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I Buy Less when Others Suggest: Impact of Personal Relative Deprivation, Temporal Discounting, Social Norms and Store Reputation on Food Over-Acquisition

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I BUY LESS WHEN OTHERS SUGGEST: IMPACT OF PERSONAL RELATIVE DEPRIVATION, TEMPORAL DISCOUNTING, SOCIAL NORMS, AND STORE REPUTATION ON FOOD OVER-ACQUISITION

A Dissertation

by

SWAPNIL SARAVADE

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ABSTRACT

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Food over-acquisition has shown to have detrimental consequences such as food over-consumption, food waste, obesity, and greenhouse effects. Extant literature has typically focused on food over-consumption, with little explanation of its precursor, food over-acquisition. The current thesis situates the research in grocery retail and examines why people over-acquire food. Further, which interventions can marketers develop to mitigate food over-acquisition and in which grocery stores would those be effective? The present dissertation approaches this issue by drawing concepts from two disciplines, sociology, and behavioral economics. Through five studies, the current thesis shows that when people feel relatively food-deprived, they tend to prefer smaller immediate rewards over larger later rewards (Study 1), which translates into food over-acquisition (Studies 2 and 3). To mitigate this undesirable psychological route, intervention of social norms is examined. Social norms are of two types, descriptive (what others do) and injunctive (what others suggest or approve of). Results show that injunctive norms effectively mitigate food over-acquisition among people who prefer smaller immediate rewards (Study 4). However, when social norms are situated in the context of highly reputed grocery stores, descriptive norms are more effective in mitigating food over-acquisition among people who feel relative food deprivation (Study 5). Overall, this dissertation identifies *who* is susceptible to

acquire excess food and *how* food over-acquisition is triggered; further, it also examines *where* and *which* type of intervention would effectively mitigate food over-acquisition. The current research findings contribute to marketing theory by providing a nuanced understanding of the psychological mechanism that triggers food over-acquisition. In addition, the differential effect of social norms, store reputation, and temporal discounting on food acquisition provide marketing managers and public policymakers more precision in developing marketing interventions to help consumers make informed purchase decisions. Such marketing interventions will potentially facilitate consumer well-being.

DEDICATION

I dedicate my dissertation to my parents Gunshil Saravade and Shailaja Saravade, and my brother Vishal Saravade, who have wholeheartedly supported, motivated and inspired me all along. I also dedicate my dissertation to my late paternal grandfather Ganapat Saravade, my paternal grandmother late Savitribai Saravade, my maternal grandfather late Nathuram Gaekwad for being so inspirational and loving. And to my maternal grandmother Sulochana Gaekwad. A special thanks to my friends and relatives who have either directly or indirectly been supportive, inspirational, and kind to me. Thank you for your support and patience.

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CHAPTER I

INTRODUCTION

According to Food and Agriculture Organization (FAO) report (FAO 2011), 40% of the food losses occur during post-harvest and processing in developing countries. Whereas in developed countries more than 40% of losses happen at retail and consumer levels. At the consumer level, insufficient purchase planning and expiring 'best-before-dates' cause large amounts of waste (FAO 2011). Recently, Block et al. (2016) described major points of food waste from agricultural production to disposition. Extant research has shown excessive food purchasing as one of the key antecedents to food waste (Porpino 2015, Harrison et al. 1975; Cox & Downing, 2007; Koivupuro et al. 2012; Beretta et al. 2013; Ganglbauer et al. 2013; Graham-Rowe et al. 2014; Stefan et al. 2013).

The tendency to acquire food in excess of one's needs is termed as food over-acquisition (FAO 2014). The current thesis follows this definition of food over acquisition. More than half of food wasted in developed countries occurs at different points from the point of sale, consumer acquisition, consumption, and disposition (Lipinski et al. 2013). The current research focuses on the consumer acquisition stage, wherein consumers acquire food at a grocery store. Specifically, present research situates the investigation in the context of grocery retail and examines why consumers acquire food in excess. Specifically, the current thesis examines the psychological

route that triggers food over-acquisition. Further, present research also examines interventions that could mitigate food over-acquisition at the retail and consumer level.

Substantial portion of research in marketing has focused on over-consumption (Cornil et al. 2020, Garg et al. 2007, Hock & Bagchi 2018, Irmak et al. 2011, Kahn and Wansink 2004, McFerran et al. 2019, Sengupta and Zhou 2007). Specifically, research has examined the role of performance goals (Cornil et al. 2020), moods (Garg et al. 2007, Winterich and Haws 2011), presence of other shoppers (McFerran et al. 2010), crowding (Hock & Bagchi 2018), food name (Irmak et al. 2011), food packaging (Scott et al. 2008) on food consumption. While extant literature has focused on over-consumption, there is insufficient explanation of food over-acquisition, a precursor to food over-consumption (Block et al. 2016, Porpino 2016, Wertenbroch 1998). Understanding food over-acquisition would enable consumers to limit subsequent consumption by restricting purchases at the point of purchase (Wertenbroch 1998). Further, it would also provide marketers and public policy makers more precision in developing interventions to help consumers make informed purchase decisions (Reynolds et al. 2019) .The current dissertation addresses this gap in the literature by uniting two interdisciplinary strands of significant inquiry: sociology and behavioral economics, to examine a unique psychological route through which consumers show a higher tendency of food over-acquisition. The concept of personal relative deprivation is drawn from sociology. Personal relative deprivation refers to feelings of resentment and dissatisfaction stemming from the belief that one is deprived of a desired and deserved outcome compared with some referent (e.g. what similar others have; Crosby 1976; Olson 1986; Walker & Smith, 2002). The current research applies this definition in the context of food and terms it as personal relative food deprivation. In the remainder of the document, personal relative deprivation in the context of food will be referred as personal

relative food deprivation (RFD). Next, the concept of temporal discounting is drawn from behavioral economics. Temporal discounting refers to the weaking of the value of a future reward due to a delay in receipt (Green, Myerson, & McFadden, 1997, Critchfield and Kollins 2001). For example, most people prefer $2,000 now over the same amount in 6 months. This is presumably because the subjective value of the delayed $2,000 is relatively less. In other words, people discount its value. Further, temporal discounting entails discounting of delays such that high temporal discounting is referred to as delay discounting while low temporal discounting is referred to as delayed gratification. Drawing together the concepts of relative deprivation and temporal discounting, this dissertation investigates the problem of food over-acquisition by demonstrating how consumers' feelings of relative deprivation affect temporal miscalculations which in turn impact food acquisition. Based on the understanding of this unique psychological route of the problem, the current dissertation examines the intervention of social norms to mitigate food over-acquisition. Social norms refer to implicit codes of conduct that guide appropriate action (Higgs 2015; Herman, Fitzgerald, & Polivy, 2014). Past literature (Cialdini, Kallgreen, & Reno, 1991; Cialdini, Reno, & Kallgreen, 1990) classifies social norms into two types: descriptive and injunctive norms. Descriptive norms describe the behavior of other people in the social environment (Cialdini et al. 1990). Injunctive norms refer to what others approve or disapprove of (Cialdini et al. 1990). The current dissertation examines both these norms for their effect on consumers' temporal miscalculations and food over-acquisition behavior. Further, the present research also examines how the effectiveness of social norms differs based on the reputation of the store in which they are displayed. Overall, the current dissertation not only identifies a unique psychological route to the problem of food over-acquisition but also proposes solutions in the form of interventions to mitigate food over-acquisition. The findings of this

dissertation provide actionable insights that have important implications for marketers, policy makers, and consumers. The implications and importance of this dissertation are delineated in the following sections.

Importance of this dissertation

The importance and relevance of this dissertation is anchored around five key areas. First, the current dissertation attempts to address the existing problem of food over-acquisition. A 2015 Series of International Conferences on Food Loss and Waste Reduction' Report urges research in the area of food waste Although academic research has looked into the issue of over-consumption (Argo & White, 2012; Garg, Wansink, & Inman, 2007; Parker, Umashanker & Schleicher, 2019), research has not acknowledged the importance of over-acquisition, which is a precursor to over-consumption (Porpino 2016). The current thesis draws attention to this important issue of over-acquisition in the context of food. Understanding of this step is key in managing the problem of food waste. Roughly US$ 680 billion worth of food is wasted in industrialized countries and US$ 310 billion in developing countries (FAO 2013). These statistics indicate that addressing the problem of food waste is a complex task. The current research attempts to take small yet effective steps to address this problem at retail and consumer level. Further, addressing this problem requires interventions at all three levels, marketers, public policy makers, and consumers. To that end, the current thesis proposes and examines the interventions in the form of social norms. The current thesis strives to provide an understanding of the psychological triggers of food over-acquisition that could result in food waste. Understanding of these triggers is important for marketers and policy makers to take effective steps to minimize food over over-acquisition and reduce food waste. Consumers purchasing food in excess may translate into less purchase frequency, which is inconsistent with marketing's goal

of increasing purchase frequency (Garg et al. 2007). Further, the food acquired may not be consumed by the consumer because of multiple reasons such as shelf life, satiation, or poor storage. Thus, interventions that encourage customers to purchase only the required quantity of groceries in a particular shopping trip may benefit consumers in the long run in terms of managing their food inventory and also their finances. Second, obesity rates are rapidly growing worldwide to the point of becoming a problem of epidemic proportions (World Health Organization 2007). In fact, Obesity has affected about 93.3 million of US adults in 2015-2016 according to Centers for Disease Control and Prevention report (2015-2016). Specifically, the prevalence of obesity was higher among adults aged 40–59 (42.8%) than among adults aged 20–39 (35.7%). Furthermore, obesity itself is associated with different diseases such as diabetes, arthritis, asthma, heart ailments etc. Obesity is also linked to feelings of depression which then further feed into obesity, in the form of stress eating (Stunkard, Faith, & Allison, 2003). Further, the associated healthcare costs make the situation even more complex. Acknowledging these issues, the current thesis attempts to provide interventions at the point-of-purchase, that show potential to make consumers mindful of the quantity of groceries they acquire. Consumers could limit subsequent consumption by restricting purchases at the point of purchase, especially of vice food options (Wertenbroch 1998). This is important because ordinary consumers may have less knowledge about the consequences of their consumption (Herman& Pantzar, 1997). Third, research (FAO 2015) has also shown that if food waste were a country, it would be the third largest emitter of greenhouse gases (behind the United States and China). Thus, considering the environmental impact of food waste, understanding the triggers of food over-acquisition are important for not only consumers today, but also for the consumers in the future, more precisely future generations. The current thesis provides crucial insights at psychological level that impact

environmental conservation and sustainability. Fourth, over-acquisition is associated with making financial decisions (Balderjahn et al. 2020, Wertenbroch 1998). Thus, the current thesis extends beyond food, health and environment. Purchasing only the required quantities of groceries may result in saving (lower credit card debts), which could be used in investments in other domains or even in making future food purchases.

Contribution of this dissertation

The current thesis contributes towards literature in consumer behavior and marketing. First, the current thesis not only examines the problem of food over-acquisition but also proposes solutions in the form of actionable managerial interventions. This is important, because literature has mainly focused on the outcomes of social norms, with limited investigation of the psychological route through which the effect of social norms takes place (Robinson et al. 2011). The current thesis shows that social norms mitigate food over-acquisition. This dissertation responds to call for more research on developing interventions to limit food waste (Reynolds et al. 2019). Second, findings of the current research promise strong managerially actionable interventions. The effectiveness of distinct message framings of social norms was found to have differential impact on food acquisition among people with varying degrees of relative food deprivation. For instance, the current research found a differential effect of descriptive and injunctive norm messages on food acquisition behaviors, between the relatively deprived and the control group. Research by Cialdini et al. (2007) showed that social norms could result in desirable as well as undesirable responses. Further, theory of normative conduct suggests that norms influence behavior only when they are salient and focal in attention. Findings from the current research contribute to the literature on social norms by showing the differential effect of social norms on grocery purchases. Thus, considering that message framings and design of in-

store merchandise are in direct control of marketers and policy makers, the findings of the current thesis provide actionable interventions to retailers (Block et al. 2016).

Third, the current thesis not only measures food over-acquisition in terms of quantity of groceries purchased but also examines the dollar amount spent on groceries as a measure of over-acquisition. Further, the present research also measures food over-acquisition by examining consumers' preference for a shopping cart or a shopping basket, a highly ignored factor in marketing literature. Fourth, the current thesis applies the concept of temporal discounting in the context of grocery gift cards. Unlike prior research that has mainly used monetary rewards in temporal discounting tasks (Bickel, Odum, & Madden, 1999; Callan, Shead, & Olson, 2011; Du, Green, & Myerson, 2002; Frye et al.2016; Van Den Bergh, Dewitte & Warloop, 2008), the current thesis used grocery gift cards as rewards. Thus, the current thesis extends the boundaries of the types of rewards considered in temporal discounting tasks. Although, the current thesis is set in the context of food retail, the findings could be replicated in other contexts such as fashion retailing, consumer durables and other consumables that are prone to over-acquisition.

Fifth, this thesis provides an elucidation of the underlying psychological route that results in over-acquisition. Applying the sociological concept of relative deprivation in the context of food (RFD), the consequences of RFD extend the theoretical and contextual boundaries of the concept of relative deprivation. Sixth, the current thesis shows that feelings of relative deprivation can be manipulated and that this manipulation results in distinct temporal calculations and acquisition behaviors. In this way, the current thesis connects sociological concept of relative deprivation to the temporal discounting concept of behavioral economics and shows their impact on acquisition behavior. Seventh, this dissertation shows that consumers' responses to social norms are contingent upon the reputation of the store in which they are

displayed. This finding would provide retail store managers more precision in designing the social norms, taking into account the reputation of the retail store. Overall, the current thesis not only contributes towards the literature in consumer behavior and marketing but also contributes towards the literature in sociology and behavioral economics.

CHAPTER II

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

This chapter discusses literature on 1) Relative deprivation (food) deprivation and temporal discounting; 2) Temporal discounting and food over-acquisition; 3) The moderating effect of social norm type; and 4) The Moderated moderating effect of store reputation.

Personal Relative (food) Deprivation and Temporal Discounting

Personal relative deprivation refers to feelings of resentment and dissatisfaction resulting from the belief that one is deprived of a desired and deserved outcome compared with some referent (e.g. what similar others have; Crosby 1976; Olson 1986; Walker & Smith 2002). The concept of relative deprivation historically emerged around the era of the second world war. A study by Stouffer et al. (1949) at the Research Division of the Information branch of the U.S. Army found that soldiers in the air corps were less satisfied with the promotions than those soldiers in the military police, even though the promotions in the air corps were quicker than those in the military police. Stouffer et al. (1949) reasoned that the dissatisfaction stemmed from soldiers in the air corps who compared themselves with other air corps soldiers who received rapid promotions. Whereas soldiers in the military police compared themselves with other military police who received slower promotions. That means, even though soldiers in the air corps were better off compared to those in the military police, they were yet more dissatisfied. In

other words, people who were objectively better off in some situations were found to be subjectively worse-off than comparison groups (Crosby 1976).

The term relative deprivation is interpreted in two distinct ways in the literature. First, relative deprivation suggests that one's sense of grievance is not a function of one's actual situation in absolute terms. The second pertains to the emotions that entail negative self-comparisons with others (Crosby 1976). Putting these two aspects together, relative deprivation is the feeling or emotion that one has been deprived unjustly of something desirable. The current conceptualization of relative deprivation is evolved from early work by Gur (1970), Runciman (1966), and Davis (1959). In fact, Davis was the first theorist to propose a formal theory of relative deprivation. The central assumption of the relative deprivation theory is that people cannot feel relatively deprived unless they first desire a result that they lack. Davis proposed three determinants that result in relative deprivation. He proposed that an individual who lacks a certain attribute must "perceive that a similar other has that attribute, want that attribute, and feel entitled to that attribute" (Crosby 1976, p. 88). When any one of these determinants or intervening variables is absent, deprivation would not occur. Runciman (1966) added a fourth determinant. He proposed that the individual must think that it is feasible to obtain that attribute. Gurr (1970) contradicted Runciman (1966) by asserting that people feel relative deprivation only when the person thinks that it is not feasible to obtain that attribute. According to Gurr (1970), when an individual desires a reward but is not able to acquire it, the individual feels relatively deprived. Crosby (1976) examined the early work by Davis (1959), Runciman (1966), and Gurr (1970), and proposed an egoistical model of relative deprivation. The model suggests that environmental determinants such as personality traits, personal past, immediate environment societal, and biological needs are the causes of relative deprivation. The intervening variables

occur as five preconditions to relative deprivation. As per the model (Crosby 1976, p. 90), an individual who lacks a certain attribute must "1) see that someone else possess that attribute, 2) want that attribute, 3) feel entitled to that attribute, 4) think it is feasible to achieve or obtain that attribute, and 5) lack a sense of personal responsibility for not having attribute." These five pre-conditions are necessary and sufficient conditions for feelings of relative deprivation. However, it should be noted that relative deprivation should not be confused with other seemingly similar emotions or feelings. For instance, when a person does not want a certain attribute then the resulting feelings could be termed as righteous indignation (Crosby 1976). When the sense of entitlement or deservingness is absent, then resulting feelings could be called disappointment. When the individual feels and realizes that it is not feasible to obtain or achieve a certain attribute, an emotion of jealousy or dissatisfaction results. Lastly, when an individual feels responsible for his/her existing situation then an emotion of dissatisfaction or envy with the self-results. Although the terms may differ from those used elsewhere (Klein 1957; Schoeck 1969), the key point here is that absence of even one precondition results in emotions or feelings that are distinct from relative deprivation (Crosby 1976). Additionally, it is important to distinguish between relative deprivation from perceived self-discrepancy (Runciman, 1966). Perceived self-discrepancy is the discrepancy between what a person thinks he should have and what he does have. That means, an individual may perceive a wide discrepancy between what he/she should have and what he/she does have but may not feel relatively deprived or may not feel a sense of resentment about it. For instance, an average person may feel a wide discrepancy between himself/herself and Tom Cruise (popular Hollywood actor), but may not feel the emotion of relative deprivation, because the average person may not really want to be an actor. When a person feels relative deprivation on an individual basis, it is referred to as egoistical deprivation

(Crosby 1976). When a group feels relative deprivation compared to another group, it is called as fraternal deprivation (Runciman, 1966). The focus of the current thesis is egoistical deprivation.

With this historically rich work on relative deprivation as a background, the current thesis delves into understanding how feelings of personal relative deprivation impact over-acquisition. Past research has demonstrated that feelings of personal relative deprivation result in various negative consequences such as increased physical stress symptoms (Walker & Mann, 1987), poorer physical health and taking health risks (Eibner & Evans, 2005; Pham-Kanter 2009), increased portion sizes and energy intake (Sim et al. 2018), and lower subjective well-being (Ellaway et al. 2004; Luttmer 2005; Walker, 1999). Further, research has also found that financial dissatisfaction results in higher propensity to directly acquire more financial resources (Blalock, Gertler, & Levine 2008; Bowles & Park 2005; Callan et al. 2008; Haisley, Mostafa, & Loewenstein, 2008; Neumark & Postlewaite, 1998). Recently, Zhang et al. (2015) found that relative deprivation increased materialism and aspirations for fame. In the context of gambling, Callan et al. (2008, 2011) showed that personal relative deprivation translates into gambling urges. They reasoned that since gambling provides an avenue to dramatically and rapidly improve one's financial situation, people may perceive it as a way to allay their feelings of relative deprivation. In other words, people who feel relative deprivation would prefer smaller immediate rewards instead of reaping the benefits of larger later rewards (Callan et al. 2011).

If feelings of relative deprivation produce urges to improve their personal situation by acquiring more resources, then it is likely that the need to acquire more resources would lead people experiencing RFD to acquire excess food. These resources could be available in form of rewards, which could be available immediately or after a certain delay. In the context of grocery shopping, larger later rewards would typically be in the form of financial savings and lesser urge

to consume excess food and thereby maintain one's health. In addition, benefits in the form of self-confidence and self-image associated with one's finances and health would also be a form of larger later rewards. On the other hand, immediate smaller rewards would be in the form of taste, visual appeal, and satisfaction from acquisition of desired food. People who experience relative deprivation have shown to prefer smaller immediate rewards and this tendency results in gambling urges as acquisition of smaller immediate rewards provides an avenue to restore a sense of deservingness among people who feel relative deprivation (Callan et al. 2011). It is likely that people who experience relative deprivation will want to restore their sense of deservingness by acquiring rewards available immediately, even though those rewards would be of lower value, rather than a larger, better reward or an outcome available later. That means, in the trade-off between the delay in receiving a reward and the magnitude of the reward, people who experience PRD would compromise on the value of the reward for the immediate receipt of the reward. Further relative deprivation being aversive in nature, people look for means to eliminate it (Smith, Cronin, & Kessler, 2008; Zoogah 2010). It is likely that a sense of immediacy would take over the preference for larger later rewards (financial savings), resulting in more purchases in the present through smaller immediate rewards. That is, people who experience RFD would show a higher likelihood to discount a delay. Therefore, it is reasonable to hypothesize that people who experience RFD will show higher preference for smaller immediate rewards over larger later rewards.

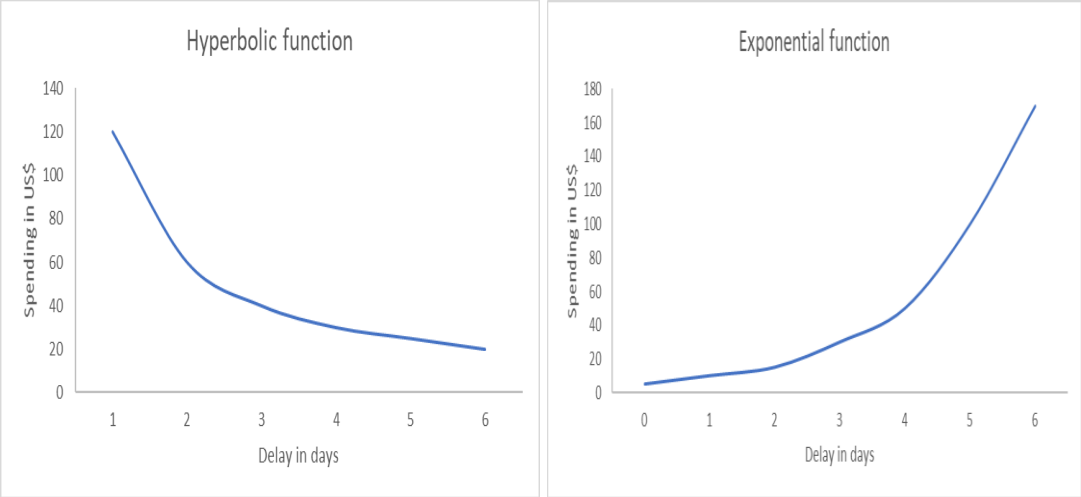
H1: People who feel personal relative food deprivation (RFD) will show higher preference for smaller immediate rewards compared to larger later rewards.

Temporal Discounting and Food Over-acquisition

The concept of temporal discounting has emerged from the early work on intertemporal choices by John Rae (1834). John Rae examined the sociological and psychological determinants of intertemporal choices. Also, Adam Smith (1776**)** had recognized that intertemporal choices not only impact an individual's health, wealth and happiness but may also determine the economic prosperity of nations (Frederick, Loewenstein & O'Donoghue, 2002). Work on intertemporal choices was then followed by works of Paul Samuelson (1937). Paul Samuelson proposed the discounted utility (DU) model. The model is basically an equation that specifies a decision maker's intertemporal preferences over consumption profiles (example, the person's well-being). However, it was found that the model was inadequate in explaining certain patterns. For instance, the rate at which an individual discounts the delay does not remain constant over time, rather it appears to decline. This pattern is referred to as hyperbolic discounting. Specifically, for a certain delay (for example: 60 days), the discount rates vary based on different types of intertemporal choices. For instance, gains are discounted more than losses, small amounts are discounted more than large amounts, sequence of outcomes are discounted differently than when considered individually. In a study by Thaler (1981), participants were asked to choose from a smaller immediate reward and larger later reward. It was found that the discount rate decreased from immediate receipt of the reward to the later received reward. A similar pattern of discounting delays was found by others (Benzion, Rapoport, & Yagil, 1989; Chapman 1996D; Chapman & Elstein, 1995; Pender, 1996; Redelmeier & Heller, 1993). Further, researchers found that, compared to the exponential functional form that assumes constant discount rates, the hyperbolic discounting function that imposes declining discount rates showed a better fit with the data (Frederick et al. 2006). Researchers have consistently found that temporal discounting is better described by a hyperbola than by an exponential (Green, Myerson,

& McFadden, 1997; Kirby, 1997; Kirby & Maraković, 1995; Kirby & Santiesteban, 2003; Rachlin, Raineri, & Cross, 1991; Simpson & Vuchinich, 2000).

Figure A: Example of hyperbolic and exponential function



The current thesis uses a hyperbolic discounting function to determine how consumers tradeoff between smaller immediate rewards and larger later rewards. Temporal discounting could be interpreted as higher rate of discounting delays (referred to as delay discounting) or lower rate of discounting delays (delayed gratification). The following section sheds more light on these points.

Delay Discounting and Delayed Gratification

Delay discounting is measured as a temporal discounting function, or a quantitative index of how rapidly a delayed reward loses value, which can be calculated a number of different ways (Green & Myerson 2004; Mazur 1987; Mitchell et al. 2005; Myerson, Green, & Morris 2011). Stating it differently, delay discounting is a cognitive process in which individuals prefer smaller immediate rewards relative to larger delayed rewards (Loewenstein 1988). Researchers suggest that delay discounting is a malleable behavioral tendency which can be modified based on

different pharmacological or environmental conditions (Dallery & Raiff 2007). The current thesis examines both these conceptualizations.

Delay discounting suggests that an automatic attribution occurs when people face a choice between a delayed value and an immediate value. This attribution of value is subjective and varies as per the nature of the task. For instance, the degree of delay discounting is estimated by presenting participants with series of hypothetical choices (e.g., money, health, and drugs) that vary in their time of receipt and value. Specifically, choice involve rewards that could be received immediately or at a larger value after certain delays (Reynolds & Schiffbauer 2004; Robles & Vargas 2008).

The decision of the subject is based on the evaluation of the present value of the reward. The present value of the reward that is considered higher, is chosen by the subject. Over a series of such choices, the subjective value of the reward is calculated. This value takes into account the preference reversals between the choices. Subjective value of the delayed reward thus represents the value at which the present reward is equal in attractiveness to the delayed reward. This subjective value is then equivalent to the discounted or depreciated objective value as a function of the delay in its receipt (Odum et al. 2000). That means, subjects who discount the value of delayed outcomes at high rates are more concerned with the immediate consequences rather than prioritizing larger later outcomes (Epstein et al. 2003). Looking at it differently, the subjective value of an outcome or rewards diminishes as a function of the delay in its receipt (Reynolds & Schiffbauer 2004).

Studies about discounting have been important in understanding the interplay of risk and time in everyday situations such as choices pertaining to health and finance which entail

cognizance of the present and the future (Du, Green, & Myerson, 2002). Research has shown that less consumers are psychologically associated to their future selves, the less willing they will be to forgo immediate benefits to larger later benefits to be received by their future self (Bartels & Urminsky 2011). Delay discounting has shown to affect evaluation of choices pertaining to visceral influences, marketing influences, or private cognitive analysis (Matta, Goncalves, & Bizarro 2012). Considering the accuracy and consistency of delay discounting, researchers suggest that understanding of both individual and intraindividual differences could be enhanced (Matta et al., 2012). Delay discounting lends theoretical insight into numerous behaviors relevant to mental and physical health (Bickel & Marsch, 2001; Critchfield & Kollins, 2001) as well as personal financial wellbeing (Angeletos et al. 2001). Temporal discounting is also associated with compulsive overeating (Kekic et al. 2020). Research by Weller et al. (2008), found that obese women show greater delay discounting than healthy-weight women. Further, individuals with substance abuse, gamblers, alcoholic, smokers showed a tendency of delay discounting (Madden et al.1997; Mitchell 1999; Petry 2002; Reynolds, & Schiffbauer, 2004).

Another way of viewing delay discounting is the inability to delay gratification (Mischel, Ayduk, & Mendoza-Denton, 2003; Rachlin 2000), such that individuals who show a greater preference for smaller, immediate rewards (greater delay discounting) are considered less willing to delay gratification. Research has shown that obese youth were more likely to choose smaller, immediate rewards, and that difficulties in delaying gratification were greater for food than other alternatives (Bonato & Boland, 1983; Geller, Keane, & Scheirer, 1981, Johnson, Parry, & Drabman, 1978). Specifically, Geller et al. (1981) presented food items in the form of cupcakes, candy bars, etc., and non-food items in the form of rubber balls, toys, etc. in an alternate order. They were asked to choose between one cupcake now or two cupcakes later, followed by one

non-food item such as one toy now or two toys later. Results showed that obese individuals consumed the food items at a higher rate than non-obese individuals. In addition, recent research has found that the inability to delay gratification in young children predicts weight gain from ages 3–11 (Francis & Susman, 2009, Seeyave et al. 2009). Achieving long-term objectives requires certain motivation to exercise preference for future prospects to modulate the desire for immediate gratification. Thus, foregoing the temptation of immediate gratification and waiting for a future reward requires mental effort. Such effort is proportional to the magnitude of the reward (Thaler 1981). Research has shown that choosing larger and future rewards over immediate and smaller rewards is associated with various positive results throughout life including better academic performance, healthy social relationships, lower rates of psychopathology and criminal behavior, and more adaptive social functioning (Hirsh, Morisano, & Peterson, 2008; Shamosh & Gray, 2008). Drawing on the above effects of delay discounting and delayed gratification, it is reasonable to hypothesize the following:

H2: People who show a preference for smaller immediate rewards (versus larger later rewards) are more likely to show a tendency of food over-acquisition.

The Moderating effect of Social Norm Type

Norms have been an integral aspect of human civilization. Sherif, (1936, p. 3) defined norms as "customs, traditions, standards, rules, values, fashions and all other criteria of conduct which are standardized as a consequence of the contact with other individuals." As social animals, human behavior is strongly shaped by the perceptions of social norms (Ajzen & Fishbein, 1980; Asch 1951; Fishbein & Ajzen, 1975). The current thesis draws attention to the role of social norms in mitigating food over-acquisition. Social norms are implicit codes of conduct that provide a guide to appropriate action (Herman et al. 2003; Higgs 2015). Social

norms include general expectations of one's social behavior (Pepitone 1976); expectancies of valued others relating to one's behavior (subjective norms) as proposed by the theory of reasoned action (Fishbein & Ajzen, 1975), expectations of one's own behavior (personal norms) as suggested by Schwartz (1977), and benchmarks that are build based on one's observation of others' behavior (Cialdini et al. 1991). Early research on social norms showed that contact with others influences one's perceptions of reality (Sheriff 1936). Further, induced group norm was sustained even after one year of it being induced (Rohrer et al. 1954).

According to the Focus Theory of Normative Conduct by Cialdini et.al. (1990) and Cialdini et.al. (1991) norms are likely to influence behavior only when they are salient and focal in attention. The theory further asserts two distinct types of social norms, each of which affects one's motivation differently resulting in distinct behaviors (Deutsch & Gerard, 1955). These two types of social norms are termed as descriptive norms and injunctive norms.

Descriptive norms refer to the behavior of most others in the social environment (Cialdini et al. 1990). In other words, descriptive norms describe what is normal or typical in any given situation. It motivates people by furnishing evidence of what will be an effective and adaptive action. It tends to induce the notion that "If everybody is doing it, then it must be the right and sensible thing to do" (Cialdini et al. 1990). Descriptive norms provide consensus information such that, the more the number of people responding to a situation in a typical way, the more correct is the behavior perceived to be (Kelley & Thibaut, 1954). This information influences behavior as research shows that others' behavior in the social environment shapes one's response and interpretation of the situation (Milgram, Bickman, & Berkowitz, 1969). As per Cialdini et al. (1990), when an individual perceives a social support, she/he tends to follow the lead since the heuristic of social proof eases cognitive effort, and saves time resulting into an outcome that has

high likelihood to be effective. This phenomenon is most pronounced when the source of reference is similar to the individual (Festinger 1954).

The second type of social norm is the injunctive norm. Injunctive norms describe the conduct that most others approve or disapprove of Cialdini et al. (1990). Injunctive norms refer to rules or beliefs about what constitutes morally approved and disapproved conduct. In contrast to descriptive norms, which specify what is done, injunctive norms specify what ought to be done. Injunctive norms refer to perceptions of expected behavior (what other people endorse) (Cialdini et al. 1990). Research has shown that that when an injunctive norm was made salient, littering was reduced irrespective of how clean the environment was (Cialdini et al. 1990). In their subsequent study, Cialdini et al. (1991) found that descriptive norms reduced littering only when it occurred in the same situation in which there was opportunity to litter. On the other hand, injunctive norms reduced littering in both the same and different environment. It should be noted that several different norms may apply to any situation, however the norm that is most salient will have the greatest impact on behavior. That means individuals who are dispositionally or temporarily focused on normative considerations are most likely to align their actions with the norm (Berkowitz & Daniels, 1964; Berkowitz 1972; Gruder, Romer, & Korth, 1978; Miller & Grush, 1986; Rutkowski, Gruder, & Romer, 1983; Schwartz & Fleishman, 1978). Activation of injunctive norms brings about two effects. First, it shifts the focus away from antisocial behavior that constitutes the descriptive norm for the setting. Second, it leads individuals to attend to a motivational construct—social approval and disapproval—that encourages behavior in a socially desirable direction irrespective of what others may have done in the setting (Reno, Cialdini, & Kallgreen, 1993).

In the context of gambling, Meisel and Goodie (2014) found that when the reference group was close others (i.e., family and friends), injunctive norms predicted greater gambling frequency. In contrast, when the reference group was other students, the main effect of descriptive norms predicted greater gambling frequency. When predicting gambling problems, only descriptive norms were significant, regardless of the proximity of the normative referent. These results suggest that individuals are influenced by their perceptions of others engaging in gambling behavior, irrespective of the proximity. Further, their findings indicate that perceptions of approval from close others facilitate respondents' gambling frequency, but this effect was more evident when individuals perceived that close others, specifically friends, were gambling frequently. There was a significant interaction between similar others' perceptions of injunctive and descriptive norms. In environments where the individual perceived other students to gamble frequently, the individual engaged in frequent gambling, whether or not other students approved of the behavior. Conversely, in contexts where the individual perceived that other students gambled infrequently, individuals with low levels of perceived approval gambled more frequently than individuals with high perceived approval. This is reflective of Brehm's (1966) psychological reactance theory, which states that when individuals perceive that their behavioral freedoms are threatened, they deviate from the norm by strengthening attitudes and behaviors contrary to what was intended. If gambling individuals believe that gambling is threatened, they engage in the behavior more frequently to compensate for the lack of gambling in the environment, as well as the lack of acceptance of it. An alternative explanation may suggest that in environments where the behavior is infrequent and when the reference group is unfamiliar, the individual is not confident in his or her perceptions of approval regarding gambling. Further, the influence of social norms has also been assessed in the context of environmental conservation

(Cialdini, Goldstein, Griskevicius, 2008; Cialdini 2005; Cialdini et al. 1990; Lede, Meleady, & Seger, 2019; Nolan et al. 2008), littering, healthy and unhealthy food choices, smoking, drug use, and addiction (Barnum & Armstrong, 2019) etc. In fact, study 2 of Nolan et al. (2008) found that, when compared to information salience, normative social influence resulted in a pronounced behavioral change towards conserving the environment, despite normative information being indicated as least motivating. Research by Cialdini et al. (2006) found a differential effect of social norms on thefts. They found that making descriptive norm salient increased the likelihood of theft (of petrified wood from a park), whereas making injunctive norm salient mitigated the possibility of thefts. Specifically, a negatively worded injunctive norm was most effective in mitigating a possibility of thefts. Their results imply that the form of a social norm could dramatically alter individuals' behavior, such that some actions could be desirable while some could be undesirable. These findings are aligned with Jacobson et al. (2011) which examined the psychological response tendencies when a specific norm was made salient. They found that individuals relate to descriptive norms with a goal of making accurate/efficient decisions, whereas individuals relate to injunctive norms with a goal of gaining/maintaining. Further, compared to descriptive norms, injunctive norms result in increased self-awareness and greater sense of conflict pertaining to conformity decisions. In addition, self-regulatory depletion impacted conformity to injunctive norm and descriptive norms. Particularly, self-regulatory depletion reduced adherence to injunctive norm but increased adherence to descriptive norm. Overall, the findings imply that exposure to social norms could translate into desirable or even undesirable behaviors.

The current thesis examines the effect of social norms in the context of food purchase in the retail environment. Research pertaining to the effect of providing information on food choice

and intake has been widely conducted (Robinson, Fleming, & Higgs, 2014; Robinson, Thomas, Aveyard, & Higgs, 2014; Robinson, Benwell, & Higgs, 2013; Robinson, Blissett, & Higgs, 2013). For instance, Mollen, Rimal, Ruiter, & Kok, (2013) investigated the effect of social norms on food selection. Specifically, they examined the effect of healthy descriptive norms, healthy injunctive norms, unhealthy descriptive norms, and control (no message) on food choices. In their experiment, they exposed the participants to norm messages in a between-subjects design. The findings showed that compared to unhealthy descriptive norms, healthy descriptive norms resulted in more healthy choices. Further, participants in the injunctive norm group made more healthy decisions than unhealthy descriptive norm condition. There was no significant difference between injunctive healthy norm and the control condition. Both healthy social norms signs (i.e., descriptive, injunctive) did increase the number of healthy food choices compared to the unhealthy descriptive norm message. This finding is consistent with a study by Lally, Bartle, and Wardle, (2011). Their results showed that descriptive norm perceptions were predictive of fruit and vegetable, sugar-sweetened drinks and snack food intake. In contrast, there were no effects of injunctive norms on food intake. The authors reasoned that injunctive norms could be less important for immediate decisions. Looking through the angle of self-regulation, the authors suggested that self-regulation depletion increased conformance to descriptive norms, but decreased conformance to injunctive norms such that descriptive norms were most effective and influential under conditions of low effortful cognitive activity, while injunctive norms required more cognitive activity to influence behavior (Jacobson, Mortensen, & Cialdini, 2011). In fact, in the subsequent work Jacobson et al. (2015) found that injunctive social norms require arduous processing of self-control. Recently, Stok, de Vet, de Ridder, and de Wit (2016) investigated how majority framing versus minority framing of descriptive norms impact vegetable intake.

Their results show that participants showed higher compliance with the majority norms than minority norms. Further, they found that descriptive norms trigger three cognitive processes self-identification, attitudes, and self-efficacy, which mediate the effect of descriptive norms and vegetable intake.

Research by Salmon et al. (2014) showed that conditions of low self-control led to healthy food choices in the presence of normative cues that convey majority endorsement for those products. Rook and Fischer (1995) found that normative influences moderate the relationship between impulsiveness and related behavior. Further, intake of palatable food was affected by social norms when conveyed in the form of information about the amounts eaten by prior participants (Pliner & Mann, 2004; Roth et al. 2001). Overall, injunctive and descriptive norms have been shown to be aligned, but they may also be in conflict and interact to guide behavior (Schultz et al. 2007; Smith & Louis, 2008). However, the extent of the interaction of injunctive and descriptive norms to explain eating behavior has not been examined in detail and needs research attention (Jacobson et al. 2011; Meisel & Goodie, 2014).

People with low self-esteem are more likely to show a need for affiliation with others (Baumeister & Leary, 1995). Robinson et al. (2011) found that participants who showed high empathy and low self-esteem exhibited higher adherence to eating norm of the associate. Research has shown that self-esteem relates negatively to personal relative deprivation (Callan et al. 2008; Tougas et al. 2005; Walker 1999). That means, people who feel relative deprivation would show a higher need for affiliation with others. Since, people who feel relatively deprived tend to look for means to restore their sense of deservingness (Callan et al. 2011), the need for affiliation would allow them to diminish the feelings of relative deprivation. Considering that injunctive norms communicate *what others think one should do* or *what others approve of* people

who feel relatively deprived would most likely comply with what similar others want them to do as it would allow them to fulfill their need for affiliation, by conforming to what others want them to do. In other words, people with relative deprivation would reason that performing those actions that those similar others approve of, would allay their feelings of relative deprivation and give them a sense of being affiliated with similar others. This reasoning aligns with Robinson et al. (2011) who found that participants who showed high empathy and low self-esteem adhered more to the eating norm of the associate. That means, if people with low self-esteem are more likely to follow the eating norm set by eating partner (other), then people who feel relatively highly deprived should show a higher tendency to comply with social norms set by other shoppers. In other words, when people who feel relatively food deprived are informed that other people at the store want them to abide by certain shopping tendencies, they are most likely to conform. More specifically, an injunctive norm will be more effective (versus descriptive) norm among people who feel relatively deprived since it reflects approval from similar other people with whom they want to affiliate. Therefore, it is reasonable to hypothesize that injunctive norms (versus descriptive norms) would be more effective with people who feel high relative deprivation, such that injunctive norms will result in preference for larger later rewards and reduce food over-acquisition.

H3: Injunctive norms (versus descriptive norms) will mitigate the effect of relative deprivation on preference for larger later rewards and thereby reduce food over-acquisition.

The Moderating effect of Store Reputation

Consumers use retailer's reputation as a signal of product quality (Bell 1999; Dawar & Parker, 1994). Previous studies suggest that stores can carry social identity information. For example, consumers pursue symbolic congruency between their self-concept and retail environments (Sirgy, Grewal, & Mangleburg, 2000) and are influenced by store design cues when making quality judgments of a merchandise (Baker et al. 2002). Therefore, consumers may sometimes be concerned with their social identity, and with the image conveyed by the store. Under these conditions, they may be influenced by the reputation of the retailer when evaluating the communication from the retailer. In the context of the current research, it could be reasoned that when consumers are motivated to manage and enhance their social identities, the image-related aspects of a store will gain saliency with evaluating the communications associated with the store. Accordingly, cues that can address social identity goals, such as store reputation, will also play an important role in making judgments of communication from the retailer. Specifically, if the retail store emphasizes the shared identity of the customers through social norms, customers will be more likely to follow the norms (Cruwys et al. 2012).

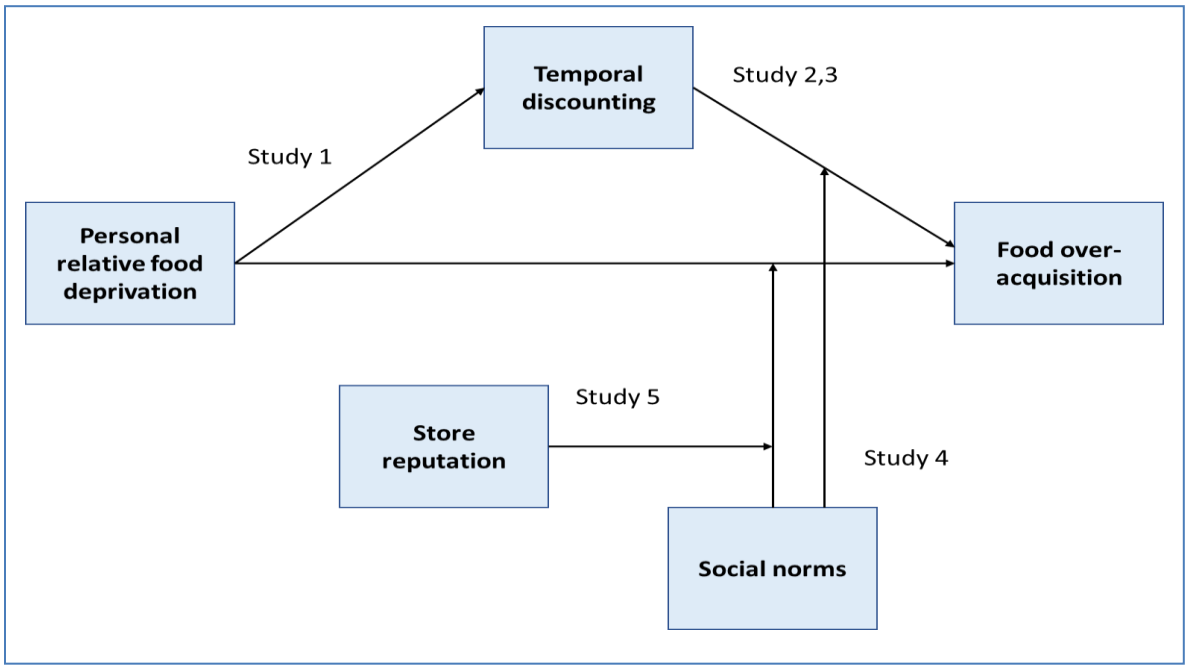
Research shows that norms are more likely to be adhered when the referent group is socially proximal or is considered "in-group" which gives a perception of shared identity (Cruwys et al. 2012). Alternatively, it is also found that people follow norms of "out-groups" that are perceived as aspirational (Englis & Solomon, 1995), but avoid behaviors of "out-groups" that are considered lower status (Berger & Heath, 2008; Berger & Rand, 2008). The reasoning being, a person would follow the lead of an aspirational "out-group" because the person would seek or desire social approval. This line of reasoning connects with people who experience feelings of

relative food deprivation, wherein they would follow the lead of those people who form the aspirational "out-group" in the backdrop of grocery shopping.

Particularly, in the context of present research, it is likely that people who feel relative food deprivation will follow norms communicated by a store that is perceived to be upscale, prestigious or high-end, compared to when communicated by a store that is perceived to be ordinary, common, or low-end. This effect would result because following a norm enhances the need for affiliation with a social group and being liked (Deutsh & Gerard, 1955, Higgs 2015). Research has shown that need for affiliation is associated with following a norm, especially among those who measure low on self-esteem (Robinson et al. 2011). Self-esteem has shown to relate negatively to personal relative deprivation (Callan et al. 2008; Tougas et al. 2005; Walker 1999). It is likely that people who feel relative deprivation would adhere to norms followed by other people. That is, a descriptive norm compared to an injunctive norm would be relatively more effective in mitigating food over-acquisition among people who may feel relative deprivation, since descriptive norms imply what other people typically do. However, this effect would be more pronounced when people shop at stores that have a favorable store reputation compared to those who do not have a favorable store reputation. Because, adhering to or rather emulating what an aspirational group of people who shop at a highly reputed store typically do (descriptive norm), would mean that the person could belong or affiliate with a specific group of people shopping at a store by following a norm of an aspirational *out-group*, and in the process reduce the feelings of relative food deprivation. This reduction in feelings of relative food deprivation, could help consumers make informed purchase decisions and reduce food over-acquisition. Therefore, it is reasonable to hypothesize that:

H4: Descriptive norms (vs. Injunctive norms) will be more effective in mitigating food over-acquisition among people who feel relative food deprivation (vs. those who do not feel relative food deprivation) at stores that have high store reputation (versus those that have low store reputation).

Figure B Conceptual model



CHAPTER III

METHODOLOGY

The primary motive behind this dissertation is to not only identify the specific psychological route that leads to food over-acquisition, but also propose interventions that could neutralize or mitigate food over-acquisition. Specifically, studies 1, 2, and 3 pertain to identifying a unique route to the problem of over-acquisition. Study 4 pertains to proposing interventions in the form of social norms to neutralize food over-acquisition. Study 5 examines the moderation effect of store reputation, social norms, and RFD in mitigating food over-acquisition. Overall, the current thesis not only identifies the problem of food over-acquisition but also offers solutions in the form of multiple interventions.

Overview of the Current Research

The central objective of the current research was to investigate the mechanism through which RFD influences food over-acquisition and examine the interventions that could mitigate food over-acquisition (see table 1 for an overview of current research). In Study 1, the hypothesis that experimentally induced RFD produces a tendency of delay discounting rather than delay of gratification was tested. In the next two studies, the author examined correlational (Study 2) and causal (Study 3) evidence for the hypothesis that delay discounting impacts food over-acquisition. In Study 4, the author introduced social norms as an intervention that serves as a moderating variable. Specifically, study 4 demonstrates that salience of social norms mitigates

the effect of RFD on food over-acquisition. Lastly, study 5 shows that the effect of social norms in mitigating food over-acquisition is contingent upon store reputation. Thus, the primary aim in the current thesis is to test the hypothesis that RFD translates into food over acquisition via increased desire for immediate- even if smaller-reward, how social norms mitigate this effect, and in which type of stores are social norms effective.

CHAPTER IV

STUDY 1 EFFECT OF RFD ON DELAY DISCOUNTING

The goal in study 1 was to obtain causal evidence through an experiment to test the hypothesis that RFD produces an increased preference for smaller immediate rewards in lieu of larger, later rewards. The manipulation of personal relative deprivation validated by Callan et al. (2008) was adapted to the context of RFD. Participants in the current study were led to believe that they were either relatively deprived of food or were at the same level as similar others. Participants were then asked to complete a delay-discounting task as part of assessing their tendency of delay discounting or delayed gratification. It was hypothesized that participants who learned that they were dep rived of food as compared to similar others would show increased preference for immediate food acquisition in lieu of later food acquisition. This prediction is consistent with the Callan et.al. (2011) finding that personal relative (financial) deprivation leads to increased preference for smaller, immediate rewards at the expense of a larger, later rewards.

Method

Participants

Prospective participants were recruited from the United States and were contacted using a telephone directory (white pages) containing contact information of US residents. A research assistant made phone calls in an alphabetical order to every fifth person in the directory. Call

recipients were informed that a major state university was conducting a study and therefore, requested their participation for a reward of $5. Prospective participants who were interested to participate in the study were asked to provide their email address. Participants then received an email containing the online study. To redeem the reward, participants were informed to note down a four-digit code that they would receive at the end of the study and email it back to the research assistant. In total, 110 unique codes were received. The codes allowed the researchers to allocate the reward to the participants. Of the 110 responses, 72 responses had responded with the correct unique codes and IP address. Further, 10 participants failed the attention check question and 1 participant had taken a similar study before. Thus, data from 61 participants was analyzed (males = 23, females = 38, mean age = 30.50 years). Of these 61 participants, 30 participants were in the deprived condition and 31 participants were in the non-deprived condition.

Procedure

Given the hypothesis, deception was used in the study. In the introduction of the study, participants were informed that the researchers were interested in investigating participants' grocery shopping behavior and their tendency to use grocery shopping gift cards. Participants were notified that during the course of the study, they would be given an online "personalized score" (Comparative Food Purchase Index, CFI) and feedback about their food purchasing behavior. Participants were informed that this personalized score and feedback would result from "strong statistical calculations" and comparison of their information with information of people who matched their profile in a "powerful sophisticated software" which contained a large database of people similar to them. In reality, there was neither a "powerful sophisticated software" nor a "strong statistical calculations" procedure.

Continuing with the fabricated story, participants first completed a series of demographic questions which were composed of gender, age, marital status, number of members they lived with, average annual income, average monthly spend on groceries, height, weight and zip code. To make the "personal profile" more believable, an inventory of 13 food categories of everyday use on a 7-point Likert scale was included. Participants also answered how frequently the grocery items were exhausted. This question allowed to account for participants' food storage tendencies. To further build credibility of the story, participants were asked to indicate their frequency of grocery shopping.

Once participants answered these questions, they were notified on their monitors that the computer would calculate their "Comparative Food Purchase Index" (CFI). Specifically, participants read the following text on their computer screen:

> We will now calculate your Comparative Food-Purchase Index (CFI). The CFI measures a person's standing in terms of his/her average monthly purchase of groceries relative to the grocery purchases of similar other individuals. Based on the information you provided, the index will produce a score using your profile relative to the information in our database from people who match your profile. The score will tell you how you compare against similar others in terms of the sufficiency of grocery/food purchase and consumption. Depending on current database activities, the process may take up to a minute to complete. Once it finishes the calculation, a screen showing your CFI and an overall feedback will appear. After you click on the arrow below, please do not press any key as the system will be processing your responses. To begin processing, please click on the arrow below.

Once participants clicked the arrow below, they saw a sequence of screens which were designed to create a perception that their personal profile was being calculated, analyzed and compared to a database of people who matched their profile. Specifically, the text on the screen progressed from "Processing……..please wait.." to "Accessing database…please wait…" to "Calculating CFI… Please wait.." This waiting time was constant for all participants. Once the "processing" was finished, participants saw their CFI and feedback on the screen. Half of the

participants received the same positive CFI (+2.09) and the other half of the participants received the same negative CFI (-79.02). A CFI of -79.02 signified the relatively deprived condition and CFI of +2.09 signified the non-deprived condition. Specifically, the participants who received a negative CFI read the following on their computer screen:

> Your Comparative Food-Purchase Index (CFI) was derived from statistical analysis using both the information from your profile and the information in our database from people who matched your profile. The score will tell you how you compare against similar others in terms of the sufficiency of grocery/food purchase and consumption. The CFI ranges from -100 to +100. A negative (-) CFI means that your food purchase/consumption is, on average, less than that of similar others. A positive (+) CFI means your food purchase/consumption is, on average, greater than that of similar others. A CFI closer to zero (between -10 and +10) indicates that your food purchase/consumption is more or less equal to that of similar others.
>
> Your Comparative Food-Purchase Index (CFI): -79.02
>
> The negative CFI of -79.02 indicates that you purchase/consume significantly less grocery and food relative to individuals who match your profile. Even though you may feel you are buying the necessary groceries, our expert analysis suggests that you have NOT been purchasing/consuming enough grocery/food.

While the initial paragraph remained the same, participants who received a positive CFI read the following in the computer screen:

> Your Comparative Food-Purchase Index (CFI): +2.09
>
> The positive CFI of +2.09 indicates that you purchase/consume sufficient grocery and food relative to individuals who match your profile. Our expert analysis suggests that you have in fact been purchasing/consuming enough grocery/food.
>
> After reading the feedback, participants answered manipulation check questions.

Manipulation check questions measured the cognitive and affective component of the manipulation on a 7-point Likert scale. Two of the four items for the cognitive component of manipulation check were “I think the CFI reliably shows how I fare against similar others in terms of the amount of my food purchase and consumption”, “I think the CFI is a true measure

of standing relative to similar others in terms of my food purchase and consumption." Two of the four items for the affective component of the manipulation check were, "I am resentful of my grocery purchase and purchase/ consumption" and "I am satisfied with my current level of grocery purchase/consumption." The two other items were "I want to have more grocery" and "My current level of grocery consumption is deserved and fair in comparison to similar others."

Participants also answered an instructional attention check question. Specifically, participants responded whether to the question, "According to the CFI calculated for me personally, my food purchase and consumption has been:" Participants were presented with three options, greater than similar others, lesser than similar others, and equal to similar others.

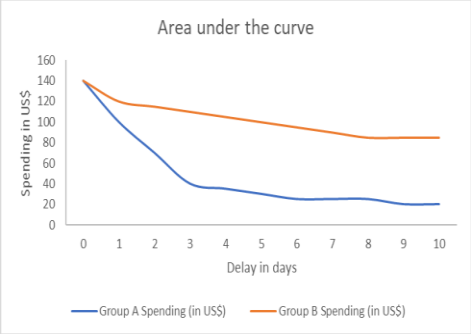
After answering the manipulation check questions, participants were directed to participate in an online study concerning grocery shopping gift cards. Specifically, participants were told that a company named XYZ was providing grocery shopping gift cards which could be used in any of the grocery stores in the USA. Participants were then asked to make several hypothetical decisions about receiving a grocery shopping gift card through a delay-discounting task. Since delay discounting refers to the weakening of a consequence because of a delay in its occurrence, an experiment that examines the effects of this delay is called a delay discounting procedure (Critchfield & Kollins, 2001). Research suggests that delay discounting procedure allows one to understand more about various behavioral problems and their treatment (Myerson, Green, & Warusawitharana, 2001).

The delay discounting procedure in the current study was adapted from previous studies of discounting (Du et al. 2002; Holt et al. 2003, Myerson et al. 2003, Frye et al. 2016, Callan et al. 2011). The degree of delay discounting is estimated by presenting the subject with a series of

hypothetical choices that are to be received immediately in a smaller amount or in a larger amount after a delay (Reynolds & Schiffbauer, 2004; Robles & Vargas, 2008). Participants completed the computerized delay discounting task wherein they were presented with two grocery shopping gift cards and were asked to choose one of them. One of the gift cards had a smaller amount (in US $) of credit which could be received immediately and was required to be spent the same day. The other had a larger amount (in US $) of credit, but the participant was required to wait for a certain period before they receive and spend it. The participant made six decisions at each of the seven delays. The delays ranged from 3 days, 7 days, 15 days, 30 days, 60 days, 120 days to180 days. That means, the participants made a total of 42 choices. The first question at each delay (here for example 7 days) was, "Which option do you prefer?" a) $100 gift card now b) $200 gift card after 7 days. For each of the subsequent choices at that delay, the amount of the immediate gain was adjusted according to the participant's previous choice, while the amount of the delayed reward remained the same. The size of the adjustment to the immediate gain was half of the smaller amount. For example, if the participant chose to receive the $100 gift card now over the $200 gift card in 7 days, then the alternatives on the next trial were a $50 gift card now and a $200 gift card in 7 days. The amount of the immediate reward decreased with each successive choice of the immediate reward. However, when the participant chose the larger later reward, the amount of the immediate reward increased by half of the previous immediate reward. For example, if the participant on the second trial chose to receive $200 gift card in 7 days over $50 gift card now, then the alternatives on the third trial were $75 gift card now ($50 +(50/2)=$75) and $200 in 7 days (see Appendix A figure 1.1). This adjustment of the amounts for the immediate rewards allowed for the calculation of the indifference point (i.e., subjective value of the delayed reward) for each delay. Indifference point

is the value at which the immediate reward is equal in attractiveness to the larger delayed reward. Estimation of the indifference points was replicated across each of the seven delays to arrive at an understanding of the individual's preference for reward over time (Madden & Johnson, 2010). The following hyperbolic function was used (Mazur 1987; Myerson & Green, 1995): $V = A/(1+kD)$. Here V represents the subjective value of a delayed reward, A indicates the amount of the delayed reward, D represents the length of the delay before A is received and k denotes a free parameter that denotes the degree of discounting (or the discounting rate) observed in the data path (i.e. steepness of the curve or how fast the value drops as a function of delay). Higher k values translate to higher degrees of discounting or impulsivity. However, as suggested by Myerson et.al. (2001), the area under the discounting curve (AUC) was considered as the index of delay discounting. The values of AUC ranged from 0 to 1, with smaller values indicating steeper discounting (tendency of delay discounting) and larger values indicating relatively less discounting (tendency to delay gratification). The figure below shows an example of AUC wherein the discounting of hypothetical groups (group A and group B) are depicted. As seen in the figure below, the area under the blue curve is much lower than the area under the orange curve. That is, the curve in blue shows steeper discounting than the curve indicated in orange. Even though the delay discounting task in the current research involved hypothetical rewards (and not real rewards), past research has shown that results obtained from hypothetical choices parallel decisions involving real rewards (Johnson & Bickel, 2002; Lagorio & Madden, 2005; Madden et al. 2003).

Figure C: Example of area under the curve



After finishing the delay discounting task, participants viewed a text wherein they were informed that the CFI and the feedback was only for experimental purposes and that there is no "sophisticated software" associated with the study. Further, the score does not reflect their grocery shopping/eating habits. Participants were then asked questions about their actual grocery purchase habits, frequency of dining out, importance of food intake, grocery shopping, physical fitness, and spending self-control. Next, participants were presented with an attention check question, wherein they were asked to answer "4 = Neither agree nor disagree", on a 7-point Likert scale. Lastly, participants were asked whether they had participated in a similar study before. Participants then received a randomly generated four-digit code and were asked to email the code to the research assistant. Participants were then thanked for their participation.

Results and Discussion

Manipulation checks

The manipulation was successful. The manipulation of relative food deprivation was examined by assessing the influence of CFI on participants' cognition, attention and affect. Analysis of the manipulation check using a 7- point Likert scale confirmed that participants in

both deprived (M= 5.26, SD= 1.194) and non-deprived (M=5.45, SD= 1.14) condition, considered CFI was a true, reliable and accurate measure of participants' food purchase and consumption. In other words, participants believed the fabricated cover story of CFI narrated in the study. Further, participants in the deprived condition correctly indicated that their food purchase was less than similar others (M=1.933, SD= 0.2537) and participants in the non-deprived (control) condition correctly indicated that their food purchase and consumption was greater than similar others (M= 1.00, SD= 0.00; t (59) = 20.48, p <0.01). In addition, based on the CFI received by the participants, measures of how satisfied and resentful participants were about their current level of grocery purchase/ consumption, their agreement with wanting more groceries and whether their current level of grocery consumption was deserved and fair in comparison to similar others were assessed as manipulation checks. Results showed a significant difference between participants in the deprived condition and non-deprived condition. Specifically, participants in the deprived condition (M= 3.58, SD= 0.93) reported lower satisfaction and higher resentment with their current level of grocery purchase/consumption, weaker agreement with the deservingness and fairness of the current level of grocery consumption in comparison to similar others and with wanting more groceries than participants in the non-deprived condition (M= 5.09, SD=0.48; t (59) = -7.99, p =0.00).

Delay discounting analysis

Further, delay discounting data for each of the two groups was also assessed. As hypothesized, participants who learned that they purchased fewer groceries than similar others had a smaller AUC on average (M= 0.40, SD= 0.172) than participants who learned that they purchased groceries in quantity comparable to similar others (M= 0.51, SD= 0.212), t(59)= -2.25 , $p<0.05$, $\eta^2 = 0.079$. That means, participants in the relatively deprived condition discounted the

delay more steeply that participants in the non-deprived condition (Appendix A figure 1.2). Further, frequency of dining out, importance of food intake, grocery shopping, physical fitness, and spending self-control were controlled for. Overall, participants in the deprived condition discounted the delay more steeply than participants in the non-deprived condition. That means RFD produces an increased preference for immediate smaller rewards at the expense of a larger delayed rewards.

Consistent with the hypothesis, study 1 shows that manipulating the independent variable in the model (RFD) produces changes in our proposed mediator (desire for smaller immediate rewards). In study 2, the hypothesis that desire for immediate smaller rewards produces a tendency of food over acquisition is tested.

CHAPTER V

STUDY 2 EFFECT OF DELAY DISCOUNTING AND DELAYED GRATIFICATION ON FOOD OVER-ACQUISITION

The primary goal of study 2 was to evaluate whether individual differences in delay discounting predict food over acquisition. Participants were first asked to complete a delay-discounting task similar to that in study 1 and then were asked to indicate their grocery purchases through a series of questions pertaining to food over-acquisition. Overall, the purpose of study 2 was to test the prediction that, participants who show tendency of delay discounting subsequently purchase more groceries.

Method

Participants

In total, responses from 70 working professionals were recruited from the Midwest region of the United States. Data from 2 participants was deleted since they did not complete the delay discounting task. Therefore, data analysis was conducted on responses from 68 participants (24 males, 44 females, mean age = 32 years).

Procedures and Measures

Participants were notified in the introduction of the study, that the study was about their preference for grocery shopping gift cards. Participants first completed the delay-discounting task as administered in study 1. Immediately after completing the task, participants answered questions pertaining to their grocery purchases. In addition, participants were then asked questions about their general grocery shopping behavior. Participants were also asked their level of hunger on a 7-point Likert scale with 1= not at all hungry and 7= very hungry. To measure the amount of groceries in the shopping cart and shopping basket, a pretest was conducted. In the pretest pictures (Appendix B) of a shopping cart and shopping basket with varying amounts of groceries were shown to participants. The purpose of the pretest was to calibrate the quantity of groceries in the shopping carts and shopping baskets. The pretest was conducted using paper and pencil with 30 undergraduate students in a large US University. Pictures of a shopping cart were printed on one side of the page, while pictures of a shopping basket were on the back side of the page. Specifically, participants were shown a picture of shopping cart/shopping basket completely full of groceries on the top right corner of the page. Participants were shown four pictures of a shopping cart/shopping basket with varying amounts of groceries starting from an empty cart to an approximately three-quarter full cart. Participants were asked to write down how full the shopping cart/shopping basket was. Given the purpose of the pretest to calibrate a scale for the amount of groceries in the shopping cart and shopping basket, mean percentages for each picture were calculated. The quantity of groceries was then translated on a 5-point scale, with 1 being “empty”, 2 being “quarter full”, 3 being “half full”, 4 being “three quarters full”, and 5 being “full” for both shopping cart and shopping basket.

In the main study, after participants completed the delay discounting task they were shown a picture of an empty shopping cart and an empty shopping basket, and were asked to choose any one of those, if they were to go grocery shopping. Based on participants' choice, participants were shown pictures of five shopping cart/shopping basket with varying amounts of groceries. The pictures were pretested to calibrate the responses. Participants then recorded the quantity of grocery they would purchase on a five-point Likert scale. Next, participants were asked to assume that if they were to be provided with $100 grocery shopping gift card, how much of the $100 would they spend on groceries. After responding to these three questions, participants were asked to assume that their most recent grocery purchase was that particular morning. Based on this assumption, participants answered the second set of questions, which were same as the first set. The purpose of asking the participants to assume their recent grocery shopping to be that morning was to assess whether participants who discount delays show tendency of acquiring excess food despite the assumption of grocery shopping that morning.

Overall, multiple behavioral measures were employed to capture food over-acquisition. Participants were not only asked to indicate the amount of groceries they would purchase but also asked questions pertaining to size of the shopping container (shopping cart and shopping basket) they would prefer, numerical amount (in US$) they would spend on groceries and, hypothetical questions pertaining to a receipt of a $100 grocery shopping gift card and their most recent grocery shopping.

Results and Discussion

The following results section is divided into two parts: before participants' assumption of grocery shopping in the (that) morning and after participants' assumption of grocery shopping in the (that) morning. This assumption allowed to examine food over-acquisition tendency between

people preferring a delayed but larger valued grocery gift card versus immediate but smaller valued grocery gift card. The results were consistent between both these assumptions, such that people who showed a tendency to prefer larger valued but delayed grocery gift cards preferred a shopping basket (over a shopping cart), purchased fewer groceries, and spent less on groceries compared to people who preferred smaller valued but immediate grocery gift cards. Thus, preference for grocery gift card of lower value that was immediately available over grocery gift card of larger value but available later translated into over-acquisition of groceries. The results of this study consistently show that the AUC predicts participants' preference for shopping cart vs. shopping basket, quantities of groceries purchased, and the dollar amount spent on groceries. The section below provides a more detailed analysis of the effect of AUC on the quantities of groceries purchased. Further, towards the end of the section, analysis of preference for shopping cart (or shopping basket) on the quantity of groceries purchased and dollar amount spent on groceries is also demonstrated. The results show that preference for shopping cart (or shopping basket) has a significant effect on the quantity of groceries purchased and the dollar amount spent on groceries, under both conditions, before the morning shopping assumption and after morning shopping assumption. The section below provides more detailed results.

Before the morning shopping assumption

Shopping cart versus shopping basket. In total, 45.59% participants showed preference for a shopping cart while 54.41% participants showed preference for a shopping basket. Regression analysis including gender, age, marital status, number of persons in the household (including the participant), average annual income of the household, average monthly spending on groceries, education and AUC showed only a significant relation between AUC and preference for a shopping cart or shopping basket. The results of the regression indicated that

AUC explained 74% variance (R square = 0.74, F (9,58) = 18.384, p<0.01) in participants' choice of shopping basket or shopping cart. As predicted, AUC significantly predicted preference for shopping cart or shopping basket, such that a greater willingness to delay gratification related to preference for shopping basket.

The chart (appendix B figure 2.1) shows subjective values (US dollars) of the delayed reward (grocery gift card) by whether participants preferred a shopping cart or a shopping basket. The curved lines represent the group hyperboloid discounting function. The curved lines are plotted based on the indifference points calculated for each delay. The chart shows that participants who showed a tendency of delayed gratification chose a shopping basket over a shopping cart. Analyzed in a different way, logistic regression analysis showed that AUC significantly predicted the odds of participants' choosing a shopping basket (2) or shopping cart (1), B = 8.487, Wald = 25.363, p < .01, odds ratio (OR) = 4851.212. The value of Negelkerke R square was 0.780. Notably, hunger did not have any significant effect on the preference for shopping cart or shopping basket (appendix B figure 2.2). The finding suggests that hungry shoppers feel the urge or immediacy to buy more. However, this urge need not translate into purchasing more groceries.

Quantity of grocery purchased. Analysis was performed by using ANOVA. Results showed a significant between subjects' effect of temporal discounting and the quantity of groceries purchased. This effect was observed for groceries purchases both before and after morning shopping assumption. Participants who showed a preference for smaller valued immediately available grocery gift cards purchased significantly more quantity of groceries then participants who showed preference for larger valued grocery gift cards available after a delay (M_{sir} = 4.15> M_{llr} = 2.21 , F(1,66) = 75.737, p<0.01) (refer appendix B figure 2.3).

Participants on an average indicated purchase of up to 50% full of shopping cart/shopping basket of groceries. Quantity of groceries purchased was measured on a 5-point Likert scale with 1 being empty cart/ basket and 5 being completely filled cart/basket. The scale point of 1 corresponded to an empty shopping cart/ shopping basket, while scale point of 5 corresponded with a full shopping cart/shopping basket. While, scale point of 2, point 3, and point 4 indicated that the shopping carts/shopping baskets were filled with 25%, 50% and 75% groceries respectively. On a scale of 1 to 5, participants on an average indicated 3.18 quantity of groceries. For the purpose of analysis, participants with scores less than 3.18 were coded as 1, while those with scores greater than 3.18 were coded as 2. Logistic regression analysis predicted the odds of participants' purchasing more than average quantity of groceries (2) or purchasing.

Analysis was also conducted by performing a median split on the quantity of groceries purchased. With median = 3, participants with scores less than 3 were coded as 1, while those with scores greater than 3 were coded as 2. Logistic regression analysis predicted the odds of participants' purchasing more than the average quantity of groceries (2) or purchasing less than average groceries (1), B = -8.343, Wald = 24.442, $p < .00$, odds ratio (OR) = .015, such that willingness to delay gratification was related to purchase less than average quantity of groceries. The value of Negelkerke R square was 0.771, indicating a good predictive power.

Regression analysis was employed to assess how well the hyperboloid discounting function (AUC) predicted the quantity of groceries purchased. Regression analysis including gender, age, marital status, number of persons in the household (including the participant), average annual income of the household, average monthly spending on groceries, education and AUC showed only a significant relation between AUC and quantity of groceries purchased. Results showed that AUC explained 71.2% variance (R square = 0.71, F (8,59) = 18.233,

$p<0.01$) in the quantity of groceries purchased by the participants. The AUC significantly predicted quantity of groceries purchased, such that as AUC increased, the total quantity of groceries purchased decreased. In other words, a greater willingness to delay gratification (higher AUC) indicated purchase of less groceries. More specifically, people's' tendency to prefer larger later grocery gift cards (rewards) translates into purchase of fewer groceries.

The charts (appendix B figure 2.4) show subjective values (US dollars) of the delayed reward (grocery gift card) by the quantity of groceries purchased. The curved lines represent the group best-fit hyperboloid discounting function. The curved lines are plotted based on the indifference points calculated for each delay. Notably, hunger did not predict the amount of groceries purchased by the participants ($p>0.05$). This is important, since it counters the popular notion of people buying more groceries when hungry.

Amount of dollars spent on groceries. ANOVA was used for analysis. Results showed a significant between subjects' effect of temporal discounting on the dollar amount spent on groceries. This effect was observed for groceries purchases both before and after morning shopping assumption. Participants who showed a preference for smaller valued immediately available grocery gift cards spent significantly more dollar amount then participants who showed preference for larger valued grocery gift cards that were available after a delay (M_{sim} = \$77.94> M_{llr} = \$34.59 , $F(1,65) = 52.707$, $p<0.01$).

Participants on an average spent \$55.94 dollars on groceries. For the purpose of analysis, participants who spent less than \$55.94 were coded as 1, and participants who spent more than \$55.94 were coded was 2. It was hypothesized that participants who show a tendency of delayed gratification may spend less than \$55.94. Logistic regression analysis predicted the odds of

participants' spending more than an average dollar amount on groceries (2) or spending less than average dollar amount on groceries (1), B = -6.353, Wald = 24.673, p< .00 1, odds ratio (OR) = .002. The value of Negelkerke R square was 0.645. Results showed that the AUC predicted participants spending on groceries, such that, participants who should a tendency of delayed gratification (larger valued grocery gift card after a delay) spent less than the average amount ($55.94) on grocery purchases. This tendency is depicted in the below shown hyperboloid discounting curves.

Analysis was also conducted by performing a median split on the quantity of groceries purchased. With median = 45, participants with scores less than 45 were coded as 1, while those with scores greater than 45 were coded as 2. Logistic regression analysis predicted the odds of participants' spending more than an median dollar amount on groceries (2) or spending less than median dollar amount on groceries (1), B = -5.577, Wald = 23.043, p< .00, odds ratio (OR) = .000. The value of Negelkerke R square was 0.567. Results showed that the AUC predicted participants spending on groceries, such that, participants who should a tendency of delayed gratification (who preferred larger valued grocery gift card after a delay) spent less than the median amount ($45) on grocery purchases.

Regression analysis including gender, age, marital status, number of persons in the household (including the participant), average annual income of the household, average monthly spending on groceries, education and AUC showed a significant relation of AUC and education on the dollar amount spent on groceries. Research has found that people belonging to lower income and less educated groups discount delayed rewards more steeply than higher income and more educated groups (de Wit et al. 2007; Green et al.1996; Kirby et al. 2002; Reimers et al. 2009). Regression analysis showed that AUC predicts the dollar amount spent on groceries

(appendix B figure 2.5). Results showed that AUC explained 66.2% variance (R square = 0.662, F (1,65) = 14.202, p<0.01) in the dollar amount spent on groceries. The AUC significantly predicted the dollar amount spent on groceries, such that as AUC increased, the dollar amount spent on groceries decreased. In other words, when people show a tendency of delayed gratification, they spend less (than average) on groceries. Notably, again hunger did not have any effect on the dollar amount spent on groceries.

After morning shopping assumption

Shopping cart versus shopping basket. In total, 44.1% participants showed preference for a shopping cart while 55.9% participants showed preference for a shopping basket. Regression analysis including gender, age, marital status, number of persons in the household (including the participant), average annual income of the household, average monthly spending on groceries, education and AUC showed only a significant relation between AUC and preference for a shopping cart or shopping basket. Regression analysis showed that AUC explained 75.9% variance (R square = 0.759, F (8,59) = 23.289, p<0.01) in participants' choice of shopping basket or shopping cart. The AUC significantly predicted preference for shopping cart or shopping basket, such that a greater willingness to delay gratification related to preference for a shopping basket. Analyzed in a different way, logistic regression analysis showed that AUC significantly predicted the odds of participants' choosing a shopping basket (2) over a shopping cart (1), B = 9.640, Wald = 22.181, p < .01, odds ratio (OR) = 15364.953**.** The value of Negelkerke R square was 0.825, indicating a good predictive power. Yet again, hunger did not have any significant effect on the preference for shopping cart or shopping basket.

The charts (appendix B figure 2.6), show subjective values (in US dollars) of the delayed reward (grocery gift card) by whether participants preferred a shopping cart or a shopping basket after assuming that they had done grocery shopping that morning. The curved lines represent the group best-fit hyperboloid discounting function. The curved lines are plotted based on the indifference points calculated for each delay. The chart shows that participants who showed a tendency of delayed gratification chose a shopping basket over a shopping cart.

Quantity of groceries. Analysis was performed by using ANOVA. Results showed a significant between subjects' effect of temporal discounting and the quantity of groceries purchased. Participants who showed a preference for smaller valued immediately available grocery gift cards purchased significantly more quantity of groceries then participants who showed preference for larger valued grocery gift cards available after a delay (M_{sir} = 4.15> M_{llr} = 2.15 , $F(1,66) = 58.644$, $p<0.01$).

Participants on an average indicated purchase of up to 50% full of shopping cart/shopping basket. Quantity of groceries purchased was measured on a 5-point Likert scale with 1 being empty cart/ basket and 5 being filled cart/basket. The scale points of 2,3,4 indicated 25%,50%,75% filled shopping cart or shopping basket respectively. On a scale of 1 to 5, participants on average indicated 3.14 quantity of groceries. For the purpose of the analysis, participants with scores less than 3.14 were coded as 1, while those with scores greater than 3.14 were coded as 2. Logistic regression analysis predicted the odds of participants' purchasing more than average groceries (2) or purchasing less than average groceries (1), B = -7.826, Wald = 23.703, p< .00, odds ratio (OR) = .000. The results showed that willingness to delay gratification was related to purchase of less than average quantity of groceries. The value of Negelkerke R square was 0.740, indicating a good predictive power.

Analysis was also conducted by performing a median split on the quantity of groceries purchased. With median = 3, participants with scores less than 3 were coded as 1, while those with scores greater than 3 were coded as 2. Logistic regression analysis predicted the odds of participants' purchasing more than average quantity of groceries (2) or purchasing less than average groceries (1), B = -7.826, Wald = 23.703, $p < .05$, odds ratio (OR) = .000, such that willingness to delay gratification was related to purchase less than the average quantity of groceries. The value of Negelkerke R square was 0.740, indicating a good predictive power.

Regression analysis was employed to assess how well the hyperboloid discounting function (AUC) predicted the quantity of groceries purchased. Regression analysis including gender, age, marital status, number of persons in the household (including the participant), average annual income of the household, average monthly spending on groceries, education and AUC showed that there is a significant effect of AUC (and number of persons in the household) on preference for the quantity of groceries. A separate regression analysis indicated that number of persons in the household did not predict the quantity of groceries purchased. Results showed that AUC explained 67.3% variance (R square = 0.673, $F(8,59) = 15.150$, $p<0.01$) in the quantity of groceries purchased by the participants. The AUC significantly predicted preference for shopping cart or shopping basket, such that for everyone unit of increase in the AUC, the total quantity of groceries purchased decreased by 1.643 units. In other words, a greater willingness to delay gratification (higher AUC) indicates purchase of fewer groceries. More specifically, people's' tendency to prefer larger, later grocery gift cards (rewards) translate into purchase of fewer groceries. Notably, hunger did not predict the amount of groceries purchased by the participants ($p>0.05$). This is important, since it counters the popular notion of consumers buying more groceries when hungry.

The charts (appendix B figure 2.7) show subjective values (US dollars) of the delayed reward (grocery gift card) by the amount of groceries the participants purchased. The curved lines represent the group best-fit hyperboloid discounting function. The curved lines are plotted based on the indifference points calculated for each delay.

Amount of dollars spent on groceries. Analysis was performed by using ANOVA. Results showed a significant between subjects' effect of temporal discounting on the dollar amount spent on groceries. Participants who showed a preference for smaller valued immediately available grocery gift cards spent significantly more dollar amount on groceries then participants who showed preference for larger valued grocery gift cards available after a delay (M_{sim} = \$82.26> M_{llr} = \$29.21, $F(1,65) = 105.521$, $p<0.01$).

Participants on average spent \$55.73 dollars on groceries. For the purpose of the analysis, participants who spent less than \$55.94 were coded as 1, and participants who spent more than \$55.94 were coded was 2. It was hypothesized that participants who show a tendency of delayed gratification may spend less than \$55.94. Results showed that the AUC predicted participants spending on groceries, such that, participants who should a tendency of delayed gratification (larger valued grocery gift card after a delay) spent less than the average amount (\$55.94) on grocery purchases. This tendency is depicted in the form of hyperboloid discounting curves.

Regression analysis showed that AUC predicts the dollar amount spent on groceries. Regression analysis including gender, age, marital status, number of persons in the household (including the participant), average annual income of the household, average monthly spending on groceries, education and AUC showed that there is a significant effect of AUC (and gender) on the dollar amount spent on groceries. A separate analysis of gender showed no significant

effect on the dollar amount spent on groceries. Results showed that AUC explained 78.4% variance (R square = 0.784, $F(8,59) = 26.783$, $p<0.01$) in the dollar amount spent on groceries. The AUC significantly predicted the dollar amount spent on groceries, such that for every one unit of increase in the AUC, the dollar amount spent on groceries decreased by 42.470 units. That means, as AUC increases, dollar amount spent on groceries decreases. In other words, when people show a tendency of delayed gratification, they spend less (than average) dollar amount on groceries when at a grocery store. Notably, hunger did not have any effect on the dollar amount spent on groceries. Analyzing it differently, logistic regression analysis predicted the odds of participants' spending more than an average dollar amount on groceries (2) or spending less than average dollar amount on groceries (1), B = -10.729, Wald = 21.905, p< .00, odds ratio (OR) = .000. The value of Negelkerke R square was 0.865 indicating a very good predictive power.

Analysis was also conducted by performing a median split on the quantity of groceries purchased. With median = 45, participants with scores less than 45 were coded as 1, while those with scores greater than 45 were coded as 2. Logistic regression analysis predicted the odds of participants' spending more than an median dollar amount on groceries (2) or spending less than median dollar amount on groceries (1), B = -8.458, Wald = 25.291, p< .00, odds ratio (OR) = .000. The value of Negelkerke R square was 0.773. Results showed that the AUC predicted participants spending on groceries, such that, participants who should a tendency of delayed gratification (who preferred larger valued grocery gift card after a delay) spent less than the median amount ($45) on grocery purchases. This tendency is depicted in the below shown hyperboloid discounting curves (appendix B figure 2.8).

Analysis of the effect of preference for shopping cart and shopping basket on quantity of groceries purchased and dollar amount spent on groceries

Before morning shopping assumption. Results of MANOVA showed that preference for shopping cart (M using the shopping cart = 4.40, SD = 0.855) and shopping basket (M using the shopping basket = 2.16, SD = 0.646) has a significant effect on the quantity of groceries purchased $F(1,65) = 148.863$, $p<0.01$, partial eta squared = 0.868. Further, this preference for shopping cart (M using the shopping cart = 86.40, SD = 17.98) and shopping basket (M using the shopping basket = 31.24, SD = 17.07) has a significant effect on the dollar amount spent on groceries $F(1,65) = 164.78$, $p<0.01$, partial eta squared = 0.717.

After morning shopping assumption. Results of MANOVA showed that preference for shopping cart (Mean using the shopping cart = 4.60, SD = 0.621) and shopping basket (Mean using the shopping basket = 2.00, SD = 0.743) has a significant effect on the quantity of groceries purchased $F(1,66) = 239.735$, $p<0.01$, partial eta squared = 0.784. Further, this preference for shopping cart (M using the shopping cart = 90.40, SD = 28.37) and shopping basket (M using the shopping basket = 31.24, SD = 17.07) has a significant effect on the dollar amount spent on groceries $F(1,66) = 320.505$, $p<0.01$, partial eta squared = 0.829. Overall, the results of study 3 provide support to the hypothesis that people who prefer immediate smaller rewards are more susceptible to food over acquisition.

CHAPTER VI

STUDY 3 EFFECT OF DELAY DISCOUNTING AND DELAYED GRATIFICATION ON FOOD OVER-ACQUISITION

Study 3 seeks to show that delay discounting predicts subsequent food over acquisition. To investigate the causal relationship between delay discounting and food over-acquisition, the manipulation of delay discounting and delayed gratification was adapted from Callan et al. (2011**)**. Participants read an article that was consciously aimed to convince them that either delay discounting "living in the moment" or delayed gratification "importance of patience" are beneficial. It was anticipated that participants who were momentarily convinced of the benefits of delay discounting "living in the moment" (vs. delay gratification) would show a higher tendency of food over-acquisition.

Method

Participants

In total, 94 participants (41 males, 53 females) participated in the study. Participants were working professionals, recruited from a behavioral lab at a large midwestern university in the United States. Of the 94 participants, 10 participants failed the attention check (5 females, 5 males) and one participant indicated prior participation in the study (1 male). Subtracting the attention check fails and participant's prior participation, data from 83 participants (48 females,

35 males, mean age=35.69) was analyzed. Participants were randomly assigned to either the delay discounting condition (n=39) or the delayed gratification condition (n=44).

Procedures and Measures

Participants were informed that the experimenters seek their opinion on multiple different topics, however given the time constraints they would read and respond to only one of the many different articles in the database. Delay discounting was manipulated by randomly assigning one of the two articles. One article discussed about importance of living in the moment and other article discussed about importance of patience. The number of words were approximately equal in both the articles. Participants were randomly assigned one of the two articles. The articles summarized the results of a real longitudinal study, which reported the long-term health benefits of delaying gratification or living in the moment. The contents of the article were adapted from Callan et al. (2011).

Once participants finished reading the articles, the manipulation was tested. Participants were asked to record how interesting, informative, and persuasive the article was on a 7-point Likert scale with 1 being strongly disagree and 7 being strongly agree. Further, an open-ended question was included wherein participants were asked to recall any of the specific benefits related to people's willingness to delay gratification (or live in the moment). Participants then answered how much they agreed (on a 7-point Likert scale) with the importance of living in the moment or importance of patience (Callan et al. 2011, p. 962, 973). Food over-acquisition was measured using the same measures as in study 2.

Results and Discussion

Manipulation checks

The manipulation was successful. Following Callan et al, (2011), the manipulation was checked by comparing the average rating to the midpoint of the scale (4 = neither agree nor disagree) separately by condition. With respect to the midpoint, participants on average showed agreement with the importance of patience (or importance of living in the moment) in both the delay of gratification ($M = 6.09$, $SD = 1.03$), $t(43) = 13.463$, $p < .001$), and the live in the moment ($M = 4.95$, $SD = 1.503$), $t(38) = 3.941$, $p < .001$). To assess whether participants in the importance of patience condition agreed more in delayed gratification than participants in "live in the moment condition" (hereafter referred as LITM condition), the manipulation check item in the "live in the moment" condition was reverse coded. It was found that participants in the delay of gratification condition ($M = 6.09$, $SD = 1.03$) agreed that "good things come to those who wait" to a greater extent than participants in the live in the moment condition ($M = 3.05$, $SD = 1.503$), $t (39) = -3.941$, $p < .001$).

Spending on groceries from the $100 grocery gift card

MANOVA was employed for analysis because the effect of temporal discounting was examined on two dependent variables (before the morning shopping assumption and after the morning shopping assumption). Results of MANOVA showed a significant effect of temporal discounting on the dollar amount spent on groceries. This effect was observed for both before $F (1,81) = 18.29$, $p<0.05$, $\eta^2 = 0.184$ and after assumption of grocery shopping that morning $F (1,81) = 7.080$, $p<0.05$, $\eta^2 = 0.080$. Participants in the delay discounting condition, on average, spent significantly more (M=$63.59) than participants in the delayed gratification condition

(M=$41.25) before the morning shopping assumption. Furthermore, these results were consistent even after participants were asked to assume that they had finished grocery shopping that morning. Specifically, participants in the delay discounting condition, on average, spent significantly more (M=$41.64) than participants in the delayed gratification condition (M=$25.14) before the morning shopping assumption. Overall, participants in the delay discounting condition, on average, spent significantly more (M=$52.61) than participants in the delayed gratification condition (M=$33.19).

Preference for shopping cart or shopping basket

Since the independent and the dependent variables were both categorical in nature, chi square test was employed. Results showed a significant association between temporal discounting and preference for shopping carts/shopping baskets for both, before (chi square = 4.224, df=1, p=0.04), and after the morning shopping assumption (chi square = 4.952, df=1, p=0.026). Considering the change in preference for shopping carts and shopping baskets, before and after morning shopping assumption, four combinations were examined (for example, before morning shopping assumption "shopping cart", after morning shopping assumption "shopping cart" coded as 1, shopping cart -shopping basket as 2, and so on). One-way ANOVA was employed for this analysis. Results showed a significant between subjects effect of temporal discounting on preference for shopping cart and shopping basket, F(1,81)=6.774, p=0.011.

Quantity of groceries purchased

Results of MANOVA showed a significant effect of temporal discounting on total quantity of groceries purchased before the morning shopping assumption F(1,81)= 18.290, $p<0.05$, $\eta^2 = 0.184$, and after the morning shopping assumption F(1,81) = 7.080, $p< 0.05$, ,

η^2=0.80. Participants in the delayed gratification condition (M=2.70), purchased significantly fewer groceries (M=3.51) before the morning grocery shopping assumption. These results were consistent even after participants were asked to assume that they had finished grocery shopping that morning. Participants in the delayed gratification condition (M=2.29), purchased significantly less groceries (M=2.74) than participants in the delay discounting condition. Overall, compared to participants in the delayed gratification condition (M=2.495), participants in the delay discounting condition purchased significantly more groceries (M=3.126).

Quantities of groceries were recorded on a 5-point scale, with 1 being "empty", 2 being "quarter full", 3 being "half full", 4 being "three quarters full", and 5 being "full" when either shopping cart or shopping basket was selected. Therefore, looking at the results differently, it can be inferred that participant in the delay discounting condition, on average, filled more than half (50%>) of their shopping cart or shopping basket. In contrast, participants in delayed gratification condition filled slightly less than quarter (<25%) of the shopping cart or shopping basket with groceries. Variables pertaining to, purchase of small quantities of groceries because of preference for fresh groceries, purchase of larger quantities of groceries to avoid frequent shopping trips, frequency of grocery shopping, preference for shopping cart or shopping basket, most recent grocery shopping, frequency of dining out, importance of food intake, physical fitness, grocery/food shopping, education, number of persons in the household, average annual income of the household, average monthly spending on groceries, marital status, self-control and spending self-control were controlled (Appendix D).

Drawing together, results of study 3 show that a causal path exists which connects delay discounting and delayed gratification to over-acquisition. Specifically, participants who were subjected to live in the moment condition acquired significantly more food than participants in

the delayed gratification condition did. Overall, in study 1, study 2, and study 3 examined the underlying psychological route to the problem of food over-acquisition. Study 4 introduces social norms as an intervention to mitigate this psychological route.

CHAPTER VII

STUDY 4 EFFECT OF SOCIAL NORMS ON THE RELATIONSHIP BETWEEN RFD AND FOOD OVER-ACQUISITION

The primary purpose of study 4 was to introduce an intervention in the form of social norms and examine its effect in reducing food over-acquisition. Study 4 examined the moderating effect of social norms (descriptive norms versus injunctive norms) on the relationship between RFD and delay discounting (and gratification) and its downstream effect on food over-acquisition. It was hypothesized that injunctive norm would mitigate the effect of RFD on individuals' tendency to prefer larger later rewards. On the other hand, descriptive norms will be relatively less effective than injunctive norms for people who experience high RFD. A pretest was conducted to examine manipulation of injunctive and descriptive norms. The pretest was then followed by a main study to examine the interaction of RFD and social norms on delay discounting (and gratification) and food over-acquisition. Overall, this study is consistent with the purpose of the thesis which pertains to not only identify the unique psychological route that leads to the problem of food over-acquisition but also offer solutions to address the problem.

Pretest

Participants in the pretest were informed of a cover story, that a leading grocery retailer had conducted a nationwide customer survey. Based on the results of the survey, the grocery retailer had developed different designs of posters. Further, participants were also informed that

the name of the retailer was concealed for technical reasons. The posters (Appendix F) are adapted from White and Simpson (2013). The posters were shown to the participants in a between-subjects design. Participants then answered manipulation check questions. The manipulation check questions assessed the effectiveness of both injunctive and descriptive norm.

Data was collected using Amazon Mechanical Turk. A total of 80 participants were recruited. Two participants failed attention check questions. Therefore, data from 78 participants was analyzed (males = 52, females =26, mean age = 38.22 years). Participants were informed that a certain retailer had conducted a nationwide research and had developed a poster. Participants were asked to examine the poster and answer few questions. One group of participants were randomly assigned to read an injunctive norm poster (n=35), while the second group of participants were randomly assigned to read a descriptive norm poster (n=43). Participants rated statements on a 7-point bipolar scale with 1 indicating an interpretation of an injunctive norm statement and 7 indicating an interpretation of a descriptive norm statement. More specifically, participant were asked to respond to "The poster provides information about:" The responses were "What fellow shoppers think I should do to reduce food waste" denoted as one, and "What fellow shoppers are doing to reduce food waste." was denoted as seven.

An independent samples t test was used to examine between group differences. Results showed a significant difference between the groups t (76) = -4.45, p=.00. Specifically, participants in the injunctive norm condition correctly interpreted the injunctive norm message (M= 3.80), and participants in the descriptive norm condition correctly interpreted the descriptive norm message (M=5.58). Further participants were asked to rate the poster on a 7-point Likert scale, based on professionalism and believability. Participants in both groups rated that the posters looked professional ($M_{injuctive\ norms}$ = 4.91, $M_{descriptive\ norms}$ = 5.44) and were believable

($M_{injuctive\ norms}$ = 5.11, $M_{descriptive\ norms}$ = 5.86). An independent samples t test was performed. Results showed that for professionalism there was no significant difference between the groups, t(77)= -1.750 , p=.084. For believability there was a significant difference between the groups, t(77)= -2.462 , p=.016. Here, the significant difference indicates that the group that was exposed to descriptive norm ($M_{descriptive\ norms}$ = 5.86), believed the norm significantly more than the group that was exposed to injunctive norm ($M_{injuctive\ norms}$ = 5.11). However, one-sample t-test shows that values were significantly more than 4 ($M_{professional}$ = 5.21, $M_{believable}$ = 5.53), indicating that the posters where professional and believable. A one sample t-test was employed with a test value of 4, to examine whether each of the groups found the posters professional and believable. Each of the groups found the poster to be professional t(77)= 7.930, p<.001 and believable t(77)= 9.804, p=.00. Overall, the manipulation of social norms was successful. The pretested posters were employed for the social norms manipulation in study 4 and study 5.

Method

Participants

A total of 468 participants were recruited using Amazon Mechanical Turk. Of these, 77 participants failed instructional attention check for relative food deprivation, 177 participants failed instructional attention checks for social norms, 20 participants failed attention check towards the end of the study, and 33 participants indicated prior participation in a similar study. Therefore, responses from 307 participants were eliminated from the analysis. Overall, data from 161 participants (males= 96, females=64, average age = 37.5 years) was analyzed. Six participants indicated that they had faced psychological conditions. Their data was retained in the analysis.

Procedure

The study was a 2(relative food deprivation: deprived vs. control) x 3(social norms: injunctive vs. descriptive vs. control) in a between subjects' design. Participants completed the personal relative food deprivation manipulation identical to study 1. Participants were then presented with the social norm manipulation. Participants were informed that a large retailer had conducted a nationwide study to understand consumers' grocery shopping behavior and had developed different posters that would be put up in grocery stores (refer Appendix G). According to the focus theory of normative conduct, a norm exerts stronger influence on behavior, when only one of the two types of norms (descriptive or injunctive) is salient in an individual's mind (Cialdini et al. 1990). Therefore, participants were randomly presented with one poster (descriptive or injunctive norm), or the participant were not be shown any poster (control condition). Participants then answered the measures of food acquisition similar to those in study 2 and study 3. Participants then answered questions about choosing an immediate smaller valued grocery gift card or a delayed larger valued grocery gift card. Specifically, participants had to make 11 hypothetical decisions, by choosing between a smaller valued gift certificates available after the session, using 11 values ($10, $20, $30, $40, $50, $60, $70, $80, $90, $100, and $110) or receiving a $120 gift certificate in six months. This procedure was adapted from study 2 of Bartels and Urminsky (2011). Participants were debriefed and then were asked to answer questions pertaining to their real-life grocery shopping behavior (control variables). Lastly, participants were thanked for their participation.

Results and Discussion

Manipulation checks

Manipulation check for relative deprivation was successful. There were 96 participants in the relative deprivation condition and 64 participants in the control condition. The manipulation of relative food deprivation was examined by assessing the influence of CFI on participants' cognition, attention and affect. Analysis of the manipulation check using a 7- point Likert scale (1 = strongly disagree, 7= strongly agree) confirmed that participants in both deprived (M= 4.61, SD= 1.50) and control (M=5.32, SD= 1.11) condition, considered CFI was a true, reliable and accurate measure of participants' food purchase and consumption. Alternatively, using a one sample t-test, with test value as 4, showed a mean of 4.90 and standard deviation of 1.40 such that t(158)=8.123, p=.000. In other words, participants believed the fabricated cover story of CFI narrated in the study. Further, participants in the deprived condition correctly indicated that their food purchase was less than similar others (M=2.00, SD= 0.00) and participants in the control condition correctly indicated that their food purchase and consumption was similar to others (M= 2.98, SD= .125; t (158) = -77.281, p =0.00). In addition, based on the CFI received by the participants, measures of how satisfied and resentful participants were about their current level of grocery purchase/ consumption, their agreement with wanting more groceries and whether their current level of grocery consumption was deserved and fair in comparison to similar others were assessed as manipulation checks. Results showed a significant difference between participants in the deprived condition and control condition. Specifically, participants in the relatively deprived condition (M= 3.76, SD= 0.914) reported lower satisfaction and higher resentment with their current level of grocery purchase/consumption, weaker agreement with the deservingness and fairness of the current level of grocery

consumption in comparison to similar others and with wanting more groceries than participants in the non-deprived condition (M= 3.43, SD= 1.01; t (158) = 2.129, p =.035). Further, participants were asked to indicate the meaning of CFI on a scale of 1 to 7, 1= I do not buy enough groceries, 7= I buy enough groceries. The manipulation check was successful such that there was significant difference between both groups. Participants in the relatively deprived condition reported that according to the CFI they do not purchase enough groceries (M=4.08, SD=1.89), while participants in the control condition reported that they purchase enough groceries (M= 5.88, SD= 1.03; t (158) = -6.923, p =0.00). Participants rated the extent to which they deserve more groceries. There was a significant difference between the two groups such that participants in the relatively deprived condition reported that they deserve more groceries (M= 4.58, SD= 1.73) while participants in the control condition reported that their current level of grocery purchases were well-deserved (M= 5.88, SD= .917; t (158) = -5.454, p =0.00). Overall, the manipulation of relative food deprivation was successful considering the influence of CFI on participants' cognition, attention and affect.

The manipulation for social norms was successful as well. Participants who were shown the descriptive norm poster showed more agreement with the descriptive norm ($M_{Descriptive}$ = 5.79 > $M_{Injunctive}$ = 4.54; t(94)= -3.452, p=.001) Further, both the posters were found to be believable ($M_{Descriptive}$ = 5.38; $M_{Injunctive}$ = 5.52; t(94)= .504, p=.615) and professional ($M_{Descriptive}$ = 5.12; $M_{Injunctive}$ = 5.24; t(94)= .488, p=.627), with no significant difference between the groups. In other words, both groups agreed that the poster was believable and professional.

Quantity of groceries purchased, and dollar amount spent on groceries

The measure of preference for larger later rewards was the number of deferred options (waiting 6 months for the gift certificate) chosen out of the 11 choice tasks, where choosing more deferred options indicated greater patience (Bartels & Urminsky 2011). Analysis of the proposed model using Hayes Process Macro model 7, showed that the model was not significant, as the effect of RFD on the values for shopping cart or shopping basket, quantity of groceries purchased, and dollar amount spent on groceries before and after morning shopping assumption were not significant. All p values were greater than .05. Further, the confidence interval values were on either side of zero. In other words, the signs of lower and upper confidence interval were different. However, social norms did show reduction in food acquisition. Specifically, social norms did not show an interaction effect with RFD to mitigate food over-acquisition. Rather, social norms interacted with participants' tendency to prefer smaller immediate rewards versus larger delayed rewards. Analysis using MANOVA showed an interaction effect of participants' preference for larger later rewards and social norms. A median split was performed on the participant's preference for larger later rewards. Participants who chose the larger later reward less than the median (median=5), were coded as 1 and were labelled as *lower preference for larger later rewards*, and participants who chose the larger later reward more than the median were coded as 2 and were labelled as having *higher preference for larger later rewards*.

Specifically, there was a significant interaction effect between participant's preference for larger later rewards and social norms on dollar amount spent on groceries after the morning shopping assumption ($F_{2,151}$= 3.290, p=.04, η^2 = 0.042) (Appendix H). Particularly, participants who showed lower tendency to prefer larger later rewards and who were randomly assigned to the injunctive norm condition spent significantly less dollar amount on groceries (M=$61.56,

SD= 26.74) compared to those who were randomly assigned to the descriptive norm condition (M=$72.29, SD= 24.18) and those who were randomly assigned to the control condition (M=$ 62.71, SD= 26.35) (Table 2). Importantly, it is noteworthy that the effect was reversed among participants who showed higher tendency to prefer larger later rewards (refer figure 5.1). Particularly, participants who showed higher tendency to prefer larger later rewards and who were randomly assigned to the injunctive norm condition spent significantly higher dollar amount on groceries (M=$86.04, SD= 98.88) compared to those who were randomly assigned to the descriptive norm condition (M=$48.82, SD= 25.95) and those who were randomly assigned to the control condition (M=$63.57, SD= 33.32). The results imply that the effect of injunctive norms would reverse among people who prefer larger later rewards such that people would spend more dollar amount on groceries, compared to absence of any social norm. Moreover, despite the participants assuming that they had finished their grocery shopping that particular morning, participants who preferred larger later rewards and were exposed to the injunctive norm condition spent a higher dollar amount on groceries. Overall, as shown by PROCESS model 7, social norms did not moderate the relationship between RFD and temporal discounting to reduce food over-acquisition as hypothesized. Instead, using MANOVA with social norms and temporal discounting as IV, it was found that social norms moderated the relationship between temporal discounting and food over-acquisition. Thus, this finding partially supported the hypothesis H3, such that social norms were effective in reducing food over-acquisition. However, they did not moderate the relationship between RFD and temporal discounting, rather social norms moderated the relationship between temporal discounting and food over-acquisition.

In addition, there was a marginally significant interaction effect between participant's preference for larger later rewards and social norms on the quantity of groceries purchased

before the morning shopping assumption ($F_{1,151}$= 3.332, p=.069, η^2 = 0.035). Specifically, participants who showed lower tendency to prefer larger later rewards and who were randomly assigned to the injunctive norm condition purchased significantly less quantity of groceries (M=3.34, SD=0.827) compared to those who were randomly assigned to the descriptive norm condition (M=3.58, SD=0.717) and those who were randomly assigned to the control condition (M=3.57, SD=0.917). This finding supports the hypothesis H4. Again, similar to results of spending on grocery shopping after the morning shopping assumption, the effect was flipped among participants who showed higher tendency to prefer larger later rewards (refer figure F1). Specifically, participants who showed higher tendency to prefer larger later rewards and who were randomly assigned to the injunctive norm condition purchased significantly more quantity of groceries (M=3.71, SD=0.845) compared to those who were randomly assigned to the descriptive norm condition (M=3.29, SD=0.920) and those who were randomly assigned to the control condition (M=3.25, SD=0.844).Overall, this finding supports the hypothesis H4 which states that injunctive norms will be more effective among people who prefer smaller immediate rewards, thereby reducing food over-acquisition.

There was no significant interaction between participant's preference for larger later rewards and social norms on dollar amount spent on groceries before morning shopping assumption and quantity of groceries purchased after morning shopping assumption. Further, the direct effect of personal relative food deprivation was not significant F (1,154) =0.058, p>.05.

Preference for shopping cart or shopping basket

Since the independent and the dependent variables were both categorical in nature, chi square test was employed. Specifically, a split file function was used wherein the data was split based on the social norm manipulation. Then, a crosstabs function in SPSS was used wherein participants' preference for larger later rewards was tabulated as a row and participants' preference for a shopping cart or shopping basket before morning shopping assumption and after morning shopping assumption formed columns. Results showed a significant association between temporal discounting and preference for shopping carts/shopping baskets for before (chi square = 4.379, df=1, p=0.036), but for after the morning shopping assumption (chi square = .655, df=1, p= 0.418), only for those participants who were randomly assigned to the injunctive norm manipulation (Table 3). That means, injunctive norm manipulation was effective such that participants who preferred larger later rewards and those who preferred smaller immediate rewards showed a differential effect on preference for shopping cart and shopping basket before as well as after morning shopping assumption. Participants in the descriptive norm and control groups did not show any significant association between temporal discounting and preference for shopping carts/shopping baskets for before as well as after morning shopping assumption. The following variables were used as covariates: education, weight, preference for fresh groceries, preference for avoidance of shopping trips, preference for shopping cart or shopping basket, grocery purchasing tendency in reality, extent of hunger, recency of grocery shopping, importance of food intake, physical fitness, grocery shopping, and frequency of dining out (Please refer Appendix I).

Overall, study 4 showed that social norms are effective in mitigating food over-acquisition. However, the results of study 4 did not support H3 as social norms did not interact

with personal relative food deprivation to mitigate food over-acquisition. However, it was found that social norms moderated the relationship between temporal discounting and food-acquisition to mitigate food over-acquisition. It should be noted that, study 4 assumes that the social norms will be effective uniformly across stores, irrespective of whether the store has higher or lower store reputation. In other words, while study 4 shows the moderating effect of social norms, it does not explain whether the effectiveness of social norms will differ based on the overall reputation of the store. However, as per the focus theory of normative conduct (explained earlier), social norms have differential effect on behaviors contingent on different situations (Cialdini, Reno, and Kallgren 1990). It is, therefore, likely that customers would process the social norm differently, when the norm is situated at a grocery store that has a high reputation as opposed to a low reputation. This conjecture is tested in study 5 wherein the effect of store reputation on food acquisition is assessed in conjunction with social norms and feelings of relative food deprivation.

CHAPTER VIII

STUDY 5 EFFECT OF SOCIAL NORMS AND STORE REPUTATION ON THE RELATIONSHIP BETWEEN RFD AND FOOD OVER-ACQUISITION

The primary purpose of study 5 is to examine the effectiveness of social norms intervention considering the reputation of the store in which the social norm would be situated. Specifically, study 5 tests H4 which suggests that store reputation moderates the moderating effect of social norm on the relationship between RFD and food over-acquisition.

Method

Participants

Data was collected from 300 participants using Amazon Mechanical Turk. Of these, nine participants failed attention check towards the end of the study, 97 participants indicated prior participation in a similar study, responses of 3 participants showed error in the format of the data and 6 participants could not qualify due to age restriction. Therefore, responses from 115 participants were eliminated from the analysis. Data from 185 participants (males= 119, females= 66, average age = 36.76 years) was analyzed. Ten participants indicated that they had faced psychological conditions. Their data was retained in the analysis.

Procedure

The study was a 2 (relative food deprivation: deprived vs. control) x 2 (social norms: injunctive vs. descriptive vs. control) x 2(Store reputation: low versus high) between subjects' design. Participants completed the personal relative food deprivation manipulation identical to study 1. Participants were then presented with the social norms and store reputation manipulation. First participants were asked an open-ended question about the characteristics of a grocery retailer that was either upmarket or ordinary, depending on the condition they would be randomly assigned. For instance, participants who were randomly assigned to a lower store reputation condition answered, "According to you, what are some of the characteristics of a grocery store that is quite ordinary, common, and low-end?" Participants who were randomly assigned to a higher store reputation condition answered, "According to you, what are some of the characteristics of a grocery store that is quite upmarket, prestigious, and high-end?" After participants answered the open-ended question, they were asked to read a scenario wherein they had to imagine shopping at a grocery store which was either low-end or high-end and wherein a poster was displayed (Appendix J). Specifically, participants in the high store reputation read, "Imagine that you go grocery shopping at a grocery store. Considering the products, services, location, and people shopping at the store, the grocery store is widely known to be quite upmarket, prestigious, and high-end. As you enter the grocery store, you observe a poster. Please click next to view the poster. Please read the poster carefully and answer the questions that follow." Participants then viewed a poster which formed the manipulation for a descriptive or an injunctive norm. The posters were same as those used in study 4. Participants then answered the measures of food acquisition similar to those in study 2 study 3. Participants then responded to questions about choosing an immediate smaller valued grocery gift card or a delayed larger

valued grocery gift card similar to that in study 4 (Bartels and Urminsky 2011). Participants were then debriefed and were asked to answer questions pertaining to their real-life grocery shopping behavior (control variables). Lastly, participants were thanked for their participation.

Results and Discussion

Manipulation checks

Manipulation check for relative deprivation was successful. There were 108 participants in the relative deprivation condition and 77 participants in the control condition. Participants were asked to indicate the sufficiency of their grocery purchases based on the CFI, on a 7-point Likert scale, 1= I do not buy enough groceries, 7= I buy enough groceries. The manipulation check was successful such that there was significant difference between both groups. Participants in the relatively deprived condition reported that according to the CFI they do not purchase enough groceries (M=4.44, SD=1.737), while participants in the control condition reported that they purchase enough groceries (M= 5.88, SD= 0.952; t (183) = -5.64, p =.00). Participants rated the extent to which they deserve more groceries. Specifically, on a scale of 1 to 7, 1= I deserve more groceries, 7= My current level of groceries is well deserved," participants were asked to indicate the extent to which they deserve more groceries based on the CFI. There was a significant difference between the two groups. Participants in the relatively deprived condition reported that they deserved more groceries (M= 4.81, SD= 1.463) while participants in the control condition reported that their current level of grocery purchases were well-deserved (M= 5.74, SD= .951; t (158) = -4.913, p =0.00). Overall, the manipulation of relative food deprivation was successful.

The manipulation of relative food deprivation was examined by assessing the influence of CFI on participants' cognition, attention and affect. Analysis of the manipulation check using a 7- point Likert scale (1 = strongly disagree, 7= strongly agree) confirmed that participants in both deprived (M= 5.16, SD= 1.23) and control (M=5.41, SD= 0.925) condition, considered CFI was a true, reliable and accurate measure of participants' food purchase and consumption. Alternatively, using a one sample t-test, with test value as 4, showed a mean of 5.27 and standard deviation of 1.12 such that t(184)= 15.40, p=.000. In other words, participants believed the fabricated cover story of CFI narrated in the study. The manipulation for social norms was successful as well. Participants who were shown the descriptive norm poster showed more agreement with the descriptive norm ($M_{Descriptive} = 5.62 > M_{Injunctive} = 5.04$; t(183)= -2.483, p=.014) Further, both the posters were found to be believable ($M_{Descriptive} = 5.65$; $M_{Injunctive} = 5.83$; t(183)= 1.131, p=.260) and professional ($M_{Descriptive} = 5.57$; $M_{Injunctive} = 5.61$; t(183)= .263, p=.793), with no significant difference between the groups. In other words, both groups agreed that the poster was believable and professional.

The manipulation check for store reputation was successful as well. Participants in the lower store reputation group indicated that the store is prestigious ($M_{low} = 5.24 < M_{high} = 5.80$; t(183)= -3.620, p=.010); upmarket ($M_{low} = 5.09 < M_{high} = 5.76$; t(183)= -3.066, p=.003); and upscale ($M_{low} = 4.95 < M_{high} = 5.76$; t(183)= -3.647, p=.000). When asked about favorable view of the store, did not show any significant difference between the groups. Overall, the manipulation of perceived relative deprivation, social norms, and store reputation were successful.

Quantity of groceries purchased, and dollar amount spent on groceries

The measure of preference for larger later rewards was the number of deferred options (waiting 6 months for the gift certificate) chosen out of the 11 choice tasks, where choosing more deferred options indicated greater patience (Bartels & Urminsky 2011). A median split was performed on the participant's preference for larger later rewards. Participants who chose the larger later reward less than the median (median=5), were coded as 1 and were labelled as lower preference for larger later rewards, whereas participants who chose the larger later reward more than the median were coded as 2, and were labelled as having higher preference for larger later rewards. Hereafter, the following suffixes are used to express the specific means: (P= relatively deprived condition, C= control condition; H=high store reputation, L= low store reputation; I= Injunctive norm, D= Descriptive norm). Considering these notations, M_{PHI} indicates the mean of participants in the relatively deprived condition who viewed an injunctive norm poster at store which had higher store reputation.

The Hayes PROCESS Macro model 19 was employed to examine the moderating effect of store reputation and social norms on participants' likelihood of food over-acquisition. Results showed a significant three-way interaction effect of RFD, social norms, and store reputation on quantity of food purchased after the morning shopping assumption (b=1.3675, t=2.4657, p=.014, η^2=.035) (Table 4). Specifically, results showed that when participants in the relatively food deprived condition viewed a descriptive norm poster at a high-end grocery store purchased significantly fewer groceries than those who viewed the injunctive norm poster at a high-end grocery store (M_{PHD} = 3.22 <M_{PHI} =3.82) (Appendix K). In other words, a descriptive norm versus an injunctive norm will be more effective in mitigating food over-acquisition at a high-end grocery store among people who feel relative deprivation. This effect was partially flipped

among participants in the control condition such that M_{CHI} = 3.23 <M_{CHD} =3.81 (p=.053). Specifically, participants who did not feel relative food deprivation, reduced food over-acquisition when they viewed an injunctive norm at a reputed grocery store. Such three-way interaction effect was not observed for quantity of groceries before the morning shopping assumption, dollar amount spent on groceries before and after morning shopping assumption. In addition, there was a significant interaction effect of store reputation and social norms on the quantity of groceries purchased after morning shopping assumption (b=-1.118, t= -1.996, p=.0475). Next, the interaction between participants' preference for larger later rewards, social norms, and store reputation on the dependent variables, was analyzed using Hayes Process Macro model 2. There was a significant interaction effect of participants' preference for larger later rewards and store reputation (b= -29.94, t=-2.011, p=.0459) on dollar amount spent on groceries. Specifically, participants who preferred larger later rewards spent more dollar amount on groceries before morning shopping assumption when the store reputation was low (M=$87.50>M=$67.35); however, when the store reputation was high, participants who preferred larger later rewards spent less dollar amount on groceries (M= 73.62<M =82.64). Further, results showed a significant interaction effect between participants' preference for larger later rewards and perceived store reputation (b= -.5431, t=-2.0, p=.047), such that participants who preferred larger later rewards purchased more groceries after morning shopping assumption when the store reputation was low (M_{low} =3.41>M_{high}= 3.31); however, participants who preferred smaller immediate rewards purchased more groceries (after morning shopping assumption) when the store reputation was high (M_{high} =3.73>M_{low}= 3.30).

Preference for shopping cart or shopping basket

Analysis of the proposed model using Hayes Process Macro model 19, showed that the model was not significant, as the values for shopping cart or shopping basket, quantity of groceries purchased and dollar amount spent on groceries before and after morning shopping assumption were not significant. All p values were greater than .05. Further, the confidence interval values were on either side of zero. In other words, the signs of lower and upper confidence interval were different.

The following variables were used as covariates: education, weight, preference for fresh groceries, preference for avoidance of shopping trips, preference for shopping cart or shopping basket, grocery purchasing tendency in reality, extent of hunger, recency of grocery shopping, importance of food intake, physical fitness, grocery shopping, frequency of dining out, and self-control. Results showed that only number of persons in a household had a significant effect on participants' preference for larger later rewards (b= -.6819, t= -2.38, p=.0183) and participants, preference for purchasing more groceries by saving shopping trips had a significant effect on the quantity of groceries purchased after the morning shopping assumption, (b= 0.2153, t= -3.1729, p=.0018).

Overall, results of study 5 partially support H5. Specifically, results show that the effectiveness of social norms in mitigating food over-acquisition is contingent upon the reputation of the store at which the social norms is displayed. A descriptive norm (versus an injunctive norm) is more effective in mitigating food over-acquisition at a grocery store that has a high reputation, among people who feel relative deprivation. However, among people who do

not feel relative deprivation, an injunctive is more effective in mitigating food over-acquisition at a store that has high reputation.

CHAPTER IX

DISCUSSION, IMPLICATIONS AND CONCLUSION

Current thesis examines personal relative deprivation in the context of food and shows its effect on food over acquisition. Across five studies, results show that participants who experienced RFD demonstrated a higher tendency to prefer smaller immediate rewards over larger later rewards, and this tendency translated into food over-acquisition. Specifically, study 1 showed that a manipulation of RFD increased participants' preferences for smaller-immediate versus larger-later rewards. The next two studies showed that a lower willingness to delay gratification – which was measured and via the delay discounting task (study 2) and via experimental manipulation (study 3) was associated with a tendency of food over-acquisition. Study 4 introduced an intervention of social norms weakening the effect of temporal discounting on food over-acquisition. In study 5, social norms were situated in the context of store reputation. Results showed that the descriptive norms are more effective in mitigating food over-acquisition among people who experience RFD (then injunctive norms) when displayed at stores that had high reputation.

Theoretical Contribution

To determine the effectiveness of marketing interventions to reduce food over-acquisition, it is pivotal to understand who is susceptible to food over-acquisition and where

would the marketing intervention be most effective. Situational and/or contextual factors are important in understanding behaviors that affect food waste (Filipová et al. 2017). Specifically, it is important to understand the psychological mechanism that triggers food over-acquisition among people who are more prone to acquire food in excess. The current dissertation shows that people who feel relatively food deprived show a tendency to prefer smaller immediate rewards, and this tendency translates into them acquiring food in excess. Further, current research also examines the effectiveness of social norms in the context of grocery shopping and thereby contributes to the literature on marketing interventions such as prompts. Prompts are messages in an audio or visual medium designed to remind people to perform a certain behavior (Stöcklii et al. 2018). Extent research on prompts as a form of an intervention, has shown that prompts are effective in reducing food waste, however, there is insufficient explanation of its underlying psychological mechanism (Kallbekken & Sælen, 2013; Stöcklii et al. 2013; Whitehair et al. 2013). The current dissertation responds to call for research pertaining to the underlying psychological mechanism. As evidenced in study 4, social norms interact with temporal discounting to impact food acquisition behaviors. Specifically, descriptive norms and injunctive norms have a differential impact on consumers' tendency to prefer smaller immediate versus larger later rewards. This finding extends research on prompts which suggests that prompts are effective when they call for a behavior that is easy to execute on repeated occasions and when they are situated where the target behavior occurs. The current research shows that in the context of grocery shopping, the display of injunctive or descriptive norms at the point of purchase is effective in reducing food acquisition behaviors.

Food over-acquisition is measured in three distinct ways. Specifically, consumers' preference for a shopping cart or a shopping basket, quantity of groceries purchased in the

shopping cart or shopping basket, and the dollar amount spent on groceries. Further, participants were also asked to assume that their grocery shopping was already done that particular morning and were asked how much groceries would they still purchase. This performed a unique form of measuring food over-acquisition. To that end, this dissertation provides an alternative way to measure consumers' tendency of food over-acquisition.

Implications to marketing managers and public policy makers

Findings of this thesis have strong implications to marketing managers in terms of store positioning and marketing communications. Marketers could utilize the findings of study 5, in designing interventions specific to their store. In other words, the interaction effect of social norms and store reputation could help marketers in positioning the store and using the social norm interventions accordingly. Since, social norm interventions highlight the greater good that the store is trying to achieve, consumers may perceive the store more favorably which could translate into a more loyal and committed relationship between the consumers and the store.

Marketers could frame their marketing communication messages in tune with their store reputation. According to results of study 5, people who feel relative deprivation followed a descriptive norm compared to injunctive norm, when it was suggested to be displayed at a highly reputed store. Grocery stores that are rated as highly reputed could utilize this finding in developing marketing messages at the store. It is worth noting that store reputation is more specific in nature, such the marketing communication need not apply to all the stores of a retail chain. Rather a specific retail store at a specific location, could use the findings of study 4 and study 5, to design and execute marketing interventions at that particular store.

From public policy perspective, current thesis informs policy makers in develop food literacy initiatives with enhanced precision. This dissertation attempts to respond to call for research on food waste, food marketing and food literacy, on how firms can promote food well-being through marketing efforts and how consumers could be empowered through food literacy (Scott & Vellen 2019; Stöcklii et al. 2018). Food literacy goes beyond nutritional information of foods,and constitutes the ability to process information to make informed food choices that foster individuals and the society (Block et al. 2011). Current research could motivate policy makers to regulate consumer purchases with an intent to prevent food over-acquisition in the short as well as in the long term. Research also suggests that a pivotal challenge facing food policymakers is that, one-size-fits-all policy solutions are relatively less effective than targeted actions, considering the contrasting responses of different population segments to different initiatives (Berry et al. 2019; Pham & Mandel, 2019; Scott & Vellen, 2019). This dissertation complements past research, by demonstrating how people who feel relative deprivation respond to marketing interventions differentially compared to people who do not experience relative deprivation.

Results of this thesis will provide marketing managers and public policy makers pointers towards designing interventions through which consumers can make responsible food purchase decisions. For instance, store managers may design merchandise with specific social norms in those aisles wherein the likelihood of one-time bulk purchase of items are higher. Further the design of the message could be in tune with the reputation of the store. Companies may also use the results of this thesis to design their packaging considering the size of the packaging and volume of the content in the packaging to manage over-acquisition of groceries by consumers. Public policy makers may gain more precision in message framing in their campaigns. Further, the current thesis puts forth the psychological mechanism that triggers food over-acquisition.

Public policy makers could highlight these triggers in their promotional campaigns to build consciousness and a sense of responsibility among people towards grocery shopping.

Limitations and Future Research

The current research has some limitations which could be addressed in future research. For instance, the current thesis proposes to examine the effectiveness of social norms in lab settings. However, a field study could be conducted to gain a more generalizable understanding of the effect of social norms on food over-acquisition. The present research was focused on understanding food over-acquisition in grocery retail. However, food over-acquisition in the context of restaurants was beyond the scope of this research. Future research could investigate food over-acquisition in restaurant settings. The current research was conducted in a developed country such as the United States. Similar studies could be conducted in developing countries to understand the triggers of over-acquisition and the effectiveness of social norms. For instance, in developing countries, injunctive norms may be less effective than descriptive norm because consumers may not comply with suggestions of other consumers as they may compete with other consumers to get a seemingly limited resource.

Another interesting avenue of future research stems from the measurement of food over-acquisition considering consumers' preference for shopping carts or shopping baskets. Future research could investigate the effectiveness of marketing communication on shopping carts or shopping baskets. A study by Payne et al. (2015) could provide an interesting starting point to proceed in this direction. Further, the focus of the current research was on the quantity of groceries purchased in totality. That is, over-acquisition of healthy foods and unhealthy foods was out of the scope of current research. Future research could examine over-acquisition considering feelings of relative deprivation on over-acquisition of healthy and unhealthy foods.

Specifically, it would be interesting to determine, whether people who feel relative deprivation would favor quantity or quality or both to compensate for the feelings of relative deprivation. Further, although the current research was specific to the context of food, the underlying psychological mechanism could be examined in other contexts such as fashion, wherein the likelihood of over-acquisition is higher. For instance, consumers may feel relatively deprived when viewing other fashionable shoppers, models on a merchandise or promotional materials. Overall, future work examining food over-acquisition may serve the interest of not only consumers but also marketers and policy makers.

Summary and Conclusion

Connecting back to the research questions of this thesis, the current dissertation responds with the following results. *Who is more likely to over-acquire food?* People who feel relative food deprivation are more likely to over-acquire food. *Why do they show food over-acquisition?* Because, people who feel relative deprivation show an increased preference for smaller immediate rewards in lieu of larger later rewards. This tendency then translates into food over-acquisition. *Which interventions would be effective in mitigating food over-acquisition among people who feel relatively food deprivation?* Interventions in the form of social norms would be effective in mitigating food over-acquisition among people who feel personal relative food deprivation. Social norms are of two types: descriptive norms and injunctive norms. *How do social norms mitigate food over-acquisition?* Social norms interact with individuals' ability to discount delays, such that injunctive norms are more effective in mitigating food over-acquisition among people who showed preference for smaller immediate rewards. *In which grocery stores would social norms be most effective?* Social norms would be most effective in mitigating food over-acquisition among people who feel relative food deprivation at grocery

stores that are known to have a higher reputation. Specifically, descriptive norms when displayed at stores that are known to have a higher reputation are more effective in reducing food over-acquisition among people who feel relative food deprivation. The findings of this dissertation hopefully stimulate future research in marketing and beyond.

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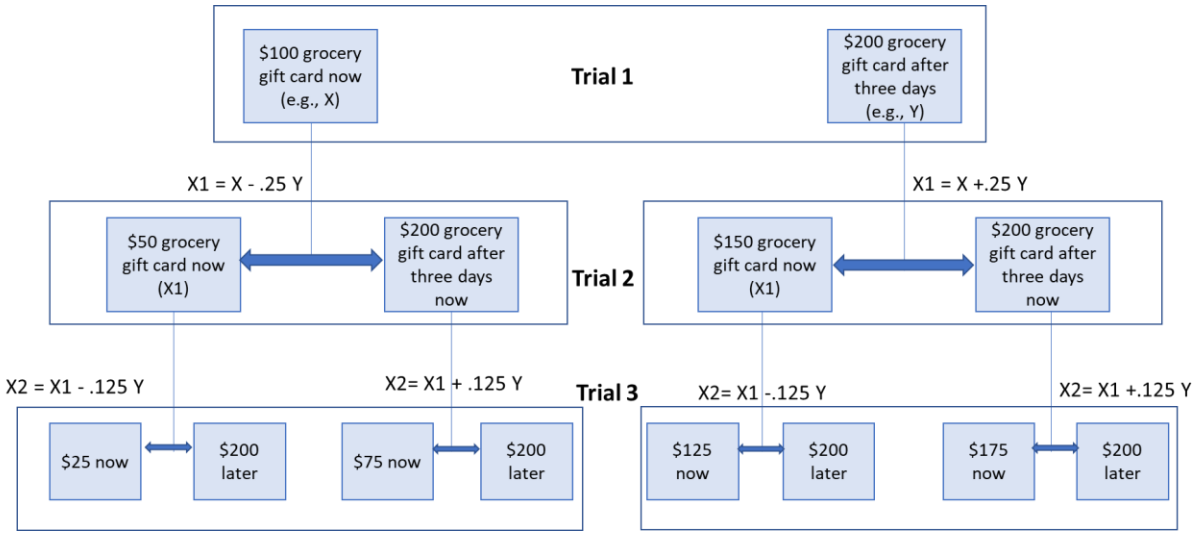
APPENDIX A

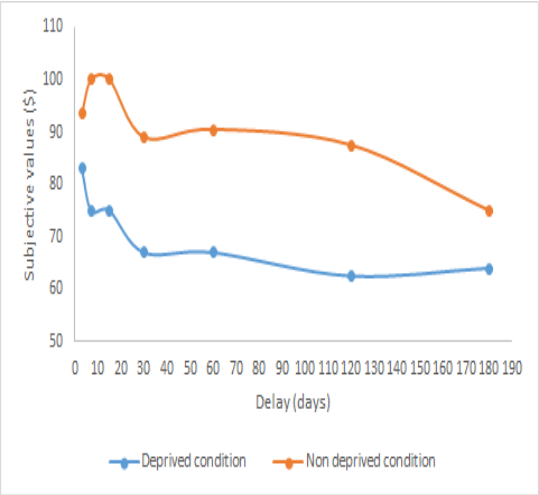
APPENDIX A

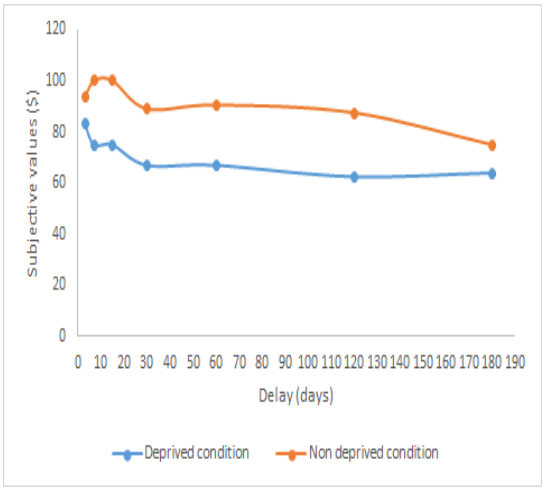
Figure 1.1: Temporal discounting task



The figure shows the choices that participant encounters upon making specific decisions between smaller immediate and larger later grocery gift card (Adapted from Frye et al. 2016).

Figure 1.2. Subjective values of delayed monetary reward



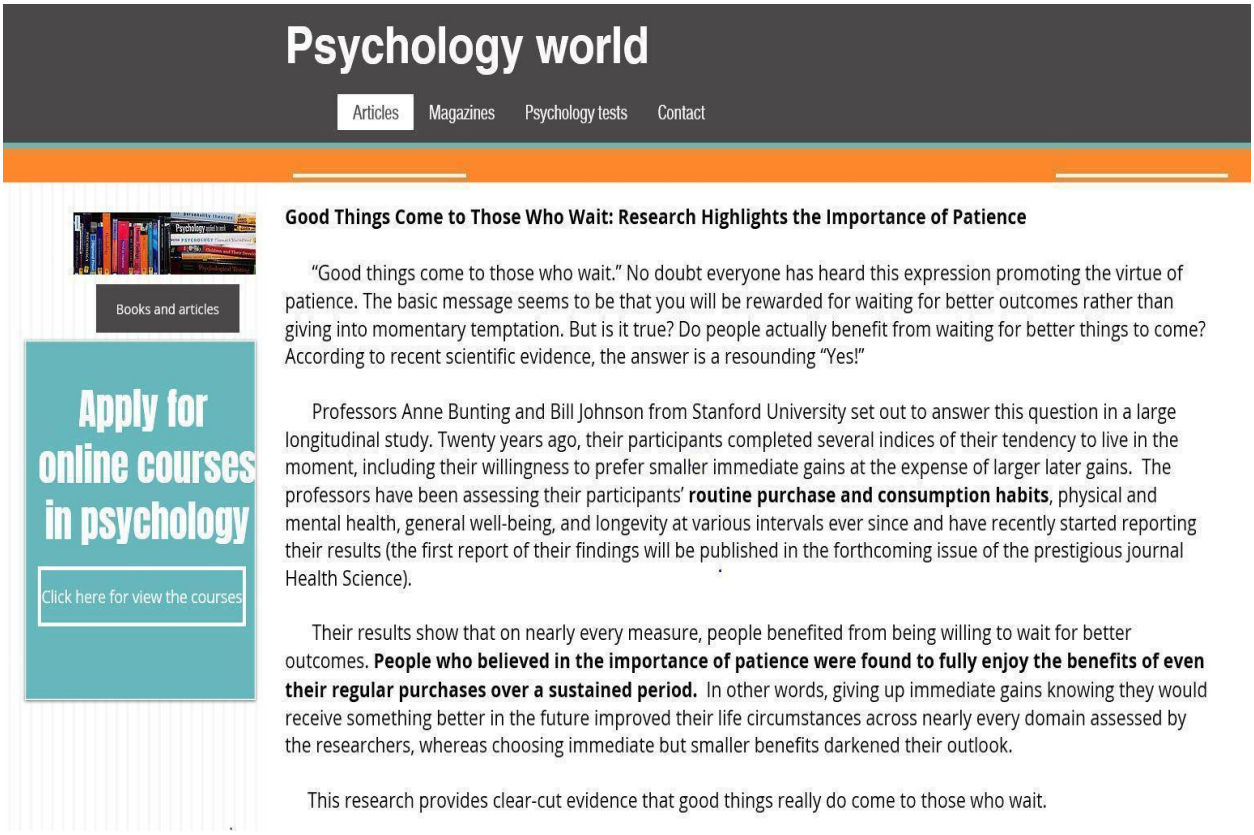


Personal relative food deprivation condition is plotted as a function of the time until receipt of the reward (Study 1). The curved lines represent the group hyperboloid discounting function. The points along the lines represent the median indifference points plotted by relative deprivation condition at each of the seven delays.

APPENDIX B

APPENDIX B

Importance of patience article (delayed gratification condition)



Importance of living in the moment article (delay discounting condition)

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Books and articles

Good Things Come to Those Who "Live in the Moment": Research Highlights the Importance of Living in the Here-and Now

"You can't take it with you." No doubt everyone has heard this expression promoting the virtue of "living in the moment." The basic message seems to be that you will be rewarded for enjoying what you presently have rather than waiting for something you expect to have in the future. But is it true? Do people benefit from living in the moment and appreciating the here-and-now rather than waiting for what's to come? According to recent scientific evidence, the answer is a resounding "Yes!"

Professors Anne Bunting and Bill Johnson from Stanford University set out to answer this question in a large longitudinal study. Twenty years ago, their participants completed several indices of living in the moment, including their willingness to prefer smaller immediate gains at the expense of larger later gains. The professors have been assessing their participants' **routine purchase and consumption habits**, physical and mental health, general well-being, and longevity at various intervals ever since and have recently started reporting their results (the first report of their findings will be published in the forthcoming issue of the prestigious journal Health Science).

Their results showed that on nearly every measure, people benefited from their willingness to live in the here-and-now. **People who believed in the importance of living in the moment were found to fully enjoy the instant benefits of even their regular purchases.** In other words, choosing to enjoy benefits immediately improved their life circumstances across nearly every domain assessed by the researchers, whereas deciding to wait for larger, delayed gains darkened their outlook.

This research provides clear-cut evidence that you really can't "take it with you." Go ahead; enjoy it while you can!

APPENDIX C

APPENDIX C

Food acquisition pretest

Q.1 If the cart on the right hand side is 100% full. What percentage of each of the following carts is full of groceries? Please write your response in the box provided below each picture.

100 % full

% full

% full

% full

% full

Q.2 If the basket on the right hand side is 100% full. What percentage of each of the following baskets are full of groceries? Please write your response in the box provided below each picture.

100 % full

% full

% full

% full

% full

APPENDIX D

APPENDIX D

Detailed results of study 2

Spending on groceries from the $100 grocery gift card

Analysis by gender should that for males there was a significant effect of temporal discounting on food acquisition before the morning shopping assumption $F(1,33) = 14.181$, $p<0.05$, $\eta^2 = 0.301$ but not after the morning shopping assumption. For females, there was a significant effect of temporal discounting on food acquisition for both, before morning shopping assumption $F(1,46)=5.625$,$p<0.02$, $\eta^2 = 0.109$ and after morning shopping assumption $F(1,46) = 6.504$,$p<0.05$, $\eta^2 = 0.124$. On examining the differences between the two conditions, males (M=$52.47) spent nearly the same amount on groceries as did females (M=$52.625) in the delay discounting condition. Similar results were found in the delayed gratification condition wherein males (M=$31.755) spent nearly the same amount on groceries as did females (M=$31.755).

Preference for shopping cart and shopping basket

There was no significant association between preference for shopping cart or shopping basket and gender.

Quantity of groceries purchased

Analysis by gender should that for males there was a significant effect of temporal discounting on food acquisition before the morning shopping assumption $F(1,33) = 16.173$, $p<0.05$, $\eta^2 = 0.329$ but not after the morning shopping assumption. For females as well, there was a significant effect of temporal discounting on food acquisition before morning shopping assumption $F(1,46)=6.048$,$p<0.05$, $\eta^2 = 0.116$ but not after the morning shopping assumption.

Control variables

Dependent variable Quantity of groceries

1. **Tendency to purchase in smaller quantity because of preference for fresh groceries**

Results showed a significant effect for before morning shopping assumption $F(1,80) = 12.063$, $p <0.05$, $\eta^2 = 0.131$, but not after the morning shopping assumption $F(1,80) =2.786$, $p =0.099$, $\eta^2 = 0.034$.

2. **Tendency to purchase in larger quantity in order to avoid frequent grocery shopping trips**

Results showed a significant effect for before morning shopping assumption $F(1,80) = 16.008$, $p <0.05$, $\eta^2 = 0.167$, but not after the morning shopping assumption $F(1,80) =3.595$, $p =0.062$, $\eta^2 = 0.043$.

3. **Frequency of grocery shopping**

Grocery shopping frequency was employed as a covariate. Results showed that grocery shopping frequency did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 2.196$, $p=0.142$, $\eta^2 = 0.027$. However, it did have significant effect after the morning shopping assumption $F(1,80)=10.053$, $p=0.002$, $\eta^2 = 0.112$. This reasonable because the assumption itself suggests that the most recent grocery shopping

was that morning. The effect of temporal discounting on food acquisition was significant for before assumption of morning grocery shopping but not for after morning grocery shopping.

4. General preference for using shopping cart vs. shopping basket

Results did not show any significant effect for neither before morning shopping assumption $F(1,80) = 0.630$, $p = 0.430$, $\eta^2 = 0.008$, but not after the morning shopping assumption $F(1,80) = 1.814$, $p = 0.182$, $\eta^2 = 0.022$. The result suggest that irrespective of the general tendency to use either shopping cart or shopping basket, the effect of temporal discounting on food acquisition is evident.

5. Most recent grocery shopping

Results showed that grocery shopping frequency did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)=1.508$, $p=0.223$, $\eta^2 = 0.018$. However, it did have significant effect after the morning shopping assumption $F(1,80)=10.618$, $p=0.002$, $\eta^2 = 0.117$.

6. Dining out

Results showed that percentage of food consumed though dining out did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)=0.237$, $p=0.628$, $\eta^2 = 0.003$ as well as after the morning shopping assumption $F(1,80)=0.223$, $p=0.638$, $\eta^2 = 0.003$.

7. Importance of food intake

Results showed that participants' importance to food intake did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 2.053$, $p=0.156$, $\eta^2 = 0.025$ but had a significant effect after the morning shopping assumption $F(1,80)= 5.032$, $p=0.028$, $\eta^2 = 0.059$.

8. Importance of physical fitness

Results showed that participants' importance to physical fitness did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 0.028$, $p=0.867$, $\eta^2 = 0.000$. There was no significant effect after the morning shopping assumption $F(1,80)= 0.641$, $p=0.426$, $\eta^2 = 0.008$ as well.

9. Importance of grocery shopping

Results showed that participants' importance to grocery shopping/food intake did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 0.002$, $p=0.965$, $\eta^2 = 0.000$. There was no significant effect after the morning shopping assumption $F(1,80)= 3.541$, $p=0.064$, $\eta^2 = 0.042$ as well.

10. Education

Results showed that participants' educational qualification did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 0.842$, $p=0.361$, $\eta^2 = 0.010$. There was no significant effect after the morning shopping assumption $F(1,80)= 0.102$, $p=0.750$, $\eta^2 = 0.001$ as well.

11. Number of persons in the household

Number of persons in the household did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 0.248$, $p=0.595$, $\eta^2 = 0.004$. There was no significant effect after the morning shopping assumption $F(1,80)= 1.637$, $p=0.204$, $\eta^2 = 0.020$ as well.

12. Average annual income of the household

Average annual income of the household had a significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 2.270$, $p=0.009$, $\eta^2 = 0.083$. There was no significant effect after the morning shopping assumption $F(1,80)= 0.761$, $p=0.386$, $\eta^2 = 0.009$.

13. Average monthly spending on groceries:

Average monthly spending on groceries did not have a significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 0.001$, $p=0.982$, $\eta^2 = 0.000$. There was no significant effect after the morning shopping assumption $F(1,80)= 1.466$, $p=0.230$, $\eta^2 = 0.018$.

14. Self-control

Self-control was examined as a covariate. Factor analysis was conducted on the thirteen-item self-control scale. Nine of the thirteen factors were reverse coded. All the thirteen items loaded on one factor. Self-control was covaried with quantities of groceries purchased and dollar amount spent on groceries. Results showed that self-control did not have significant effect on quantity of groceries purchased $F (1,80) = 1.499$, $p=0.224$, and the dollar amount spent on groceries $F(1,80) = 1.528$, $P=0.220$, before morning shopping assumption. However, temporal discounting had a significant effect on both, quantity of groceries purchased, $F (1,80) = 14.619$, $p=0.00$, $\eta^2 = 0.155$, and the dollar amount spent on groceries, $F (1,80) = 15.449$, $p=0.00$, $\eta^2 = 0.162$.

When examined after the assumption that the grocery shopping was done in the (that) morning, self-control did not have a significant effect on the quantity of groceries purchased, F (1,80) = 3.976, p=0.50. However, self-control had a significant effect on dollar amount spent on groceries, F (1,80) = 19.229, p=0.00, η^2 = 0.194.

Analyzed in a different way, self-control had a significant effect only on the dollar amount spent on groceries after the morning shopping assumption. This effect was significant participants who were assigned to the importance of living in the moment, F (1,80) = 16.488, p=0.00, η^2 = 0.308. For participants who were in the important of patience condition, there was no significant effect of self-control on quantity of groceries purchased and dollar amount spent on groceries for both before and after morning shopping assumption.

15. Spending self-control

Factor analysis showed that all the 10 items of the spending self-control scale loaded on one factor (α= 0.942).

Quantities of groceries purchased

There was no significant effect before morning shopping assumption F (1,80) = 0.009, p=0.926, η^2 = 0.000. However, there was a significant effect after the morning shopping assumption F (1,80) = 5.493, p=0.022, η^2 = 0.064. The effect of temporal discounting on food - acquisition was significant for before morning shopping assumption F (1,80) = 18.433, p =0.000, η^2 = 0.187. There was no significant effect after morning shopping assumption F (1,80) = 2.563, p =0.113, η^2 = 0.031. For females, there was no significant effect for both, before morning shopping assumption F (1,80) = 0.387, p=0.537, η^2 = 0.009 and after the morning shopping assumption F (1,80) = 1.423, p=0.239, η^2 = 0.031. The effect of temporal discounting on food -

acquisition was significant for before morning shopping assumption F (1,80) = 6.350, p =0.015, η^2 = 0.124. However, there was no significant effect after morning shopping assumption F (1,80) = 1.232, p = 273, η^2 = 0.027.

For males as well, there was no significant effect for, before morning shopping assumption F (1,80) = 1.000, p=0.325, η^2 = 0.030. There was a significant effect after the morning shopping assumption F (1,80) = 6.142, p=0.019, η^2 = 0.161. The effect of temporal discounting on food -acquisition was significant for before morning shopping assumption F (1,80) = 15.750, p =0.000, η^2 = 0.330. However, the effect was not significant for after morning shopping assumption F (1,80) = 2.262, p =0.142, η^2 = 0.066.

Dependent variable Dollar amount spent on groceries from the $100 grocery shopping gift card

1. Tendency to purchase in smaller quantity because of preference for fresh groceries

There was no significant effect for both, before morning shopping assumption F(1,80) = 3.511, p = 0.065, η^2 = 0.042, and after the morning shopping assumption F(1,80) = 0.012, p =0.914, η^2 = 0.000. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 14.646, p =0.00, η^2 = 0.155 and after morning shopping assumption F(1,80) = 6.536, p =0.012, η^2 = 0.076.

2. Tendency to purchase in larger quantity to avoid frequent grocery shopping trips

There was no significant effect for both, before morning shopping assumption F(1,80) = 2.287, p = 0.134, η^2 = 0.028, and after the morning shopping assumption F(1,80) = 0.029, p =0.865, η^2 = 0.000. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 14.50, p =0.00, η^2 = 0.153 and after morning shopping assumption F(1,80) = 6.790, p =0.011, η^2 = 0.078.

3. Frequency of grocery shopping

Results showed that grocery shopping frequency did not have significant effect on the quantity of groceries purchased before morning shopping assumption $F(1,80)= 1.417$, $p=0.237$, $\eta^2 = 0.017$. However, it did have significant effect after the morning shopping assumption $F(1,80)=15.553$, $p=0.000$, $\eta^2 = 0.163$. This reasonable because, the assumption itself suggests that the most recent grocery shopping was that morning. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption $F (1,80) = 17.740$, $p =0.00$, $\eta^2 = 0.182$ and after morning shopping assumption $F(1,80) = 7.063$, $p =0.009$, $\eta^2 = 0.081$.

4. General preference for using shopping cart vs. shopping basket

There was a significant effect before morning shopping assumption $F(1,80)= 7.317$, $p=0.008$, $\eta^2 = 0.0084$. However, there was no significant effect after the morning shopping assumption $F(1,80)= 0.982$, $p=0.325$, $\eta^2 = 0.012$. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption $F (1,80) = 12.128$, $p =0.001$, $\eta^2 = 0.132$ and after morning shopping assumption $F(1,80) = 5.137$, $p =0.026$, $\eta^2 = 0.060$.

5. Most recent grocery shopping

There was a no significant effect before morning shopping assumption $F (1,80) = 1.493$, $p=0.225$, $\eta^2 = 0.018$. However, there was a significant effect after the morning shopping assumption $F (1,80) = 12.523$, $p=0.001$, $\eta^2 = 0.135$. This is reasonable because the assumption itself pertains to the assumption that the grocery shopping was that morning. The effect of temporal discounting on food -acquisition was significant for both before morning shopping

assumption F (1,80) = 16.622, p =0.000, η^2 = 0.172 and after morning shopping assumption F (1,80) = 5.390, p =0.023, η^2 = 0.063.

6. Dining out

There was no significant effect for both, before morning shopping assumption F(1,80) = 1.039, p = 0.311, η^2 = 0.013, and after the morning shopping assumption F(1,80) = 1.907, p =0.171, η^2 = 0.023. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 19.204, p =0.000, η^2 = 0.194 and after morning shopping assumption F(1,80) = 4.458, p =0.0038, η^2 = 0.053.

7. Importance of food intake

There was no significant effect for both, before morning shopping assumption F(1,80) = 0.392, p = 0.533, η^2 = 0.005, and after the morning shopping assumption F(1,80) = 2.685, p =0.105, η^2 = 0.032. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 17.061, p =0.000, η^2 = 0.176 and after morning shopping assumption F(1,80) = 5.913, p =0.017, η^2 = 0.069.

8. Importance of physical fitness

There was no significant effect for both, before morning shopping assumption F(1,80) = 1.321, p = 0.254, η^2 = 0.016, and after the morning shopping assumption F(1,80) = 0.093, p =0.762, η^2 = 0.001. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 19.472, p =0.000, η^2 = 0.196 and after morning shopping assumption F(1,80) = 7.080, p =0.009, η^2 = 0.081.

9. Importance of grocery shopping

There was no significant effect for both, before morning shopping assumption F(1,80) = 0.009, p = 0.925, η^2 = 0.000, and after the morning shopping assumption F(1,80) = 1.972, p =0.164, η^2 = 0.024. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 17.677, p =0.000, η^2 = 0.181 and after morning shopping assumption F (1,80) = 6.139, p =0.015, η^2 = 0.071.

10. Education

There was no significant effect for both, before morning shopping assumption F(1,80) = 0.355, p = 0.553, η^2 = 0.004, and after the morning shopping assumption F(1,80) = 0.289, p =0.592, η^2 = 0.004. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 15.881, p =0.000, η^2 = 0.166 and after morning shopping assumption F(1,80) = 5.942, p =0.017, η^2 = 0.069.

11. Number of persons in the household

There was no significant effect for both, before morning shopping assumption F(1,80) = 0.359, p = 0.551, η^2 = 0.004, and after the morning shopping assumption F(1,80) = 0.000, p =0.999, η^2 = 0.000. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 16.787, p =0.000, η^2 = 0.173 and after morning shopping assumption F (1,80) = 6.791, p =0.011, η^2 = 0.078.

12. Average annual income of the household

There was no significant effect for both, before morning shopping assumption F(1,80) = 0.359, p = 0.551, η^2 = 0.004, and after the morning shopping assumption F(1,80) = 0.000, p =0.999, η^2 = 0.000. The effect of temporal discounting on food -acquisition was significant for

both before morning shopping assumption F (1,80) = 16.787, p =0.000, η^2 = 0.173 and after morning shopping assumption F(1,80) = 6.791, p =0.011, η^2 = 0.078.

13. Average monthly spending on groceries

There was no significant effect for both, before morning shopping assumption F(1,80) = 0.030, p = 0.862, η^2 = 0.000, and after the morning shopping assumption F(1,80) = 0.031, p =0.860, η^2 = 0.000. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 17.841, p =0.000, η^2 = 0.182 and after morning shopping assumption F(1,80) = 6.964, p =0.010, η^2 = 0.080.

14. Spending self-control

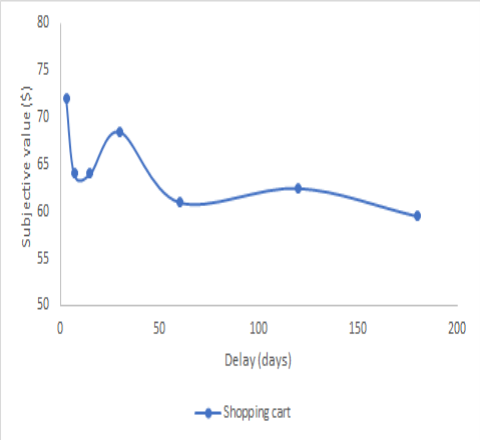
Factor analysis showed that all the 10 items of the spending self-control scale loaded on one factor (α= 0.942). Considering the dollar amount spent on groceries there was no significant effect before morning shopping assumption F (1,80) = 3.449, p=0.067, η^2 = 0.041. However, there was a significant effect after the morning shopping assumption F (1,80) = 24.735, p=0.000, η^2 = 0.236. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 16.07, p =0.000, η^2 = 0.167 and after morning shopping assumption F (1,80) = 4.99, p =0.028, η^2 = 0.059. For females, there was no significant effect, before morning shopping assumption F (1,80) = 0.722, p=0.40, η^2 = 0.016. However, there was a significant effect after the morning shopping assumption F (1,80) = 9.592, p=0.003, η^2 = 0.176. The effect of temporal discounting on food -acquisition was significant for both before morning shopping assumption F (1,80) = 4.495, p =0.040, η^2 = 0.091 and after morning shopping assumption F (1,80) = 4.121, p =0.048, η^2 = 0.084. For males as well, there was no significant effect for, before morning shopping assumption F (1,80) = 0.379, p=0.060, η^2 = 0.106 and after the morning shopping assumption F (1,80) = 15.539, p=0.000, η^2 = 0.327. The effect of

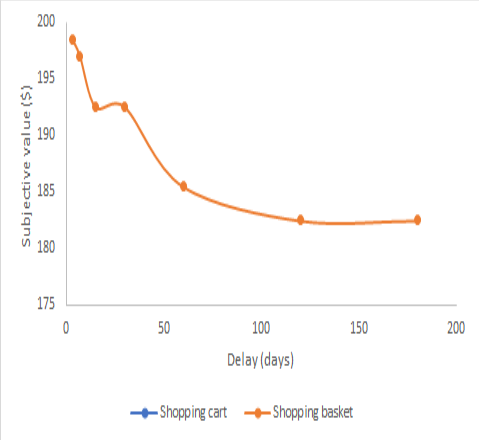
temporal discounting on food -acquisition was significant for before morning shopping assumption $F(1,80) = 14.617$, $p = 0.001$, $\eta^2 = 0.314$. However, the effect was not significant for after morning shopping assumption $F(1,80) = 1.522$, $p = 0.226$, $\eta^2 = 0.045$.

APPENDIX E

APPENDIX E

Figure 2.1 Preference for a shopping cart or shopping basket (before morning shopping assumption)





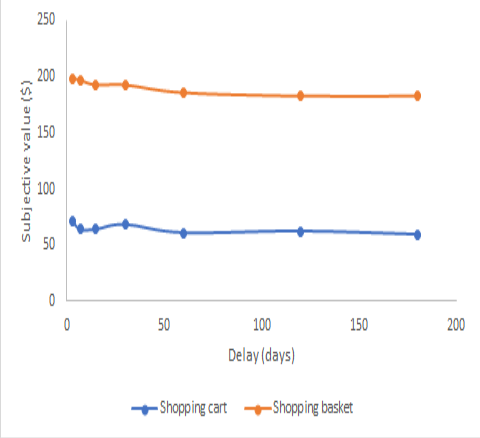


Figure 2.2 Effect of hunger on temporal discounting

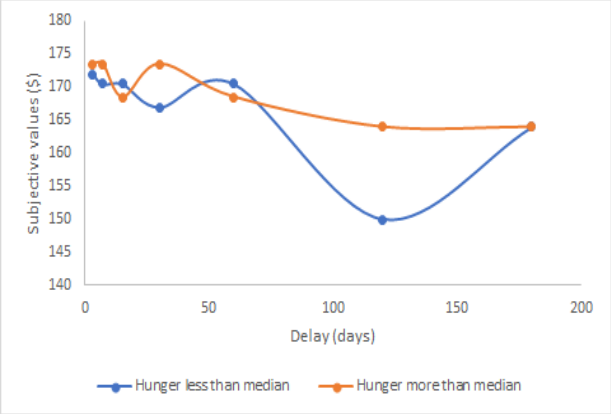


Figure 2.3 Quantity of groceries purchased, and dollar amount spent on groceries

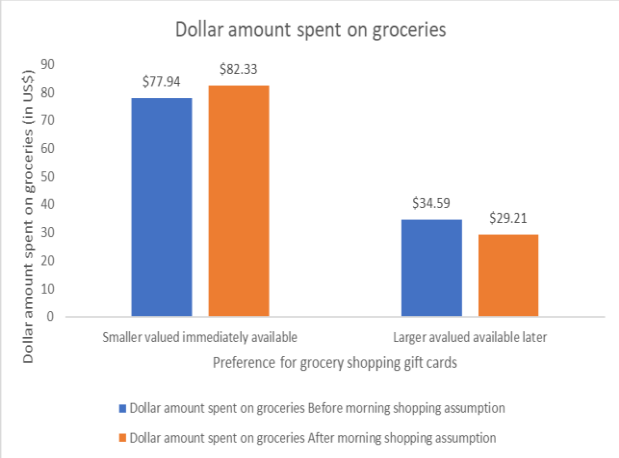
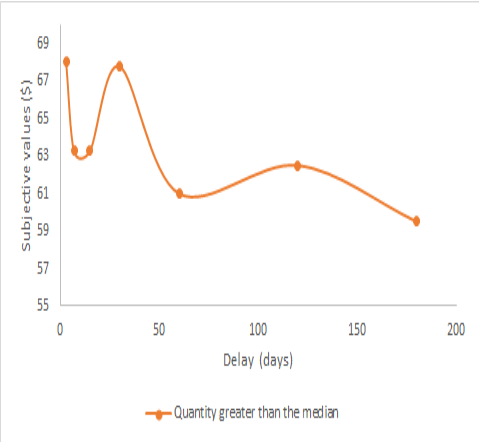
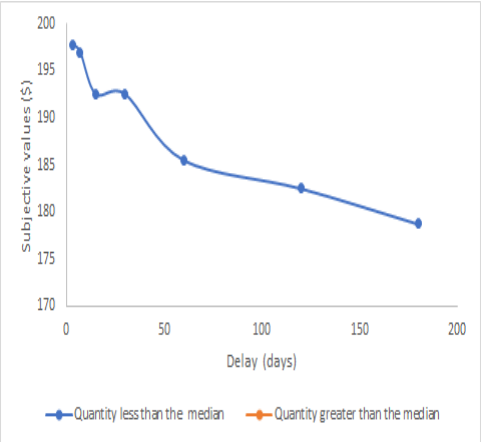


Figure 2.4 Quantity of grocery purchased (before morning shopping assumption)





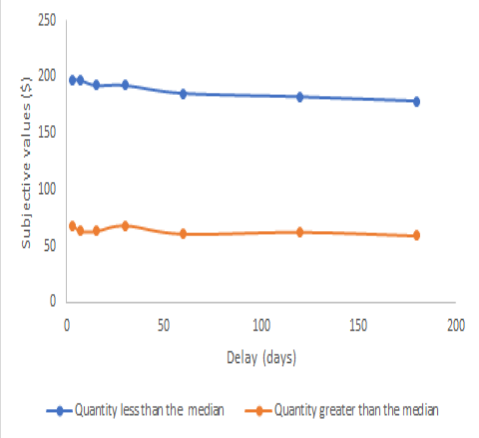
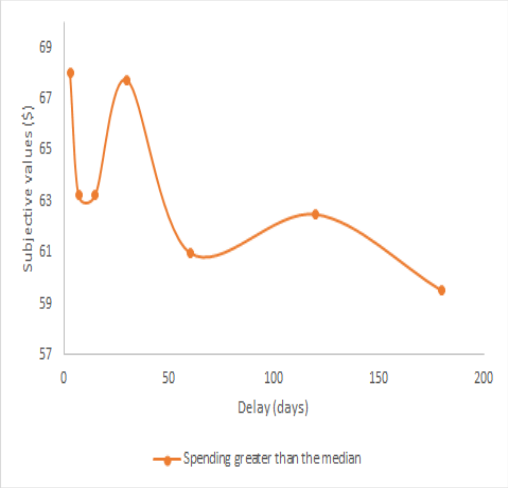
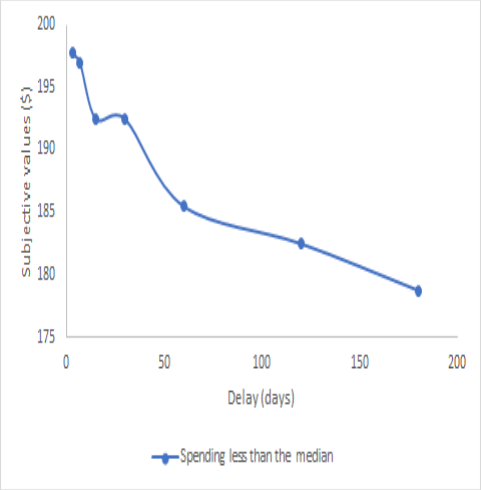


Figure 2.5 Dollar amount spent on groceries (before morning shopping assumption)





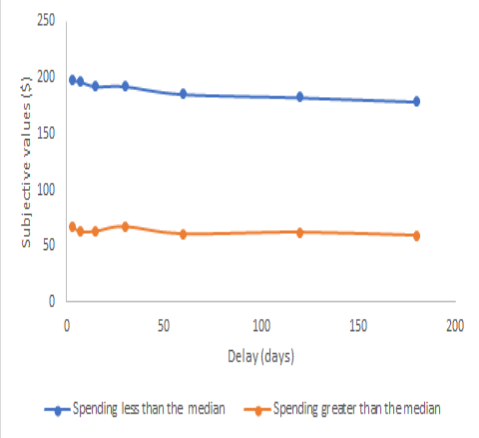
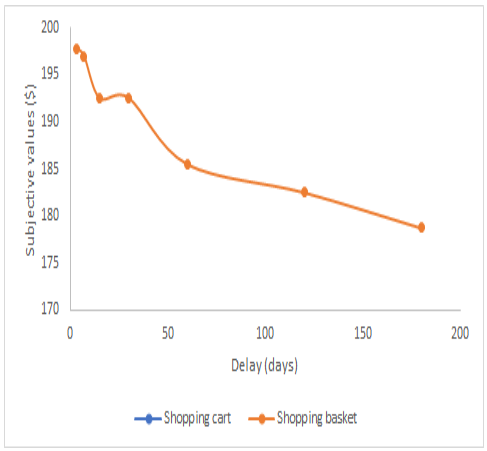
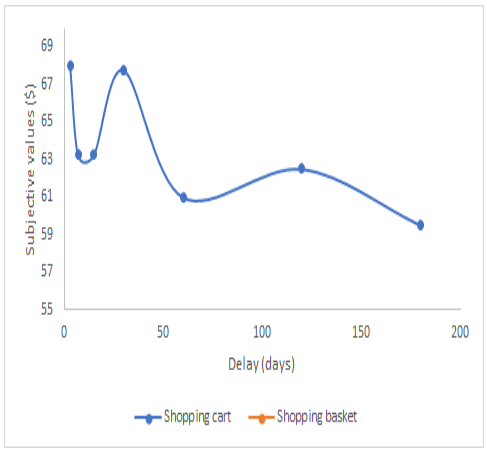


Figure 2.6 Preference for shopping cart or shopping basket (after morning shopping assumption)





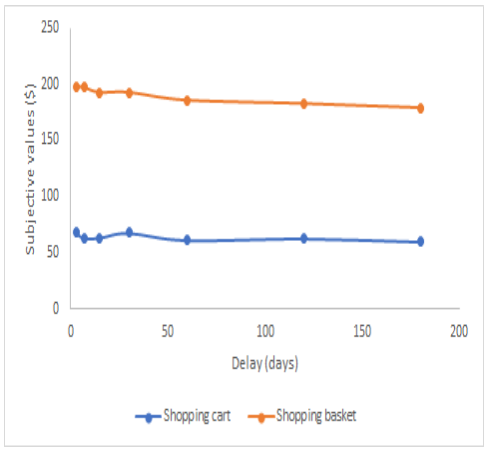
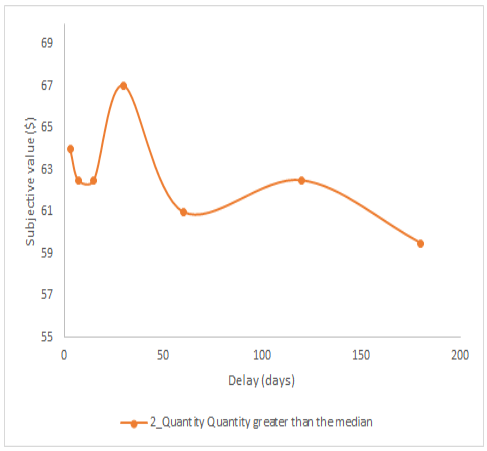
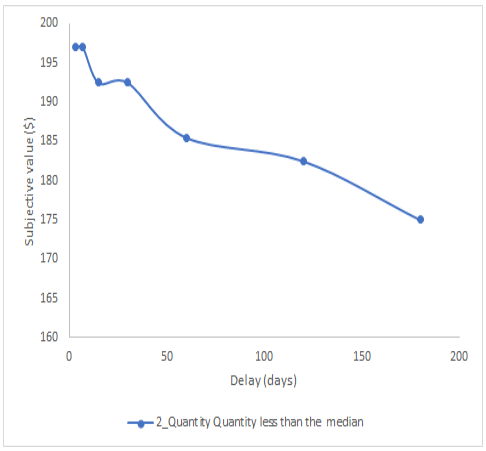


Figure 2.7 Quantity of grocery purchased (after morning shopping assumption)





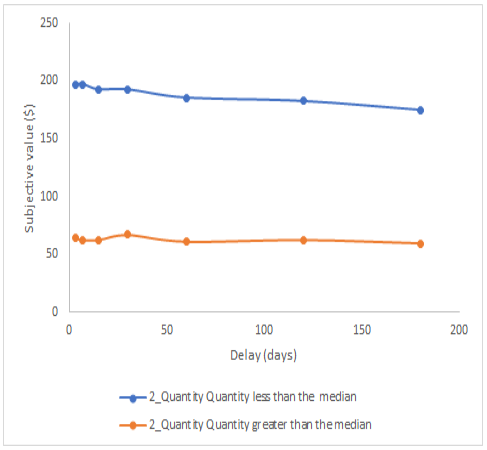
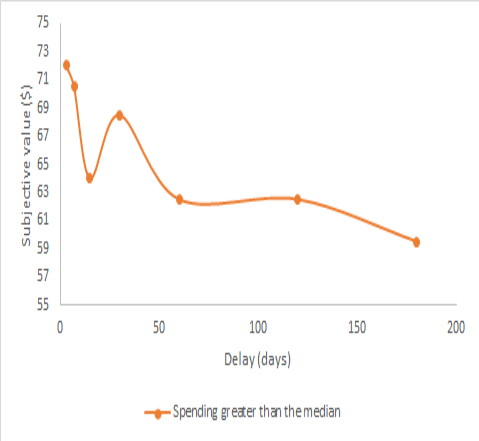
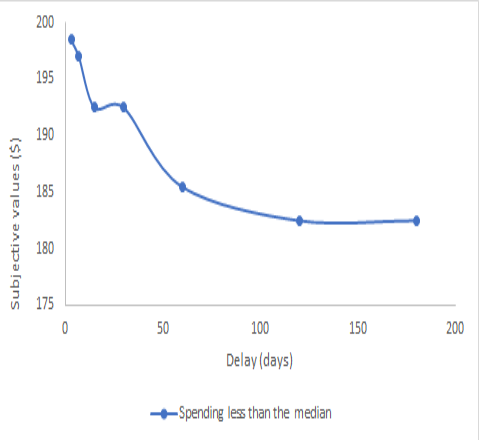
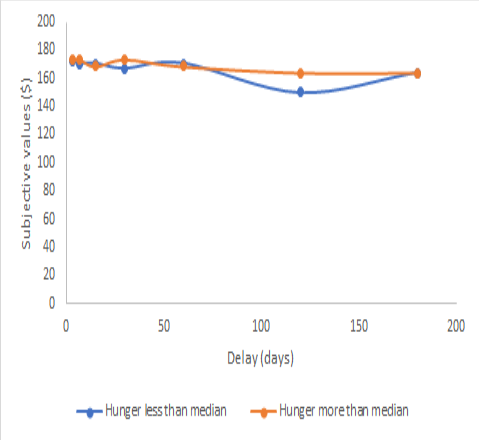


Figure 2.8 Dollar amount spent on groceries (after morning shopping assumption)



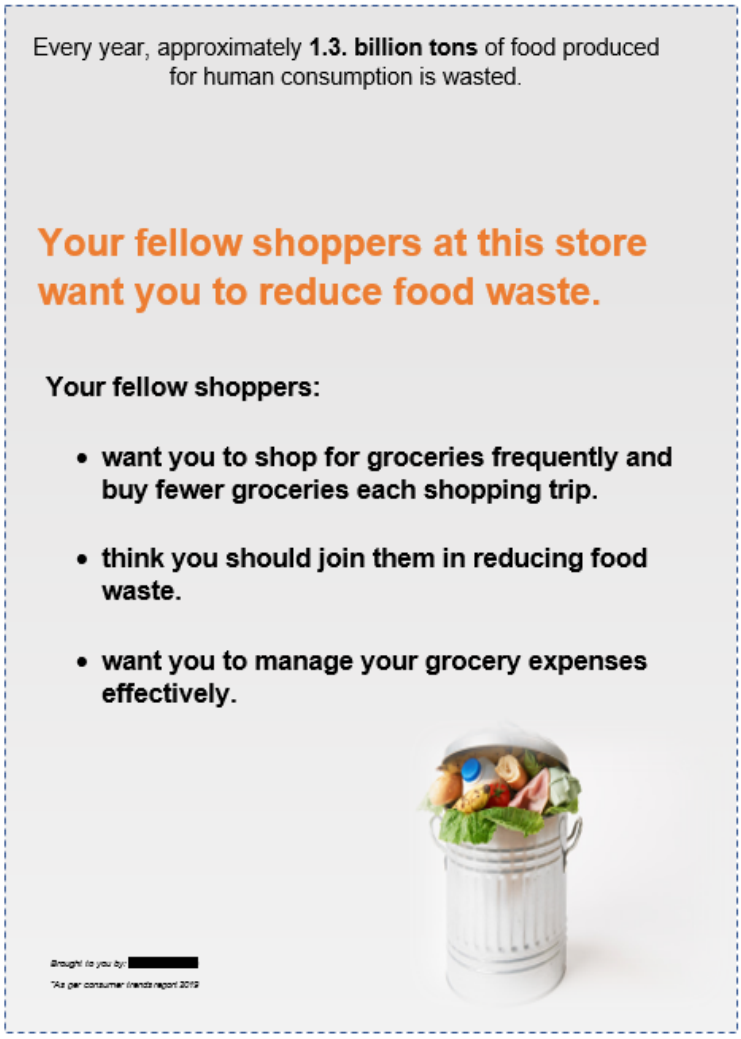




APPENDIX F

APPENDIX F

Social norms stimuli: Injunctive norm manipulation



Social norms stimuli: Descriptive norm manipulation

Every year, approximately **1.3. billion tons** of food produced for human consumption is wasted.

Your fellow shoppers at this store are reducing food waste.

Your fellow shoppers:

- **are shopping for groceries frequently and buying fewer groceries each shopping trip.**
- **are reducing food waste.**
- **are managing their grocery expenses effectively.**

Brought to you by: [redacted]

**As per consumer trends report 2019*

APPENDIX G

APPENDIX G

Study 4 scenario

Recently, a grocery retailer conducted nationwide research about consumers' grocery shopping behavior. Based on the results of the research, the retailer developed a poster. The retailer plans to put up this poster in their grocery stores across the nation.

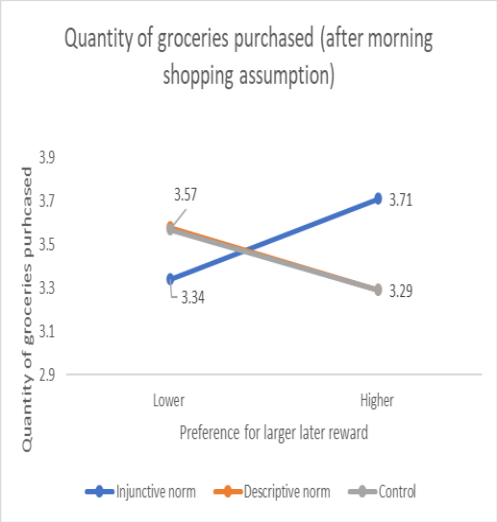
We are interested in your response to the poster. Please read the poster carefully. Please click the arrow below, to view the poster. After you view the poster, please click the next arrow to answer a few questions.

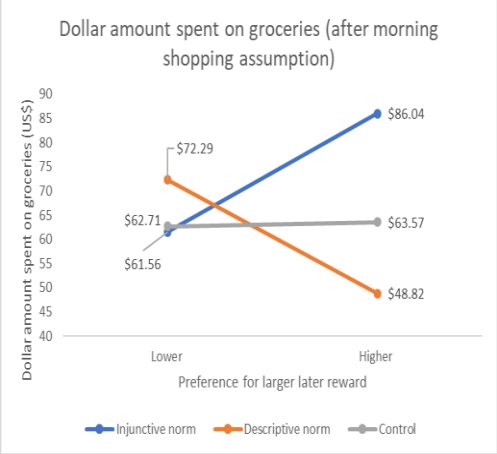
Please note: The name of the grocery retailer is concealed for confidential reasons.

APPENDIX H

APPENDIX H

Figure 5.1 Two-way interaction of social norms and preference for larger later rewards on food acquisition.





APPENDIX I

APPENDIX I

Study 4 Control variables

The following variables were used as covariates: education, weight, preference for fresh groceries, preference for avoidance of shopping trips, preference for shopping cart or shopping basket, grocery purchasing tendency in reality, extent of hunger, recency of grocery shopping, importance of food intake, physical fitness, grocery shopping, frequency of dining out and self-control. Results showed that number of persons in a household had a significant effect on dollar amount spent on groceries after morning shopping assumption $F(1,132)= 6.842$, $p=0.01$, $\eta^2 = 0.049$. The percentage of food intake that comes from dining out $F(1,132)= 5.439$, $p=0.021$, $\eta^2 = 0.040$, importance of food intake, $F(1,132)= 3.899$, $p=0.05$, $\eta^2 = 0.029$, making fewer purchases because of preference for fresh groceries $F(1,132)= 10.578$, $p=0.05$, $\eta^2 = 0.074$, education $F(1,132)= 4.296$, $p=0.04$, $\eta^2 = 0.032$ had a significant effect on dollar amount spent on groceries before morning shopping assumption.

However, preference for purchase of large quantities of groceries to avoid grocery shopping trips had a significant effect on the quantity of groceries purchased before morning shopping assumption, $F(1,132)= 4.207$, $p=0.045$, $\eta^2 = 0.030$. The percentage of food intake that comes from dining out had a significant effect on quantity of groceries purchased after morning

shopping assumption $F(1,132)= 7.155$, $p=0.008$, $\eta^2 = 0.051$, preference for shopping cart or shopping basket before morning shopping assumption $F(1,133)= 8.114$, $p=0.005$, $\eta^2 = 0.057$. Interestingly, self-control did not show any significant effect on dollar amount spent on groceries and quantity of groceries purchased before morning shopping assumption.

APPENDIX J

APPENDIX J

Study 5 scenario

Please read the scenario carefully and fully imagine yourself to be in this exact situation. After you read the scenario please answer the questions that follow.

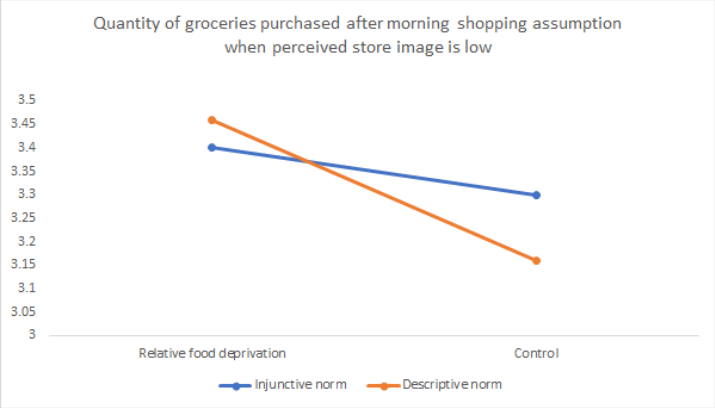
Imagine that you go grocery shopping at a grocery store. Considering the products, services, location, and people shopping at the store, the grocery store is widely known to be quite ordinary, common, and low-end (upmarket, prestigious, and high-end). As you enter the grocery store, you observe a poster.

Please click next to view the poster. Please read the poster carefully and answer the questions that follow.

APPENDIX K

APPENDIX K

Figure 5.2 Three-way interaction of personal relative food deprivation, social norms, store reputation on the quantity of groceries purchased after morning shopping assumption.



APPENDIX L

APPENDIX L

TABLE 1 Overview of studies

Studies	Relationship	Method	Sample	Key findings
1	Effect of PFD on temporal discounting	Two group experimental design (PFD vs. control)	N= 61 (males = 23, females = 38, mean age = 30.50 years). General population in the United States contacted through a telephone directory.	Individuals who feel relative food deprivation prefer smaller immediate rewards over larger later rewards.
2	Effect of delay discounting and delayed gratification on food over-acquisition	A survey measuring temporal discounting.	N= 68 (males = 24, females = 44, mean age = 35.69 years). Working professionals, recruited from a behavioral lab at a large midwestern university in the United States.	Individuals who chose smaller immediate rewards over larger later rewards showed higher tendency of food over-acquisition.

3	Effect of temporal discounting on food over-acquisition	Two group experimental design (Delay discounting vs. Delayed gratification)	N= 83 (males = 35, females = 48, mean age = 35.69 years). Working professionals, recruited from a behavioral lab at a large midwestern university in the United States.	Individuals who chose smaller immediate rewards over larger later rewards showed higher tendency of food over-acquisition.
4	Moderating effect of social norms on the relationship between PFD and food over-acquisition.	2 (PFD: Relative food deprivation vs. control) x 3 (Social norms: Injunctive vs. Descriptive vs. Control)	N=161 (males= 96, females=64, average age = 37.5 years). Participants were recruited using Amazon Mechanical Turk.	Injunctive norms effectively reduced food over-acquisition among people who chose smaller immediate rewards.
5	Moderated moderating effect of social norms and store reputation on the relationship between PFD and food over-acquisition	2 (PFD: Relative food deprivation vs. control) x 2(Social norms: Injunctive vs. Descriptive) x 2 (Store reputation: High vs. Low)	N=188 (males= 119, females=66, average age = 36.76 years). Participants were recruited using Amazon Mechanical Turk.	When social norms are situated in the context of highly reputed grocery stores, descriptive norms are more effective in mitigating food over-acquisition among people who feel relative food deprivation.

TABLE 2 Study 4 Means and Standard Deviation

	Preference for larger later rewards (LLR)	
Social Norms	Low LLR	High LLR
Injunctive norm	$62.72 (27.15)	$86.04 (98.88)
Descriptive norm	$72.29 (24.18)	$48.82 (25.95)

(Low LLR= Lower preference for larger later rewards, High LLR= Higher preference for larger later rewards, DV= Dollar amount spent on groceries after morning shopping assumption.)

TABLE 3 Study 4 Chi-Square test

	Preference for shopping cart or shopping basket	
Social Norms	CB1	CB2
Injunctive norm	3.895 (.048)	4.456 (.035)
Descriptive norm	0.036 (.849)	0.913 (.339)

(CB1= Shopping cart or shopping basket before morning shopping assumption, CB2= Shopping cart or shopping basket after morning shopping assumption)

TABLE 4 Study 5 Three-way interaction effect

Antecedent	Coef.	SE	t	p
RFD	2.667	1.524	1.749	0.145
LLR	0.0055	0.1954	0.028	0.977
Repute	3.2	1.512	2.116	0.0358
RFD x Repute	-1.925	0.8874	-2.17	0.031
LLR x Repute	-0.0192	0.1256	-0.152	0.878
SN	2.198	1.454	1.511	0.132
RFD x SN	-1.579	0.8727	-1.81	0.072
LLR x SN	0.044	0.1264	0.3499	0.726
Repute x SN	-1.975	0.939	-2.102	0.036
RFD x Repute x SN	1.367	0.5546	2.465	0.014
LLR x Repute x SN	-0.027	0.0824	-0.3358	0.737
Constant	0.0584	2.3669	0.0247	0.9803
Model summary	R^2 = 0.085			
	F (11, 173) = 1.466, p= *.14*			

RFD= Personal Relative Food Deprivation, LLR= Preference for larger later rewards, Repute = Store reputation, SN= Social Norms

BIOGRAPHICAL SKETCH

Swapnil Saravade (swapnil.g.saravade@gmail.com) earned his Ph.D. in Business Administration with a Marketing concentration from Robert C. Vackar College of Business & Entrepreneurship at the University of Texas Rio Grande Valley (UTRGV) in August 2021. He previously earned his Master of Marketing Research (MMR) from Southern Illinois University Edwardsville (SIUE) in May 2016. He completed his Master of Management Studies (MMS) from Chetana's R.K. Institute of Management & Research (associated with the University of Mumbai), India in 2012. He completed his Bachelor of Chemical Engineering (BE Chemical) from Datta Meghe College of Engineering, associated with University of Mumbai, India in 2009.

His research focusses on digital marketing and retail strategies. His research has been published in the *Journal of Business Research* and the *Journal of Macromarketing*. He has presented his research at conferences such as the Association for Consumer Research (ACR), American Marketing Association (AMA), and Society for Marketing Advances (SMA). In 2020, Swapnil was awarded the Ph.D. Student Research Excellence Award from the Department of Marketing and the Dean's award for the Best Doctoral Student in the Ph.D. Business Administration program at UTRGV. During his Ph.D. education, Swapnil taught undergraduate courses such as Consumer Neuroscience, Principles of Marketing, Social Media & e-Marketing, Integrated Marketing Communications, and Retailing, at UTRGV.