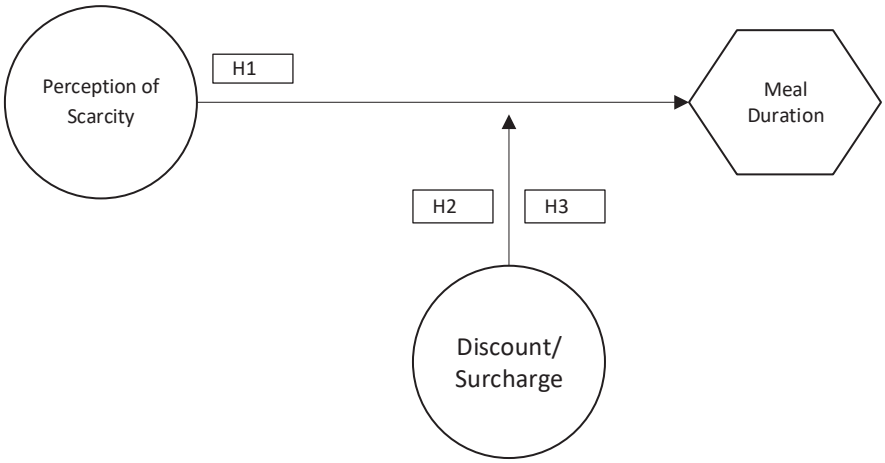

Figure 1. Conceptual model.

CHAPTER THREE

Methodology

Introduction

This project builds on the research of Kimes, Wirtz and Noone (2002), examining customers' perception of how long it should take to eat, while adding to the body of research exploring a customer's perception of a fixed meal duration and willingness to accept discounts and surcharges based on meal duration. Of particular interest is the utility of restricting customer time at table as a driver of revenue in restaurants, underpinned theoretically by Brock's (1968) Commodity Theory and Kahneman and Tversky's (1979) Prospect Theory. Presented below are the research question and hypotheses driving this project, the study design, methods for data collection, and plan for analysis.

Research question:

Are time constraints at a restaurant acceptable to the general population?

Using Commodity Theory (Brock, 1968), this study proposes these hypotheses:

H_{1a}: A patron's perception of the restaurant will affect the minimum discount that would they would consider to make them want to finish their meal early.

H_{1b}: A patron's perception of the restaurant will affect the minimum discount that would definitely make them want to finish their meal early

Using Prospect Theory (Kahneman & Tversky, 1979), this study proposes these hypotheses:

H_2: The participant's perception of the reasonability of a fixed meal duration will impact the discount they will need in order to finish their meal earlier than the fixed meal duration time.

H_3: Restaurant patrons with different socioeconomic status (i.e. household income) will have different opinions regarding a fixed meal duration and their willingness to take a discount to leave early or pay a surcharge to stay longer.

Research design

The design for this project is a quantitative, random survey design: data was gathered through an anonymous, voluntary Qualtrics survey comprised of quantitative, primarily Likert-scale questions exploring the research question and associated hypotheses, above.

Sample

The minimum sample size for the survey was 600 people. This number was derived by taking the estimated total population of the United States on April 15, 2019 (7,231,730,616 people), and multiplying by 22% (the estimated amount of people who eat out on a monthly basis (Statista, 2016), which equals 328,715,028 people. Using a sample size calculator, a confidence level of 95% and a confidence interval of 4, produced the effect size for this survey of 600 people.

Participants were secured through Qualtrics. In keeping with Qualtrics process for participant solicitation, the survey was comprised of individuals who have self-selected to become part of the pool of participants who are interested in participating in the research. All surveys were sent via Qualtrics to participant-provided email destinations housed in Qualtrics databases; there is a high confidence level that the sample is representative of the populations.

Inclusion criteria

- Men and women over the age of 21
- Dined at a casual full-service restaurant in the last 30 days
- Have not dined at a casual full-service restaurant in the last 30 days

Instrumentation

The sampling method for this online survey will be random sampling.

Kimes et al. (2002) based their survey questions regarding price sensitivity measurement (PSM) surveys from Gabor and Granger (1966), Shaw (1992), and Lewis and Shoemaker (1997). Using the same techniques from the PSM surveys, Kimes et al. focused on a patron "typical service encounter," as a matter of time (p. 225), instead of price. The Kimes et al. (2002) survey determined that the expected dining time of the participants was 60.2 minutes. The survey for this paper used the same questions to reevaluate the expected dining time for United States restaurant patrons.

Further questions take into consideration the Rule of 100 as a way to help diminish price sensitivity when it comes to buying or spending behavior. The Rule of 100 is summed up by saying if a product sells for less than $100, then the discount should be as a percentage. If the product sells for more than $100, then the discount should be in a dollar amount (Berger, 2013). By setting the scenario with four patrons and a bill for the entire table priced at $100, this sets the stage for each patron having a shared portion of the bill of $25. Using percentages will make it easier for the participant to understand and perceive the value of the discount (Berger, 2013).

The questions are grouped in four blocks. The first block of questions (Q2.1-Q2.6) asks participants initial perception of a fixed meal duration. The second block of questions (Q3.1-Q 3.6) focuses on the participants perception of meal duration and their perceptions of leaving early for a discount. The third block of questions (Q4.1-Q4.6) focuses on the participants perception of meal duration and their perception of paying a surcharge to stay at the table longer. The last block of questions (Q5.1-Q5.5) collects the participants census information. No information collected can be used to identify the participant. Please refer to appendix B for the questionnaire.

With the questions being blocked together to make it easier for the participant to follow the line of though in the questioning, thus the questions do not systematically line up in correlation to the hypotheses. H_1 looks into the participants willingness to either take a discount to leave early, or pay a surcharge to stay longer. Questions 3.1, 3.2, and 3.5 address the participants willingness to take a discount to leave early. When the survey comes to ask the participant about the surcharge, it addresses the participants willingness in three ways. First, question 4.1 askes the participants how interested they are in paying a surcharge to stay at the table loner. Then questions 4.3 and 4.5 ask how much of a time frame the participant is willing to pay for and questions 4.4 and 4.6 address the participants willingness to pay for said time. Questions 3.5 and 4.7 as the questions are asking the participants how much their like or dislike of the restaurant influences their decision to take a discount to leave early or pay a surcharge to extend their stay beyond the given sixty minuets.

Hypothesis H_2 relates to questions 3.3 and 3.4 by asking the participants how much of a discount they would consider to leave the table early, before the sixty-minute dining period is over. The participants are asked in question 3.3, what the minimum discount they would consider to think about leaving early. and question 3.4 asks what the minimum discount would be for the participant to definitely leave the table early. Questions 5.1 through 5.5 will be used to analyze the information collected based on the participants census information to address hypothesis H_3.

Protection of Human Subjects

As the population of participants who were surveyed have opted-in to the research via Qualtrics, and no personal identifying information is being gathered, risks to participants and threats to vulnerable populations are minimal.

Consent/debriefing procedures.

Participants were provided with a consent/non-disclosure form, using UNLV IRB verbiage (see Appendix A). Participants may reserve the right to opt out of the study entirely, or choose not fill in sections of the study. Participant information will be kept anonymous.

CHAPTER FOUR

Data Analysis

Introduction

A total of 13,302 surveys were distributed by Qualtrics. A total of 636 surveys were returned with a response rate of 4.78%. Among these 636 participants, 606 met the inclusion criteria described in Chapter Three. The data analysis was performed in R-Studio version 1.1.463. R libraries “psych”, “descr”, “ggplot2”, “apaTables”, and “dplyr” where used to perform the statistical analysis. Presented below are the results of the analysis, beginning with the descriptive statistics and followed by data analysis focused on each of the four hypotheses presented in Chapter Three.

Participant Profile

Participants were evenly distributed between males and females (see Table 1). The majority of participants were over the age of 50, married and had earned a 4-year degree. Income range of the participants was divided between those earning less than $50,000 a year as a household and those earning more than $125,000 a year. All 606 participants answered yes to the portion of the consent form, reporting they believed had been to a full-service casual dining restaurant within the last 30 days. After the definition of a full-service casual dining restaurant was provided, the majority of participants stated that they had visited a full-service casual dining restaurant 1-3 times per week within the last 30 days.

Table 1

Demographic Profile of the Respondents (N = 606)

Demographic Variable	N	%
Gender		
Male	301	49.67
Female	305	50.33
Age		
21-30	26	4.29
31-40	50	8.25
41-50	47	7.76
51-60	116	19.14
61-70	234	38.61
70+	133	21.95
Marital Status		
Married	398	65.68
Widowed	39	6.44
Divorced	72	11.88
Separated	8	1.32
Never married	89	14.69
Education level		
Less than high school	3	0.50
High school graduate	73	12.05
Some college	132	21.78
2-year degree	58	9.57
4-year degree	207	34.16
Professional degree	118	19.47
Doctorate	15	2.48
Income		
Less than $50,000	157	25.91
$50,001-$75000	126	20.79
$75,001-$100,000	116	19.14
$100,001-$125,000	72	11.88
More than $125,000	135	22.28
Number of visits per week		
Never	40	6.69
1-3 times	533	89.13
4-6 times	19	3.18
7 or more	6	1.00

Descriptive statistics

Laid out below are the descriptive statistics of the study, organized by question block for ease of understanding. Within each block, the questions posed in the survey as part of the block are presented and an analysis of the findings is provided.

Question Block 2

Question block 2 asked the participants what their expected meal duration would be for a dining experience that includes four people eating at a casual full-service restaurant. Participants were asked how much time would be too short to finish their dinner, what their expected time was to finish their dinner, how long was too long to finish their dinner, and how long was too much time to finish their dinner before they considered not coming back to the restaurant (see Figure 2).

Figure 2. Summary of expected dining times.

Expected dining time was calculated at 57.16 minutes (see Table 2). This finding was in keeping with the summary of expected dining times, wherein a meal duration of 25.24 minutes

was deemed too short, 67.31 minutes was considered long and 78.79 minutes was considered or too long. In addition, according to the findings of this project, the average amount of time needed for the participant to comfortably finish their meal after the food is been brought to the table is 27.67 minutes, just under one half-hour. Important to note: according to the data, the total duration of the meal is generally expected to be 57.16 minutes, and comfortably finishing the meal takes 27.67 minutes. This means that, in order to stay within customer expectations, a restaurant has approximately 30 minutes to get the meal to the table (see Table 2).

Table 2

Mean Values of Dining Times

Dining Times	Means	STD
Expected	57.16	20.44
Long	67.31	30.20
Too Long	78.59	30.15
Short	25.24	16.15
After Dinner Served	27.67	9.96

Participants were asked how a special event would affect their decision to accept a discount to finish their meal early. A total of 172 participants (28.38%) stated that a special event would *probably* affect their decision to except a discount to finish their meal early. A similar number, 162 participants (26.73%) stated that this would *definitely* affect their decision to finish their meal early. A somewhat smaller subset, 141 (23.27%) participants stated that a special event *might or might not* affect their decision to except a discount to finish their meal early. In the two smallest subsets, 72 (11.88%) participants stated that a special event would *definitely not* affect their decision to take a discount to finish early and 59 participants (9.74%) stated that a special event would *probably not* affect their decision to take a discount to leave early.

The majority of participants, comprised of all those who said having a fixed meal duration was *extremely reasonable* (62.5%), *somewhat reasonable* (60.50%), *neither reasonable or unreasonable* (45.50%), and *somewhat unreasonable* (53.90%), stated that a special event would *definitely* or *probably* affect their decision to receive a discount to finish their meal early. Participants who stated a fixed meal duration was *extremely unreasonable* (43.70%) were the only group that stated a special event would *probably not* or *definitely not* affect their decision to accept a discount to finish their meal early.

Question Block 3

Question 3.1 asked the participants how they would feel about a fixed meal duration. The majority of participants responded that the idea of a fixed meal duration was somewhat reasonable or extremely reasonable (see Figure 3).

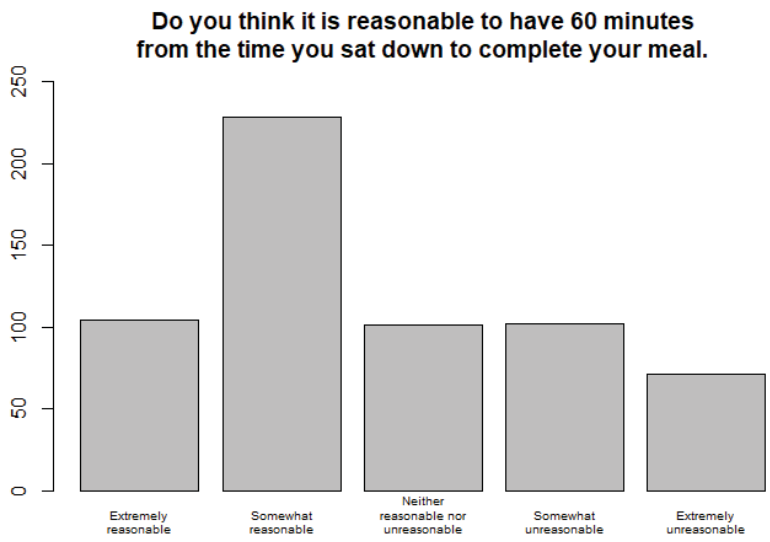

Figure 3. Do you think it is reasonable to have 60 minutes from the time you sat down to complete your meal?

Question 3.2 asked the participants if they would be interested in taking a discount to finish their dinner in under sixty minutes. The majority of participants stated that they would be interested in accepting a discount to finish their meal early (see Figure 4).

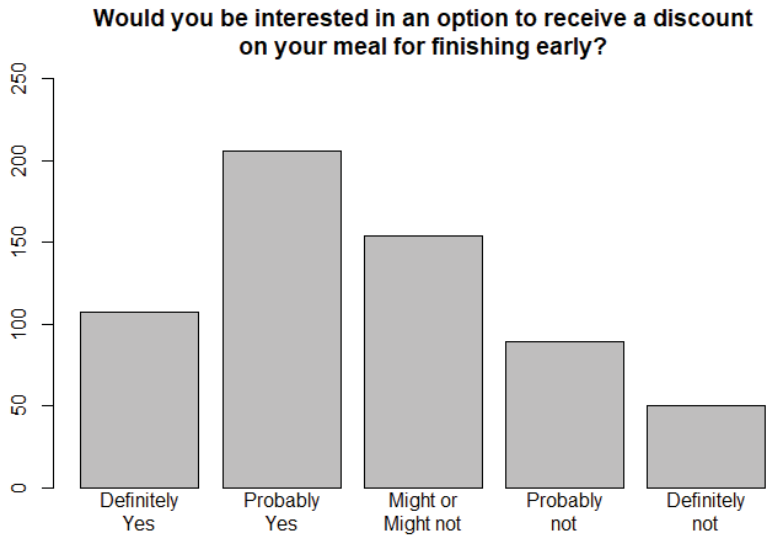

Figure 4. Would you be interested in an option to receive a discount on your meal for finishing early?

Question 3.3 asked the participants what would be the minimum discount they would consider to finish their meal early. The mean for this question was a 29.33% discount with a standard deviation of 20.20. Approximately 68% of participants could be expected to agree to a range of a 9.13% to a 49.53% discount (see Table 3).

Question 3.4 asked the participants what the minimum discount they would consider to definitely finish their meal early. The mean for this question was 34.30% with a standard deviation of 22.31. Approximately 68% of participants could be expected to agree to a range of a 11.99% discount to a 56.61% discount (see Table 3).

Table 3

Mean Values

Discounts	Means	STD
What would be the minimum discount you would consider to entice you to finish your meal early?	29.33	20.20
What would the minimum discount be that would definitely make you want to finish your meal early?	34.30	22.31

Question 3.5 asked how much the participant would have to like the restaurant to finish their meal early. Most participants stated that they would neither have to like or dislike a restaurant to consider finishing their meal early. Participants' responses also heavily favored somewhat liking the restaurant and liking the restaurant a great deal to consider finishing their meal early (see Figure 5).

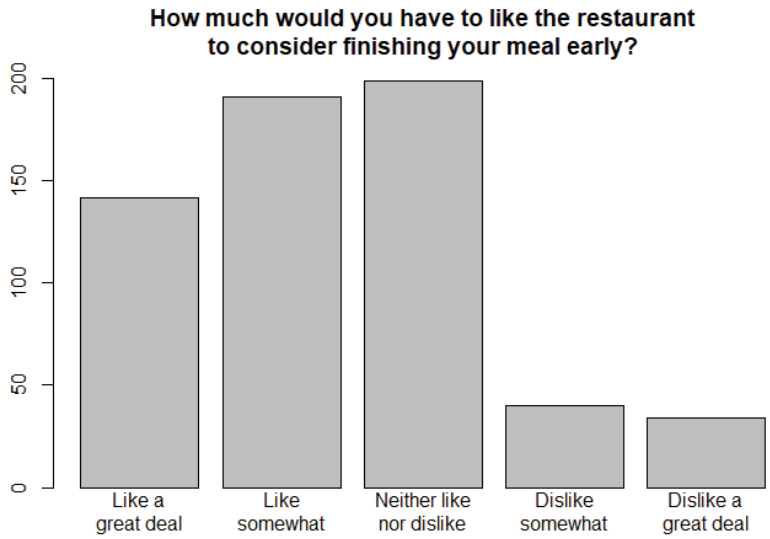

Figure 5. How much would you have to like the restaurant to consider finishing your meal early?

Question 3.6 asked the participants how celebrating a special event would change their mind about finishing a meal early. When taking into consideration a special event, the majority of participants said that this event would change their mind when it comes to taking a discount to finish their meal early (see Figure 6).

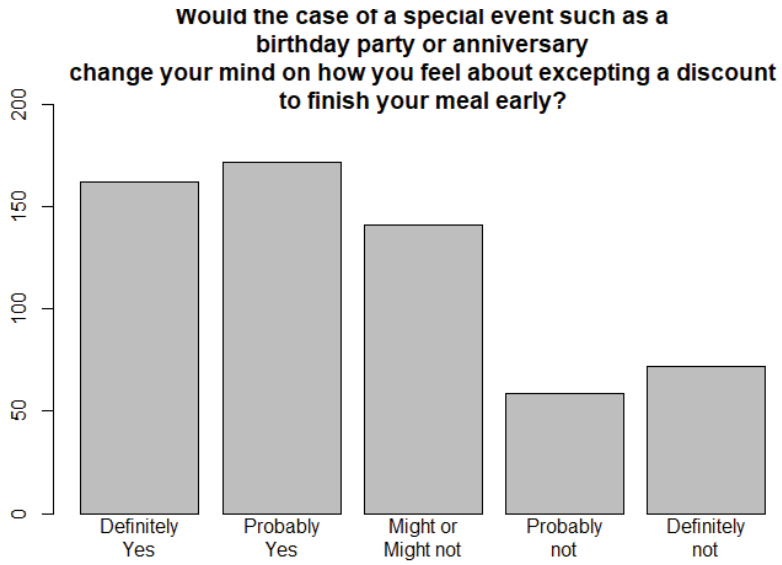

Figure 6. Would the case of a special event such as a birthday party or anniversary change your mind on how you feel about excepting a discount to finish your meal early?

Question Block 4

Question 4.1 introduced the idea of paying a surcharge to extend the dining time at the restaurant. Participants were asked if they would be willing to pay a surcharge to stay longer at the restaurant, even if they were continuing to order food and drinks. Only 9.41% of the participants indicated that they would be interested in paying a surcharge to extend their dining duration (see Figure 7).

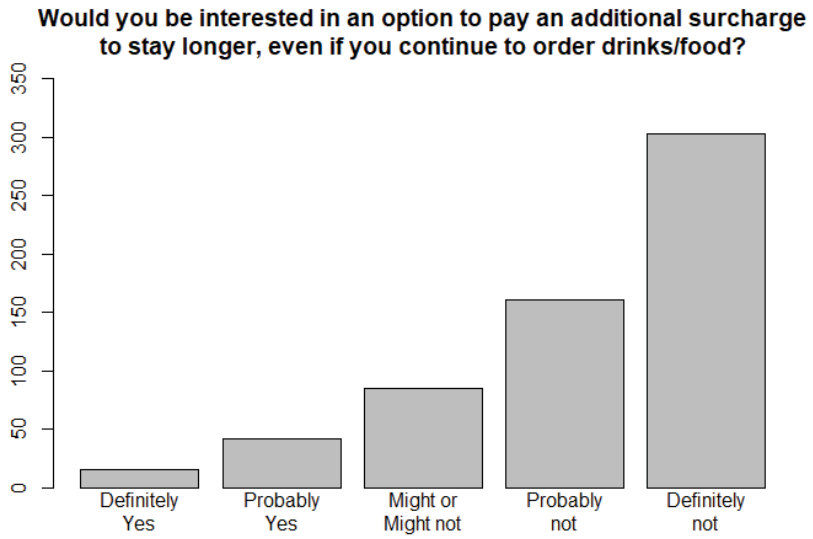

Figure 7. Would you be interested in an option to pay an additional surcharge to stay longer, even if you continue to order drinks/food?

Question 4.2 was asked of all participants, even though the majority were not interested in paying more money for more time at a restaurant. This question gave the participant two options of paying a flat fee to extend their time dining time or to pay a percentage of their bill to extend their dining time. Since the flow of the survey questions did not take the participant through both sets of questions about the two options, the participants' response going further left null data to the opposite question that the participant picked.

To avoid null data in the analysis, participants were split into two groups to finish the analysis of question block four. Just over half, 54.29%, of the participants stated they would rather pay a percentage of their bill to extend their dining time while 45.71% of the participants selected, they would rather pay a flat fee to extend their dining time. Participants who selected the flat fee as their option were then taken to questions 4.3 and 4.4.

Question 4.3 asked the participant, who selected the flat fee as their option, how much time they would expect to get if they paid a surcharge to extend their dining time. The mean for this question was 39.34 minutes with a standard deviation of 22.72. Although most participants were not open to paying more money for more time, if they had to, 68% could be expected to be willing to pay extra for an amount of time ranging from 62.06 minutes to 16.62 minutes (see Table 4).

Question 4.4 then asked the participants, who selected the flat fee as their option, how much would they be willing to pay for this extension of time. The mean for this question was found to be $12.25 with a standard deviation of 22.49, so 68% could be expected to be willing to pay between $0 to $34.74 (see Table 4).

Participants who chose a percentage of their bill to extend their dining time were taken to questions 4.5 and 4.6. Question 4.6 asked the participant how much time they would expect to extend their dining time. The data showed a mean of 36.41 minutes with a standard deviation of 21.77, for a dining extension between 59.18 minutes and 14.64 minutes (see Table 4).

Question 4.6 then asked the participant what percentage of their bill they would be willing to pay for this time extension. The mean for this question was 10.36% with a standard deviation of 16.43, for a range of between 26.79% and 6.07% (see Table 4).

Important to note, the flat fee responses and percentage responses from participants were similar regarding participants' willingness to modify their time at table.

Table 4

Mean values of Dining Times

	Means	STD
Dining Times		
Discount Selected		
What would be your expected time duration to be able to continue to sit at the table?	39.34	22.72
With the time you picked above in mind, how much additional money would you be willing to pay for this extension of time to sit at the table?	12.25	22.49
Percentage of Bill Selected		
What would be your expected time duration to be able to continue to sit at the table?	36.41	21.77
With the time you picked above in mind, how much would you be willing to pay for this extension of time to sit at the table?	10.36	16.43

Previous responses showed that participants' affinity for a restaurant did not increase their willingness to pay more. However, all participants were required to answer Question 4.7, which asked the participant how much would they have to like the restaurant to consider paying a surcharge to extend their dining time. Almost half, 46.70%, of the participants stated that they would have to like the restaurant a great deal to consider paying a surcharge to extend their dining experience (see Figure 8).

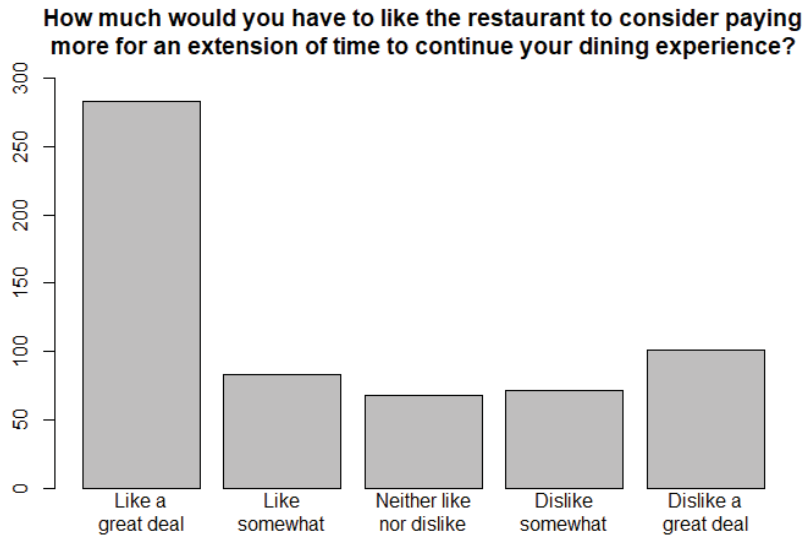

Figure 8. How much would you have to like the restaurant to consider paying more for an extension of time to continue your dining experience?

Data analysis of hypotheses

Discussed in the following sections are each of the four hypotheses proposed at the outset of this project.

Hypothesis 1A.

Regarding hypothesis one, the first calculation performed was the covariance and correlation of the participants' perception of the restaurant to the minimum discount they chose to leave the table early. If the participant selected "Extremely reasonable" the value assigned to their entry would be 1 and would follow through the Likert scale, of 5 choices, to 5 for an "Extremely unreasonable" answer. In this instance, a covariance of -4.656801 and a correlation of -.2028303. This indicates that as the participants' score on the Likert scale increases, or their perception of a fixed meal duration's acceptability decreases, the percentage of discount needed for the participant to finish their meal early decreases. In short, they need more of a discount to

finish the meal early the more they dislike the idea of a fixed meal duration. This relationship also does not represent causation between the two variables, but it does describe an inverse relationship.

Next a regression was run to determine the strength of the relationship between the two variables. The results from the regression shows the inverse relationship between the perception of the restaurant and the discount selected to leave the table early (see Table 5).

Table 5

Regression Results Using Minimum Discount from Q3.3 as the Criterion

Predictor	b	95%_CI	sr2	95%_CI	Fit
(Intercept)	45.59**	[38.98, 52.20]			
Somewhat reasonable	-11.29*	[-20.28, -2.30]	0.01	[-.01, .02]	
Neither reasonable nor unreasonable	-13.30**	[-20.66, -5.94]	0.02	[-.00, .04]	
Somewhat unreasonable	-20.62**	[-27.80, -13.45]	0.05	[.02, .08]	
Extremely unreasonable	-17.97**	[-25.12, -10.82]	0.04	[.01, .07]	
					R2 = .063** 95% CI[.03,.10]

Note. A significant b-weight indicates the semi-partial correlation is also significant; b represents unstandardized regression weights; sr2 represents the semi-partial correlation squared; square brackets are used to enclose the lower and upper limits of a confidence interval. * $p < .05$. ** $p < .01$.

Plotting the residuals for the regression allows to see if the model is a good fit for the data. A straight line fit within the model shows a good fit in part of the data, but not for all (see Figure 9).

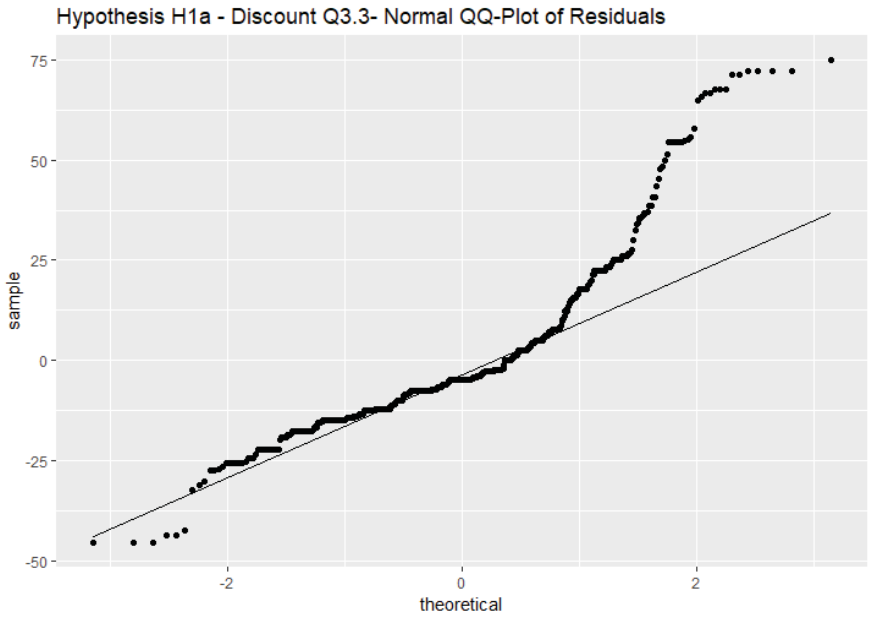

Figure 9. Hypothesis H1A: A normal QQ-plot of residuals for discount Q3.3.

Running a Shapiro-Wilks normality test verified that the data for this set were not normalized and therefore not a good fit. This test returned a P-Value of 2.2e-16 which is less than the excepted alpha of .05, meaning the data significantly deviate from a normal distribution.

Bootstrapping techniques were applied to the discount responses to normalize the data. This technique makes assumptions that values not seen in the data are impossible (Efron, 1979). Another assumption is that values outside of the range of the data are impossible (Efron, 1979). The last assumptions are that there are no time dependencies or hierarchical dependencies, and that there is no reasonable prior information about the data (Efron, 1979). Five thousand samples were run to provide the best normalization for this data set. Running a Shapiro-Wilks normality test after applying the bootstrapping method now provide a P-Value of .8453, showing that the data is now normalized and a good fit (see Figure 10).

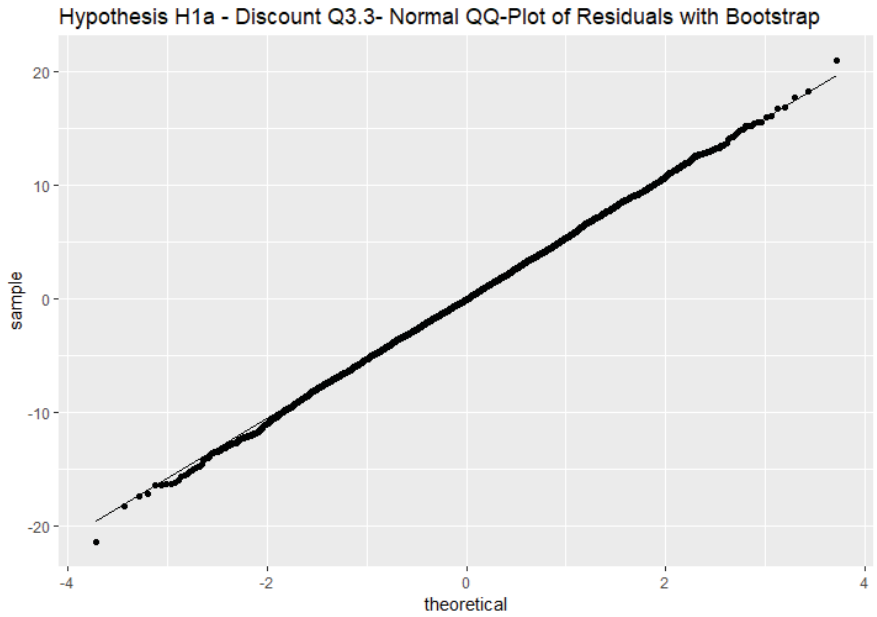

Figure 10. Hypothesis H1A: A normal QQ plot of residuals with bootstrap for discount Q3.3.

A random sample of Likert responses were generated to match the 5000 bootstrapped discount samples. The probabilities of the original responses (32.84% Neither like nor dislike, 31.52% Like somewhat, 23.43% Like a great deal, 6.60% Dislike somewhat, and 5.61% Dislike a great deal) were kept in place to simulate these 5000 responses. These responses were then run in a regression against the bootstrapped discount data points (see Table 6).

Table 6

Regression results using Bootstrapped Q3.3 as the criterion

Predictor	b	b_95%_CI	sr2	sr2_95%_CI	Fit
(Intercept)	87.88**	[87.56,88.19]			
Somewhat reasonable	-0.04	[-0.45, 0.37]	0	[-.00, .00]	
Neither reasonable nor unreasonable	0.28	[-0.13, 0.68]	0	[-.00, .00]	
Somewhat unreasonable	-0.05	[-0.70, 0.60]	0	[-.00, .00]	
Extremely unreasonable	-0.36	[-1.04, 0.32]	0	[-.00, .00]	
					R2 = .001
					95% CI[.00,.00]

Note. A significant b-weight indicates the semi-partial correlation is also significant; b represents unstandardized regression weights; sr2 represents the semi-partial correlation squared; square brackets are used to enclose the lower and upper limits of a confidence interval. ** $p < .05$.

Analyzing the results from this regression shows a r-squared value of .001. The null hypothesis is therefore rejected because the r-squared is less than the accepted alpha of .05. By rejecting the null hypothesis, it is assumed that a patrons' perception of the restaurant will have an effect on whether or not they are willing to take a discount to leave early.

Hypothesis 1B.

The same tests were run concerning the participants' perception of the restaurant against the minimum discount that would definitely make them want to finish their meal early. The covariance, -4.137607, and correlation, -0.1632061, shows an inverse relationship between the two variables. A regression shows similar results of the regression run against Q3.3 (see Table 7).

Table 7

Regression results using minimum discount from Q3.4 as the criterion

Predictor	b	b_95%_CI	sr2	sr2_95%_CI	Fit
(Intercept)	51.09**	[43.76, 58.42]			
Somewhat reasonable	-15.66**	[-25.63, -5.70]	0.01	[-.00, .03]	
Neither reasonable nor unreasonable	-13.08**	[-21.24, -4.92]	0.02	[-.00, .03]	
Somewhat unreasonable	-21.85**	[-29.80, -13.89]	0.05	[.01, .08]	
Extremely unreasonable	-17.67**	[-25.60, -9.74]	0.03	[.00, .06]	
					R2 = .055** 95% CI[.02,.09]

Note. A significant b-weight indicates the semi-partial correlation is also significant; b represents unstandardized regression weights; sr2 represents the semi-partial correlation squared; Square brackets are used to enclose the lower and upper limits of a confidence interval. ** p < .01.

A plot of the residuals shows a similar plot to the results of Q3.3, showing not a good fit for the data (see Figure 11).

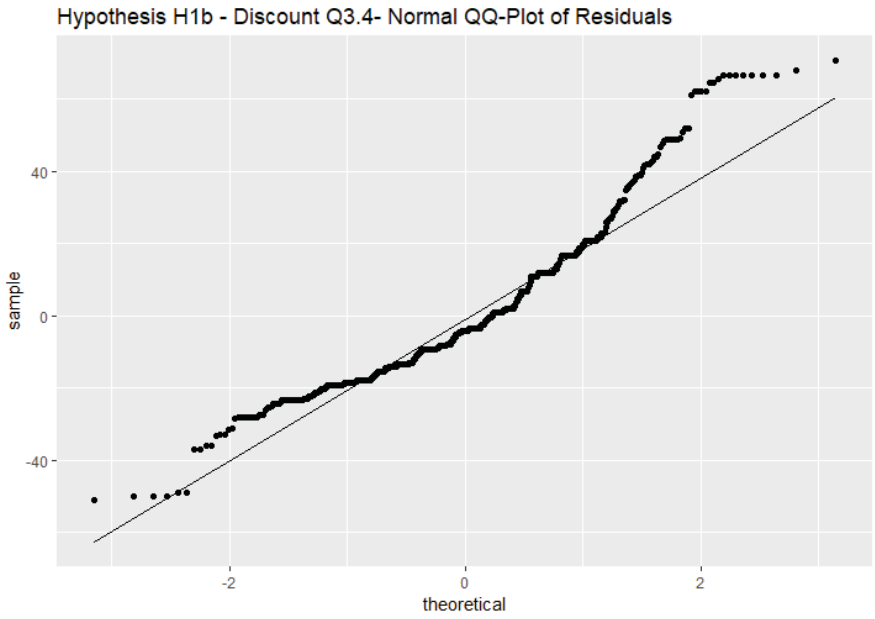

Figure 11. Hypothesis H1B: A normal QQ-plot of residuals for discount Q3.4.

Running a Shapiro-Wilks normality test concludes that the data does not come from a normalized set. Bootstrapping techniques were applied to the discount responses to normalize the data. Five thousand samples were run to provide the best normalization for this data set. Running a Shapiro-Wilks normality test after applying the bootstrapping method now provide a P-Value of .6559, showing that the data is now normalized and a good fit (see Figure 12).

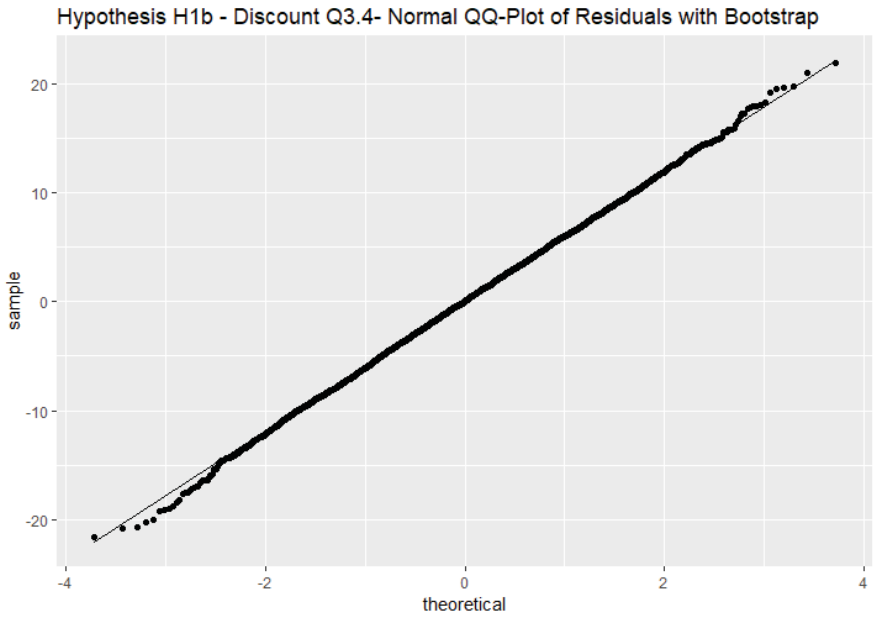

Figure 12. Hypothesis H1B: A normal QQ-plot of residuals with bootstrap for discount Q3.4.

A random sample of Likert responses were generated to match the 5000 bootstrapped discount samples. The probabilities of the original responses (32.84% Neither like nor dislike, 31.52% Like somewhat, 23.43% Like a great deal, 6.60% Dislike somewhat, and 5.61% Dislike a great deal) were kept in place to simulate these 5000 responses. These responses were then run in a regression against the bootstrapped discount data points (see Table 8).

Table 8

Regression results using Bootstrapped Q3.4 as the criterion

Predictor	b	b_95%_CI	sr2	sr2_95%_CI	Fit
(Intercept)	102.91**	[102.57, 103.26]			
Somewhat reasonable	0.15	[-0.31, 0.60]	0	[-.00, .00]	
Neither reasonable nor unreasonable	0.14	[-0.31, 0.60]	0	[-.00, .00]	
Somewhat unreasonable	0.14	[-0.59, 0.87]	0	[-.00, .00]	
Extremely unreasonable	0.46	[-0.33, 1.25]	0	[-.00, .00]	
					R2 = .000
					95% CI[.00,.00]

Note. A significant b-weight indicates the semi-partial correlation is also significant; b represents unstandardized regression weights; sr2 represents the semi-partial correlation squared; square brackets are used to enclose the lower and upper limits of a confidence interval. ** p < .01.

Again, the null hypothesis is therefore rejected because the r-squared value is less than the accepted alpha of .05, and it is assumed that the participants' perception of the restaurant will have an effect to whether the patron will accept a discount to finish their meal early.

Hypothesis 2.

To analyze the impact a discount has based on participants' perception of the reasonability of a fixed meal duration, an ANOVA is used to compare the multiple means of the discount selected for each of the five choices from question Q3.1. The five choices of acceptance presented to the participant are extremely reasonable, somewhat reasonable, neither reasonable nor unreasonable, somewhat unreasonable, and extremely unreasonable. Plotting the discount entered by the participants results in Table 8, immediately below (see Figure 13).

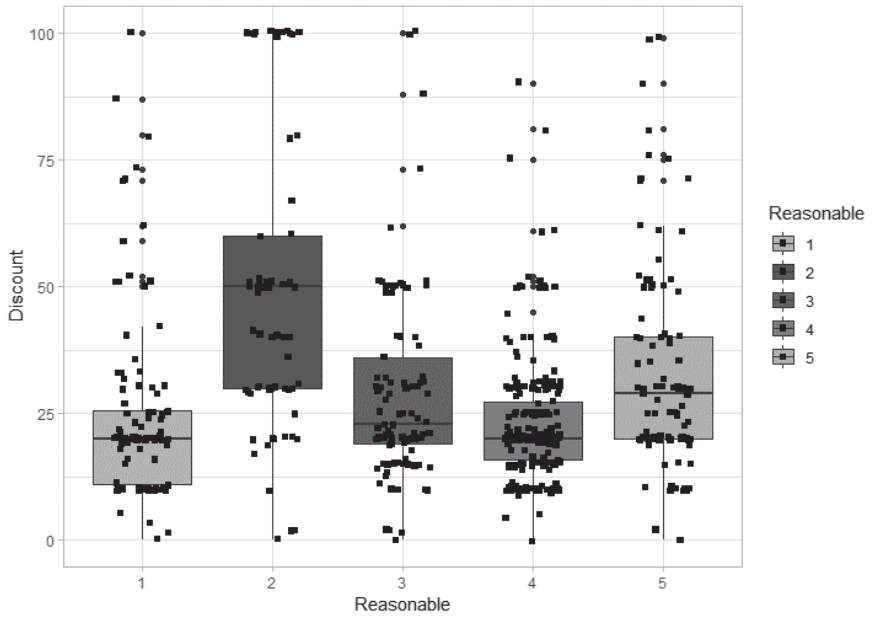

Figure 13. A boxplot of discount (Q3.3) vs reasonable (Q3.1).

An ANOVA analysis was preformed showing statistical significance, indicating that the level of Reasonability chosen by the participants was associated with the discount selected by the participant to finish their meal early (see Table 9).

Table 9

Summary of ANOVA Discount (Q3.3) ~ Reasonable (Q3.1)

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Reasonable	4	41164	10291	30.05	0.00***
Residuals	601	205809	342		

Note. *** $p < 0.001$.

A Tukey Honest Significant Differences test was then run to preform multiple pairwise-comparisons between the means of the groups. This test showed a significant difference between 5-1, and 5-4 with adjusted P-Values less than alpha of 0.05. Groups 5-1 and 5-4 fail to reject the null hypothesis. For all other groups, the null hypothesis is rejected and the alternative is excepted. This test also shows that the confidence interval for Somewhat reasonable to all other levels do not differ among themselves, but are different from Reasonable control (see Table 10).

Table 10

Tukey multiple comparisons of means 95% family-wise confidence level. Fit: aov(formula = Discount (Q3.3) ~ Reasonable (Q3.1))

Reasonable				
	diff	lwr	upr	p adj
2-1	25.18	17.32	32.91	0.00
3-1	4.40	-2.71	11.43	0.44
4-1	-1.26	-7.25	4.73	0.98
5-1	8.08	1.03	15.14	0.02
3-2	-20.76	-28.60	-12.92	0.00
4-2	-26.38	-33.26	-19.50	0.00
5-2	-17.03	-24.86	-9.21	0.00
4-3	-5.62	-11.67	0.43	0.08
5-3	3.72	-3.38	10.83	0.61
5-4	9.34	3.31	15.37	0.00

To test the normality of the data, a Shapiro-Wilks normality test was run. This test showed a P-Value of 2.2E-16, which is less than alpha of .05, The data were not normalized, and further modeling must be done to normalize the data. This can also be seen when plotting a QQ-Plot of the residuals of the ANOVA (see Figure 14).

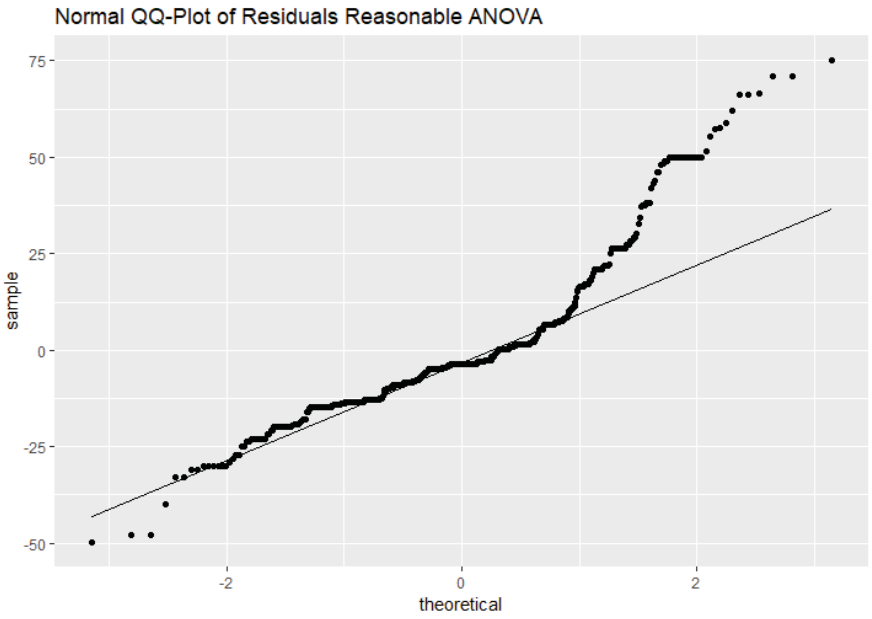

*Figure 14. A n*ormal QQ-plot of residuals reasonable ANOVA.

To keep the data modeling the same, the bootstrapped discount data used in H1 will be used again to keep the data the same for normalizing and analyzing the data for H2. The same assumptions exist for bootstrapping in this example as were present in H1. A random sample of Likert responses for Reasonable Q3.1, were generated to match the 5000 bootstrapped discount samples. The probabilities of the original responses (37.62% Somewhat reasonable, 17.16% Extremely reasonable, 16.83% Somewhat unreasonable, 16.67% Neither reasonable nor unreasonable, and 11.72% Extremely unreasonable) were kept in place to simulate these 5000 responses. These responses were then run in an ANOVA against the bootstrapped discount data points (see Table 11).

Table 11

Summary of ANOVA Discount (Q3.3) ~ Reasonable (Q3.1) with Bootstrap

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Reasonable	4	618	154.56	4.29	0.002**
Residuals	4995	179989	36.03		

Note. ** $p < 0.01$.

A Tukey Honest Significant Differences test was then run to preform multiple pairwise-comparisons between the means of the groups. This test showed a significant difference between 5-2, 5-3, and 5-4 with adjusted P-Values less than alpha of 0.05. Groups 5-2, 5-3 and 5-4 fail to reject the null hypothesis. For all other groups, the null hypothesis is rejected and the alternative is excepted (see Table 12).

Table 12

Tukey multiple comparisons of means 95% family-wise confidence level. Fit: aov(formula = Discount (Q3.3) ~ Reasonable (Q3.1)) Bootstrap

Reasonable				
	diff	lwr	upr	p adj
2-1	0.59	-0.09	1.26	0.12
3-1	0.58	-0.22	1.38	0.27
4-1	0.50	-0.28	1.28	0.41
5-1	-0.42	-1.29	0.46	0.69
3-2	-0.01	-0.70	0.68	1.00
4-2	-0.09	-0.76	0.57	1.00
5-2	-1.01	-1.78	-0.23	0.00
4-3	-0.08	-0.88	0.71	1.00
5-3	-1.00	-1.89	-0.11	0.02
5-4	-0.91	-1.78	-0.04	0.03

To test the normality of the data, a Shapiro-Wilks normality test was run. This test showed a P-Value of .6031, which is greater than alpha of .05, showing that the data is

normalized. This can also be seen when plotting a QQ-Plot of the residuals of the ANOVA (see Figure 15).

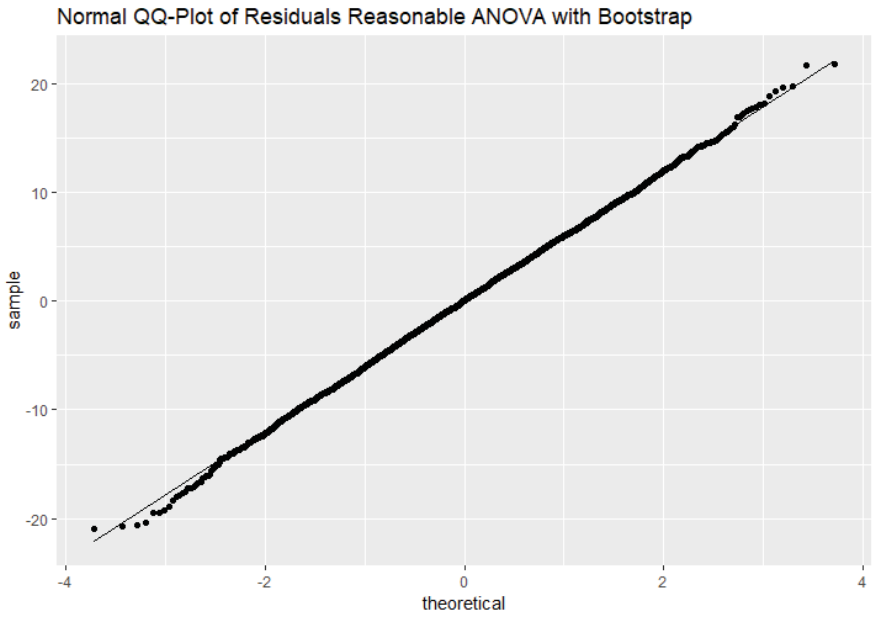

*Figure 15. A n*ormal QQ-plot of residuals for reasonable ANOVA with bootstrap.

To test the means for the participants' answers from their stated Interest in accepting a discount to finish their meal early, from question Q3.2, to the discount they selected, an ANOVA was performed. Fist a boxplot of the data is created to visual the means of discounts the participants selected for each of the levels of interest (see Figure 16).

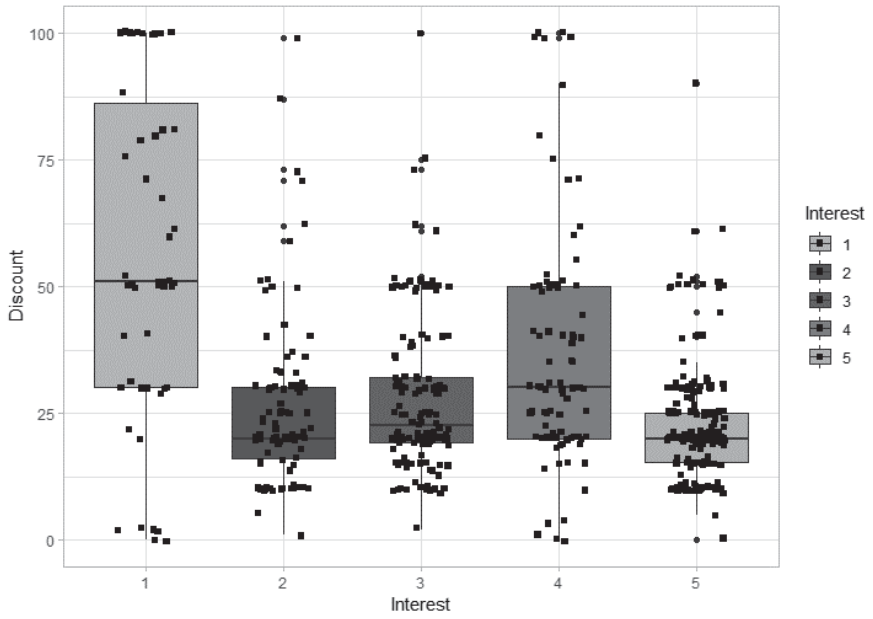

Figure 16. A boxplot of discount (Q3.3) vs interest (Q3.2).

An ANOVA analysis is preformed showing statistical significance, indicating that the level of Interest chosen by the participants are associated with the discount selected by the participant to finish their meal early (see Table 13).

Table 13

Summary of ANOVA Discount (Q3.3) ~ Interest (Q3.2)

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Interest	4	53545	13386	41.59	0.00***
Residuals	601	193428	322		

Note. *** $p < 0.001$.

A Tukey Honest Significant Differences test is then run to preform multiple pairwise-comparisons between the means of the groups. This test shows a significant difference between 4-2, 4-3, and 5-3 with adjusted P-Values less than alpha of 0.05. Here the null hypothesis is accepted for groups 4-2, 4-3, and 5-3. For all other groups, the null hypothesis is rejected and the alternative is excepted. This test also shows that the confidence interval for Extremely reasonable

to all other levels do not differ among themselves, but are different from Interest control (see Table 14).

Table 14

Tukey multiple comparisons of means 95% family-wise confidence level. Fit: aov (formula = Discount (Q3.3) ~ Interest (Q3.2))

Interest				
	diff	lwr	upr	p adj
2-1	-31.45	-39.85	-23.04	0.00
3-1	-28.91	-36.90	-20.92	0.00
4-1	-20.30	-28.98	-11.63	0.00
5-1	-34.16	-41.90	-26.43	0.00
3-2	2.54	-3.64	8.71	0.79
4-2	11.14	4.10	18.18	0.00
5-2	-2.72	-8.57	3.13	0.71
4-3	8.61	2.07	15.14	0.00
5-3	-5.25	-10.48	-0.02	0.05
5-4	-13.86	-20.09	-7.64	0.00

To test the normality of the data, a Shapiro-Wilks normality test was run. This test showed a P-Value of 2.2E-16, which is less than alpha of .05, The data were not normalized, therefore additional data modeling must be done to normalize the data. This can also be seen when plotting a QQ-Plot of the residuals of the ANOVA (see Figure 17).

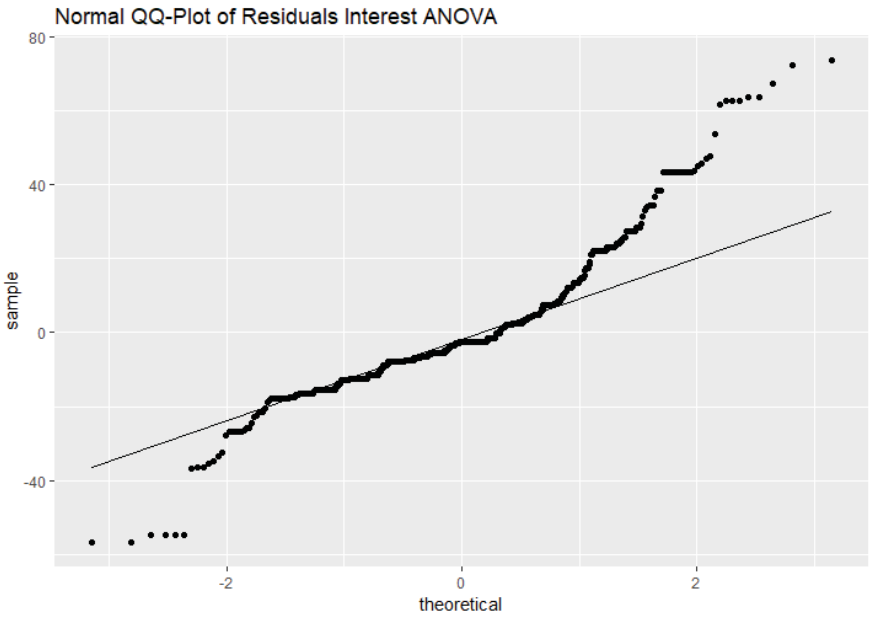

*Figure 17. A n*ormal QQ-plot of residuals for interest ANOVA.

To normalize the data, a random sample of Likert responses for Interest Q3.2, were generated to match the 5000 bootstrapped discount samples. The probabilities of the original responses (33.99% Probably yes, 25.12% Might or might not, 17.66% Definitely yes, 14.69% Probably no, and 8.25% Definitely no) were kept in place to simulate these 5000 responses. These responses were then run in an ANOVA against the bootstrapped discount data points (see Table 15).

Table 15

Summary of ANOVA Discount (Q3.3) ~ Interest (Q3.2) with Bootstrap

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Interest	4	83	20.69	0.572	0.683
Residuals	4995	180524	36.14		

A Tukey Honest Significant Differences test is then run to preform multiple pairwise-comparisons between the means of the groups. This test shows no significant difference between

any of the groups as all P-Values are greater than the alpha of .05. Thus, the null hypothesis is rejected and the alternative is excepted for all groups (see Table 16).

Table 16

Tukey multiple comparisons of means 95% family-wise confidence level. Fit: aov (formula = Discount (Q3.3) ~ Interest (Q3.2)) with Bootstrap

Interest				
	diff	lwr	upr	p adj
2-1	-0.22	-0.90	0.47	0.91
3-1	-0.19	-0.91	0.52	0.95
4-1	-0.36	-1.17	0.45	0.74
5-1	0.08	-0.91	1.08	1.00
3-2	0.02	-0.58	0.63	1.00
4-2	-0.14	-0.86	0.58	0.98
5-2	0.30	-0.62	1.22	0.90
4-3	-0.17	-0.91	0.58	0.97
5-3	0.28	-0.67	1.22	0.93
5-4	0.44	-0.57	1.46	0.76

To test the normality of the data, a Shapiro-Wilks normality test was run. This test showed a P-Value of .602, which is greater than alpha of .05, showing that the data is normalized. This can also be seen when plotting a QQ-Plot of the residuals of the ANOVA (see Figure 18).

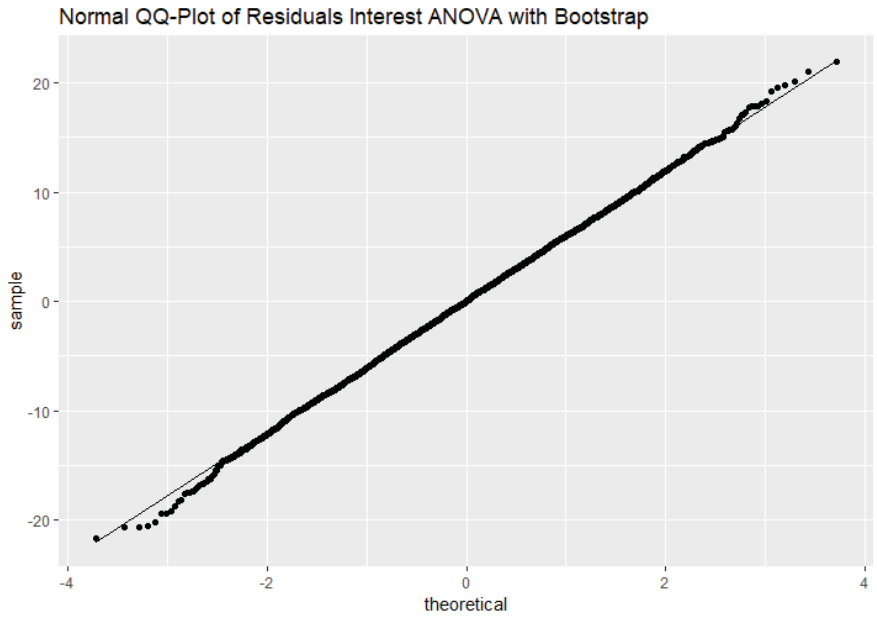

Figure 18. A normal QQ-plot of residuals interest ANOVA with bootstrap.

A two-way ANOVA was run to test that there was no difference in the means of factor Reasonable, that there is no difference in the means of factor Interest, and that there is no interaction between factors Reasonable and Interest (see Table 17).

Table 17

Summary of 2-way ANOVA Discount (Q3.3) ~Reasonable (Q3.1) + Interest (Q3.2)

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Reasonable	4	41164	10291	33.55	0.00**
Interest	4	22707	5677	18.51	0.00**
ReasonablexInterest	16	7375	461	1.52	0.09
Residuals	597	183101	307		

Note. ** $p < 0.01$.

From this test, we can conclude that both Reasonable and Interest are statistically significant. Reasonable is the most significant factor variable. These results show that changing participants' responses in Reasonable or Interest will impact significantly the mean of the percent discount. The interaction between the two variables is not significant with an adjusted P-

Value, 0.0858, which is greater than alpha of 0.05. This indicates that the relationship between Reasonable and discount does not depend on the participants' Interest (see Table 18).

Table 18

Means and standard deviations for Discount as a function of a 5(Reasonable (Q3.1)) X 5(Interest (Q3.2)) design

	Interest									
	1		2		3		4		5	
Reasonable	M	SD	M	SD	M	SD	M	SD	M	SD
1	56.67	37.86	24.70	17.50	17.00	7.48	35.71	32.01	21.58	11.46
2	62.06	33.18	41.50	28.87	39.57	11.80	53.55	24.87	20.50	5.66
3	35.00	42.22	27.86	11.04	32.20	18.18	28.00	26.75	23.46	10.59
4	48.60	23.96	21.73	10.48	21.83	8.87	28.35	14.60	22.54	12.12
5	50.33	32.51	31.43	14.65	27.97	15.10	40.18	23.52	24.55	11.63

Note. M and SD represent mean and standard deviation, respectively.

To test the normality of the data, a Shapiro-Wilks normality test was run on the two-way ANOVA. This test shows a P-Value of 2.2E-16, which is less than alpha of .05, The data were not normalized, therefore additional modeling must be done to normalize the data. This can also be seen when plotting a QQ-Plot (see Figure 19) and histogram of the residuals of the two-way ANOVA (see Figure 20).

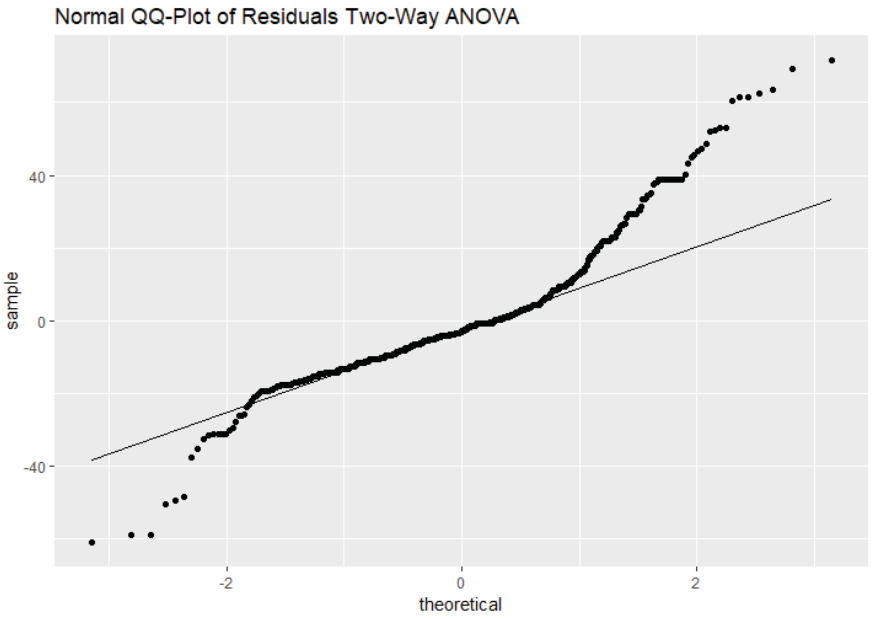

Figure 19. A normal QQ-plot of residuals two-way ANOVA.

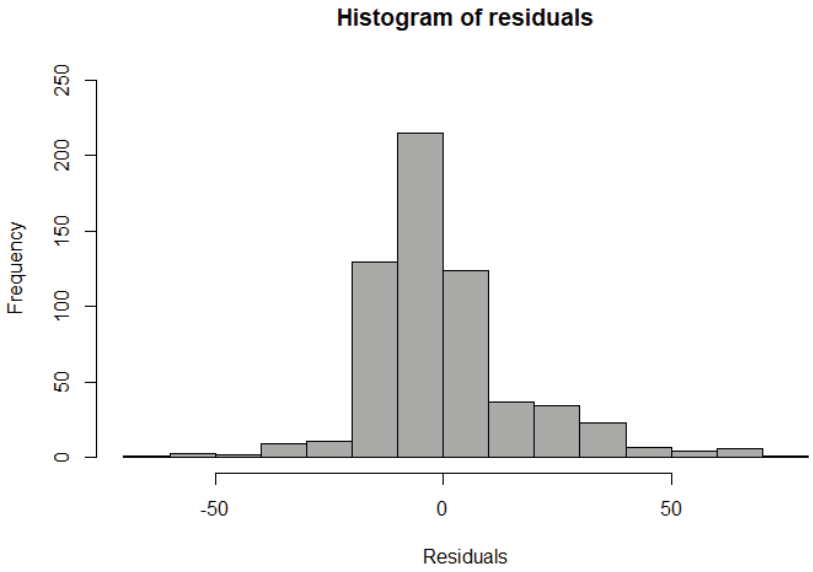

Figure 20. A histogram of residuals.

Since the data from the two-way ANOVA is not from a normal distribution, the test was performed again using the normalized discount data set against the 5000 random generated responses for Reasonable (Q3.1) and Interest (Q3.2) (see Table 19).

Table 19

Summary of 2-way ANOVA Discount (Q3.3) ~Reasonable (Q3.1) + Interest (Q3.2) with Bootstrap

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Reasonable	4	618	154.56	4.285	0.002**
Interest	4	88	22.03	0.611	0.655
ReasonablexInterest	16	473	29.58	0.82	0.664
Residuals	4975	179427	36.07		

Note. ** $p < 0.01$.

From this test, we can conclude that Reasonable is statistically significant. These results show that changing participants' responses in Reasonable will impact significantly the mean of the percent discount. The interaction between the two variables is not significant with an adjusted P-Value, 0.66358, which is greater than alpha of 0.05. This indicates that the relationship between Reasonable and discount does not depend on the participants' Interest (see Table 20).

Table 20

Means and standard deviations for Discount as a function of a 5(Reasonable (Q3.1)) X 5(Interest (Q3.2)) design with Bootstrap

	Interest									
	1		2		3		4		5	
Reasonable	M	SD	M	SD	M	SD	M	SD	M	SD
1	103.29	5.63	102.32	5.77	102.59	6.28	102.94	6.72	102.58	6.32
2	103.29	5.84	103.26	5.93	103.21	5.97	103.23	5.97	103.66	6.20
3	103.44	6.15	103.36	5.73	103.15	5.75	103.30	6.31	102.90	5.29
4	103.29	6.26	103.18	5.97	102.96	6.21	102.72	6.29	105.03	6.85
5	102.37	6.19	102.44	6.26	102.87	5.48	101.19	5.94	101.77	5.75

Note. M and SD represent mean and standard deviation, respectively.

To test the normality of the data, a Shapiro-Wilks normality test was run on the two-way

ANOVA. This test shows a P-Value of 0.6031, which is greater than alpha of .05, The data is normalized, and can also be seen when plotting a QQ-Plot (see Figure 21) and histogram of the residuals of the two-way ANOVA (see Figure 22).

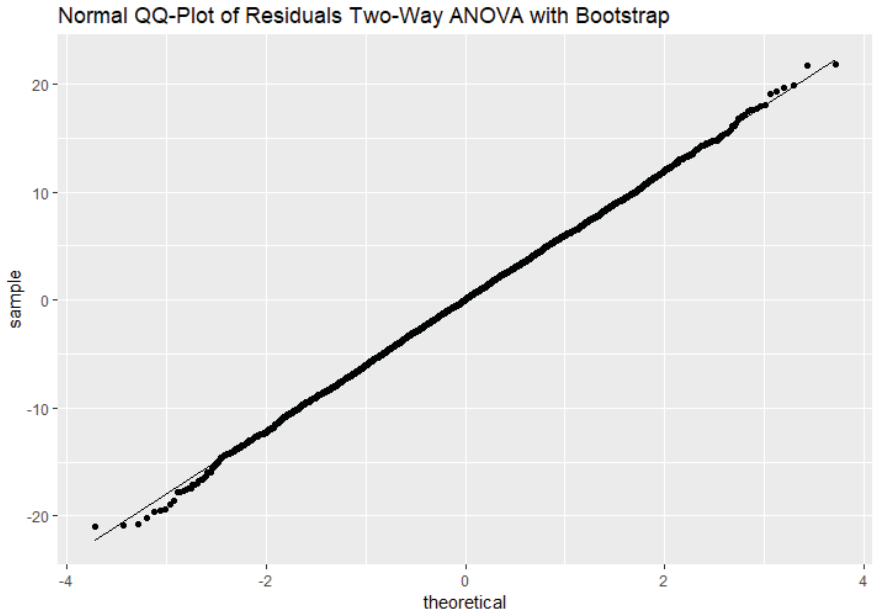

*Figure 21. A n*ormal QQ-plot of residuals two-way ANOVA with bootstrap.

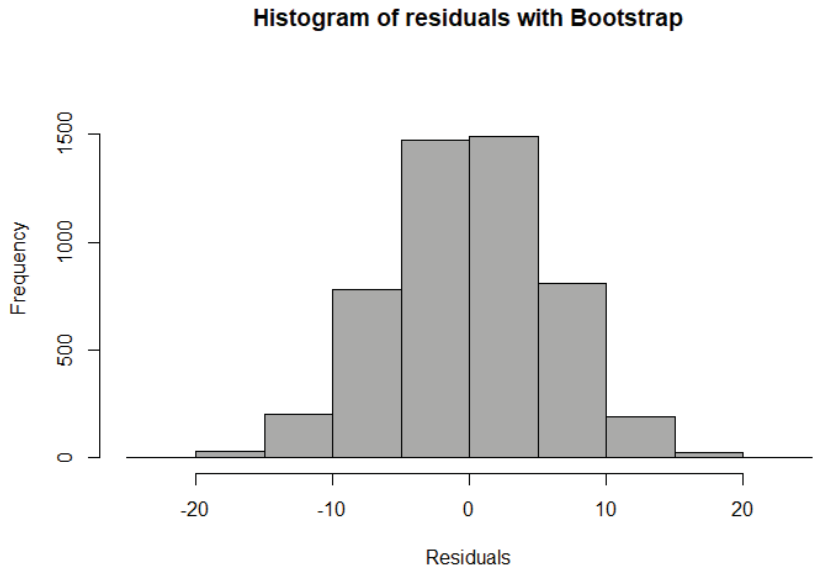

Figure 22. A histogram of residuals with bootstrap.

With the evidence gathered from running these tests, it is assumed that the participant's perception of the reasonability of a fixed meal duration, does have an impact on the participant's willingness to finish their meal early.

Hypothesis 3.

A chi-squared tests was run to analyze the independence of the socioeconomic status compared to the participant's perception of the restaurant, willingness to take a discount to finish their dinner early, and their willingness to pay a surcharge to stay at the table longer. A normal chi-squared test was performed as well as a simulated test based on 2000 replicates (this test strengthens the P-Value of the data). Each variable from Block five were tested (see Table 21). The results of this test show that there were only two socioeconomic statuses that reject the null hypothesis in favor of the alternative. Both Age and Martial Status show P-Values of less than the alpha of 0.05 (see Table 21).

Table 21

Pearson's-Chi-squared test Census information Question Block 5

	X-squared	DF	P-Value	Simulated P-Value
Gender				
Perception of a fixed meal duration	5.02	4	0.29	0.27
Willingness to take a discount	3.95	4	0.41	0.41
Willingness to pay a surcharge - Flat Fee	2.59	5	0.76	0.77
Willingness to pay a surcharge - Percentage	6.46	5	0.26	0.27
Age				
Perception of a fixed meal duration	32.28	20	0.04*	0.04*
Willingness to take a discount	43.72	20	0.01**	0.01**
Willingness to pay a surcharge - Flat Fee	35.83	25	0.07	0.08
Willingness to pay a surcharge - Percentage	33.81	25	0.11	0.12
Marital Status				
Perception of a fixed meal duration	32.02	16	0.01**	0.01**
Willingness to take a discount	9.50	16	0.89	0.90
Willingness to pay a surcharge - Flat Fee	31.46	20	0.05*	0.05
Willingness to pay a surcharge - Percentage	39.27	20	0.01**	0.01**
Education level				
Perception of a fixed meal duration	32.99	24	0.10	0.10
Willingness to take a discount	26.76	24	0.32	0.32
Willingness to pay a surcharge - Flat Fee	27.50	30	0.60	0.60
Willingness to pay a surcharge - Percentage	28.37	30	0.55	0.55
Income				
Perception of a fixed meal duration	11.55	16	0.77	0.78
Willingness to take a discount	14.84	16	0.54	0.53
Willingness to pay a surcharge - Flat Fee	6.24	20	1.00	1.00
Willingness to pay a surcharge - Percentage	13.70	20	0.85	0.85

Note. Simulated P-Value based on 2000 replicates; ** $p < 0.01$, * $p < 0.05$.

When looking at Age, the participants' perception of a fixed dining duration, P-Value 0.04298, as well willingness to take a discount, P-Value 0.00249, is less than the alpha of 0.05, and reject the null hypotheses in favor of the alternative, meaning age has an effect on the participants' perception of a fixed meal duration and as well as willingness to take a discount (see Table 22).

Two age groups, 71 or older and 41-50, did not favor the idea of a fixed meal duration. Only 36% of participants 71 or older had a positive perception of a fixed meal duration and only 49.2% of participants who were 41-50 had a positive perception of a fixed meal duration. Participants who were 61-70 had the highest positive perception of a fixed meal duration at 77.90%, while all the other groups were around 60% favorability for a fixed meal duration (see Table 22).

Table 22

Cross Table Age (Q5.1) vs Reasonable (Q3.1) Likert scale

	Extremely reasonable	Somewhat reasonable	Neither reasonable nor unreasonable	Somewhat unreasonable	Extremely unreasonable	Total (N)
21 – 30 (N)	6	10	3	5	2	26
Row Percent	23.10	38.50	11.50	19.20	7.70	4.30
31 – 40 (N)	15	15	11	4	5	50
Row Percent	30.00	30.00	22.00	8.00	10.00	8.30
41 – 50 (N)	8	21	8	7	3	47
Row Percent	17.00	44.70	17.00	14.90	6.40	7.80
51 – 60 (N)	25	32	21	17	21	116
Row Percent	21.60	27.60	18.10	14.70	18.10	19.10
61 – 70 (N)	39	92	39	43	21	234
Row Percent	16.70	39.30	16.70	18.40	9.00	38.60
71 or older (N)	11	58	19	26	19	133
Row Percent	8.30	43.60	14.30	19.50	14.30	21.90
Total (N)	104	228	101	102	71	606
	17.20%	37.60%	16.70%	16.80%	11.70%	

There is one age group who was shown to be heavily influenced by the willingness to take a discount to finish their meal early. 21-30-year-old group reported a 73.1% willingness to take a discount. As the participants' age increased, their willingness to take a discount dropped significantly to 34.6% for the age group 71 or older (see Table 23).

Table 23

Cross Table Age (Q5.1) vs Interest in taking a discount (Q3.2)

	Definitely yes	Probably yes	Might or might not	Probably not	Definitely not	Total (N)
21 – 30 (N)	10	9	5	2	0	26
Row Percent	38.50	34.60	19.20	7.70	0.00	4.30
31 – 40 (N)	14	17	12	3	4	50
Row Percent	28.00	34.00	24.00	6.00	8.00	8.30
41 – 50 (N)	13	18	11	4	1	47
Row Percent	27.70	38.30	23.40	8.50	2.10	7.80
51 – 60 (N)	24	39	24	18	11	116
Row Percent	20.70	33.60	20.70	15.50	9.50	19.10
61 – 70 (N)	32	91	58	33	20	234
Row Percent	13.70	38.90	24.80	14.10	8.50	38.60
71 or older (N)	14	32	44	29	14	133
Row Percent	10.50	24.10	33.10	21.80	10.50	21.90
Total (N)	107	206	154	89	50	606
	17.70%	34.00%	25.40%	14.70%	8.30%	

Marital Status also showed P-Values less than alpha of 0.05 for the participants' perception of a fixed meal duration, P-Value 0.009468, and for willingness to pay a surcharge as a percentage of the bill, P-Value 0.01149, to stay longer, meaning marital status has an effect on the participants perception of a fixed meal duration and willingness to pay a surcharge. In this instance, the null hypothesis is also rejected in favor of the alternative (see Table 24).

The majority of participants who were married, never married or widowed all stated that the idea of a fixed meal duration was reasonable. Participants who were divorced or separated were much less in favor of the idea that a fixed meal duration was reasonable.

Table 24

Cross Table Marital Status (Q5.3) vs Reasonable (Q3.1) Likert scale

	Extremely reasonable	Extremely unreasonable	Neither reasonable nor unreasonable	Somewhat reasonable	Somewhat unreasonable	Total (N)
Divorced (N)	6	12	11	24	19	72
Row Percent	8.30	16.70	15.30	33.30	26.40	11.90
Married (N)	81	42	59	149	67	398
Row Percent	20.40	10.60	14.80	37.40	16.80	65.70
Never married (N)	15	10	21	32	11	89
Row Percent	16.90	11.20	23.60	36.00	12.40	14.70
Separated (N)	1	1	4	2	0	8
Row Percent	12.50	12.50	50.00	25.00	0.00	1.30
Widowed (N)	1	6	6	21	5	39
Row Percent	2.60	15.40	15.40	53.80	12.80	6.40
Total (N)	104	71	101	228	102	606
	17.20%	11.70%	16.70%	37.60%	16.80%	

The concept of paying a surcharge was overwhelmingly unpopular with the participants from this survey (see Table 25). Participants who stated that they had never been married are the mostly likely to pay a surcharge to increase their dining time (14.69%). Separated and widowed participants follow the participants who had never been married with an approximate 10% willingness to pay a surcharge. Divorced participants were the least likely to pay a surcharge. Only 5.6% of divorced participants said they would be willing to pay a surcharge to increase their dinning time.

Table 25

Cross Table Marital Status (Q5.3) vs Interest in paying Surcharge (Q4.1)

	Definitely yes	Probably yes	Might or might not	Probably not	Definitely not	Total (N)
Divorced (N)	2	2	7	20	41	72
Row Percent	2.80	2.80	9.70	27.80	56.90	11.90
Married (N)	8	27	50	111	202	398
Row Percent	2.00	6.80	12.60	27.90	50.80	65.70
Never married (N)	3	10	21	14	41	89
Row Percent	3.40	11.20	23.60	15.70	46.10	14.70
Separated (N)	1	0	0	4	3	8
Row Percent	12.50	0.00	0.00	50.00	37.50	1.30
Widowed (N)	1	3	7	12	16	39
Row Percent	2.60	7.70	17.90	30.80	41.00	6.40
Total (N)	15	42	85	161	303	606
	2.50%	6.90%	14.00%	26.60%	50.00%	

With all other socioeconomic statuses, we fail to reject the null hypothesis and the assumption is made that all other socioeconomic statuses have no effect perception of the restaurant, willingness to take a discount to finish dinner early, or willingness to pay a surcharge to stay longer.

Summary

The biggest factor when analyzing this data was the non-normalization of the data distribution. This affected hypotheses 1 and 2. Due to the data not being in a normal distribution, the null hypotheses are rejected in favor of the alternative. For hypothesis 3, Age and Martial status are shown to have an effect on participants' perception of a fixed meal duration. Participant age groups 71 and older and 41-50 years old do not favorably look at fixed dining times. The majority of participants who reported they were married, never married or widowed all stated that the idea of a fixed meal duration was reasonable (participants who identified as divorced or separated were not included in this finding, as they responded differently).

Willingness to take a discount to finish the meal early was also affected by age. Participants age 21-30 were the most willing to take a discount to finish their meal early. Even though paying a surcharge is not a popular concept for participants of this survey, marital status had an effect on whether or not the participant was willing to pay a surcharge to stay at the table longer. Of those who were willing to pay a surcharge, participants who stated that they had never been married led all groups in willingness to pay a surcharge to extend their dinning time.

CHAPTER FIVE

Conclusion

Introduction

Space, product, price, and time are the four variables that drive revenue management (RM). The restaurant sector controls three of these variables very well. Time is the one variable many restaurants fail to manage. With restaurants focusing heavily on customer satisfaction, reluctance exists to define a fixed meal duration, as the perception is that this will diminish the customers satisfaction (Noone, Kimes, Mattila, and Wirtz, 2007). Nevertheless, a balance must be struck between the restaurant wanting to turn tables and customers who want to linger (Kimes & Robson, 2004). If the restaurant sector can find this balance of time with customers, perhaps new ways of looking at time as a commodity should be introduced to the sector, which can not only help restaurants optimize revenues, but offer customers better pricing opportunities during no peak times (Kimes & Wirtz, 2003).

This study sought to examine whether an opportunity exists in the restaurant sector to implement a new way of managing revenue, by controlling the variable of time, just as other leaders in the hospitality industry, such as the airline and hotel sectors have done. Gaining an understanding of the general population's acceptance of the idea of a fixed meal duration allows insight to whether or not time in the context of revenue management in restaurants could be implemented or not. Discussed below are the research questions addressed in the work, followed by a synthesis of the findings and conclusions drawn from the study.

Implications of the results

This research lends important insight into the utility of time as a commodity within restaurant revenue management. The findings of this project confirm the findings of Kimes,

Wirtz, and Noone, (2002): restaurant patrons' expectation regarding meal duration is still approximately one hour. The findings also complement the service efficiency research of Hwang and Lambert (2009): participants in this project indicated that the amount of time needed to comfortably finish their meal after the food is delivered to the table is 27.67 minutes. Add this to Hwang and Lambert's (2009) assertion that the service process should take 29 minutes, and the total meal duration, approximately one hour, aligns back to Kimes' (2002) original assertions.

What this project adds to the conversation, however, is an additional insight that may prove useful for restaurants wanting to manage time as a commodity in the context of revenue management. Returning to the research question, this project sought to answer if/how time constraints at a restaurant are acceptable to the general population. The data show that willingness to modify time spent at a restaurant was present in both specific age ranges of survey participants as well as those of specific marital statuses. This willingness manifested in several ways:

- The age group of 21-30 showed that they are motivated enough by receiving a discount to finish their meal before a fixed meal duration.
- Individuals who are married, widowed, or who have never been married show favorability to the idea of restaurant giving their patrons a fixed meal duration. Individuals who are divorced or separated do not.

Implications to prior research

Questions 2.1 through 2.5 built on the research done by Kimes, Wirtz and Noone (2002). For the purpose of this paper, only Kimes, Wirtz, and Noone's (2002) North American data was considered to retain similarities between surveys, since the survey for this project was only

distributed to North American subjects. Kimes et al., (2002) first question in regards to the participants' expected meal duration was 59.00 minutes with a standard deviation of 14.4. This study shows just a small decrease in the participant's expected meal duration at 57.16 minutes with a standard deviation of 20.44. The second question Kimes et al., (2002) asked was how long would the participant feel was too long for dinner and found that 80.20 minutes with a standard deviation of 14.40 was too long. Participants from this survey suggested a much shorter time of 67.31 minutes with a standard deviation of 30.20. When asked about how long was too long before the participant would not consider coming back to the restaurant, Kimes et al., (2002) found this to be 90.40 minutes with a standard deviation of 11.90. This survey's participants suggested, again, a much shorter dining time of 78.59 minutes with a standard deviation of 30.15. Kimes et al., (2002) then asked their participants how much time was too short for dinner and how much time was too short where the participant would consider not coming back. Time of 29.5 minutes with a standard deviation of 8.3 and 23.4 minutes with a standard deviation of 5.8 were the answers, respectively. Participants from this survey were only asked once, how long is too short for dinner and their answered 25.24 minutes with a standard deviation of 16.15, which is right in between the respondents from Kimes et al., (2002). The last question of this survey brings in a different element to the line of questioning, asking how much time the participant felt they needed to comfortably eat their dinner after their meals were served. Participants responded with a dining time of 27.67 minutes with a standard deviation of 9.96.

Limitations

There are several limitations for this data set. The first limitation was not being able to control for how the participant understood what a casual full-service restaurant is. This was brought to light when, after accepting the informed consent (which required they had been to a

casual full-service restaurant), 40 participants said they had not been to a casual full-service restaurant after being given the definition. Another limitation was not being able to control for how a participant might think about what a group is or why they are going out to eat. A group could consist of many different kinds of people who have different relationships which would alter the reason for why the group is going out to eat.

The data set itself is also a limitation. Results of the survey came back with a skew towards the 61-70 age group (approximately 30% of the data), and 60 and above (approximately 40%). This could have influenced the results of the survey as this generation of participants could feel much differently about the questions than participants in other demographics. As the chi-squared test showed, the age of the participant effected their perception of the idea of having a fixed meal duration. Finally, the data were not normalized. Even though statistical modeling can be done to normalize the data, collecting more surveys would help to normalize the data naturally. Further testing could also be done by examining how different regions of the United States or the world would affect the results of this survey.

Recommendations for Future Research

One of the opportunities for future work on this particular data set could be to normalize the data to dig further in order to explore hypotheses 1 and 2. This study data favored an older population; additional surveying to see how a younger population might perceive the idea of a fixed meal duration, as they are the ones who will be affected by the decisions restaurants will make around RM practices, could be compelling.

Further research should also address how price discrimination and dynamic pricing might affect a patron's perception of their dining experience. Many restaurant patrons are unfamiliar with this practice inside a restaurant setting. Understanding how to educate the restaurant

customer on why the price change is happening will help to avoid the customer going elsewhere (Kimes, Chase, Choi, Lee, and Ngonzi, 1989). Overcoming restaurant patrons' perception of low pricing will also need to examined. If restaurant patrons' perception of price comes only from discounting, price anchoring will occur. Restaurants may need to anticipate and explore how to overcome objections from their customers.

If restaurants are going to implement RM practices, the pricing structure will be different than what the customer is familiar with today. Perhaps experimenting with price changes that customers are not used to seeing (i.e. something other than Happy Hour) will help restaurants understand how to overcome customer objections when RM models are implemented into restaurant business models.

Participants from this study suggested that a discount between 29.33% and 34.30% of their bill would encourage them to finish their meals early. Further research would be needed to examine exactly how much of a discount would be needed, or if a discount is the best tool to encourage the patron to leave early. There could be a gap between what a patron says they would want to receive for a discount and what it would actually take for them to finish their meal early.

As RM models are implemented into restaurant business models, restaurants could also consider different pricing for different tables. Models for differential pricing like this already exist in night clubs, hotels and airlines. Selling different tables, rooms and or seats for different prices could add another level into the RM models deployed in restaurants. Understanding how restaurant customers would respond to this could also be explored.

Conclusions

Restaurant managers must understand their patrons' expectations, especially when it comes to meal duration. Thompson (2008) suggests several tools to help managers improve

efficiency: faster service, hiring more employees, and training service staff when guiding their patrons through the dining process. Though these are common practices within the industry, restaurants struggle to implement these practices. Using these techniques in correlation with a fixed dining time can help reduce the negative perception a customer might have when being told that they have a fixed amount of time to eat.

This project shows that baring any delays by the restaurant, customers have a neutral to positive feeling about a fixed meal duration. Triangulating the research from this survey, Kimes et al. (2002), and Hwang and Lambert (2009), a 60-minute fixed meal duration is viable within the context of a restaurant. By validating this concept of a fixed meal duration, RM models could be considered for use in the restaurant industry. Opportunities exist to explore this phenomenon more closely, with potentially-positive outcomes for restaurant revenue management and little to no adverse effect to the consumer.

APPENDIX A

Informed Consent

You are invited to participate in a research study. The purpose of this study is to investigate a restaurant patrons' dining experience. You are being asked to participate in this study because you are at least 21 years of age and have visited a casual full-service restaurant in the past 30 days. If you volunteer to participate in this study, you will give about 15 minutes of your time to complete a questionnaire about your dining behaviors. There will not be direct benefits to you as a participant in this study. However, the research will develop knowledge on how different discounts and surcharges can be used improve the guest experience. There are risks involved in all research studies. This study includes only minimal risks. You may feel uncomfortable when answering some of the questions. You may choose to discontinue participation at any time. Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. 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 at UNLV for 3 years after completion of the study. After the storage time, the information gathered will be completely discarded.

If you have any questions or concerns related to the study, you may contact Dale Billings at dale.billings@unlv.edu or the Principle Investigator, Dr. Chih-Chien Chen at chih-chien.chen@unlv.edu. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll-free at 877-895-2794 or via email at** IRB@unlv.edu**.**

If you agree to the terms stated above, please continue with the survey. If not, please close your browser to exit the survey.

APPENDIX B

Participant Survey

Casual full-service restaurant

Meal Duration: Implications for Restaurant Revenue Management

---

Start of Block: Informed Consent

Q28 How old are you?

- O Under 21
- O 22-40
- O 41-60
- O 61+

Skip To: End of Block If How old are you? = Under 21

Q1.1 Informed Consent

You are invited to participate in a research study. The purpose of this study is to investigate a restaurant patrons' dining experience. You are being asked to participate in this study because you are at least 21 years old and have visited a casual full-service restaurant in the past 30 days. If you volunteer to participate in this study, you will give about 15 minutes of your time to complete a questionnaire about your dining behaviors. There will not be direct benefits to you as a participant in this study. However, the research will develop knowledge on how

different discounts and surcharges can be used improve the guest experience. There are risks involved in all research studies. This study includes only minimal risks. You may feel uncomfortable when answering some of the questions. You may choose to discontinue participation at any time. Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. 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 at UNLV for 3 years after completion of the study. After the storage time, the information gathered will be completely discarded.

If you have any questions or concerns related to the study, you may contact Dale Billings at dale.billings@unlv.edu or the Principle Investigator, Dr. Chih-Chien Chen at chih-chien.chen@unlv.edu. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll-free at 877-895-2794 or via email at IRB@unlv.edu.

If you agree to the terms stated above, please continue with the survey. If not, please choose no or close your browser to exit the survey.

O Yes

O No

Skip To: End of Block If Informed Consent You are invited to participate in a research study. The purpose of this study is... = No

Q30 A **casual dining restaurant** (or sit down restaurant) is a restaurant that serves moderately-priced food in a casual atmosphere. Casual dining restaurants provide full table service, with a price range of $10 to $20 for the dinner menu and $7 to $17 for the lunch menu. Because of full table service, tips also add to the total amount a customer spends at these restaurants. Casual dining restaurants often have a full bar with separate bar staff, a beer and wine menu. They are frequently, but not necessarily, part of a wider chain, particularly in the US.

Q29 How often do you dine in casual full-service restaurants?

- O Never
- O 1-3 times per week
- O 4-6 times per week
- O More than 7 times per week

Page Break

End of Block: Informed Consent

Start of Block: Default Question Block

Q2.1 Assume you are going out to a restaurant for a casual dinner with friends. You are going out with 3 other friends and the total check for the group is $100. The group check will be split

evenly between all 4 people ($25 per person). Based on this scenario, please answer the following questions: About how long do you think dinner should take?

0 10 20 30 40 50 60 70 80 90 100110120

Minutes 

Page Break

Q2.2 How long would your dinner have to be before you thought it was taking a bit too long?

0 10 20 30 40 50 60 70 80 90 100110120

Minutes 

Page Break

Q2.3 How long would your dinner have to be before you thought it was so long that you would never return to the restaurant?

0 10 20 30 40 50 60 70 80 90 100110120

Minutes 

Page Break

Q2.4 How short would the dinner have to be before you thought it was so quick that you would feel rushed?

0 10 20 30 40 50 60 70 80 90 100110120

Minutes	

Page Break

Q2.5 After your meal has been delivered to you, how much time do you need to comfortably eat your meal?

0 10 20 30 40 50 60

Minutes	

Page Break

End of Block: Default Question Block

Start of Block: Discounts

Q3.1 Barring any delay by the restaurant, how would you feel about a restaurant gave you a fixed period of time to eat your meal? Do you think it is reasonable to have 60 minutes from the time you sat down to complete your meal?

- O Extremely reasonable
- O Somewhat reasonable
- O Neither reasonable nor unreasonable
- O Somewhat unreasonable
- O Extremely unreasonable

Page Break

Q3.2 If the restaurant had a fixed time for you and your party to finish your meal, let's say 60 minutes, would you be interested in an option to receive a discount on your meal for finishing early?

O Definitely yes

O Probably yes

O Might or might not

O Probably not

O Definitely not

Page Break

Q3.3 What would be the minimum discount you would consider to entice you to finish your meal early?

0 10 20 30 40 50 60 70 80 90 100

Percent Discount 

Page Break

Q3.4 What would the minimum discount be that would definitely make you want to finish your meal early?

0 10 20 30 40 50 60 70 80 90 100

Percent Discount 

Page Break

Q3.5 How much would you have to like the restaurant to consider finishing your meal early?

- O Like a great deal
- O Like somewhat
- O Neither like nor dislike
- O Dislike somewhat
- O Dislike a great deal

Page Break

Q3.6 Would the case of a special event such as a birthday party or anniversary change your mind on how you feel about excepting a discount to finish your meal early?

- O Definitely yes
- O Probably yes
- O Might or might not
- O Probably not
- O Definitely not

Page Break

End of Block: Discounts

Start of Block: Surcharge

Q4.1 If the restaurant had a fixed time for you and your party to finish your meal, let's say 60 minutes, would you be interested in an option to pay an additional surcharge to stay longer, **even if you continue to order drinks/food**?

- O Definitely yes
- O Probably yes
- O Might or might not
- O Probably not
- O Definitely not

Page Break

Q4.2 Would you consider a flat dollar amount per set amount of time or a percentage of your check amount per dollar of time?

- O Flat Fee
- O Percentage of bill

Skip To: Q4.5 If Would you consider a flat dollar amount per set amount of time or a percentage of your check amou... = Percentage of bill

Page Break

Q4.3 What would be your expected time duration to be able to continue to sit at the table?

0 10 20 30 40 50 60 70 80 90

Time period for extension 

Page Break

Q4.4 With the time you picked above in mind, how much additional money would you be willing to pay for this extension of time to sit at the table?

0 25 50 75 100 125 150 175 200

Dollars 

Skip To: Q4.7 If With the time you picked above in mind, how much additional money would you be willing to pay for...(Dollars) Is Not Empty

Page Break

Q4.5 What would be your expected time duration to be able to continue to sit at the table?

0 10 20 30 40 50 60 70 80 90

Time period for extension	

Page Break

Q4.6 With the time you picked above in mind, how much would you be willing to pay for this extension of time to sit at the table?

0 10 20 30 40 50 60 70 80 90 100

Percent of bill	

Page Break

Q4.7 How much would you have to like the restaurant to consider paying more for an extension of time to continue your dining experience?

- O Like a great deal
- O Like a moderate amount
- O Like a little
- O Neither like nor dislike
- O Dislike a little

Page Break

End of Block: Surcharge

Start of Block: Census

Q5.1 Please select your age range. (check one)

- O 21 - 30
- O 31 - 40
- O 41 - 50
- O 51 - 60
- O 61 - 70
- O 71 or older

Page Break

Q5.2 Please select your gender. (check one)

- O Male
- O Female

Page Break

Q5.3 Please select your Marital Status. (check one)

- O Married
- O Widowed
- O Divorced
- O Separated
- O Never married

Page Break

Q5.4 Please select your Education Level. (check one)

- O Less than high school
- O High school graduate
- O Some college
- O 2 year degree
- O 4 year degree
- O Professional degree
- O Doctorate

Page Break

Q5.5 Please select your household income range. (check one)

- O Less than $50,000
- O $50,001 - $75,000
- O $75,001 - $100,000
- O $100,001 - $125,000
- O More than $125,000

Page Break

End of Block: Census

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CURRICULUM VITAE

Dale Billings
dalebill1@gmailcom

EDUCATION

MA in Hospitality Administration **Expected Fall 2019**
University of Nevada, Las Vegas
Dissertation title: "Meal Duration: Implications for Restaurant Revenue Management"
Committee: Dr. Carl Braunlich, Dr. Chih-Chien Chen (chair), Dr. Anthony Gatling, Dr. Han-fen Hu
Advisor: Dr. Christine Burgman, Dr. Gail Sammons

BS in Computer Information Systems - Systems Analytics **2017**
DeVry University

TEACHING

Graduate Assistant **2018-2019**
Department of Hospitality, University of Nevada, Las Vegas

HONORS AND AWARDS

Graduated Magna Cum Laude, DeVry University 2017

ACADEMIC MEMBERSHIPS

Harrah Hospitality College Representative of the Graduate and Professional Student Association (GPSA) 2018-2019

INDUSTRY CERTIFICATIONS

Certified Hospitality Industry Analyst Awarded 2018

PROFESSIONAL EXPERIENCE

Data Analytics
Spark Analytics, Scottsdale, AZ 2016-2018
Data Analyst

- Re-envisioned the company's food service data analysis vertical
- Evaluated existing process efficacy and led rapid-cycle change
- Lead a team to develop a proof of concept for a labor analytics application
- Lead a DevOps team to develop a C# program to create custom reports in Excel, pulling data from a MS SQL server
- Automated daily business operations; replaced all batch scripts with PowerShell
- Developed new KPIs for detecting fraud in Loyalty programs
- Implemented data analytics algorithms for seven POS systems
    - ALOHA, Agilysys, Micros, Vivonet, POSItouch, Volante, Nextep

Hospitality Industry, Management

- Collaborated with venture capital firms to conceptualize, unveil, and oversee several restaurants across the Southwest

- Designed and operationalized data-driven strategies to manage revenue and grow food and beverage sales while reducing cost for restaurants in the Phoenix metropolitan area
- Solicited as an industry expert by food and beverage companies to evaluate new products intended for the hospitality industry
- Designed and disseminated food, pairing, and craft drink menus across several exclusive restaurants in Southwest at the request of proprietors
- RE-calibrated ALOHA POS administration across several restaurants: re-designed menu structure, promotions, comps, and events processes

San Felipe's Cantina, Scottsdale AZ 2010-2014
General Manager
Decreased operational beverage cost from 35% to 18% and food cost from 38% to 28% by designing and introducing new lunch, dinner, and drink menus

Fenix Bistro, Phoenix, AZ 2008-2010
General Manager

Library Bar and Grill, AZ | NM 2007-2008
General Manager

El Toro Bravo, AZ 2005-2007
Beverage Manager
Began a late-night food and drink service that increased sales by $100K/month

Martini Ranch, AZ | CA | CO 2002 -2007
General Manager/Beverage Manager
Increased beverage sales by 30% weekly, increasing net earnings from $2.54 million to $3.64 million in one year.

TECHNICAL SKILLS

- C#
- PowerShell
- SQL Server
- R

REFERENCES

Dr. Carl Braunlich, Associate Professor of Hospitality
University of Nevada, Las Vegas
(702) 895 4842, carl.braunluch@unlv.edu

Dr. Chih-Chien Chen, Assistant Professor of Hospitality
University of Nevada, Las Vegas
(702) 895 0875, chih-chen.chen@unlv.edu

Dr. Anthony Gatling, Associate Professor of Hospitality

University of Nevada, Las Vegas
(702) 895 4872, anthony.gatling@unlv.edu

Dr. Sarah Tanford, Professor of Hospitality
University of Nevada, Las Vegas
(702) 895 5982, sarah.tanford@unlv.edu