DEALING WITH UNCERTAINTY IN THE ADVANCE TICKET SALES MARKET: AN EMPIRICAL EXAMINATION ON THE ADAPTIVE NATURE OF CONSUMER'S INTERTEMPORAL CHOICE DECISIONS

A Dissertation
Submitted to
The Temple University Graduate Board

In Partial Fulfillment
of the Requirements for the Degree
DOCTOR OF PHILOSOPHY IN BUSINESS ADMINISTRATION

by
WONSOK FRANK JEE
May 2019

Examining Committee Members:

Joris Drayer, Ph.D. (Advisory Chair), Department of Sport and Recreation Management

Chihyung Ok, Ph.D. (Examining Chair), Department of Tourism and Hospitality Management

Anthony Di Benedetto, Ph.D. (Committee Member), Department of Marketing

Donald A. Hantula (External Reader), Ph.D., Department of Psychology

ABSTRACT

Timing is everything. There are ideal times for essentially in everything we do. Every day we face questions of timing, but we have limited guiding principles to answer those questions. There is a science behind ‘when we buy’ and the advance ticket sales market provides a ripe laboratory for research. Consumer’s deal with myriads of uncertainty finding the ideal time to book that vacation they have been long time waiting for. Prices change daily based on real time demand and the information asymmetry between buyers and sellers further complicates this problem for consumers as decisional agents. Given this emerging research opportunity, this dissertation conducts a series of experimental studies to examine the underlying process consumers undergo when booking and purchasing sporting event tickets.

Study 1 begins exploring two key decisional factors (sellout risk and opportunity cost) consumers use to guide their temporal choice under uncertainty. A selective attention bias was elicited where sport fans and casual consumers placed subjective weighted values on these uncertainty cues. Study 2 further examines distinct biases in temporal choice due to emotion and motivation of consumers. The study found that consumers with higher involvement led to the belief to find better priced deal in the future which was mediated by their overconfidence. Lastly, Study 3 examines the boundary conditions and tests how the information frame and structure of the environment can further influence consumer’s booking and purchase decision.

The empirical findings from the dissertation highlight the importance of consumer’s decisional biases in inter-temporal choice and provides theoretical and practical implications for both marketing and pricing research. Unlike normative assumptions of rationality, the studies find that there is no one size fit all optimal decision model on whether to wait or purchase. The optimization strategy of temporal choice ultimately lies within the interaction between the individual and how they cope with uncertainty cues in their surrounding purchase environment.

This dissertation is dedicated to my parents, Innho Jee and Aeja Yoo.

Thank you for all of your prayers, love and support.

ACKNOWLEDGEMENTS

I would not have reached this academic milestone without the support, guidance and encouragement from a variety of honorable people. I will always owe an extreme debt of gratitude and gratefulness to my faculty, colleagues and family whom helped me become a better scholar, teacher, and person that I am today.

I would like to first thank my dissertation committee who were critical in the development and completion of my dissertation. Special thanks to Dr. Joris Drayer for his academic guidance in addition to his unwavering support, encouragement and kindness throughout the several years of my advisement. Dr. Chihyung Ok for his constructive feedback, timely encouragement, and thoughtful advice both academically and spiritually. Dr. Anthony Di Benedetto for willingly serving on my committee and Dr. Donald Hantula as the external reader of my dissertation. It was an honor to plant this small seed from your 'Delay Discounting and Intertemporal Choice' research seminar and present the harvest of my doctoral research to you. Collectively, I could not ask for a better group of incredibly brilliant advisors who were critical but kind, motivating while thoughtful, and supportive of my work during my time at Temple.

My experience at Temple University would not have been the same without my great colleagues and friends. I will always cherish the memorable times spent on philosophical debates and methodological discussions throughout my time at the Fox School of Business and School of Sport, Tourism and Hospitality Management. A special thank you to Dr. Wooyang Kim for his early mentorship as I transitioned into and progressed throughout my Ph.D journey. I would also like to thank Moonsup Hyun for his friendship and for the hours running methodological ideas together which were critical in completing my dissertation. Glen Kim and Seungha Lee for making the city of Philly my new home. My dearest partner and companion Hyewon Im, for her endless prayers and nights working on revisions on data visualization, graphics and slide design.

Finally, but most importantly I am thankful to my family and for their infinite love. My grandparents whom are now present in heaven with God, DaeHee Yoo and Sunbun Im you taught me the value of an education at an early age while being great role models throughout my life. I only hope you will be able to join us at commencement and celebrate with your grandson once more. My beloved Mom and Dad Aeja Yoo and Innho Jee who have been a constant source of prayer and support, happiness and love for that I am always and will forever be grateful.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION AND OVERVIEW OF STUDIES

Prelude

With regards to time, Einstein once quoted “People like us, who believe in physics, know the distinction between past, present, and future is nothing more than a persistent stubborn illusion”. To further illustrate the abstruse concept of relativity to the inquisitive reporters of the New York Times, Helen Dukas – Albert Einstein’s secretary – went on to narrate a famous anecdote to the public:

> *When a man sits with a pretty girl for an hour, it seems like a minute. But let him sit on a hot stove for a minute – and it’s longer than an hour. That’s relativity.”* (Dukas, 1929).

Einstein’s general theory in relativity challenged general assumptions on the absolutism of time concept and introduced the idea that time to the human mind is nothing more than an illusion.

Nevertheless, time has been used as a means of measurement to create order, structure, and essence for management to deal with uncertainty throughout human history. Farmers of early civilizations planted by observing the moon’s phase and signs in the zodiac. The study of astrology and time formed the basis of a systemized calendar system, which guided the planting, cultivating, and harvesting of crops. Though astrology was primarily used as a guide for growing crops and agriculture, it has also been applied to the practice of foraging and husbandry. For example, poultry farmers set up a schedule for their chicken’s eggs to hatch when it is a new moon and in a "fruitful" sign. Temporal decisions were carefully examined and monitored to fulfill the basic physiological needs and prosperity in agricultural societies.

Post industrialization, the advancement of road and airline transportation has transcended the concept of conventional physical boundaries and lead to the creation of universal time zones (i.e., Greenwich Mean Time Zone). Countries obsessed to become the forefront of the world by creating a standardization of 'measurements' (i.e., metric system of the French International System of Units, British imperial system, and US customary system). It was pivotal for countries to implement time and space measurements to become the center of the globe and dictate the manufacturing and industrial imperialism. Those who could dominate time and space measurements would be able to control and gain a competitive advantage in the industrial era.

Human society further delved into the precision of measuring time, with the development of the atomic clock. Inside a cesium atomic clock, cesium atoms are funneled down a tube where they pass through radio waves. Since 1967, the official definition of a second was agreed as 9,192,631,770 cycles of sufficient radiation that induces an atom of the cesium element to vibrate between two energy states. Precision became a succeeding factor in modern management as Peter Drucker articulated that "If you can't measure it, you can't improve it". Time variance has become one of the most powerful tools for understanding operations and quality control mechanisms. We can now detect and monitor individuals by comparing the variance in milliseconds encrypted in the digital signature of our every computer devices.

With the further ubiquitous usage of personal smartphone devices in the digital era, we increasingly visualize time as an enemy and struggle to optimize with this limited resource. Unlike how Einstein perceived time to be merely a flat dimension, we now treat time as a limited resource and artificially create generic timelines and goals to guide and direct our behavior. Individuals struggle with aging and deterioration of health, college students struggle to graduate in 4 years, politicians fight with time to get projects pushed through their elective tenure, companies struggle to maximize profit figures quarterly deadlines, and financial investors fight time against inflation depreciation of financial assets. Consciously and subconsciously, we are challenged with time pressures and time seems to be an essential component to success in today's management.

Similarly, time also impacts the utility and wealth of consumer's decisions. When should households decide to stop spending and start saving money? Should consumers buy now or wait to search for better deals later for goods and services? Accordingly, how do we delay instant gratification of short-term goals to attain fruitful long-term consumption goals? Also, the impact of cognition and emotion of consumers has opened interesting avenues on time perception in consumer behavior research. From a normative perspective, waiting and delay of consumption creates a loss of opportunity cost. Nevertheless, time and waiting signal incomplete information and misleading meanings for consumers in the purchase environment (Kirmani, Amna, & Rao, 2000). Maister has developed an interesting stream of research referred to as the consumer psychology of waiting, and found that increased length of waiting lines can enhance the perceived taste of food (1984).

Collectively, there is an abundance of literature in marketing and consumer behavior that have addressed the 'who', 'what' 'where' and 'how' in consumers' thought, feeling, decision-making and behavior. Ultimately, the primary research question of this dissertation study addresses the 'when' problem in consumers' decision-making by examining the different intertemporal choices consumers make in the modern era. Furthermore, advances in information technology and the emergence of an e-commerce environment has reshaped this decisional context immensely and warrants a ripe avenue of opportunities for inter-temporal choice research.

Research Opportunity

The advanced sales market in the travel, hospitality, and sports industry is a favorable context to examine how consumers make uncertainty judgments and purchase decisions across a temporal time frame. The unique characteristics in the marketing mix (focusing on the 4 P's -product, price, promotion, and place) factors in advanced sales markets present a compelling case to further examine how companies influence (along with how consumer's adapt) consumer's temporal purchase decisions in an online e-commerce environment.

Product

Primarily, it is the perishability characteristic of the product that makes this product unique and creates the opportunity for advanced purchase and sales (Kimes, 1989). This is different from general product categories, such as canned goods or any materialistic items that can carry over stable reservation value. For example, if a hotel room or airline ticket is not sold by the specific day or night, that room night or seat is lost forever as unsold inventory. Likewise, any unsold sports ticket cannot be sold once the game or event is over. It is an experiential product that expires, and there is essentially no economic value in holding on to the product beyond the event date. Thus airline, hotel, and sports teams need to continually address inventory control over the entire year. Some transient hotels or airlines sell most of their rooms and seats a few days in advance, but in some situations, reservations are made well in advance of the day desired (Kimes, 2003). In the case of group sales, reservations might even be made several years in advance, as with a sports season ticket holder that purchases years before an event (Coats & Humphreys, 2007).

When the product is sold in advance, the manager is faced with seller uncertainty. Should a consumer that wants to pay a low rate be accepted, or should the manager wait to see if a higher paying customer will appear? Likewise, buyers are faced with the uncertainty either to buy now to avoid sellout and be available to make it to the destination, or to wait for better deals that may come up in the future. A wide variety of temporal decisions faced by both buyers and sellers are presented and observable within this product domain.

The relationship between the product and the consumer is also distinctly unique in the above industry. The high level of emotional attachment and identification of consumers is rarely matched in other product or service markets. Many hold loyalty programs to specific airlines and hotels and travel explicitly using the selective brand's products. Sports fans often demonstrate an unprecedented abundance of knowledge in their product domain and display emotional attachment to the sports product (Dwyer, 2011). These sports fans are very knowledgeable about their teams and the leagues, and willingly follow player updates, game statistics, and share high levels of identification with their team. The distinctive relationship between consumers and the experiential product can elicit how some psychological constructs might impact temporal decisions apart from other agents and organisms.

Price

The second factor relates to the respective industry's unique approach to pricing. Accordingly, businesses in this industry use revenue management and dynamic pricing strategies based on consumer's real-time demand. The ability to apply varying levels of price discrimination in practice is possible due to the segmentation of consumers, as well as the high fixed cost and essentially zero-variable cost structure (Kimes, 1989). Once a certain number of rooms or seats are sold for a given hotel night or flight, it does not cost much more for a business to sell another room or accommodate standby ticket seats. Likewise, in the case for sports markets, given that most professional sporting events already attract crowds in the tens of thousands, servicing additional patrons does not require a large shift in day-of-game operations (Drayer, Shapiro & Lee, 2012). As this additional cost is relatively small and in most case negligible, sports organizations have the opportunity to charge a variety of prices based on real-time demand.

Also, a large proportion of the room and ticket sales occur online, and advances in technology and data analytics have enabled these industries to price based upon real-time changes of demand. Excellent information systems that track the searches and activity of customer reservations in real-time, coupled with a rich database of historical demand on availability and price elasticity, provides the groundwork for the most advanced revenue management practices in the airline and hotel industry (Talluri, & Van Ryzin, 2006). The statistical orientation of many professional sports and the ease of access to other quantifiable demand factors also make dynamic ticket pricing a manageable task and predominant practice for sports teams. The practice of dynamic ticket pricing is used by more than two-thirds of Major League Baseball (MLB) organizations (Sachdev, 2013). Additionally, the National Basketball League, National Hockey League (NHL), college athletic departments, and football bowl game organizers have implemented this real-time approach to pricing (Shapiro, Drayer, & Dwyer, 2014; Morehead & Shapiro, 2017)

Place

Recent developments of secondary resale marketplaces have also made this context an emerging research topic. The standardization and legitimization of online transactions have led to the growth of legalized secondary ticket market (Drayer, Stotlar, & Irwin, 2010). Now consumers have safe alternative options to buy directly from the primary business (business to consumer - B2C) or resort to other resellers in the secondary market (consumer to consumer - C2C). Accordingly, the secondary ticket market in the sports industry has revolutionized into a 15 billion dollar industry with more than 1,000 secondary resale markets in the US (“Ticketing Today”). Most of these platforms are based on uniquely developed algorithms that offer essentially the same product but all in unique platforms. With increased competition within online marketplaces, these secondary ticket market platform businesses have experimented with a range of online marketing techniques to differentiate themselves and make their platform more appealing to buyers and sellers alike. Nonetheless, research has been limited to test the effectiveness of these emerging industry practices (Brett Goldberg, CEO, and founder of Tickpick, September 2017). There are enormous opportunities in the dissertation study to suggest practical implications that can be applied contemporary.

Promotion

Marketing communications on prices, discounts, prices, time and deals are diversely and extensively used in the advanced sales environment that entails high buyer and seller uncertainty. Accordingly, marketers rely on an array of visual communication techniques that differentiate the purchase experience of the consumer. For businesses, the idea behind disclosing this type of information is to signal a sense of urgency to buyers and induce early purchase (Aggarawal, Jung, & Huh, 2011). For the consumer, a data representation of numeric scarcity can lead to different judgment perceptions of urgency for consumers (Hoffrage, Gigeranzer, Krauss, & Martignon, 2002). For example, if a stadium consists of a total of 40,000 seats, do consumers form a different scarcity perception when the buyer is presented with the message that '400 tickets are remaining' compared to 'less than 1% remaining'? Contrarily, for low demand games with empty seats, is it effective to display percentage figures instead of large figure sums of tickets remaining (i.e., 56% vs. 22,400 seats available)? Testing the effects of numerical scarcity theories in consumer psychology can help marketers implement the dominant strategy to promote games of different demand.

From a promotion perspective, it is pivotal to easily identify and segment the varying homogenous consumer groups in the market. As mentioned earlier, revenue management industries can easily segment consumer groups (i.e., business vs. leisure travelers for travel; avid die-hard sports fans vs. casual recreational consumers for sport). Accordingly, marketers can manipulate search algorithms and offer targeted messages and deals to meet the needs of the different consumer group segments. Airlines and hotels can effectively promote and sell rooms and seat sections that better fit each consumer group needs. Sports fans can be targeted to receive scarcity messages that trigger their primary motivation to attend the event, while casual fans may be targeted to receive best deal messages that evoke deal-seeking behavior, where they view the game as a discretionary means of substitutable entertainment expenditure.

Collectively, the travel, hospitality, and sports industry that specializes in advanced sales products warrants numerous research opportunities; to not only extend the theoretical boundaries of inter-temporal choice literature but also bestow practical implications to businesses who want to gain a competitive advantage in the advanced sales market.

Overview of Dissertation

The dissertation is broken down into four primary chapters. The Introduction describes the motivation and foundation of the study, followed by a discussion on the research opportunity, potential contributions, and dissertation document framework.

The following chapter, entitled Literature Review and Theory Development, will explore existing stream of literature as it pertains to the domain of intertemporal choice. The chapter focuses on seminal theories in judgment and decision-making, including delay discounting and hyperbolic discounting models. This section further surveys the normative models in the tourism and hospitality literature that have specifically been developed to understand the decision-making process in the booking behavior of hotel and sports tickets. Selective theories from consumer psychology are discussed to highlight the importance of several decision-making biases, to illustrate and expand on how consumers deal with uncertain environments.

Chapter 3, is the experimental portion of the dissertation. Three consecutive studies are conducted to test and expand on the existing theories of intertemporal choice and adaptive decisions consumers make in an uncertain advanced sales environment. Study 1 examines the selective attention bias the different consumer groups place on uncertainty cues. Study 2 investigates the overconfidence bias in the probability estimates of risk assessment elicited by an individual's level of involvement. Study 3 tests how information distortion (anchoring, scarcity farming) can influence a temporal purchase.

Chapter 4, debriefs with the theoretical and managerial implications driven by the findings of this dissertation study. The study concludes with a consideration of potential limitations and proposed directions for future research.

CHAPTER 2

LITERATURE REVIEW AND THEORY DEVELOPMENT

Intertemporal Choice and Delay Discounting

This chapter aims at the theoretical integration of the delay discounting from the consumer behavior and judgment and decision-making literature into explaining the phenomenal issues and psychological process behind consumers intertemporal choice decisions within the tourism, hospitality, and sports industry. The term “inter-temporal choice” is used to describe any decision that requires tradeoffs among outcomes that will have their effects at their times (Read, 2004). The definition is broad, as reflected by the range of choices and activities embraced by it. Examples vary widely and are configured by the decision subject and context: From a pigeon deciding to consume one food pellet at once, or two pellets in two seconds; whether or not take a flu shot now or later; when to get down to work on a promised paper; whether to invest in a pension fund or buy a wide screen TV (Rachlin, 1991).

In every case, the agent is called on to decide between an earlier and usually smaller penalty or reward against a later and usually larger penalty or reward. The goal of research in the intertemporal choice literature is to understand how these decisions are made, and how they should be made. Whether it involves the searching and booking of airline flights and hotel reservations or purchasing tickets to a concert or sporting event: in all of the choice situations, time complicates the problem. Should consumers ‘buy now’ to avoid the risk of sell-out, or ‘should they wait and buy later’ to search opportunities for better-priced deals in the near future. Indeed, in each of these situations, virtual and natural occurring choice decisions in an advanced sales market can be conceptually framed as an inter-temporal choice problem for the consumer.

The conventional analysis of inter-temporal choice takes the viewpoint that the effect of delay on the subjective value of future outcomes can be captured by a cognitive delay discounting function (Rachlin & Green, 1972; Rachlin, Raineri & Cross, 1991). Full list of discount function parameters in Table 1. Delay discounting is the process by which future events are subjectively devalued by the decision maker, and this process is thought to underlie some forms of impulsive decision making (Madden & Bickel, 2006). In a delay discounting model framework, the optimization of choice is based upon the scrutiny of alternatives at the time where the consumer evaluates unseen future consequences, and are able to realize and evaluate the quality of those consequences once the consumer secures them in the future. Accordingly, the value of delay discounting refers to the reduction in a reward's value caused by delays.

Table 1. Four frequently discussed discount functions and their corresponding discount rates (*r*) and discount factors (δ). Read (2004)

		Hyperbolic discounting		
	Exponential	*One-parameter (Mazur, 1984)*	*Generalized (Lowenstein & Prelec, 1992)*	*Proportional discounting (Harvey, 1994)*
F(d)	$\left(\frac{1}{1+r}\right)^d$	$\frac{1}{1+kd}$	$(1+\alpha d)^{-\beta/\alpha}$	$\frac{h}{h+d}$
r(d)	$\frac{r}{1+r}$	$\frac{k}{1+kd}$	$\frac{\beta}{1+kd}$	$\frac{1}{h+d}$
$\delta(d)$	$\frac{1}{1+r}$	$\frac{1+k(d-1)}{1+kd}$	$\left(\frac{1+\alpha(d-1)}{1+\alpha d}\right)^{\beta/\alpha}$	$\frac{h+d-1}{h+d}$

In financial terms, exponential discounting is equivalent to *compound* interest, while one-parameter hyperbolic discounting is *simple* interest.

Delay discounting is a timely topic, perhaps nowhere more so than in the United States. Many of the most pressing problems facing the United States have their roots in impulsivity. The average family in the United States has a savings rate of -1% and a credit card debt of $9,000. Obesity rates have risen dramatically over time, with diverse negative effects that are beginning to undermine what had been a long trend toward improving public health. It has been estimated that as much as 40% of all premature mortality in the United States is the result of unhealthy behaviors, which represent decisions favoring immediate benefits at the expense of delayed costs, and only 10% is the result of deficits in the quality of health care delivery (Schroeder, 2007). Even global warming is centrally connected to delay discounting because it is a consequence of consumption and production decisions that provide short-term benefits but jeopardize the well-being of future generations (Nordhaus, 1991).

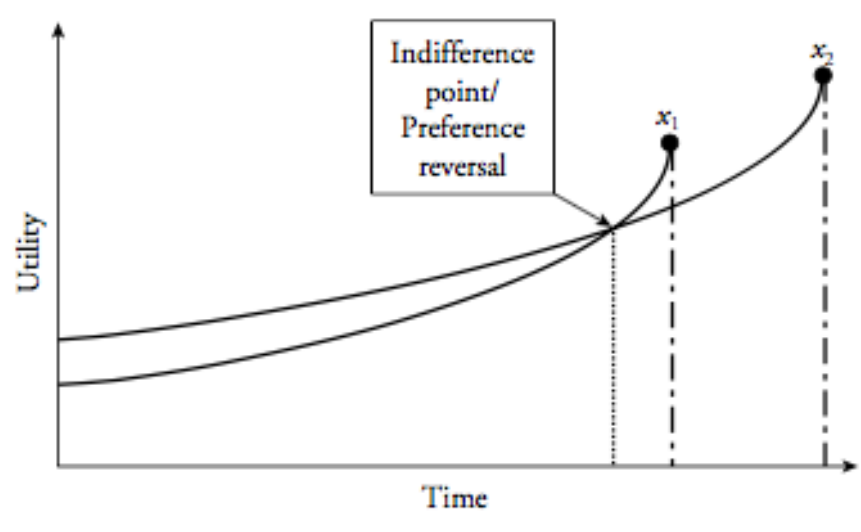


Figure 1. Hyperbolic delay discounting function; showing how preferences can briefly change from a larger-later (x_2) to a smaller sooner (x_1). Source: Read, Frederick, & Airoldi (2008)

Delay discounting has been applied extensively within the field of decision-making under uncertainty in economics and finance. Inter-temporal choice in human decision-making follows an uncontroversial normative principle in economic and financial decisions, where Fisher (1930) dictates the rate at which money should be discounted; rational decision makers will borrow or lend so that their marginal rate of substitution between present and future will be equal to the market interest rate. The discounting rate plays the same role in inter-temporal choice as the probability weighting function does in risky choice. A key implication of this is that the pure rate of time preference will be independent of the willingness to trade off monetary amounts at different times. By calculating the time value of money or future expected cash flow streams, financial analysts can objectively value and discount annuity payments, mortgages, bonds, stocks and a wealth of financial products. Using the delay discounting method, we can explain many aspects of naturally occurring inter-temporal choice problems utilizing the constant delay discounting exponential rate models.

Theoretically, animals and humans discount delayed rewards ecologically because the future is uncertain; some event or interruption prevents the species from collecting a delayed reward. This fundamental discounting by interruptions hypothesis seems compelling across a broad domain context. Interruptions can come in many forms, such as natural interruptions by predators for animals searching to gather food in the ecological environment to social interruptions occurring to consumers in the advanced sales market environment. Conceptually, the two standard ecological and economic forces associated with delay discounting involve competition and opportunity costs. The two factors provide wide explanation and theoretical implications explaining inter-temporal choice for animal species and humans. Evidence from empirical studies in human decision-making has further supported that simple informational cues predicting interruptions can influence inter-temporal choice.

Competition (Collection Risk)

For most species, competition (with groupmates or other species) poses an enormous interruption risk (Stephens, 2002; Stevens & Stephens, 2010). Waiting to obtain a food item or mating opportunity gives others the chance to grab it. For instance, bypassing a smaller, closer food item in favor of a larger, more distant one means that a forager may well end up with nothing because enormous groupmates have arrived first. Therefore, species living in larger, competitive groups generally exhibit stronger preferences for immediacy than solitary species. The threat of competitive interruption triggers a preference for immediate payoffs (Carrascal & Moreno, 1993; Emery, Dally & Clayton, 2004).

As demonstrated in the case for advanced purchase scenarios, consumers discount delayed rewards because the future is uncertain; a so-called interruption risk might prevent the consumer from consuming a delayed reward. In a sporting event context, competition with other consumers poses an enormous interruption risk. Waiting to obtain a discounted ticket gives others the chance to grab it in the meantime. We would expect, therefore, that consumers in a higher demand, competitive product category should exhibit stronger preferences for immediacy than low demand product categories. The threat of competitive interruption fundamentally triggers a preference for immediate payoffs.

Opportunity Cost of Waiting

In addition to increasing competition, waiting in delayed decisions imposes opportunity costs because animals (and humans) must wait to put delayed rewards to use (Stephens, Kerr & Jurici, 2004). One of the first attempts to address and test species differences of opportunity cost in inter-temporal preference, Tobin and Logue (1994) argued that species with high metabolic rates simply cannot afford to wait for long delays to receive food and will prefer immediate rewards more than will species with lower metabolic rates.

The same implications can be applied between different consumer groups in the advanced sales market. There exist varying levels of opportunity cost associated with the sensitivity of interruption risk to delayed purchase and consumption. The urgency of business travelers heading towards a destination is different than a leisure traveler who wants to wait and find the best hotel and travel deals available. The sensitivity to social interruption risk for marathon registration to be sold out is higher for committed runners compared to causal runners who have less urgency toward event sell out and rather find a better deal for an event.

However, there are three important reasons to be cautious when applying discounting as an explanation of choice in the case for consumers. First, the experimental tasks might not capture the ecologically relevant risks and opportunity costs that consumers face in their purchase environments. Second, there exist several alternative hypotheses that can, in principle, account for specific experimental results without discounting. Finally, direct manipulation of delay-discounting variables did not always have the predicted effect on choice (Henly et al., 2008; King & Logue, 1992).

Despite these setbacks in laboratory settings, there are many reasons to believe that delay-discounting models – developed through the underlying factors of collection risk and opportunity cost – have developed robust normative models to explain consumer temporal preferences. Green and Myerson (2004) report on their search for a common process underlying discounting of time and probability, and find that discounting involves multiple processes, traits, and abilities. As an empirical extension, this study further tested within the domain of consumers' online purchase activities based on the categories of goods and services in the tourism, hospitality, and sports context. This study aims to define the key factors that explain the inter-temporal decision of consumers in an advanced sales inter-temporal choice purchase situation and, more importantly, how this context deviates from normative (rational choice) models or inter-temporal choice.

Normative models of Advanced Sales Decision in Tourism, Hospitality, and Sport

The traditional approach to modeling consumers' purchase decisions does not adequately address the complexity of, and the remarkable changes in, the way consumers advance book travel-related products and services (Schwarz & Chen, 2010). The travel, hospitality, and sports industry is focused on offering an experiential service product, one that cannot generally be stockpiled after the time of consumption. Due to this perishability, there exists little or no reservation value for flight tickets, hotel rooms, or sporting event tickets once the time of the service has been delivered to the consumer. As a result, advanced sales (temporal price discrimination) have been a widely accepted practice of revenue management in the travel and hospitality industry.

This gap in the marketing literature is especially evident when it comes to the behavior of the deal-oriented segment; that is, the characteristic conduct of consumers who use the internet to search and book for the best hotel, airline or sporting event deals. Revenue-maximizing hotels that operate in this advanced-booking dynamic-pricing environment adjust their room rates in response to changing market conditions (Bitran & Mondschein, 1995; Talluri & Van Ryzin, 2005; Schwartz & Chen, 2010; Dwyer, Drayer, & Shaprio, 2013). The separation of purchase and consumption in the product creates a problem for consumers as the question 'when to buy?' becomes an eminent task to maximize the utility of their purchase decision. We may or not be able to attend a concert through possible sell out if we wait too long to find better deals. Contrarily, if we purchase the product too early, we run the risk of not being able to consume at all due to natural interruptions, such as cancellation because of uncertain weather conditions or social interruptions, such as personal schedule conflicts. In this case, the person that waits to the last minute may have an advantage. As a result, the above-mentioned industries face an emerging market segment of deal-seeking travelers who employ vigorous strategies in an attempt to anticipate price changes over time, so that they can obtain the best travel deals (Darlin, 2006; Gabaix & Laibson, 2006; Glab 2004; Travel Tech, 2006).

Many traditional price discrimination models in travel and hospitality assume that in the aggregate level, the distribution of customers' reservation price changes over time (Zhao & Zheng, 2000) and, more specifically, the distribution of customers' willingness to pay increases (Raeside, 1997) over time. Two principal explanations have been proposed to explain this phenomenon. The first explanation stipulates that as the date of stay or purchase approaches, proportions of business travelers (compared to budget travelers) increase in the advance sales market. These business travelers tend to book close to the date of travel, whom exhibit low price elasticity of demand for travel; in other words, they are less sensitive to price changes and have higher willingness to pay for immediate availability at the last minute. On the other hand, those consumer groups who exhibit higher price elasticity of demand for travel (budget travelers) are more sensitive to price and are willing to book earlier if they think it will help them secure a better price.

The second explanation looks at the decision-making process of individual consumers in the advanced sales market. Schwarz (2000) first conceptualized a normative consumer decision model to approach the consumers advanced sales decision in the hospitality context (Figures 1 and 2). According to Schwarz (2000), the optimal decision of when to book for a hotel is determined by a function of expected utility and room rate of a hotel, where the consumer makes a strategic decision depending on the fluctuation of these factors. Hence, decision rules to book now or delay booking and search is determined based of these factors. If the expected utility is higher than the quoted room rate, the rational decision (optimization) is to book now instead of delaying the purchase.

Following the advance-booking decision zones models stipulates that in an uncertain environment, two variables describe the point at which a consumer "switches" from what the supplier would consider a desirable booking situation (i.e., paying the rate offered and discounting any further foraging or shopping) to the less desirable search-and-switch strategy (Schwarz, 2006). These two variables are the quoted rate and customer utility. In line with the conventional marketing model, the consumers' utility is defined as the difference between the customers' willingness to pay for the good (reserve price) and the expected cost of the booking decision. The consumers' select a booking strategy for which their utility is maximized.

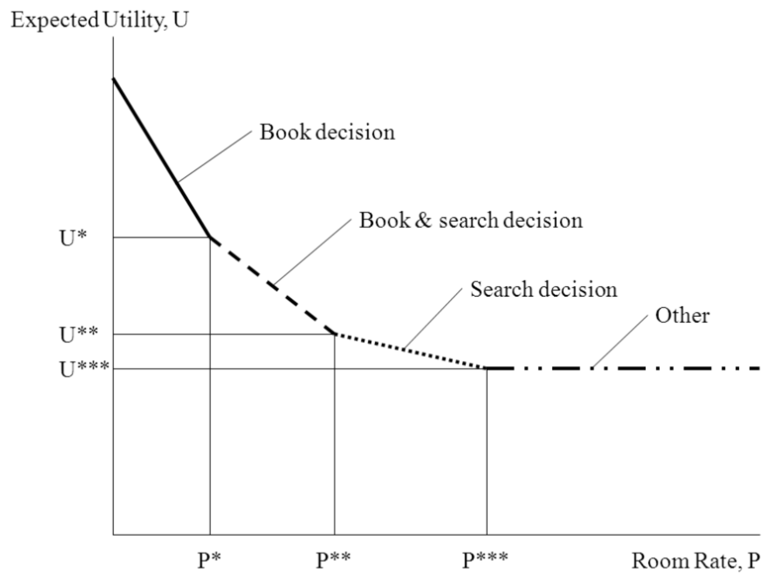


Figure 2. Generic Advanced-Booking Decision Model Rates and Optimal Zones (Schwarz, 2006).

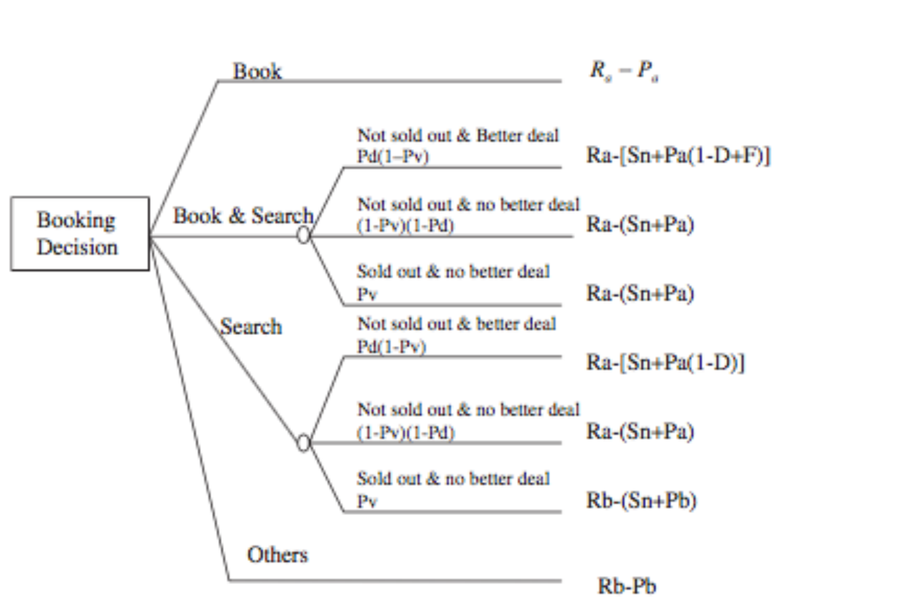


Figure 3. Generic Advanced-Booking Decision Model's Decision Tree (Schwarz, 2010).

In recent studies, Schwartz (2008) expanded this theoretical model to include timing, arguing that the generic advanced-booking decision model could not be assumed to be static over time (based on a constant exponential discounting model assumption). Instead, the model should be revised to reflect the behavioral and dynamic nature of some of its variables. More specifically, Schwartz challenged this static assumption and suggested that some of the model's elements (e.g., consumers' perception of the hotel selling out) change as the date of stay approaches (2008).

The modal strategy in behavioral decision research is to compare observed behavior with a normative model. When purchasing tickets in advance, consumers are faced with all kinds of environmental uncertainty. Chen and Schwartz (2008) have further found that consumer perceived propensity to book changes due to the likelihood of being offered a better deal (self-perceived probability estimations of the opportunity cost of waiting) and sellout risk (self-perceived probability estimations of competition risk) as the date of stay nears purchase. At times when sellout expectations are low and/or expectations of finding a better deal are high, the customer's propensity to book is lower. Hence, at these times, it might be beneficial to strategically disclose information about the number of units already booked. As shown by Chen and Schwarz (2006), the customers' propensity to book increases if they are told that many of the rooms are already reserved. However, Chen and Schwarz (2008) argue that these findings underscore the importance of timing and call attention for empirical decisions on the role of timing in travelers advanced booking decision.

To address this research inquiry, Dwyer, Drayer, and Shapiro (2013) attempted to test for the impact of lead time using two theoretical constructs that reflect the two interruption risks in the context advance sales market for sport tickets; ETA (expected ticket availability) and ELR (expected lower rate), which is a participant's probability assessment of finding a similar price or lower rate ticket. While the traditional approach to revenue management assumed a simple monotonic change in willingness to pay as the date of stay nears (Chen & Schwarz, 2006), the fluctuating patterns of ETA and ELR revealed in Dwyer et al. (2013) supports opportunities for price management involving time-related interventions, and highlights the need to develop a modal strategy that reflects how consumer's deal with uncertainty cues in the advances sales market.

The adaptive nature of Inter-temporal choice and Delay Discounting

The study of behavioral ecology primarily focuses on the evolutionary and adaptive basis of behavior due to surrounding ecological pressures. Todd and Gigerenzer (2000) defined ecological rationality as the "adaptive behavior resulting from the fit between the mind's mechanisms and the structure of the environment in which it operates". Unlike normative decision models, there is no constant and ultimate optimized decision rule deemed rational that caters to all contextual domains. That is, the appropriateness of a decision mechanism fundamentally depends on the structure of the environment. Thereby, the experimental settings to test ecological rationality results and support a mismatch between the domain of selection and the domain of testing.

Economists and psychologists have repeatedly shown that humans are willing to wait months or years for delayed payoffs (Frederick, Loewenstein, & O'Donoghue, 2002), leading some to propose patience as a unique capacity in humans (e.g., McClure, Laibson, Lowenstein, & Cohen, 2004). This study extends the inter-temporal and delay discounting literature by testing whether this consistency of patience (constant discounting) can be induced in the unique context of advanced sales in sports ticket purchase. To this extent, the proposed empirical studies in this dissertation focus on inter-temporal choice in the advanced sales market and, more importantly, on why human consumers deal with the uncertainty differently in their purchase environment. What makes advanced sales decisions for consumers difficult can be attributed to the uncertainty dilemma that time creates and complicates decision making models.

Literature in judgment and decision-making defines uncertainty as disagreement among forecasters, or doubts within a single forecaster, as to the correct value of an unknown quantity of interest (Lichtenstein, Fischohoff, & Phillips, 1982; Ayton & McClelland, 1997; Klayman, Soll, Gonzalez-Vallejo, & Barlas, 1999). Years of behavioral research in the field of judgment and decision-making have unearthed a variety of cognitive limitations when people are confronted with uncertainty (Lichtenstein, Fischohoff, & Phillips, 1982; Ayton & McClelland, 1997; Klayman, Soll, Gonzalez-Vallejo, & Barlas, 1999).

Table 2. Consumer Decision Making: Major Perspectives of Rationality

	Rational Choice	**Heuristics & Biases**	**Behavioral Ecology**
Theory	Newtonian Theory	Newtonian Theory	Darwinian Theory
Discipline	Economics	Cognitive Psychology	Evolutionary Theory
Focus	Prescriptive	Descriptive	Descriptive
Reasoning	Deductive	Deductive	Inductive
Rationality	Normative	Normative	Ecological
Role of Emotion	Emotion is ignored	Emotion is error	Emotion is information
Application of Heuristics	Heuristics overlooked	Heuristics are applicable to low cognition	Heuristics are ways to achieve decisional efficiencies
Research Program	Develop rules for universally optimal choice	Compare choice to normative model and catalog errors	Analyze choice as adaptation
View of Humanity	People are rational	People are irrational	People are ameliorators
Behavior of Consumers	Consumers are passive	Consumers are responsive	Consumers are proactive
Focal Components	Commodity's demand and supply	Human's cognitive ability	Interaction between human mind and environment

Note: This table is based on Hantula (2012), Todd & Gigerenzer (2007), and Simon (1974).

Table 3. Examples of phenomena that were first interpreted as “cognitive illusions” (left) but later revalued as reasonable judgements given the environmental structure

Is a phenomenon due to a “cognitive illusion”…	…. or to an environmental structure plus an unbiased mind?
Overestimation of low risks and underestimation of high risks	This classical phenomenon can be deduced from an unbiased mind in an environment with unsystematic error, causing regression toward the mean (Gigerenczer & Fiedler, 2004)
Overconfidence bias (defined as miscalibration)	“Miscalibration” can be deduced from an unbiased mind in an environment with systematic error, causing regression toward the mean (Dawes & Mulford, 1996; Erev et al., 1994)
Overconfidence bias (defined as mean confidence minus proportion correct)	“Overconfidence bias” can be deducted from an unbiased mind environment with unrepresentative sampling of questions; disappears largely with random sampling (Juslin, Winman, & Olsson, 2000)
Contingency illusion	“Contingency illusion” can be deduced from an unbiased mind performing significance tests on samples with unequal sizes, such as minorities, and majorities (Fiedler, Walther, & Nickel, 1999)
Availability bias	“Availability bias” largely disappears when the stimuli (letters) are representatitvely sampled reather than selected (Sedlmeier, Hertwig, & Gigerenzer, 1998)
Preference reversals	Consistent social values can create what look like preference reversals (Sen, 2002)
Probability matching	Probability matching is suboptimal for an individual studies in isolation, but not necessarily for individuals in an environment of social competition (Gallistel, 1990)
Conjunction fallacy	“Conjuction fallacy” can be deduced from the human capacity for semantic inference in social situations (Hertwig & Gigerenzer, 1999)

Note: The general argument is that an unbiased mind plus environmental structure (such as unsystematic error, unequal sample sizes, skewed distributions) is *sufficient* to produce the phenomenon. Note that other factors also contribute to the phenomena. The moral is that people would never err, but that in order to understand good and bad judgments, one needs to analyze the structure of the problem or of the natural environment.

The following proposed empirical studies of this dissertation address several of these cognitive limitations, which are unique to humans, and demonstrate how consumers eventually adaptively deal with the uncertain environment in the advanced sales purchase decision. Humans exhibit logical reasoning and judgment in making decisions, and sometimes these cognitive abilities direct humans forecasting ability to false predictions when implementing future decisions. Humans also suffer from overconfidence in their predictions of uncertainty. Novices and experts alike appear to be overconfident in most of their predictions (Cerf & Navasky, 1984). Humans become overconfident in part, not only because of our inability to envision all possible pathways into the future but also because of several behavioral and ecological limitations, which are discussed below.

Bias in Assessing and Weighing Probabilities of Risk

When it comes to people's perceptions of risk, several factors play a role. Humans seem to dread most those risks we understand poorly, or those we have no control and risks occur in clusters, such as an airplane crash in which all people are killed. Such risks instill more fear than far greater risks that hit isolated individuals at random, such as automobile accidents. Similarly, we react more strongly to uncertainties that are vividly portrayed or experienced, such as physical assault or highly traumatic childbirth, than the less vivid statistical risks associated with various kinds of cancer (Fischhoff, 1983; Slovic, 1987).

Moreover, humans have been shown to be poor in probability judgments. This is essential as most of the information we receive about risk is measured in probabilistic formats. Several studies asked people to choose among uncertain alternatives, and when given the opportunity to get additional information, few inquired about data and probabilities (Kunreuther, Hogarth, & Meszaros, 2001; Magat, Viscusi, & Huber, 1987). This problem is especially acute when dealing with very low probabilities, such as the chance of catastrophic accidents or natural disasters. In such cases, people cannot readily distinguish between 0.0001 and 0.00001 risks, even though the latter is 10-times less likely. In sum, humans seem to have a hard time assessing and estimating risk and uncertainty appropriately.

Overconfidence bias (Illusion of control)

A motivational reason why certain people might be overconfident is that they harbor a deep-seated psychological need to feel in control of the uncertain environment. Langer (1975) showed that people harbor an insidious illusion of control, which gets stronger as they exert more effort in predicting the future. For example, lottery sales in Massachusetts markedly increased once people were allowed to pick their own lucky number rather than being assigned a number at random (Perlmuter & Monty, 1977). This need for an illusion of control is widespread (Presson & Benassi, 1996) in human judgment and decision making and might explain why gamblers blow on their dice and study streaks of roulette.

However, research finds that this illusion of control, or overconfidence, may also contribute to our mental health (Taylor & Brown, 1988). Although overconfidence might lead to worse predictions, this might not all be bad in terms of one's satisfaction with the decision. It feels good to be able to feel subjectively accurate over our decisions, even though the reality is not the case. One would not feel as bad and actually more satisfied if the ticket they bought through discretion is actually more expensive than one had randomly chosen and bought at a lower price unless knowing the consequence. Overconfidence just needs to be suppressed somewhat when making key forecasts or important decisions. Study 2 address this by asking, why are more emotionally attached and involved sports fans (who do much research and more time and effort researching their team and players) biased in their judgment and predictions in the advanced sales market?

Information distortion

People's perceptions of risk and uncertainty are further distorted because the available information of the environment might not be representative of the real situation. We are overly aware of those parts of the world that produce that noise or are most readily in our line of sight (Tversky & Kahneman, 1974). For example, when researchers asked subjects whether they thought lung cancer or automotive accidents caused more deaths annually in the USA, the majority guessed auto accidents. In fact, at the time of the study, there were about 140,000 deaths per year from lung cancer compared to about 40,000 from automobile accidents. People learn about automobile accidents from the media every day, and their perception of risk is skewed accordingly, explained through the availability and accessibility of information (Huber, Wider, & Huber, 1997). Similarly, we overreact to shark attacks in the ocean or terrorist attacks in the sky and fail to put these risks in their proper statistical perspective. This bias towards overweighting the most readily available information operates in many subtle ways and can best be countered by asking where the hidden slants are in the data that are available to us.

Study 3 tests the boundary conditions when the same information is presented differently, creating distortions that can lead to different risk perceptions and resultant behaviors: 1) When scarcity is presented in raw number figures vs. proportion ratios (235 seats remaining vs. 15% remaining); 2) Anchoring (low price vs. price ranges) can lead to higher or lower evaluations in our risk perceptions and purchase likelihood.

CHAPTER 3

PROPOSED EMPIRICAL STUDIES AND FINDINGS

Study 1 – Fast and frugal decision heuristics of the inter-temporal choice
Which factor dominates decision making for fans to buy now or purchase later?

From a classical economic standpoint, for good reasoning and rational choice under uncertainty, consumers must adhere to the laws of logical deduction, apply precise calculations of probability and fulfill maximization of future expected utility. Yet, in real life, people make judgments and decisions, generally without calculating conditional probabilities and expected utility payoff functions (Gigerenzer & Goldstein, 1996; Kahnemann, 2011). Study 1 attempts to directly manipulate the two aforementioned identified environmental cues of uncertainty, sellout risk (competition amongst others), and the opportunity cost of waiting (investment cost of waiting now to consume later), as well as examine how this impacts consumers inter-temporal purchase decision. The study further attempts to answer the question of when two contradicting environmental cues of uncertainty are present, which factor becomes more dominant for consumers' to book/purchase now or delay their decisions of booking/purchase.

Conventional economic literature concerning the topic had supported that the two conceptual relationships generally move in opposing directions over time (Borland and McDonald, 2003). Assuming supply is fixed over the short term, when high demand (competition) is expected for a given product, perceived sellout risk for the product increases in the market, and accordingly the opportunity of finding better offers and deals decrease (lower opportunity cost of waiting) for consumers. Conversely, when expected demand (sellout risk is low) is low for a given product, there exists more potential supply in the market and the opportunity of finding similar or better deals increases (higher opportunity cost of waiting).

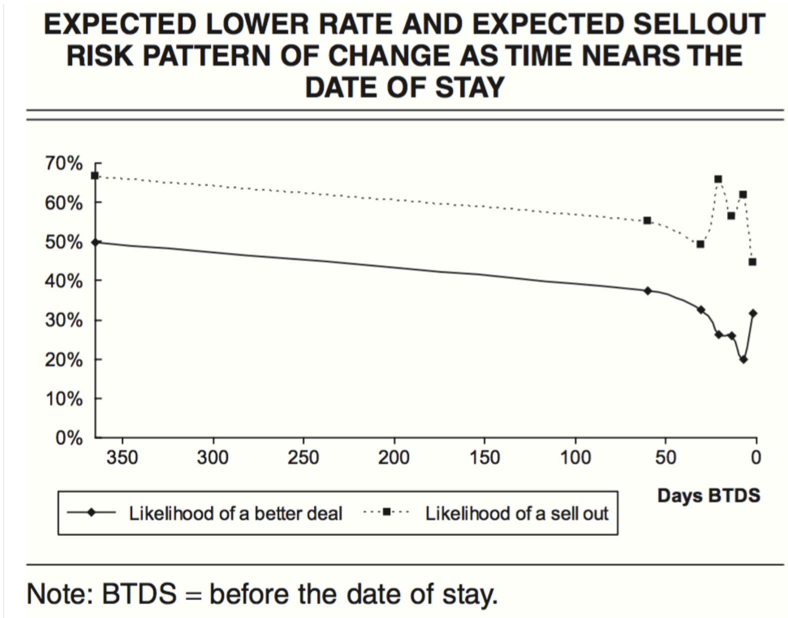


Figure 4. The relationship between Time and ESR and ELR (Dwyer, et al., 2013)

Dwyer, Drayer, and Shapiro (2013) replicated and tested this hypothesized relationship in an advanced sports ticket purchase context using a 19-day advanced purchase timeframe. These authors found that for a generic sports ticket product category, the overall likelihood of ticket availability (an indirect measure of sellout risk) and the likelihood of finding a better deal (a measure of the opportunity cost of waiting) both decreased over time. However, this relationship showed contrasting relationships within a 30-day time frame before the event (Figure 4.) Moreover, they also discovered that consumers' perception of likelihood of sellout and likelihood of finding a better deal differed across different levels of sports fans, where both factors of likelihood of sellout and likelihood of finding a better deal were overestimated for highly identified sport fans than less identified sport fans (Dwyer et al., 2013). Their empirical findings in the sports context further suggest that the judgmental process of the inter-temporal choice (when to book/purchase) might be segmented through consumers of differing levels in team identification.

The study also tested differences of subjective risk judgments in different market platforms; as within the same purchase scenario, perceived sellout risk (competition) was significantly higher for consumers in the primary market, whereas estimates of likelihood of finding a better deal (opportunity cost of waiting) was significantly higher in the secondary market scenario (Dwyer et al., 2013). Furthermore, the decreasing perceived sellout risk pattern over time seemed to be prevalent in both ticket sources, whereas the absolute probability judgment values were larger for the secondary market, and the increasing relationship in the perceived likelihood of finding a better deal (opportunity cost of waiting) was only evident within the secondary ticket market scenario. These findings support that the subjective probability judgment of uncertainty in consumers' might be swayed within which purchase environment (primary vs. secondary) they are exposed to and ultimately the inter-temporal purchase decision.

When information cues of the two factors of environmental uncertainty expected 'competition' and 'opportunity cost of waiting' is presented to consumers, a simple decision rule can be applied: as when competition is high and opportunity cost of waiting is low, there is a high likelihood for customers to buy now than wait, whereas when competition is low and opportunity cost of waiting is high, it is optimal for customers to postpone and delay purchase. Similarly, in the hospitality literature, Chen and Schwarz (2008) found that participant's likelihood of booking changed substantially when information of sellout risk was presented against scenarios in which no demand information or less sellout risk was presented. This relationship was further moderated by price, when the offered booking rate was low to begin with, the influence of competition (demand and sellout risk) was not significant under any purchase scenario in their study. These findings suggest that consumers might take the low price as the dominant factor of their booking decision and make the decision to buy early (Chen and Schwarz, 2008), regardless of the uncertainty of the advance sales purchase environment.

Disregarding the rare situation when booking prices are discounted at a drastic rate, the hypothesized positive relationship between competition (sellout risk) and the purchase likelihood seems to prevail as a robust empirical finding within the advances sales market literature in hospitality and sport management (Chen & Schwarz, 2008; Dwyer, Drayer & Shapiro, 2013). Yet, previous empirical studies on the subject have not examined how consumers' opportunity cost of waiting impacts their inter-temporal booking/purchase decision, and specifically how these two factors moderate the ultimate decision to book/purchase now or book/purchase later. Though these two factors are somewhat conceptually correlated, they are not necessarily dependent on each other. For instance, when there is an anticipated game ticket with high demand, sellout risk (competition) is high, and it may be unlikely to find better deals by waiting on the market (opportunity cost is low). However, with more and more secondary resellers available on the online market platform, the opportunity cost of waiting can be lower for high demand tickets as more resell transactions are available in the effort for sellers to seek for excess arbitrage profit. Eventually, if the opportunity cost for a high demand game is low for consumers, the best strategy would be to wait to buy at the last moment when sellers who have no intention of attending the games will have no choice but to lower their prices.

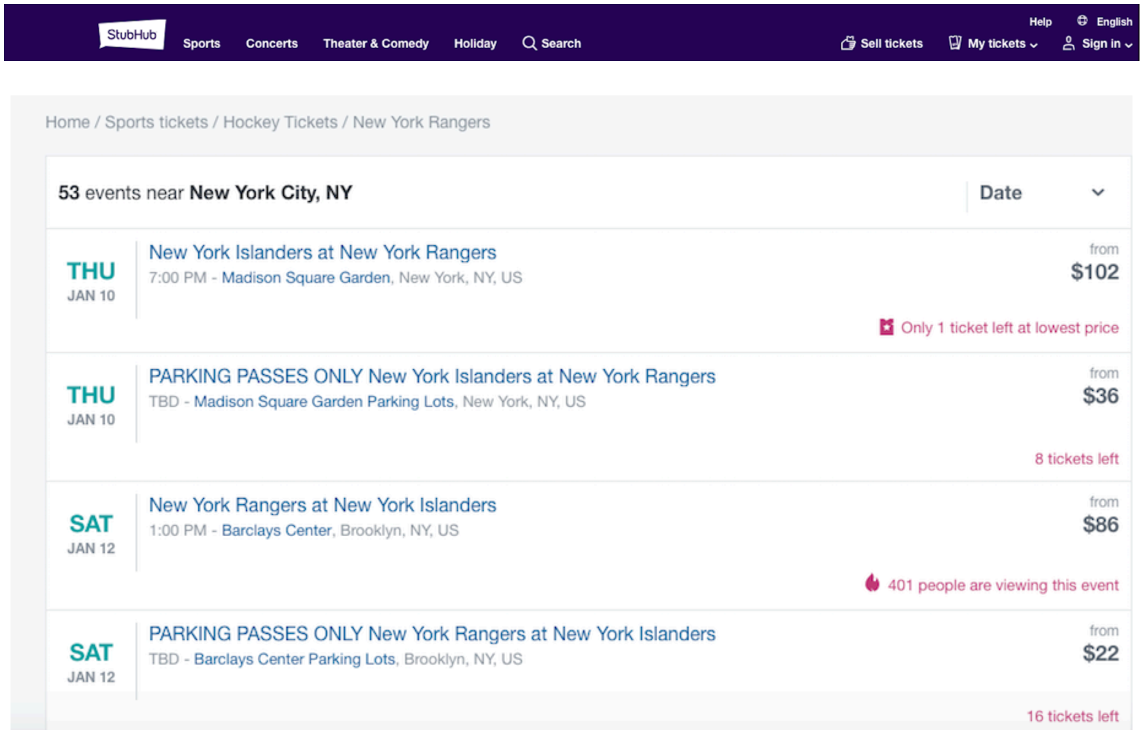


Figure 5. An example of competition manipulation. Source: Stubhub website.

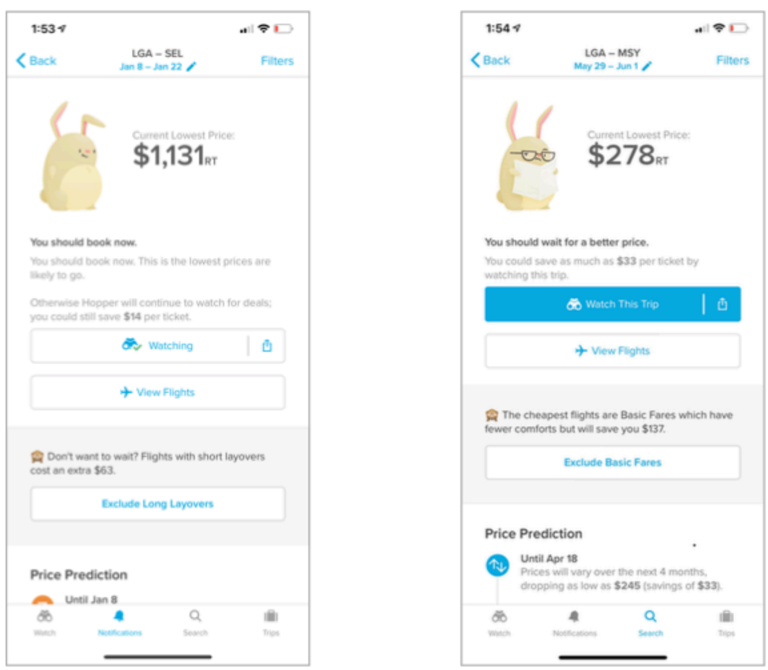


Figure 6. An example of opportunity cost manipulation. Source: Hopper app.

Accordingly, there has not been a comprehensive discussion on the interaction between the conflicting scenarios of the uncertain market (Example in figure 5 and 6). What happens when a consumer faces a product that has a high chance of selling out but is exposed to a situation where several alternative deals are offered and readily available? What does the consumer decide to do when the probability of a product selling out is low, but the likelihood of finding better alternative deals are unlikely? Does one factor (competition vs. opportunity cost) become more dominant than the other when the advance sales purchase environment sends competing information of uncertainty? To address these research questions, this experimental study aims to test when two different information cues of uncertainty are presented, what becomes the dominant information cue consumers respond to in their decision to buy now or wait to purchase later.

Additionally, sports consumers have been segmented through team identification, where highly identified group fans exhibit distinct forms of behavior against non-fans. In the case of travel purchase, lifestyle segmentation is essential where business travelers it is important for them to be able to make it to the destination whereas leisure travelers are generally more sensitive towards finding a better deal and wait. For hardcore fans, sellout risk might be a more important cue; these fans who wish to participate in the game or event rather than to wait and search for a better deal. For less involved fans, as primarily deal seekers in the market, it is more important to search for better deals. Thereby, sellout risk will be a more dominant factor in purchase intention than the likelihood of finding a better deal for fans than non-fans. Whereas, for casual fans, the opportunity cost of waiting (likelihood of finding a better deal) will be more dominant in their purchase or search decision. To examine the fast and frugal decision heuristics of sports fans and casual fans, this study tests the following hypotheses on consumer's purchase intention/likelihood with relationship to the two decisional factors (sellout risk and the opportunity cost of waiting) in the advanced sales environment.

Research Hypotheses

Main effects of the study

H1: High/Low competition condition will lead to Higher/Lower purchase likelihood.

H2: Low/High opportunity cost condition will lead to Higher/Lower purchase likelihood.

The study further will test post hoc group comparisons where:

H3: In the high sellout risk × high opportunity cost of waiting condition:

Purchase likelihood will be significantly higher for sports fans than non-sport fans

H4: In the low sellout risk × low opportunity cost of waiting condition:

Purchase likelihood will be significantly higher for fans than non-sport fans

Methods

Subjects and Study Incentives

In partnership with the Institute for Hospitality and Tourism Management at Saint Joseph's College New York, a total of 120 undergraduate students were recruited to log into to a simulated website, to assess the information provided online, and book NCAA March Madness tickets at the best rate they can find. This simulated ticket reservation site tested whether; a subject's purchase likelihood could be influenced by manipulating information cues of uncertainty in a generic advanced purchase decision scenario. To ensure enough sample size to conduct the necessary statistical test and post-hoc comparisons, a minimum of *N =30* was required for each condition group. A stratified sampling method based on the proportion of department majors of the academic institution was used in the sample process to ensure generalizability of results to the population of the study. If the maximum number of department major student quota were filled, students from other department were targeted in recruitment. Once a total of 120 students were selected, participants were randomly assigned to the four treatment conditions of the study. All research participants went through a training session to ensure that they understood the assignment and operation of the online simulation experiment. To further ensure validity of results, as an incentive tickets to the NCAA ACC Tournament (Syracuse vs. Wake Forest at the Barclay's Center) were given to students who successfully completed the experimental task.

Table 4. Key Demographics of Study 1 Participants

Age	22.54, Mean	**Ethnicity**	66.3%, Caucasian
	3.69, St. Dev		12.3%, Hispanic
Gender	57.4%, Male		10.4%, African American
	42.6%, Female		11.0%, Other
Household Income	12.5%, Less than $20K	**Department Major**	28.3%, Business
	20.7%, $20K-$40K		20.0%, Psychology
	22.9%, $40K-$60K		17.5%, Biology & Chemistry
	24.7%, $60K-$80K		15.0%, Journalism & Media
	15.0%, $100K-$200K		11.6%, Recreation & Leisure
	3.4%, More than $200K		6.6%, Other

The study gave participants 3 days (representing three weeks) to book their tickets at the lowest price possible. Participants were informed that depending on the remaining supply of tickets and game demand; the website might increase or decrease the quoted ticket prices. Also, it was emphasized that if the tickets sold out (i.e., if all seats were fully booked), subjects would be unable to buy their tickets. Allowed just one login per day (representing one week), the participant could choose to either ‘purchase now’ or ‘wait for a better deal’. Search and switch was not allowed once the booking decision was confirmed, as participants were no longer allowed to access the reservation website once a purchase decision had been made.

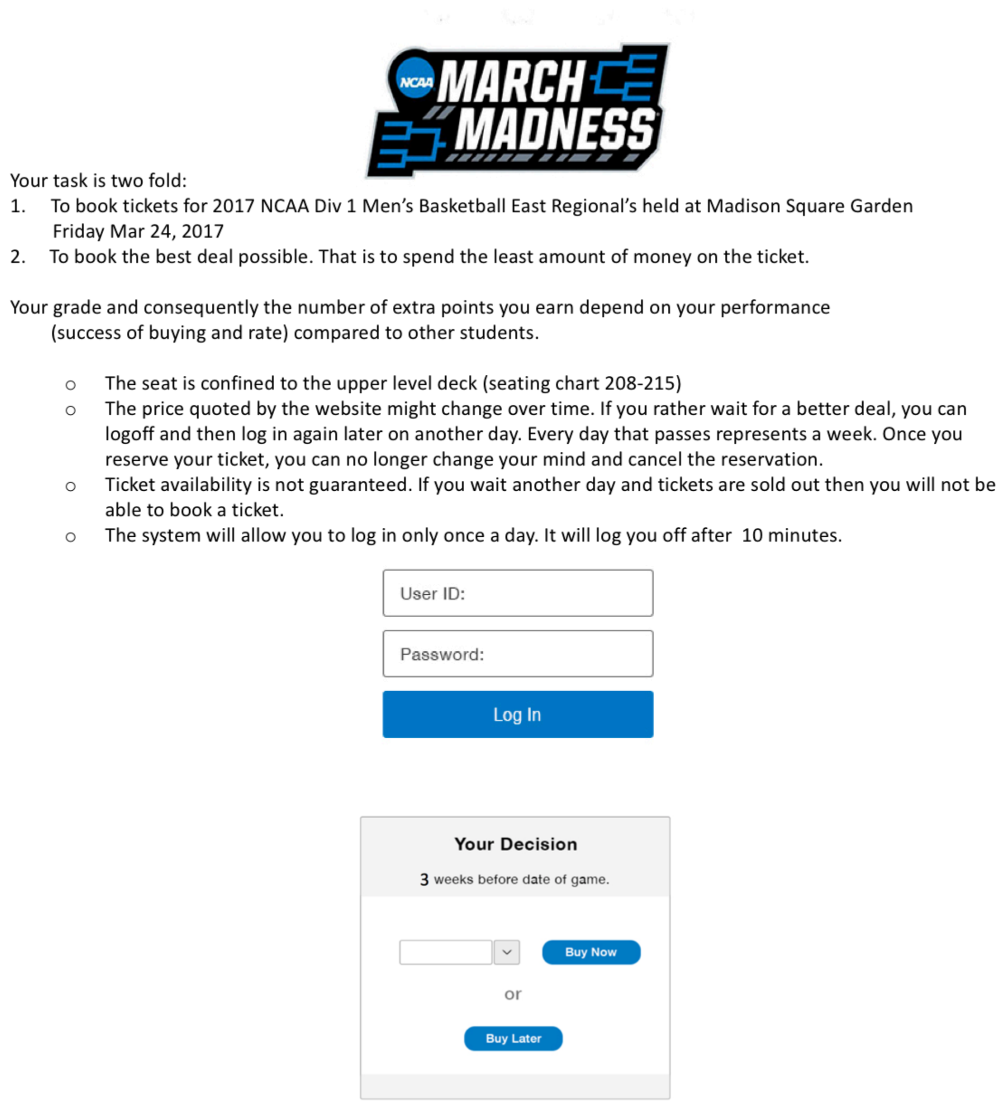


Figure 7: Generic NCAA Sports Ticket Booking Simulation Web Platform.

Experimental Design

To test the proposed research hypotheses a 2 (competition: high vs. low) × 2 (opportunity cost of waiting: high vs. low) between-group experimental design was implemented, subjects were randomly assigned into each of the four treatment group conditions. The competition condition was manipulated into two distinct levels of ‘high sellout risk’ and ‘low sellout risk’ for the event. Operationalization of sellout risk was provided through both graphics and verbal descriptions (see Figure 7). In the high-level condition, a visual vignette of a seating chart graphically and verbally stated that only 10% of seats were remaining for the given event, whereas in the low-level condition the seating chart will show 50% of seats are currently remaining for the given event.

The opportunity cost of delaying purchase was manipulated into two distinct levels of ‘high opportunity cost’ and ‘low opportunity cost’ through two distinct scenario descriptions (see Figure 8). For the case of the low-level condition, a visual cue of higher quoted price deals offered by different comparative website platforms was included along with a verbal description stating that ‘the current offer is the lowest transaction price in recent 30 days’. In the high-level condition, a visual cue of similar price deals was offered from various alternative websites along with a verbal description indicating that ‘a lower price deal has been offered within the recent 24 hours’. Chen and Schwarz (2006) revealed that a low enough discount price would simply encourage participants to impulsively book early without further consideration. Because price can be a critical confounding factor that can skew the results of the study, the initial offered price of the deal being offered in each scenario was controlled to $205 to match the face value of the ticket.

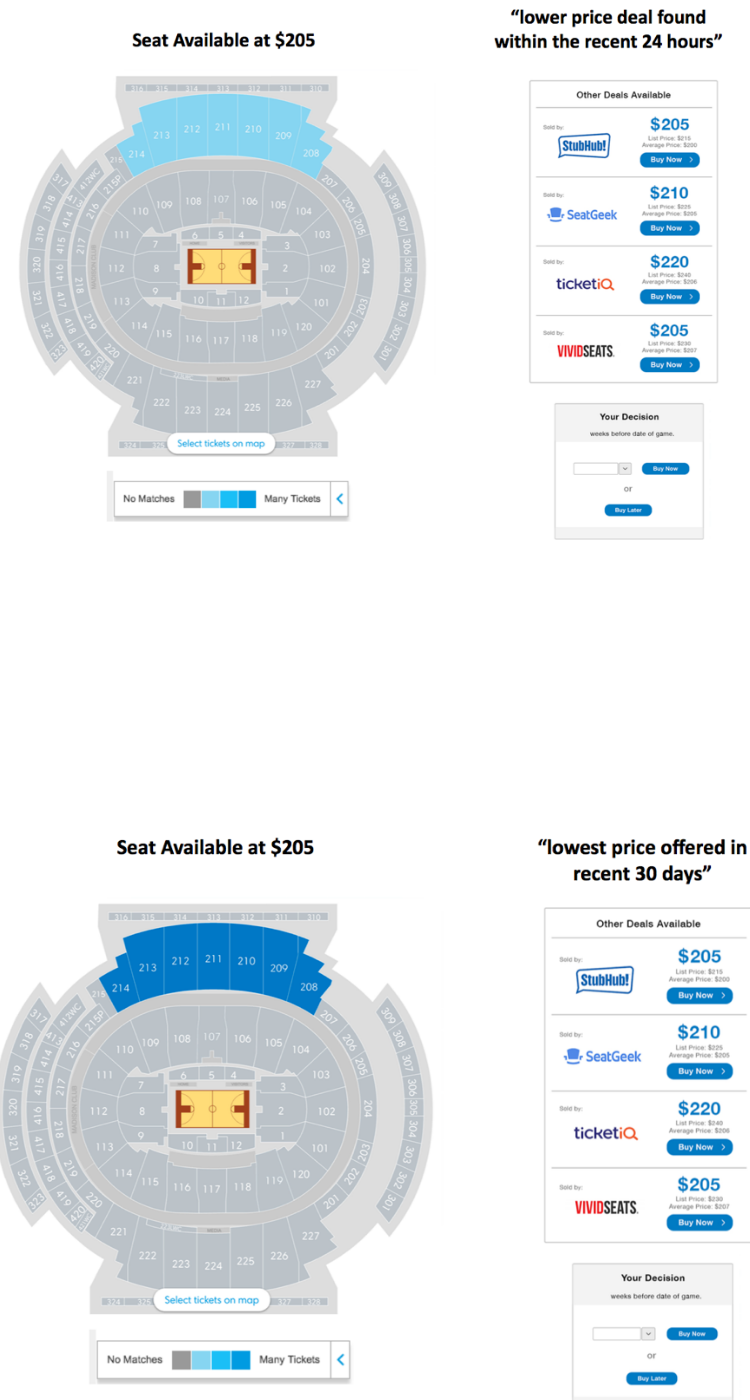


Figure 8. Vignettes of the Ticket Purchase Scenario Conditions for Study 1.

Following an initial screen where subjects were randomly distributed to each of their allocated treatment scenarios, participants were presented with two action buttons with the respective captions of “buy now” or “purchase later”, which intends to give an actual post-hoc observed choice measure as the dependent variable of the study. The number of weeks left before the date of the game, and the time remaining for the current session was also shown on the generic website for further descriptive analysis. Participants were automatically logged off by the registration system if they did not decide within 10 min of logging into the simulation website. The last screen depends on each subject’s response, but participants will be given an option to reconsider each of their final choices. If participants selected the “purchase now” button, the final screen gives a choice between “confirm the purchase” or “return to the previous screen” buttons. Once participants “confirm the purchase” their results along with demographic information will be coded and recorded into a spreadsheet database platform. If participants elected to “purchase later” and confirm their delayed purchase decision, they would wait until the next day to partake in the second leg of the experiment.

Each of the four condition descriptions remained the same for subjects participating in the next day of the experiments (reflecting no changes in the market over a 1-week time frame). The second day acted as a filter to examine which type of participant and which treatment scenario is likely to resist the urge to purchase now against waiting to find a better deal later. Those participants who patiently waited to search for the final day (reflecting final week in the study) of the experiment will now be given altered market conditions. The remaining participants in the high sellout risk × high opportunity cost condition will be shown a full sellout scenario where there are no available tickets remaining. Remaining participants for all other treatment conditions will find a screen with ticket deals offered at a lower price in their final day of the experiment.

Measurements

Dependent Variable

The dependent variable of the study measures purchase likelihood, which was operationalized by calculating the proportion of subjects who placed a reservation on the first two days (representing the first two weeks) over the number of subjects remaining who participated in the last day of the experiment (participants who did not purchase now and waited to purchase later). Once again, the differing descriptions provided for the third day of experiments does not necessarily compromise the validity of measurement as the focus of the dependent variable is to capture the statistical variance between the dichotomous choice of purchasing now or purchase later caused by the manipulation of the four treatment conditions (independent variables). The study used the first 2 days (where time has changed, but conditions remained the same) for this measurement to ensure that there are large enough observations for statistical significance tests (Chen & Schwarz, 2006). Those who have successfully found the best deal will be rewarded extra points on the assignment. Once again, the resulting points accumulated for participants through this simulation experiment are solely for academic incentive and educational purposes. The real choice experiment depicts a realistic hypothetical scenario of uncertainty in the advanced sales purchase, and the offered scenario predictions are based on empirical findings of decreasing price patterns over time in secondary market ticket pricing research (Shapiro & Drayer 2014; Drayer, Rascher & McEvoy, 2012; Sweeting, 2012).

Analysis and Results

Of the 120 students, 81 (67.5%) booked the tickets in the first 2 days. Table 5 shows what percentage of the respondents in each of the four treatments booked during the first 2 days.

Table 5: Percentage of Respondents that Booked in Each Treatment Condition.

	Opportunity Cost					
	High		**Low**		**Total**	
Sellout Risk	***N***	**Purchase (%)[a]**	***N***	**Purchase (%)**	***N***	**Purchase (%)**
Low	5	16.6%	18	60.0%	23	38.3%
High	29	96.6%	29	96.6%	58	96.6%
Total	34	56.6%	47	78.3%	81	67.5%

[a] Percentages shown as the number of respondents who ended up booking in each condition, 30 students were equally randomly assigned to each condition

Eighteen of the 30 respondents (60.0%) who were shown a low sellout risk and the low opportunity cost of waiting scenario had decided to book the tickets, while only five respondents (16.6%) booked when shown the same low sellout risk scenario but with high opportunity costs of waiting. A chi-squared test of independence was performed to examine the relation between treatment condition and booking percentage. The relationship between these variables was significant. Overall, 38.3% of the subjects who were shown a low sellout risk scenario booked tickets within the first 2 days, regardless of which opportunity condition they saw. Contrarily, 29 of the 30 respondents (96.6%) who were shown that many seats were booked and that the price was the "lowest price offered in the recent 30 days". Higher sellout risk has resulted in increasing the purchase likelihood of consumers for both the low (60.0% to 96.6%) and high opportunity cost scenarios (from 16.6% to 96.6%). No change in the percentage of booking was observed in comparison with the "lower price found in the last 24 hours" condition in the high sellout risk scenario. Overall, 96.6% of respondents booked in the high sellout risk scenario, with a 58.3% difference compared to the low sellout risk scenarios of 38.3%.

Hence, unlike the high sellout risk condition, where we detected no significant difference in purchase likelihood with regards opportunity costs, information on available deals made a considerable difference when the likelihood of sellout of tickets was lower. This increased the purchase likelihood from 16.6% to 60.0%. Deal-seeking behavior was attenuated when there was less likelihood of sellout; in other words, interruption risk to attend the event is lower.

This study supported the idea that when online information indicates that many of the tickets (in this case, seats) have already been booked, consumers were more likely to book compared with a situation where only a few seats have already been reserved. The 96.6% percent of bookings within high sellout risk condition is significantly higher ($p < .05$, χ^2 = Pearson's chi-squared test) than in the low sellout risk condition (38.3%).

Table 6. A post-hoc analysis of booking percentages by NCAA basketball fan involvement.

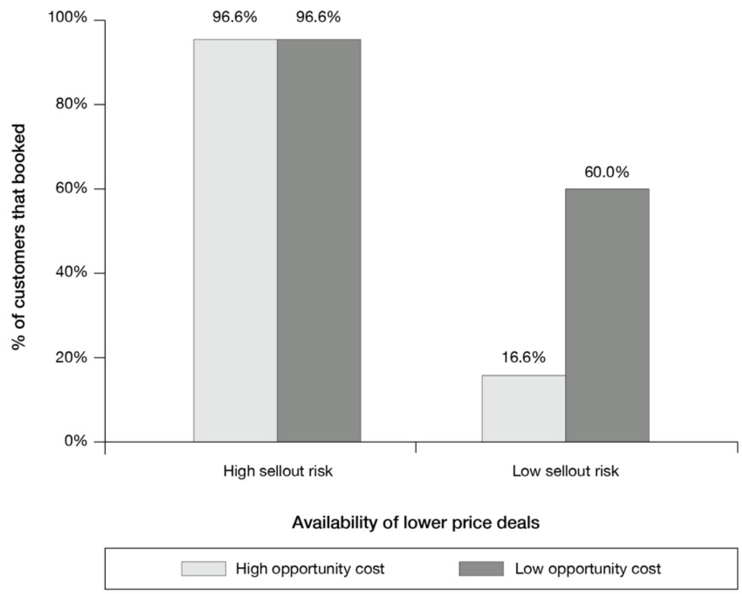
	NCAA basketball fans		Casual consumers		Total	
Sellout Risk	***N***	**Purchase (%)[a]**	***N***	**Purchase (%)**	***N***	**Purchase (%)**
Low	20	40.0%	3	36.6%	23	38.3%
High	30	100.0%	28	93.3%	58	96.6%
Total	50	70.0%	31	65.0%	81	67.5%

[a] Percentages shown as the number of respondents who ended up booking in each condition, 30 students were equally randomly assigned to each condition

	NCAA basketball fans		Casual consumers		Total	
Opportunity Cost	***N***	**Purchase (%)[a]**	***N***	**Purchase (%)**	***N***	**Purchase (%)**
Low	21	60.0%	26	96.6%	47	78.3%
High	29	83.3%	5	30.0%	34	56.6%
Total	50	70.0%	31	65.0%	81	67.5%

[a] Percentages shown as the number of respondents who ended up booking in each condition, 30 students were equally randomly assigned to each condition

However, the relationship between the opportunity cost of waiting and willingness to book depends, at least to some extent, on the demand information. This interaction is demonstrated in Table 7 and Figure 9.



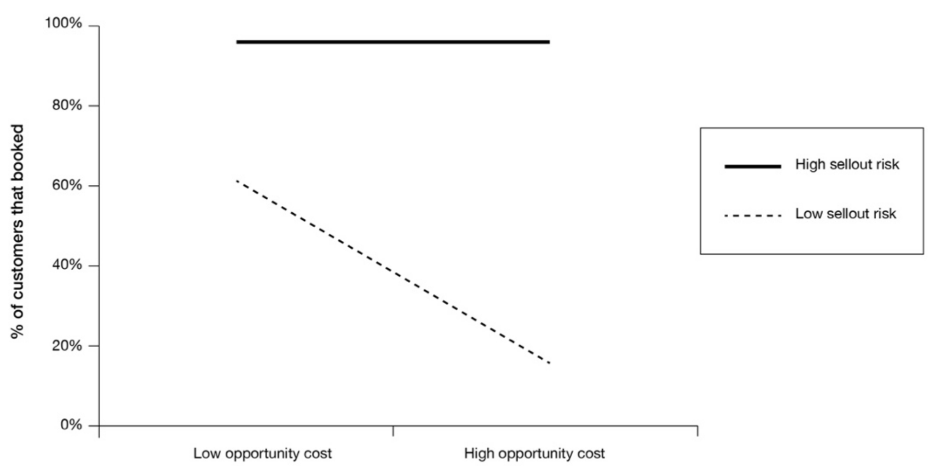


Figure 9. The Impact of Reservation Information on Willingness to Book

This relationship further supported the positive main effect relationships of competition and negative relationships for opportunity cost on consumers' likelihood to purchase. Furthermore, to test research hypotheses 3 and 4, a post hoc mean group comparison conducted through chi-squared tests was used to compare mean differences in purchase likelihood among NCAA fan and non-fan groups.

Discussion

Some limitations and directions for future research should be noted. First, this study employed a relatively homogenous student population. While the results indicate that the investigated behavioral phenomenon does exist, the effect could be further validated with replication studies within a heterogeneous population.

Furthermore, the event should be investigated under different conditions and contexts. One promising direction would address price and time. Price was controlled in the study and kept at face value of the ticket. It would be interesting to see how price affects real-time decision-making. Chen and Schwarz have proposed alternative explanations if a quoted price is too low, consumer's would move to "grab" this incredible price deal rather than to wait for a better one. In such circumstances, the information about competition and availability of tickets is deemed meaningless by the subject, and he or she does not consider searching for a better deal. Likewise, the study used 3 days in the scenario, which represented three weeks. As research in this field has supported timing to do with consumer's perception, it would be neat to include this in a future study.

This study examined the effect that information about the number of available tickets might have on consumers' willingness to book. Consumers who use online booking have access to information about the number of seats reserved for an event by other customers, which is otherwise unavailable.

The results of the study indicate, as theorized, that when a large number of tickets were already reserved, willingness to book increased. However, the effect on availability on waiting on better deals was found only to be effective under low demand scenarios. When there is high demand for a game, the effect on deal-seeking behavior vanished.

The major implication focuses on illuminating the adaptive decision-making process under an uncertain temporal purchase environment. The apparent interactions of the main effects in Study 1 further strengthen the idea that consumers do not weigh both decision factors equally, but are prone to bias their decision weights on uncertainty judgment and selectively focus on one over the other when it comes to the decision to purchase now or postpone the purchase. Furthermore, by soliciting different groups, the empirical study was able to test and find what proportion of participants who booked under the high demand scenario featured NCAA basketball fans more heavily and we were able to examine the higher proportion of respondents in the casual consumers booking under the low opportunity condition.

By focusing on narrowing the information asymmetry gap between the provider and consumer, this study provides implications that disseminating specific information (competition or opportunity cost) of environmental uncertainty may influence consumers' assessment of the likelihood that tickets will sell out and consequently influence their booking decisions. For instance, focusing on sellout risk and messaging higher scarcity should be the focus to encourage direct consumption for highly involved consumer groups, whereas for casual consumers it will be best to target and disseminate information portraying that the opportunity cost is low and that this will be the best foreseeable deal available in the advance sales market. The findings from this study will help organizations implement yield increase strategies in which providing selective information about market uncertainty will lead to an increase in more direct and current purchase.

Study 2. Overconfidence in the subjective accuracy of consumers' risk perceptions

Blinded by Attachment: Are avid fans better deal seekers in the advanced sales market?

Finding the best deal to purchase sport event tickets over a temporal period can be linked to an extended format of foraging behavior identified in behavioral ecology. Behavioral ecologists have used economic optimization models to predict and understand how and when animals search for wild food resources periodically (coined as patch exploitation) over time (Beaugrand, 1997; Parker, 1974; Parker & Rubenstein, 1981). Likewise, consumers are essentially dealing with market uncertainty through an information foraging activity by using all necessary information cues and uncertainty valuations to make predictions and decisions on whether to make a purchase now or wait and search for a better-priced deal in the near future (Wells, 2012; Hantula, 2003; DiClemente & Hantula, 2003; Smith & Hantula, 2003; Foxall, 2003).

From a marketing perspective, the product of sport is unique as consumers demonstrate an unprecedented abundance of knowledge in their product category and share extreme levels of emotional attachment to a non-materialistic experiential good (Dwyer & Drayer, 2010). Highly involved sports fans follow daily game statistics, player salaries, and injury updates, and share high levels of emotional attachment with their team and players. Sports fans consistently love talking about sports, following every update through dedicated sport media outlets where information resources are readily available.

Research in sports management has documented high uncertainty in the product outcome pertaining to both the game itself and making it difficult to predict the demand for the product (Forrest & Simmons, 2002; Peel & Thomas, 1988). Outcome uncertainty of sports games has been documented to be a significant factor affecting attendance (Borland & Mcdonald, 2003; Hansen & Gauthier, 1989). Sports fans value the utility of the product based on the perceived uncertainty (Buraimo & Simmons, 2008) as the situational outcome uncertainty changes minute-to-minute (Alavy, Gaskell, Lech & Szymanski, 2010).

The high uncertainty in the product generated anxiety and suspense among consumers (Pawlowski, Nalbantis, & Coates, 2018) and resulted in much irrational, superstitious behaviors among sports fans (Wright & Erdal, 2008). This uncertainty also creates a ripe domain for gambling (Falter & Perignon, 2000) and legitimizing other derivative markets, such as fantasy football (Holleman, 2006). Highly involved sports fans believe, to a certain degree, that they are experts in predicting the uncertain outcome of the events when it comes to sport and their respective product domain (Kwak, Lim, Lee, & Mahan, 2010).

In a perfect market environment, consumers can consider all available information and weigh them into their decision and accurately predict the best time to purchase tickets for a sporting event. However, consumers are innately bounded by rational decision making through cognitive limitations, as observed in our Study 1. Consumers might follow a simple decision rule where one factor may solely dominate the other, for instance, sellout risk may be the main criteria for certain group of fans, whereas in some cases it could be the opposite, where for average consumers finding the best deal is of their greatest concern. Consumers do not weigh all factors objectively and strive to find a single optimized decision, but instead adapt to the uncertainty of the market environment.

For example, literature in naturalistic decision-making has replicated findings that under uncertain circumstances experts typically use a recognition-primed strategy to make decisions (Klien, 1997; Klien, 2008; Lipshitz & Shaul, 1997; Zsambok & Klien, 2014). The basic explanation is that skilled decision makers make sense of the situation at hand by recognizing it as one of the prototypical situations they have experienced and stored in their long-term memory. With regards to decision heuristics in the advanced sales ticket market, experienced buyers should roughly know what actually happens, so what will be apparent is an approximation from actual predictions. Moreover, a significant interaction with experience might suggest that heuristics dominate where consumers remember that one time when they got a great deal by waiting or that one time when they could not get a ticket because the prices went through the roof and forgot the multiple times when the prices moved the way they normally expected them to do; low probability effects are viewed as more likely than they actually are (Shah & Oppenhemier, 2008) or uncommon experiences drawing more attention are possible explanations to the phenomenon examined in the next study.

The next study focuses on examining various individual trait factors (experience, expertise, involvement) that influence the subjective accuracy of sports consumers' inter-temporal purchase decision. More importantly, it is imperative to investigate and understand how these individual trait factors moderate or mediate the relationship behind the cognitive process that impacts their final temporal purchase decision.

Theoretical Background

Illusion of Control

Langer (1975) first coined the term “illusion of control” to explain how people tend to overestimate their control in chance-based situations. Langer’s ‘illusion of control’ theory elicits that people believe they can control, or at least influence, desired outcomes in chance-based situations (1975). People often overestimate their ability to control the desired outcome in chance-based situations. This is known as the illusion of control, which is defined as “an expectancy of a personal success probability inappropriately higher than the objective probability would warrant” (Langer, 1975; p. 313). Studies have found that people develop illusory control perceptions when skill-relevant factors (e.g., familiarity, knowledge, choice, etc.) are presented with the task (Thompson et al. 1998). Also, research in the literature further supports that knowledge or experience increases the illusion of control (Cantinotti, Ladouceur, R., & Jacques 2004; Kwak, Lim, Lee, & Mahan, 2010). Cantinotti et al. (2004) found that experts’ skills are cognitive distortions that reinforce the illusion of control. He points to studies showing that expert bridge players struggled more than novices to adapt when the rules were changed, and that expert accountants were worse than novices at applying new tax laws. Also, Kwak (2013) examined the psychological antecedents that led to higher confidence and predicting the outcome of the NCAA March Madness tournament game outcomes and probability to win fantasy football (Kwak et al., 2010).

Involvement and Risk Perception

Dwyer, Drayer, and Shapiro (2013) found that although provided with the same environmental ticket market scenario, the average ETA (47.7% > 40.7%) and ELR (44.8% > 36.6%) predictions were higher for highly identified fans than more lower identified fans. These results indicate that general prediction for avaiablity and perceived likelihood of finding a better deal was generally higher for highly identified sports fans. Although this significant difference across fan groups have been an intriguing empirical finding, there has not been any research on the root cause and procedural decision making of explaining this effect.

Involvement and Overconfidence

Good decision-making requires more than just knowledge of the facts, concepts, and relationships. Good decision-making also requires metaknowledge, an understanding of the limits of our knowledge (Russo & Schoemaker, 1992). Unfortunately, humans tend to have a deeply rooted overconfidence in their beliefs and judgments. Because meta-knowledge is not recognized or rewarded in practice (it is difficult for consumers to evaluate whether their purchase decision is relatively accurate), overconfidence has remained a hidden flaw in decision making under uncertainty (Mckenna, 1993). Although overconfidence might distort the prediction accuracy of agents in decision-making, it can still serve a purpose during the decision implementation process (i.e., higher confidence in the decision can lead to higher satisfaction when decisional efficiency cannot be attained).

One key factor this study concerns as a root cause of overconfidence is consumer involvement in their product. In particular, this second study examines, under a sports consumer behavior context, why highly involved sports fans can be blinded by overconfidence in their decision, which might lead to certain biases in the estimation of future probability judgments and ultimately their inter-temporal choice. Given the same environmental market conditions, this study tests whether the risk perception of sellout and likelihood of finding a better deal is perceived differently across varying level of fandom.

Along with the theoretical framework of the illusion of control, studies in psychology and gambling research have shown that task-relevant information also increased one's expectancy in winning in chance-based situations (Dixon, 2000). For instance, a series of experimental studies have noted that people feel more confident in making decisions when the amount of available information increases (Letarte, Ladouceur, & Mayrand, 1986).

However, confidence did not necessarily translate into better performance in probability predictions (Kwak, 2015). In a sports management setting, Study 2 further tests whether sports fans with higher involvement are more often worse predictors and biased in their decisions. We measure ELR (expected likelihood of a lower deal) and ESR (expected sellout ratio), which are both measurements of competition and opportunity cost in the foraging model for an advance purchase decision. We wanted to test whether, even though the estimated opportunity cost of ELR is generally lower and estimated sellout risk, ESR might be higher than normal consumers that the purchase intention will be higher for fans to buy now than postpone later.

Proposed Research Hypotheses and Mediation Model

H1: Involvement will have a positive effect on individual's expected ticket availability (ETA)

H2: Involvement will have a positive effect on individual's expected likelihood of finding a better deal (ELR)

H3: The relationship between involvement and risk perception will be mediated by Individual's level of confidence

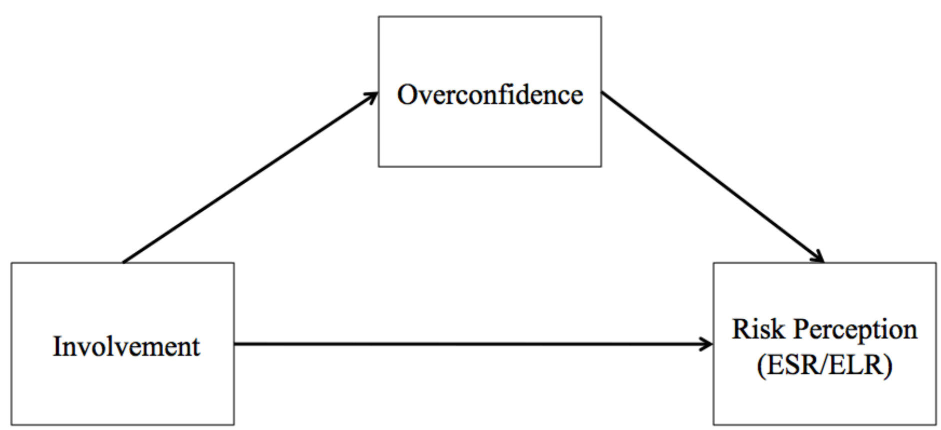


Figure 10. Hypothesized mediation model of sports fan overconfidence influence

Methods

Subjects and Study Incentives

To examine and test the effects of fan involvement and risk predictions of the advanced ticket sales environment 640 Respondents from Qualtrics Survey Panel were recruited to participate in the study. Through Qualtrics, an online survey was distributed to geographically confined subjects of New York City residents over a 10-day period. Within each email, a brief message and link were provided to ask respondents to participate in filling out an online questionnaire. The study will maintain and adapt ELR and ETA measurements from the studies of Chen and Schwaz (2008) and Dwyer, Drayer and Shapiro (2014)'s quasi-experimental design on examining the booking behavior for sporting events. Research subjects who agreed to participate in the study were given a vignette scenario, where a group of friends decides to watch a NY Giants football game.

The participants were told that they are asked by their group of friends to book game tickets for the entire group. They searched the Internet find available tickets to attend the future game. The described experimental task controlled for extraneous variables including the opponent for the game, seat location, the date of stay and quoted price. After reading through the purchase scenario, participants were asked two questions estimating for the likelihood of future events (likelihood of sellout, and the likelihood of finding a better-priced deal later). The survey also collected participants' demographic information, followed by questions regarding their ticket purchase behavior, knowledge of sport ticket markets, and fan involvement.

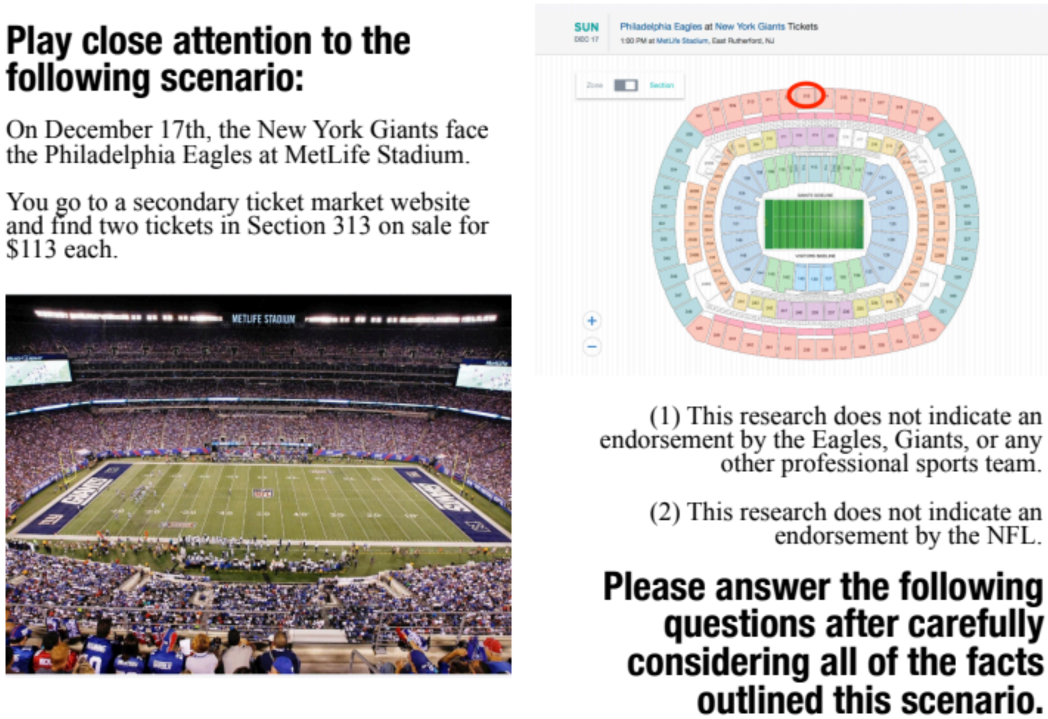


Figure 11. Vignette of Ticket Purchase Scenario

Measurements

The illusion of control has been operationalized in a variety of methods in the consumer behavior and sports management literature (Presson & Benassi, 1996; Kwak 2013; Kwak, Lim, Lee, & Mahan, 2010). Studies have used various measures, such as discrepancy scores between expected and actual performance, self-rating of perceived control, and self-ratings of confidence. Presson and Benassi (1996) found that larger effect sizes were reported in studies that measured participants' perceived ability to predict outcomes than participants' perceived ability to control outcomes. Therefore, this study employed self-ratings of perceptions of likelihood expected ticket availability (ETA) and expected the likelihood of finding a lower rate (ELR). Single item measures will be used to directly measure respondents' perceived probability of sellout risk and the likelihood of finding a better deal adapted from Dwyer, Drayer and Shapiro's (2013) study in secondary ticket markets.

Independent and Dependent Variables

Fan Involvement (Behavioral Involvement)

The following items were included to measure fan involvement: (1) the total number of years as a spectator and participant in NFL; (2) the total number of hours spent watching and following their favorite NFL players and teams on a weekly basis; and (3) the amount of money they spend on NFL merchandise on a weekly basis. A weighted composite score of involvement was created through exploratory factor analysis (EFA

The two dependent variables for this study were ETA, the subjects' assessment of the expected ticket availability and ELR, their assessment of the likelihood of finding a similar or lower price ticket anytime before the scenario date and the game.

Expected Ticket Availability (ETA)

I believe the chance the same or very similar tickets will be available between tomorrow (DATE) and today (DATE) is _______%. (Please indicate a number between 0 and 100).

Expected Likelihood of Finding a Better Deal (ELR)

I believe the chance that I could find the same or very similar tickets somewhere else at a price lower than $(PRICE) each between tomorrow (DATE) and today (DATE) is ______%. (Please indicate a number between 0 and 100).

Mediator Variable

Perceived Confidence

Three items were used to measure participant's perceived confidence (attitude) about their ticket purchase (" I am confident in using both primary and secondary ticket market knowledge compared to the average sport fan", " I am confident in searching for the best deal available compared to the average sport fan", and "Generally, I am confident in my purchase decision to sport games"). A seven-point Likert scale (1 = strongly disagree; 7 = strongly agree) was used to measure the variability among the three items. Confirmatory Factor Analysis (CFA) and Cronbach's alpha was used to ensure the internal validity and test the external validity of the latent construct.

Control variables

To better examine the hypothesized relationships and the proposed mediation model, two potential covariates were introduced to the statistical control variance between the main and indirect effects of the proposed structural model.

Ticket Purchase Experience (behaviors)

Two items were used to measure an individual's past ticket purchase behavior. The first item asked how often participants purchase tickets online, monthly, on a five-point scale (1 = never; 2 = rarely, 3 = sometimes, 4 = frequently, 5 = every month). The second item asked participants the number of days they had last purchased a ticket online for a sports game. The measurement was reverse coded and deducted from a total value of 365 days to ensure the directional strength of measurement; 365 indicates that the consumer purchased a ticket today and 1 indicates that the most recent day when the consumer purchased a ticket is 1 year ago.

Perceived Knowledge (expertise) of the Sports Ticket Market

Two items were adapted from Kwak et al. (2010) to measure participants' perceived knowledge about sport ticket markets: "I am knowledgeable about sport ticket markets compared to the average sport fan", "I have better ability to comprehend necessary sport information compared to the average sport fan", and " I have better ability to comprehend sport ticket market information compared with the average sport fan". The measures utilized a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree) and were further tested to address internal validity and consistency of the measurement.

Table 7. Measurement Items table

Variables of Study	Survey Items
Dependent Variable	
ETA	I believe the chance the same or very similar price tickets will be available between tomorrow and today is _______ %
ELR	I believe the chance I can find same or very similar price ticket deals between tomorrow and today is _______ %
Independent Variable	
Involvement	Total number of years as a spectator or participant in NFL
	Total number of hours spent watching or following their favorite NFL players or teams per week
	Total amount of money spent on NFL merchandise per year
Mediator Variable	
Confidence	I am confident in using both primary and secondary ticket market knowledge compared to the average sport fan
	I am confident in searching for the best deal available compared to the average sport fan
	Generally, I am confident in my purchase decision to sport games
Control Variables	
Expertise	I am knowledgeable about sport ticket markets compared to the average sports fan
	I have better ability to comprehend necessary sport ticket market information compared to the average sports fan
Experience	How often do you purchase tickets online on a monthly basis
	Number of days you have last purchased a ticket online for NFL
Time	Number of days before the game of event (dummy coded)

Analysis and Results

A total of 640 New York area sports fans responded to the email solicitation. Table 8 provides demographic information for the sample. Table 9 shows the number of observations that correspond to the 10-time level treatments as well as the averages and standard deviations for each of the two dependent variables (ELR and ETA). Perceived ticket availability was highest 10 days before the event (at 53.72%) and lowest the day before the event (at 37.89%). The same pattern was observed for ELR. ELR was highest at 48.92% 10 days before the event and dropped significantly to 35.88% just a day before the event. In general, as time grew closer to the event, the respondents' perceived probability of both ticket availability and the likelihood of finding a lower priced ticket dropped significantly.

Table 8. Key Demographics of the Sample.

Age	33.674, Mean 11.792, St. Dev	**Ethnicity**	76.3%, Caucasian 12.3%, Hispanic 6.1%, Asian 5.3%, Other
Gender	69.1%, Male 30.9%, Female		
Household Income	12.5%, Less than \$20K 20.7%, \$20K-\$40K 22.9%, \$40K-\$60K 24.7%, \$60K-\$80K 15.0%, \$100K-\$200K 3.4%, More than \$200K	**Education**	21.5%, High School 4.1%, Bachelor's Degree 18.0%, Graduate Degree 16.5%, Professional Degree 7.7%, Other 9.0%, Did not specify

Table 9. Estimates of ETA and ELR by days leading up to the event.

Days Before the Game	Number of Observations	Expected Ticket Availability		Expected Lower Rate	
		Average (%)[a]	*SD*	Average (%)[b]	*SD*
10	40	53.72	28.88	48.92	29.19
9	80	52.13	24.09	48.13	23.57
8	54	50.33	25.85	46.22	28.49
7	48	46.22	28.47	44.93	28.83
6	71	47.36	28.95	42.53	24.32
5	80	50.08	29.97	43.98	27.65
4	56	48.73	29.81	44.94	28.42
3	60	40.33	22.68	44.31	24.18
2	76	40.81	27.98	38.63	29.21
1	76	37.89	28.15	35.88	29.75

[a] Main effects result, $p < 0.001$
[b] Main effects result, $p < 0.001$

Using Wilks' statistic, our MANOVA results show that there was a significant effect of time period on participants ETA and ELR risk assessments [$\Lambda = 0.954$, $F(18, 1262) = 1.653$, $p < 0.05$]. The descriptive statistics for the different dependent variables are reported in Table 10. The effect size measured using partial eta-squared values η^2 was 0.023. Because participants responded on 10 different time slots for the experiment, time also needed to be included as a control variable for the global mediation model. Thereby a dichotomous time dummy variable was generated based on when respondent took the survey prior to the days leading to the game event scenario.

Table 10. Regression estimates of Standardized Coefficients

	Confidence		Expected Lower Rate		Expected Ticket Availability	
	Estimate [a]	***SE***	**Estimate [a]**	***SE***	**Estimate [a]**	***SE***
Involvement	.496***	.069				
Involvement			.106*	1.655	.117**	1.639
Confidence			.200*	2.25	.052	2.269
D1			.159**	5.503	.171***	5.695
D2			.193***	4.503	.191***	4.308
D3			.106*	5.254	.122*	4.925
D4			.092	5.192	.078	5.169
D5			.070	4.438	.101	4.717
D6			.111*	4.591	.164**	4.709
D7			.100	5.022	.115*	4.986
D8			.088	4.611	.033	4.345
D9			.120*	4.948	.095	4.832
Expertise			-.087	2.316	.021	2.207
Experience			.075	1.715	.057	1.669

Total R^2 = 6.3% (ETA), 9.4% (ELR), N =641

[a] *p < 0.05, **p < 0.01, ***p < 0.001

Before conducting regressions for hypotheses testing, weighted sum scores for involvement, confidence, expertise, and experience were created through a series of exploratory factor analyses (DiStefano, Zhu, & Mindrila, 2009). Next, a series of ordinary least squares (OLS) regression models were conducted to test the study's hypotheses regarding the effects of consumers' level of involvement on their risk perception through the level of overconfidence. To isolate the effect of the independent variable and mediator, past experience, expertise was included as a control variable in the mediation model. H1 was supported as involvement was a significant predictor of the level of confidence (β = .496, $p < 0.001$). Confidence was a significant predictor of ELR (β = 5.729, $p < 0.05$). However, confidence was not significantly associated with ETA (β = 1.516, $p = 0.504$).

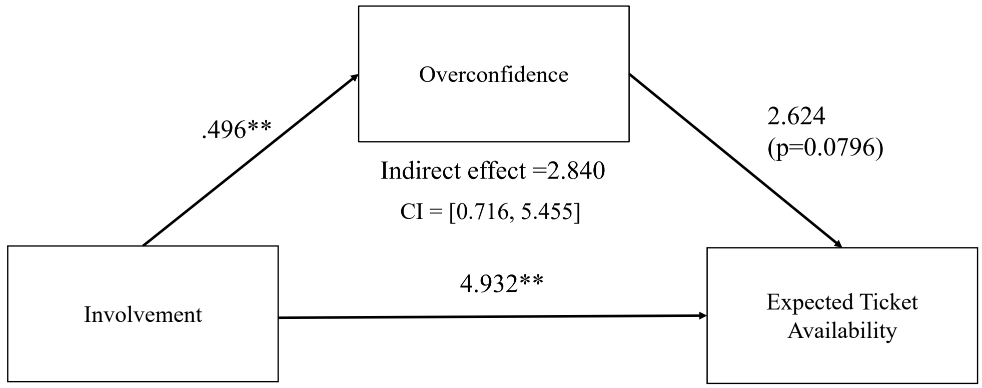


Figure 7. Standardized regression coefficients for the relationship between involvement and expected ticket availability(ETA) mediated by perceived confidence.
* *p*<.05, ** *p*<.01

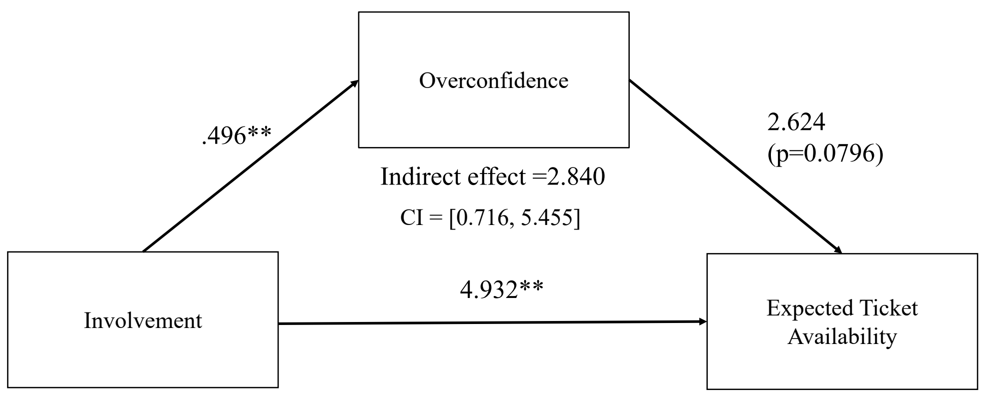


Figure 7. Standardized regression coefficients for the relationship between involvement and expected ticket availability(ETA) mediated by perceived confidence.
* *p*<.05, ** *p*<.01

Figure 12. Mediation Analysis Results

Mediation Analysis

The mediation-based hypothesis (H3) was formed from the rationales offered in H1 and H2. Involvement was found to be a significant predictor of confidence, and confidence was a significant predictor of individual's risk perception (only for ELR, not ETA). To examine the mediated relationship of the illusion of control (involvement, overconfidence and probability judgments of risk perception), the study generated confidence intervals through bootstrapping methods (Hayes, 2013). The indirect effect of involvement on ELR through overconfidence was found to retain 95% confidence intervals (CIs) that did not include zero (indirect effect = 2.840, CI = [0.716, 5.455]). However, the indirect effect of involvement on ETA through overconfidence was not statistically significant as the 95% confidence interval includes zero (indirect effect = 0.751, CI = [-1.433, 3.129]). Thus, H3 was partially confirmed.

Discussion

The mediation analysis was run as a confirmatory assessment of the overall theory of illusion of control being posited in this work. The indirect effect of involvement through overconfidence was significant only on ELR and was not significant on ETA. The apparent mediation effect of overconfidence between involvement and ELR in subjective risk probability in this study hopes to further strengthen that given the same environmental scenario of uncertainty that consumers do not evaluate the information cues equally. Such customers Might be blinded by their fan involvement, which generates overconfidence in their ability and risk perception judgments towards the uncertain purchase environment.

Although this study might offer interesting implications towards practice, several limitations should be noted. First, in this experiment, a particular team brand (NY Giants and Philadelphia Eagles) was used to control for the potential effects of brand strength. Although Gierl, Plantsch, and Schweidler (2008) did not find any significant difference between a famous brand and fictitious generic brands in their quasi-experimental study, the potential moderating effects of brands might be worth examining in this area of research. To test the main research question, it is essential to control the potential effects of extraneous variables, yet it would be interesting to examine how consumer's psychological attachment and involvement to a team brand might moderate the level of preferences for the current purchase.

Study 3 – Testing Boundary Conditions: Information Distortion of Uncertainty

An Empirical Examination on Anchoring and Scarcity Framing in Sport Ticket Markets

People's perceptions of risk and uncertainty are further distorted because the available information might not be fully representative of the real situation (Shoemaker, 2004) at hand. Traditional normative theories of choice typically assume that people are rational and that they have clear and stable preferences, based on an expected utility function (Von Neumann & Morgenstern, 1947). As a result, choice theory assumes description invariance (Tversky & Kahneman, 1986) – the manner in which the information is presented to the decision maker should not change the decision; and procedural invariance (Tversky & Kahneman, 1986; Shafir, 1993) – the method of eliciting preferences should not change the decision. Study 3 challenges these basic assumptions within the generic advance decision model framework (Schwarz, 2000) by testing whether the structural framing of environmental uncertainty might influence consumer perceptions on opportunity cost and competition and influence behavior in the advanced sales purchase decision.

The extension study is based on the empirical observations that are currently presented in the online secondary ticket markets for travel sports and events. With increased competition of online ticket marketplaces, businesses have experimented with myriad online marketing techniques to differentiate themselves and make their platforms more appealing to buyers and sellers alike. Though different ticket distributors have implemented several different methods to convey scarcity on their website, the underlying effects have not been discussed or tested in the hospitality or sports literature.

Theoretical Background

In standard economic theory, consumers as rational agents should exhibit no difference in their judgment and purchase decision of the uncertainty situation. However, real-world decision-makers bring other perspectives to the table when under uncertainty situations. Study 3 asks: How does the framing of available ticket information affect consumer's inter-temporal search and purchase behavior. In particular, this study tests two actual presentation effects of scarcity (numeracy and anchoring) used in the current market and how these different frames affect consumers perceptions of ticket availability and discounting parameters of the advanced-decision making model.

Framing

A frame refers to a mental model (Johnson-Laird, 1983) of the decision problem that individuals use to solve the problem, and includes details about the elements of the decision problems (i.e., information) as well as the context. While the information from a particular problem might remain the same, it may be perceived, organized, and interpreted differently; it may be structured differently; and the problem may be solved in a different context, by different people or at different times. Conceptually, we collectively refer to any of these different ways of looking at the same problem as a different frame (Kahnemann & Tversky, 1984; Schoemaker & Russo, 2001).

In particular, the concreteness principle in framing literature (Slovic, 1972; Thaler & Johnson, 1990) suggests that decision-makers will use information in the context of the frame that is presented to them, without making any attempts to reframe it. In this study, framing has been pedagogically tested in a method where researchers took the same information and presented it differently to two groups of subjects (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981) and compared the resultant outcomes in their decisions. These authors were able to demonstrate significant differences in choices across groups of subjects and to attribute these differences solely to presentation differences, which presumably resulted in differences in the mental representation.

Scarcity framing through numeracy

Scarcity represents an interesting concept to study along in decisions made under uncertainty. According to the scarcity principle (Cialdini, 1993), opportunities seem more valuable when they appear more limited, and scarcity techniques predominantly fall into two categories. For instance, suppliers restrict the number of products/deals available (i.e., only 500 tickets available) or through time (only available for 15 days). The fundamental principles of those scarcity messages differ. Under the limited time condition, suppliers encourage consumers to purchase as early as possible to generate maximum revenue during the period of the promotional offer. Meanwhile, under the quantity condition, suppliers restrict a lot of products to a limited number of available units (Cialdini, 2008). The latter approach creates a sense of urgency for consumers to compete with other buyers to purchase the product because the number of products in the marketplace diminishes as other consumers purchase the product (Aggarwal et al., 2011).

Numeracy is defined as "how facile people are with basic probability and mathematical concepts" (Lipkus, Samsa, & Rimer, 2001) and is an important consideration when looking at framing; given that perception of numbers, ratios, and percentages that are often involved. There are a variety of numeracy tests from the Berlin Numeracy Test (Cokely, Galesic, & Schulz, 2012), including those that emphasize statistical numeracy and numeracy tests that have been shown to be particularly applicable to judgment and decision-making tasks (Peters, Västfjäll, & Slovic, 2006). Although not inherently an anchoring task, Black, Woloshin & Welch (1997) found that numeracy was strongly related to understanding the benefits of mammography, which has implications for the framing of numbers, which is further discussed in this study proposal.

Several behavioral researchers have pointed out that the decision-making process regarding service-oriented products might be fundamentally different from that of consumable products for consumers, due to the unique characteristics of service products (e.g., intangibility and unpredictability; Stafford & Day, 1995). Consumers are not able to predict the outcome of consuming the service until they actually experience it; therefore, such intangibility increases the perceived risk associated with decision-making behavior. It would be interesting to explore how scarcity message framing might influence perceived risk associated with the service-oriented process. Perceived risk associated with service-oriented products might lead to a systematically different process during their decision-making behavior (Suri et al., 2007).

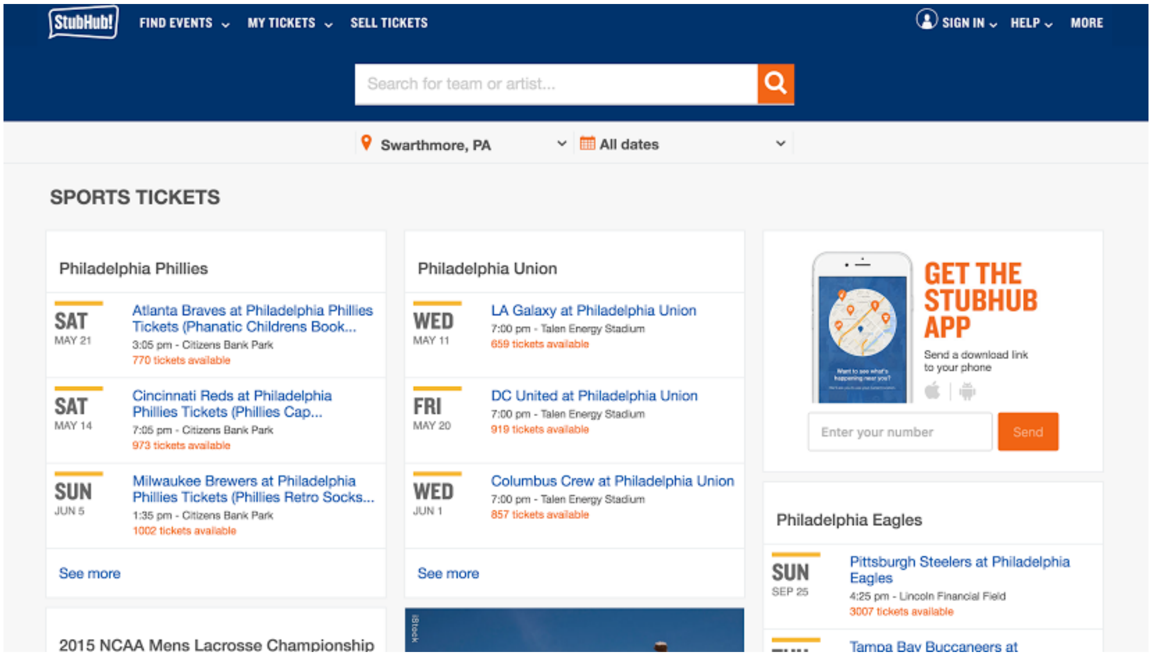


Figure 13. Example of scarcity through frequency numeracy framing. Source: Stubhub.

Typically, when purchasing event tickets in an online environment, consumers are exposed to information on product scarcity expressed in raw numbers, featuring the total amount of seats available (Figure 10). The idea behind disclosing this type of information is to demonstrate sellout risk as we have seen in our previous studies and for sellers to signal a sense of urgency for consumers and increase current purchase decision. Data representation and visualization can lead to different judgment and perceptions of uncertainty and scarcity for consumers. The question here lies in whether there exists a procedural difference in forming scarcity perception among consumers when the information is presented in different numerical frames (i.e., frequencies or in percentages).

When using different numerical cues to measure scarcity, are consumers even measuring the same phenomenon? For example, if a stadium occupies 40,000 seats in total, is there a difference in purchase likelihood when the information is presented as 400 seats available or less than 1% remaining? Contrarily, when there is relatively lower demand for an event, does it generate more scarcity when using percentages (56% instead of 22,400 seats remaining); is any numerical framing message more effective than the other when messaging scarcity? From a managerial perspective, it would be best to implement whichever frame signals a higher sense of scarcity and urgency for consumers to book/purchase for each uncertain scenario. Hence, Study 3 intends to test on which frame is more effective, in terms of signaling higher scarcity perceptions and accordingly influence consumer's propensity to book early.

Anchoring – lowest price vs. min-max price range

People's estimates of certain quantities are biased in the direction of a salient comparison value or "anchor". Although the effect has been easy to demonstrate, such anchoring biases have not been so easy to explain (Strack & Mussweiler, 1997). People's judgments are often inordinately influenced by the first information that comes to mind. These primacy effects are related to numerical cues and have traditionally been called "anchoring effect" – an umbrella description that includes almost any judgment that is assimilated to an anchor value.

Although generally not studied in the anchoring context, research on individual differences, such as openness to experiences (McElroy & Dowd, 2007), suggests that individual differences might affect anchoring results. For example, when an individual considers an estimate (e.g., height of a redwood tree), the difference between an individual's reference point and the presented anchor represents a ratio similar to the anchoring index described by Jacowitz & Kahneman (1995) of: anchoring index = median (high anchor) – median (low anchor) / high anchor – low anchor. Although the equation is used to assess the power of an anchor across multiple respondents, an individual potentially makes a similar type of numerical comparison (reference point/anchor) when deciding the plausibility of an estimate. Thus, an individual's ability, or lack thereof, to consider mathematical relationships likely has practical implications for anchoring effects and need for understanding the different mechanisms behind the decision-making process.

In advanced sales event ticket markets, various websites of ticket distributors have seemed to experiment with different type of anchors as the first piece of pricing information, but no research has identified or tested the effectiveness in practice. Although most websites do provide further search options to compare prices across various sections in the next search phase, it has been observed that sellers reveal fundamentally two different price cues as their initial anchor. For instance, some secondary ticket market web platforms (StubHub from Figure 11) have presented a single lowest ticket price (from $179) for each seat section, whereas others seem to display a range of prices ($95–$264.50) between a minimum and maximum value (Ticketmaster from Figure 11) as the initial cue in the ticket search website.

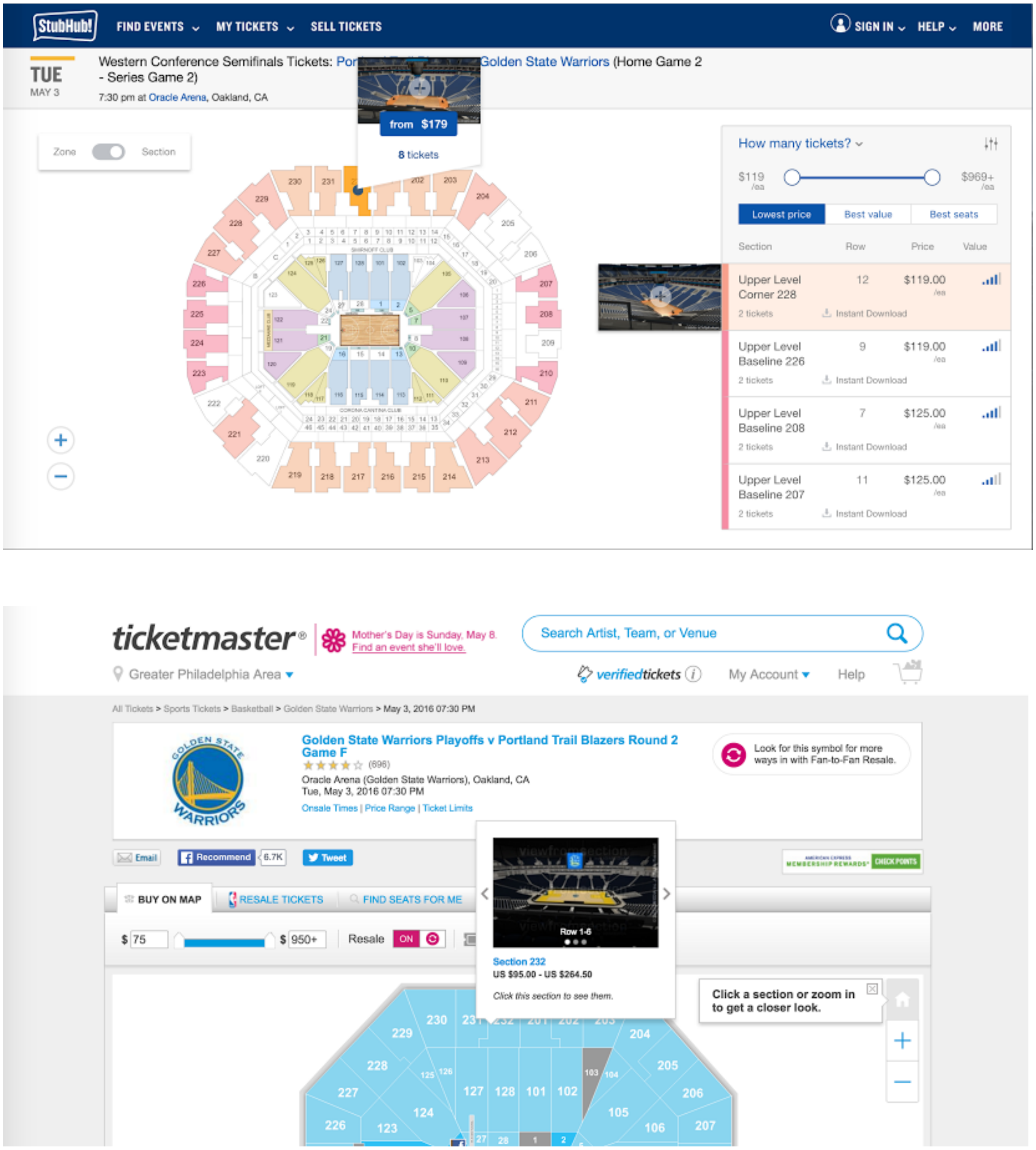


Figure 14: Example of Price Anchors in Sport Ticket Market Platforms

Previous findings from anchoring research might support that demonstrating a singular lowest price anchor (against a min-max price range) might generate a lower estimation of the perceived value of the ticket, but this might have questionable consequences leading to consumers inter-temporal choice decisions. A singular lowest price anchor might benefit direct purchase as it might be perceived that the product may be portrayed underestimated at a certain time and therefore increase early purchase for consumers. However, a min-max price anchor might demonstrate a larger variance of deals in the uncertain situation and thereby display relatively higher levels of opportunity cost compared to the singular price anchor scenario.

Hence, this study aims to directly answer and empirically test:

(1) Which price anchor (lowest price vs. min-max range) works more effectively in signaling lower opportunity cost and increase purchase likelihood for consumers?

(2) Which numeracy frame (frequency vs. percentages) works more effectively in signaling higher scarcity perception with respect to high and low demand for sports games?

To further examine these research questions, we adapted the theoretical framework of Dwyer, Drayer and Shapiro's (2013) study, which utilized and measured the two key constructs that reflect the risk factors that dictate consumer's advanced purchase decision for sport tickets; Expected Ticket Availability (ETA) and Expected Likelihood of Finding a Lower Rate (ELR). The fluctuating patterns of ETA and ELR revealed in Dwyer et al. (2013) called for the need to develop modal strategies that reflect how consumer's deal with uncertainty cues in the advances sales market. To this extent, this study tests the boundary condition of this previous study by examining how consumer's subjective probability assessments (ETA and ELR) can further be distorted by scarcity framing and price anchoring. Under the generic advanced decision-making model, this study tested which numerical frame and anchor generates a higher sense of urgency (related to ESR and ELR estimations) to induce consumers to book now, rather than to wait further for delayed purchase. In terms of practice, this study attempts to identify when the scarcity problem in most likely to manifest for consumers and provide direction on marketing implications through messaging.

Methods

Sample and Procedures

A total of 640 respondents completing an online survey were recruited via Qualtrics Panel services. Participants were solicited electronically via 10 date-specific email blasts and recruits prior to a Dec 17th New York Giants home game. As a result, to fit the demographic descriptions of the study, respondents were regionally confined to New York and Philadelphia fans. Participants who agreed to participate in the study were randomly assigned to a vignette ticket purchase scenario. The main study of interest utilized a 2 (Demand: high vs. low) × 2 (Numeracy framing: frequency vs. percentages) factorial between group study design, where subjects were randomly assigned into six groups, including a control group scenario (see appendix). The hypothetical scenario controlled extraneous factors of seat location, time, and date of the event. According to the scenario, participants were asked to book two tickets prior to the event. After reading the scenario, participants are asked two questions, rating their subjective likelihood of ETA and ELR estimates. After reading the scenario, participants were asked two questions that estimated the likelihood of future events (likelihood of sellout, and the likelihood of finding a better-priced deal later). This was followed by several demographic questions, which asked about participant's attitudes and behavior, including their ticket purchase experience, knowledge, and fan involvement.

As participants were only being manipulated to experience one condition, the study utilized a between-subject design. By this approach, we can be sure that the scores will not be influenced by factors like sensitization or knowing what is being measured, thereby increasing the possibility of having a good subject tendency. Participants will also not experience order effects, such as carryover of perceived status. The participants were randomly assigned to either of the two conditions. This helps to reduce or eliminate the systematic differences between the two groups, achieving group equivalence. Hence, the internal validity of the study, which is important here as we are attempting to establish relationships between two variables, is increased.

Manipulation Check

We applied several manipulation checks and screening questions that increase the validity of the study. The first screening question was included to verify whether the survey respondent was an actual sports fan of the team. Along with the geographical screening code in place, it was imperative to confine the sample to Giants fans. The screening question provided a photo and asked the participants to identify an all-pro wide receiver player on the New York Giants (see appendix).

Furthermore, a memory recall attention check question was placed immediately after reading through the scenario. The question asked the participant to recall the exact price that was quoted on the purchase scenario. As there were no options to go back to that page, those who responded incorrectly were also eliminated from the study. Finally, throughout the survey, the manipulation check questions were included in Likert-scale matrices. To check whether they were paying attention to the survey, respondents were asked to click on ‘strongly agree’ or ‘strongly disagree’.

Measurements

Dependent Variable

The two dependent variables for this study were ETA, the subjects’ assessment of the expected ticket availability and ELR, and their assessment of the likelihood of finding a similar or lower price ticket anytime before the scenario date and the actual game.

- Expected Sellout Risk (ETA)

I believe the chance the same or very similar tickets will be available between tomorrow (DATE) and today (DATE) is __________%. (Please indicate a number between 0 and 100).

- Expected Likelihood of Finding a Better Deal (ELR)

I believe the chance that I could find the same or very similar tickets somewhere else at a price lower than $(PRICE) each between tomorrow (DATE) and today (DATE) is ______%. (Please indicate a number between 0 and 100).

Independent Variable

The independent variables of the study were directly manipulated through the vignette descriptions of the study (view appendix). A content analysis was conducted to determine the level conditions of high demand and low demand for NFL games. The highest NY

Giants attendance figure for the NFL season was in week 7 (78,527), and lowest was in week 10 (73,210). The total cap of seats in the Metlife stadium is 82,500. Therefore, the high demand condition was demonstrated either through ‘825 tickets remaining’ (raw numbers) vs. ‘1% remaining’ (percentages), whereas the information of the low demand condition was represented either through ‘16,500 seats remaining’ (raw numbers) or ‘20% remaining (percentages)’. Price anchors were also manipulated and operationalized in the scenario into two distinct levels of ‘from $113 (which represented the low-price anchor)’ vs. ‘from $113 to $682 available (the alternative price range anchor).

Analysis and Results

A total of 640 New York area sports fans responded to the email solicitation. Table 11 provides demographic information for the sample. Table 9 shows the number of observations that correspond to the 10-time level treatments, as well as the averages and standard deviations for each of the two dependent variables (ELR and ETA). Perceived ticket availability was highest 10 days prior to the event at 53.72% and lowest the day before the event at 37.89%. The same pattern was observed for ELR. ELR was highest at 48.92% 10 days prior to the event and dropped significantly to 35.88% just a day before the event. In general, as time grew closer to the event, the respondents’ perceived probability of both ticket availability and the likelihood of finding a lower priced ticket dropped significantly.

Table 11. Key demographics for Study 3.

Age	33.674, Mean 11.792, St. Dev	**Ethnicity**	76.3%, Caucasian 12.3%, Hispanic 6.1%, Asian 5.3%, Other
Gender	69.1%, Male 30.9%, Female		
Household Income	12.5%, Less than $20K 20.7%, $20K-$40K 22.9%, $40K-$60K 24.7%, $60K-$80K 15.0%, $100K-$200K 3.4%, More than $200K	**Education**	21.5%, High School 4.1%, Bachelor's Degree 18.0%, Graduate Degree 16.5%, Professional Degree 7.7%, Other 9.0%, Did not specify

Table 12. Estimates of ETA and ELR by days leading up to the event.

		Expected Ticket Availability		Expected Lower Rate	
Days Before the Game	**Number of Observations**	**Average (%)[a]**	***SD***	**Average (%)[b]**	***SD***
10	40	53.72	28.88	48.92	29.19
9	80	52.13	24.09	48.13	23.57
8	54	50.33	25.85	46.22	28.49
7	48	46.22	28.47	44.93	28.83
6	71	47.36	28.95	42.53	24.32
5	80	50.08	29.97	43.98	27.65
4	56	48.73	29.81	44.94	28.42
3	60	40.33	22.68	44.31	24.18
2	76	40.81	27.98	38.63	29.21
1	76	37.89	28.15	35.88	29.75

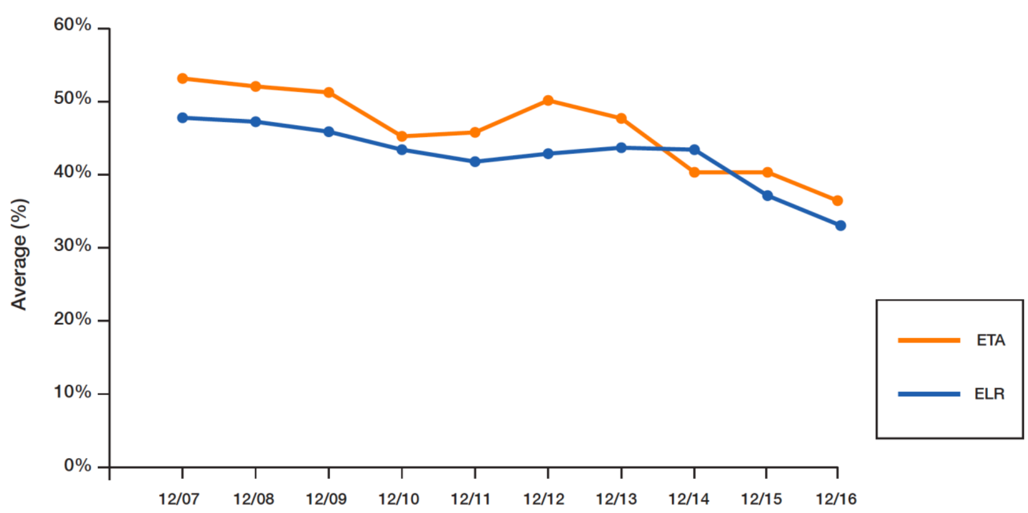


Figure 15. Graphical Trend of ETA and ELR estimates by days leading up to the event.

Multivariate analysis of variance (MANOVA) was conducted to determine the overall differences in the mean likelihoods scores of the dependent variable between groups. MANOVA is the appropriate statistical test to conduct when there are multiple dependent variables that are moderately correlated (Tabachnick & Fidell, 2007). Two 2×2 factorial analyses of variance (ANOVA) were conducted to determine if there are any differences in the mean assessments for each treatment. The main effect results were analyzed to answer whether the structural framing of numeracy scarcity and price anchoring affects consumers' probability estimations of environmental uncertainty. Tukey post hoc tests were further conducted to identify which combined treatment level generates significant differences from other groups. Additionally, due to the use of the same dependent variables in the two separate procedures, a Bonferroni adjustment was made. To adjust for all main effects, the significance value was set at 0.025.

Using Wilks' statistic, the MANOVA results showed there was a significant effect of time period on participants ETA and ELR assessments ($\Lambda = 0.954$, $F(18, 1262) = 1.653$, $p < 0.05$). The descriptive statistics for the different dependent variables are reported in Table 10. The effect size measured using partial eta-squared values η^2 was 0.023.

Table 13. Estimates of ETA and ELR by Initial Price Information Anchor.

		Expected Ticket Availability		**Expected Lower Rate**	
Price Anchor	**Number of Observations**	**Average (%)**[a]	***SD***	**Average (%)**[b]	***SD***
Min	108	51.24	30.32	46.61	29.24
Min-Max	112	42..08	25.58	37.14	25.50

[a] Main effects result, p < .001
[b] Main effects result, p < .001

The main effects of ETA and ELR with regards to price anchor and scarcity numeracy resulted in statistically significant differences [$F(5,635) = 6.018$, $p < .001$; $F(5,635) = 6.449$, $p < .001$ respectively]. On average, respondents provided with the 'Min' price anchor (51.24%) felt the probability the same or similar priced ticket would be available between the scenario date and the date of the game was higher than those provided with the 'Min-Max' price range anchor (42.08%). Meanwhile, more respondents provided with the 'Min' price anchor (46.61%) on average, expected to find a similar or lower priced deal than the respondents provided with the 'Min-Max' condition (37.14%).

Table 14. Estimates of ETA/ELR by Game Demand and Scarcity Framing.

Scarcity Framing	Number of Observations	Expected Ticket Availability Average (%)[a]	SD	Expected Lower Rate Average (%)[b]	SD
Raw Numbers	208	52.13	26.46	50.38	27.23
Percentages	213	40.63	27.57	38.33	25.87

[a] Main effects result, $p < .001$
[b] Main effects result, $p < .001$

Game Demand	Number of Observations	Expected Ticket Availability Average (%)[a]	SD	Expected Lower Rate Average (%)[b]	SD
Low	203	49.50	30.32	46.52	29.24
High	218	43.35	25.58	42.21	25.50

[a] Main effects result, $p < .05$
[b] Main effects result, $p < .1$

Table 14 provides the main effect results for game demand and scarcity framing. The main effects of scarcity framing on ETA and ELR factorial ANOVA resulted in statistically significant differences [$F(1,420) = 19.040$, $p < .001$; $F(1,420) = 21.418$, $p < .001$ respectively]. The proportion of respondents provided with the 'Raw Numbers' scarcity frame (52.13%) that felt that the same or similar ticket would be available between the scenario date and the date of the game was higher than those provided with the 'Percentages' scarcity frame (40.63%). Meanwhile, more of the respondents provided with the 'Raw Numbers' price anchor (50.38%) expected to find a similar or lower priced deal than the 'Percentages' condition (38.33%).

The main effects game demand on ETA and ELR factorial ANOVA resulted in significance levels of $F(1,420) = 5.359$, $p < .05$ and $F(1,420) = 2.672$, $p < 0.1$, respectively. Respondents provided with the 'Low' game demand scenario (51.24%) felt on average the probability the same, or similar ticket would be available between the scenario date and the date of the game was higher than those respondents provided with the 'High' game demand scenario (42.08%). Meanwhile, respondents provided with the 'Low' game demand scenario (46.61%) on average, expected the probability to find a similar or lower priced deal to be higher than the 'Percentages' condition (37.14%).

Table 15. Estimates of ETA by Game Demand and Scarcity Numeracy Condition

			Expected Ticket Availability		Expected Lower Rate	
Game Demand	**Ticket Source**	**Number of Observations**	**Average (%)[a]**	***SD***	**Average (%)[b]**	***SD***
Low	Raw Numbers	101	55.40	27.32	51.84	27.32
	Percentages	102	43.65	24.60	41.26	24.60
High	Raw Numbers	107	49.03	25.37	49.00	25.37
	Percentages	111	37.86	29.89	35.64	29.89

[a] Main effects result, $p < .01$
[b] Main effects result, $p < .01$

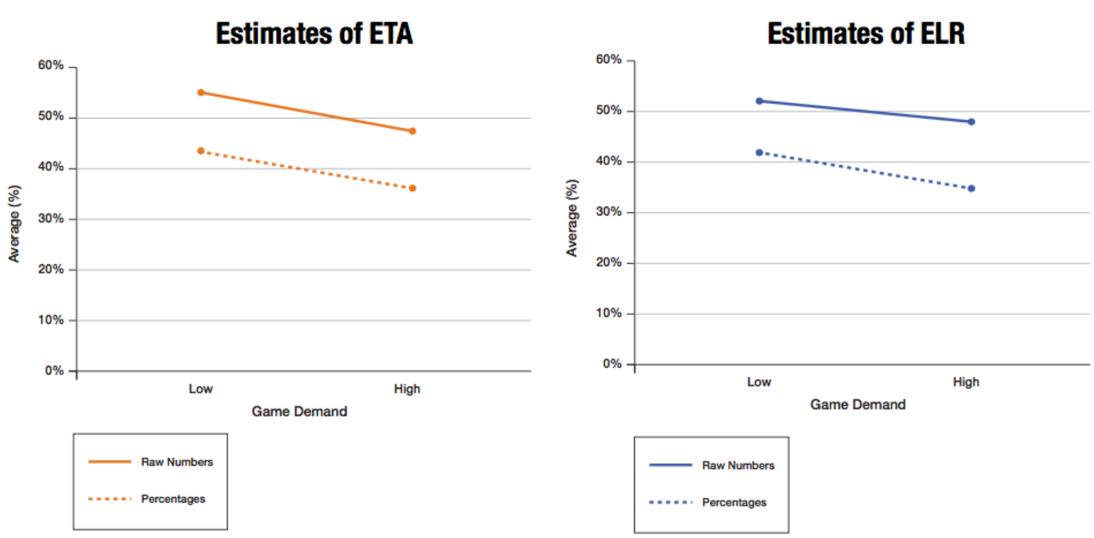


Figure 16. Estimates of ETA and ELR by Game Demand and Scarcity Framing

The interaction effect with regards to the moderating influence of game demand and scarcity framing on respondent's ETA and ELR was not significant F (1,420) = 0.142, p = .706; F(1,420) = 0.036, p = .850. However, the magnitude of percentages scarcity numeracy framing was further strengthened which is graphically and visually comprehensible through Table 15. And Figure 16.

Discussion

Although this study has several important practical implications, several limitations should be noted. First, in this experiment, a particular team brand (NY Giants and Philadelphia Eagles) was used to control for the potential effects of brand strength. Although Gierl, Plantsch, and Schweidler (2008) did not find any significant difference between famous brands and fictitious generic brands used in their quasi-experimental study, the potential moderating effects of brands might be worth examining in this area of research. However, for this study, it was essential to tightly control the potential effects of extraneous variables to manifest the examined relationships proposed in the study. It would be interesting to examine how consumer's psychological attachment and involvement to a team brand might moderate the level of preferences for the current purchase.

CHAPTER 4

CONCLUSION AND GENERAL DISCUSSION

Epilogue

The following dissertation topic has initially been devised as an attempt to overcome struggles on how one can continuously stay motivated and progressive towards an unceasing pursuit for success in academia and life. From a timetable standpoint, when we have a meaningful task ahead, we are advised to plan ahead and get it done well ahead of schedule. Societal cultures have taught us that "the early bird gets the worm" and constantly reinforced the idea that he who procrastinates is lost and that acting early is important. Individual buyers act quickly to gain access to early information and to be able to purchase goods and services at below market prices. Companies strive for innovation to capitalize on the first mover technological advantage. Likewise, in academia, when we have a great research idea to develop, we're encouraged to act fast – collect the data, run the analysis, and get the research paper published as soon as possible. Time management is a pivotal factor when it comes to fighting against the 'tenure clock', as it pertains to this ever-lasting cycle of research and publishing.

As a chronic procrastinator, this naturally led the author to tap into the literature of inter-temporal choice and delay discounting. Why do people procrastinate? What drives people to be impulsive? How do we program ourselves to work productively towards a long-term goal and be less impulsive? If we know that waiting and delaying gratification is the best strategy, how do we change our impulsive instinct in order to improve our inter-temporal decisions? Review of the literature on the subject (which started as a personal inquiry on personal time management), has evolved and uncovered multiple research questions that, if answered, could help understand the everyday inter-temporal choice problems we face as consumers in our daily lives.

Theoretical Contributions

This study aimed to understand the temporal purchase decisions consumers make on a daily basis from a behavioral, ecological perspective. Unlike computers or synthetic organisms, animals and humans are inevitably confined to limited physical resources (including time) and also our cognitive and emotional frames. We are continuously dealing with optimization problems as we consistently adapt to the uncertain environment to survive. Theoretically, from an evolutionary management framework, the survival goal of consumers can be interpreted as sustained consumption (Montgomery, 2011). Unlike normative assumptions of rationality, our research finds that the optimal decision about whether to purchase or delay lies within the interaction between the individual and the surrounding environmental pressures (the purchase environment).

As we observed in the chapters of study 1 (Fast and Frugal Heuristic Decisions in Inter-temporal Choice), among the two decisional factors - for highly involved sports fans, sellout risk was the dominant factor in the decision-making process. Thus, impulsive or immediate purchase becomes the optimal (rational) survival strategy for making it to the event. Whereas for casual consumers, opportunity cost becomes more dominant as finding the most cost-efficient deal to go to the event becomes the rational heuristic decision rule. Eliciting a consistent decisional preference was not observed as different consumer groups are optimizing their choice by adapting to the uncertain cues of the purchase environment. When these two informational cues clashed, sellout risk was where the risk of not being able to attend the event loomed larger for highly identified sports fans, whereas casual fans valued the opportunity cost of delaying the purchase, which activated their deal-seeking behavior.

Study 2 further demonstrated the distinctiveness in human behavior, including unique psychological attachment to their given expertise and involvement with a product. This study illustrates why some of the inter-temporal choices we make might be more complicated than those exhibited from animal behavior, as our decisions also revolve around cognition and emotion. Cognitively, the more expertise and experience people gain, the more entrenched people become in a particular way of viewing the world. As we gain knowledge about a domain, we become prisoners of our own prototypes. This effect was shown to be reproducible in the context of sports fans and their ticket purchase. There was strong support that high level of fan involvement let to one's increased belief of being able to find better deals in the online sports ticket market. This effect was mediated by their overconfidence, which was theoretically proposed by Langer's illusion of control. The foraging behavior of consumers as deal seekers in the online purchase scenario helped to understand the underlying mechanism of biased temporal decision-making in the sports management context.

Study 3 tested many of the boundary conditions in which the framing of uncertain purchase environmental cues can further lead to biased intertemporal decisions. More specifically the study manipulated two environmental cues: the initial price anchor (min price vs. min-max range) and numeracy scarcity (absolute numbers vs. percentages). Study 3 also revealed that the different numerical frames resulted in statistically significant differences in the probability estimates of the uncertain environment. While the empirical findings are specific to the context of sports management, the robustness of anchoring and scarcity framing was further strengthened through the respective replication study.

Managerial Implications

From a practical sense, the intensity and sophistication of consumers' deal-seeking behavior impair the effectiveness of revenue management systems. This consequently threatens the travel, hospitality, and sports industry's ability to generate sufficient revenues. Most conventional revenue management tools rely on economical price discrimination theory and consumer behaviors models that are now outmoded by internet-based searching.

Study 1 further supports the core premise of the behavioral ecology proving that there is no one size fit all discounting model approach to explain consumer's inter-temporal choice decision in the advanced sales market. Therefore, different marketing strategies should be targeted to different groups of consumers. Study 2 focused on sports fans deal-seeking behavior. Fans with high involvement were more confident about finding the best deal. The study tested whether the mechanism behind this relationship was sports fans' overconfidence bias. Ticket market platforms can capitalize on this overconfidence by implementing gamification of the task itself. Introducing rewards- and points-based systems might be a suggestion for convincing sports fans that they can beat the system. Study 3 focused on the context where strategic marketing action is needed to achieve the best communication and marketing tactics to persuade and evoke the wanted behavior of the consumers. By understanding recent findings, the study managers can willingly tweak messages of scarcity (frequencies and percentages) and identify which works effectively for various event conditions (high demand vs. low demand) to target specific types of consumers (avid fans vs. casual fans), thereby maximizing their sales revenue.

Limitations and Opportunities for Future Research

This study has several limitations. One of the core assumptions in the proposed models was that decisional agent's attitude toward risk was aversive. The models did not account for variance explained by an individual's level of risk-seeking traits. Also, there are several structural differences to be noted between travel and hotel markets and sporting event ticket sales. While revenue management practices and discriminatory prices have become a norm in the airline and hotel sales, dynamic ticket pricing is a relatively new practice in the sports ticket context. Consumer fairness perceptions and familiarity can lead to potential confounding factors in the results of the study. Lastly, the aforementioned empirical studies mainly relied on hypothetical experimental methods and primary data collection. The study findings could be strengthened and replicated with field experiments that implement real-time treatments and continuous manipulation levels.

There are many tertiary routes this stream of literature can be extended into in the future. The field of delay discounting has answered many questions on how to deal with impulsive behavior in drug seeking, gambling, and clinical techniques for educating human beings on tolerance and delaying instant gratification. Likewise, from the consumer perspective, understanding the process 'when' to buy may help inform better decision making and improve the overall utility of their decision. When should I buy my airline ticket? Will I risk the chance to a sell out by waiting too long? Will I be able to find a better deal by waiting or buying now? We live in an evolving white-rapid age of information technology and virtual transaction era. As consumers, we are more than ever overwhelmed by the many purchase situations in an uncertain, and information overloaded sales environment. Future research and inquiry on this subject can help alleviate such stress by equipping consumer's with the right knowledge to achieve a sustainable purchase experience.

BIBLIOGRAPHY

Adams, J. K. (1957). A confidence scale defined in terms of expected percentages. *The American journal of psychology, 70*(3), 432-436.

Aggarwal, Praveen, Sung Youl Jun, and Jong Ho Huh (2011), "Scarcity Messages," *Journal of Advertising,* 40(3), 19–30.

Aggarwal, P., & Vaidyanathan, R. (2003). Use it or lost it: Purchase acceleration effects on time-limited promotions. *Journal of Consumer Behavior*, 2, 393–403.

Aggarwal, P., Jun, S. Y., & Huh, J. H. (2011). Scarcity messages: A consumer competition perspective. *Journal of Advertising*, 40, 19–30.

Aguirre-Rodriguez, Alexandra (2013), "The Effect of Consumer Persuasion Knowledge on Scarcity Appeal Persuasiveness," *Journal of Advertising*, 42(4), 371–79.

Alavy, K., Gaskell, A., Leach, S., & Szymanski, S. (2010). On the edge of your seat: Demand for football on television and the uncertainty of outcome hypothesis. *International Journal of Sport Finance*, *5*(2), 75.

Alloy, L. B., Abramson, L. Y., & Viscusi, D. (1981). Induced mood and the illusion of control. *Journal of Personality and Social Psychology, 41*(6), 1129.

Ayton, P., & McClelland, A. G. (1997, September). How real is overconfidence? In *Conference on Subjective Probability, Utility and Decision Making: Overconfidence: Sources, implications, and solutions, Aug, 1995, Jerusalem, Israel*. John Wiley & Sons.

Bagchi, Rajesh, and Derick F. Davis (2012), "$29 for 70 Items or 70 Items for $29? How Presentation Order Affects Package Perceptions," *Journal of Consumer Research*, 39(1), 62–73.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173.

Bass, Bernard M., Wayne F. Cascio, and Edward J. O'Connor (1974), "Magnitude Estimations of Expressions of Frequency and Amount.," *Journal of Applied Psychology*, 59(3), 313–20.

Beaugrand, J. P. (1997). Resolution of agonistic conflicts in dyads of acquainted green swordtails (Xiphophorus helleri): a game with perfect information. *Behavioural processes*, *41*(1), 79-96.

Belson, K. (2009, May 17). Baseball tickets too much? Check back tomorrow. *The New York Times.* http://www.nytimes.com/2009/05/18/sports/baseball/18pricing.html

Benzion, U., Rapoport, A., & Yagil, J. (1989). Discount rates inferred from decisions: An experimental study. *Management science*, *35*(3), 270-284.

Berry, C. J., Henson, R. N. A., & Shanks, D. R. (2006). On the relationship between repetition priming and recognition memory: Insights from a computational model. *Journal of Memory and Language, 55,* 515–533.

Berry, C. J., Shanks, D. R., & Henson, R. N. A. (2006). On the status of unconscious memory: Merikle and Reingold (1991) revisited. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 32,* 925–934.

Bickel, W. K., Odum, A. L., & Madden, G. J. (1999). Impulsivity and cigarette smoking: delay discounting in current, never, and exsmokers. *Psychopharmacology*, *146*(4), 447-454.

Bitran, G. R., & Mondschein, S. V. (1995). An application of yield management to the hotel industry considering multiple day stays. *Operations Research*, *43*, 427–443.

Blankenship, Kevin L., Duane T Wegener, Richard E Petty, Brian Detweiler-bedell, and Cheryl L Macy (2008), "Elaboration and Consequences of Anchored Estimates: An Attitudinal Perspective on Numerical Anchoring," 44, 1465–76.

Borland, J., & MacDonald, R. (2003). Demand for sport. *Oxford review of economic policy*, *19*(4), 478-502.

Bonner, Carissa, and Ben Newell (2008), "How to Make a Risk Seem Riskier: The Ratio Bias versus Construal Level Theory," *Judgment and Decision Making*, 3(5), 411–16.

Brenner, L. A., Koehler, D. J., Liberman, V., & Tversky, A. (1996). Overconfidence in probability and frequency judgments: A critical examination. *Organizational Behavior and Human Decision Processes*, 65(3), 212-219.

Buraimo, B., & Simmons, R. (2008). Do sports fans really value uncertainty of outcome? Evidence from the English Premier League. *International Journal of Sport Finance*, *3*(3).

Cantinotti, M., Ladouceur, R., & Jacques, C. (2004). Sports betting: Can gamblers beat randomness? *Psychology of Addictive Behaviors*, *18*(2), 143.

Camerer, C. F., Loewenstein, G., & Rabin, M. (Eds.). (2011). *Advances in behavioral economics*. Princeton university press.

Chandran, Sucharita, and Geeta Menon (2004), "When a Day Means More than a Year: Effects of Temporal Framing on Judgments of Health Risk," *Journal of Consumer Research*, 31(2), 375–89.

Chapman, Gretchen B., and Eric J. Johnson (1994), "The Limits of Anchoring," *Journal of Behavioral Decision Making*, 7(4), 223–42.

Chase, V. M., Hertwig, R., & Gigerenzer, G. (1998). Visions of rationality. *Trends in cognitive sciences*, *2*(6), 206-214.

Chelonis, J. J., King, G., Logue, A. W., & Tobin, H. (1994). The effect of variable delays on self-control. *Journal of the Experimental Analysis of Behavior*, *62*(1), 33-43.

Chen, C. C., & Schwartz, Z. (2008). Timing matters: Travelers' advanced-booking expectations and decisions. *Journal of Travel Research*, 47(1), 35-42.

Chen, C. C., & Schwartz, Z. (2006). The Importance of Information Asymmetry in Customers' Booking Decisions A Cautionary Tale from the Internet. *Cornell Hotel and Restaurant Administration Quarterly*, *47*(3), 272-285.

Chen, C., & Schwartz, Z. (2008). Room rate patterns and customers' propensity to book a hotel room. *Journal of Hospitality & Tourism Research,32(3), 287-306*.

Church, R. M., & Broadbent, H. A. (1990). Alternative representations of time, number, and rate. *Cognition*, *37*(1-2), 55-81.

Cialdini, R. (1993). *Influence (rev): The Psychology of Persuasion.* HarperCollins.

Coates, D., & Humphreys, B. R. (2007). Ticket prices, concessions and attendance at professional sporting events. *International Journal of Sport Finance, 2*(3), 161-170.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. 1988, Hillsdale, NJ: L. *Lawrence Earlbaum Associates*, *2*.

Cokely, E., Galesic, M., & Schulz, E. (2012). Measuring risk literacy: The Berlin numeracy test. *Decision Making*, 7(1), 25–47.

Cokely, E. T., Galesic, M., Schulz, E., Ghazal, S., & Garcia-Retamero, R. (2012). Measuring Risk Literacy: The Berlin Numeracy Test. *Judgment and Decision Making*.st

Coulter, Keith S., and Robin A. Coulter (2007a), "Distortion of Price Discount Perceptions: The Right Digit Effect," *Journal of Consumer Research*, 34(2), 162–73.

Coulter, Keith S., and Robin A. Coulter (2007b), "Distortion of Price Discount Perceptions: The Right Digit Effect," *Journal of Consumer Research*, 34(2), 162–73.

Cruz Rambaud, S., & Muñoz Torrecillas, M. J. (2006). Social discount rate: a revision.

Davis, E. S., & Hantula, D. A. (2001). The effects of download delay on performance and end-user satisfaction in an Internet tutorial. *Computers in Human Behavior*, *17*(3), 249-268.

Dawes, R. M., & Mulford, M. (1996). The false consensus effect and overconfidence: Flaws in judgment or flaws in how we study judgment?. *Organizational Behavior and Human Decision Processes*, *65*(3), 201-211.

DiClemente, D. F., & Hantula, D. A. (2003). Optimal foraging online: Increasing sensitivity to delay. *Psychology & Marketing*, 20(9), 785-809.

Dixon, M. R. (2000). Manipulating the illusion of control: Variations in gambling as a function of perceived control over chance outcomes. *The Psychological Record, 50*(4), 705.

Drayer, J., & Rascher, D. (2013). Sport pricing research: Past, present, and future.

Drayer, J., Rascher, D. A., & McEvoy, C. D. (2012). An examination of underlying consumer demand and sport pricing using secondary market data. *Sport Management Review*, 15(4), 448-460.

Drayer, J., Shapiro, S., & Lee, S. (2012). Dynamic ticket pricing in sport: An agenda for research and practice.

Dwyer, B. (2011). Divided loyalty? An analysis of fantasy football involvement and fan loyalty to individual National Football League (NFL) teams. *Journal of Sport Management*, *25*(5), 445-457.

Dwyer, B., & Drayer, J. (2010). Fantasy sport consumer segmentation: An investigation into the differing consumption modes of fantasy football participants.

Dwyer, B., Drayer, J., & Shapiro, S. L. (2013). Proceed to checkout? The impact of time in advanced ticket purchase decisions. *Sport Marketing Quarterly*, *22*(3), 166-180.

Dwyer, B., Shapiro, S., & Drayer, J. (2011). Segmenting motivation: An analysis of fantasy baseball motives and mediated sport consumption.

Ellis, P. D. (2010). *The essential guide to effect sizes: Statistical power, meta-analysis, and the interpretation of research results*. Cambridge University Press.

Epley, Nicholas, and Thomas Gilovich (2001), "Putting Adjustment Back in the Anchoring and Adjustment Heuristic: Differential Processing of Self-Generated and Experimenter-Provided Anchors.," *Psychological science*, 12(5), 391–96.

Epley, Nicholas, and Thomas Gilovich (2005), "When Effortful Thinking Influences Judgmental Anchoring: Differential Effects of Forewarning and Incentives on Self-Generated and Externally Provided Anchors," *Journal of Behavioral Decision Making*, 18(3), 199–212.

Epley, Nicholas, and Thomas Gilovich (2006), "The Anchoring-and-Adjustment Heuristic: Why the Adjustments Are Insufficient.," *Psychological science*, 17(4), 311–18.

Epley, Nicholas, and Thomas Gilovich (2010), "Anchoring Unbound," *Journal of Consumer Psychology*, 20(1), 20–24.

Erev, I., Wallsten, T. S., & Budescu, D. V. (1994). Simultaneous over-and underconfidence: The role of error in judgment processes. *Psychological review*, *101*(3), 519.

Estle, S. J., Green, L., Myerson, J., & Holt, D. D. (2007). Discounting of monetary and directly consumable rewards. *Psychological science*, *18*(1), 58-63.

Estle, S. J., Green, L., Myerson, J., & Holt, D. D. (2006). Differential effects of amount on temporal and probability discounting of gains and losses. *Memory & Cognition*, *34*(4), 914-928.

Falter, J. M., & Pérignon, C. (2000). Demand for football and intramatch winning probability: an essay on the glorious uncertainty of sports. *Applied Economics*, *32*(13), 1757-1765.

Fiedler, K., Walther, E., & Nickel, S. (1999). The auto-verification of social hypotheses: Stereotyping and the power of sample size. *Journal of Personality and Social Psychology*, *77*(1), 5.

Fischhoff, B. (1983). Predicting frames. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *9*(1), 103.

Fischhoff, B., Watson, S. R., & Hope, C. (1984). Defining risk. *Policy sciences*, *17*(2), 123-139.

Fischhoff, B., Slovic, P., & Lichtenstein, S. (1983). "The Public" Vs."The Experts": Perceived Vs. Actual Disagreements About Risks of Nuclear Power. In *The analysis of actual versus perceived risks* (pp. 235-249). Springer, Boston, MA.

Forrest, D., & Simmons, R. (2002). Outcome uncertainty and attendance demand in sport: the case of English soccer. *Journal of the Royal Statistical Society: Series D (The Statistician)*, *51*(2), 229-241.

Frederick, S., Loewenstein, G., & O'donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of economic literature*, *40*(2), 351-401.

Frederick, S., & Loewenstein, G. (1999). 16 Hedonic Adaptation. *Well-Being. The foundations of Hedonic Psychology/Eds. D. Kahneman, E. Diener, N. Schwarz. NY: Russell Sage*, 302-329.

Frederick, Shane W, and Daniel Mochon (2012), "A Scale Distortion Theory of Anchoring.," *Journal of experimental psychology. General*, 141(1), 124–33.

Foxall, G. R. (2002). *Consumer behaviour analysis* (Vol. 3). Taylor & Francis.

Furnham, Adrian, and Hua Chu Boo (2011), "A Literature Review of the Anchoring Effect," *Journal of Socio-Economics*, 40(1), 35–42.

Gierl, H., Plantsch, M., & Schweidler, J. (2008). Scarcity effects on sales volume in retail. *The International Review of Retail, Distribution and Consumer Research, 18(1)*, 45-61.

Gigerenzer, G. (2000). *Adaptive thinking: Rationality in the real world*. Oxford University Press, USA.

Gigerenzer, G., & Fiedler, K. (2003). Minds in environments: The potential of an ecological approach to cognition. *Manuscript submitted for publication.[GG]*.

Gigerenzer, G., Fiedler, K., & Olsson, H. (2012). Rethinking cognitive biases as environmental consequences.

Gigerenzer, G., & Goldstein, D. G. (1996). Reasoning the fast and frugal way: models of bounded rationality. *Psychological review*, *103*(4), 650.

Gigerenzer, G., Hertwig, R., Hoffrage, U., & Sedlmeier, P. (2008). Cognitive illusions reconsidered. *Handbook of experimental economics results*, *1*, 1018-1034.

Gigerenzer, G., & Selten, R. (Eds.). (2002). *Bounded rationality: The adaptive toolbox*. MIT press.

Gigerenzer, G., & Todd, P. M. (1999). *Simple heuristics that make us smart*. Evolution and Cognition.

Gabiax, X., & Laibson, D. (2006). Shrouded attributes, consumer myopia, and information suppression in competitive markets. *The Quarterly Journal of Economics*, *121*, 505–540.

Glab, J. (2004). *Does advance booking pay?* Retrieved November 8, 2006, from http://www.travelandleisure.com/articles/does-advance-booking-pay

Gourville, John T. (1998), "Pennies-a-Day: The Effect of Temporal Reframing on Transaction Evaluation," *Journal of Consumer Research*, 24(4), 395–403.

Green, L., Fristoe, N., & Myerson, J. (1994). Temporal discounting and preference reversals in choice between delayed outcomes. *Psychonomic Bulletin & Review*, *1*(3), 383-389.

Green, L., & Myerson, J. (2004). A discounting framework for choice with delayed and probabilistic rewards. *Psychological bulletin*, *130*(5), 769.

Green, L., Myerson, J., & McFadden, E. (1997). Rate of temporal discounting decreases with amount of reward. *Memory & cognition*, *25*(5), 715-723.

Green, L., Myerson, J., Lichtman, D., Rosen, S., & Fry, A. (1996). Temporal discounting in choice between delayed rewards: the role of age and income. *Psychology and aging*, *11*(1), 79.

Green, L., Myerson, J., & Ostaszewski, P. (1999). Amount of reward has opposite effects on the discounting of delayed and probabilistic outcomes. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *25*(2), 418.

Grewal, D, H Marmorstein, and Arun Sharma (1996), "Communicating Price Information through Semantic Cues: The Moderating Effects of Situation and Discount Size," *Journal of Consumer Research*, 23(2), 148–55.

Hall, R. E. (1988). Intertemporal substitution in consumption. *Journal of political economy*, *96*(2), 339-357.

Han, G., Chock, T. M., & Shoemaker, P. J. (2009). Issue familiarity and framing effects of online campaign coverage: Event perception, issue attitudes, and the 2004 presidential election in Taiwan. *Journalism & Mass Communication Quarterly*, *86*(4), 739-755.

Harvey, C. (1995). Proportional discounting of future costs and benefits. *Mathematics of operations research*, *20*(2), 381-399.

Hantula, D. A. (2003). Guest editorial: Evolutionary psychology and consumption. *Psychology & Marketing*, *20*(9), 757-763.

Hantula, D. A. (2005). Guest editorial: Experiments in e-commerce. *Psychology & Marketing*, *22*(2), 103-107.

Hantula, D. A., & Bryant, K. (2005). Delay discounting determines delivery fees in an e-commerce simulation: A behavioral economic perspective. *Psychology & Marketing*, *22*(2), 153-161.

Hantula, D. A. (2012). Consumers are foragers, not rational actors: towards a behavioral ecology of consumer choice. In *Handbook of developments in consumer behaviour*. Edward Elgar Publishing.

Hantula, D. A. (2010). The behavioral ecology of human foraging in an online environment: of omnivores, informavores, and hunter–gatherers. In *Evolutionary psychology and information systems research* (pp. 85-99). Springer, Boston, MA.

Hantula, D. A., & Wells, V. K. (Eds.). (2014). *Consumer behavior analysis:(a) rational approach to consumer choice*. Routledge.

Hauser, J. R., & Urban, G. L. (1979). Assessment of attribute importances and consumer utility functions: Von Neumann-Morgenstern theory applied to consumer behavior. *Journal of Consumer Research*, *5*(4), 251-262.

Heath, Timothy B., Subimal Chatterjee, and Karen Russo France (1995), "Mental Accounting and Changes in Price: The Frame Dependence of Reference Dependence," *Journal of Consumer Research*, 22(1), 90–97.

Herr, Paul M, Christine M. Page, Bruce E. Pfeiffer, and Derick F. Davis (2012), "Affective Influences on Evaluative Processing," *Journal of Consumer Research*, 38(5), 833–45.

Hertwig, R., & Gigerenzer, G. (1999). The 'conjunction fallacy'revisited: How intelligent inferences look like reasoning errors. *Journal of behavioral decision making*, *12*(4), 275-305.

Hey, J. (1997). *The economics of uncertainty*. Edward Elgar Publishing.

Hoffrage, U., Gigerenzer, G., Krauss, S., & Martignon, L. (2002). Representation facilitates reasoning: What natural frequencies are and what they are not. *Cognition,* 84(3), 343-352.

Holleman, M. C. (2006). Fantasy football: Illegal gambling or legal game of skill. *NCJL & Tech.*, *8*, 59.

Holt, D. D., Green, L., Myerson, J., & Estle, S. J. (2008). Preference reversals with losses. *Psychonomic Bulletin & Review*, *15*(1), 89-95.

Howard, D. R., & Crompton, J. L. (2004). Tactics used by sports organiza- tions in the United States to increase ticket sales. *Managing Leisure, 9*, 87-95.

Howard, Daniel J, and Roger A Kerin (2006), "Broadening the Scope of Reference Price Advertising Research: A Field Study of Consumer Shopping Involvement," *Journal of Marketing*, 70(4), 185–204.

Huber, O., Wider, R., & Huber, O. W. (1997). Active information search and complete information presentation in naturalistic risky decision tasks. *Acta Psychologica*, *95*(1), 15-29.

Inman, J. Jeffrey, Anil C. Peter, and Priya Raghubir (1997), "Framing the Deal: The Role of Restrictions in Accentuating Deal Value," *Journal of Consumer Research*, 24(1), 68–79.

Ishikawa, Masaya, and Hidetomo Takahashi (2010), "Overconfident Managers and External Financing Choice," *Review of Behavioral Finance*, 2(1), 37–58.

Jacowitz, K. E., & Kahneman, D. (1995). Measures of Anchoring in Estimation Tasks. *Personality and Social Psychology Bulletin*, *21*(11), 1161–1166.

Jang, W. E., Ko, Y. J., Morris, J. D., & Chang, Y. (2015). Scarcity Message Effects on Consumption Behavior: Limited Edition Product Considerations. *Psychology & Marketing, 32*(10), 989-1001.

Johnson-Laird, P. N. (1983). Mental models: Towards a cognitive science of language, inference, and consciousness (No. 6). Harvard University Press.

Johnson-Laird, Philip N., and Eldar Shafir (1993), "The Interaction between Reasoning and Decision Making: An Introduction," *Cognition*, 49(1-2), 1–9.

Juslin, P., Winman, A., & Olsson, H. (2000). Naive empiricism and dogmatism in confidence research: A critical examination of the hard–easy effect. *Psychological review*, *107*(2), 384.

Juslin, P., Winman, A., & Olsson, H. (2003). Calibration, additivity, and source independence of probability judgments in general knowledge and sensory discrimination tasks. *Organizational Behavior and Human Decision Processes*, *92*(1-2), 34-51.

Kagel, J. H., & Roth, A. E. (2000). The dynamics of reorganization in matching markets: A laboratory experiment motivated by a natural experiment. *Quarterly Journal of Economics*, 201-235.

Kahneman, D. (1994). New challenges to the rationality assumption. *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft*, 18-36.

Kahneman, D. (2003). A perspective on judgment and choice: mapping bounded rationality. *The American psychologist, 58*(9), 697–720. doi:10.1037/0003-066X.58.9.697

Kahneman, D. (2011). *Thinking, fast and slow.* New York: Farrar, Straus and Giroux.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the Econometric Society*, *47*(2), 263–292.

Kenley, C. R., & Armstead, D. C. (2004). Discounting models for long-term decision making. *Systems engineering*, *7*(1), 13-24.

Kimes, S. E. (1989). The basics of yield management. *Cornell Hotel and Restaurant Administration Quarterly, 30*(3), 14-19.

Kimes, S. E. (1994). Perceived fairness of revenue management. *Cornell Hotel and Restaurant Administration Quarterly, 35*(1), 22-29.

Kimes, S. E. (2003). Revenue management: A retrospective. *Cornell Hotel and Restaurant Administration Quarterly, 44*(5-6), 131-138.

Kimes, S. E., (2010a). The future of hotel revenue management. *Cornell Hospitality Report, 10*(14), 4-15.

Kimes, S. E., (2010b). Successful tactics for surviving an economic down- turn: Results from an international study. *Cornell Hospitality Report, 10*(7), 4-14.

Kimes, S. E., Chase, R. B., Choi, S., Lee, P. Y., & Ngonzi, E. N. (1998). Restaurant revenue management: Applying yield management to the restaurant industry. *Cornell Hotel and Restaurant Administration Quarterly, 39*(3), 32-39.

Kimes, S. E., & Schruben, L. W. (2002). Golf course revenue management: A study of tee time intervals. *Journal of Revenue and Pricing Management, 1*(2), 111-120.

Kimes, S. E., & Singh, S. (2009). Spa revenue management. *Cornell Hospitality Quarterly, 50*(1), 82-95.

Kirmani, Amna, and Akshay R. Rao (2000), "No Pain, No Gain: A Critical Review of the Literature on Signaling Unobservable Product Quality," *Journal of Marketing*, 64(2), 66–79.

Klayman, J., Soll, J. B., González-Vallejo, C., & Barlas, S. (1999). Overconfidence: It depends on how, what, and whom you ask. *Organizational behavior and human decision processes*, *79*(3), 216-247.

Klein, G. (1997). The recognition-primed decision (RPD) model: Looking back, looking forward. *Naturalistic decision making*, 285-292.

Kock, N., Hantula, D. A., Hayne, S. C., Saad, G., Todd, P. M., & Watson, R. T. (2008). Introduction to Darwinian perspectives on electronic communication. *IEEE Transactions on Professional Communication*, *51*(2), 133-146.

Koehler, D. J., & Harvey, N. (Eds.). (2008*). Blackwell handbook of judgment and decision making.* John Wiley & Sons.

Krishna, Aradhna (1991), “Effect of Dealing Patterns on Consumer Perceptions of Deal Frequency and Willingness To Pay,” *Journal of Marketing Research*, 28(4), 441–451.

Kung, M., Monroe, K. B., & Cox, J. L. (2002). Pricing on the Internet. *Journal of Product & Brand Management, 11*(5), 274-288.

Kwak, D. H. (2013). The overestimation phenomenon in a skill-based gaming context: The case of March Madness pools. *Journal of Gambling Studies*, *32*(1), 107-123.

Kwak, D. H., Lim, C. H., Lee, W. Y., & Mahan, J. E. (2010). How confident are you to win your fantasy league: Exploring the antecedents and consequences of winning expectancy. *Journal of Sport Management*, *24*(4), 416-433.

Langer, E. J. (1975). The illusion of control. *Journal of personality and social psychology*, *32*(2), 311.

Lazaro, A., Barberan, R., & Rubio, E. (2002). The discounted utility model and social preferences:: Some alternative formulations to conventional discounting. *Journal of Economic Psychology*, *23*(3), 317-337.

Leonard, T. C. (2008). Richard H. Thaler, Cass R. Sunstein, Nudge: Improving decisions about health, wealth, and happiness.

Letarte, A., Ladouceur, R., & Mayrand, M. (1986). Primary and secondary illusory control and risk-taking in gambling (roulette). *Psychological reports, 58*(1), 299-302.

Levin, Irwin P., Sandra L. Schneider, and Gary J. Gaeth (1998), “All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects,” *Organizational Behavior and Human Decision Processes*, 76(2), 149–88.

Lichtenstein, S., Fischhoff, B., & Phillips, L. (1982). Calibration of probabilities: The state of the art to 1980. D. Kahneman, P. Slovic, and A. Tverski (Eds.) *Judgement under uncertainty: Heuristics and biases.*

Lipkus, I. M., Samsa, G., & Rimer, B. K. (2001). General performance on a numeracy scale among highly educated samples. *Medical decision making : an international journal of the Society for Medical Decision Making, 21*(1), 37–44.

Lippman, S. A., & McCall, J. J. (1981). The economics of uncertainty: Selected topics and probabilistic methods. *Handbook of mathematical economics*, *1*, 211-284.

Lipshitz, R., & Ben Shaul, O. (1997). Schemata and mental models in recognition-primed decision making. *Naturalistic decision making*, 293-303.

Logue, A. W., Forzano, L. B., & Tobin, H. (1992). Independence of reinforcer amount and delay: The generalized matching law and self-control in humans. *Learning and Motivation*, *23*(3), 326-342.

Loewenstein, G. F. (1988). Frames of mind in intertemporal choice. *Management Science*, *34*(2), 200-214.

Loewenstein, G., & Elster, J. (Eds.). (1992). *Choice over time*. Russell Sage Foundation.

Loewenstein, G., & Prelec, D. (1992). Anomalies in intertemporal choice: Evidence and an interpretation. The Quarterly Journal of Economics, 107(2), 573-597.

Loewenstein, G., Read, D., & Baumeister, R. F. (Eds.). (2003). *Time and decision: Economic and psychological perspectives of intertemporal choice*. Russell Sage Foundation.

Loewenstein, G., & Thaler, R. H. (1989). Anomalies: intertemporal choice. *Journal of Economic perspectives*, *3*(4), 181-193.

Madden, G. J., Begotka, A. M., Raiff, B. R., & Kastern, L. L. (2003). Delay discounting of real and hypothetical rewards. *Experimental and clinical psychopharmacology*, *11*(2), 139.

Madden, G. J., & Bickel, W. K. (2010). *Impulsivity: The behavioral and neurological science of discounting*. American Psychological Association.

Madden, G. J., Petry, N. M., Badger, G. J., & Bickel, W. K. (1997). Impulsive and self-control choices in opioid-dependent patients and non-drug-using control patients: Drug and monetary rewards. *Experimental and clinical psychopharmacology*, *5*(3), 256.

Maister, D. H. (1984). *The psychology of waiting lines*. Boston, MA: Harvard Business School.

Marewski, J. N., Gaissmaier, W., & Gigerenzer, G. (2010). Good judgments do not require complex cognition. *Cognitive Processing, 11,* 103–121.

Marewski, J. N., Gaissmaier, W., Schooler, L. J., Goldstein, D. G., & Gigerenzer, G. (2010). From recognition to decisions: Extending and testing recognition-based models for multi-alternative inference. *Psychonomic Bulletin & Review, 17,* 287–309.

Mazur, J. E. (1984). Tests of an equivalence rule for fixed and variable reinforcer delays. *Journal of Experimental Psychology: Animal Behavior Processes*, *10*(4), 426.

McElroy, T., & Dowd, K. (2007). Susceptibility to anchoring effects: How openness-to-experience influences responses to anchoring cues. *Judgment and Decision Making, 2*(1), 48–53.

McKenna, C. J. (1986). *The economics of uncertainty*. Wheatsheaf Books.

McKenna, F. P. (1993). It won't happen to me: Unrealistic optimism or illusion of control? *British Journal of Psychology, 84*(1), 39-50.

McKenzie, Craig R. M. (2004), "Framing Effects in Inference Tasks—and Why They Are Normatively Defensible," *Memory & Cognition*, 32(6), 874–85.

Miron-Shatz, Talya, Arthur Stone, and Daniel Kahneman (2009), "Memories of Yesterday's Emotions: Does the Valence of Experience Affect the Memory-Experience Gap?," *Emotion (Washington, D.C.)*, 9(6), 885–91.

Moe, Wendy W., and David A. Schweidel (2012), "Online Product Opinions: Incidence, Evaluation, and Evolution," *Marketing Science*, 31(3), 372–86.

Monga, Ashwani, and Rajesh Bagchi (2012), "Years, Months, and Days versus 1, 12, and 365: The Influence of Units versus Numbers," *Journal of Consumer Research*, 39(1), 185–98.

Montgomery, C. A. (Ed.). (2011). *Resource-based and evolutionary theories of the firm: towards a synthesis.* Springer Science & Business Media.

Morehead, C. A., Shapiro, S. L., Madden, T. M., Reams, L., & McEvoy, C. D. (2017). Athletic Ticket Pricing in the Collegiate Environment: An Agenda for Research. *Journal of Intercollegiate Sport*, *10*(1), 83-102.

Mussweiler, Thomas, and Fritz Strack (2000), "Numeric Judgments under Uncertainty: The Role of Knowledge in Anchoring," *Journal of Experimental Social Psychology*, 36(5), 495–518.

Mussweiler, Thomas, and Fritz Strack (2001), "The Semantics of Anchoring," *Organizational Behavior and Human Decision Processes*, 86(2), 234–55.

Myerson, J., & Green, L. (1995). Discounting of delayed rewards: Models of individual choice. *Journal of the experimental analysis of behavior*, *64*(3), 263-276.

Myerson, J., Green, L., & Warusawitharana, M. (2001). Area under the curve as a measure of discounting. *Journal of the experimental analysis of behavior*, *76*(2), 235-243.

Nordhaus, W. D. (1997). Discounting in economics and climate change; an editorial comment. *Climatic Change*, *37*(2), 315-328.

Nordhaus, W. D. (1991). A Sketch of the Economics of the Greenhouse Effect. *The American Economic Review*, *81*(2), 146-150.

Northcraft, Gregory B, and Margaret A Neale (1987), "Experts, Amateurs, and Real Estate: An Anchoring-and-Adjustment Perspective on Property Pricing Decisions," *Organizational Behavior and Human Decision Processes*, 39(1), 84–97.

Oppenheimer, Daniel M, Robyn a LeBoeuf, and Noel T Brewer (2008), "Anchors Aweigh: A Demonstration of Cross-Modality Anchoring and Magnitude Priming.," *Cognition*, 106(1), 13–26.

Pandelaere, Mario, Barbara Briers, and Christophe Lembregts (2011), "How to Make a 29% Increase Look Bigger: The Unit Effect in Option Comparisons," *Journal of Consumer Research*, 38(2), 308–22.

Parker, G. A. (1974). Assessment strategy and the evolution of fighting behaviour. Journal of theoretical Biology, *47*(1), 223-243.

Parker, G. A., & Rubenstein, D. I. (1981). Role assessment, reserve strategy, and acquisition of information in asymmetric animal conflicts. *Animal Behaviour*, *29*(1), 221-240.

Peel, D., & Thomas, D. (1988). Outcome uncertainty and the demand for football: An analysis of match attendances in the English football league. *Scottish Journal of Political Economy*, *35*(3), 242-249.

Pelham, BW (1994), "The Easy Path From Many To Much: The Numerosity Heuristic," *Cognitive Psychology*, 26(2), 103–33.

Perlmuter, L. C., & Monty, R. A. (1977). The importance of perceived control: Fact or fantasy? Experiments with both humans and animals indicate that the mere illusion of control significantly improves performance in a variety of situations. *American Scientist*, *65*(6), 759-765.

Perlmuter, L. C., Scharff, K., Karsh, R., & Monty, R. A. (1980). Perceived control. *Motivation and Emotion*, *4*(1), 35-45.

Peters, E., Västfjäll, D., & Slovic, P. (2006). Numeracy and decision making. *Psychological Science.,17*(5), 407–413.

Pawlowski, T., Nalbantis, G., & Coates, D. (2018). Perceived game uncertainty, suspense and the demand for sport. *Economic Inquiry*, *56*(1), 173-192.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods*, *40*(3), 879-891.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, instruments, & computers*, *36*(4), 717-731.

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate behavioral research*, *42*(1), 185-227.

Presson, P. K., & Benassi, V. A. (1996). Illusion of control: A meta-analytic review. *Journal of Social Behavior and Personality*, *11*(3), 493.

Rachlin, H., Battalio, R., Kagel, J., & Green, L. (1981). Maximization theory vindicated. *Behavioral and Brain Sciences*, *4*(3), 405-417.

Rachlin, H., Brown, J., & Cross, D. (2000). Discounting in judgments of delay and probability. *Journal of Behavioral Decision Making*, *13*(2), 145-159.

Rachlin, H., & Green, L. (1972). COMMITMENT, CHOICE AND SELF-CONTROL. *Journal of the experimental analysis of behavior, 17*(1), 15-22.

Rachlin, H., Raineri, A., & Cross, D. (1991). Subjective probability and delay. *Journal of the experimental analysis of behavior, 55*(2), 233-244.

Rajala, A. K., & Hantula, D. A. (2000). Towards a behavioral ecology of consumption: Delay-reduction effects on foraging in a simulated Internet mall. *Managerial and Decision Economics*, *21*(3-4), 145-158.

Read, D., Frederick, S., & Airoldi, M. (2008). Longitudinal tests of intertemporal preference reversals due to hyperbolic discounting.

Reyna, Valerie F. (2008), "A Theory of Medical Decision Making and Health: Fuzzy Trace Theory.," *Medical Decision Making*, 28(6), 850–65.

Reyna, Valerie F. (2012a), "A New Intuitionism: Meaning, Memory, and Development in Fuzzy-Trace Theory.," *Judgment and Decision Making*, 7(3), 332–59.

Reyna, Valerie F. (2012b), "Risk Perception and Communication in Vaccination Decisions: A Fuzzy-Trace Theory Approach," *Vaccine*, 30(25), 3790–97.

Reyna, Valerie F., and Charles J. Brainerd (1991), "Fuzzy-Trace Theory and Framing Effects in Choice: Gist Extraction, Truncation, and Conversion," *Journal of Behavioral Decision Making*, 4(October 1990), 249–62.

Reyna, Valerie F., and Charles J. Brainerd (1995), "Fuzzy-Trace Theory: An Interim Synthesis," in *Learning and Individual Differences*, 1–75.

Reyna, Valerie F., and Charles J. Brainerd (2008), “Numeracy, Ratio Bias, and Denominator Neglect in Judgments of Risk and Probability,” *Learning and Individual Differences*, 18(1), 89–107.

Reyna, Valerie F., and Charles J. Brainerd (2011), “Dual Processes in Decision Making and Developmental Neuroscience: A Fuzzy-Trace Model.,” *Developmental review: DR*, 31(2-3), 180–206.

Russo, J. E., & Schoemaker, P. J. (1992). Managing overconfidence. *Sloan management review, 33*(2), 7.

Sachdev, A. (2013, May 12). Baseball teams get dynamic with ticket pricing. Chicago Tribune. Retrieved from http://articles.chicagotribune.com/ 2013-05-12/business/ct-biz-0512-stub-hub—20130512_1_stubhubbleacher-ticket-ticket-reselling

Schoemaker, P. J. (1982). The expected utility model: Its variants, purposes, evidence and limitations. *Journal of economic literature*, 529-563.

Schoenfelder, T. E., & Hantula, D. A. (2003). A job with a future? Delay discounting, magnitude effects, and domain independence of utility for career decisions. *Journal of Vocational Behavior*, *62*(1), 43-55.

Scholten, M., & Read, D. (2006). Discounting by intervals: A generalized model of intertemporal choice. *Management science*, *52*(9), 1424-1436.

Schroeder, S. A. (2007). We can do better—improving the health of the American people. *New England Journal of Medicine*, *357*(12), 1221-1228.

Schwartz, L. M., Woloshin, S., Black, W. C., & Welch, H. G. (1997). The role of numeracy in understanding the benefit of screening mammography. *Annals of internal medicine, 127*(11), 966-972.

Schwartz Z. (2008). “Time, Price and Advanced Booking of Hotel Rooms”. *International Journal of Hospitality and Tourism Administration*, 9(2), 128-146.

Schwartz Z. (2006). “Advanced Booking and Revenue Management: Room Rates and the Consumers’ Strategic Zones”. *International Journal of Hospitality Management*, 25(3), 447-462.

Sedlmeier, P., Hertwig, R., & Gigerenzer, G. (1998). Are judgments of the positional frequencies of letters systematically biased due to availability?. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *24*(3), 754.

Shah, A. K., & Oppenheimer, D. M. (2008). Heuristics made easy: an effort-reduction framework. *Psychological bulletin*, *134*(2), 207.

Shea, B. (2014, March 2). Dynamic ticket prices means stadium seat prices are adjusted up or down as a strategy to boost revenue for teams. Crain's Detroit Business. Retrieved from http://www.crainsdetroit.com/ article/20140302/BLOG013/140309989/d

Shapiro, S. L., Drayer, J., & Dwyer, B. (2016). Examining consumer perceptions of demand-based ticket pricing in sport. *Sport Marketing Quarterly*, *25*(1).

Shapiro, S. L., Drayer, J., & Dwyer, B. (2014). Exploring Fantasy Baseball Consumer Behavior: Examining the Relationship between Identification, Fantasy Participation, and Consumption. *Journal of Sport Behavior*, *37*(1).

Shapiro, S. L., & Drayer, J. (2014). An examination of dynamic ticket pricing and secondary market price determinants in Major League Baseball. *Sport Management Review*, 17(2), 145-159.

Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *Journal of Consumer Research*, *26*(3), 278-292.

Shoemaker, P. J., & Vos, T. P. (2009). *Gatekeeping theory*. Routledge.

Simonson, Itamar, James R. Bettman, Thomas Kramer, and John W. Payne (2013), "Comparison Selection: An Approach to the Study of Consumer Judgment and Choice," *Journal of Consumer Psychology*, 23(1), 137–49.

Simonson, Itamar, and Aimee Drolet (2004), "Anchoring Effects on Consumers' Willingness-to-Pay and Willingness-to-Accept," *Journal of Consumer Research*, 31(3), 681–90.

Slovic, P., Fischhoff, B., & Lichtenstein, S. (1984). Behavioral decision theory perspectives on risk and safety. *Acta psychologica*, *56*(1-3), 183-203.

Smith, C. L., & Hantula, D. A. (2003). Pricing effects on foraging in a simulated Internet shopping mall. *Journal of Economic Psychology*, *24*(5), 653-674.

Soebbing, B. P. (2008). Competitive Balance and Attendance in Major League Baseball: An Empirical Test of the Uncertainty of Outcome Hypothesis. *International Journal of Sport Finance*, *3*(2).

Stafford, M. R., & Day, E. (1995). Retail services advertising: the effects of appeal, medium, and service. *Journal of Advertising*, *24*(1), 57-71.

Stephens, D. W. (2002). Discrimination, discounting and impulsivity: a role for an informational constraint. *Philosophical Transactions of the Royal Society of London B: Biological Sciences, 357*(1427), 1527-1537.

Stephens, D. W., & Anderson, D. (2001). The adaptive value of preference for immediacy: when shortsighted rules have farsighted consequences. *Behavioral Ecology, 12*(3), 330-339.

Stephens, D. W., Kerr, B., & Fernández-Juricic, E. (2004). Impulsiveness without discounting: the ecological rationality hypothesis. *Proceedings of the Royal Society of London B: Biological Sciences, 271*(1556), 2459-2465.

Stevens, J. R., & Stephens, D. W. (2010). *The adaptive nature of impulsivity.*

Strack, F., & Mussweiler, T. (1997). Explaining the enigmatic anchoring effect: Mechanisms of selective accessibility. *Journal of Personality and Social Psychology, 73*(3), 437–446.

Sweeting, A. (2012). Dynamic pricing behavior in perishable goods markets: Evidence from secondary markets for major league baseball tickets. *Journal of Political Economy*, 120(6), 1133-1172.

Tabachnick, B. G., & Fidell, L. S. (2007). *Experimental designs using ANOVA.*

Takahashi, T. (2005). Loss of self-control in intertemporal choice may be attributable to logarithmic time-perception. *Medical hypotheses*, *65*(4), 691-693.

Talluri K. T., & Van Ryzin, G. J. (2006). *The theory and practice of revenue management*. New York: Springer.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: a social psychological perspective on mental health. *Psychological bulletin*, *103*(2), 193.

Thaler, R. H., & Johnson, E. J. (1990). Gambling with the house money and trying to break even: The effects of prior outcomes on risky choice. *Management science*, *36*(6), 643-660.

Thompson, S. C., Armstrong, W., & Thomas, C. (1998). Illusions of control, underestimations, and accuracy: a control heuristic explanation. *Psychological bulletin*, *123*(2), 143.

Tobin, H., & Logue, A. W. (1994). Self-control across species (Columba livia, Homo sapiens, and Rattus norvegicus). *Journal of Comparative Psychology*, *108*(2), 126.

Todd, P. M., & Gigerenzer, G. (2000). Précis of simple heuristics that make us smart. *Behavioral and brain sciences*, *23*(05), 727-741.

Trope, Yaacov, and Nira Liberman (2003), "Temporal Construal.," *Psychological Review*, 110(3), 403–21.

Trope, Y., & Fishbach, A. (2000). Counteractive self-control in overcoming temptation. Journal of Personality and Social Psychology, 79, 493–506.

Tversky, Amos, and Daniel Kahneman (1974), “Judgment under Uncertainty: Heuristics and Biases.,” *Science (New York, N.Y.)*, 185(4157), 1124–31.

Tversky, Amos, and Daniel Kahneman (1981), “The Framing of Decisions and the Psychology of Choice.,” *Science (New York, N.Y.)*, 211(4481), 453–58.

Ülkümen, Gülden, Manoj Thomas, and Vicki G. Morwitz (2008), “Will I Spend More in 12 Months or a Year? The Effect of Ease of Estimation and Confidence on Budget Estimates,” *Journal of Consumer Research*, 35(2), 245–56.

Urminsky, Oleg and Gal Zauberman (2016) “The Psychology of Intertemporal Preferences,” *Blackwell Handbook of Judgment and Decision Making*, George Wu and Gideon Keren (eds), Wiley-Blackwell.

Vinod Venkatraman, Sangsuk Yoon, and Khoi Vo (2015) ,"Overall Probability of Winning Heuristic in Decisions Under Uncertainty and Ambiguity", in NA - Advances in Consumer Research Volume 43, eds. Kristin Diehl and Carolyn Yoon, Duluth, MN : Association for Consumer Research, Pages: 260-264.

Viswanathan, Madhubalan, and Sunder Narayanan (1994), “Comparative Judgments of Numerical and Verbal Attribute Labels,” *Journal of Consumer Psychology*, 3(1), 79–101.

Von Neumann, J., & Morgenstern, O. (1947). Theory of games and economic behavior, 2nd rev.

Von Neumann, J., & Morgenstern, O. (2007). *Theory of games and economic behavior (commemorative edition)*. Princeton university press.

Wakker, P., & Deneffe, D. (1996). Eliciting von Neumann-Morgenstern utilities when probabilities are distorted or unknown. *Management science*, *42*(8), 1131-1150.

Wann, Daniel, Christina Bayens, and Allison Driver (2004), “Likelihood of Attending a Sporting Event as a Function of Ticket Scarcity and Team Identification.,” *Sport marketing quarterly*, 13(4), 209–15.

Wansink, Brian, Robert J. Kent, and Stephen J. Hoch (1998), “An Anchoring and Adjustment Model of Purchase Quantity Decisions,” *Journal of Marketing Research*, 35(1), 71.

Weber, E. U., Johnson, E. J., Milch, K. F., Chang, H., Brodscholl, J. C., & Goldstein, D. G. (2007). Asymmetric discounting in intertemporal choice: A query-theory account. *Psychological science*, *18*(6), 516-523.

Wegener, Duane T., Richard E. Petty, Kevin L. Blankenship, and Brian Detweiler-Bedell (2010a), "Elaboration and Numerical Anchoring: Breadth, Depth, and the Role of (non-)thoughtful Processes in Anchoring Theories," *Journal of Consumer Psychology*, 20(1), 28–32.

Wegener, Duane T., Richard E. Petty, Kevin L. Blankenship, and Brian Detweiler-Bedell (2010b), "Elaboration and Numerical Anchoring: Implications of Attitude Theories for Consumer Judgment and Decision Making," *Journal of Consumer Psychology*, 20(1), 5–16.

Wegener, Duane T., Richard E. Petty, Brian T. Detweiler-Bedell, and W.Blair G. Jarvis (2001), "Implications of Attitude Change Theories for Numerical Anchoring: Anchor Plausibility and the Limits of Anchor Effectiveness," *Journal of Experimental Social Psychology*, 37(1), 62–69.

Wells, V. K. (2012). Foraging: An ecology model of consumer behaviour? *Marketing theory.*

Wilson, Timothy D., Christopher E. Houston, Kathryn M. Etling, and Nancy Brekke (1996), "A New Look at Anchoring Effects: Basic Anchoring and Its Antecedents," *Journal of Experimental Psychology: General*, 125(4), 387–402.

Wine, B., Gilroy, S., & Hantula, D. A. (2012). Temporal (in) stability of employee preferences for rewards. *Journal of Organizational Behavior Management*, *32*(1), 58-64.

Wong, Kin Fai Ellick, and Jessica Yuk Yee Kwong (2000), "Is 7300 M Equal to 7.3 Km? Same Semantics but Different Anchoring Effects.," *Organizational Behavior and Human Decision Processes*, 82(2), 314–33.

Wright, P. B., & Erdal, K. J. (2008). Sport Superstition as a Function of Skill Level and Task Difficulty. *Journal of Sport Behavior*, *31*(2).

Yamagishi, Kimihiko (1997), "When a 12.86% Mortality Is More Dangerous than 24.14%: Implications for Risk Communication," *Applied Cognitive Psychology*, 11(6), 495–506.

Yoon, S., & Fong, N. M. (2016). Numeric Competencies and Anchoring Biases. In *CogSci*.

Yoon, S., Fong, N. M., & Dimoka, A. (2013). The Robustness of Anchoring Effects on Market Good Valuations.

Vohs, K. D., Baumeister, R. F., & Schmeichel, B. J. (2012). Motivation, personal beliefs, and limited resources all contribute to self-control. Journal of Experimental Social Psychology, 48(4), 943–947.

Zauberman, G., Kim, B. K., Malkoc, S. A., & Bettman, J. R. (2009). Discounting time and time discounting: Subjective time perception and intertemporal preferences. *Journal of Marketing Research*, *46*(4), 543-556.

Zauberman, Gal, Jonathan Levav, Kristin Diehl, and Rajesh Bhargave (2009). "1995 Feels So Close Yet So Far The Effect of Event Markers on Subjective Feelings of Elapsed Time." Psychological Science. 21 (December) 133-139.

Zauberman, Gal, Rebecca K. Ratner, and B. Kyu Kim (2009). "Memories as assets: Strategic memory protection in choice over time." *Journal of Consumer Research,* 35(5), 715-728.

Zhang, Y. Charles, and Norbert Schwarz (2012), "How and Why 1 Year Differs from 365 Days: A Conversational Logic Analysis of Inferences from the Granularity of Quantitative Expressions," *Journal of Consumer Research*, 39(2), 248–59.

Zhang, Y. Charles, and Norbert Schwarz (2013), "The Power of Precise Numbers: A Conversational Logic Analysis," *Journal of Experimental Social Psychology*.

Zhao, W., & Zheng, Y. S. (2000). Optimal dynamic pricing for perishable assets with nonhomogeneous demand. *Management science*, *46*(3), 375-388.