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Psychological Determinants of Satiation and Its Recovery: Perceived Scarcity, Future Consumption and Other Research Directions

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UNIVERSITY OF MIAMI

PSYCHOLOGICAL DETERMINANTS OF SATIATION AND ITS RECOVERY:
PERCEIVED SCARCITY, FUTURE CONSUMPTION AND OTHER RESEARCH
DIRECTIONS

By

Julio Sevilla

A DISSERTATION

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Doctor of Philosophy

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DIRECTIONS

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Psychological Determinants of Satiation and its Recovery:
Perceived Scarcity, Future Consumption and Other
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Satiation takes place when we repeatedly consume an enjoyable experience. While the occurrence of this phenomenon is directly related to the amount consumed, there are psychological factors that may delay it. The current research expands our knowledge of these factors by introducing and demonstrating two new psychological determinants of satiation and suggesting new directions for future research. This work shows that when people perceive a stimulus as scarce they will satiate from it at a slower rate due to a focus on consuming as much as possible which leads them to pay less attention to the quantity consumed and to satiate slower. Moreover, the current research shows that when people anticipate future consumption in a given domain as being high on variety, they will experience slower rates of satiation from a present consumption episode. This is explained by a focus on enjoying the present more and by increased thoughts about the future experience. Future directions point towards the study of how the consumption rate at which satiation is reached influences the rate at which people recover from satiation; and to the effect that consumption context may play on satiation from a target experience.

TABLE OF CONTENTS

	Page
LIST OF FIGURES.....	iv
Chapter	
1 INTRODUCTION	1
2 PERCEIVED SCARCITY REDUCES THE RATE OF SATIATION	6
3 THE EFFECT OF PROSPECTIVE FUTURE VARIETY ON SATIATION FROM A CURRENT EXPERIENCE	45
4 FUTURE RESEARCH DIRECTIONS	70
5 CLOSING REMARKS.....	80
 Bibliography	 85

LIST OF FIGURES

	Page
1 FIGURE 1.....	91
2 FIGURE 2.....	92
3 FIGURE 3.....	93
4 FIGURE 4.....	94
5 FIGURE 5.....	95
6 FIGURE 6.....	96
7 FIGURE 7.....	97

CHAPTER 1: INTRODUCTION

People satiate from enjoyable experiences (Coombs and Avrunin 1977). It does not matter how much we like our favorite dish or song, eventually our enjoyment of it will decrease if we consume it too often. This posits a major challenge to our happiness (Frederick and Loewenstein 1999) as it means that we need to continuously look for better products and experiences in order to maintain a constant level of enjoyment (Brickman and Campbell 1971). Most people believe that satiation is determined exclusively by the objective amount consumed (Mook and Votaw 1992; Rolls, Duijvenvoorde, and Rolls 1984). While it is reasonable to expect that eating two meals will be more satiating than having one, most people seem to be unaware that there are subtle aspects of an experience that may also affect how fast satiation occurs. Rolls et al. (1981) introduced the concept of sensory specific satiety, which means that people satiate on individual aspects of an experience. They showed that people's desire for the food consumed declined more than that for other stimuli that were not ingested. Besides being sensory-specific, satiation has also been proven to be a psychological effect (e.g. Raghunathan and Irwin 2001; Redden 2008). This posits an opportunity for consumers and researchers as it suggests that there are ways in which the rate at which we satiate can be reduced besides simply limiting consumption amount.

Recently, research has examined the psychological aspects of satiation, including categorization level (e.g. Raghunathan and Irwin 2001; Redden 2008), degree of variety

(e.g. Kahn, Ratner and Kahneman 1997; Ratner, Kahn and Kahneman 1999; Rolls et al. 1984), memory (Galak et al. 2009; Rozin et al., 1998) and consumption rate (Galak et al. 2012; Nelson and Meyvis 2008; Nelson et al. 2009). The goal of the current research is to add to this literature by looking at factors that have not been previously considered. Specifically, this research looks at how the scarcity of a stimulus and the anticipation of prospective future consumption in a given domain affect satiation. This work also introduces a few avenues for future research on this area. This includes a proposal for the study of the effect that initial consumption and satiation rate may have on subsequent satiation recovery rate. The effect that changes in consumption context may have on satiation from a target stimulus is also discussed. This research contains three essays organized as follows:

Essay 1: *“Perceived Scarcity Reduces the Rate of Satiation”*

Essay 2: *“The Effect of Prospective Future Variety on Satiation from a Current Experience”*

Essay 3: *“Directions for Future Research”*

The first essay, “Perceived Scarcity Reduces the Rate of Satiation”, posits that people satiate less from a constant stimulus if they believe that it is scarce. The reason for this is that in such cases people feel an urge to take advantage of a limited opportunity, and this in turn makes them focus on consuming more and paying less attention to the quantity consumed. This work contributes to the literature in two ways. First, it demonstrates that the scarcity of a product may affect satiation. Second, it opens the door to investigate other properties of a stimulus that may also influence satiation rate. The

second essay, “The Effect of Prospective Future Variety on Satiation from a Current Experience” studies the effect that anticipating prospective future consumption may have on satiation from a present stimulus. We posit that when people anticipate a more varied future they will satiate slower from a current, but related, consumption episode. This occurs because of two reasons. First, this research shows that people focus on savoring the present experience more, presumably because they know that they will be experiencing something different in the future. Second, thinking about the taste of the item to be consumed in the future enhances enjoyment and reduces satiation from the current experience.

The third essay discusses two potential directions for future research. The first research endeavor proposed is: “The Effect of Consumption and Satiation Rate on Satiation Recovery Rate.” This work aims to extend our knowledge about the way in which we people recover from satiation. It proposes that when people reach a target level of satiation due to a faster consumption rate as opposed to a slower one, they will take more time to recover from it and wish to consume the stimulus again. I propose that the reason for this is that when satiation is reached at a faster rate, retrospective memories about the experience do not tend to be as positive as when it is reached through a slower rate of consumption. This differential effect on memories will make people who satiated slower take less time to recover even if they had to consume in higher amounts to reach that level (e.g. Galak et al. 2012). This prediction is at odds with past work that suggests that the more we consume a stimulus the more satiated we will be (e.g. Mook and Votaw 1992).

Another direction for future research looks at the effect of consumption context on satiation. I propose that people may enjoy more and satiate slower from a frequently consumed stimulus if consumption context is changed. For example, imagine a person who usually listens to the same set of songs at the gym and at some point stops enjoying this experience as much as he initially did. I suggest that changing consumption context, for example, listening to the same set of songs while driving as opposed to at the gym, may help the consumer enjoy these previously highly liked songs more than if he continued to experience them in the usual setting. I posit that this will occur because consumers incorporate contextual aspects to their enjoyment of a stimulus and that changing these seemingly irrelevant aspects may help them avoid habituation and enjoy their favorites more.

Taken as a whole, this work helps us develop a deeper understanding of the psychological determinants of satiation and its recovery. The two first essays are closely related. The first one studies quantity of the consumed good by manipulating perceptions of temporal scarcity or the amount of a stimulus that is available due to natural constraints. The second essay looks at a more circumstantial aspect of quantity consumed in the future. It examines how external factors, or our own decisions, about forthcoming consumption experiences, affect current satiation. However, these projects are different in terms that their respective effects are driven by distinct mechanisms that will be described in detail in their corresponding chapters. The third essay discusses future research directions, including the study of the influence of consumption and satiation rate on satiation recovery rate. While this specific topic is less related to the first two, it also studies quantity but from a different perspective. It looks at how perceived quantity

consumed in the past, as determined by our consumption rate, affects how fast we recover from satiation. Past research has shown that the larger the quantity of time that elapses from the moment a consumption experience ends, the more recovery from satiation a consumer will experience (Nelson and Meyvis 2008; Nelson et al. 2009). However, this past work does not consider an aspect of the initial consumption experience that may override the effect of passage of time quantity on recovery from satiation. This factor is the rate at which people initially consumed and reached satiation from the experience keeping satiation amount constant. I propose that the faster the consumption and satiation rate were, the slower the recovery rate will be. This is because retrospective memories from the experience will be more favorable when people consume and satiate at a slower rate. We expect this prediction will hold despite people who satiated slower will have consumed more, and past work (Mook and Votaw 1992) and common intuition suggest that the more we consumed, the longer time it should elapse before we desire a stimulus again. This notion is consistent with past work documenting the role of memories on satiation (Galak et al. 2009; Ratner, Kahn and Kahneman 1999; Rozin 1998).

The objective of the current research is to motivate further work on the area of satiation and its recovery.

CHAPTER 2: PERCEIVED SCARCITY REDUCES THE RATE OF SATIATION

Enjoyment drops with repeated consumption for nearly every experience. That is, people satiate on their favorite stimuli as they consume them more (Coombs and Avrunin 1977). Such satiation presents a challenge for maintaining happiness as consumers continually search for new experiences just to maintain the same level of enjoyment (Brickman and Campbell 1971). Even though a remedy could prove instrumental to well-being, past research has demonstrated few ways to reduce satiation (e.g., Raghunathan and Irwin 2001; Redden 2008). Our research finds one such solution by leveraging scarcity to establish a new preventive against this phenomenon.

The typical consumer response to satiation is to increase variety by consuming something different (Herrnstein and Prelec 1991; Ratner, et al. 1999). Although such switching might help with satiety, this strategy requires an abundance of different products that are readily available and well liked. In many cases, a favored product may instead be scarce in that there are limited opportunities to consume it. We focus on this notion of scarcity as it might apply to seasonality, shelf life, physical proximity, or lack of money. For example, imagine the family that must eat the giant fruit basket over the holidays before it spoils. Satiation poses a particularly significant cost here if it prevents fully enjoying the tasty, healthy fruits while they are briefly available.

We instead propose that consumers have a natural ability to take advantage of rare consumption opportunities – slower satiation when scarcity is high. Although increased scarcity may increase desire (Fromkin 1970; Verhallen 1982), we argue that the benefits of scarcity are also enduring as they grow with repeated consumption. In other words,

scarcity slows satiation. Our theoretical account is that scarcity triggers a focus on consuming as much as possible, leaving little need to monitor the quantity consumed or to worry about overconsumption (as many dieters do). We propose that this lack of attention to the quantity consumed subsequently reduces the rate of satiation. The result is that consumers are naturally encouraged to take fuller advantage when consuming a product they perceive to be available only on scarce occasions.

Our research contributes to both the scarcity and satiation literatures in important ways. We provide evidence that scarcity increases enjoyment during consumption, a generally assumed but largely untested claim (Cialdini 2009). In our studies, scarcity did not affect initial liking, rather the benefit appeared only over time through less satiation. This suggests that scarcity theories need to incorporate repeated consumption to fully capture effects on liking. We also establish scarcity as one of the few ways to combat satiation – a research call largely unanswered (Brickman & Campbell 1971; Frederick & Loewenstein 1999). This helps explain why products available for a limited time only (e.g., pumpkin ice cream at Halloween), reserved for special occasions (e.g., an expensive sushi restaurant), or seasonal in nature (e.g., certain fruits or seafood) seem to endure as consumer favorites over the years. More generally, we highlight attention to the quantity consumed as an important driver of satiation. Perceptions of scarcity offer one way to specifically influence this attention, but it is likely not unique in this regard. We expect our work to spur future research to uncover other factors that similarly reduce such attention, with the result being more ways to lower satiation and improve consumer happiness.

THEORETICAL DEVELOPMENT

Scarcity and Liking

Previous literature has used the term scarcity to refer to any lack of product availability (Brock 1968; Cialdini 2009). The nature of scarcity can be categorized as either situational with little quantity available at the moment, or temporal with few opportunities to consume. Past work has largely focused on situational scarcity, and how consumers use it as a cue to infer how much they want something (Cialdini 2009). For example, people valued recipe books more when the books were unavailable due to their popularity or limited supply (Verhallen 1982). Fromkin (1970) found that people wanted to spend more time in a “chamber” when told it was unavailable at the moment. People similarly desired an art print more when told it was available from only one museum versus most stores (Lynn 1989). Inman, Peter and Raghurir (1997) likewise showed that an offer seemed like a better deal when it had restrictions such as a purchase limit, purchase precondition, or time limit. This work all shows that scarcity increases wanting.

Although scarcity increases wanting, there is very little evidence that scarcity makes consuming a product more enjoyable. Worchel and colleagues (1975) showed that people had a greater desire to eat a cookie when led to believe it was scarce. However, they found no difference in taste ratings of the cookie. Kurtz (2008) found that reminding students that they had only a short amount of time left in college improved their ratings of happiness, possibly because they now found the college experience more enjoyable.

Beyond these two studies, though, there has been little research on the effects of scarcity on experienced enjoyment.

We address this open question in the scarcity literature as the first work to examine how scarcity affects enjoyment over time during repeated consumption. We have people rate their enjoyment during consumption (i.e., while eating a food), and all of our studies test how scarcity affects enjoyment beyond wanting or just an initial exposure. We also focus on scarcity as it pertains to the limited availability of consumption occasions. That is, we look at how scarcity affects enjoyment of a product that often is not available. We propose that the effects of such scarcity on enjoyment may be evident only in the satiation rate over the course of repeated consumption (which past research has not measured). In the next sections, we discuss how enjoyment changes over time, and how scarcity could affect this process of satiation.

Satiation with Repeated Consumption

Satiation refers to the process whereby consumers typically enjoy a stimulus less as they consume more of it (Coombs and Avrunin 1977; Redden 2008). The phenomenon of satiation arises for practically every type of experience (Frederick and Loewenstein 1999). Consumers tend to attribute their satiation to physiological changes such as feeling full after a big meal (Mook and Votaw 1992). However, there is emerging evidence that satiation is at least partially psychological in nature (Galak, Redden, and Kruger 2009; McSweeney and Swindell 1999; Redden 2008; Rolls et al. 1981). In particular, researchers have linked satiation to numerous processes that include adaptation (Helson

1964), habituation (Thompson and Spencer 1966), and optimal stimulation (Berlyne 1971). This psychological component explains why satiation occurs for non-ingested stimuli, appears nearly instantaneously, depends on memory, and dissipates with variety (McSweeney and Murphy 2000). More importantly, it also allows interventions to slow satiation even though they do not alter physiological processes such as digestion.

Although multiple psychological processes contribute to satiation, past work has shown that a common driver of this phenomenon is the level of attention during consumption. For example, children habituated less quickly while eating pizza (as measured by their salivation rate) when they simultaneously completed a hard versus an easy memory task (Epstein, et al. 2005). Brunstorm and Mitchell (2006) similarly showed that participants reported smaller changes in hunger, fullness, and the desire to eat when distracted by a computer game while eating cake. Higgs and Woodward (2009) likewise found that watching television during lunch increased the amount of snacks people were likely to eat later in the afternoon. Finally, multiple interruptions made a massage more enjoyable by disrupting the process of adaptation (Nelson and Meyvis, 2008). These findings each indicate that attention plays a role in satiation.

Beyond such general distractions, past work further hints that attention to the quantity consumed may particularly influence satiation. Participants ate over 75% more soup when the bowl was continually refilled without their knowledge (Wansink, et al. 2005), diners ate more at an unlimited buffet when the empty plates were regularly removed (Wansink and Payne 2007), and amnesiacs ate multiple lunches in succession with seemingly little satiation (Rozin, et al. 1998). Although these works did not measure ongoing enjoyment, they all hint that satiation decreases as people pay less attention to

what they are consuming and how much they have consumed. We propose that perceptions of scarcity likewise influence how much attention people pay to consumption quantities, and that this affects the subsequent rate of satiation.

Scarcity, Attention, and Satiation Rate

We propose that people given the chance to partake of a scarce consumption opportunity want to take advantage of it by consuming a great amount. Given this desire and less need for restraint, people may pay less ongoing attention to the quantity during consumption. Scarcity signals that monitoring of the quantity consumed is unnecessary. In some ways, this inference resembles how healthy food labels encourage overconsumption as people pay little heed to the quantity eaten because restraint is less critical for these foods (Coelho et al. 2008; Redden and Haws 2013). We propose that the mere perception of scarcity also lessens the attention paid to the quantity consumed, and this reduced attention slows satiation to facilitate consuming more.

Although scarcity may reduce attention to the quantity consumed, our theory does not require that people must necessarily attend more to other aspects of the experience (e.g., brand, flavor, or texture). That is, we do not assume attention is a single resource that stays constant across all experiences. Our theory is hence not rooted in a general distraction away from the current experience. We propose instead that scarcity triggers a focus on consuming more which leads to a reduction in a very specific type of attention – that to the quantity consumed – that slows satiation. Of course, to the extent other

features become salient and further draw attention away from the quantity consumed, we expect even greater effects on satiation.

We focus on attention to the quantity consumed as our theoretical mechanism, but its roots may lie in an evolutionarily learned tenet that scarce food is often key for survival (Covasa and Ritter 1999). Imagine a watering hole or feeding spot that is sporadically available only on some occasions. One of our ancient ancestors stumbling upon this opportunity would gain from stocking up on this resource by consuming a great deal. Slower satiation would facilitate this advantageous behavior, so people may have developed an ability to satiate less during a scarce consumption opportunity. In fact, there is evidence of such an adaptive behavior in animals as rats are largely insensitive to the consumption of oleate that is found in fat (Covasa and Ritter 1999), possibly because fat aids survival but is scarce in nature. We propose that a similar notion helps humans slow their satiation when they encounter a scarce consumption opportunity. There will likely be an urge to take full advantage of the chance to consume, which leads to a focus on consuming more and paying less attention to how much one consumes. The end result is less satiation and presumably an ability to happily consume more.

We have proposed that scarcity encourages consuming more by slowing satiation through reduced attention to the quantity consumed. However, it is worth noting that another route to the same outcome could have been more closely monitoring the quantity consumed, and actively regulating behavior based on the progress being made. These (and other) accounts could also explain why perceived scarcity could increase intake, yet both still fit equally well within an evolutionary-based explanation. The evolutionary psychology literature has generally remained silent on the proximate cognitive

mechanisms at play, and the effect of perceived scarcity on attention is no exception. We posit that, compared to increasing attention, reducing attention may be more effective as a general strategy for increasing intake as it requires less cognitive effort by automatically operating through ongoing enjoyment versus recruiting more effortful self-control resources that require nearly constant attention. Put another way, satiation provides an efficient yet influential means to regulate how much one keeps consuming.

We tested our theory in a series of studies in which participants rated their enjoyment as they ate a food. Study 1 validated the core prediction as participants satiated slower when eating grapes after learning the grapes were available only at certain times of the year (versus common and regularly available). Study 2 demonstrated the general nature of our predicted effect by replicating the finding with chocolate candy. More importantly, it also established that reduced attention to the quantity consumed mediated the effect of scarcity on satiation. Study 3 provided additional evidence of our process by directly manipulating the proposed mediating construct of attention to the quantity consumed. When we encouraged participants to keep track of how many pieces of chocolate they ate, the manipulation of scarcity no longer affected satiation. Study 4 extended the behavioral relevance of our effect by showing that perceived scarcity reduced satiation, and this led participants to eat more, and made them more likely to purchase and pay more for the food. Attention to the quantity consumed again explained this result as inaccuracies in the estimated quantity consumed mediated the effects. Study 5 further detailed our theoretical framework by showing that scarcity reduced attention to the quantity consumed because participants focused on consuming more. The studies

consistently established that the perception of scarcity slowed satiation because people paid less attention to the quantity consumed.

STUDY 1

This study tested our core prediction that perceptions of scarcity slow satiation. We gauged satiation by how quickly ongoing measures of enjoyment dropped over time, in line with recent research (Redden 2008; Nelson and Meyvis 2008; Ratner et al. 1999). We chose grapes as the food to be eaten because they are familiar and well liked by most people. As well, they also have a growing season and naturally have times of the year when they are more or less available.

Method

One hundred and thirty undergraduates participated for partial course credit. Upon arriving at the lab, participants were told that they would participate in a taste test in which they would each eat a total of 16 grapes. Participants first ate a single grape and rated “How much are you enjoying these grapes so far?” (1 = not at all, 100 = very much). They then read the following description in which we manipulated the perceived scarcity of the grapes (changes for the common condition noted in brackets):

“The grape you just tasted belongs to a particular [common] species that grows in very few places of [all over] the world each year. Because of this,

this grape has limited availability [is widely available] and is quite scarce [common].

This design ensured that participants familiarized themselves with the task before the key manipulation. More importantly, it also provided an initial rating of enjoyment unbiased by the scarcity manipulation. This allowed us to separately compare enjoyment before any information, right after the scarcity manipulation, and over time after the scarcity manipulation.

After reading the description of the grapes, participants subsequently had five servings of grapes each containing three units. They rated their enjoyment of the grapes on the previously used 100-point scale after each serving. Thus, each participant gave a total of six enjoyment ratings with one prior to the scarcity manipulation and five afterwards. After finishing the final grape, participants rated the availability of the grapes by rating their agreement (1 = not at all, 9 = very much) with the statements “This species of grape is widely available” and “This species of grape is really common”. These final two measures were included as manipulation checks.

Results

Manipulation checks. Participants perceived the grapes to be less available when they were in the scarce versus the common condition ($M_{scarce} = 4.50$ vs. $M_{common} = 8.79$; $t(128) = 7.64, p < .0001$). Likewise, those participants in the scarce condition also perceived the grapes to be less common than participants in the common condition

($M_{scarce} = 3.98$ vs. $M_{common} = 6.00$; $t(128) = 5.51$, $p < .0001$). The manipulation of perceived scarcity worked as intended.

Effect of scarcity on satiation. Our core prediction was that participants in the scarce condition would satiate at a slower rate. We tested the effect of scarcity on satiation using a regression on the five enjoyment ratings taken after the manipulation. The model included scarcity as a dummy-coded factor (set to one for scarcity), and the cumulative number of servings previously eaten as a continuous measure. The model also included the enjoyment rating taken before the manipulation as a covariate, and a repeated measure with an unstructured error structure. The analysis found a main effect of the number of servings ($F(1, 127) = 75.78$, $p < .0001$) as enjoyment declined as participants ate more grapes. More importantly, as the key test of our theory, there was an interaction between scarcity and the number of servings ($F(1, 127) = 15.75$, $p < .0001$). As shown in Figure 1, participants in the scarce condition satiated slower than those in the common condition. The model did not find a main effect for scarcity ($F < 1$, *ns*), indicating that scarcity affected enjoyment only over the course of repeated consumption.

We performed a series of planned contrasts to verify that the pattern of the interaction supported our theory. The initial enjoyment rating taken prior to the scarcity manipulation did not differ between the two conditions ($M_{scarce} = 76.00$ vs. $M_{common} = 76.91$, $t < 1$, *ns*). This merely indicates that our random assignment was successful in that the two groups generally liked grapes the same. A contrast of the enjoyment rating taken right after the scarcity manipulation also found no difference between the conditions ($M_{scarce} = 74.22$ vs. $M_{common} = 76.70$, $t < 1$, *ns*). The lack of an effect here shows that scarcity did not have an immediate effect on enjoyment. However, as predicted, the

contrast on the final enjoyment rating indicated a significant difference ($M_{scarce} = 67.66$ vs. $M_{common} = 56.58$, $t(128) = 2.02$, $p < .05$). This pattern of results provides evidence that the perception of scarcity resulted in a slower rate of satiation (i.e., a less steep slope), yet had no immediate effect on enjoyment (i.e., no intercept difference).

Discussion

This study confirmed our hypothesis that perceptions of scarcity reduce the rate of satiation. When participants ate grapes they believed were available only at particular times of the year, they experienced less satiation than those who believed the grapes to always be available. In fact, this perception of scarcity had a substantial effect in this study. Satiation in terms of the decrease in reported enjoyment was reduced by over half ($M_{scarce} = 8.34$ vs. $M_{common} = 20.33$) when the grapes were framed as scarcely versus commonly available.

This study produced sizable effects on satiation even though participants were physically consuming the grapes. The physical ingestion of the grapes provided participants access to physiological signals of their ongoing satiation. In spite of this, we propose that scarcity still reduced satiation because satiation also relies on how much attention people pay to the amount consumed. We found the predicted effects when eating grapes in this study, but we expect our theory to hold across nearly every type of food, unlike some other alternative explanations. For example, the notion that scarcity might provide a “license” to sin with fewer negative emotions like regret (Khan and Dhar 2006; Fitzsimons, Nunes and Williams 2007) seems less applicable to a virtuous food

like grapes. Our proposed process seems to better account for the data here, and the next study gathers additional measures to provide more direct evidence for our theory.

STUDY 2

The goal of this study was two-fold. First, it tested if the effects in Study 1 generalize to other foods. The previous study found that perceptions of scarcity reduced satiation when eating grapes. This could relate to something peculiar about grapes, such as they are seasonal in nature, perceived as virtuous, or generally not craved. To test if our prediction holds for other foods, we now used chocolate. Chocolate provides a stark contrast to grapes as it is not seasonal, relatively unhealthy, and highly desired. Our theory predicts that, regardless of the food type, perceptions of scarcity will still slow satiation by reducing attention to the quantity consumed. Second, this study takes a direct measure of attention to the quantity consumed to test whether it mediates the effect of scarcity on satiation. This mediation evidence will provide strong support for our theory and help rule out alternative accounts not steeped in attention to the quantity consumed.

Method

One hundred and seventy-seven undergraduates participated for course credit. Each participant received six pieces of chocolate weighing 21 grams in total. Participants first ate just one piece of the chocolate and rated it on a 100-point scale (“How much are you enjoying this candy so far?”; 1 = not at all, 100 = very much). Each participant then

read the following passage adjusted for whether they had been randomly assigned to the scarce or common condition:

“The product you just tasted contains cocoa grains that belong to a particular [very common] species that grows only in a few areas of Brazil for a short period of time [all over the world] every year. Because of this the product has limited availability [is widely available] and is quite scarce [common].”

Following the manipulation, participants consumed and rated the remaining five chocolates. After rating the sixth piece, participants answered “How much attention did you pay to the quantity of chocolate consumed?” (1 = not at all, 9 = very much). This measure was included so we could test whether our proposed process mediated any effects. We also asked “How much attention did you pay to the flavor of the chocolate?” (1 = not at all, 9 = very much) to rule out that attention to just any detailed aspect of the experience could explain the effect. Finally, we included two checks to ensure our manipulations influenced perceived scarcity. Participants rated their agreement (1 = not at all, 9 = very much) with the statements “This chocolate is widely available” and “This chocolate is really common”.

Results

Manipulation checks. Participants in the scarce condition considered the chocolates to be less available than those in the common condition ($M_{scarce} = 3.63$ vs. $M_{common} = 8.60$; $t(175) = 11.58, p < .0001$). They similarly perceived the chocolates to be less common when framed as scarcely available at only certain times ($M_{scarce} = 3.80$ vs. $M_{common} = 6.09$; $t(175) = 8.50, p < .0001$). Both of these items indicate that the scarcity manipulation was successful.

Effect of scarcity on satiation. We predicted that manipulating perceived scarcity would lower the rate of satiation. To test our hypothesis, we performed a regression on the five enjoyment ratings taken after the scarcity manipulation. The model included the scarcity condition as a dummy-coded factor (set to one for scarcity), and the cumulative number of pieces previously eaten as a continuous factor. The model also included a covariate for the enjoyment rating taken before the manipulation, and a repeated measure with an unstructured error structure. The analysis found a main effect of the number eaten ($F(1, 174) = 99.60, p < .0001$) as enjoyment declined with greater consumption. There was a marginally significant main effect of scarcity ($F(1, 174) = 3.43, p < .07$). However, these main effects were both qualified by the key predicted interaction between scarcity and the number eaten ($F(1, 174) = 8.38, p < .01$).

Figure 2 shows the nature of the interaction: enjoyment declined at a slower pace for those in the scarce versus the common condition. This reduced satiation led participants in the scarce condition to enjoy the last piece of chocolate more than participants in the common condition ($M_{scarce} = 53.30$ vs. $M_{common} = 36.73$; $t(175) = 3.43$,

$p < .001$). However, there was no difference in the enjoyment ratings taken right before the scarcity manipulation ($M_{scarce} = 67.82$ vs. $M_{common} = 64.01$, $t < 1$, *ns*), or right after it ($M_{scarce} = 67.52$ vs. $M_{common} = 60.94$, $t(175) = 1.44$, $p > .15$). The pattern of results for these contrasts indicates that the interaction was driven by a difference in the rate of satiation (i.e., a slope) rather than a temporary increase in initial liking (i.e., an intercept). This is exactly the pattern predicted by our theory.

Attention to quantity as a mediator. Consistent with our theory, participants in the scarce condition paid less attention to the quantity consumed ($M = 5.63$) than those in the common condition ($M = 6.78$; $t(175) = 2.51$, $p < .02$). We tested for mediation using the procedure outlined by Preacher and Hayes (2008). Our measure of satiation was the rating of the second piece eaten (taken right after the manipulation) minus the rating of the final piece eaten.¹ We then confirmed that this drop in enjoyment was predicted by both the scarcity condition ($\beta = -9.99$, $t(175) = 2.63$, $p < .01$), and the attention to quantity mediator ($\beta = 1.51$, $t(175) = 2.46$, $p < .02$). Finally, a bootstrapping analysis found that the factor for the scarcity condition had a significant indirect effect on the drop in enjoyment via the attention to quantity pathway ($\beta = -1.44$, 95% *CI*: [-1.10, -4.17]). This indicates that attention to the quantity consumed mediated the effect of perceived scarcity on satiation. A similar analysis found no evidence that attention to the flavor mediated the effect, as this factor was not influenced by the scarcity manipulation ($M_{scarce} = 6.14$ and $M_{common} = 6.60$; $t(175) = 1.10$, $p > .27$), or related to the drop in enjoyment ($\beta = -.06$, t

¹ We found similar results when the drop in enjoyment was calculated using the first rating before the manipulation as the starting point. The rating taken after the manipulation seems like a more appropriate control because it will account for any main effect of the scarcity manipulation on enjoyment.

< 1 , *ns*). Thus, it is not attention to any aspect of the experience, but rather reduced attention to the quantity consumed that explains why scarcity reduced satiation.

Discussion

This study replicated the previous study in confirming our core prediction: perceptions of scarcity reduced satiation. This finding provided further support for our theory and generalized the effects to another food. Compared to the grapes in Study 1, the chocolate used here differs in important ways. Chocolate is available at all times of the year, considered a vice for most diets, and a pleasurable indulgence. Even so, we still found that scarcity reduced satiation while eating chocolate. This is highly relevant, as the scarce products we are frequently exposed to in the marketplace are often of a hedonic nature. The results across the first two studies using different foods suggest that our effect is quite general in nature and extends to many foods.

We posit that scarcity had this effect because satiation depends on how much attention people pay to the amount eaten. Specifically, we posit that the belief one is consuming a scarce product diverted attention from keeping track of the quantity consumed, which in turn reduced satiation. Process measures provided direct evidence for the role of attention to the consumption quantity, while failing to find support for attention to the flavor. This indicates that our effects do not reflect a general distraction that reduces attention to every aspect of an experience; rather, the effect is specific and focused on attention to the quantity consumed. Mediation analysis showed that attention to the quantity consumed contributed to our findings and helped explain the effect of

scarcity on satiation. Scarcity seems to have a special ability to impede the attention processes that contribute to satiation. In this study, we created this benefit for consumers by merely claiming that the chocolates were not always available for consumption. As a result, the scarcity of limited opportunities for consumption proved to be an effective way to combat satiation.

STUDY 3

The primary goal of this study was to provide further support for our theory and proposed process. The previous study established attention to the quantity eaten as a mediator of the effect of scarcity on satiation. To complement this mediation evidence, we directly manipulated our core construct of attention to the quantity eaten in this study. If attention to the amount eaten underlies the effect of scarcity on satiation, as we propose, then explicitly instructing participants to pay close attention to their consumption quantity should diminish the effect. Such a finding would provide strong evidence for our proposed theory.

Method

Three hundred and twelve undergraduates participated for partial course credit. The stimuli and procedure matched those used in the previous study with the addition of the attention to quantity cue manipulation. This resulted in a 2 (perceived scarcity: scarce vs. common) x 2 (attention to quantity cue: absent vs. present) between-subjects design.

Each participant ate a total of six pieces of chocolate weighing 21 grams in total. After eating each piece, they rated their enjoyment on a 100-point scale (“How much are you enjoying this candy so far?”; 1 = not at all, 100 = very much). Scarcity was manipulated as in the previous study by altering the description of the chocolate to either be scarcely available only at certain times or commonly available at all times. Participants read this description in between eating the first and second pieces of chocolate so that the first enjoyment rating could serve as a covariate unbiased by the manipulation. Participants in the attention to quantity cue present condition were asked “How many candies did you just eat?” right after eating each piece of candy. This manipulation was designed to induce participants to pay more attention to the quantity of chocolate they had consumed. Participants in the attention to quantity cue absent condition did not receive this question and were left to their own devices as in the previous studies.

Results

Effect of scarcity on satiation. We tested our predictions using a regression analysis on the five enjoyment ratings taken after the manipulation. The model included factors for the perception of scarcity and attention to quantity cue conditions (dummy coded with scarce framing and attention to quantity cue present set to one), and the cumulative number of pieces eaten as a continuous factor. The model also included the initial enjoyment rating taken prior to the scarcity manipulation as a covariate, and a repeated measure with an unstructured error structure. The analysis found a main effect

for scarcity ($F(1, 307) = 4.53, p < .04$), and for the number previously eaten ($F(1, 307) = 221.92, p < .0001$). These two factors also significantly interacted with each other ($F(1, 307) = 7.14, p < .01$). More importantly, as predicted by our theory, all of these results were qualified by the overall three-way interaction with the attention cue factor ($F(1, 307) = 5.30, p < .03$). Figure 3 shows the nature of this interaction, but we report below separate ANCOVAs for each attention cue condition to test the pattern of the results.

Attention to quantity cue absent. For participants who did not get the attention cue, the results replicated the previous studies. There was a main effect of the number previously eaten ($F(1, 171) = 113.71, p < .0001$), no main effect of scarcity ($F(1, 171) = 1.40, p > .23$), and a two-way interaction between these factors ($F(1, 171) = 16.58, p < .0001$). These participants found the chocolate equally enjoyable right before the scarcity manipulation ($M_{scarce} = 67.66$ vs. $M_{common} = 68.05, t < 1, ns$), and right after it ($M_{scarce} = 68.71$ vs. $M_{common} = 67.42, t < 1, ns$). However, after eating the sixth piece of chocolate, participants in the scarce condition enjoyed the chocolate more than participants in the common condition ($M_{scarce} = 54.73$ vs. $M_{common} = 37.17, t(172) = 3.62, p < .001$). This demonstrates that the difference in enjoyment was not attributable to an intercept effect, rather it was due to a slope effect as our theory predicted.

Attention to quantity cue present. For participants receiving the attention cue, the results support our theory that attention to the quantity eaten underlies our effects. There was a main effect of the number previously eaten ($F(1, 135) = 116.40, p < .0001$), but no interaction between the number previously eaten and the scarcity condition ($F < 1, ns$). The lack of an interaction shows that cuing participants to the quantity eaten eliminated the effect of scarcity on the rate of satiation. This resulted in no differences in enjoyment

between the scarce and common groups whether enjoyment was measured before the scarcity manipulation ($M_{scarce} = 70.12$ vs. $M_{common} = 67.13$, $t < 1$, *ns*), right after it ($M_{scarce} = 70.99$ vs. $M_{common} = 64.39$, $t(136) = 1.45$, $p > .14$), or after the final piece ($M_{scarce} = 45.25$ vs. $M_{common} = 37.90$, $t(136) = 1.27$, $p > .20$). Forcing participants to pay more attention to the quantity being consumed by merely asking “How many candies did you just eat?” made those in the scarce condition satiate just as quickly as those in the common condition. In fact, consistent with our theory, only the scarce group without the attention cue had satiation that differed from the other three conditions (each pair wise comparison had $p < .01$).

Discussion

This study replicated the effects from our other studies by showing that perceptions of scarcity reduced satiation. Further, this study provided additional evidence that our proposed process of attention to the quantity consumed underlies the effect. We eliminated the influence of perceived scarcity on the rate of satiation by instructing participants to attend to the quantity being consumed. Thus, when nudged to pay attention to their consumption quantity, participants eating an apparently scarce food satiated exactly like their counterparts who believed they were consuming a widely available product. Not surprisingly, the presence of this attention cue did not influence the satiation rate of those participants who believed their product was more common, presumably because they were already paying attention to how much they had eaten.

Coupling this study with the previous one, we now have convergent evidence that changes in the attention to the quantity consumed drove these effects.

STUDY 4

The previous studies established that perceived scarcity slows the rate of satiation. This study had three objectives to expand on these findings. First, this study tested the robustness of scarcity effects to downstream consequential outcomes. Whereas our previous studies kept the quantity constant to properly gauge satiation, this study allowed participants to freely consume the chocolate (i.e., no piece-by-piece instructions with ratings). If perceived scarcity reduces the rate of satiation, as we predict, then it should also cause people to eat more. In addition to this behavioral measure of satiation, the study also included more typical managerial measures of retrospective enjoyment, purchase intention, and willingness to pay that should similarly reflect satiation. Second, the free consumption setting afforded an additional test of our theory. We gathered a more objective measure of attention to the quantity consumed by asking participants to estimate how much chocolate they had eaten. If participants in the scarce condition indeed paid less attention to the quantity consumed, then they should have less accurate estimates of the amount consumed (versus those in the common condition). As a proxy for attention to the quantity consumed, we also expected estimation accuracy to mediate the effect of scarcity on the amount consumed. Third, this study altered the scarcity manipulation to address a concern. Although the manipulations in the previous studies clearly influenced perceived scarcity, they may have also affected perceived uniqueness

or rarity. This study better differentiated these constructs by eliminating any unique aspects (e.g., grains from Brazil), and making it salient that the product was widely available (not rare in terms of quantity), yet widely available only during certain time periods (scarce in terms of limited opportunities).

Method

One hundred and twenty-two undergraduates completed this study for course credit. Participants learned that they would be eating chocolate as part of a taste test. They each received a cup with 30 pieces of chocolate each weighing 3 grams (total of 90 grams). Participants next read the following passage adjusted for whether they had been randomly assigned to the scarce or common treatment condition:

“The chocolate you are going to eat in this study belongs to a species that is available during **only a very brief window of time each year [throughout the whole year]**. It is available during this time, but **you cannot get it during all of the rest of the time [It is always readily available and you can get it anytime].**”

Participants then learned they could eat as much of the chocolate as they wanted. Once a participant decided to stop eating, they returned any uneaten candy to the lab administrator. The lab administrator then left the room and counted the number of pieces each participant ate.

Participants next answered several questions to gauge their continuing interest in the chocolate. They rated “Overall, how much did you enjoy the chocolate you ate during this study?” (0 = not at all, 10 = very much); “How likely would you be to purchase this chocolate?” (0 = not likely at all, 10 = very much likely); and “How much would you pay for a serving of this chocolate as big as what you received?”. We gauged attention to the quantity consumed by having participants estimate “How many chocolate pieces did you eat today during the study?”. Finally, as manipulation checks, participants rated their agreement (0 = not at all, 10 = very much) with “This chocolate is widely available” and “This chocolate is really common”.

Results

Manipulation checks. Compared to the common condition, participants in the scarce condition considered the chocolate to be less available ($M_{scarce} = 7.16$ vs. $M_{common} = 8.18$; $t(120) = 2.07$, $p < .05$), and less common ($M_{scarce} = 5.13$ vs. $M_{common} = 6.68$; $t(120) = 3.07$, $p < .01$). This indicates that the scarcity manipulation was successful.

Effect of scarcity on quantity consumed. We predicted that participants in the scarce condition would consume more chocolate as they would satiate at a slower rate. Consistent with this prediction, participants in the scarce condition ate 36% more pieces of chocolate than those in the common group ($M_{scarce} = 6.50$ vs. $M_{common} = 4.78$; $t(120) = 2.83$, $p < .01$). They ate more presumably because they satiated at a slower rate.

Estimated quantity consumed. If participants in the scarce condition paid less attention to the quantity consumed, then we expect them to provide less accurate

estimates. We calculated the accuracy of each estimate as the absolute value of the estimated quantity less the actual quantity that a participant ate (i.e., the unsigned error). Consistent with our prediction, participants in the scarce condition had more inaccurate estimates than those in the common condition ($M_{scarce} = 2.98$ vs. $M_{common} = 1.77$; $t(120) = 3.71, p < .01$).

Mediation analysis. Our theory further predicts that this inaccuracy mediates effects on the quantity consumed. Greater inaccuracy was indeed related to the quantity consumed ($\beta = 1.03, t(120) = 10.52, p < .0001$). When the quantity consumed was regressed on both the estimate inaccuracy and the perceived scarcity condition (scarce coded as 1), the estimated inaccuracy remained reliable ($\beta = 1.00, t(120) = 9.92, p < .0001$), while the coefficient for scarcity declined from -1.72 ($t(120) = 2.83, p < .01$) to $-.44$ ($t < 1, ns$). Bootstrapping indicated significant mediation ($\beta = 1.19, 95\% CI: [.46, 1.98]$). We also performed a mediation analysis with estimate inaccuracy and the raw estimate both included as factors. Bootstrapping established that estimate inaccuracy mediated the effect of scarcity ($\beta = 1.06, 95\% CI: [.39, 1.92]$), while the raw estimate did not ($\beta = .10, 95\% CI: [-.55, .77]$). This pattern shows that the mediation results did not simply reflect an inaccuracy due to those in the scarce condition simply eating more. Instead, it is the accuracy of the estimate that drove the effects on the quantity consumed, consistent with our theory that predicts less attention to the quantity consumed.

Other dependent measures. We next analyzed the effect of the scarcity manipulation on the other measures that should reflect satiation. Compared to the common condition, participants in the scarce condition recalled that the experience was more enjoyable ($M_{scarce} = 8.37$ vs. $M_{common} = 7.40$; $t(120) = 2.52, p < .02$), expressed a

higher likelihood of buying the chocolate ($M_{scarce} = 6.60$ vs $M_{common} = 5.20$; $t(120) = 2.87$, $p < .01$), and a willingness to pay more for the chocolate ($M_{scarce} = 3.18$ vs. $M_{common} = 2.08$; $t(120) = 2.55$, $p < .02$). Across all of these measures, participants in the scarce condition had a greater desire to have more of the candy.

Discussion

This study tested our predictions using several measures that should reflect satiation, and perceived scarcity affected all of them. Increased scarcity led participants to eat more, to recall enjoying the experience more in retrospect, to be more likely to purchase the candy, and to be willing to pay more for it. These findings suggest that the ability of scarcity to reduce satiation likely has a wide range of consequences, in particular the behavioral outcome of eating more. This is a particularly important consequence for consumers, especially given the growing obesity epidemic (Flegal et al. 2012). Of course, the other outcomes of purchase intent and willingness to pay also have great relevance to firms marketing their products.

The free consumption in this study not only tested our theory in a new setup, it also provided further evidence to support our proposed process. Instead of using a post-measure of attention to the quantity consumed, we could employ a more objective measure of attention using an estimate of the quantity eaten. Consistent with paying less attention, participants had less accurate estimates of how much they consumed when told the candy was scarce versus common. Further, the degree of inaccuracy served as a mediator and helped account for why perceived scarcity increased how much people ate.

This provides further evidence to support our proposed theory that perceived scarcity slows satiation by reducing attention to the quantity consumed.

Four studies have now provided consistent evidence that perceptions of scarcity reduce the rate of satiation. As well, we have a variety of process evidence linking this effect to reduced attention to the quantity consumed. One interesting question is why the perception of scarcity is linked to a lower level of such attention. We have proposed that this occurs because people take advantage of the opportunity to consume a scarce product by focusing on consuming more. With this outcome in mind, they have less need to monitor their intake or keep track of the quantity consumed. The next study tests if a focus on consuming more plays this role as an antecedent.

STUDY 5

This study built on the findings in the previous studies in three important ways. First, although we have shown the role of attention to the quantity consumed, the findings remained silent on why this happened. We have proposed that people pay less attention to how much they consume because they focus on eating more. To establish direct evidence of this connection, this study measured these underlying constructs to test for mediation. Second, so far we have measured enjoyment throughout the consumption experience to better capture the full pattern of changes over time. A drawback to this thorough approach is that participants may have found these repeated ratings to be somewhat fatiguing or annoying. We were also concerned that the baseline measure may have attenuated any initial effects of scarcity as this pre-rating was often not used in past work

on wanting (Worchel et al. 1975; Verhallen 1982). This study alleviated these concerns by measuring enjoyment at only two points in time: after the initial piece, and after the final piece. Third, this study included the behavioral measure of choice. Participants chose how many pieces of chocolate they would take home, as well as more typical managerial measures of retrospective enjoyment, purchase intent, and willingness to pay.

Method

Eighty-three undergraduates participated for partial course credit. Participants received 12 pieces of chocolate weighing a total of 30 grams. Before consuming the candies, each participant read the following passage adjusted for whether they had been randomly assigned to the scarce or common condition:

“The chocolate you are going to eat in this study belongs to a species that is available during **only a very brief window of time each year [throughout the whole year]**. It is available during this time, but **you cannot get it during all of the rest of the time [It is always readily available and you can get it anytime].**”

Following the manipulation, participants consumed only the first piece of chocolate. They then rated “How much are you enjoying this product so far?” and “How much would you like to eat more of this candy?” using two separate 100-point scales (1 = not at all, 100 = very much). We added this second measure of liking given we now had

fewer measurement trials than the previous studies, and both measures are common in the satiation literature. Participants were then told that they could eat the remaining 11 pieces. After they finished eating, they again rated the last piece using the same two scales so the drop in ratings could capture satiation. Participants also rated “Overall, how much did you enjoy the chocolate today?” (0 = not at all, 10 = very much). We also included two additional measures to capture the lingering desire for the chocolate as participants indicated “How likely would you be to purchase this chocolate?” (1 = Not at all likely, 10 = Very likely), and “How much would you pay for a full bar of this chocolate?”. Finally, as a behavioral measure of satiation, each participant chose how many pieces of the chocolate they wanted to take home. If participants in the scarce condition indeed satiated less, then they should choose to take more chocolates home to eat later.

Participants then completed several measures designed to let us test for our proposed process. Participants answered “When eating the chocolate, did you try to consume as much as you could?” (0 = not at all, 10 = a lot), and “How much attention did you pay to the quantity of chocolate you consumed?” (0 = none at all, 10 = very much). To assess the role of other mechanisms, participants also rated “How much attention did you pay to the flavor of the chocolate consumed? (0 = no attention at all, 10 = a lot of attention); “Did this study get your full attention the whole time?” (0 = not at all, 10 = a lot); “To what extent did you try to look for different aspects of the taste of the chocolate as you were consuming it?” (0 = not at all, 10 = very much); “How much regret did you feel when eating this chocolate?” (0 = not at all, 10 = very much); “Would you say that the chocolate you ate today is a premium chocolate?” (0 = not at all, 10 = very much);

and “How expensive do you think the chocolate you ate today is?” (0 = not at all, 10 = very much). Finally, to ensure our manipulations influenced perceived scarcity more than rarity, participants rated their agreement (1 = not at all, 9 = very much) with the statements “This chocolate is widely available”, and “This chocolate is really common”. Participants also rated “How rare is the chocolate you just tasted?” (0 = not rare at all, 10 = very rare).

Results

Manipulation checks. Participants in the scarce condition considered the chocolates to be less available than those in the common condition ($M_{scarce} = 5.34$ vs. $M_{common} = 6.57$; $t(81) = 2.21$, $p < .04$). They similarly perceived the chocolates to be less common ($M_{scarce} = 4.24$ vs. $M_{common} = 5.28$; $t(81) = 2.33$, $p < .03$). Both of these items indicate that the scarcity manipulation was successful. Moreover, there was not a significant difference in perceptions of rarity between conditions ($M_{scarce} = 4.54$ vs. $M_{common} = 4.18$; $t < 1$, *ns*), which indicates that our manipulation had the intended effect of altering perceptions of scarcity more so than rarity.

Effect of scarcity on satiation. We predicted that increasing perceived scarcity would slow the rate of satiation. To test our hypothesis, we performed a repeated measures ANOVA on indices averaging the enjoyment and the desire for more ratings ($\alpha > .82$ for both initial and final index). The model included timing (initial; final) as a within-subject factor, and scarcity (common; scarce) as a between-subjects factor. The analysis identified a main effect of timing as participants satiated over time ($F(1, 81) =$

79.21, $p < .0001$), but no main effect of scarcity ($F < 1$, *ns*). More importantly, as shown in Figure 4, the timing and scarcity factors interacted ($F(1, 81) = 4.05$, $p < .05$). There was not a significant difference in rated enjoyment immediately after consumption of the first chocolate ($M_{scarce} = 77.82$ vs. $M_{common} = 76.62$; $t < 1$, *ns*), but participants in the scarce condition indicated greater enjoyment after the final piece ($M_{scarce} = 53.89$ vs. $M_{common} = 39.71$; $t(81) = 2.00$, $p < .05$). Thus, we replicate our earlier findings.

Other dependent measures. We next analyzed the effect of the scarcity manipulation on the other measures that should reflect satiation. Compared to the common condition, participants in the scarce condition chose to take home more of the chocolate ($M_{scarce} = 4.73$ vs. $M_{common} = 3.07$; $t(81) = 2.19$, $p < .04$), recalled the overall experience as being more enjoyable ($M_{scarce} = 7.34$ vs. $M_{common} = 6.33$; $t(81) = 2.20$, $p < .04$), and had a greater likelihood of purchasing the chocolate ($M_{scarce} = 6.21$ vs. $M_{common} = 4.56$; $t(81) = 2.90$, $p < .01$). They also indicated a willingness to pay more for the chocolate, but this result did not attain statistical significance ($M_{scarce} = 1.40$ vs. $M_{common} = 1.25$; $t < 1$, *ns*). Regardless, the overall pattern is clear as participants in the scarce condition had a greater desire for more of the candy.

Mediation analysis for attention to quantity consumed. We have posited that perceptions of scarcity slow satiation because of reduced attention to the quantity consumed. We tested this claim with a mediation analysis. We calculated satiation as the index of ratings after the first piece minus that after the last piece. The scarcity independent variable (dummy coded as 1 for scarce) influenced the attention to quantity mediator ($M_{scarce} = 4.75$ vs. $M_{common} = 6.48$; $t(81) = 3.09$, $p < .01$). The attention to quantity mediator was also related to the dependent variable of satiation ($\beta = 4.70$, $t(81) =$

3.76, $p < .001$). When the dependent variable was simultaneously regressed on both the mediator and the independent variable, the mediator remained significant ($\beta = 4.34$, $t(80) = 3.28$, $p < .01$), while the coefficient for the independent variable declined from -13.98 ($t(81) = 2.01$, $p < .05$) to -5.89, $t < 1$, *ns*). A bootstrapping analysis confirmed that the scarcity manipulation had a significant indirect effect on satiation via the attention to quantity pathway ($\beta = -7.49$, 95% *CI*: [-3.00, -15.41]). This pattern of results indicates that attention to the quantity consumed mediated the effect of perceived scarcity on the rate of satiation.

Mediation analysis for focus on consuming more. We have further proposed that attention to the quantity consumed differs because scarcity leads people to focus on consuming more. To demonstrate this other piece of our process sketched in Figure 5, we conducted an additional mediation analysis. The focus on consuming more was influenced by perceptions of scarcity ($M_{scarce} = 6.07$ vs. $M_{common} = 4.03$; $t(81) = 4.00$, $p < .0001$), and was related to attention to the quantity consumed ($\beta = -.46$, $t(81) = 4.19$, $p < .0001$). When the analysis of the effect of perceptions of scarcity on attention to quantity included the focus on consuming more mediator, the mediator remained reliable ($\beta = -.38$, $t(80) = 3.18$, $p < .01$), and the scarcity coefficient decreased from -1.73 ($t(81) = 3.09$, $p < .01$) to -.93 ($t(80) = 1.56$, $p < .15$). A bootstrapping analysis confirmed the presence of significant mediation ($\beta = -.79$, 95% *CI*: [-.23, -1.67]). This shows that a focus on consuming more mediated the effect of perceived scarcity on attention to the quantity consumed.

Mediation analysis for other constructs. We tested whether other measures mediated the effect of scarcity on satiation. The scarcity manipulation did not affect

attention paid to the flavor ($M_{scarce} = 6.29$ vs. $M_{common} = 5.62$; $t(81) = 1.57$, $p > .12$), to different aspects of the food ($M_{scarce} = 5.61$ vs. $M_{common} = 5.10$; $t(81) = 1.02$, $p > .31$), or to the study ($M_{scarce} = 6.90$ vs. $M_{common} = 6.26$; $t(81) = 1.21$, $p > .22$). It also did not affect regret ($M_{scarce} = 3.98$ vs. $M_{common} = 3.76$; $t < 1$, *ns*), but it did alter perceptions of being a premium ($M_{scarce} = 5.22$ vs. $M_{common} = 3.88$; $t(81) = 2.58$, $p < .02$), and expensive product ($M_{scarce} = 5.15$ vs. $M_{common} = 3.93$; $t(81) = 2.63$, $p < .02$). However, the extent of satiation did not correlate with either the perception of being premium ($r = -.10$, $p > .35$), or expensive ($r = -.20$, $p > .08$). This indicates that these perceptions did not serve as mediators. Overall, the process shown in Figure 5 best accounted for the pattern of our findings.

Discussion

This study replicated the previous findings and confirmed our theoretical process. When told a product was available only at certain times, participants paid less attention to the quantity consumed which reduced satiation. Mediation evidence established that this happened partially because scarcity triggered a focus on consuming more that encouraged less ongoing monitoring of the quantity being eaten. However, perceptions of scarcity did not reduce attention to just any aspect of the experience as a general distraction account would predict. A general distraction has difficulty explaining why scarcity increased the focus on eating more while simultaneously decreased attention to the quantity consumed.

The results indicated that reduced attention to the quantity consumed was the critical driver of our effects. The data did not find evidence of mediation for attention to

other aspects (e.g., flavor, overall study), or for any of several other constructs we measured (e.g., regret, premium perceptions, rarity of the product). This helps rule out several alternative explanations as the evidence better supported our proposed process.

This study also demonstrated the general nature of this phenomenon along several dimensions. First, participants tasted and rated the chocolate only after the scarcity manipulation. This study design is more consistent with some past work on scarcity and wanting (Worchel et al. 1975; Verhallen 1982), and likely matches the timing found in natural settings as consumers often learn about a product before tasting it. We replicated our key results, indicating that our effects are not peculiar to the design of the study. Second, this study measured ongoing enjoyment on only two occasions: after eating the first and last pieces. We still found that perceived scarcity reduced the drop in enjoyment, indicating that fatigue or annoyance was likely not driving the effect in previous studies. Third, this study demonstrated that perceived scarcity led participants to choose more of the candy to take home with them. This suggests that perceived scarcity does not affect just the current consumption experience; rather, it could have a wide range of future effects that include product preferences, consumption frequency, brand loyalty, willingness to pay, etc.

GENERAL DISCUSSION

A ubiquitous problem for consumers is satiation on things they like most. That is, they often expend great effort to find something they really enjoy, yet find this pleasure is fleeting as the satiation from repeated consumption makes it less enjoyable. Such

satiation poses a consequential problem for both consumers as they futilely search for new experiences to sustain their happiness (Brickman and Campbell 1971), and for those serving consumers (e.g., policy makers, firms, parents) who face a constantly changing set of preferences. Unfortunately, although researchers have highlighted this problem, past work has demonstrated few successful solutions (see Raghunathan and Irwin 2001; Redden 2008 for exceptions). The present research adds to this sparse literature by showing that perceived scarcity effectively reduces satiation.

Five empirical studies establish that creating the mere perception of scarcity, by saying a product is available at only limited times, reduces the rate at which enjoyment declines over time. We demonstrate this effect whether participants eat a food that is more virtuous, or more hedonic. We also find the effect appears whether satiation is captured through the decline in enjoyment ratings, the amount consumed, the amount taken home, recall of the overall experience, intention to purchase, or willingness to pay. This evidence shows the general nature of this effect, and suggests it likely holds across most foods for most outcomes tied to preference.

The studies also established why scarcity reduced satiation. Consumers who believed that a product was scarce paid less attention to how much they consumed, and this made them satiate slower. Process evidence supported this explanation in the form of mediation using measured attention to the quantity (Studies 2 and 5), moderation by directly manipulating this attention to eliminate the scarcity effect (Study 3), and mediation using the accuracy of the estimated quantity eaten (Study 4). Finally, we also established that perceptions of scarcity reduce attention to the quantity consumed because people felt the need to take advantage of the rare consumption opportunity they had been

given (Study 5). Across the studies, we found consistent evidence that perceived scarcity slows satiation by reducing the attention to the quantity consumed.

Our findings deepen our understanding of the process of satiation (and how to stop it), while also providing insight into how scarcity affects liking. While past work has established that scarcity increases wanting (Fromkin 1970; Verhallen 1982; Cialdini 2009), we show that scarcity also increases enjoyment but this phenomenon largely develops only over time. We consistently failed to see evidence that scarcity affects enjoyment initially after the scarcity manipulation. We found instead that scarcity increased enjoyment only because it reduced the rate of satiation after a considerable amount had been consumed (i.e., a slope effect). This pattern of results indicates that the typical assumption that scarcity increases liking is perhaps an oversimplification. Given the scant experimental evidence showing that scarcity increases liking, future research could find it fruitful to explore the conditions under which scarcity increases liking.

We confirmed that limited opportunities to consume slow satiation, but we should also note potential limitations. The effect of perceived scarcity on the rate of satiation may attenuate with consumption on many occasions. It is easy to imagine that a once scarce stimulus will no longer be seen as such once it has been available many times in the past. However, when thoughts of scarcity have been activated, we expect that the tendency to turn off satiation may be quite automatic. This could explain why consumers from industrialized countries (the sample population we used in our studies) would still show our predicted effects even though their survival no longer depends on consuming scarce stimuli in large amounts.

It is also worth noting how our findings fit with past work on the relationship between product availability and consumption. We add to this literature by demonstrating the importance of the type of scarcity. Past research has found that scarcity in the form of limited quantities on hand can reduce the amount consumed (Folkes et al. 1993; Wansink 1996). Although this past work did not measure enjoyment (so it is necessarily silent on satiation), in some ways we find the opposite relationship as perceived scarcity reduced satiation and increased consumption (as in Study 4). We reconcile these two findings by differentiating between scarcity as a limited quantity on hand (as in past work) versus scarcity as a limited opportunity to consume (as in our work). The former notion of a limited quantity should encourage conservation to make it last, while the latter notion of a rare consumption opportunity should encourage free consumption and the slower satiation rate we find. Future research should further explore how the situational and temporal aspects of scarcity affect enjoyment and intake in different ways.

We have speculated that humans learned the adaptive behavior of maximizing the opportunity to eat scarce foods, and slower satiation facilitates this outcome. Future work can explore the evolutionary foundations of this effect, and whether it is automatic in nature. Future work could also understand how conscious goals to regulate one's diet fit with our findings. For example, a dieter trying to eat more carrots may find that explicitly tracking their progress toward this goal proves effective. Alternatively, given our findings for perceived scarcity, a dieter might find carrots less satiating and more palatable if they did not track their consumption. Regardless, we suggest that dieters might avoid scarce foods (or at least appreciate their effects), and eliminate making limited availability more

salient (e.g., chocolate cake only on Fridays). These steps might let them use satiation to better control their diet.

Future work could also examine how broadly our effects apply, an important concern for firms. It remains an open question whether perceived scarcity will reduce satiation for all foods, all physical products, or even all experiences. To the extent that attention to quantity drives satiation, we expect our theory applies in many cases. Thus, firms should consider the broader implications of our work for marketing. For example, a scarce product may underperform in the single exposure setup typically found in product taste tests or ad focus groups, yet overperform in the market with repeated consumption and satiation. Likewise, a firm may want to restrict the times a product is made available (sometimes called an “in-and-out”), and explore the effectiveness of this strategy in increasing the preference and demand for a product. A particularly interesting question is the optimal frequency and duration for these periods of limited availability. More generally, firms should consider how they can leverage a scarce image for a brand, and how this technique holds up in the face of satiation with repeated consumption.

Our work identifies perceptions of scarcity as one way to reduce attention to the quantity consumed, which subsequently slows the rate of satiation. Of course, scarcity is almost certainly not unique in this ability. We expect future work to uncover other factors that could similarly slow satiation. For example, perhaps when people mindlessly follow the norm of what others are doing (Cialdini 2009), they may similarly pay less attention to the quantity consumed and get less satiated. By identifying attention to the quantity as a key underlying mechanism, the present research provides some direction to future research to identify the best ways to reduce satiation. We show that scarcity is one way to

dampen this particular attention, and while there are surely multiple ways to trigger perceptions of scarcity, there are also surely other constructs that produce similar effects on this type of attention. We hope this work encourages and assists such endeavors given the importance of satiation for consumer well-being.

CHAPTER 3: THE EFFECT OF PROSPECTIVE FUTURE VARIETY ON SATIATION FROM A CURRENT EXPERIENCE

Several factors influence our enjoyment and satiation from a current experience. These include: the initial utility (Coombs and Avrunin 1977), the quantity consumed (Mook and Votaw 1992; Rolls, Duijvenvoorde, and Rolls 1984), the rate at which we consume it (Nelson and Meyvis 2008; Nelson et al. 2009), how much variety it contains (Ratner, Kahn, Kahneman 1999; Rolls et al. 1981), how we remember it (Rozin et al, 1998) or categorize it (Redden 2008). Finding ways to delay satiation can increase our overall happiness (Raghunathan and Irwin 2001) as this effect causes consumers to stop enjoying their favorite products and feel the need to consume superior ones in order to maintain a constant level of enjoyment (Brickman and Campbell 1971). Despite its importance, not much work has investigated methods in which satiation can be reduced.

The current research looks at a new factor that may influence satiation from a current experience: consumers' prospective future consumption in a given domain. Frequently, our future consumption in a specific category is pre-determined because of decisions we make in advance. For example, we choose to buy vacation packages, time shares, or season tickets for extended periods of time, lease vehicles for a set number of months, acquire annual country club or gym memberships, or buy yogurt in bulk at Costco. Alternatively, there are situations where we may find ourselves committed to a specific set of entertainment or dining options due to external circumstances, for example, when we move to a particular city for work. Common to both of these types of situations is the fact that consumers know what their future consumption in a given domain is likely to be.

This research looks at the effect that a specific aspect of prospective future consumption may have on satiation from a current experience. We study the effect that the amount of variety that a consumer will be exposed to in the future may have on satiation from a present consumption episode. We predict that given consumers' preference (Herrnstein and Prelec 1991) and tendencies to overvalue variety (Ratner, Kahn and Kahneman 1999; Simonson 1990), they will enjoy more and satiate from a present experience less if they know that in the future they will be facing a more varied consumption episode.

This rationale is consistent with past findings documenting people's preference for variety. For example, Ratner, Kahn and Kahneman (1999) showed that people prefer choosing varied sets even though these are less enjoyable. The reason for this is that despite being less enjoyable in real time, these varied sets are recalled as more pleasant, probably due to people's lay beliefs about variety. Moreover, research by Simonson (1990) showed that people underestimate their future desire for a stimulus that they are consuming in the present. This bias will lead consumers to pick more variety when they make simultaneous as opposed to sequential choices. Consistent with this tendency to underestimate future desire for a currently consumed stimulus, we propose that consumers will enjoy a present stimulus more if they know that in the future they will be exposed to a more varied experience.

Unlike past work on anticipation of enjoyable experiences (e.g. Loewenstein 1987), we propose that this effect will take place even in cases when preferences for the varied future is equal to preferences for the focal consumption experience. Moreover, we propose that not only will consumers extract direct utility from anticipating a varied

future, but they will also enjoy more and satiate less from a current, related consumption experience. This notion is supported by research showing that satiation is not merely a physiological phenomenon but it is also constructed in present time (e.g. Redden 2008; Rolls et al, 1981), as this means that its occurrence may be influenced by external factors that could affect the way in which consumers experience a consumption episode.

Demonstrating the effect that prospective future consumption may have on a related current experience is relevant as it would suggest that when consumers commit to specific future consumption conditions, they are not only making a decision that will affect their enjoyment of it in an upcoming time, but also their present enjoyment of other related experiences. This finding may prove instrumental to people's wellbeing, as it would show that the way in which consumers set themselves up for the future may have a positive effect on their enjoyment and satiation from a current associated experience.

The current research contributes to both the anticipated consumption and satiation literatures in meaningful ways. It shows that anticipating future consumption does not only affect our present feelings through either savoring or dread (Loewenstein 1987), but it may also play a role on how much we enjoy and how fast we satiate from a current experience. By doing this, we also establish a novel determinant of satiation. This would be a valuable addition to the satiation literature, if we consider the theoretical importance that anticipating an experience has on wellbeing and the frequency with which we encounter situations in our everyday lives where our future consumption in a specific domain is predetermined due to our own decisions or external circumstances.

THEORETICAL DEVELOPMENT

Future Consumption and Wellbeing

Anticipating an experience influences our feelings in the present and not only in the future (Loewenstein 1987). People *savor* an upcoming pleasurable event and *dread* a future aversive one. Besides the direct effect on wellbeing that these anticipatory emotions may have (Loewenstein et al. 2001), we propose that the anticipation of future experiences could also play a role in our enjoyment and satiation from a current related consumption episode.

Recent work has looked at the effects that anticipating future consumption may have on behavior. For example, Shu and Gneezy (2010) showed that people may not only procrastinate for aversive experiences but also for positive ones as they may choose to wait for what they think is the right moment to consume their favorites and maximize their experienced utility. Moreover, research by Meyvis and Cooke (2007) has shown that anticipating making similar future choices in a given domain increases people's propensity to compare their past choices with better alternatives, which decreases their preference for their chosen option. This occurs because in such cases consumers overweigh unfavorable comparisons. While this may be true for cases involving choices in the present and in the future, we hypothesize the opposite for situations that do not involve making decisions, as these already have been made. In such cases, we propose that people will be likely to enjoy the present experience more as they know they will be consuming a different one in the future. Moreover, we predict that consumers will also

start thinking about their enjoyment of their upcoming future experience, which will make the present consumption episode more enjoyable overall. Our prediction is supported by findings that show that satiation is constructed at the moment and can be influenced by psychological factors (e.g. Raghunathan and Irwin 2001; Redden 2008). In this case we propose that anticipating the future may influence our psychological “satiation clock” and the way in which we experience and satiate from the present.

Satiation from Repeated Consumption

Satiation describes the phenomenon where consumers enjoy a stimulus less as repeated consumption takes place (Coombs and Avrunin 1977). This effect has been documented among all types of stimuli including edible (e.g. Rolls et al, 1981) and nonedible ones (e.g. Nelson and Meyvis 2008; Nelson et al. 2009; Ratner, Kahn and Kahneman 1999). Fortunately, recent research has shown that the occurrence of satiation may be delayed by psychological factors (e.g. Raghunathan and Irwin 2001; Redden 2008). Hence, finding new ways to avoid it is instrumental to people’s happiness (Frederick and Loewenstein 1999). Recent efforts on this direction have focused on factors such as creating interruptions during a hedonic event (Nelson and Meyvis 2008; Nelson et al. 2009) or manipulating the way in which an experience is categorized (Raghunathan and Irwin 2001; Redden 2008).

While it is intuitive to believe that physiological factors, such as the quantity consumed (e.g. Mook and Votaw 1992) or the amount of variety experienced (e.g. Ratner, Kahn and Kahneman 1999; Rolls et al., 1984) affect satiation, recent research has

also shown that merely making people remember how much variety they have enjoyed in the past can help them recover from this effect (Galak et al. 2009). Consistent with this notion, we propose that if people can recover from satiation by recalling past varied experiences, then it would be fair to examine if current satiation can be delayed by thinking about the degree of variety to be enjoyed in the future.

Future Variety and Satiation Rate, Savoring the Present and Tasting the Future

The current research proposes that enjoyment and satiation in the present can be influenced by how much variety we anticipate to consume in the future. We posit that this occurs for two reasons. First, people may focus on savoring the currently consumed item more if they know that they will not be experiencing it again in the near future. Research by Kurtz (2008) showed that students enjoyed their college experience more when they were told that this would be ending soon. This demonstrates that focusing on the ending of a positive life experience can lead to increased enjoyment of the present. While students on this experiment may have elected to engage in more university related activities to take advantage of their last days in college, we suggest that participants in our studies may have had a similar motivation, which could have led them to focus on savoring the present experience more, and this may have led to its higher enjoyment.

Besides this motivation to enjoy the present, we suggest that when consumers anticipate that they will be having a related yet different consumption experience in the future they may also start mentally simulating its taste in the present, which may lead them to “consume it ahead of time” and enjoy the overall experience more. Past research

has demonstrated that perceptions about the taste of a stimulus can be influenced by relevant aspects such as perceived price (e.g. Plassman et al. 2008), healthiness (Raghunathan, Naylor and Hoyer 2006), knowledge about the presence of a particular ingredient (Lee et al. 2006) or brand name (Allison and Uhl 1964; Leclerc et al. 1994). Even common, subtle, non-evaluative written or visual cues such as color information have been shown to affect taste perceptions (Hoegg and Alba 2007). If such non-diagnostic cues have been demonstrated to influence perceived flavor, then it may be reasonable to suggest that thinking about the taste of a stimulus to be consumed in the future while consuming a different item in the present may also affect current experienced taste and this could influence overall enjoyment and subsequent satiation from an experience. In our proposed setting, given consumers' preference for variety (e.g. Ratner, Kahn and Kahneman 1999; Simonson 1990) and its prospects of being enjoyed in the future, we predict that this effect will derive in higher enjoyment and less satiation from a current consumption experience.

We tested our theory in a series of studies in which participants rated their enjoyment as they ate food. Study 1 validated the core prediction that participants satiated slower when they were told that they would be consuming a different stimulus in the future (versus the same). Study 2 demonstrated the effect in a setting where participants had some control about what they would consume in the future. This study also varied timing in the future, showing that the effect persists when future consumption occurs in a few days as opposed to in a few weeks. This experiment demonstrates that the phenomenon is caused by an enhancing effect of anticipating a varied future as opposed to a negative effect of anticipating a redundant consumption episode. This was achieved

through the introduction of a control condition which was compared to both types of future consumption scenarios. Study 3 provided mediational support in favor of the proposed mechanisms and ruled out the alternative explanation that the effect may be due to higher preference for the jelly bean flavor to be consumed in the future. This experiment also demonstrates that the effect is domain specific, as it did not hold when participants were told that in the future they would be experiencing a more preferred, though unrelated consumption episode. This series of studies consistently established that anticipating prospective future variety slowed satiation from a current experience and that this occurred because people focused more on enjoying the present and also imagined the taste of the stimulus to be consumed in the future.

STUDY 1

This study was designed to test the hypothesis that people satiate slower from a current consumption experience when they anticipate consuming more variety in the future. The experiment employed a 2-cell design, where participants were told that they would be enjoying high variety in their next consumption episode or that they would be consuming the same stimulus as in the current study (no variety condition).

Method

One hundred and eighty five (185) students participated in this experiment in exchange for course credit. Upon arriving at the lab, participants were told that they would be participating in a taste test in which they would each eat a total of 20 French vanilla jelly beans. Before starting the consumption task participants were asked to read the following passage:

“In this study you will be eating French vanilla jelly beans and providing evaluations about the experience. When the session is over, you will receive a bag of jelly beans with 8 different flavors [or the same French vanilla flavor] for you to take with you.”

After reading the manipulations, participants subsequently had five servings of jelly beans each containing four units. Following each serving, subjects rated their enjoyment of the candies using the following scale: “How much are you enjoying this candy so far?” (1 = not at all, 100 = very much).

Results

Future Variety vs No Future Variety. Our core prediction is that participants in the future variety condition would satiate at a slower rate. To test this hypothesis, we performed a repeated measures ANOVA on the five enjoyment ratings with prospective future as the between-subjects factor and ratings as the within-subjects variable. The initial enjoyment

rating (i.e., immediately after the manipulation) did not differ between the future variety (M = 48.97) and no future variety conditions (M = 51.74; $t(183) = 0.98, p > .35$). However, enjoyment after the fifth consumption episode was higher in the future variety condition (M = 30.88 vs. M = 20.98; $t(183) = 2.30, p < .03$). Figure 6 illustrates the sequences of enjoyment ratings for each of the conditions. The analysis also revealed a significant enjoyment x prospective future consumption interaction, ($F(1, 183) = 13.86, p < .0001$), suggesting that ratings in the future variety condition exhibited a different pattern than those in the no future variety group. These results demonstrate that the enjoyment ratings for the variety condition declined at a slower pace than those in the no variety group.

Discussion

This study provides initial evidence in favor of the effect of prospective future consumption on satiation from a current experience. However, there are alternative explanations for the findings we reported. For example, while our hypothesis suggests that the differential effect is due to people satiating less in the variety condition, it is possible that the findings could have been driven by people satiating faster in the no variety group. In Study 2 we will add a control condition to rule out this alternative explanation. The design used in study 1 is a proxy for some real life situations where consumers' future consumption is determined by external circumstances and not by their own design (e.g. the options available in a particular city where a person is travelling for work). Study 2 will investigate if the effect holds for cases where participants have some

control on their future consumption experiences. Moreover, study 1 manipulates the degree of variety by mentioning that in the future consumers will enjoy eight different flavors versus the same one. In Study 2, we ask participants to rank their favorite flavors and based on these preferences, assign them to a particular variety condition. Finally, since this effect relies on consumers' perceptions of the "future," we manipulate the magnitude of the time that will elapse between the current and the future conditions and observe if the effect persists.

STUDY 2

This study had several objectives. First, we rule out the alternative explanation that the results found in Study 1 may have been driven by the no future variety group and not by the variety condition as we hypothesized. We did this by introducing a control group and comparing it to the future conditions. Second, this study extends the effect to situations where prospective future consumption is not completely determined by external factors but it is also influenced by consumer choice. To do this we asked participants to rank their favorite flavors of jelly beans and assigned them to eat their second most preferred one during the current experiment. The "future condition" either tells them that they will be eating that same flavor or their favorite one during their next consumption occasion. Third, in this experiment we asked participants to rate a trial serving before the manipulation takes place to make sure that participants' initial preference for the jelly beans is not different among conditions. We took this measure because in this study participants would be eating different flavors of jelly beans and we

wanted to make sure that there were no initial differences created by this factor. Finally, this study investigates the role of timing on the future variety effect.

Method

Three hundred and thirteen (313) undergraduates participated for partial course credit. The design was a 2 (time distance: small vs. large) x 2 (future flavor: favorite or same) plus a control condition between-subjects design with consumption episodes as a repeated measures factor. At the beginning of the study participants were asked to rank five different flavors of jelly beans (strawberry, cherry, lemon, orange and grape) by preference (1=favorite, 5=least favorite). After providing their rankings, participants were asked to consume 25 jelly beans of their second favorite flavor. Participants first ate one piece of candy and rated it on a 100-point scale (“How much are you enjoying this candy so far?”; 1 = not at all, 100 = very much). By measuring initial preferences we could control for initial differences in preference. After consuming and rating the first jelly bean, participants (except those in the control condition) read a passage that manipulated time distance and option to be consumed in the future. Participants who were assigned to the variety condition were told that they would be eating their favorite jelly bean flavor in their next consumption episode, while those who were assigned to the “same” condition were instructed that they would be eating the same flavor they were eating during the study. For the time distance manipulation we told participants that they would be having their next consumption episode “a few days from now,” (small distance) or that they would be going through the experience next year (large distance). Participants then were asked to consume 4 jelly beans and rate their enjoyment of the candies using the same

scale as in study 1: “How much are you enjoying this candy so far?” (1 = not at all, 100 = very much). They repeated this mechanism five times, for a total of 25 jelly beans consumed and 6 post-manipulation ratings provided.

Results

We tested our predictions by using a repeated measures ANOVA on the six post-manipulation consumption episodes with future variety and time distance as between-subjects variables and enjoyment for the first jelly bean consumed as a covariate. Before performing the analysis we confirmed that there were no differences in initial liking of the jelly beans among the groups ($F(1, 308) = 1.63, p > .25$). After running the analysis (excluding the control condition) we found a main effect for future variety ($F(1, 258) = 17.18, p < .0001$) as participants satiated more in the future variety than in the no future variety condition ($M_{variety} = 45.57$ vs. $M_{control} = 29.92; t(255) = 3.72, p < .0001$). There was also a significant effect of the repeated measures factor ($F(1, 258) = 27.25, p < .0001$) as participants enjoyed the candies more after the first consumption episode than after the last one ($M_{1st} = 70.76$ vs. $M_{6th} = 36.34; t(260) = 14.70, p < .0001$). There was also a significant future variety x consumption episode interaction ($F(1, 258) = 9.21, p < .0001$). Moreover, all of these results were qualified by an overall three-way interaction with the time distance factor ($F(1, 258) = 2.29, p < .05$). While the effect held across both time distance conditions, it was directionally stronger for the near future group in the high future variety condition ($M_{small\ distance} = 49.18$ vs. $M_{large\ distance} = 42.35; t(135) = 1.25, p > .21$), while it was directionally stronger for the distant future group in the no variety

condition ($M_{small\ distance} = 25.77$ vs. $M_{large\ distance} = 33.36$; $t(125) = 1.17$, $p > .24$). This pattern of results suggests that the effect will hold for cases where future consumption is expected to take place in the far or near future.

Control condition. Finally, we compared the rates of satiation between the future variety conditions and the control group and found that the latter exhibited a faster rate of satiation ($F(1, 194) = 8.08$, $p < .0001$). People in the future variety condition enjoyed the last consumption episode more than those in the control condition ($M_{variety} = 45.57$ vs. $M_{control} = 26.64$; $t(194) = 3.78$, $p < .0001$). There were no significant differences between the no future variety and the control conditions ($M_{no\ variety} = 29.92$ vs. $M_{control} = 26.64$; $t(171) = 0.61$, $p > .54$). This pattern of results demonstrates that the effect of prospective future variety on satiation from a current experience was driven by people satiating slower in the future variety condition.

Discussion

This study replicated the effect by showing that people satiate less from a current experience when they are able to anticipate a more varied future consumption episode from the same domain. Further, this study extends the validity of the effect to situations where consumers are able to determine what their favorite experiences are. This study also replicates the effect using a different manipulation from that employed in the first experiment. While in the first study we manipulated future variety by telling participants that they would be receiving a bag of jelly beans containing either eight different flavors or the same flavor they had just consumed for them to take home, in this case we did this

by communicating to subjects that they would be eating their top ranked flavor of jelly beans in the future as opposed to their second one. This study also demonstrates that the effect will hold in cases where future consumption is expected to take place in either the near or far future.

Study 3 was designed to provide mediational evidence supporting our theory. In this experiment we pre-tested the jelly beans flavors that were used for both the current and future consumption scenarios in order to make sure that they were equally liked so that we could rule out an alternative explanation that the effect may be driven by higher intrinsic preference for the item to be consumed in the future as opposed to by variety. While this design is relevant as it emulates real life situations where we set ourselves to consume our favorites, a follow-up design must rule out this potential account. Finally, and unlike the past studies, in study 3 participants were not asked to provide enjoyment ratings across the consumption episode, but instead were only asked at the end of the experience. While using periodic ratings of enjoyment is the best way to illustrate the differences in the slopes of satiation among the conditions, it is possible that the effect may have been due to differential boredom experienced among the different treatments, so this simpler design helped to rule out that alternative explanation and constituted a more naturalistic test of the effect. The reduced number of measures also allowed us to add another typically used measure of enjoyment and satiation (e.g. Redden 2008; Rolls et al. 1981): “How much would you like to eat another jelly bean”?

STUDY 3

This study provided evidence that increased savoring of the present experience and thoughts about the taste of the future were the underlying mediation mechanisms. This experiment also showed that the effect was specific to future varied experiences from the same domain and that it does not hold for prospective future consumption experiences belonging to other product categories. This study showed that this is true even in cases where an item from a different category evokes higher preference than a distinct product from the same domain. In order to show this, this design employed four conditions: future variety from the same domain, future variety from a different domain, same future and control condition. The stimuli used in this study were French vanilla or cherry jelly beans (used in a counterbalanced way for the present, future, same and varied scenarios) and participants' receipt of their favorite "itunes" song for the future variety from a different domain condition.

Method

Three hundred and twenty-two (322) students participated in this study in exchange for course credit. As mentioned, the jelly beans stimuli used in this study were French vanilla and cherry. These flavors were previously pretested among 72 students from the same subject population and were shown to be similarly liked ($M_{cherry} = 5.94$ vs. $M_{french\ vanilla} = 5.62$; $t(70) = .64, p > .52$). We also pretested subjects' preference towards receiving an itunes song of their choice and this proved to be higher than liking for both

jelly beans flavors combined ($M_{itunes} = 7.14$ vs. $M_{french\ vanilla} = 5.78$; $t(105) = 3.15$, $p < .005$).

We gave all participants 20 jelly beans to be consumed in the lab. Half of the participants were randomly assigned to receive French vanilla jelly beans while the other half received cherry. Once participants had received their jelly beans they were assigned to one of the three future conditions (same jelly bean flavor, different jelly bean flavor, itunes song) or to the control group. Based on the treatment they were assigned to participants were told that two weeks from now, when they returned to the lab, they would be receiving their designated item. Alternatively, subjects in the control condition were not given any information regarding an upcoming consumption experience.

After receiving the instructions, participants were asked to consume the jelly beans serving they had received. Once they were done consuming them they were asked the following two questions: “How much did you enjoy the jelly bean you just ate?” (1=not at all, 100=very much so) and “How much would you like to eat another jelly bean?” (1=not at all, 100=very much so). The second measure is another commonly used satiation measure (Redden 2008; Rolls et al. 1981). After providing these measures, participants were asked a series of additional questions to delve more into the underlying mechanism behind the effect: 1) “How much did you try to savor the jelly bean consumption experience you just had?” (0=not at all, 10=very much) 2) “As you were eating the jelly beans, how much were you thinking about the taste of the jelly beans (or the sound of the song) you will consume the next time you come to the lab?” (0 = not at all, 10 = very much). Other questions inquired participants about how much they were looking forward to the future consumption experience, their feelings of hope associated

to the future event, to what extent they imagined themselves consuming the item they were assigned to in the future and their level of attention to the quantity consumed and to the flavor of the jelly beans they ate. Participants were also asked how much they would be willing to pay for a serving of the jelly bean flavor they had just eaten. Finally, participants were asked (with the exception of those in the control condition): “To what extent does the product you will have the opportunity to consume on your next visit to the lab belong to the same category as the jelly beans you just ate (0=it does not belong to the same category at all, 10=it belongs to the exact same category). This final measure was a manipulation check on the product domain manipulation.

Results

Manipulation checks. As expected, there was a significant difference between the same future condition and the different future from the same domain ($M_{\text{same future}} = 5.68$ vs. $M_{\text{different-same}} = 3.32$; $t(160) = 4.21, p < .03$) and the different future from a different domain groups ($M_{\text{same future}} = 5.68$ vs. $M_{\text{different-different}} = 2.25$; $t(158) = 6.50, p < .0001$). There was also a significant difference between the different future from the same domain and the different future from a different domain conditions ($M_{\text{different-same}} = 3.32$ vs. $M_{\text{different-different}} = 2.25$; $t(160) = 2.21, p < .03$). This pattern of results confirms that the consumption domain manipulation was successful.

Satiation. We ran an ANOVA with the composite of enjoyment ($\alpha > .88$) as the dependent variable and the future condition and the jelly bean flavor eaten in the present as the independent factors. There was a significant effect of the future condition ($F(3,$

314) = 10.45, $p < .0001$) and a non-significant role of the jelly bean flavor consumed ($F(1, 314) = .25, p > .61$). As expected, participants in the future variety from the same domain condition satiated less ($M_{\text{different-same}} = 42.55$) than subjects from the rest of the three conditions combined ($M_{\text{others}} = 22.80$; $F(1, 318) = 28.81, p < .0001$). As hypothesized, participants from the other three conditions experienced similar rates of satiation among themselves ($F(2, 234) = 1.39, p > .25$).

Willingness to pay. Consistent with the pattern of reduced satiation, participants in the future variety from the same domain condition expressed a higher willingness to pay for a jelly bean serving of the same flavor as the one they ate during the experiment than subjects from the other groups ($M_{\text{different-same}} = 0.52$ vs. $M_{\text{others}} = 0.33$; $F(1, 318) = 4.04, p < .05$). Stated willingness to pay by participants' from the other three conditions was similar among themselves ($F(2, 234) = 0.98, p > .37$).

Mediating role of Savoring the Present and Thinking about the Taste of the Future. In order to test out hypothesis, that the effect of prospective future variety on satiation from a current experience was driven by an increased savoring of the present and participants' thoughts about the taste of the item to be consumed in the future, we compared the future variety from the same domain condition to the future variety from a different domain and the same future conditions. We did not include the control condition in this analysis as participants assigned to this group did not receive information about any upcoming consumption experience in the lab. Before running the mediation analysis, we verified that the same future and future variety from a different domain conditions were not significantly different in the savoring of the present ($M_{\text{same}} = 2.68$ vs. $M_{\text{different-different}} = 3.09$; $t(143) < 1, p > .45$) and thoughts about the taste of the future item

measures ($M_{same} = 2.47$ vs. $M_{different-different} = 2.44$; $t(143) < 1, p > .94$). We demonstrate that the future variety from the same domain condition was significantly different from the other two groups for the savoring of the present ($M_{future-same} = 4.46$ vs. $M_{other\ two} = 2.88$; $t(216) = 2.61, p < .02$) and thoughts about the taste of the future item measures ($M_{future-same} = 3.86$ vs. $M_{other\ two} = 2.46$; $t(216) = 3.14, p < .005$).

The future variety independent variable (dummy coded as 1 for future variety from the same domain) influenced the savoring of the present ($M_{future-same} = 4.46$ vs. $M_{other\ two} = 2.88$; $t(216) = 2.61, p < .02$) and thoughts about the taste of the future mediators ($M_{future-same} = 3.86$ vs. $M_{other\ two} = 2.46$; $t(216) = 3.14, p < .005$). The savoring the present ($\beta = 2.76, t(216) = 6.35, p < .001$) and thoughts about the future taste ($\beta = 2.26, t(216) = 3.77, p < .005$) mediators were also related to the dependent variable of satiation. When the dependent variable was simultaneously regressed on both mediators and the independent variable, the savoring of the present and thoughts about future taste mediators remained significant ($\beta = 13.63, t(216) = 3.12, p < .005$), while the coefficient for the independent variable was not ($\beta = 7.04, t(216) = 1.86, p > .06$). A bootstrapping analysis confirmed that the future variety manipulation had a significant indirect effect on satiation via the savoring the present and thoughts about the future taste pathway ($\beta = 6.59, 95\% CI: [-1.86, -11.93]$). This pattern of results indicates that savoring the present and thoughts about future taste mediated the effect of prospective future variety on satiation from a current experience.

Mediation Analysis Comparing the Two Future Jelly Beans Conditions. A separate mediation analysis comparing the two conditions that anticipated the consumption of jelly beans in the future also showed mediational support in favor of the

theoretical account. In this case, the future variety independent variable (dummy coded as 1 for future variety from the same domain) also influenced the savoring of the present ($M_{future-same} = 4.46$ vs. $M_{same} = 2.68$; $t(146) = 2.35, p < .03$) and thoughts about the taste of the future mediators ($M_{future-same} = 3.86$ vs. $M_{same} = 2.47$; $t(146) = 2.64, p < .01$). The savoring the present ($\beta = 1.59, t(146) = 2.00, p < .05$) and thoughts about the future taste ($\beta = 2.30, t(146) = 1.24, p < .03$) mediators were also related to the dependent variable of satiation. When the dependent variable was simultaneously regressed on both mediators and the independent variable, the savoring the present and thoughts about future taste mediators remained significant ($\beta = 10.83, t(146) = 2.16, p < .04$), while the coefficient for the independent variable was not ($\beta = 4.61, t(146) = 1.03, p > .30$). A bootstrapping analysis confirmed that the future variety manipulation had a significant indirect effect on satiation via the savoring the present and thoughts about the future taste pathway ($\beta = 6.21, 95\% CI: [-1.26, -11.52]$). This pattern of results once again indicates that savoring the present and thoughts about future taste mediated the effect of prospective future variety on satiation from a current experience.

Discussion

This study provides mediational support for the proposed theoretical account and shows that the effect is domain specific. Moreover, this study replicates the results using an additional measure of satiation and by using non-repetitive measures of enjoyment. This rules out any alternative explanations associated with differential boredom among the groups potentially generated by the repetitive measures of satiation. More

importantly, this experiment demonstrates that the effect is not driven by higher preferences for the item to be consumed in the future variety from the same domain condition, instead we show that the effect will hold even in cases where the item to be consumed in the forthcoming experience evokes similar preferences as the one currently consumed.

GENERAL DISCUSSION

Satiation is one of the biggest impediments to people's happiness as it leads them to enjoy less the things that they like the most (Coombs and Avrunin 1977). Finding ways to combat it is crucial for people's wellbeing, however, only a few ways to do so have been documented in the literature (e.g. Raghunathan and Irwin 2001; Redden 2008). The current paper introduces a new way to mitigate the occurrence of this phenomenon. Three empirical studies demonstrate that anticipating a varied future consumption experience can reduce satiation from a current consumption episode. We demonstrate this effect in different ways and obtain the same pattern of results. In Study 1 we used French vanilla jelly beans as stimuli and manipulated the degree of variety (high variety versus same variety) that participants were likely to have in a future consumption experience. We demonstrated that when future variety was high, subjects enjoyed more and satiated less from a related current consumption episode. Study 2 replicated this effect in a design where participants were able to rank which their favorite jelly beans flavors were and based on this were assigned to a prospective future consumption experience. More importantly, this study demonstrates that the effect persists for cases where the upcoming

consumption episode is scheduled to take place in the near or the faraway future. This study also replicates the phenomenon using a design in which it emulates real life situations where we make choices and set ourselves to consume our favorite experiences in the future but need to go through a less desirable episode in the present. Study 3 provided evidence for our theoretical account by demonstrating that the effect is mediated by increased savoring of the present and thoughts about the taste of the upcoming consumption experience. This study also demonstrates that the effect is domain specific and cannot be explained by higher intrinsic preference for the item to be consumed in the future.

It is also demonstrated that the effect will hold for cases where prospective future consumption is either influenced by the consumer (study 2) or dictated by external circumstances (studies 1 and 3). This is a relevant finding, as in our everyday life, we regularly face situations where we can either decide what our future consumption in a specific domain could be (e.g. time shares and vacation packages, car leases, bulk buying) or are simply constrained to a certain set of experiences as a result of external circumstances (e.g. moving to a particular city for work).

Our findings help us learn more about the phenomenon of satiation and how to mitigate it as no research had looked at the effect of prospective future consumption on satiation from a current experience. We provide evidence that satiation cannot only be recovered from by remembering past stimuli consumed in the past (Galak et al. 2009) but it can also be affected in real time by anticipating what items could be consumed in the future. We also increase our understanding of the effects that anticipating future experiences may have on present wellbeing. While past work has suggested that people

derive direct utility from anticipating the future (Loewenstein 1987), no work has shown that it could also affect our enjoyment and satiation of a current experience. We hope the present findings spur additional research on the impact that anticipation of the future may have on wellbeing in the present.

Managerial Implications

These findings have important implications for consumer wellbeing as we show that an easy way to enjoy our present experiences and the routine of our lives more could be setting ourselves up with highly varied future consumption opportunities. While it is evident that people desire variety (e.g. Ratner, Kahn and Kahneman 1999; Simonson 1990), we found that the mere act of knowing that the future may bring us something different in a given consumption domain, could help us enjoy our experiences of the present. There are countless opportunities in our everyday lives that could allow us to take advantage of this strategy for wellbeing. For example, we are able to plan indulgent vacations months in advance, which would cue that we will be doing something different in the future and may allow us to enjoy the present more. We can also pre-purchase a luxurious condo while in pre-construction, or pre-order the newest convertible model at our local dealer. These and other consumption decisions may not only help us be happier in the future but could also allow us to enjoy our current experiences of the present.

Future Research

Our findings suggest a few avenues for future research. One area would be to look at other aspects of anticipating consumption in the future that could affect satiation in the present. In this research we look at prospective future consumption in terms of what will be consumed in the future (variety). However, future work could focus on other factors such as prospective quantity to be consumed. Moreover, additional research could look at the role that uncertainty about prospective future consumption may have on satiation from a current experience.

CHAPTER 4: FUTURE RESEARCH DIRECTIONS

Chapters 2 and 3 introduced two new psychological factors that help delay satiation from a current consumption experience. The present chapter discusses two additional research directions that may help further our knowledge about this phenomenon. The first topic relates to the process of recovery from satiation (e.g. Galak et al. 2009; Nelson and Meyvis 2008; Nelson et al. 2009) as opposed to satiation from a current experience (e.g. Ratner, Kahn and Kahneman; Redden 2008; Rolls et al. 1981). On the other hand, like Chapters 2 and 3, the second research idea suggests another psychological factor that may help reduce satiation from a current experience.

The Effect of Initial Consumption and Satiation Rate on Satiation Recovery Rate

Recovery from satiation is the process in which people regain their desire to consume a stimulus after having become satiated from it. This process starts immediately after consumption and occurs gradually. The main factor that has been shown to facilitate recovery from satiation is the passage of time (Nelson and Meyvis 2008; Nelson et al. 2009; Ratner, Kahn and Kahneman 1999), while more recent work has demonstrated that merely recalling past variety can also accelerate this process (Galak et. al 2009). Aside from this work, the topic of recovery from satiation remains widely unexplored.

As consumers, we try to maximize our utility from the consumption of our favorite things in life (e.g. Shu and Gneezy 2010; Zauberman et al. 2009). This would be an easy task if satiation did not exist (Coombs and Avrunin 1977), as we would be able to consume our favorites as often as we could without any worry of growing bored of them. However, satiation takes place for nearly all types of consumption experiences such as food (e.g. Redden 2008; Rozin et al. 1998), music (e.g. Galak et al. 2009; Nelson and Meyvis 2008; Ratner, Kahn and Kahneman 1999), and television programs (Nelson et al. 2009). There are different characterizations to describe this phenomenon, as it can be seen as a form of adaptation (Frederick and Loewenstein 1999; Nelson and Meyvis 2008), habituation (Groves and Thompson 1970; McSweeney and Swindell 1999) or as related to optimal stimulation level (e.g. Helson 1964; Raju 1980). What all of these representations have in common is that they fit into the notion that satiation is not a merely physiological phenomenon but also a psychological one (e.g. Redden 2008; Rolls et al. 1981). This means that there may be ways to influence it without actually modifying the actual quantity consumed. Consistent with this notion, a recent stream of research has shown that factors such as categorization level (e.g. Raghunathan and Irwin 2001; Redden 2008), memory (e.g. Galak et al. 2009; Rozin et al. 1998) or consumption rate (Galak et al. 2012; Nelson and Meyvis 2008; Nelson et al. 2009; Ratner, Kahn and Kahneman 1999) can alter satiation, however, more work should look at other ways in which this phenomenon could be affected.

The current research studies how the speed of consumption that led to a particular satiation level affects how fast we recover from satiation. This is a relevant topic as

consumption rate is one of the aspects of an experience that as consumers we can more easily control.

Consumption Rate

Past work on this topic has demonstrated that the passage of time is one of the main factors that help consumers recover from satiation from their preferred stimuli (Nelson and Meyvis 2008; Nelson et al. 2009). Specifically, Nelson and Meyvis (2008) showed that interrupting a consumption experience can make a pleasant episode more enjoyable and an unpleasant one more irritating as breaks disrupt hedonic adaptation (Frederick and Loewenstein 1999). Moreover, Nelson et al. (2009) demonstrated that this effect can be extended to cases where a hedonic experience is interrupted by an unpleasant one, for example, the presentation of TV ads during a sitcom. Consistent with this, more recently Galak et al. (2012) showed that people tend to consume their favorite items so quickly that they are not able to maximize consumption utility due to avoidable unforeseen satiation. They did this by assigning participants to conditions where they could either decide how often they would consume a preferred stimulus or where this consumption rate was determined for them. Their findings showed that consumers satiated faster from a desirable experience when they determined how often they would experience it as they tended to consume too quickly. This occurred because their accelerated consumption rate did not allow them to take breaks that would have led them to recover from satiation, a strategy that consumers do not seem to appreciate.

The main finding that this line of research has established is that when people consume their favorite stimuli too quickly, which they tend to do, they satiate from these experiences at a faster rate, as their consumption velocity does not allow for breaks that help them to dishabituate. The current research proposes that besides these effects on present satiation, an accelerated consumption rate may have other consequences on people's enjoyment of an experience. Specifically, we propose that given a *constant* amount of satiation, a fast consumption and satiation rate may delay the rate at which people recover from satiation from a hedonic experience even in cases where more time to recover was allowed to elapse. Moreover, for an equal amount of satiation to occur between a fast and a slow consumption condition, the quantity consumed must have to be larger in the slower group (e.g. Nelson and Meyvis 2008; Nelson et al. 2009). This process would have an overall detrimental effect, as fast consumption and satiation in the present would not only lead to less consumption and enjoyment in the present but also in the future. The current research proposes that given a constant level of satiation reached in the fast condition, more time would need to elapse in order for a consumer to reach a specific level of recovery from satiation relative to a slow consumption group.

This premise goes against past assumptions about the role of passage of time on recovery from satiation, as this research does not make any predictions about a differential role of recovery from satiation according to the experienced consumption and satiation rates. However, this research does suggest that the more time elapses from the end of consumption, the more a consumer will recover. We propose that in some cases differential rates of satiation may make a consumer recover less even if she allowed more time to progress for this recovery to take place.

To provide an example, it has been widely assumed that if a consumer experiences a specific degree of satiation from a preferred item, let's say 60% from an initial liking of 90, the more time that elapses from the end of that consumption episode, the more he or she is going to recover from satiation. While the current research proposal does not contest the finding that the passage of time helps recover from satiation, it posits that this factor will be moderated by the consumption and satiation rate that made a consumer reach a given degree of satiation. Specifically, we propose that if a consumer reaches a target amount of satiation (in this case 60% from an initial liking of 90) through a faster consumption and satiation rate, he will take more time to reach certain level of recovery.

A more specific example has a situation where two different consumers received a box of fine chocolates for their birthday, which happens to be on Monday. Both of them tried the chocolate on this day and reported an initial liking of the product of 90 in a 100 points scale. The first consumer decides to eat the chocolates at a fast rate and has two of them during three straight days for a total of six chocolates in three days. The second consumer eats them at a slower rate and eats 2 chocolates every other day over 7 days for a total of 8 candies in a week. Given the differential rate of consumptions and amounts consumed, let's assume that at the end of their respective consumption sequences the enjoyment for the chocolate for each of the individuals has declined to 30 in a 100 points scale. This prediction is consistent with past work (e.g. Nelson et al. 2008; Nelson et al. 2009), as the participant who consumed at a slower (faster) rate was able to consume more (less) chocolates as he spaced out consumption across 7 days (3 days). Our research question here would be: "How many days does each consumer need to wait, from the

time their respective consumption experiences ended, in order for him or her to recover from satiation to a level where his enjoyment increases to 80 in a 100 points scale”? Or put in a different way: “How much will each of these consumers recover from satiation 5 days after their respective consumption experiences ended?” Past research would hypothesize that both consumers would need to wait the same number of days, or would recover the same after 5 days, as no research has shown that the effect of passage of time on recovery from satiation can be influenced. It could also be hypothesized that the consumer that consumed slower would recover from satiation at a slower rate, as he had to consume more in order to reach the same degree of satiation as his or her fast consumption counterpart; and the more we consume the more we satiate (e.g. Mook and Votaw 1992). However, the present research hypothesizes the opposite.

The reason for this is that despite the amount of satiation the two consumers reached was the same and that the subject in the slow consumption/satiation rate ate more chocolates in order to reach the target level, the consumer that had a faster rate of satiation and consumed less is likely to keep less favorable memories of the experience. This is because the duration of his enjoyable experience would be relatively shorter (Ariely and Loewenstein 2000). Considering this, I propose:

H1: Given a *constant* amount of satiation, a person who reached satiation at a faster rate is likely to have less favorable memories of the consumption experience

Memories have shown to play an important role on consumer wellbeing (Cowley et al. 2008; Fredrickson and Kahneman 1993; Kahneman et al. 1993; Redelmeier and

Kahneman 1996; Schreiber and Kahneman 2000; Zauberan et al. 2009). For example, the “peak and end rule” shows that people have a bias that consists on keeping more favorable memories about experiences that had a higher peak and ended positively (Fredrickson and Kahneman, 1993; Kahneman et al. 1993; Redelmeier and Kahneman 1996; Schreiber and Kahneman 2000). Moreover, Cowley (2008) documented the “retrospective hedonic editing” effect, which consists on people selectively combining events to frame a previous experience in its most positive light. Zauberan et al. (2009) introduced the “strategic memory protection theory” that proposes that consumers treat their special memories as assets and based on their lay theories actively pursue ways to protect them from events that may potentially impair their ability to retrieve them. Moreover, research by Ratner, Kahn and Kahneman (1999) showed that people tend to pick varied consumption sequences during real time experiences even though they would enjoy sticking to their favorites more. The reason for this is that their retrospective memories from varied consumption experiences are better even if this is not indeed the case. Memories have also been shown to influence recovery from satiation. Specifically, research by Galak et al. (2009) has shown that satiation is a malleable phenomenon that can be recovered from by merely recalling past variety consumed in a relevant consumption domain. Given this, I propose:

H2: If a consumer recalls better memories from a specific consumption episode, this is likely to recover from satiation faster than a person who does not have such a favorable retrieval from the same experience.

The present proposal aims to document a different way in which memories about an experience could influence satiation, more specifically, satiation recovery rate. While

past research on memories and satiation (Higgs 2002; Higgs 2008; Rozin et al. 1998) and satiation recovery (Galak, Redden and Kruger 2009) has focused on how much consumers perceive they consumed in the past, the mechanism we propose would depend on the pleasantness of their memories from the past associated experience. Moreover, despite consumers in the slow consumption group would have eaten more quantity (in order to reach a similar level of satiation as the fast consumption counterparts) and this factor should instead delay their recovery from satiation (as objective amount consumed is a strong determinant of this phenomenon (Mook and Votaw 1992)), I propose that the positive valence of their memories associated with the experience would allow them to override this effect and recover at a faster rate.

Discussion

This research would contribute to our understanding of the phenomenon of satiation in important ways. First, it would show that passage of time (Nelson and Meyvis 2008, Nelson et al. 2009), the main determinant of recovery from satiation may have a differential effect based on the rate at which a participant originally consumed and became satiated. Second, this research would show a new way in which memories about an experience could affect satiation, more specifically satiation recovery rate. While past work has focused on how memories about the perceived quantity consumed affects satiation (Higgs 2002; Higgs 2008; Rozin et al. 1998) and satiation recovery rate (Galak, Kruger and Redden 2009), this research looks at how memories about the pleasantness of

the experience may also affect satiation recovery. Finally, this research may have public policy and consumer welfare implications. While against popular beliefs, this research could suggest that consumers should initially splurge on the consumption of unhealthy, highly caloric stimuli with the hopes that they become quickly satiated from them and take an even longer time to recover from this satiation, this strategy is not feasible in our everyday world. With so many indulgent options to pick from once one of our favorites loses its special status, such strategy would only lead us to over-consume even more and jump from one indulgent option to another at an even faster rate. Future work should look for ways in which satiation and satiation recovery rate could be manipulated with the intention to contribute to people's healthier lifestyles.

The Effect of Consumption Context on Satiation

This chapter ends with the suggestion of a new factor that may affect satiation from a current experience: consumption context. Extensive work has shown that context influences choice (e.g. Huber et al. 1982; Simonson 1989; Simonson and Tversky 1992) and product evaluations (e.g. Allen and Janiszewski 1989; Herr 1989; Meyers-Levy and Sternthal 1993; Meyers-Levy and Tybout 1987). The current research idea builds on work by Menon and Kahn (1995) that has demonstrated that context may also affect people's variety seeking behavior. The reason for this is that people seek variety in order to meet their optimal stimulation level (OSL) (e.g. McAlister and Pessemier 1982; Raju

1980), so when changes in the decision context help them reach this threshold, their need for variety is reduced.

Past research on variety seeking behavior also suggests that people may seek variety as a result of satiation from their usually chosen options (e.g. McAlister 1982). However, more recent work by Ratner, Kahn and Kahneman (1999) has shown that consumers choose variety in their experiences even in cases when they would have enjoyed their default choice items more than the different ones they ended up selecting. This suggests that the role that context may play on satiation from a current experience remains unclear and is worth examining, given the frequency of situations in which we have the opportunity to consume a target item but in a different context.

Moreover, while the findings by Menon and Kahn (1995) focused on varying *choice context* to explore the effect this had on the amount of variety consumers chose, this research aims to look at the influence that changing *consumption context* may have on satiation from a current experience once the decision of what to consume has been made. Consistent with past findings that suggest that people's perceptions of a product often assimilate accessible contextual aspects (e.g. Allen and Janiszewski 1989; Herr 1989; Meyers-Levy and Sternthal 1993; Meyers-Levy and Tybout 1987), the current research proposes that such factor may also influence satiation from a current experience. The reason for this is that consumers may also satiate from the contextual aspects of their commonly consumed experiences (e.g. listening to a particular set of songs at the gym) and introducing changes to their usual consumption conditions (e.g. listening to the same set of songs while driving a car) may help them satiate from them at a slower rate.

CHAPTER 5: CLOSING REMARKS

The present research extends our knowledge about the psychological determinants of satiation. Past work on this area has looked at psychological factors such as categorization (e.g. Raghunathan and Irwin 2001; Redden 2008), variety consumed (Rolls et al. 1984; Ratner, Kahn and Kahneman 1999), memory (Galak, Redden and Kruger 2009; Rozin et al., 1981) and consumption rate (Galak, Kruger and Loewenstein 2012; Nelson and Meyvis 2008; Nelson et al. 2009; Ratner, Kahn and Kahneman 1999) and how they affect satiation. This research introduces new factors related to perceived scarcity, prospective future variety, consumption context and consumption rate and how they relate to satiation or its recovery.

The current work is comprised of three different yet related essays.

Essay 1: “Perceived Scarcity Reduces the Rate of Satiation”

The first essay helps us learn more about the role of attention to quantity on satiation from a current experience. Specifically, this research shows that manipulating attention cannot only help reduce satiation by leading people to focus on specific aspects of an experience (Redden 2008), but it can also do so by preventing people from keeping track of how much they are consuming. We show that in cases where people feel

motivated to take advantage of a rare consumption opportunity, such as the one offered by a scarce item, they will tend to focus on consuming more, which will make them pay less attention to the quantity consumed and will lead them to satiate at a slower rate. This suggests that future research should try to discover other aspects that may also lead people to pay less attention to the quantity consumed, as these are likely to reduce satiation. Moreover, while in this research we manipulate beliefs about the properties of a product by manipulating how scarce this allegedly is, more work should focus on varying product perceptions in different ways and examining how this affects satiation (e.g. price, quality, specialty, etc). Finally, this research also suggests that past work may have failed to demonstrate that perceptions of scarcity affect actual enjoyment of a product (Worchel 1975), as this effect seems to require repeated consumption in order to be captured.

Essay 2: “The Effect of Prospective Future Variety on Satiation from a Current Experience”

This research demonstrates that anticipating prospective future consumption in a given domain may affect the rate of satiation from a present, related experience. Specifically, this work shows that when people anticipate consuming a different stimulus in the future they will be able to enjoy a current consumption experience more. In order for this effect to hold, the item to be consumed in the future should belong to the same consumption domain as the one to be enjoyed in the present.

This research also increases our understanding of the role of anticipation in consumer behavior. While past work had looked at the effect that anticipating future experiences may have on aspects such as global wellbeing (Loewenstein 1987), choice regret (Meyvis and Cooke 2007) or product usage (Shu and Gneezy 2010) no work had looked at how anticipating consumption in the future could influence our enjoyment and satiation of a related experience in the present.

We demonstrate that this effect is due to increased focus on savoring the present and more thoughts about the flavor of the item to be consumed in the future. More importantly, this research has relevant implications on consumer wellbeing, as its findings suggest that the enjoyable experiences we set up ourselves to experience in the future may not only increase our happiness at a latter point, but may also help us enjoy a current experience more.

Essay 3: "Directions for Future Research"

We also suggest two new research directions to extend our knowledge about satiation. The first idea relates to the study of recovery from satiation, while the second one falls within the same category as the first two topics, and proposes a new psychological factor that may reduce satiation from a current experience.

While past research has demonstrated that satiation can be influenced by psychological determinants (e.g. Redden 2008; Rolls et al. 1981), recent work has also found that the rate at which we recover from this effect can be influenced by

manipulating aspects such as recalling past variety (Galak et al. 2009). The current idea aims to show that the effectiveness of the most common way in which consumers recover from satiation, as is the passage of time elapsed between consumption episodes (e.g. Nelson and Meyvis 2008; Nelson et al. 2009; Ratner, Kahn and Kahneman 1999), may also be affected by the way in which we originally reached satiation from the target experience. Specifically, it is proposed that when consumers reach a specific level of satiation by consuming at a fast as opposed to at a slow rate, their recovery from this effect will be slower. This will occur even in cases when more time is allowed to elapse. The reason for this will be differences in the memories from the experience (e.g. Rozin 1998). Specifically, when consumers reach satiation by consuming at a faster rate, the memories from this particular experience are likely to be less favorable than the ones they will keep if they would have satiated at a slower rate. This is because faster satiation is likely to be perceived as an inferior experience from one in which the effect took place at a slower rate. We hope this finding motivates additional research on the yet more unexplored area of recovery from satiation.

The second research direction proposed aims to look at the effect of *consumption context* on satiation from a current experience. Past research has extensively shown that *choice context* influences decision making (e.g. Huber et al. 1982; Simonson 1989; Simonson and Tversky 1992) and product evaluations (e.g. Allen and Janiszewski 1989; Herr 1989; Meyers-Levy and Sternthal 1993; Meyers-Levy and Tybout 1987). Consistent with this, the current research builds on work by Menon and Kahn (1995) that shows that changing *choice context* reduces variety seeking behavior as it decreases need for stimulation (e.g. Raju 1980). Alternatively, this work proposes changing *consumption*

context to explore how such variation affects satiation from a commonly consumed stimulus. I hypothesize that people will satiate less from a current experience when this takes place in a different context. The reason for this is that consumers often incorporate contextual aspects on their product perceptions (e.g. Allen and Janiszewski 1989; Herr 1989; Meyers-Levy and Sternthal 1993; Meyers-Levy and Tybout 1987), and if this effect carries to the phenomenon of satiation, then contextual changes may help reduce its occurrence.

Together, these three topics aim to further our knowledge about the effect of satiation and its recovery by looking at novel factors that had been unexplored until now. I hope these findings motivate more innovative approaches to the study of this phenomenon.

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FIGURE 1

MEAN ENJOYMENT RATING BY CONDITION IN STUDY 1

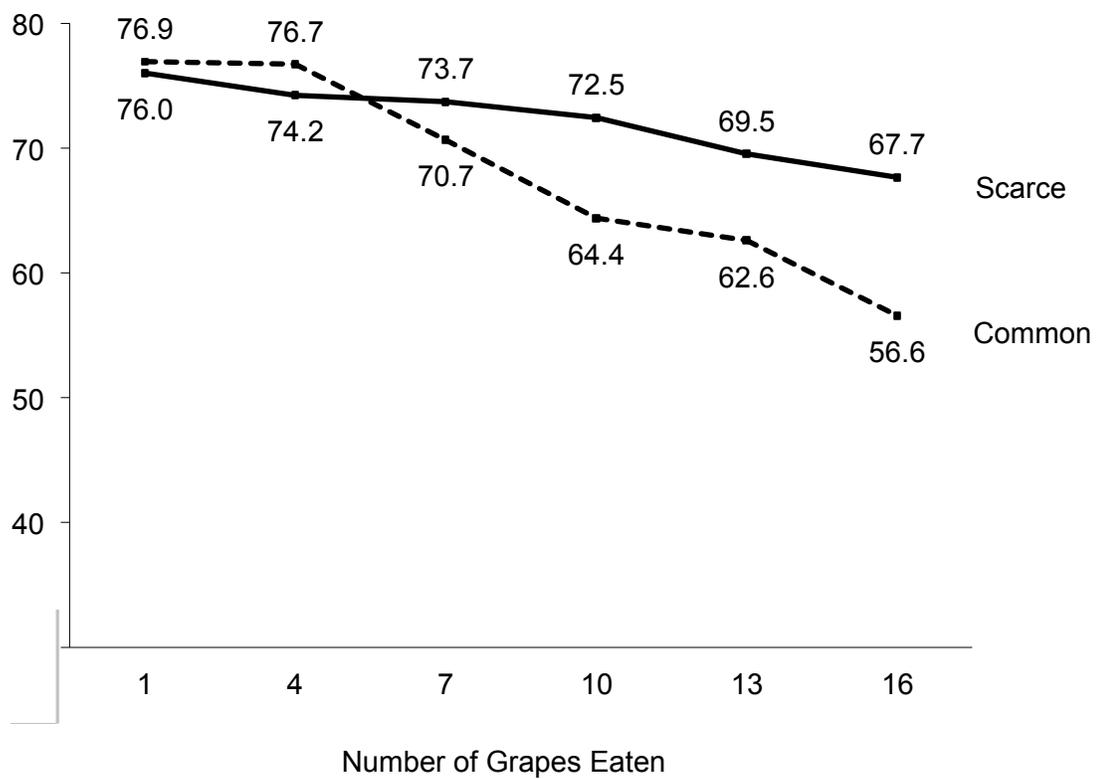


FIGURE 2

MEAN ENJOYMENT RATING BY CONDITION IN STUDY 2

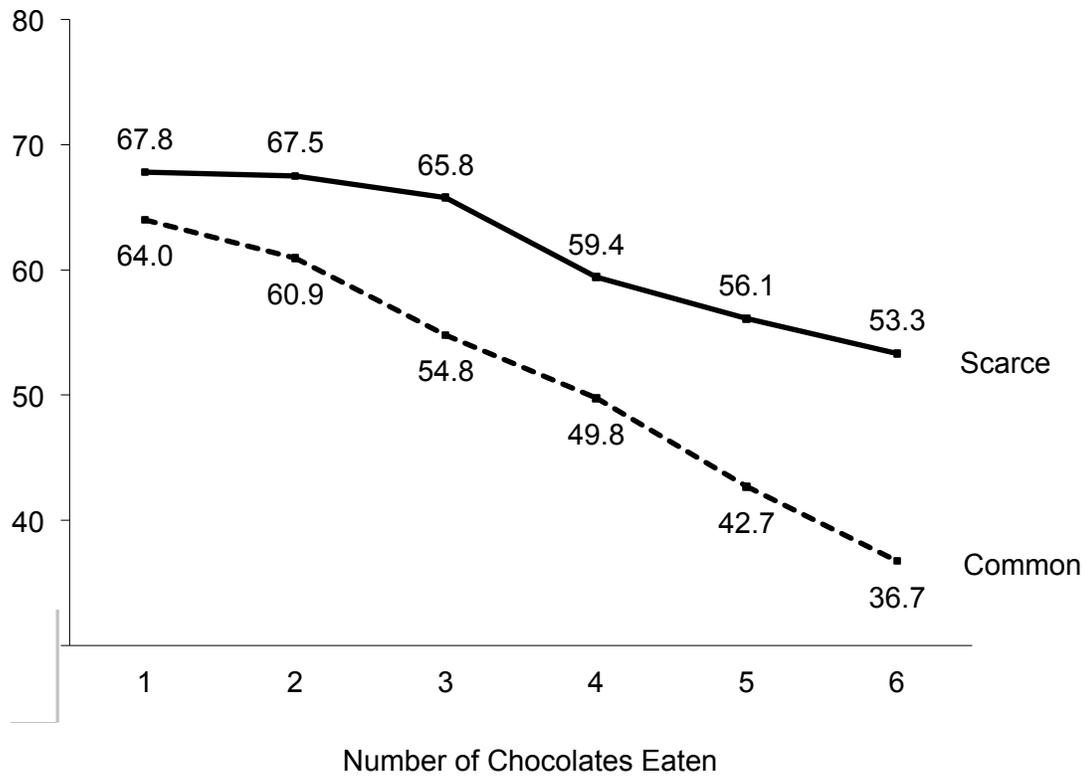


FIGURE 3

MEAN ENJOYMENT RATING BY CONDITION IN STUDY 3

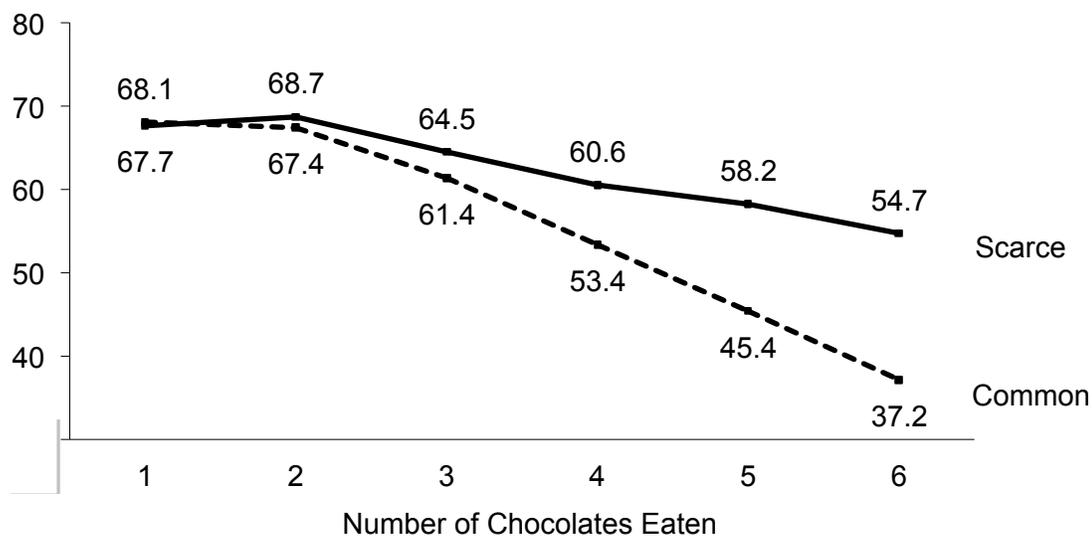
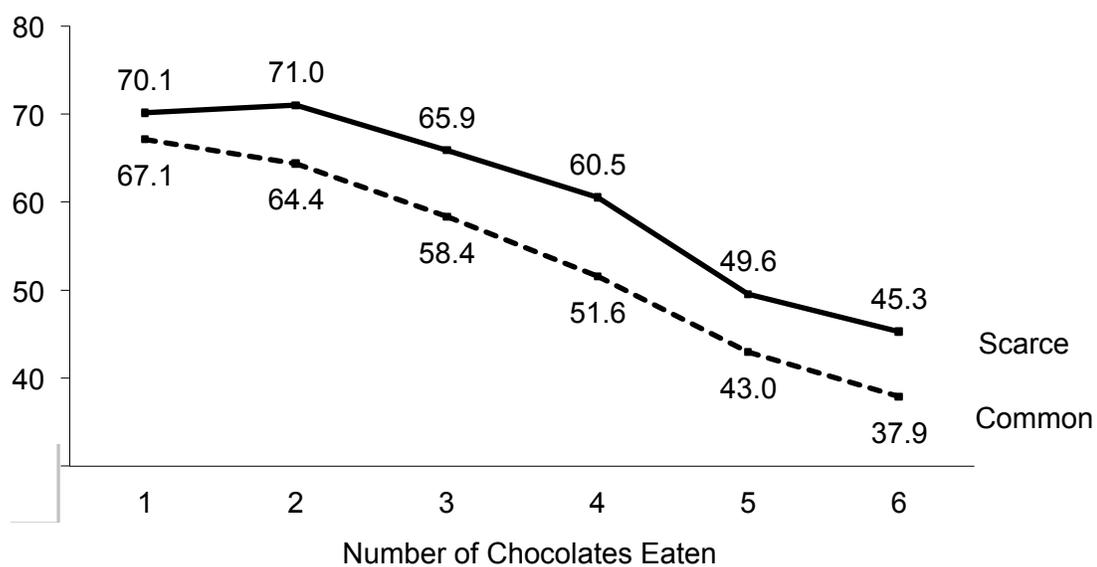
ATTENTION TO QUANTITY CUE ABSENT*ATTENTION TO QUANTITY CUE PRESENT*

FIGURE 4

MEAN ENJOYMENT INDEX BY CONDITION IN STUDY 5

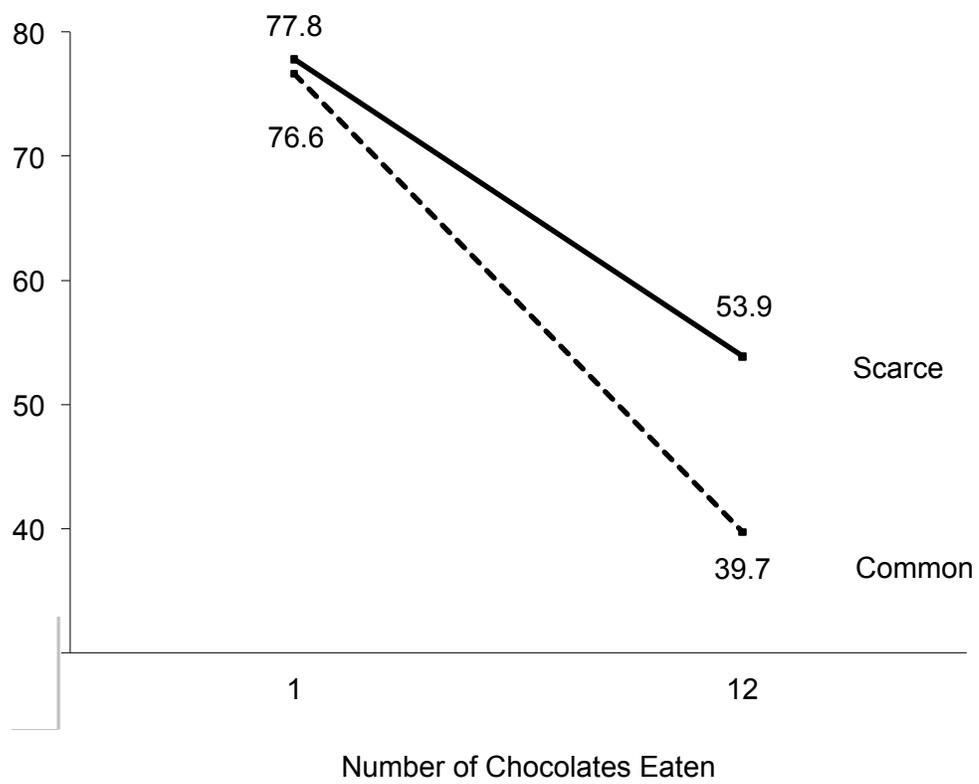
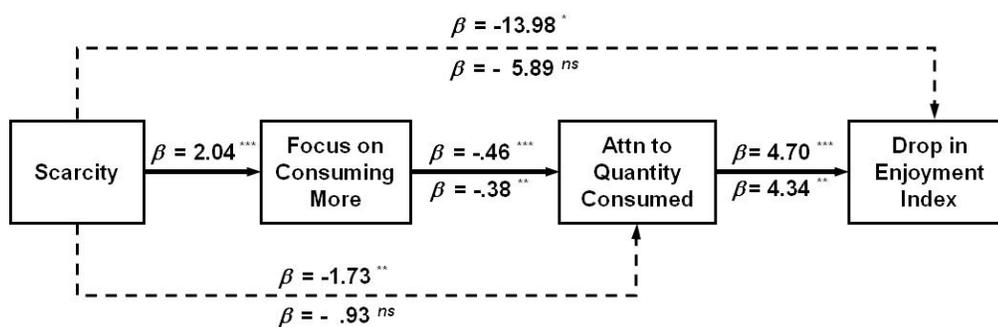


FIGURE 5

MEDIATION ANALYSES IN STUDY 5



NOTE. — Simple tests are shown above each line. Tests in the regression model with the mediator are shown below each line; * $p < .05$, ** $p < .01$, *** $p < .001$, *ns* = non-significant

FIGURE 6

MEAN ENJOYMENT RATINGS BY CONDITION IN STUDY 1

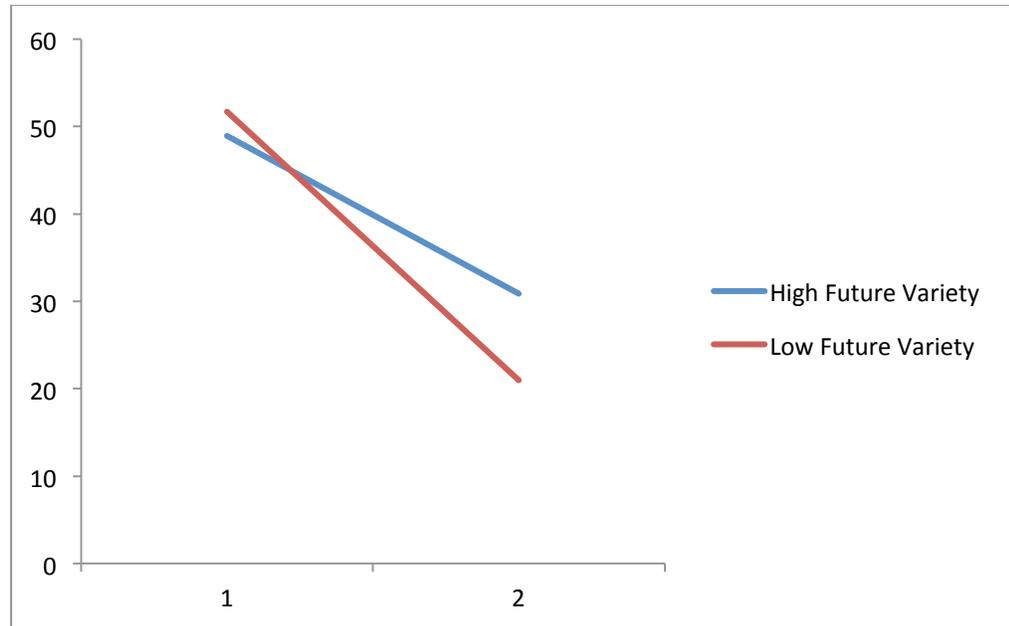


FIGURE 7

MEAN ENJOYMENT RATINGS BY CONDITION IN STUDY 2