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**Journal of
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Review

Why did I eat that? Perspectives on food decision making and dietary restraint

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Abstract

Consumers trying to watch or restrict what they eat face a battle each day as they attempt to navigate the food-rich environments in which they live. Due to the complexity of food decision making, consumers are susceptible to a wide range of social, cognitive, affective, and environmental forces determined to interrupt their intentions to restrict their dietary intake. In this article, we integrate literature from diverse theoretical perspectives into a conceptual framework designed to offer a better understanding of the antecedents, interruptions, and consequences of dietary restraint. We outline a path for researchers to investigate how restraint behaviors in the eating domain influence a wide variety of consumer psychological phenomena. It is our hope that a collective examination of this literature provides a lens that directs future research on food decision making and dietary restraint and empowers consumers to invest their cognitive and behavioral resources towards healthy eating behaviors.

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Keywords: Dietary restraint; Dieting; Eating behavior; Food consumption; Food

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Introduction

Why did I eat that? Most people have asked themselves this question at least once, if not many times. After all, eating is essential to survival and an integral part of daily life. And, food temptations abound. Although the physiological need for food may sometimes prompt us to eat, a wide range of other factors including positive and negative moods, distraction, and sensory cues, as well as a plethora of other psychological and social influences, underlie most eating decisions and consequently, a majority of the empirical investigations into food decisions. Researchers from a broad range of theoretical perspectives have sought insight into consumers' food decision making. This substantial body of research and the ever-growing statistics on obesity demonstrate that overconsumption of food is a robust phenomenon.

Excessive eating and unhealthy food choices are at the root of one of the most pressing health concerns facing the United States and much of the developed world. The most recent results from the National Health and Nutrition Examination Study (NHANES) investigating the prevalence of obesity reveals that approximately one third of adults in the United States, 32.2% of men and 35.5% of women over the age of 20, are obese (Flegal, Carroll, Ogden, & Curtin, 2010). Being overweight or obese has a negative effect on quality of life and has significant psychological (Falkner et al., 2001; Puhl & Heuer, 2010), sociological (Brownell, Puhl, Schwartz, & Rudd, 2005; Christakis & Fowler, 2009), and economic (Finkelstein, Trogdon, Cohen, & Dietz, 2009) costs.

In an increasingly obesogenic environment, medical experts, nutrition advocates, and public health officials are urging consumers to be more aware of their eating decisions, encouraging moderation and a focus on healthy eating (Faith, Fontaine, Baskin, & Allison, 2007; Goldberg & Gunasti, 2007;

Howlett, Burton, & Kozup, 2008). In addition, with all the media and marketplace emphasis on the growing obesity epidemic, consumers are exposed to vast amounts of information about food decision making and are becoming increasingly diet conscious. One study found approximately 47% of men and 75% of women in the United States diet at some point during their lifetime (Jeffery, Adlis, & Forster, 1991). However, increased awareness and focus on dieting has yet to reduce or reverse obesity trends. This begs the question, how does a focus on diet with the intent to restrict eating, impact food decision making?

This review integrates findings from diverse theoretical perspectives in the areas of consumer, cognitive, and social psychological research to demonstrate how the complexity of food decision making contributes to failures to exercise dietary restraint. We integrate what we know about restricting food consumption, commonly referred to as dieting, and identify the many opportunities for researchers and practitioners to investigate and expand our understanding of food decision making. It is our hope that a collective examination of this area of inquiry will provide consumer psychology researchers with a lens empowering consumers to invest their cognitive, affective, and behavioral resources toward healthier eating behaviors.

We begin with an overview of food decision making, focusing on the psychological construct of dietary restraint. Introduced by Herman & Mack, 1975, restrained eaters are identified as those who are concerned with their weight and use dieting behaviors in an attempt, though not always successful, to maintain an "ideal weight." Next, we examine research that explores the antecedents to restrained eating. Then, we summarize key elements from consumer, cognitive, and social psychology research domains that may influence consumers' food decision making and interrupt dietary restraint. We conclude with a discussion that highlights investigations into

the potential consequences of restrained eating behaviors as a means to influence food decision making and address the issue of overconsumption of food. Fig. 1 provides an overview and describes how we approach our integration of the research on the antecedents, interruptions, and consequences of dietary restraint in the consumer psychology domain.

Dietary restraint and food decision making

Restrained and unrestrained eating

When offered a luscious piece of chocolate cake, how easy or difficult is it to exercise restraint? Some consumers simply ask themselves, *Do I want cake?* and act accordingly. However, for others, the decision to eat or not to eat the cake requires a laborious and conflicted choice. Such individuals have been labeled restrained eaters. Restraint is the perpetual “cognitively mediated effort” that an individual makes “to combat the urge to eat” (Ruderman, 1986, p. 248). However, restrained eaters often vacillate between periods of dieting and periods of overconsumption or disinhibited eating (Lowe, 1993; Ruderman, 1986). Restrained eaters are always thinking about food (Polivy, 1998), constantly trying to monitor and regulate the food they eat through “self-imposed dietary rules” (Ward & Mann, 2000, p. 755).

This constant focus on food consumption and decision making does not result in dietary virtue. In fact, the continuous attention and effort required to restrain eating behavior when faced with a plethora of temptations, or during times when “cognitive controls are interrupted,” often results in dietary lapses and overeating (Larsen, van Strien, Eisinger, Herman, & Engels, 2007, p. 101). Consequently, there is a persistent and significant correlation between being overweight and restrained eating ranging from .37 to .39 (Heatherton, Herman, Polivy, King, & McGree, 1988). While one might expect restrained eaters to maintain a healthy weight, the large body of evidence demonstrates that restrained eaters struggle with weight fluctuations more than unrestrained eaters (Heatherton, Polivy, & Herman, 1991). These weight fluctuations may be the result of dieting behavior followed by periods of indulgence and overeating which more than compensate for weight lost during restriction periods (Heatherton et al., 1988; Heatherton, Herman, & Polivy, 1991; Stice, 2002). Based on these findings, the construct of restrained eating does not seem

to offer a model of food decision making that leads to healthy food consumption and weight control.

Early explanations of the different eating patterns of restrained and unrestrained eaters focused on how restrained eaters relied on external cues to determine when and how much to eat rather than their own internal physiological cues of hunger and satiety (Herman & Mack, 1975). Continued investigation along these lines prompted the development of the boundary model of eating regulation (Herman & Polivy, 1984). The boundary model defines the difference between the body’s natural signals of hunger and satiety as the “zone of biological indifference” (Herman & Polivy, 1984). By conditioning themselves to follow their self-constructed diet rules rather than listen to their bodies’ signals, restrained eaters widen the boundary between hunger and satiety. Over time, it becomes more challenging for restrained eaters to recognize their bodies’ signals (Herman & Polivy, 1984; Stroebe, 2008).

Intersection of restraint and dieting behavior

The psychological construct of dietary restraint is not synonymous with dieting. In fact, much of the research on dietary restraint refers to a cyclical pattern of dieting and overeating (Lowe, 1993). However, literature in both the consumer and the psychological domains frequently use the terms restrained eaters and dieters interchangeably, without distinguishing these terms. Two factors, concern over dieting and weight fluctuations, have historically been used to measure and identify those with restraint tendencies (Laessle, Tuschl, Kotthaus, & Pirke, 1989; Ruderman, 1986). At a given point in time, a restrained eater may or may not be currently dieting (Lowe, & Timko, 2004). By contrast, dieters actively restricting their food intake are engaging in restraint. Put another way, restrained eaters are not always active dieters but consumers actively dieting are utilizing restraint. It is important to note the overlap of these two constructs because some of the research summarized in this article measures and discusses restraint behaviors while other research focuses on consumers who are actively dieting. This idea may help to explain some of the inconsistent findings that appear in the restraint literature. Confusion over the restraint construct has also prompted researchers to advocate for measurement of other factors that examine the cognitive and behavioral strategies for restricting dietary intake (Lowe, 1993; Martz, Sturgis, & Gustafson, 1995; Stunkard & Messick, 1985; van Strien, Frijters, Bergers, & Defares, 1986). The main goals of this review are not only to identify opportunities for researchers to clarify these inconsistencies, but also to examine how our understanding of restraint and dieting behaviors are advanced by related consumer psychology topics such as self-control, impulsive consumption, and automaticity.

The dietary rules that restrained eaters follow may change over time as they experience periods of dieting success when “commitment and eating self-efficacy” are high (Lowe, 1993). However, research shows it is difficult to maintain a high level of control over eating, and dieting success is often followed by periods of disinhibited eating, or indulgence, that may explain

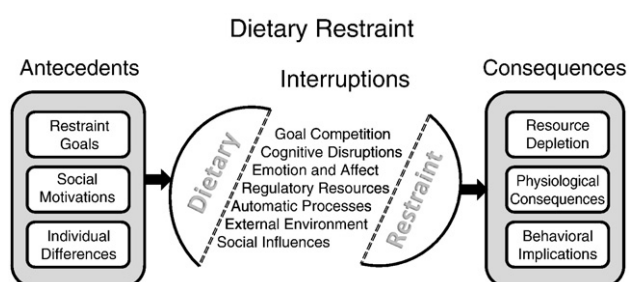


Fig. 1. Conceptual framework.

the overweight status of many restrained eaters or chronic dieters (Heatherton et al., 1988; Lowe, 1993). While there are different explanations of the cause, research indicates that engaging in periods of dieting and restraint followed by periods of eating disinhibition may actually increase the weight of restrained eaters over time. These findings indicate that becoming a restrained eater, or engaging in dieting behavior over the long-term, may not reduce obesity, and paradoxically may contribute to the obesity phenomenon. Why, then, do so many consumers seek to restrict eating or engage in dieting behaviors? We begin to answer this question by examining some of the antecedents of dietary restraint.

Antecedents of dietary restraint

To understand how dietary restraint influences food consumption, we must first explore what motivates some people to restrict or control their eating behaviors. While eating can be a response to hunger triggered by the physiological needs of our body, people are more likely to eat due to psychosocial factors (Tomiya, Mann, & Comer, 2009) and environmental cues (Wansink & Sobal, 2007). Eating for reasons other than hunger is widely considered to be at the root of the obesity problem. Restrained eaters seek to use their cognitive resources to override their physiological urge to eat (Ruderman, 1986). To examine the underlying motives for such dietary restriction, we delve into the antecedents of restrained eating: restraint goals, social motivations, and individual differences. We begin with a discussion of goals and explore what goals might motivate some consumers to restrict their dietary intake.

Restraint goals

Fishbach and Ferguson (2007, p. 491) define a goal as a “cognitive representation of a desired endpoint.” Identifying the endpoint that triggers the goal of dietary restraint may be an important piece of the puzzle revealing why restraint fails to yield consistent success in the maintenance of a healthy weight. Most research examining dietary restraint has not been connected to the specific goal prompting restriction. However, the broader extant research on goals may provide insight into why people choose to restrict their eating and, perhaps more importantly, why some people are more successful than others in exercising dietary restraint. For example, it may be that exposure to nonverbal cues in media and society as a whole promote a goal connected to a pro-slim bias, prompting some people to use dieting behaviors to control their weight (Weisbuch & Ambady, 2009). For other consumers, more general health goals such as, *I want to feel good and have more energy*, may motivate dietary restraint. It is likely these two motivations, drive for thinness and health promotion, result in differences in how consumers pursue restrained eating goals. Researchers have also investigated complex psychological factors that motivate some restrained eaters such as psychological distress or depression (Wardle, Waller, & Rapoport, 2001), low self-esteem (Heatherton & Polivy, 1992), and body image dissatisfaction (Johnson & Wardle, 2005). More research is

needed to understand how different motivations for dietary restraint influence goal commitment, strategies for implementation, and ultimately success or failure in achieving restraint goals.

Motivation for restraint goals may also explain differences in the ability of consumers to adhere to their diet intentions in the face of temptation. For example, dieting with a specific short-term goal in mind, *I want to look good in my dress for my daughter's wedding*, may facilitate stronger vigilance against temptation than a long-term, more general health goal. Because of the high value placed on a short-term goal, consumer engagement or motivation to succeed may also increase (Fishbach, 2009). However, once a short-term goal is achieved, consumers likely return to prior eating habits and perhaps gain even more weight back “presumably because they overeat when they are no longer dieting” (Polivy, 1998, p. 182). By contrast, consumers motivated by long-term goals may internalize positive attitudes toward the goal and adopt strategies that facilitate automatic, goal-consistent behavior that promotes positive health outcomes (Ferguson, 2007).

The conflict created between long-term and short-term goals in the face of immediate temptations is related to research investigating how temporal distance influences decision making. Hoch and Loewenstein (1991, p. 503) describe such decisions as a battle between “two psychological forces of desire and willpower” where consumers implement different strategies to reduce desire in the immediate face of temptation and increase willpower of “the far-sighted self to constrain behavior” (p. 500). Framing goals from a prevention perspective that emphasizes the benefits of resisting temptation, *I want to avoid gaining weight*, may strengthen resolve in the short-term. By contrast, evoking promotion goals from the far-future perspective, *I want to live a long and healthy life*, may be more motivating for long-term restraint (Mogilner, Aaker, & Pennington, 2008).

Just as goals motivate dietary restraint, other psychological, social, and marketplace mechanisms may also influence food decisions. Ultimately, the choice of a restraint goal may originate from social interactions and other aspects of an individual's identity. Next, we explore some of the social antecedents of restrained eating.

Social motivations

Many of the motivations behind why someone chooses to restrain their eating may stem from social influences. This section explores mechanisms that may make public eating behavior different from private eating patterns in an effort to better understand why some people pursue a restriction goal. Peers, family, and the public at large all exert varying levels of influence over eating behaviors depending on the presence of individual and situational factors.

Families likely exert more influence at younger ages, shaping dietary patterns, individual and culturally related taste preferences, as well as specific eating rules. Research has demonstrated how families may pass on restrained eating tendencies from one generation to the next. Specifically,

mothers “who were highly preoccupied with weight and eating reported higher levels of restricting their daughters’ access to energy-dense snack foods and encouraging daughters to lose weight” (Francis & Birch, 2005, p. 552). Further, “daughters’ restrained eating behavior across ages 9–11... was partially mediated by daughters’ perceptions of maternal pressure to lose weight over time” (Francis & Birch, 2005, p. 552). This research demonstrates how restrained eating behaviors are influenced by the familial environment.

Peers may exert more influence among older children and adults, as well as in product categories often consumed in public (Childers & Rao, 1992). In an examination of impulsive shopping behaviors, the type of group cohesiveness (peer vs. family) moderates a person’s susceptibility to social influence (Luo, 2005). Specifically, among people who were highly susceptible to social influence, those examining purchase scenarios in a cohesive peer group setting were more likely to make impulse purchases than those in a cohesive family group setting (Luo, 2005). Future research should examine how the interaction between group cohesiveness and susceptibility to social influence motivates dietary restraint intentions.

Identity signaling

In adolescent girls and college age women, dieting is considered normal eating behavior (Herman & Polivy, 1987). As people display a “need to belong” (Baumeister & Leary, 1995) adopting eating patterns outwardly visible to and discussed by others may offer a way to achieve group membership and acceptance. Within society, we use consumption and our connection to brands to “communicate the self-concept to others” (Escalas & Bettman, 2003, p. 339). We use both our public and private eating behaviors to construct and signal our identity. For example, one person may identify as *Vegan*, avoiding consumption, eating or otherwise, of any animal products as a function of a desire not to harm animals in any way. Another may adopt a *Vegan* pattern of food consumption because of specific health beliefs. Yet a third may adopt a *Vegan* eating pattern based on a desire to belong to a particular social group. Sometimes, however, our public eating is not a display of our eating pattern as a whole, but rather a temporary tool we use to shape how others view us. For example, in social situations, women may eat less than their dining partners as a way to demonstrate femininity (Mori, Chaiken, & Pliner, 1987). Pursuing restraint goals to signal our identity to others may reflect varying degrees of commitment to the restriction goal, particularly as compared to food consumption that occurs in private. While research has investigated these public eating behaviors, more research is needed to understand how public and private eating may conflict and possibly interfere with restraint intentions.

Beyond using dietary restraint to send social signals, social forces may influence food consumption in other ways. More recent research suggests that people use consumer behaviors to signal an identity different from a group they wish to disassociate from or to demonstrate their uniqueness to others (Berger & Heath, 2007). For example, someone who wishes to demonstrate their uniqueness may refrain from eating dessert in

public when others order dessert. This desire to demonstrate uniqueness may be used to promote healthy levels of restraint. When a group of diners learned of an (hypothetical) association between an avoidance group and consumption of junk food, those concerned about self-monitoring made healthier choices at lunch (Berger & Rand, 2008). Frequently, research investigating differences between restrained and unrestrained eating behaviors examines dietary violations. Researchers do not typically seek to examine the conditions or underlying processes that facilitate restraint. Designing research to understand the social motivations that promote restraint, rather than indulgence, may help public health and nutrition advocates encourage healthy eating.

Public consumption

Research by McFerran, Dahl, Fitzsimons, and Morales (2010) underscores how consumption differences in a group setting may be driven by more than avoidance motives. While people do tend to eat more when they see or believe others are eating more, these consumption differences are accentuated by the weight status of dining partners. For example, respondents served themselves more and consumed the most food when a thin confederate served herself a large portion as compared to when a visibly overweight confederate helped herself to larger servings (McFerran et al., 2010). Fundamental to understanding these findings is an implied underlying belief that a single eating episode is predictive of the other person’s normative behavior. Therefore, when respondents see a heavy person with a large quantity of food, they infer that their size is related to consuming larger portions. Similarly, when respondents see a thin person selecting a small portion, they assume moderation is how they control their weight. In both of these cases, respondents ate less (McFerran et al., 2010). However, when respondents see a thin person taking a large portion, it violates their beliefs about who eats large portions and the consequences of overconsumption, and this contradiction may license people to eat more. When the body type of others is salient, the influence of social comparison on food consumption may be more pronounced (Trampe, Stapel, & Siero, 2007). Future research should explore differences in how diet conscious consumers respond to other social consumption cues.

In an attempt to reconcile findings that show how social influence may increase consumption with those that increase restraint, Herman, Roth, and Polivy (2003), p. 873) conclude:

With only a modest degree of oversimplification, we may conclude that (a) when people eat in groups, they tend to eat more than they do when alone (social facilitation); (b) when individuals eat in the presence of models who consistently eat a lot or a little, these individuals likewise tend to eat a lot or a little, respectively (modeling); and (c) when people eat in the presence of others who they believe are observing or evaluating them, they tend to eat less than they do when alone (impression management).

The influence of these social motivations on food consumption is the result of efforts to eat in a way that achieves a desired

output. However, people may not always be consciously aware of social influences on their eating behavior (Vartanian, Herman, & Wansink, 2008). More research is needed to understand how conscious and nonconscious processes work in concert to influence how consumers respond to social cues that enhance versus undermine dietary restraint. Individual differences in areas such as the susceptibility to social influence, the need to belong, the need for uniqueness, and the degree of self-monitoring may moderate social influences on dietary restraint. Next, we explore how individual influences, in particular, conscious versus automatic patterns, gender, and nutrition knowledge, may motivate restrained eating.

Individual differences

Conscious vs. automatic patterns

Eating behaviors are frequently habitual, in an effort to minimize the cognitive resources spent (Khare & Inman, 2006). Restrained eaters practice and internalize diet rules which help limit the time they spend in food decision making tasks. For example, restrained eaters in the dieting phase may ban certain foods, like chocolate. Avoiding specific foods or categories of food is likely based on internalized heuristics or rules (e.g., *foods not to eat on a diet*) restrained eaters create to facilitate faster decision making rather than the food's actual or perceived calorie content (Knight & Boland, 1989). However, if dietary habits revolve around the consumption of less healthy foods such as fast-food or hedonic snacks, intentions to change those behaviors and engage in restriction are often difficult, particularly if the habits are strong or have a long history (Ji & Wood, 2007) or if the consumer is under time pressure to make a decision (Wood & Neal, 2009). Consumers have different levels of belief in their own abilities to use resources and skills to exercise internal control over their eating behavior (Kidwell & Jewell, 2003). For hedonic eating behaviors, consumers with low confidence in activating internal control to exercise restraint rely more on their emotional reactions in a decision making task (Kidwell & Jewell, 2003). However, when consumers with low levels of internal control set out to perform a utilitarian task such as choosing a healthful meal, they draw upon their cognitive resources to make their choice (Kidwell & Jewell, 2003). Levels of internal control and an individual's beliefs about their own internal control may explain why some consumers are able to successfully use dietary restraint to achieve health outcomes while others are not. More research is needed focusing on how beliefs about internal and external control over eating among restrained eaters may help prevent consumption violations that undermine diet intentions.

Beyond people's beliefs about their ability to control their behavior, consumers automatically adjust their behavior based on their internal preferences for a specific time of day. When consumers experience their peak physiological arousal, their willingness to wait is longer and service satisfaction ratings are higher (Hornik, Ofir, & Shaanan-Satchi, 2010). In addition, depending on consumers' circadian rhythm, they have more cognitive resources available during their peak performance periods (Yoon, Cole, & Lee, 2009). At the same time,

consumers may be more prone to food cravings or may crave certain foods at different times throughout the day (Arbetter, 1989). Consumers trying to control their food cravings may be more, or less, successful depending on when their optimal functioning time of day occurs. Future research should explore how time of day influences compliance and violation of dietary restraint goals.

Gender

There is evidence that women are more concerned with weight status and dieting than men (Rozin, Bauer, & Catanese, 2003). This preoccupation with weight explains why women diet more frequently and earlier than males (Rolls, Fedoroff, & Guthrie, 1991). While some studies have found no difference in the prevalence of restrained eating based on gender (Snoek, van Strien, Jassens, & Engels, 2008), much research has investigated restraint tendencies in studies that only include females (Heatherton, Herman, et al., 1991; Herman & Mack, 1975; Herman & Polivy, 1975; Lowe & Timko, 2004). Future research should examine and compare restraint tendencies in both males and females.

Nutrition knowledge

Restrained eaters must possess knowledge about nutrition and health in order to make choices that advance their goals, as well as possess the motivation and time to use that nutrition information during the food decision making process. For consumers motivated to engage in healthy behaviors, higher health and nutrition knowledge positively impacts dietary restriction (Moorman & Matulich, 1993). Having higher health and nutrition knowledge may provide restrained eaters with the tools they need to navigate the plethora of choices available to achieve their restriction goal. For example, restrained eaters may be more likely to use nutrition labels to make food choices (Nayga, 2000). However, dieters and non-dieters may use nutrition labels differently. Comparing dual vs. single column nutrition facts panels, Antonuk and Block (2006) found that while non-dieters adjust their consumption and eat less when intended serving size is more prominently displayed in the dual column label, dieters did not. As the number of health claims prominently featured on product packages increases, deciphering nutritional information becomes a challenging and complicated task at which even knowledgeable consumers fail (Block & Peracchio, 2006). In addition, researchers have found evidence of a "halo effect" that surrounds product health claims triggering a broad range of health inferences about the product (Andrews, Burton, & Netemeyer, 2000). The challenge for public policy officials is to balance the benefits of product claims that facilitate healthy choices with the possible negative side effects this type of persuasive information may have on consumer food decision making.

In this section, we discussed some of the research that investigates the antecedents of restrained eating behavior. Despite their best intentions, many consumers who intend to restrict their dietary intake fail. In the next section, we explore how such restraint tendencies are interrupted by a variety of internal and external forces.

Interruptions of dietary restraint

Restrained eaters are frequently challenged to balance multiple goals that at times may conflict. Conflicting goals in the eating domain may help us understand why restrained eaters sometimes succumb to temptation and make choices counter to their restraint goal. These goals may also highlight the factors that trigger a restrained eater to cycle between dieting and disinhibition. At the heart of this conflict is the question of whether we eat to live or eat for the hedonic pleasure of consuming good food. Since “most of us live in food-rich environments, where palatable food is widely available and where we are surrounded by cues ... likely to prime the goal of eating enjoyment,” pursuit of a dietary restraint goal may frequently be inhibited (Stroebe, Papies, & Aarts, 2008, p. 179). The continuous presence of hedonic food cues also means that the desire to exercise restraint and hedonic consumption goals may be activated simultaneously (Fishbach & Zhang, 2008). In this section, we examine research that investigates the transition between restraint and indulgence when a consumer's intention to restrict eating is interrupted by an array of psychological and social forces as well as consumption cues that may trigger goal violation.

Goal competition

Rebound effects

When presented with a food temptation, consumers must balance their immediate desires with their long-term dietary restriction goals. For example, while walking through the mall, the wafting scent of Cinnabon may attract you. How do you weigh the pleasure you anticipate from such an indulgence against a desire to maintain a healthy diet? Some consumers may think, *I had a good workout this morning, I deserve a treat*. Although “people are disproportionately attracted to immediately available rewards” (Hoch & Loewenstein, 1991, p. 494), for restrained eaters, the mere presence of temptation may activate their restriction goal. Returning to the Cinnabon example, for restrained eaters, the smell and corresponding consideration of indulgence may remind them of their restraint goal and fuel their ability to resist the temptation. These consumers may be more inclined to think, *I have been so good this week, I don't want to blow my diet*. However, actions that move a consumer toward achievement of one goal, such as exercising or making a healthy meal choice, have been shown to license the same individual to subsequently move toward the opposite goal, such as indulging in a larger meal or adding dessert (Fishbach & Dhar, 2005; Louro, Pieters, & Zeelenberg, 2007; Chandon & Wansink, 2007a).

Similarly, when people think about a time they resisted a food temptation they are more likely to indulge unless they also recall the reasons why they decided to resist (Mukhopadhyay, Sengupta, & Ramanathan, 2008). More recently, researchers have demonstrated that merely having the opportunity to make a healthy choice, such as having a choice between a side salad or fries when making a lunch selection, may license the consumer to choose an indulgent snack even if the consumer did not select

the healthy option initially offered (Wilcox, Vallen, Block, & Fitzsimons, 2009). Collectively, this research demonstrates that a choice (Fishbach & Dhar, 2005), past choice (Mukhopadhyay et al., 2008), or the opportunity to choose a healthy as compared to hedonic food (Wilcox et al., 2009) may fulfill healthy eating goals and trigger a rebound effect, licensing a less healthy choice now or in the near future. This rebound effect may explain why restrained eaters move between periods of restraint and periods of counter-regulatory eating. The movement between healthy and hedonic goals may also be driven by nonconscious processes (Laran & Janiszewski, 2009). Understanding how conscious behaviors conspire with nonconscious processes to move restrained eaters into goal violation would be an important step toward understanding how restraint goals influence food decisions and ultimately, health outcomes such as weight status. Future research should examine these processes.

Implementation interruptions

Often, a long-term goal such as exercising dietary restraint in an effort to control weight may conflict with the more immediate goal of finding a quick breakfast to eat on the way to work. Consumers have shown they have the ability to construct possible outcomes that meet both personal and situational goals simultaneously (Ratneshwar, Barsalou, Pechmann, & Moore, 2001). However, the list of possible alternatives for consideration when faced with a food decision often includes items that meet one goal and conflict with another. While it might seem as though one solution is to make sure healthy options are as widely available as their less healthy alternatives, research indicates that having both healthy and hedonic choices at hand may actually backfire. Across several studies, Fishbach and Zhang (2008) find that presenting healthy and hedonic food choices together increases the likelihood of indulgence specifically among those concerned about watching their weight. Thus, making healthy alternatives more available does not assure dietary restraint. At the same time, a broad goal of exercising restraint in the face of temptation does not seem to give consumers actionable tools for achieving their restraint goal.

Health goals without specific implementation intentions designed to help consumers manage the conflict that will arise are less likely to be achieved (Gollwitzer & Branstätter, 1997). In designing implementation intentions, consumers may construct ways to represent their broader health goal with specific “preferences, choices, and behaviors” that help guide their actions in the face of goal conflict (Bagozzi & Dholakia, 1999). As an example, restrained eaters may keep foods on hand specifically intended to help them achieve both their personal goal of healthy eating and situational goals such as consuming time-saving meals. Implementation intentions help consumers prepare for the temptations they face daily, particularly when consumers are committed to a goal and have confidence in their ability to achieve that goal (Gollwitzer & Sheeran, 2009). But, creating contingency plans for every food decision is likely an impossible task as consumers may not be able to anticipate all the challenges they will face. Therefore, consumers are more

likely to adopt a broad set of strategies designed to manage dietary conflicts.

Prevention vs. promotion focus

When presented with a temptation that could interrupt a restrained eater, prevention and promotion focused consumers adopt different strategies to balance their conflicting desires. Promotion focused consumers, those chronically disposed to or those induced into a promotion frame of thinking, are more tempted by indulgent food choices (Dholakia, Gopinath, Bagozzi, & Natarajan, 2006). At the same time promotion focused consumers may be better at exercising self-control and resisting temptation. Consumers with a prevention orientation place more emphasis on a product's hedonic attributes while those with a promotion focus place more emphasis on utilitarian attributes (Chernev, 2004). Specifically, promotion focused consumers tend to use approach strategies when faced with temptation while prevention focused consumers rely on avoidance strategies. Avoidance strategies place emphasis on the temptation itself, to avoid eating the cheesecake, (Dholakia et al., 2006) diminishing the ability to resist temptation. By contrast, approach strategies adopted by promotion focused individuals draw attention to the positive health goal that may underlie the desire to restrain eating and may make it easier to exercise self-control (Dholakia et al., 2006). This research implies that consumers who try to restrain their eating behavior with a promotion focused goal using approach strategies such as *I want to eat more fruits and vegetables*, may be less likely to violate their own diet rules or intentions when faced with tempting foods.

Impulsive consumption

Work by Sengupta and Zhou (2007) finds that impulsive consumers are more prone to adopt a promotion focus when exposed to hedonic foods and are more likely to choose a hedonic (vs. healthy) snack. These authors propose that promotion focused consumers place more emphasis on the hedonic reward of consuming an indulgent food relative to the potential negative consequences. One possible explanation for the divergent findings of Dholakia et al. (2006) who show that promotion focused individuals are better at resisting temptation, and Sengupta and Zhou (2007), who find that promotion focused consumers choose indulgent cake more than salad, is the dieting status of the respondents. Specifically, Dholakia et al. (2006) found in their first study that promotion focused consumers report more desire for a tempting food such as cheesecake but in their second study, which included only dieters, increased desire translated into better self-control over food choices for promotion focused consumers.

Future research should explore the intersection of dietary restraint and impulsive consumption in more detail. As an example, there may be a difference in the impulsivity of restrained eaters when they are in the dieting as compared to the indulgence phase of the restrained eating cycle. For those currently dieting, using approach strategies may bolster or call into action their self-control resources to resist food temptations. By contrast, dieters with a prevention focus who use

avoidance strategies are more likely to indulge in hedonic snacks that interrupt their restraint goal (Dholakia et al., 2006). Taken together, this research suggests that approach vs. avoidance strategies for implementing restraint goals may work differently when consumers are in the dieting vs. indulgent cycle of their restrained eating. In addition, these differences may be moderated by impulsivity.

While prudent and impulsive consumers respond similarly when a hedonic goal is activated and the opportunity to make a food decision is immediately available, research outcomes are different if there is a delay between when a hedonic goal is activated and the opportunity to act presents itself (Ramanathan & Menon, 2006). In a food-rich environment where hedonic choices are abundantly available, implementing strategies to delay opportunities to indulge may help prudent consumers, but backfire for those with strong impulsive tendencies who overconsume at the next eating opportunity (Ramanathan & Menon, 2006). Restrained eaters may vacillate between periods of prudence and impulsiveness that correspond to their dieting and indulgent cycles. Understanding what triggers prompt transitions between these cycles is important, as a delay in the availability of indulgent foods may strengthen resolve to resist a temptation at some times, and at other times, the delay may trigger rebound eating and overconsumption. A better understanding of how dietary restraint interacts with impulsive tendencies may help identify when consumers are likely to move from a restrictive to an indulgent phase of the dieting cycle. Next, we examine some of the specific factors consumers face that create internal conflict or in other ways interrupt their desire to exercise restraint.

Categorizing food choices

Categorizing foods as healthy or hedonic may not always assist restrained eaters in the food decision making process. Activation of goals influences how consumers judge the similarities and differences between the food choices available. For example, when health goals are activated, consumers seeking a snack see healthy alternatives (e.g., *granola bar or yogurt*) as more acceptable substitutes than less healthy alternatives that are similar on dimensions such as shape (e.g., *granola or candy bar*) (Ratneshwar et al., 2001). However, when consumers are focused on a situational goal such as finding a quick breakfast they can eat on the go, they see different product choices as acceptable substitutes (e.g., *apple or donut*), more than when they are primed with a personal health goal (Ratneshwar et al., 2001). Understanding when bottom-up or situational goals are activated, as compared to when goal-derived or top-down dietary goals are activated, may help us to better understand why restrained eaters sometimes make choices consistent with their desire for restraint, and at other times, violate their own diet rules.

Another way in which the categorization of healthy and hedonic foods may undermine restriction goals stems from research that explores how goal choice interacts with levels of self-control (Poynor & Haws, 2009). When a person with low self-control chooses a restriction goal such as dieting, there is internal conflict between the restriction goal and their ability to

exercise self-control. The individual may respond by categorizing more items as necessities rather than luxuries, ultimately influencing purchase intentions (Poynor & Haws, 2009). Expanding the categorization of foods considered *acceptable to eat on a diet* licenses those with lower levels of self-control to eat things other restrained eaters avoid, and ultimately may undermine achievement of the restraint goal. For example, while some dieters put chocolate on their list of forbidden foods (Knight & Boland, 1989) others may think, *Chocolate is OK as long as it is dark chocolate high in antioxidants and I eat it in small amounts*, and then consume several hundred calories of dark chocolate eaten in small amounts throughout the day.

Goal structure

The structure and number of sub-goals that make up an overarching goal of restraint may play a significant role in the ability of a consumer to achieve successful restraint. In demonstrating what they refer to as the dilution hypothesis, Zhang, Fishbach, and Kruglanski (2007) find that the more goals people adopt to work toward a desired outcome, the lower the strength of association between each individual goal and the success of the overall goal. Dieters trying to lose weight may be more likely to achieve success if they focus on a single goal rather than multiple goals such as, *eating more whole grains, eating less fat, and drinking less alcohol*. For dietary restraint, the dilution hypothesis aids our understanding of goal violation in several ways. First, since the associative strength between each goal and the success of the intended outcome is reduced as the number of goals increases (Zhang et al., 2007), violations of any one goal may not be viewed as essential for success, reducing the vigilance of pursuit of a single goal as multiple goals are pursued. For example, the restrained eater may engage in internal bargaining among goals such as, *I'm going to have cake at the party tonight, so I need to be sure to get to the gym today*.

Beyond the phenomenon that competing goals can co-occur within an individual, researchers have proposed expanding game theory to examine whether multiple selves within an individual seek to advance opposing or contradictory goals simultaneously (Ding, 2007). However, according to the disinhibition hypothesis, it is precisely these types of allowable violations that lead to overconsumption and abandonment of restraint (Ruderman, 1986). In addition, the more rules or sub-goals a restrained eater attempts to follow, the more cognitively taxing the restraint goal becomes. Restrained eaters who follow multiple diet rules may be more susceptible to external interruptions of restraint behavior. This line of reasoning implies restrained eaters may experience more success if they focus on a single aspect of their diet rather than a long and complex list of eating rules and restrictions.

Cognitive disruptions

Restrained eaters submit to their own individual diet rules which may include eating certain amounts, consuming particular foods at predetermined times, or restricting selected foods, times, or consumption locations (Herman & Polivy, 1980; Ward &

Mann, 2000). Monitoring and restricting food consumption requires significant cognitive and attentional resources. The compliance effort makes restrained eaters susceptible to dietary lapses whenever external factors interfere with their ability to devote the attention required to restrict what they eat (Herman & Polivy, 1980). Beyond attention, cognitive resources are required for consumers to overcome their impulsive tendencies by actively engaging their reflective system to contemplate their choice and control their desire to indulge (Hofmann, Strack, & Deutsch, 2008). The actively regulated eating behavior of a restrained eater contrasts with the automatic eating behavior of an unrestrained eater who is more inclined to listen to the body's internal hunger and satiety cues. One stream of research attributes these consumption differences to the depleted cognitive resources of the restrained eater. Specifically, when restrained eaters are placed in cognitively taxing conditions, they eat more as the imposed tasks distract them from concentrating on their restraint goal (Ward & Mann, 2000). By contrast, unrestrained eaters actually consume less under the same cognitively taxing situations (Ward & Mann, 2000), presumably due to distraction from the eating task. Restrained eaters require cognitive resources to control their eating in the face of an immediate temptation, but they also face challenges as they attempt to use cognitive resources to monitor their goal progress over time including recalling and tracking eating throughout the day or over longer periods of time.

Examination of the cognitive resources required to keep track of daily food consumption may be better understood by considering a small body of research investigating the ambiguity of mental accounting practices related to tracking one's own spending (Cheema & Soman, 2006). Restrained eaters expend cognitive resources to keep a mental record of their own eating which may influence their consumption at the next meal or throughout the day. However, Cheema and Soman (2006) find that even when adequate cognitive resources are available, consumers sometimes "construct a justification for doing what they want to do," as they depart from their spending intentions and "indulge in a desirable activity" (Cheema & Soman, 2006, p. 42). The process used to justify spending may parallel the intentional dietary violations of restrained eaters or diet conscious consumers. In addition, as many dieting consumers mentally track what they eat, there may be other areas of the mental accounting literature that could assist in understanding how strategies to track and update mental food diaries facilitate or hinder restraint success. Depletion of cognitive resources may interrupt dietary restraint but researchers should also explore how a broader set of self-regulatory resources are required to regulate emotions, self-control, and restraint and may impact the intentions and behaviors of restrained eaters.

Emotion and affect

Emotion, mood, or affect influences consumption decisions throughout the day. It may influence the behavior of consumers by triggering mood dependent evaluations of products (Gorn, Goldberg, & Basu, 1993; Pham, 1998). In other situations, mood or emotion may indirectly influence how consumers evaluate and weight inputs into their decision process. In

demonstrating the affect-confirmation hypothesis, Adaval (2001) demonstrates that consumers place more weight on information that is consistent with their current mood as they evaluate multiple decision making criteria. Due to the sensory nature of food, such decisions may be particularly sensitive to the affective component consumers anticipate when they consume food. Sensory information, such as the cool, creaminess of an ice cream cone on a hot summer day or the luscious richness of dark chocolate as it melts on your tongue, often accompany hedonic food consumption. Since the affective response to tasting food, anticipated or experienced, may be automatic in nature, it likely receives precedence over other information consumers consider when making food decisions (Shiv & Nowlis, 2004). Particularly in the face of distraction (Nowlis & Shiv, 2005) or high cognitive demands (Shiv & Fedorikhin, 1999), the affective nature of food may have greater influence on choices than other stimuli. Here we explore how emotion and affect, positive or negative, may interrupt restraint intentions.

When attentional focus shifts from the desire to exercise restraint to a focus on specific food cues, consumption increases (Mann & Ward, 2004). However, the focus on food may result in more hedonic thoughts for certain consumers, making it harder for them to resist food temptations. Sensory rich food cues that provoke thoughts of food indulgences such as “imagining the taste of a cookie or the enjoyment one derives from eating them” may be more likely to engage the emotional “hot system” of diet conscious consumers (Stroebe, 2008). Engaging the “hot” impulsive system is likely to reduce the ability of restrained eaters to delay gratification of their desire to eat, which conflicts with their long-term goal of dietary restraint (Mischel & Ayduk, 2002).

In examining the differences between how restrained and unrestrained eaters think about food, Papies, Stroebe, and Aarts (2007) demonstrate that restrained eaters are more likely to respond to food cues with hedonic thoughts about food than their unrestrained counterparts. These hedonic thoughts likely exacerbate the internal struggle within diet conscious consumers. Their emotional “hot system” likely overrides their cognitive desire to resist the food temptation placed before them, and they eat. By contrast, restrained eaters who strategically employ “cold” system thoughts, (e.g., thinking of marshmallows as clouds or thinking of pretzels as wooden logs; Mischel, Ebbesen, & Zeiss, 1972), when they encounter a food temptation have been shown to exercise restraint. For example, Scott, Nowlis, Mandel, and Morales (2008) explore the emotional response of restrained eaters to food. By directing restrained eaters to think about the food they would consume as nonfood objects, these researchers were able to reverse the consumption differences between restrained and unrestrained eaters (Scott et al., 2008). Restraint success may well vary with a consumer’s ability to employ strategies or tactics designed to combat the food temptations. While research has explored differences between restrained and unrestrained eaters, there has been little research that connects particular patterns of restraint to success versus failure. Bridging this important gap may provide public health and nutrition advocates a set of tools to help promote successful restraint behaviors.

Food decision making is “hedonically complex” and requires consumers to balance a variety of emotions (Rook, 1987) with both immediate and delayed influences on food consumption (Ramanathan & Williams, 2007). Emotions range from positive hedonic emotions (e.g., excited, satisfied, happy) or negative hedonic emotions (e.g., depressed, angry, disgusted) to positive self-conscious emotions (e.g., pride or respect for self) or negative self-conscious emotions (e.g., guilt and regret; Ramanathan & Williams, 2007). Balancing the influx of emotion that may be associated with a decision to eat or not to eat is challenging for some consumers. For example, dieters anticipate more feelings of guilt when they consider consuming foods they believe are fattening or forbidden in the dieting phase (Gonzalez & Vitousek, 2004). Studies that examine eating behavior suggest that emotions, positive or negative, have more influence on eating than hunger (Tomiya et al., 2009).

Positive affect

The valence of emotion may also influence eating decisions. Positive affect as an enduring trait has been connected to healthfulness in a wide range of studies (for a review see Pressman & Cohen, 2005). In their extensive review, Pressman and Cohen demonstrate the benefits of both “behavioral and biological pathways linking positive affect to the onset or progression of physical disease” (2005, p. 958). However, positive emotions may also impact health by influencing consumption choices. Kahn and Isen (1993) demonstrate that positive affect may increase a consumer’s variety seeking tendencies and may make consumers more likely to focus on the positive attributes or features of a product, such as product health claims. Since increased variety in food choices tends to increase consumption amounts (Kahn & Wansink, 2004), positive affect may lead to overconsumption. However, increased consumption of food may not necessarily lead to negative health outcomes if positive affect improves the chances that a consumer makes healthy consumption choices such as choosing fruit over candy (Garg, Wansink, & Inman, 2007; Wansink, Cheney, & Chan, 2003). As positive affect has been connected to both increases in healthy choices as well as overconsumption, it has the potential to reinforce restraint as well as trigger disinhibition.

Negative affect

By contrast, negative affect such as emotional distress (Tice, Bratslavsky, & Baumeister, 2001), mortality salience (Ferraro, Shiv, & Bettman, 2005; Mandel & Smeesters, 2008), failure (Heatherton, Polivy, Herman, & Baumeister, 1993), and stress (Greeno & Wing, 1994) may lead to less healthful consumption choices in a variety of ways. First, consumers in a negative affective state may seek out hedonic choices they expect will generate positive feelings or boost their mood (Shiv & Fedorikhin, 1999). Compounding the problem, they may actually consume more of these hedonic (but less healthy) foods than someone in a positive affective state (Garg et al., 2007; Tice et al., 2001). While some research implies that diet conscious consumers may be more susceptible to the influence of mood on consumption (Cools, Schotte, & McNally, 1992;

Ruderman, 1985; Tomiyama et al., 2009), others show that the differential influences of mood on consumption generalizes beyond dieters (Garg et al., 2007). Research has explored the differences in both the amount and type of food consumption between those in a positive versus negative affective state. Consumption amounts may increase when consumers have low self-esteem (Ferraro et al., 2005; Mandel & Smeesters, 2008); when consumers try to use food to manage their mood (Garg et al., 2007; Tice et al., 2001); or simply view food consumption as a way to escape the negative aspects of self-awareness in relation to their negative mood (Heatherton, Herman, & Polivy, 1992). Unlike positive affect, negative affect is almost always connected to less healthy outcomes in the eating domain and restrained eaters may be particularly sensitive to the impact of negative affect on their eating decisions.

It has been suggested that the differences in why some consumers respond to negative moods with less healthy eating decisions has to do with their beliefs about whether eating has the ability to influence their mood (Andrade, 2005). In his integration of two theories, Andrade (2005) suggests that the underlying beliefs about a behavior's ability to modify mood plays an important role in whether it is the mood that prompts behavior or the desire for a positive mood state that prompts the behavior. Educating people about the nutritional consequences of eating behaviors (Garg et al., 2007) or trying to change beliefs about the ability of food to modify mood (Tice et al., 2001) may prevent overconsumption in response to negative mood states.

Recent work by Kidwell, Hardesty, and Childers (2008) explains why some consumers seem less likely to use food consumption as a way to manage their mood. Specifically, they find that consumers who are more knowledgeable about how emotions influence decision making (Emotional Intelligence or Ability) as well as more confident in their ability to manage their emotions (Emotional Confidence) may be less likely to engage in impulsive eating and "make higher-quality food decisions" (Kidwell et al., 2008, p. 618). Training consumers to control their emotions and building confidence in their ability to manage emotions in a decision making context may help them successfully engage dietary restraint. As an example, researchers have demonstrated that when consumers are primed to engage "cool-system" controls such as thinking about the functional properties of a product, for example, shape or nutritional value, they exhibit greater self-control and diminished impulsiveness (Metcalf & Mischel, 1999; Scott et al., 2008). Strengthening the willpower and resolve of diet conscious consumers may also involve training them to recognize the role of emotions in eating and providing techniques for confidently managing the influences of affect on restraint.

Regulatory resources

Beyond their emotional response to food, consumers succumb to temptation when their self-control resources run low. Self-control or the ability to control one's own "thoughts, emotions, impulses, and performance" (Tangney, Baumeister,

& Boone, 2004, p. 272) is an essential resource for consumers trying to restrict their eating behavior. While the intent of exerting self-control over one's eating behavior likely aligns with long-term restraint goals, short-term interruptions may diminish the ability to maintain control over eating behavior. Monitoring is a "crucial ingredient of the self-control process" (Baumeister, 2002, p. 672). One challenge restrained eaters face is the steady stream of daily activities requiring their cognitive attention that can interrupt the monitoring of their eating and deplete their self-control resources. Recent research shows how the act of continuous decision making during a shopping trip reduces both the accuracy and persistence consumers display in subsequent cognitive tasks (Vohs, Baumeister, Schmeichel, Twenge, Nelson, & Tice, 2008). Depletion likely occurs not just because of the act of making a decision but also from "weighting of attributes, the retrieval of information ... and the comparisons" that often precede a consumer decision (Johnson, 2008, p. 15). Similarly, constant pursuit of specific eating goals by restrained eaters may deplete their self-control resources, leading to choices in direct conflict with their desire to exercise restraint.

An important area to consider is how efforts to increase self-control resources may influence eating behaviors. In an investigation into achieving New Year's resolutions, Mukhopadhyay and Johar (2005) demonstrate that when people believe self-control is an unlimited resource that is malleable, they set and attain more goals. Perhaps more importantly, in using a priming task to invoke beliefs about the supply and adaptability of self-control resources, these researchers demonstrate that enhancing beliefs about self-control has the potential to positively influence behavioral outcomes months later. Recent research provides insights into other dimensions of the self that may contribute to increases in self-control. In a review, researchers examined how religiosity may increase self-control and self-regulation (McCullough & Willoughby, 2009). Religious groups may serve a social support function as well as an education outlet for enhancing self-control in the eating domain (Fuemmeler, Ma'sse, Yaroch, Resnicow, Campbell, & Carr, 2006). More research is needed to understand how educating restrained eaters regarding the adaptability and supply of self-control resources could minimize interruptions in dietary restraint. In addition, enhancing consumers' beliefs about their own abilities to exercise restraint and providing support mechanisms to increase self-control may help move consumers toward their health goals.

Automatic processes

In addition to the cognitive and self-regulatory resources restrained eaters expend as they endure a barrage of interruptions throughout the day, there is evidence to suggest that many eating decisions are automatic in nature, perhaps employing nonconscious processes. Most consumers aren't even aware of the estimated 200 food decisions they make each day (Wansink & Sobal, 2007). As consumers devote cognitive attention to a multitude of other 'more important' daily decisions, food-related decisions, what to eat, when to eat, and when to stop

eating, occur while on auto-pilot (Furst, Connors, Bisogni, Sobal, & Falk, 1996). This lack of cognitive attention to food consumption decisions may make consumers more susceptible to commercial, social, and individual consumption cues in the external environment.

Restrained eaters, who employ their cognitive resources to follow their own set of diet rules, may be particularly susceptible to external influences. In fact, research demonstrates that restrained eaters are only able to resist tempting hedonic foods when they use cognitive resources (Scott et al., 2008; Shiv & Fedorikhin, 1999; Ward & Mann, 2000) or other forms of distraction (Shiv & Nowlis, 2004), implying that these consumers have chronic desires for the plethora of immediately available less healthy food options. Recent findings suggest that frequent, low-cost hedonic indulgences, such as grabbing a cookie with your afternoon coffee, enhance a consumer's happiness or subjective well being (Zhong & Mitchell, 2010). It is likely that parallel conscious and nonconscious processes are at work simultaneously (Bargh, 2002; Chartrand, Huber, Shiv, & Tanner, 2008). Consumers nonconsciously strive to pursue consumption goals in line with the hedonic pleasure anticipated even as restrained eaters attempt to use their cognitive resources to pursue their restriction goals. As these consumers may not even be aware of the effect of external food cues on their ability to restrict their dietary intake, it may be difficult for restrained eaters to know when to place extra effort towards their restriction goal.

External environment

Perceptual biases

A significant body of research has investigated how external cues influence eating behaviors. These external eating cues may interrupt both restrained and unrestrained eaters as all consumers demonstrate difficulty in estimating their actual consumption. Consumers succumb to perceptual biases when they underestimate calories in larger servings (Wansink, Painter, & North, 2005). One explanation is that as the serving size increases or includes more items, consumers become worse at estimating the total calories they consume (Chandon & Wansink, 2007b). The size of serving utensils and plates also influences food consumption as people tend to serve themselves more when using larger utensils (Geier, Rozin, & Doros, 2006) and eat more from larger bowls (Wansink & Cheney, 2005). Beverage consumption is also susceptible to perceptual biases as both the size and shape of a glass affects our ability to estimate volume. Consumers underestimate volume served (Raghubir & Krishna, 1999) as well as the volume they pour (Wansink & Van Ittersum, 2003) when using shorter glasses.

However, not all consumers overeat in response to larger servings. In fact, restrained eaters consume less from larger packages as they likely anticipate the dangers of overconsumption and employ their self-control resources to restrict their eating (Scott et al., 2008). By contrast, when restrained eaters feel they are making a safe food choice, such as when hedonic foods are available in portion controlled packages or they choose a product perceived as a "diet" food, these consumers may switch to "auto pilot," conserve their cognitive resources,

and then overeat (Coelho doVale, Pieters, & Zeelenberg, 2008; Scott et al., 2008).

Packaging cues

The packaging of food also plays a significant role in how consumers evaluate a food product (healthy vs. not) and how much they consume. Pictures, words, and even where the images are placed on a product package may greatly influence consumer perceptions of the product. Research by Madzharov and Block (2010) demonstrates that consumers anchor their consumption on the number of items shown on the package; people consume a greater quantity of indulgent snack foods when more (vs. fewer) units of the snack food (e.g., number of cookies) are displayed on the packaging. Deng and Kahn (2009) demonstrate that when a product image is in the lower-right quadrant of a package, consumers infer the product is heavy (vs. light) but this inference is reduced if they believe the product is healthy. While packaging cues could be used strategically to help decrease consumption for restrained eaters, like smaller packages, these types of cues in the macro-environment may actually result in overconsumption.

In the food domain, consumers seek variety in the products they buy and ultimately eat based on sensory attributes such as flavor (Inman, 2001). Additionally, both actual and perceived variety based on product presentation increase consumption amounts as consumers anticipate higher levels of utility from the variety consumed (Kahn & Wansink, 2004). When consumers are hungry or thirsty, they seek out more variety in the foods they eat (Goukens, Dewitte, Pandelaere, & Warlop, 2007). Desire for a variety of tastes may increase consumption through physiological means when the "presentation of novel foods reinstates salivation" and ultimately increases food intake (Temple, Giacomelli, Roemmich, & Epstein, 2008, p. 15). Such influences on food consumption may in part be due to an evolutionary drive of humans to seek out a variety of foods to "maintain a varied and balanced diet, and helping us to get the diversity of nutrients, vitamins and minerals that we need" (Remick, Polivy, & Pliner, 2009, p. 448).

There is some research to indicate variety cues may help restrained eaters pursue their dietary goals. Specifically, increases in variety tend to make it more difficult for consumers to make a choice, and research indicates that in these situations, consumers may opt for the selection they find easiest to justify and choose a healthy option (Sela, Berger, & Liu, 2009). Packaging products in a way that makes the amount of items more salient and gives consumers time to "deliberate on the consumption decision," such as a box containing individually wrapped chocolates, may also help consumers trying to restrain their eating consume less (Cheema & Soman, 2008, p. 673). Understanding the influence of variety on food decision making may help restrained eaters avoid the possible negative effects of loss of restraint and allow them to utilize variety cues in a way that enhances healthy behaviors.

Product claims

Product labels and claims are also used by companies to send signals aligned with a consumer's health goals. These product

claims influence consumer perceptions of the product and expectations of taste. Research comparing how “low-fat” and “full-fat” labels influence taste perceptions shows that consumers perceive the “full-fat” version of a food to taste better (Wardle & Solomons, 1994). The “low-fat” label may activate health-related schemas in the mind of the consumer and stigmatize the product as having inferior taste (Ellen & Bone, 2008). Not only do people expect less healthy foods to taste better, they also report enjoying unhealthy foods more during actual consumption (Raghunathan, Naylor, & Hoyer, 2006).

The label “low-fat” influences more than our perceptions of taste; it has also been shown to influence how much we eat. When consumers are exposed to a “low-fat” label they tend to increase their consumption by as much as 50% (Wansink & Chandon, 2006). Increases in the consumption of foods labeled “low-fat” were found for healthy snacks such as granola as well as less healthy alternatives such as “low-fat” M&M’s (Wansink & Chandon, 2006) and “light” potato chips (Geyskens, Pandelaere, Dewitte, & Warlop, 2007). These health claim may license consumers to overindulge in a food they perceive to be a healthy choice. According to recent work by Wilcox et al. (2009), this licensing effect may be more pronounced when consumers encounter a hedonic food with a healthy product cue. Hedonic foods that send healthy product signals allow consumers to justify their consumption and license them to indulge. For restrained eaters who battle daily against their desire for tempting foods, these products may be a pathway between the dieting and indulgence phases of restriction.

Evaluation of health claims by consumers is important. Despite major changes in how companies display nutrition labels and information since 1990, consumers use nutrition information only sporadically (Balasubramanian & Cole, 2002) and at different rates based on demographic factors such as age (Cole & Balasubramanian, 1993), gender (Nayga, 2000), education levels (Mitra, Hastak, Ford, & Ringold, 1996), as well as nutrition knowledge (Andrews, Netemeyer, & Burton, 2009; Moorman, 1996). Research on the role of health claims by product advertisers hints that promotion of health claims can increase health awareness of consumers. Ippolito and Mathios (1991) found that when cereal manufacturers began promoting the importance of fiber consumption in reducing cancer risk, there was a significant jump in consumer awareness of the fiber-cancer link from 8.5% in 1984 to 32% in 1986 as measured and reported by FDA surveys. However, those who may need information most because of a specific condition, such as cardiovascular disease, do not seem to use nutrition information about specific nutrients like trans-fats (Howlett et al., 2008) and sodium (Howlett, Burton, Tangari, & Bui-Nguyen, 2010) in their consumption decision processes. In addition, how comparative product claims are presented may influence a consumer’s ability to interpret product healthfulness. Consumers have trouble processing percentages (Kruger & Vargas, 2008) and may struggle to process claims such as ‘25% less sodium than the leading brand.’

Consumers are more inclined to rely on health and nutrition claims such as “low-fat” prominently featured on product packages and menus than on the specific nutritional information

provided (Ford, Hastak, Mitra, & Ringold, 1996; Garretson & Burton, 2000; Kozup, Creyer, & Burton, 2003). The reliance on health claims is not surprising considering the difficulty of deciphering the nutritional information provided on products. For example, research has found that even physicians have trouble computing the specific nutrient content of food based on a product’s nutrition facts panel (Block & Peracchio, 2006). Reliance on advertising and front-of-package health claims can be detrimental to consumer decision making in that it creates a “health halo” surrounding the product which can lead to estimation biases and overconsumption (Chandon & Wansink, 2007a). These effects may be pronounced among restrained eaters who seem to reduce vigilance when they infer a product to be healthy. As the health consciousness of society increases, the marketplace has become saturated with products that make claims aimed at satisfying both our health goals as well as our desire for hedonic foods. In the process, consumer confusion about healthy choices is increasing (Golodner, 1993). This confusion is likely to interrupt restraint intentions and lead to indulgence and overconsumption.

Social influences

Not all the influences on our eating behavior rely solely on our individual resources and how we respond to the environment. Some eating influences are dependent on the social environment in which we consume food. Introspection of our eating behavior takes on new meaning when we move into a public setting as self-consciousness, along with other social factors, influences our decision making. Some studies have shown that eating in the view of others has a disinhibitory effect similar to that of imposing self-awareness or self-monitoring on our eating behavior (Polivy, Herman, Hackett, & Kuleshnyk, 1986).

While social expectations or desires may underlie dietary restraint motivations, they also have the ability to interrupt restraint intentions. Because of the cognitive demands required for persistent restraint, dieters may be more susceptible to a wide variety of social and environmental cues to overeat (Herman, Olmsted, & Polivy, 1983; Wansink & Sobal, 2007). Visual cues, such as food at a party or the dessert tray in a restaurant, as well as verbal cues, such as a waitress’ description of the chef’s special or group pressure to order dessert, presents a different set of challenges for exercising restraint in a social setting as compared to restrained eating in private (Herman et al., 1983).

The enjoyment of social experiences influences consumption decisions that conflict with restrained eating intentions. When we see others enjoying food, it may increase our own enjoyment as we validate our own opinions about the food and strive to share in a positive affective experience (Raghunathan & Corfman, 2006). Shared consumption experiences also influence our evaluations in nonconscious ways. Emotional contagion occurs as people observe and synchronize their facial expressions through mimicry as shared consumption experiences unfold (Ramanathan & McGill, 2007). Social consumption influences are often explored using hedonic foods

characterized as unhealthy choices such as desserts and snack foods. But it is quite possible that these social influences could be used in the same way to promote increased consumption of healthy foods that provide enjoyable consumption experiences such as the sweetness of freshly picked strawberries or the warmth of a hearty, yet healthy soup.

While being in the presence of others may interrupt dietary restraint, social exclusion has also been shown to impair regulation of eating. In research where people felt rejected or excluded, participants were less able to regulate toward healthy behaviors such as drinking a healthy but bad-tasting beverage or regulate away from unhealthy behaviors such as eating an unhealthy snack (Baumeister, DeWall, Ciarocco, & Twenge, 2005; Twenge, Cantanese, & Baumeister, 2003). In one study, Baumeister et al. (2005) found that rejection increases overeating, and mood differences between the rejected and accepted groups does not mediate differences in the amount of cookies consumed. The authors demonstrate with additional investigation that the “avoidance of self-awareness undermines self-regulation” in groups that experience rejection (Baumeister et al., 2005, p. 601). When restrained eaters indulge, they may seek an escape from self-awareness, not wanting to face their own failure. However, this escape may facilitate overconsumption. As a result, the consequences of restrained eating may ultimately undermine future attempts to restrict dietary intake.

Conclusions

This review integrates literature on food decision making and explores dietary restraint. Ultimately, understanding the factors that advance and hinder dietary restraint is critical as more consumers face the challenge of trying to lose weight to improve their health status. In addition, understanding how to encourage healthy restraint behaviors may help public health advocates as they guide educators, regulators, and private industry in macro-environmental changes to combat the obesity epidemic. It is our hope that researchers who investigate food decision making and dietary restraint continue to advance our understanding of these topics. To this end, table one provides a summary of directions for future research. Below we conclude by describing the consequences of dietary restraint including regulatory depletion, physiological consequences, and the behavioral implications of restraint (Table 1).

Consequences of dietary restraint.

Regulatory depletion

Maintaining perpetual dietary restraint is a cognitively taxing task that depletes consumers' regulatory resources. Research has investigated how this depletion interrupts dietary restraint goals, but much more work is needed to understand how regulatory resources work across different domains of consumption. How does engaging self-control resources to exercise dietary restraint affect our ability to restrain our spending, manage our behavior and emotions, or employ social consciousness? Due to the substantial cognitive resources needed to monitor and restrict food consumption, restrained

eating takes its toll on consumers' ability to perform cognitive tasks. In addition, when restrained eaters fail to live up to their own expectations for self-control in one domain such as eating, their ability to exercise self-control in other domains may be undermined (Baumeister, 2002). Additional evidence suggests that higher self-control in the food domain is correlated with increased general self-control (Wilcox et al., 2009). Future work should investigate how restraint goals, as well as goal success or failure in one domain, influence temptations to violate a restraint goal in another domain and ultimately shape consumer behavior. In addition, self-control failures among restrained eaters may lead to feelings of negative self-worth that further reduce the ability to exert self-control in future decision making tasks (Vohs, 2006).

Efforts to regulate behavior, eating or otherwise, may also positively influence future behavior. While much of the research we present here approaches self-control as a limited resource, some researchers have found support for another viewpoint. When consumers successfully resist the temptation to consume, they strengthen their self-control resources and their ability to suppress the desire to indulge (Geyskens, Dewitte, Pandelaere, & Warlop, 2008; Muraven & Baumeister, 2000). Empirical evidence demonstrates that strategies such as keeping a food journal and engaging in physical exercise can improve self-control (Baumeister, Gailliot, DeWall, & Oaten, 2006). Impressively, these authors review findings by Oaten and Cheng (2006) and report that “adherence to the exercise program was also beneficial to self-control in other spheres” as participants:

...became more successful at reducing their cigarette smoking, alcohol use, and caffeine consumption. They ate less junk food and ate more healthy food. They reported improvements in emotional control and a reduction in impulsive spending. They reported studying more and watching less television (Baumeister et al., 2006, p.1782).

This research points to avenues for investigation into how bolstering self-control resources could aid consumers as they attempt to exercise restraint in a variety of domains such as eating, consumer spending, and encouraging other health promotion behaviors. Strengthening self-control may produce a wide range of benefits to an individual as research shows those with high levels of self-control perform better academically, are psychologically well adjusted, have stronger interpersonal skills, and exert better control over their emotions and finances (Tangney et al., 2004). More research is needed to investigate how to strengthen regulatory resources, as well as a consumer's self-efficacy to engage those resources when needed, with the objective of helping consumers exercise healthy levels of dietary restraint. A better understanding of the conditions under which exercising self-control may bolster willpower and resolve, as compared to when its use drains consumers of the ability to exercise restraint, would help diet conscious consumers better navigate the rich-food environment in which they live.

Table 1
Directions for future research.

Domain	Antecedents	Interruptions	Consequences
Restraint goals	Explore connections between the underlying motivations consumers hold for exercising dietary restraint.	Identify the relationship between restraint motivations and consumer vulnerability to goal interruptions.	Identify patterns of restraint success and failure to understand eating decisions and health outcomes.
Cognitive	Identify the cognitive drivers, such as mental accounting, of restraint behavior.	Build cognitive tools to resist the depleting effects of exercising restraint and prevents interruptions.	Explore the cognitive implications of restraint throughout the day and across the consumer domain.
Emotion/affect	Investigate the role of emotional ability and emotional calibration in restraint success or failure.	Develop strategies to defend against emotional responses that interrupt restraint goals.	Understand psychological consequences of long-term restraint behaviors and impact on future restraint attempts.
Self-regulation	Examine individual differences in using regulatory resources to exercise dietary restraint.	Connect dietary restraint and impulsive consumption in the dieting phase v. disinhibition phases of restraint.	Link restraint across the consumer domain, how restraint in one domain influences other consumer behaviors.
Automaticity	Explore how time of day influences violation and compliance with restraint goals.	Understand how conscious behaviors conspire with nonconscious processes to move restrained eaters into goal violation.	Identify conditions under which automatic processes facilitate rather than inhibit restraint success.
External cues	Identify external cues that prompt restraint goals and the promotion of 'healthy' levels of restraint.	Study differential responses to eating cues such as packaging, product claims, and hedonic food temptations.	Increase knowledge of how external cues influence consumption to facilitate, rather than disrupt, restraint goals.
Social influence	Understand the role of family and peer group cohesiveness on restrained eating.	Investigate how public and private eating may conflict and possibly interfere with restraint intentions.	Differentiate the role of social influence, the need to belong, need for uniqueness, and self-monitoring on restraint.

Physiological consequences

There are also physiological consequences of perpetual restraint. While we have specifically avoided discussions of disordered eating in the context of this article (for a review see [Stice & Shaw, 2004](#)) persistent dietary restraint may have physiological consequences that undermine restraint. Exerting self-control in non-food decision tasks reduced levels of blood glucose resulting in decreased performance on subsequent self-control tasks ([Gailliot et al., 2007](#)). Therefore, exercising restraint may also make diet conscious consumers more susceptible to dietary lapses for physiological reasons. According to [Herman and Polivy \(1984\)](#), chronic restraint reduces dieters' sensitivity to their internal signals of hunger and satiety making eating regulation more challenging. Most importantly, there is no evidence to suggest restrained eating is an effective means to attaining a healthy weight. In fact, there is some evidence that restrained eaters tend to have a higher BMI ([Snoek et al., 2008](#)). From a young age, consumers view dieting and restrained eating as a potential solution to being overweight though a large body of evidence reveals that restrained eating is most definitely not a cure and may in fact create many problems for consumers attempting to achieve and maintain a healthy weight ([Heatherton, Polivy, et al., 1991; Snoek et al., 2008](#)).

Behavioral implications

The chronic cycles of dieting and disinhibition that restrained eaters exhibit may result in long-term behavioral

consequences. Such consumers may become more susceptible to periods of uninhibited eating and increasingly vulnerable to many of the interruptions to restraint behaviors outlined in this article ([Lowe, 1993](#)). Additionally, consumers may substitute other detrimental consumption behaviors such as cigarette smoking or heavy caffeine use, or other unrelated, but indulgent behaviors such as overspending, as they work to restrain their eating ([Polivy, 1998](#)). Future work should examine the cumulative behavioral effects of cyclical dieting behavior. For example, it is possible that over time, the duration of dieting phases shorten, while disinhibitory phases lengthen, as consumers feel increasingly frustrated and discouraged by their perceived lack of dieting success. Consumers may also consider more extreme and more costly methods of dieting as they seek to attain their weight goals, which seem to get further out of reach with each disinhibited cycle.

While many of the empirical investigations of restrained eating focus on the negative consequences of restraint, there are, of course, positive individual and societal consequences of restrained eating. Recall that not all restrained eaters are dieters, and not all dieters succumb to the much maligned cycle of dieting and disinhibition. Successful restraint and healthy weight status can lead to psychological well-being, positive health benefits, lower medical costs, positive outcomes at work, and perhaps better control in other areas of life ([CDC: Center for Disease Control and Prevention, 2010](#)). Understanding both the positive and negative behavioral implications of long-term restraint is critical as new generations of consumers embark on the restrained eating path.

Future directions

Restrained eaters are thought to rely more on external consumption cues such as packaging heuristics that help them decide how much to eat, social cues that prompt when and what to eat, or emotional decision making that may make them more susceptible to hedonic food cues. Particularly troublesome for public policy officials and nutrition advocates is that diet conscious consumers sometimes respond differently to consumption cues designed to decrease eating (Scott et al., 2008) and labeling changes intended to more clearly communicate serving size (Antonuk & Block, 2006). While changes to the macro-environment may encourage some consumers to eat less and make healthy choices, these changes may have the opposite effect for diet conscious consumers and license overconsumption. One theme that emerges from this review is that many paths license consumers to indulge. It seems as though consumers are muddling through life seeking ways to rationalize their detrimental health behaviors, *I did work out today, It has been a stressful week, or My diet is ruined so I might as well have dessert too*. Future research should investigate how some consumers overcome the temptation to indulge in order to augment the knowledge and beliefs of those that need help implementing restraint.

A second theme that arises is the impact of self-control and social influences on consumption. It is not just knowledge, but also the confidence to apply that knowledge, that strengthens consumers' regulatory resources. At the intersection of these two themes may be an additional tool to empower consumers to exercise restraint. Educating consumers about their tendency to seek out justification to license indulgence might strengthen their self-control in the face of hedonic food temptations. It is quite clear that increasing knowledge is not enough to encourage healthy behaviors. Consumers must also believe they possess the ability and resources required to exercise dietary restraint in the face of temptation.

In this article, we take a multidisciplinary approach, examining food decision making through the conceptual lens of dietary restraint. While researchers have identified many interruptions of dietary restraint, future research can help us better understand when dietary restraint is most likely to promote healthy food decision making. This research also points to promising avenues that may advance consumers' ability to engage restraint in a way that promotes health. While this review has focused on clarifying the construct of dietary restraint, it is clear that the self-regulatory resources required to exercise restraint in the food domain are not unique and should be examined in the context of other consumer behaviors. Shifting the emphasis from restraint towards a more positive and integrated role of food in a person's life may help achieve improved health outcomes for consumers and society. Block et al. (2010) put forth the concept of Food Well-being as "a positive psychological, physical, emotional and social relationship with food at both the individual and societal levels". It is our hope that this review provides paths for future research that will resolve conflicting findings and move us toward a better understanding of how consumers can successfully exercise restraint to achieve healthy outcomes over the long-term and promote Food Well-being.

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