A Multiple Goal Perspective on Eating Behavior

by

Peggy Jie Liu

Department of Business Administration
Duke University

Date:_______________________

Approved:

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James R. Bettman, Co-Supervisor

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Gavan J. Fitzsimons, Co-Supervisor

___________________________

Tanya L. Chartrand

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Gráinne M. Fitzsimons

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Mark Leary

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Mary Frances Luce

Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor of Philosophy of
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ABSTRACT

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Abstract

Although people frequently pursue multiple goals simultaneously, these goals often conflict with each other. For instance, consumers may have both a healthy eating goal and a goal to have an enjoyable eating experience. In this dissertation, I focus on two sources of enjoyment in eating experiences that may conflict with healthy eating: consuming tasty food (Essay 1) and affiliating with indulging dining companions (Essay 2). In both essays, I examine solutions and strategies that decrease the conflict between healthy eating and these aspects of enjoyment in the eating experience, thereby enabling consumers to resolve such goal conflicts.

Essay 1 focuses on the well-established conflict between having healthy food and having tasty food and introduces a novel product offering (“vice-virtue bundles”) that can help consumers simultaneously address both health and taste goals. Through several experiments, I demonstrate that consumers often choose vice-virtue bundles with small proportions (¼) of vice and that they view such bundles as healthier than but equally tasty as bundles with larger vice proportions, indicating that “healthier” does not always have to equal “less tasty.”

Essay 2 focuses on a conflict between healthy eating and affiliation with indulging dining companions. The first set of experiments provides evidence of this conflict and examine why it arises (Studies 1 to 3). Based on this conflict’s origins, the
second set of experiments tests strategies that consumers can use to decrease the conflict between healthy eating and affiliation with an indulging dining companion (Studies 4 and 5), such that they can make healthy food choices while still being liked by an indulging dining companion. Thus, Essay 2 broadens the existing picture of goals that conflict with the healthy eating goal and, together with Essay 1, identifies solutions to such goal conflicts.
Dedication

This work is dedicated to my family: Mom, Dad, Linda, and Andrew.
Contents

Abstract ................................................................................................................................................................. iv

List of Tables .......................................................................................................................................................... xi

List of Figures ........................................................................................................................................................ xii

Acknowledgements ................................................................................................................................................. xiii

1. Introduction: A Multiple Goal Perspective on Eating Behavior ......................................................... 1

1.1 Conflict Between Healthy Eating and Having an Enjoyable Eating Experience ............................... 1

1.1.1 How Healthy Eating Can Conflict with Having Tasty Food ......................................................... 2

1.1.2 How Healthy Eating Can Conflict with Affiliating with Indulging Dining Companions ................ 2

1.2 Decreasing Conflict Between Healthy Eating and Having an Enjoyable Eating Experience ................ 3

1.2.1 Decreasing Conflict Between Healthy Eating and Having Tasty Food ......................................... 3

1.2.2 Decreasing Conflict Between Healthy Eating and Affiliating with Dining Companions ................. 4

1.3 Overview of Essays 1 and 2 ...................................................................................................................... 5

2. Essay 1: Vice-Virtue Bundles ....................................................................................................................... 6

2.1 Introduction ..................................................................................................................................................... 6

2.1.1 Existing Solutions to Promote Healthier Eating ........................................................................... 8

2.1.2 Vice-Virtue Bundles ............................................................................................................................... 10

2.1.3 Maximizing Utility from Addressing Taste and Health Goals ................................................... 12

2.1.3.1 Utility Maximization Function ........................................................................................................ 12
2.1.3.2 Vice Lovers (Consumer Segment 1) ................................................................. 13
2.1.3.3 Virtue Acceptors (Consumer Segment 2) ....................................................... 18
2.1.3.4 Virtue Lovers (Consumer Segment 3) ............................................................. 20
2.1.3.5 Summary of Hypotheses ................................................................................. 21
2.1.4 Alternative Explanations for Vice-Virtue Bundle Preferences ....................... 22
2.2 Overview of Studies ............................................................................................ 23
2.2.1 Study 1: Choice Among Vice-Virtue Bundles ................................................. 26
  2.2.1.1 Method ........................................................................................................ 26
  2.2.1.2 Results and Discussion ............................................................................ 28
2.2.2 Study 2: Choice and Consumption of Vice-Virtue Bundles ......................... 31
  2.2.2.1 Method ........................................................................................................ 31
  2.2.2.2 Results and Discussion ............................................................................ 35
2.2.3 Study 3: Perceptions of Vice-Virtue Bundle Options ..................................... 38
  2.2.3.1 Method ........................................................................................................ 39
  2.2.3.2 Results and Discussion ............................................................................ 41
2.2.4 Study 4: Expanding a Choice Set with Mixed Bundles ................................... 53
  2.2.4.1 Method ........................................................................................................ 55
  2.2.4.2 Results and Discussion ............................................................................ 57
2.3 General Discussion ............................................................................................ 65
  2.3.1 Relationship and Contribution to Prior Research ......................................... 67
  2.3.2 Generalization to Nonfood Domains ............................................................ 70
  2.3.3 Practical Implications for Consumers and Managers .................................... 72
3. Essay 2: “Eat, Drink, and Be Merry? Decreasing Conflict Between Healthy Food Choices and Affiliation with Indulging Companions” ................................................................. 77

3.1 Introduction ......................................................................................................................... 77

3.1.1 The Conflict Between Healthy Food Choices and Affiliation with an Indulging Companion ................................................................................................................................. 79

3.1.2 Decreasing the Conflict Between Healthy Food Choices and Affiliation with an Indulging Companion ................................................................................................................................. 85

3.2 Overview of Studies ........................................................................................................... 88

3.2.1 Study 1: The Importance of Matching on Healthiness for Affiliation as Evidenced in Consumers’ Beliefs ......................................................................................................................... 88

3.2.1.1 Method ............................................................................................................................... 89

3.2.1.2 Results and Discussion ..................................................................................................... 90

3.2.2 Studies 2a-2b: The Importance of Matching on Healthiness for Affiliation as Evidenced through Choice ......................................................................................................................... 95

3.2.2.1 Study 2a Method ................................................................................................................. 96

3.2.2.2 Study 2a Results and Discussion ...................................................................................... 98

3.2.2.3 Study 2b Method ............................................................................................................... 100

3.2.2.4 Study 2b Results and Discussion ...................................................................................... 101

3.2.3 Study 3: The Importance of Matching on a Socially Meaningful Attribute .... 104

3.2.3.1 Method ............................................................................................................................... 106

3.2.3.2 Results and Discussion ..................................................................................................... 109

3.2.4 Study 4: Decreasing the Health and Affiliation Conflict By Attributing a Healthy Choice to a Constraint ................................................................................................................................. 113

3.2.4.1 Method ............................................................................................................................... 115
List of Tables

Table 1: Constructed Numeric Examples for Weighted Sum Model of Choice Among Vice-Virtue Bundles for Three Consumer Segments (Vice Lovers, Virtue Acceptors, and Virtue Lovers) ................................................................. 17

Table 2: Percentage of Participants Choosing Each Choice Option Across Conditions and Studies .......................................................................................................................... 28

Table 3: Summary of Key Findings across Studies .................................................................................................. 66
List of Figures

Figure 1: Theoretical Tastiness and Healthiness Functions for (a) Consumers Who View Vice as More Effective at Addressing a Taste Goal Than Virtue (Vice Lovers and Virtue Acceptors) and (b) Consumers Who Do Not View Vice as More Effective at Addressing a Taste Goal Than Virtue (Virtue Lovers)........................................................................................................14

Figure 2: Tastiness and Healthiness Ratings of Each Option—(a) Vice Lovers: Initial Vice Choosers Who Believe Vice Is Tastier Than Virtue (n = 43, Study 3); (b) Virtue Acceptors: Initial Virtue Choosers Who Believe Vice Is Tastier Than Virtue (n = 21, Study 3); (c) Virtue Lovers: Initial Virtue Choosers Who Do Not Believe Vice Is Tastier Than Virtue (n = 36, Study 3)........................................................................................................46

Figure 3: Beliefs about Effect of Matching on Healthiness and Matching on Flavor on Affiliation (Panel A) and Indulging Companion Feeling Self-Conscious (Panel B) (Study 1) ........................................................................................................................................91

Figure 4: Chat Partner Profiles (Study 2a).............................................................................................................................................98

Figure 5: Effect of Goal Condition on Matching on Healthiness and Flavor (Study 2a) ..99

Figure 6: Effect of Goal Condition on Matching on Healthiness and Flavor (Study 2b) 102

Figure 7: Choice of Unhealthy Option as a Function of Goal Condition and Socially Meaningful Attribute(s) (Study 3) ........................................................................................................................................110

Figure 8: Moderated Mediation Model (Study 3)..........................................................................................................................111

Figure 9: Chat Partner Profiles Viewed by Indulging Participants (Study 4) ............118

Figure 10: Indulging Participants’ Liking of a Companion, as a Function of the Companion’s Food Choice and the Presence of a Constraint Leading to a Healthy Food Choice (Study 4) .........................................................................................119

Figure 11: Indulging Participants’ Liking of a Companion, Depending on Companion’s Behavior (Study 5) ..........................................................................................................................125
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1. Introduction: A Multiple Goal Perspective on Eating Behavior

People often pursue multiple goals that may conflict, such that progress on one goal is perceived to come at the expense of another (Kruglanski et al. 2002). In this dissertation, I take the perspective that a healthy eating goal can conflict with the goal of having an enjoyable eating experience. I then point out that aside from prioritizing one goal over another, a second important way to address this conflict is to decrease the conflict between these goals. Addressing goal conflict by decreasing the conflict may prove particularly promising as many people refuse to address a health goal if they believe that eating enjoyment will be significantly compromised. Accordingly, in both Essays 1 and 2, I investigate ways to decrease the conflict between healthy eating and an enjoyable eating experience.

1.1 Conflict Between Healthy Eating and Having an Enjoyable Eating Experience

In this dissertation, I focus on two sources of enjoyment in eating experiences with which healthy eating can conflict: having tasty food (Essay 1) and affiliating with indulging dining companions (Essay 2). In a qualitative study on the experience of consuming a healthy diet, these two sources of enjoyment were among the most frequently mentioned as perceived barriers to healthy eating (Macdiarmid et al. 2013).
1.1.1 How Healthy Eating Can Conflict with Having Tasty Food

People care strongly about having food that is tasty (i.e., about deriving sensory pleasure from consuming food). Yet healthy eating often conflicts with having tasty food because many people view healthy food to be less tasty than unhealthy food. Although this unhealthy equals tasty belief is not shared by all people (Werle, Trendel, and Ardito 2013) or for all foods (Liu et al. 2015), it is common among adults and children (Maimaran and Fishbach 2014; Raghunathan, Naylor, and Hoyer 2006).

Conflict between healthiness and tastiness is problematic for promoting healthier eating. Clearly, if people believe that healthy means not tasty (Raghunathan et al. 2006) and addressing tastiness concerns is important to them (Glanz et al. 1998; Liu et al. 2015; Stewart, Blisard, and Jolliffe 2006), then differentially labeling healthy and unhealthy foods (Hawley et al. 2013; Thorndike et al. 2012) or producing healthier versions of popular foods (Tuttle 2014) will not effectively promote healthier choices.

1.1.2 How Healthy Eating Can Conflict with Affiliating with Indulging Dining Companions

People enjoy being socially accepted and liked by others. Indeed, the need to affiliate and be socially accepted is strong (Baumeister and Leary 1995) and can influence consumer product choices (Liu et al. 2013; Mead et al. 2011; Rawn and Vohs 2011). In Essay 2, I demonstrate that consumers believe healthy eating to conflict with affiliation with indulging dining companions. Additionally, I show that one reason why
consumers believe they need to match others on the healthiness attribute is because healthiness is an attribute that conveys considerable social meaning, being used to make various social judgments (Liu et al. 2013; Lowe and Haws 2014; Oakes and Slotterback 2004; Rozin 1996).

Conflict between healthy eating and affiliation is clearly problematic for promoting healthier eating. To the extent that consumers care strongly about being liked by an indulging dining companion, then consumers may be reluctant to engage in healthy eating if they fear that it may be detrimental to their social relationships.

1.2 Decreasing Conflict Between Healthy Eating and Having an Enjoyable Eating Experience

When two goals conflict, one way to encourage consumers to pursue a focal goal (e.g., healthy eating) is to decrease conflict between the focal goal and its conflicting goal. Not only may decreasing goal conflict reduce anxiety and stress (Emmons and King 1988; Etkin, Evangelidis, and Aaker 2015), but also some people may only address a health goal if eating enjoyment concerns are also addressed. Therefore, I next discuss ways to reduce the conflict between healthy eating and enjoyable eating.

1.2.1 Decreasing Conflict Between Healthy Eating and Having Tasty Food

In Essay 1, I identify a solution for decreasing conflict between healthy eating and a taste goal: offer “vice-virtue bundles” (options with non-zero proportions of both
vice (unhealthy but often tastier food) and virtue (healthy but often less tasty food)). I find that vice-virtue bundles with a small proportion of vice are viewed by many consumers as being as tasty as bundles with higher proportions of vices. This finding indicates that making an option healthier (in this case, by increasing the proportion of virtue) does not always equal less tasty (Raghunathan et al. 2006). Indeed, I find that many consumers who would otherwise select vice (if bundles were not offered) instead select a vice-virtue bundle with a small proportion of vice. Collectively, Essay 1’s findings indicate that vice-virtue bundles may allow consumers to simultaneously address both taste and health goals.

1.2.2 Decreasing Conflict Between Healthy Eating and Affiliating with Dining Companions

In Essay 2, I first establish that there is a conflict between healthy eating and affiliation with an indulging dining companion and examine why this conflict arises. Based on why this conflict arises, I then introduce two strategies that consumers can use, such that eating healthily does not decrease affiliation with a dining companion eating unhealthy food. The first strategy is to attribute choice of a healthy option to a constraint, thereby mitigating the social judgments that can be formed based on the healthiness of one’s choice. The second strategy is to offer to share one’s healthy option with an indulging companion with the stated desire to provide variety, lest the sharing offer be attributed to the desire to provide healthiness.
1.3 Overview of Essays 1 and 2

Essay 1 is drawn from “Vice-Virtue Bundles” (Liu et al. 2015), and Essay 2 is titled “Eat, Drink, and Be Merry? Decreasing Conflict Between Healthy Food Choices and Affiliation with Indulging Companions.”

2. Essay 1: Vice-Virtue Bundles

2.1 Introduction

Increasing consumers’ tendency to make healthy eating decisions is critical. Current estimates indicate that 68% of American adults are now overweight or obese (Flegal et al. 2010). In addition to having physical and mental health consequences, obesity also has significant economic consequences. To illustrate, obesity is estimated to be responsible for almost 10% of total annual medical expenditures in the United States—approximately $147 billion (Finkelstein et al. 2009). Additionally, for employers that contribute to their employees’ healthcare costs, finding ways to prevent and reduce excess weight gain is critical (Chang and Marsh 2013; Finkelstein et al. 2010; Mello and Rosenthal 2008). Furthermore, many for-profit establishments in the food industry, such as restaurant chains, are also very interested in increasing healthy food sales. Increasing healthy food sales can help such establishments address criticism for the popularity of their traditionally unhealthy offerings (Hastings 2013; Liu et al. 2014) and can be an important component of corporate social responsibility strategies (McDonald’s 2013a; McWilliams, Siegal, and Wright 2006).

Unfortunately, the deck is stacked against the choice of healthy options in many ways. First, consumers have limited self-control (Baumeister et al. 1998), and they often find the immediate benefits of tasty indulgences to be more salient than their long-term
negative consequences (O’Donoghue and Rabin 2000). In addition, cues that increase hunger and cravings permeate many choice contexts (Laibson 2001; Lambert et al. 1991; Stroebe et al. 2013), making it more difficult for consumers to resist choosing unhealthy foods (Shiv and Fedorikhin 2002). Moreover, many consumers prioritize taste goals over health goals in their food choices (Glanz et al. 1998; Stewart et al. 2006), such that health concerns only affect their food choices once they are confident that taste concerns will also be addressed.

In the present research, we consider the many daily choices that people face between unhealthy, but often tastier, options (such as fries) and healthy, but often less tasty, options (such as salad). We refer to these unhealthy and healthy options as vices and virtues, respectively, consistent with terminology used in other research on unhealthy and healthy foods (Hui, Bradlow, and Fader 2009; Mishra and Mishra 2011; Wertenbroch 1998). Although much research has examined interventions aimed at shifting consumers from selecting vice to virtue options, in the present work we focus on simultaneously addressing both taste and health goals.

Specifically, we suggest that vice-virtue bundles (offerings in which varying proportions of both vice and virtue are present in a single offering, holding the overall

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1 As Mishra and Mishra (2011) point out, however, researchers have used different, but related, terms to categorize products that vary in the extent to which they have short-term versus long-term benefits. These terms include “wants” versus “shoulds” (Milkman, Rogers, and Bazerman 2008) and “hedonic products” versus “utilitarian products” (Dhar and Wertenbroch 2000).
quantity constant (discussed further in Section 2.1.2)) represent an opportunity to address taste and health goals within a single choice (Dhar and Simonson 1999; Simonson 1989).

Importantly, depending on the a priori importance that consumers place on addressing taste versus health goals and on their beliefs about the effectiveness of vice and virtue at addressing taste goals, they may choose differently composed bundles. In general, results suggest that for many consumers, the mere presence of vice tends to drastically increase perceptions of an option’s tastiness, raising its perceived effectiveness at addressing a taste goal. For these individuals, bundles that include relatively less vice than virtue are preferred to choices that include relatively more vice than virtue. Thus, for consumers who would otherwise select vice in the absence of vice-virtue bundles, this simple solution may lead to substantially healthier choices.

2.1.1 Existing Solutions to Promote Healthier Eating

Given the strong lure of indulgent foods, numerous strategies have been suggested to curb unhealthy consumption (Chandon and Wansink 2012). One strategy involves increasing access to healthy food options (Keohane 2008; Strom 2013). However, this strategy alone may not be sufficient to significantly increase healthy eating, unless accompanied by cues to increase health awareness (e.g., traffic light symbols) (Sonnenberg et al. 2013), because many consumers will have the option to
choose unhealthy options in the same situations in which healthy options are available.

Another strategy involves increasing the time between when consumers choose food and when they can consume it (Milkman, Rogers, and Bazerman 2010). However, this strategy may not be implementable in many consumption contexts because it can be difficult to prompt consumers to order food in advance. A third strategy for decreasing unhealthy eating has been to encourage consumers to use moderation—ordering the fries but only eating a few. Yet moderation often fails (Haws et al. 2011) for two reasons: people do not appropriately monitor consumption quantity (Redden and Haws 2013) and a variety of environmental factors inhibit consumption monitoring (Wansink 2004; Wansink, Payne, and Chandon 2007). Thus, it may be very difficult to completely shift consumers away from vice consumption.

Other work, however, suggests that consumers may be responsive to external interventions that seek to alter the quantity of vice consumption rather than to eliminate it entirely (Cheema and Soman 2008; Schwartz et al. 2012). For example, research points to the potential for consumers to voluntarily limit vice quantity at the choice stage (Schwartz et al. 2012). Indeed, although consumers regularly consume large amounts of vices (Rolls, Morris, and Roe 2002; Schwartz et al. 2012; Sharpe, Staelin, and Huber 2008; Wansink 2006; Wansink, Painter, and North 2005) and rarely self-ration by spontaneously requesting to downsize the quantity of vice (Schwartz et al. 2012), they
sometimes choose to downsize when a server explicitly asks them if they want to
downsize their order (Schwartz et al. 2012).

Furthermore, other research suggests that consumers sometimes embrace
opportunities to increase virtue consumption quantity. For example, research suggests
that people engage in more exercise if they can listen to enjoyable audiobooks only
while exercising, rather than being able to listen at any time, and are willing to pay for
this restriction (Milkman, Minson, and Volpp 2014); this restriction (termed “temptation
bundling”) strategically combines the utility streams from a relative want (i.e., enjoyable
audiobooks) and a relative should (i.e., exercising) (Milkman et al. 2014). In addition,
consumers purchase greater quantities of virtuous food products when bonus packs are
offered (Mishra and Mishra 2011) and consume more virtuous food products when
quantity discounts are offered (Haws and Winterich 2013).

2.1.2 Vice-Virtue Bundles

Given that consumers may accept opportunities to increase virtue consumption
under the right circumstances, we suggest a simple solution that can help consumers
who would otherwise choose vice to simultaneously increase consumption of healthy
foods (virtues) and decrease consumption of unhealthy foods (vices) while still fulfilling
taste goals—“vice-virtue bundles.” Vice-virtue bundles consist of nonzero proportions
of both vice- and virtue-related products. These proportions can vary, such that a vice-
virtue bundle might contain relatively more virtue (e.g., three apple slices and one cookie), relatively equal proportions of virtue and vice (e.g., two apple slices and two cookies), or relatively more vice (e.g., one apple slice and three cookies).

Importantly, this solution is not equivalent to offering two snacks because the overall portions provided in the bundles are visually and volumetrically equivalent to just one snack (i.e., proportion of pure vice option plus proportion of pure virtue option equals one). Thus, this solution carefully controls overall portions. Indeed, prior research suggests that better health outcomes can be achieved if consumers both limit intake of indulgent foods (Schwartz et al. 2012; Wertenbroch 1998) and increase intake of healthy foods (Redden and Haws 2013). Vice-virtue bundles can help consumers pursue both strategies and provide multifinal means for advancing both taste goals and health goals (Köpetz et al. 2011).

In the present research, we examine the impact on consumers’ choices when vice-virtue bundles varying in terms of the relative proportions of vice and virtue (¼-vice and ¾-virtue; ½-vice and ½-virtue; and ¼-vice and ¼-virtue) are added to a choice set that otherwise would consist of pure virtue (virtue alone) and pure vice (vice alone).
2.1.3 Maximizing Utility from Addressing Taste and Health Goals

2.1.3.1 Utility Maximization Function

To understand the effect of introducing vice-virtue bundles to a choice set, consider that consumers are likely to hold both taste and health goals, albeit to different degrees. Although other goals may certainly come into play in making food decisions (e.g., reducing cost), we focus on the trade-offs between health and taste, which are often thought to be in conflict (Raghunathan et al. 2006) and which people often seek to address (Dhar and Simonson 1999). We then suggest that consumers seek to choose the option in a set that best maximizes the sum of the utility they derive from the option’s effectiveness at addressing their taste goal and the utility they derive from the option’s effectiveness at addressing their health goal.

Formally, holding all else constant, consumers tend to choose the option that provides the maximum utility, where the utility of an option A is given by the following equation:

\[
\text{Utility of option } A = (\text{importance of taste goal} \times \text{effectiveness of option } A \text{ at addressing taste goal}) + (\text{importance of health goal} \times \text{effectiveness of option } A \text{ at addressing health goal})
\]

Thus, to predict consumers’ preferences among options, it becomes important to consider consumers’ a priori beliefs about the effectiveness of different options at addressing taste and health goals and to consider the relative importance consumers
place on addressing a taste goal and a health goal. Recognizing that these effectiveness beliefs and importance weights may be heterogeneous across consumers leads us to conceptualize three segments of consumers and to develop distinct predictions regarding their response to vice-virtue bundles.

2.1.3.2 Vice Lovers (Consumer Segment 1)

We begin with consumers who we call “vice lovers.” In general, vice lovers represent the typical consumer who, when faced with a self-control dilemma between vice and virtue, tends to choose vice. Vice lovers have two characteristics that are common to many consumers. First, they perceive vices to be tastier than virtues,\(^2\) in keeping with the “unhealthy = tasty intuition” (Raghunathan et al. 2006). That is, vice lovers believe vices are more effective for satisfying taste goals than are virtues. Second, they choose pure vice over pure virtue in the absence of vice-virtue bundles, suggesting that they may place a higher importance on addressing a taste goal than a health goal when both cannot be addressed simultaneously.

Given the first of these two characteristics, we depict in Figure 1(a) these consumers’ functions for an option’s perceived effectiveness at addressing taste and

\(^2\) Note that in Section 2.1.3.4, we present a different tastiness functional form for consumers who do not believe that vice better addresses taste goals than virtue (“virtue lovers”). In contrast, we present healthiness functional forms that do not vary across consumers because, whereas taste perceptions are inherently subjective, health perceptions can be fairly unambiguous for some foods (e.g., chips and cookies are unhealthy, whereas carrots and apples are healthy), and it is these foods with unambiguous health perceptions (i.e., clear vice and virtue foods) that we focus on in the present research.
health goals as a function of its relative proportions of vice and virtue. As the proportion of vice in an option increases from 0 to 1, we predict (1) an increasing concave function for the option’s perceived effectiveness at addressing a taste goal and (2) a decreasing linear function for the option’s perceived effectiveness at addressing a health goal.

![Figure 1: Theoretical Tastiness and Healthiness Functions for (a) Consumers Who View Vice as More Effective at Addressing a Taste Goal Than Virtue (Vice Lovers and Virtue Acceptors) and (b) Consumers Who Do Not View Vice as More Effective at Addressing a Taste Goal Than Virtue (Virtue Lovers)](image)

*Notes.* These functional forms represent an option’s perceived effectiveness at addressing a taste goal and a health goal as a function of the option’s proportion of vice. In panel (a), an initial increase in vice proportion provides a substantial boost in perceived effectiveness at addressing a taste goal, with subsequent increases in vice proportion providing relatively smaller boosts in perceived effectiveness at addressing a taste goal. In panel (b), an initial increase in vice proportion does not provide a substantial boost in perceived effectiveness at addressing a taste goal (and can actually provide a decrease in perceived effectiveness at addressing a health goal); thus, any selection of vice-virtue bundles among virtue lovers is driven by variety seeking alone. Note that this figure illustrates theoretical predictions for beliefs about the effectiveness of options at addressing taste and health goals, whereas Table 1 additionally illustrates the relative importance of addressing taste and health goals.

We predict these functional forms based on prior work on affect and cognition in valuation (Hsee and Rottenstreich 2004). This work theorizes that if people rely more on feelings (or affect) than on calculation (or cognition) to make a judgment, they will be
more sensitive to the presence or absence of a stimulus than to the amount of stimulus (Hsee and Rottenstreich 2004). Because tastiness is a primarily affective (feelings-based) attribute (Shiv and Fedorikhin 1999), we anticipate that vice-loving consumers will primarily note whether vice is present or absent. If any vice is present, consumers’ perception that taste goals will be addressed will show an immediate and substantial increase. Furthermore, after this initial present/absent evaluation, returns for greater amounts of vice will diminish, consistent with satiation (Redden and Haws 2013). That is, whereas the first unit of increase in vice proportion produces a large increase in perceived effectiveness at addressing a taste goal, the marginal perceived effectiveness of a vice at addressing a taste goal diminishes quickly, such that additional units of increase in vice proportion do not add much incremental effectiveness. These properties result in an increasing concave pattern for an option’s effectiveness at addressing taste goals as a function of the proportion of vice in an option.

In contrast, for healthiness, this work leads us to predict a decreasing linear pattern for these consumers (Hsee and Rottenstreich 2004), with little or no diminishing returns. Healthiness is a primarily cognitive (calculations-based) attribute (Shiv and Fedorikhin 1999). As a result, when evaluating healthiness, people are more likely to use calculation than feelings (Hsee and Rottenstreich 2004), thus leading to a linear function of proportion of vice in an option. That is, the first unit of increase in virtue proportion does not produce a large increase in perceived effectiveness at addressing a health goal,
and the marginal perceived effectiveness of additional units of increase in virtue proportion at addressing a health goal is fairly constant. Therefore, we propose that the effectiveness at addressing a health goal decreases proportionate to the proportion of vice in an option.

To illustrate how these distinct functional forms, along with a relative prioritization of a taste goal over a health goal, can affect preference among vice-virtue bundles, we present constructed numeric example 1 (the vice-lover example) in Table 1. In this example, we use the hypothesized tastiness and healthiness functional forms depicted in Figure 1(a) and make the following additional simplifying assumptions for this segment: the consumer believes that (1) vice alone is effective at addressing the taste goal and (2) virtue alone is effective at addressing the health goal. We also indicate that the vice-lover consumer places a relatively greater importance on addressing a taste goal than on a health goal. Then, assuming that consumers attempt to maximize their utility from addressing taste and health goals, numeric example 1 leads to the prediction that vice lovers may often prefer the ½-vice option.\(^3\) Importantly, because the first unit of increase in vice proportion produces such a large increase in perceived effectiveness at addressing a taste goal, this example also illustrates that in the absence of the ½-vice

\(^3\) Note though that preference for the ½-vice option over the ¼-vice option depends on the relative importance placed on addressing a taste goal versus a health goal; the greater the relative importance placed on addressing a taste goal, the greater the preference for a vice-virtue bundle with a somewhat higher vice proportion (e.g., ½-vice over ¼-vice).
option, the ¼-vice option may often be preferred to the ¾-vice option—even though pure vice is preferred to pure virtue in the absence of vice-virtue bundles.

Table 1: Constructed Numeric Examples for Weighted Sum Model of Choice Among Vice-Virtue Bundles for Three Consumer Segments (Vice Lovers, Virtue Acceptors, and Virtue Lovers)

<table>
<thead>
<tr>
<th>Segment</th>
<th>Example</th>
<th>Effectiveness at Addressing Taste Goal (a)</th>
<th>Taste Goal Importance Weight (b)</th>
<th>Effectiveness at Addressing Health Goal (c)</th>
<th>Health Goal Importance Weight (d)</th>
<th>Total Utility of Each Option (a<em>b) + (c</em>d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Pure Virtue</td>
<td>0</td>
<td>0.55</td>
<td>40</td>
<td>0.45</td>
<td>18.00</td>
</tr>
<tr>
<td></td>
<td>¼-Vice</td>
<td>23</td>
<td>0.55</td>
<td>30</td>
<td>0.45</td>
<td>26.15</td>
</tr>
<tr>
<td></td>
<td>½-Vice</td>
<td>33</td>
<td>0.55</td>
<td>20</td>
<td>0.45</td>
<td>27.15</td>
</tr>
<tr>
<td></td>
<td>¾-Vice</td>
<td>38</td>
<td>0.55</td>
<td>10</td>
<td>0.45</td>
<td>25.40</td>
</tr>
<tr>
<td></td>
<td>Pure Vice</td>
<td>40</td>
<td>0.55</td>
<td>0</td>
<td>0.45</td>
<td>22.00</td>
</tr>
<tr>
<td>2)</td>
<td>Pure Virtue</td>
<td>0</td>
<td>0.45</td>
<td>40</td>
<td>0.55</td>
<td>22.00</td>
</tr>
<tr>
<td></td>
<td>¼-Vice</td>
<td>23</td>
<td>0.45</td>
<td>30</td>
<td>0.55</td>
<td>26.85</td>
</tr>
<tr>
<td></td>
<td>½-Vice</td>
<td>33</td>
<td>0.45</td>
<td>20</td>
<td>0.55</td>
<td>25.85</td>
</tr>
<tr>
<td></td>
<td>¾-Vice</td>
<td>38</td>
<td>0.45</td>
<td>10</td>
<td>0.55</td>
<td>22.60</td>
</tr>
<tr>
<td></td>
<td>Pure Vice</td>
<td>40</td>
<td>0.45</td>
<td>0</td>
<td>0.55</td>
<td>22.00</td>
</tr>
<tr>
<td>3)</td>
<td>Pure Virtue</td>
<td>40</td>
<td>0.50</td>
<td>40</td>
<td>0.50</td>
<td>40.00</td>
</tr>
<tr>
<td></td>
<td>¼-Vice</td>
<td>40</td>
<td>0.50</td>
<td>30</td>
<td>0.50</td>
<td>35.00</td>
</tr>
<tr>
<td></td>
<td>½-Vice</td>
<td>38</td>
<td>0.50</td>
<td>20</td>
<td>0.50</td>
<td>29.00</td>
</tr>
<tr>
<td></td>
<td>¾-Vice</td>
<td>35</td>
<td>0.50</td>
<td>10</td>
<td>0.50</td>
<td>22.50</td>
</tr>
<tr>
<td></td>
<td>Pure Vice</td>
<td>31</td>
<td>0.50</td>
<td>0</td>
<td>0.50</td>
<td>15.50</td>
</tr>
</tbody>
</table>

Notes. All numbers used are for illustrative purposes; we only make claims about the relative and not the absolute values. The “effectiveness at addressing goal” cells indicate the perceived effectiveness of each of the five options (pure virtue, ¼-vice, ½-vice, ¾-vice and pure vice) at addressing taste and health goals, where higher numbers indicate greater perceived effectiveness at addressing a given goal. The “goal importance weights” indicate the relative importance placed on addressing a taste goal and a health goal; as relative weights, the sum of the taste goal importance weight and the health goal importance weight is constrained to equal one across all examples. The overall utility of an option is given by the following weighted sum formula: utility of option A = (importance of taste goal × effectiveness of option A at addressing taste goal) + (importance of health goal × effectiveness of option A at addressing health goal). We then assume that consumers choose the option that provides the greatest overall utility. We have shaded in gray the preferred option of each consumer segment, based on the numeric values in this table. Note that for virtue lovers, if vice-virtue bundles are selected, then the vice-virtue bundle with the smallest proportion of vice (¼-vice option) would be the most popular vice-virtue bundle because of variety seeking, which would call for adding the same number of utils to all vice-virtue bundles (section 2.1.4).

Note that this unique set of predictions for virtue lovers cannot be made if we instead assumed a linear tastiness function; a linear tastiness function would lead to the
prediction that vice-virtue bundle options with higher proportions of vice (e.g., $\frac{3}{4}$-vice) would be preferred to vice-virtue bundle options with lower proportions of vice.

2.1.3.3 Virtue Acceptors (Consumer Segment 2)

We next consider a second segment of consumers ("virtue acceptors") who also view vice as tastier (more effective at addressing a taste goal) than virtue but who still choose pure virtue over pure vice in the absence of vice-virtue bundles. To consider how virtue acceptors’ preferences among vice-virtue bundles may differ from vice lovers’ preferences, we suggest that differences in goal importance may explain why a consumer may be a virtue acceptor rather than a vice lover. That is, a virtue acceptor may place relatively greater importance on addressing a health goal than a taste goal.⁴ Given these characteristics of virtue acceptors, our prediction of their preference among vice-virtue bundles is presented in constructed numeric example 2 (the virtue-acceptor example) in Table 1.

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⁴ Although we suggest that virtue acceptors and vice lovers differ because of differences in goal importance, another reason that a consumer may be a virtue acceptor rather than a vice lover implicates differences in the tastiness function: a virtue acceptor may view pure virtue as less tasty than pure vice but as tastier than a vice lover views it. In Table A.1 (Appendix A), we present a constructed numeric example that illustrates the potential choice implications if a virtue acceptor were to differ from a vice lover because of differences in beliefs about the effectiveness of a pure virtue option at addressing a taste goal, rather than differences in goal importance. Both numeric example 2 in Table 1 and the example in Table A.1 lead to the same prediction: virtue acceptors are likely to prefer a vice-virtue bundle with a lower proportion of vice than vice lovers (e.g., a $\frac{1}{4}$-vice option rather than a $\frac{1}{2}$-vice option). Thus, either reason for differentiating virtue acceptors from vice lovers can lead to the same bundle preference prediction for virtue acceptors, and in reality, both reasons may operate.
In numeric example 2, we use the same tastiness and healthiness functions as in numeric example 1, thus assuming that a virtue acceptor views a taste goal as being effectively addressed by vice alone and a health goal as being effectively addressed by virtue alone, like a vice lover. However, rather than assume that the consumer places greater importance on addressing a taste goal than a health goal, we assume that a virtue acceptor places greater importance on addressing a health goal than a taste goal. The greater the relative importance placed on addressing a health goal, the greater the preference for a vice-virtue bundle with a somewhat lower vice proportion. Thus, as shown in numeric example 2, compared to a vice lover, a virtue acceptor is likely to prefer a vice-virtue bundle with a lower vice proportion (the $\frac{1}{4}$-vice option in this numeric example).

In sum, like vice lovers, virtue acceptors view pure vice as tastier than pure virtue, such that we expect the proposed tastiness function and healthiness function to also be increasing concave and decreasing linear, respectively, as shown in Figure 1(a). However, unlike vice lovers, virtue acceptors choose pure virtue over pure vice in the absence of vice-virtue bundles, perhaps because virtue acceptors prioritize their health goal more than vice lovers do. As numeric example 2 clearly illustrates, virtue acceptors are thus likely to prefer a vice-virtue bundle with a lower proportion of vice than vice lovers prefer (e.g., a $\frac{1}{4}$-vice option rather than a $\frac{1}{2}$-vice option).
2.1.3.4 Virtue Lovers (Consumer Segment 3)

Thus far, we have discussed the majority of consumers—the large proportion who generally view vice as tastier than virtue (Raghunathan et al. 2006). However, note that there may be a third segment of consumers (“virtue lovers”) who do not view a vice as tastier than a virtue and may actually, on average, view a virtue as tastier than a vice (Werle et al. 2013). That is, they simply love the taste of a virtue (e.g., salad). We depict the tastiness and healthiness functions that we would anticipate for these consumers in Figure 1(b).

For virtue lovers, pure virtue can meet both taste and health goals. Thus, increasing the proportion of vice from 0 to 1 will tend to undermine both goals simultaneously. In other words, as illustrated in constructed numeric example 3 (the virtue-lover example), a small increase in vice proportion provides no substantial boost in taste utility for these consumers because both tastiness and healthiness are decreasing functions of the proportion of vice.\(^5\) Instead, when vice-virtue bundles are introduced, the only reason these consumers would introduce vice into their bundle would be to

---

\(^5\) In numeric example 3, we assume that the health and taste goal importance weights are equal. The reason that we assume they are equal is because virtue lovers do not face a health and taste goal conflict, so we cannot make inferences about relative goal importance based on their choice in the absence of vice-virtue bundles. Note, however, that it is possible that virtue lovers have health and taste goal importance weights that are different. Importantly, even if the goal importance weights were different, our theoretical account would still make the same predictions about virtue lovers’ preferences in the presence of vice-virtue bundles.
variety seek (discussed in Section 2.1.4; Inman 2001; Kahn and Wansink 2004).

Moreover, virtue lovers’ chosen vice-virtue bundles will likely contain only a small proportion of vice, given that a small proportion of vice allows variety seeking without producing large decreases in health and potential decreases in taste.

2.1.3.5 Summary of Hypotheses

In Figures 1(a) and 1(b) and Table 1, we summarize our hypotheses about the tastiness and healthiness functions and the corresponding predictions about preference for vice-virtue bundles for each segment. These three consumer segments consist of the two segments of consumers who believe vice tastes better than virtue (vice lovers and virtue acceptors in Figure 1(a))—but who may differ in their prioritization of taste and health goals (see also numeric examples 1 and 2 in Table 1)—and one segment that does not believe vice tastes better than virtue (virtue lovers in Figure 1(b))—thereby removing the need to use vice-virtue bundles for balancing taste and health goals, but still allowing for variety seeking to operate (see also numeric example 3 in Table 1).

Our theoretical framework thus suggests that adding vice-virtue bundles can have differential effects on consumers’ caloric intake depending on which consumer segment they belong to. Specifically, adding vice-virtue bundles should substantially decrease caloric intake for consumers who choose pure vice in the absence of vice-virtue bundles (vice lovers). However, for consumers who choose pure virtue in the absence of
vice-virtue bundles (virtue acceptors and virtue lovers), introducing vice-virtue bundles may slightly increase caloric intake.

2.1.4 Alternative Explanations for Vice-Virtue Bundle Preferences

A simple variety-seeking account suggests that people may derive additional utility from vice-virtue bundles over pure options. Specifically, a variety-seeking account would assume that pure virtue and pure vice options do not address a variety goal, whereas all vice-virtue bundles address a variety goal to the same extent (Drewnowski et al. 1997). First, we consider whether explicitly accounting for a variety-seeking goal in the utility function would affect the predicted preferred options for vice lovers and virtue acceptors, as indicated by numeric examples 1 and 2 in Table 1. If we simply added \( x \) (where \( x > 0 \)) utils to each of the vice-virtue bundles but not the pure options (to indicate added utility from addressing a variety-seeking goal), there would be no difference in the predicted preferred option. The only difference in the predicted preferred option would be for virtue lovers in numeric example 3, who would prefer the \( \frac{1}{4} \)-vice option over the pure virtue option as long as \( x > 5 \). Second, we consider whether accounting for a variety-seeking goal alone could lead to the same predicted preferred options for vice lovers and virtue acceptors, as indicated by numeric examples 1 and 2 in Table 1. That is, if we assume an increasing linear tastiness function rather than an increasing concave tastiness function, can variety-seeking lead to the same predictions as
assuming an increasing concave tastiness function? The answer is no. Although adding utils to all vice-virtue bundles can lead to the prediction that virtue acceptors prefer a $\frac{1}{4}$-vice option, it leads to the prediction that vice lovers would prefer a $\frac{3}{4}$-vice option. Thus, we argue that a variety-seeking account can (and should) account for our predictions for virtue lovers but cannot explain our predictions for vice lovers in particular, because it would predict preference for a vice-virtue bundle with relatively more vice.

Second, the existing finding that adding a small virtue (e.g., a tomato slice) to a larger vice (e.g., a hamburger) decreases perceptions of the caloric content of the meal (Chernev 2011; Chernev and Gal 2010) also cannot account for our predictions. This prior work focuses on adding smaller virtues to larger vices, which is most analogous to a vice-virtue bundle with relatively more vice than virtue, and thus would suggest the popularity of a vice-virtue bundle with relatively more vice than virtue. In contrast, we predict—because of the increasing concave tastiness function—that a vice-virtue bundle with relatively more vice than virtue will typically be less popular than vice-virtue bundles with lower vice proportions.

### 2.2 Overview of Studies

First, in Studies 1 and 2, we tested the effects of vice-virtue bundles by first examining whether people select vice-virtue bundles, what proportions of vice and virtue people prefer in vice-virtue bundles ($\frac{1}{4}$-vice, $\frac{1}{2}$-vice, or $\frac{3}{4}$-vice), and whether
people consume the options they select. Together, these studies yield the interesting conclusion that although we examined situations in which choice share of pure vice and pure virtue were not different when only pure options were offered, offering vice-virtue bundles tends to lead consumers to choose options that offer ¼-vice or ½-vice. In addition, the results of Study 2 suggest that offering vice-virtue bundles may decrease subsequent caloric consumption.

Second, in Study 3, we directly tested the forms of the tastiness and healthiness functions that we proposed might underlie choices of vice-virtue bundles. We do this by measuring consumers’ ratings of the tastiness and healthiness for different vice-virtue bundles and pure options. We examined these ratings, and relative preferences among vice-virtue bundles, separately by consumer segment.

Third, in Study 4, to demonstrate that the choice patterns that we predict for the vice-lover segment in particular cannot be explained by pure variety seeking, we tested the impact of removing the ½-vice option—the vice-virtue bundle option that tends to be chosen by the vice-lover segment when available—from the vice-virtue bundles offered. Our results indicate that in the presence of the ½-vice option, vice lovers exhibit preference shifts; consumers who would have selected a particular pure option (i.e.,

6 In Study 3, we aimed to test for the shapes of the theorized functional forms for tastiness and healthiness by measuring expected tastiness and healthiness ratings of each option. Expected tastiness and healthiness ratings are inferred to have the same functional form as perceived effectiveness at addressing taste and health goals, respectively.
pure vice in the case of vice lovers) in fact select an option that contains less than half of that particular pure option when bundles are introduced (i.e., they select \( \frac{1}{4} \)-vice). We compared the introduction of vice-virtue bundles to the introduction of vice-vice bundles, which also provide variety but do not provide an opportunity to balance goals. Our results indicate that in the absence of the middle vice-vice bundle option, preference shifts are much less likely to occur. These findings suggest that when vice-virtue bundles are offered, variety seeking does not drive choice for vice lovers; rather, the hypothesized substantial increase in taste utility provided by incorporating a small proportion of vice clearly drives choice for them.

It was also important to consider how the introduction of vice-virtue bundles affects caloric consumption. In Studies 1 and 2, our between-subjects design allows us only to observe a null effect in the aggregate. However, note that changes in aggregate caloric consumption depend heavily on the relative proportions of the different consumer segments. Thus, in Studies 3 and 4, we use a within-subjects design that allows us to segment consumers and observe differential changes in caloric consumption based on consumer segment. For vice lovers, we predict a relatively larger decrease in calories as they shift from pure vice to \( \frac{1}{2} \)-vice; in contrast, for virtue acceptors and virtue lovers, we predict a relatively smaller increase in calories as they shift from pure virtue to \( \frac{1}{4} \)-vice.
2.2.1 Study 1: Choice Among Vice-Virtue Bundles

Study 1 uses a between-subjects design to compare actual choice when vice-virtue bundles are included versus not included in a choice set. The main purpose of this study is to examine whether consumers choose vice-virtue bundles and, if so, which bundles they prefer.

2.2.1.1 Method

Participants and Design. Seventy participants (40.0% female) were recruited from a university’s annual weekend event in which graduate students camp out for college basketball tickets. The weekend event was held from Friday evening to Sunday morning. Data were collected on Saturday afternoon, ending at 6:15 p.m., when the basketball coach arrived to make a speech.

Participants were randomly assigned to one of two choice sets: (1) “pure vice–pure virtue” (a two-option choice set with pure virtue and pure vice) or (2) “vice-virtue” (a five-option choice set with pure virtue, \(\frac{1}{4}\)-vice, \(\frac{1}{2}\)-vice, \(\frac{3}{4}\)-vice, and pure vice). Eight participants were excluded from analysis for the following reasons: two said they did not want a snack, and six observed another participant’s snack choice by inadvertently seeing or overhearing another participant’s snack choice.\(^7\)

\(^7\) The choice patterns observed are largely robust to including the six participants who observed another participant’s snack choice. See Appendix B for additional details.
Procedure. Researchers approached participants who were alone or in relatively small groups and asked them to participate in a brief survey in exchange for a snack. Participants were told that we had two different sets of survey questions and that they needed to reach into an envelope and pick out a slip of paper that either had the number “1” or “2” printed on it; this number corresponded to the choice set they received. Thus, although researchers selectively approached participants, this randomization ensured no systematic bias was generated across conditions.

Depending on randomly assigned condition, participants were shown a choice set consisting of two options or five options. The pure virtue and vice options were, respectively, baby carrots and potato chips. The mixed vice-virtue bundles included a ¼-vice option (¼ baby carrots and ¼ potato chips), a ½-vice option (½ baby carrots and ½ potato chips), and a ¾-vice option (¼ baby carrots and ¾ potato chips). These choice options were presented pictorially (see Figure A.1 in the appendix). For the precise food contents (i.e., grams of baby carrots and potato chips) and calories on each plate, see Figure A.2 in Appendix A.

Participants chose one option from their assigned choice set and received a voucher that allowed them to redeem it for their chosen snack from a researcher stationed next to a cooler of snacks.
2.2.1.2 Results and Discussion

*Choice Share.* Table 2 shows the percentage of participants who selected each snack in each condition. In the pure vice–pure virtue choice set, the choice shares were not significantly different ($p = 0.163$, exact binomial test). In the vice-virtue bundle choice set, 24.1% chose pure virtue, 37.9% chose $\frac{1}{4}$-vice, 31.0% chose $\frac{1}{2}$-vice, 3.4% chose $\frac{3}{4}$-vice, and 3.4% chose pure vice.

Table 2: Percentage of Participants Choosing Each Choice Option Across Conditions and Studies

<table>
<thead>
<tr>
<th>Study Condition</th>
<th>Pure Virtue or Vice A</th>
<th>$\frac{1}{4}$ Vice or Vice B</th>
<th>$\frac{1}{2}$ Vice or Vice B</th>
<th>$\frac{3}{4}$ Vice or Vice B</th>
<th>Pure Vice or Vice B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1: Choice among Vice-Virtue Bundles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure Virtue – Pure Vice ($n = 33$)</td>
<td>63.6</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>36.4</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included ($n = 29$)</td>
<td>24.1</td>
<td>37.9</td>
<td>31.0</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Study 2: Choice and Consumption of Vice-Virtue Bundles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure Virtue – Pure Vice ($n = 46$)</td>
<td>63.0</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>37.0</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included ($n = 49$)</td>
<td>22.4</td>
<td>22.4</td>
<td>40.8</td>
<td>4.1</td>
<td>10.2</td>
</tr>
<tr>
<td>Study 3: Perceptions of Vice-Virtue Bundle Options</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure Virtue – Pure Vice – Choice 1 ($n = 100$)</td>
<td>57.0</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>43.0</td>
</tr>
<tr>
<td>Vice-Virtue Choice 2 (Vice-Lovers) ($n = 43$)</td>
<td>0.0</td>
<td>9.3</td>
<td>51.2</td>
<td>9.3</td>
<td>30.2</td>
</tr>
<tr>
<td>Vice-Virtue Choice 2 (Virtue-Acceptors) ($n = 21$)</td>
<td>19.0</td>
<td>71.4</td>
<td>9.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Vice-Virtue Choice 2 (Virtue-Lovers) ($n = 36$)</td>
<td>50.0</td>
<td>41.7</td>
<td>8.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Study 4: Expanding a Choice Set with Mixed Bundles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included Choice 1 ($n = 95$)</td>
<td>52.6</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>47.4</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included Choice 2 (Virtue Choosers) ($n = 50$)</td>
<td>32.0</td>
<td>64.0</td>
<td>4.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included Choice 2 (Vice Choosers) ($n = 45$)</td>
<td>2.2</td>
<td>15.6</td>
<td>57.8</td>
<td>11.1</td>
<td>13.3</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included Choice 1 ($n = 96$)</td>
<td>63.5</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>36.5</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included Choice 2 (Virtue A Choosers) ($n = 61$)</td>
<td>23.0</td>
<td>44.3</td>
<td>31.1</td>
<td>0.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included Choice 2 (Vice B Choosers) ($n = 35$)</td>
<td>0.0</td>
<td>5.7</td>
<td>28.6</td>
<td>37.1</td>
<td>28.6</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Excluded Choice 1 ($n = 94$)</td>
<td>58.5</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>41.5</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Excluded Choice 2 (Virtue Choosers) ($n = 55$)</td>
<td>41.8</td>
<td>58.2</td>
<td>--</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Excluded Choice 2 (Vice Choosers) ($n = 39$)</td>
<td>0.0</td>
<td>48.7</td>
<td>--</td>
<td>20.5</td>
<td>30.8</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Excluded Choice 1 ($n = 94$)</td>
<td>50.0</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>50.0</td>
</tr>
</tbody>
</table>
Both the \( \frac{1}{4} \)-vice option and the \( \frac{1}{2} \)-vice option were significantly more likely to be chosen than the \( \frac{3}{4} \)-vice option (\( p = 0.006 \) and \( p = 0.022 \), respectively, exact binomial tests). The \( \frac{1}{4} \)-vice option and the \( \frac{1}{2} \)-vice option drew similar choice shares (37.9% and 31.0%, \( p = 0.824 \), exact binomial test).

*Calories Ordered.* We also calculated calories ordered (see Figure A.2 in Appendix A). Calories ordered was not significantly different when vice-virtue bundles were introduced (\( M_{5\text{-option}} = 74 \) calories, \( M_{2\text{-option}} = 79 \) calories; independent-samples \( t \)-test: \( t(48) = 0.46 \), \( p = 0.648 \); nonparametric Mann–Whitney \( U \)-test: \( p = 0.346 \)).

*Discussion.* These results provide initial evidence that people select vice-virtue bundles when making actual food choices. We found choice shares among the vice-virtue bundles that were consistent with aggregate choice patterns predicted by a combination of asymmetric effectiveness of small vice and virtue proportions (for vice lovers and virtue acceptors) and variety seeking (for virtue lovers). Specifically, both the \( \frac{1}{4} \)-vice and \( \frac{1}{2} \)-vice options were more popular than the \( \frac{3}{4} \)-vice option.

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\( ^8 \) The degrees of freedom were adjusted because of the heterogeneity of variances.
We note that, in the aggregate, we observe no decrease in the average number of calories ordered when vice-virtue bundles were introduced. However, our theory predicts that the effects of introducing vice-virtue bundles on calories ordered at the aggregate level will depend on the relative proportion of people who would otherwise choose vice in the absence of vice-virtue bundles (vice lovers) and those who would otherwise choose virtue in the absence of vice-virtue bundles (virtue acceptors and virtue lovers). Because our between-subjects design in Study 1 does not allow us to observe participants’ a priori preferences, we cannot test for this differential effect by consumer segment. We elaborate on this limitation further in the discussion of Study 2. Then, when this limitation is lifted in Studies 3 and 4, we examine how the effect of introducing vice-virtue bundles on calories ordered differs by consumer segment.

We also note that in Study 1, we did not actually observe participants’ consumption, either during or after the experiment. Therefore, it is possible that participants did not actually consume the options they selected. It is also possible that offering vice-virtue bundles might affect consumers’ subsequent caloric intake. Examining this latter possibility is important because if offering vice-virtue bundles were to lead to higher subsequent caloric intake, then this intervention could in fact have perverse, negative effects on healthy eating initiatives. We test these possibilities in Study 2.
2.2.2 Study 2: Choice and Consumption of Vice-Virtue Bundles

In Study 2, we aimed to replicate the choice share findings of Study 1 with a different set of snacks while also measuring whether people actually consume the snacks they select. In addition, we collected dietary recall data to examine whether offering vice-virtue bundles alters subsequent (post-snack) caloric consumption.

2.2.2.1 Method

*Participants and Design.* One hundred participants ($M_{age} = 21.83, 63.0\%$ female) from a university participant pool took part in this study,\(^9\) which contained two parts. Participants were eligible to complete part 2 if they completed part 1 on the previous day. Of the 100 participants who completed part 1, 86 participants (86.0\%) also completed part 2 the next day. Participants received $5 if they only completed part 1 and $15 if they completed both parts. Part 1 was administered in 20-minute sessions between 1:30 p.m. and 4:30 p.m. Part 2 was administered in 20-minute sessions between 9:00 a.m. and 1:00 p.m.

As in Study 1, participants were randomly assigned to one of two choice-sets: (1) “pure vice–pure virtue” (a two-option choice set with pure virtue and pure vice) or (2)...

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\(^9\) For Studies 2–4, we set target sample sizes prior to data collection and analysis (Simmons, Nelson, and Simonsohn 2011). For Study 2, we aimed for approximately the same number of participants as in Study 1 but used a slightly larger sample size to account for potential attrition for the follow-up dietary recall part of the study. For Study 3, we aimed for approximately 100 participants, consistent with the number of participants in the vice-virtue 50/50-included choice 1 condition in Study 4. For Study 4, we aimed for 100 participants per between-subjects condition.
“vice-virtue” (a five-option choice set with pure virtue, ¼-vice, ½-vice, ¾-vice, and pure vice). Five participants were excluded from all analyses because of dietary restrictions (two participants reported an allergy to apples, the virtue product used in this study; one reported an allergy to wheat/gluten, an ingredient in the vice product used in this study; two reported that they do not eat chocolate, an ingredient in the vice product used in this study), thus leaving us with 95 participants for the analysis of snack choice and 81 participants for the dietary recall analysis.

Part 1 Procedure. Participants were told that part 1 would involve listening to an audio program and that they would be provided with a snack. Participants entered the lab in groups of up to eight, and each participant took a seat at an individual computer station. Dividers were placed between computer stations to keep participants from observing other participants’ food choices and consumption.

Participants first selected one of two audio programs to listen to. In actuality, both audio programs were the same to ensure that all participants had the same listening experience, but the programs were labeled with different titles to facilitate the cover story that we were interested in their audio listening experience (rather than their food choices and consumption).

Based on randomly assigned condition, participants were shown a choice set with two or five options. The pure virtue and vice options were, respectively, apple slices and Oreo cookies. The vice-virtue bundle options were ¼-vice (three apple slices
and one Oreo), ½-vice (two 4 apple slices and two Oreos), and ¾-vice (one apple slice and three Oreos). These choice options were presented pictorially (see Figure A.1 in Appendix A). For the food contents (grams of apples and Oreos) and calories on each plate, see Figure A.2 in Appendix A.

Participants circled their selections on a sheet of paper and handed them to a researcher (hereafter “the main researcher”). The main researcher then instructed participants to complete a filler survey about headphone preferences and entertainment preferences. While participants completed the filler survey, researchers stationed in a second room prepared the snacks selected by participants. To allow us to keep track of how much each participant consumed, the bottom of each snack dish was discreetly labeled to allow us to link each participant’s consumption with the rest of the data he or she provided. The main researcher then served participants their selected snacks. The main researcher told participants to begin watching the audio clip and that they could feel free to eat the snack until the researcher returned in approximately 10 minutes.

The main researcher returned after approximately 10 minutes and collected participants’ dishes and any leftovers. The researchers in the second room then recorded whether participants had any leftovers and, if so, what the leftovers were.

Finally, participants provided demographic information and entered a unique ID to allow linking of their data across parts 1 and 2 of the study. Participants were reminded to return the following day for part 2 of the study. They were not told that
they would be completing a dietary recall for part 2 because we did not want to alter their post-snack consumption behavior.

*Part 2 Procedure.* When participants returned the next day, they were told that the purpose of part 2 of the study was to gather information on what foods and drinks they had consumed yesterday from when they woke up to when they went to sleep. A three-step multiple-pass recall, adapted for group administration, was used to assess what participants had consumed (Guenther et al. 1997; Scott et al. 2007). During the first pass (quick list), participants listed all foods and beverages they consumed yesterday from when they woke up to when they went to sleep. During the second pass (detailed description), participants added detailed information about each food or beverage, including when they consumed it, the portion size consumed, and any brand names. Participants were provided with measurement estimation guides to help them estimate portion size, a folder of menus from local restaurants to help them recall exact dishes that they might have eaten, and a sheet of paper with seven questions to help them add more detail to their dietary recalls (Scott et al. 2007). During the third and final pass (review), a researcher reviewed the participant’s dietary recall to check for completeness. Of interest to the present research, this dietary recall included information on participants’ food and beverage consumption in the afternoon and evening following part 1’s snack session.
Dietary Recall Coding. Calories consumed in the afternoon and evening following the snack session was calculated using the dietary recalls, online databases containing calorie information for different foods (e.g., http://caloriecount.about.com, http://www.fatsecret.com, and http://www.myfitnesspal.com), and nutrition information on restaurant and product websites.

2.2.2.2 Results and Discussion

First, we examine the choice shares when vice-virtue bundles were introduced to the choice set. Second, we examine whether participants consumed their chosen snacks. Finally, we examine post-snack caloric consumption to examine whether introducing vice-virtue bundles alters subsequent consumption.

Choice Share. Table 2 shows the percentage of participants who selected each snack in each condition. In the pure vice-pure virtue choice set, the choice shares were not significantly different ($p = 0.104$, exact binomial test). In the vice-virtue bundle choice set, 22.4% chose pure virtue, 22.4% chose $\frac{1}{4}$-vice, 40.8% chose $\frac{1}{2}$-vice, 4.1% chose $\frac{3}{4}$-vice, and 10.2% chose pure vice.

The $\frac{1}{4}$-vice option was significantly more likely to be chosen than the $\frac{3}{4}$-vice option (22.4% versus 4.1%; $p = 0.023$, exact binomial test), and the $\frac{1}{2}$-vice option was significantly more likely to be chosen than the $\frac{3}{4}$-vice option (40.8% versus 4.1%; $p <$
0.001, exact binomial test). The ¼-vice option and the ½-vice option drew similar choice shares (22.4% and 40.8%; p = 0.150, exact binomial test).

Consumption. The majority of participants (89.5%) consumed the entire snack they selected. The percentage consuming the entire snack did not differ across conditions; 87.0% of participants in the two-option choice set condition consumed the entire snack, and 91.8% of participants in the five-option choice set condition consumed the entire snack (p = 0.441, two-proportion Z-test). Of the six participants who did not consume the entire snack in the two-option choice set condition, two had some apple leftover and four had some cookie leftover. Of the four participants who did not consume the entire snack in the five-option set condition, two had some apple leftover and two had some apple and some cookie leftover.

Snack Caloric Consumption. We then calculated the calories consumed at part 1’s snack session (see Figure A.2 in Appendix A). Calorie consumption during the snack session was not significantly different when vice-virtue bundles were introduced (M_{5-option} = 103 calories, M_{2-option} = 91 calories; independent-samples t-test: t(79) = 0.85, p = 0.396;\textsuperscript{10} nonparametric Mann–Whitney U-test: p = 0.063).

Post-snack Caloric Consumption. We then analyzed the dietary recall data to examine whether introducing vice-virtue bundles affected subsequent post-snack caloric

\textsuperscript{10} The degrees of freedom were adjusted because of the heterogeneity of variances.
consumption. The percentage of participants completing a dietary recall did not differ across conditions: 89.1% of participants in the two-option choice set condition completed a recall, and 81.6% of participants in the five-option choice set condition completed a recall ($p = 0.303$, two-proportion Z-test). An independent samples $t$-test indicated that post-snack caloric intake was lower when vice-virtue bundles were introduced ($M_{5\text{-option}} = 886$ calories vs. $M_{2\text{-option}} = 1,112$ calories; $t(79) = 2.03, p = 0.045$). Including snack calories consumed, the comparison was marginally significant ($M_{5\text{-option}} = 992$ calories vs. $M_{2\text{-option}} = 1,204$ calories, $t(79) = 1.90, p = 0.062$).

**Discussion.** Using a different set of stimuli with countable units, Study 2 replicated the choice share findings of Study 1. Specifically, we again find that when vice-virtue bundles are introduced, participants tended to choose vice-virtue bundles with proportions of vice that were 1 or less. In addition, Study 2 demonstrated that most participants consumed the entire option they selected. Thus, it appears that participants’ choices were well calibrated with their actual consumption and that offering vice-virtue bundles will not increase food waste (i.e., lead consumers to select but not consume virtues). Moreover, Study 2 found that offering vice-virtue bundles appears to lead consumers to decrease their subsequent caloric intake. We discuss this finding more in Section 2.3.3.

Finally, analogous to Study 1, no aggregate decrease in snack calories consumed occurred when vice-virtue bundles were introduced. However, our theory predicts that
the aggregate-level effects of introducing vice-virtue bundles on calories ordered and consumed will depend heavily on the relative proportions of the three consumer segments in the population. Thus, in Studies 3 and 4, we conduct a more precise examination of the impact of introducing vice-virtue bundles on calories ordered by examining the calorie implications separately for people who would otherwise choose pure vice and people who would otherwise choose pure virtue in the absence of vice-virtue bundles.

2.2.3 Study 3: Perceptions of Vice-Virtue Bundle Options

In Study 3, we test the theoretical predictions in Figures 1(a) and 1(b) and Table 1. All participants were asked to rate the perceived tastiness and healthiness of five options (pure virtue, pure vice, and three vice-virtue bundles). They then chose from a two-option choice set consisting of pure virtue and pure vice, allowing us to classify them as people who would otherwise choose pure vice (initial vice choosers) or pure virtue (initial virtue choosers) in the absence of vice-virtue bundles. Next, they chose from the five-option choice set containing vice-virtue bundles. Finally, they indicated whether they were in favor of the introduction of vice-virtue bundles.

This procedure allowed for the examination of four key outcomes—the tastiness and healthiness perceptions (which we use as a proxy for effectiveness at addressing taste and health goals), the most popular vice-virtue bundle, calories ordered as a result
of the introduction of vice-virtue bundles, and favorability toward the introduction of vice-virtue bundles—separately for the three consumer segments outlined in Table 1 (vice lovers: initial vice choosers who believe pure vice tastes better than pure virtue; virtue acceptors: initial virtue choosers who believe pure vice tastes better than pure virtue; and virtue lovers: initial virtue choosers who do not believe pure vice tastes better than pure virtue).

2.2.3.1 Method

Participants and Design. One hundred and one participants ($M_{age} = 33.59, 51.5\%$ female) from Amazon’s Mechanical Turk panel completed this study. This study had a 3 (consumer segment: vice lover, virtue acceptor, virtue lover) $\times$ 2 (ratings type: healthiness, tastiness) $\times$ 5 (rated option: pure virtue, $\frac{1}{4}$-vice, $\frac{1}{2}$-vice, $\frac{3}{4}$-vice, and pure vice) mixed design, where consumer segment was a between-subjects factor and ratings type and rated option were both within-subjects factors. One participant was excluded because he or she did not fit into any of the three consumer segments.$^{11}$

Procedure. All participants were shown a choice set with five options: pure virtue, $\frac{1}{4}$-vice, $\frac{1}{2}$-vice, $\frac{3}{4}$-vice, and pure vice. In both this study and Study 4, the pure virtue and vice options were, respectively, a plate of salad and a plate of fries. The vice-virtue

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$^{11}$ One participant was an initial vice chooser who did not rate pure vice as tastier than pure virtue. Including this participant as a vice lover (i.e., with all other initial vice choosers) does not change any of the results.
bundles included a ¼-vice option (a plate of ¾ salad and ¼ fries), a ½-vice option (a plate of ½ salad and ½ fries), and a ¾-vice option (a plate of ¼ salad and ¾ fries). We selected these stimuli because restaurants frequently offer these side dish choices. See Figure A.1 for the pictures shown to participants, and see Figure A.2 in Appendix A for the precise food contents (i.e., grams of salad and fries) and calories on each plate.

After viewing the five options, participants rated each option on healthiness (“How healthy do you think this side option is?”) and tastiness (“How tasty do you think this side option is?”), starting with the pure virtue option. Responses were on a scale anchored by 1 = not at all and 7 = very much.

Then, to classify participants as initial vice choosers and initial virtue choosers, we showed participants the pure vice and pure virtue options and asked them to imagine getting lunch from their workplace cafeteria and having to select one of the two side options.

12 To ensure that the classification of participants as initial vice choosers and initial virtue choosers was not affected by first rating the five options, we compared these participants’ choices from this two-option choice set with the choices made by a separate group of participants who chose from the same two-option choice set without first rating the five options. Using a two-proportion Z-test, we confirmed that the choice shares did not differ depending on whether participants first rated the five options. See Appendix B for additional details.
Next, participants were told to imagine instead that they now faced the five options, including three vice-virtue bundles.\textsuperscript{13} They were again asked which side option they would choose. Participants were told that the overall quantity of the side dish was still the same in all options and that they could choose the same or a different side option than they previously chose.

Finally, to examine whether participants want vice-virtue bundles to be introduced, we asked participants, “Which set of side dish offerings would you prefer for your workplace cafeteria to offer?” (from 1 = definitely option A to 7 = definitely option B). Option A referred to the two-option choice set (pure virtue, pure vice), and option B referred to the five-option choice set (pure virtue, \(\frac{1}{4}\)-vice, \(\frac{1}{2}\)-vice, \(\frac{3}{4}\)-vice, pure vice). The midpoint of the scale (4) was labeled not leaning either way.

\textbf{2.2.3.2 Results and Discussion}

First, we present tastiness and healthiness perceptions aggregated across all participants. Second, we examine tastiness and healthiness perceptions separately for the three consumer segments. Third, we identify the most popular vice-virtue bundle for each consumer segment. Fourth, we examine the impact of introducing vice-virtue

\textsuperscript{13} To ensure that participants’ choices among the five options were not affected by first rating the five options and then selecting an option from the two-option choice set, we compared participants’ choices from this five-option choice set with the choices made by a separate group of participants who chose from the same five-option choice set without first rating the five options and selecting from the two-option choice set. Using a Chi-squared test, we confirmed that the choice shares did not differ. See Appendix B for additional details.
bundles on calories ordered for each consumer segment. Finally, we examine whether each consumer segment favors the introduction of vice-virtue bundles.

*Aggregated Tastiness and Healthiness Ratings.* Past work (Raghunathan et al. 2006) examines participants in aggregate and would suggest inversely related tastiness and healthiness ratings, such that as vice quantity increases, perceived healthiness decreases and perceived tastiness increases. A two-way repeated-measures ANOVA of ratings type (healthiness, tastiness) and rated option (pure virtue, ¼-vice, ½-vice, ¾-vice, pure vice) on ratings revealed a significant interaction ($F(2, 243) = 260.63, p < 0.001$).

Follow-up tests were then conducted in the form of two separate one-way repeated-measures ANOVAs with rated option predicting healthiness and tastiness. First, a repeated-measures ANOVA predicting healthiness was significant ($F(3, 331) = 501.86, p < 0.001$); follow-up Bonferroni-adjusted contrasts indicated that healthiness ratings consistently followed a “more vice = more unhealthy” rule, such that perceived healthiness decreased significantly with each increase in vice proportion ($p$'s $< 0.001$).

Second, a repeated-measures ANOVA on tastiness was also significant ($F(2, 198) = 11.83, p < 0.001$). However, tastiness followed a different pattern: follow-up Bonferroni-adjusted contrasts indicated that the ¼-vice option was rated as significantly higher in

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14 Mauchley’s test of sphericity was significant for the interaction test ($\chi^2(9) = 128.15, p < 0.001$), for the healthiness ratings ($\chi^2(9) = 58.08, p < 0.001$), and for the tastiness ratings ($\chi^2(9) = 194.18, p < 0.001$). Therefore, the Huynh–Feldt epsilon adjustment was made to the degrees of freedom for all three $F$-tests.
perceived tastiness than the pure virtue option \( (p < 0.001) \), the \( \frac{1}{2} \)-vice option was rated as marginally significantly tastier than the \( \frac{3}{4} \)-vice option \( (p = 0.074) \), and the \( \frac{1}{2} \)-vice option was rated as similarly tasty as the \( \frac{3}{4} \)-vice option \( (p = 0.359) \) and the pure vice option \( (p = 1.00) \). Together, these ratings\(^{15} \) show that the unhealthy equals tasty intuitions that many people hold may weaken within vice-virtue combinations for this set of stimuli, reaching a plateau of \( \frac{1}{4} \)-vice to \( \frac{1}{2} \)-vice (i.e., higher vice proportion equals more unhealthy, but not always more tasty).

*Disaggregated Tastiness and Healthiness Ratings.* We then examined tastiness and healthiness ratings separately for each consumer segment. First, we verified that three distinct consumer segments exist (Table 1): 43 participants were initial vice choosers who rated pure vice as better tasting than pure virtue (vice lovers), 21 participants were initial virtue choosers who rated pure vice as better tasting than pure virtue (virtue acceptors), and 36 participants were initial virtue choosers who did not rate pure vice as better tasting than pure virtue (virtue lovers). Only one participant was an initial vice chooser who did not rate pure vice as better tasting than pure virtue, supporting our notion that this consumer segment should generally be nonexistent. As noted earlier, we excluded this participant from all analyses. We first conducted a three-way mixed

\(^{15} \) In a separate study using a between-subjects design in which participants only rated one of the five options, we found similar aggregated tastiness and healthiness results. See Appendix B for additional details.
ANOVA of consumer segment (vice lover, virtue acceptor, virtue lover), ratings type (healthiness, tastiness), and rated option (pure virtue, ¼-vice, ½-vice, ¾-vice, pure vice) on ratings. Consumer segment was a between-subjects factor, and ratings type and rated option were both within-subjects factors. This analysis revealed a significant three-way interaction (F(6, 315) = 19.26, p < 0.001).\(^6\) Follow-up tests were then conducted in the form of three separate two-way repeated-measures ANOVAs, one for each consumer segment, of ratings type (healthiness, tastiness) and rated option (pure virtue, ¼-vice, ½-vice, ¾-vice, pure vice) on ratings.

For vice lovers, a two-way repeated measures ANOVA of ratings type (healthiness, tastiness) and rated option (pure virtue, ¼-vice, ½-vice, ¾-vice, pure vice) on ratings revealed a significant interaction (F(3, 135) = 218.35, p < 0.001) (see Figure 2(a)). Follow-up tests were then conducted in the form of two separate one-way repeated-measures ANOVAs of rated option on healthiness and tastiness. First, a repeated-measures ANOVA on healthiness was significant (F(3, 124) = 192.98, p < 0.001), and follow-up Bonferroni-adjusted contrasts indicated that healthiness ratings consistently followed a “more vice = more unhealthy” rule, such that perceived

\(^6\) Mauchley’s test of sphericity was significant for the three-way interaction test (χ²(9) = 67.79, p < 0.001), for the two-way interaction test for vice lovers (χ²(9) = 33.24, p < 0.001), for the two-way interaction test for virtue acceptors (χ²(9)= 13.92, p < 0.001), for the two-way interaction test for virtue lovers (χ²(9) = 38.66, p < 0.001), for the healthiness ratings for vice lovers (χ²(9) = 43.78, p < 0.001), for the tastiness ratings for vice lovers (χ²(9) = 38.99, p < 0.001), for the healthiness ratings for virtue lovers (χ²(9) = 31.63, p < 0.001), and for the tastiness ratings for virtue lovers (χ²(9) = 40.22, p < 0.001). Therefore, the Huynh–Feldt epsilon adjustment was made to the degrees of freedom for these F-tests.
healthiness decreased significantly with each increase in vice proportion ($p'$s < 0.001). Second, a repeated-measures ANOVA on tastiness was also significant ($F(3, 130) = 71.80$, $p < 0.001$). Tastiness did not follow a linear pattern but rather appeared more similar to an increasing concave function: follow-up Bonferroni-adjusted contrasts indicated that the ¼-vice option was rated as significantly more tasty than the pure virtue option ($p < 0.001$), and the ½-vice option as rated as significantly more tasty than the ¼-vice option ($p < 0.001$); tastiness ratings appeared to plateau at the ½-vice option because the ¾-vice option was rated as equally tasty as the ½-vice option ($p = 1.00$). The pure vice option was rated as significantly more tasty than the ½-vice and the ¾-vice options ($p = 0.001$ and $p < 0.001$, respectively), suggesting that a further increase in tastiness occurred from removing all virtue. Altogether, these ratings show consistently that within vice-virtue bundles (consisting of nonzero proportions of both vice and virtue), tastiness plateaus at the ½-vice option for these stimuli. The increasing concave tastiness function and the decreasing linear healthiness function are largely consistent with the functional forms of the theoretical tastiness and healthiness functions presented in Figure 1(a). Moreover, the finding that among vice-virtue bundles, tastiness plateaus at the ½-vice option for vice lovers, suggests that either the ¼-vice option or the ½-vice option, and not the ¾-vice option, is likely to be the favored vice-virtue bundle among vice lovers.$^{17}$

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$^{17}$ As to whether the ¼-vice option or the ½-vice option is likely to be the most popular vice-virtue bundle
Figure 2: Tastiness and Healthiness Ratings of Each Option—(a) Vice Lovers: Initial Vice Choosers Who Believe Vice Is Tastier Than Virtue (n = 43, Study 3); (b) Virtue Acceptors: Initial Virtue Choosers Who Believe Vice Is Tastier Than Virtue (n = 21, Study 3); (c) Virtue Lovers: Initial Virtue Choosers Who Do Not Believe Vice Is Tastier Than Virtue (n = 36, Study 3)

Note. Error bars denote standard errors of the mean.

for vice lovers, we note that our theory suggests that the greater the relative importance of a taste goal, the greater the preference for the \(\frac{1}{2}\)-vice option. In our research, we did not explicitly measure the magnitude of the relative importance of a taste goal, which may be an important direction for future research.
For virtue acceptors, a two-way repeated-measures ANOVA of ratings type (healthiness, tastiness) and rated option (pure virtue, ¼-vice, ½-vice, ¾-vice, pure vice) on ratings also revealed a significant interaction \(F(4, 73) = 102.94, p < 0.001\) (see Figure 2(b)). Follow-up tests were then conducted in the form of two separate one-way repeated-measures ANOVAs of rated option on healthiness and on tastiness. First, a repeated-measures ANOVA on healthiness was significant \(F(4, 80) = 145.14, p < 0.001\); follow-up Bonferroni-adjusted contrasts indicated that perceived healthiness decreased significantly with each increase in vice proportion (all \(p’s < 0.001\) except \(p = 0.002\) when shifting from ¼-vice to ½-vice). Second, a repeated-measures ANOVA on tastiness was also significant \(F(4, 80) = 18.13, p < 0.001\). However, perceived tastiness did not increase linearly but rather in a concave manner: follow-up Bonferroni-adjusted tests indicated that the ¼-vice option as rated as significantly more tasty than the pure virtue option \(p < 0.001\), but tastiness ratings appeared to plateau at the ¼-vice option because the ½-vice, ¾-vice, and pure vice options were all rated as similarly tasty compared to the ¼-vice option (all three \(p’s = 1.00\)). These ratings show that tastiness plateaus at the ¼-vice option for these stimuli. The increasing concave tastiness function and the decreasing linear healthiness function are again consistent with the functional forms of the theoretical tastiness and healthiness functions presented in Figure 1(a). Moreover, the finding that among vice-virtue bundles, tastiness plateaus at the ¼-vice option for virtue
acceptors is consistent with our prediction that the $\frac{1}{4}$-vice option is likely to be the favored vice-virtue bundle among virtue acceptors.

For virtue lovers, a two-way repeated-measures ANOVA of ratings type (healthiness, tastiness) and rated option (pure virtue, $\frac{1}{4}$-vice, $\frac{1}{2}$-vice, $\frac{3}{4}$-vice, pure vice) on ratings revealed a significant interaction ($F(3, 102) = 51.98, p < 0.001$) (see Figure 2(c)). Follow-up tests were then conducted in the form of two separate one-way repeated-measures ANOVAs of rated option on healthiness and on tastiness. First, a repeated-measures ANOVA on healthiness was significant ($F(3, 106) = 171.96, p < 0.001$), and follow-up Bonferroni-adjusted contrasts indicated that perceived healthiness decreased significantly with each increase in vice proportion ($p$'s < 0.001). Second, a repeated-measures ANOVA on tastiness was also significant ($F(3, 103) = 19.88, p < 0.001$). Tastiness, like healthiness, was a decreasing function for virtue lovers, making goal balancing irrelevant. Tastiness exhibited a decreasing concave function: follow-up Bonferroni-adjusted contrasts indicated that both the $\frac{1}{4}$-vice option and the $\frac{1}{2}$-vice option were rated as similarly tasty as the pure virtue option ($p = 1.00$ and $p = 0.483$, respectively), but tastiness dropped when increasing the vice proportion further, with the $\frac{3}{4}$-vice option being rated as less tasty than the $\frac{1}{2}$-vice option ($p = 0.006$) and the pure vice option being rated as less tasty than the $\frac{3}{4}$-vice option ($p = 0.026$). These ratings show that tastiness exhibits a decreasing concave pattern, such that increasing the
proportion of vice past \( \frac{1}{2} \) leads to decreases in tastiness. These findings are consistent with our theoretical tastiness and healthiness functions presented in Figure 1(b).

*Choice Implications of Offering Vice-Virtue Bundles.* When the vice-virtue bundles were added to the choice set, 22.0% chose pure virtue, 34.0% chose \( \frac{1}{4} \)-vice, 27.0% chose \( \frac{1}{2} \)-vice, 4.0% chose \( \frac{3}{4} \)-vice, and 13.0% chose pure vice. At the aggregate level, both the \( \frac{1}{4} \)-vice option and the \( \frac{1}{2} \)-vice option were again more frequently selected than the \( \frac{3}{4} \)-vice option (\( p \)'s < 0.001, exact binomial tests).

We then assessed the most popular vice-virtue bundle for each consumer segment (see Table 2). Consistent with the observed forms of the tastiness and healthiness functions, the most popular vice–virtue bundle for vice lovers was the \( 1 \)-vice option (selected by 51.2% of participants; compared to 9.3% each for the \( \frac{1}{4} \)-vice and \( \frac{3}{4} \)-vice options, both \( p \)'s = 0.001, exact binomial tests). Additionally, consistent with the observed forms of the tastiness and healthiness functions, the most popular vice-virtue bundle for virtue acceptors was the \( \frac{1}{4} \)-vice option (selected by 71.4% of participants; compared to 9.5% for the \( \frac{1}{2} \)-vice option, \( p = 0.002 \), and no participants for the \( \frac{3}{4} \)-vice option, \( p < 0.001 \), exact binomial tests). Finally, as predicted by variety seeking, the most popular vice-virtue bundle for virtue lovers was the vice-virtue bundle with the smallest proportion of vice: the \( \frac{1}{4} \)-vice option (selected by 41.7% of participants; compared to 8.3% for the \( \frac{1}{2} \)-vice option, \( p = 0.008 \), and no participants for the \( \frac{3}{4} \)-vice option, \( p < 0.001 \), exact binomial tests).
Impact of Introducing Vice-Virtue Bundles on Calories Ordered. In Study 3, we were able to examine, separately for each consumer segment, the change in calories ordered when vice-virtue bundles were introduced. For the analyses in this section, we calculated the calories chosen in each participant’s two choices (see Figure A.2 in Appendix A).

First, at the aggregate level in this study, calories ordered was lower after the introduction of vice-virtue bundles ($M_{\text{before}} = 148$ calories, $M_{\text{after}} = 132$ calories). A paired-samples $t$-test was directional, although nonsignificant ($t(99) = 1.55, p = 0.125$), and a nonparametric related-samples Wilcoxon signed rank test was significant ($p = 0.005$), suggesting overall improvements in calorie profiles with the inclusion of vice-virtue bundles.

Our theory suggests, however, that this difference should be driven by differential changes in calories ordered by consumer segment. Therefore, we examined how introducing vice-virtue bundles impacts calories ordered separately by consumer segment. We first calculated the change in calories ordered for each participant (calories ordered after vice-virtue bundles were introduced minus calories ordered prior to vice-virtue bundles being introduced). A one-way between-subjects ANOVA of consumer segment on change in calories ordered revealed a significant main effect of consumer segment ($F(2, 97) = 81.48, p < 0.001$; nonparametric Kruskal–Wallis test: $p < 0.001$). Consistent with our theoretical argument, vice lovers ordered on average 109 fewer
calories when vice-virtue bundles were introduced, whereas virtue acceptors ordered on average 70 more calories and virtue-lovers ordered on average 45 more calories. The change in calories for vice lovers was significantly different from the change in calories for virtue acceptors and virtue lovers (Bonferroni-adjusted p’s < 0.001; Mann–Whitney U-test p’s < 0.001). Whether the change in calories for virtue acceptors and virtue lovers was significantly different differed depending on whether a Bonferroni-adjusted follow-up test (p = 0.478) or a Mann–Whitney U-test was used (p = 0.042). Most importantly, the upward shift in calories for all initial virtue choosers (virtue acceptors and virtue lovers) was less than the corresponding downward shift in calories for initial vice choosers (vice lovers), suggesting that introducing vice-virtue bundles may have population-level health benefits, even if the population consists of similar proportions of initial vice choosers and initial virtue choosers.

Choice Set Preference. Both vice lovers and virtue lovers reported that they would prefer their work-place cafeteria to offer a choice set with vice-virtue bundles (vice lovers: M = 5.81, significantly > 4, t(42) = 5.74, p < 0.001; virtue lovers: M = 5.28; significantly > 4, t(35) = 3.60, p < 0.001). Virtue acceptors indicated a directional preference for their workplace cafeteria to offer a choice set with vice-virtue bundles (M = 4.90, directionally > 4, t(20) = 1.55, p = 0.138).

Discussion. Study 3 demonstrated that tastiness perceptions of differently composed vice-virtue bundles, relative to other each other and to pure virtue or vice
options, differ depending on consumer segment. Vice lovers and virtue acceptors both exhibited an increasing concave tastiness function consistent with our predictions in Figure 1(a).\textsuperscript{18} In contrast, virtue lovers exhibited a decreasing tastiness pattern (consistent with Figure 1(b)) that made goal balancing irrelevant because pure virtue was already able to address both taste and health goals. Unlike the tastiness perceptions, healthiness perceptions did not differ across consumer segments, indicating that these consumer segments differ with respect to taste but not health perceptions, which confirms that we selected vices and virtues that are rather unambiguous in their classification (i.e., we selected clearly unhealthy and healthy options for our vices and virtues).

Consistent with predictions, the most popular vice-virtue bundle for vice lovers was the $\frac{1}{2}$-vice option (consistent with asymmetric effectiveness of small vice proportions and relatively higher taste goal importance), and the most popular vice-virtue bundle for both virtue acceptors and virtue lovers was the $\frac{1}{4}$-vice option (for virtue acceptors: consistent with asymmetric effectiveness of small vice proportions and

\textsuperscript{18} We did find that vice lovers' tastiness function plateaus at a higher proportion of vice ($\frac{1}{2}$-vice) than virtue acceptors' tastiness function ($\frac{1}{4}$-vice). This finding is consistent with the notion that virtue acceptors may differ from vice lovers in that they perceive pure virtue to have a heightened effectiveness at addressing a taste goal ($F(1, 97) = 11.76, p < 0.001$), thus leading the tastiness function to plateau at a lower proportion of vice (see Table A.1 in Appendix A). Additionally, this finding is not inconsistent with the notion that virtue acceptors may differ from vice lovers in that they place a greater importance on addressing a health goal than a taste goal (see numeric example 2 in Table 1). Importantly, both reasons for differentiating virtue acceptors and vice lovers may be at play for explaining our finding that virtue acceptors prefer to choose a $\frac{1}{4}$-vice bundle.
relatively higher health goal importance; for virtue lovers, consistent with variety seeking). In general, these findings align with our theoretical framework and expectations about the shapes of the tastiness and healthiness functions for various segments.

These vice-virtue bundle preferences have the important practical implication that the introduction of vice-virtue bundles leads to a smaller increase in calories for initial virtue choosers (virtue acceptors and virtue lovers) who shift from pure virtue to \( \frac{1}{4} \)-vice than the corresponding decrease in calories for initial vice choosers (vice lovers) who shift from pure vice to \( \frac{1}{2} \)-vice.

Finally, Study 3 demonstrated that introducing vice-virtue bundles is looked on relatively favorably by all three consumer segments, suggesting that managers may better meet most consumers’ preferences by altering their firms’ product lines to include vice-virtue bundles.

2.2.4 Study 4: Expanding a Choice Set with Mixed Bundles

In the final study, we had several important objectives. First, Study 4 uses a within-subjects design to examine the choices that initial vice choosers and initial virtue choosers make when vice-virtue bundles, including and not including the \( \frac{1}{2} \)-vice option (the preferred option of vice lovers), are offered. We do not separate initial virtue-choosers into those who do and do not believe vice tastes better than virtue (virtue
acceptors and virtue lovers, respectively), both because we do not measure tastiness perceptions in Study 4 and because Study 3 found that both consumer segments of initial virtue choosers prefer ¼-vice to other vice-virtue bundles.

When the ½-vice option was included, we predicted that we would replicate the results from Study 3 because we were using the same participant pool and food stimuli as in Study 3. Specifically, we predicted that the most popular vice-virtue bundle for initial vice choosers (i.e., vice lovers) would be the ½-vice option, whereas the most popular vice-virtue bundle for initial virtue choosers (i.e., virtue acceptors and virtue lovers) would be the ¼-vice option.

When the ½-vice option was not included, we predicted that initial vice choosers would be more likely to choose a ¼-vice option than a ¾-vice option. The rationale for this hypothesis is that because of the pattern of the tastiness and healthiness functions, a vice-virtue bundle with a smaller proportion of vice would still be substantially effective at addressing taste while still obviously addressing health, whereas a vice-virtue bundle with a larger proportion of vice cannot be substantially effective at addressing health even though it can address taste. Note that although removing the 1-vice option may reduce external validity, this procedure allows a conservative test of our theoretical account for initial vice choosers and tests a hypothesis that a pure variety-seeking account does not predict.

Second, Study 4 examines how the introduction of vice-virtue bundles affects
choice share differently from the introduction of vice-vice bundles, which should be appealing based on the variety offered, but which fail to provide the opportunity to address taste and health goals.

Finally, like Study 3, Study 4 provides an opportunity to examine shifts in calories ordered based on the introduction of vice-virtue bundles, both in aggregate and separately for initial vice choosers and initial virtue choosers.

2.2.4.1 Method

Participants and Design. Three hundred and seventy-nine participants ($M_{age} = 33.33$, 56.2% female) from Amazon’s Mechanical Turk panel completed this study. This study had a 2 (choice set type: vice-virtue, vice-vice) $\times$ 2 (expanded choice set: five options (50/50-option included), four options (50/50-option excluded)) $\times$ 2 (choice version: initial, expanded) mixed-design with choice set type and expanded choice set as between-subjects factors and choice version as a within-subjects factor. Thus, participants were randomly assigned to one of four conditions (vice-virtue five options, vice-virtue four options, vice-vice five options, or vice-vice four options), and all participants made two choices: one from a two-item (initial) choice set and one from a four- or five-option (expanded) choice set.

Procedure. All participants were asked to imagine getting lunch from their workplace cafeteria and having to select a side option. Participants made two choices.
First, they chose between pure versions of the two side options that would later be presented to them in mixed bundles. That is, participants who would see the vice-virtue bundles in the expanded choice set first chose either a plate of salad or a plate of fries. Participants who would later see vice-vice bundles in the expanded choice set first chose either a plate of macaroni & cheese or a plate of fries.\textsuperscript{19} See Figures A.1 and A.2 in Appendix A for pictures, food contents, and caloric content of each plate.

After participants chose one option from their assigned two-option choice set, they were then shown an expanded choice set consisting of either four or five options, depending on their randomly assigned condition. Participants were then told to imagine that they were now faced with this expanded choice set and again asked which side option they would choose.\textsuperscript{20} They were told that the overall quantity of the side dish was

\textsuperscript{19} Because salad and fries are very different in flavor and people are known to exhibit sensory-specific satiety along the flavor dimension (Inman 2001), we aimed to select a side dish that would be perceived as different in flavor from fries for the other vice in the vice-virtue choice set. In a separate pretest, participants (N = 39) saw a plate of macaroni & cheese and a plate of fries and were asked, “How similar or different are the flavors of the foods on these two plates?” Responses were on a scale anchored by 1 = very similar and 7 = very different. Participants indicated that they consider macaroni & cheese to be very different in flavor from fries (M = 5.77; significantly different from the scale midpoint of 4, according to a one-sample t-test, t(38) = 8.87, p < 0.001).

\textsuperscript{20} Because the potential for demand effects is generally stronger in within-subjects designs than in between-subject designs (Charness, Gneezy, and Kuhn 2012), we compared Study 4 participants’ second choice from the vice-virtue four-option choice set and the vice-virtue five-option choice set with a separate group of participants’ first (and only) choice from the vice-virtue four-option choice set and the vice-virtue five-option choice set. Using Chi-squared tests, we confirmed that the choice shares from the vice-virtue four-option choice set and the vice-virtue five-option choice set did not differ between the within-subjects and between-subjects designs. Thus, the second choice that Study 4 participants made does not seem to be driven by demand effects from using a within-subjects design. See Appendix B for additional details.
still the same in all options and that they could choose the same side option as or a different side option than they previously chose. Participants in the five-option (50/50-option included) condition saw the two options they had already seen and three mixed bundles (¼-vice, ½-vice, and ¾-vice), and participants in the four-option (50/50-option excluded) condition saw the two options they had already seen and two mixed bundles (¼-vice and ¾-vice). The three mixed bundles in the vice-virtue condition were the same as those in Study 3 containing fries and salad. The three mixed bundles in the vice-vice condition substituted macaroni & cheese for the salad (see Figures A.1 and A.2 in Appendix A).

2.2.4.2 Results and Discussion

We first present the initial choice shares for each of the four conditions. Then we present the main analyses. Specifically, we examine how consumers’ choices change when vice-virtue and vice-vice bundles, including the ½-vice option, are introduced. Second, we examine how consumers’ choices change when mixed vice-virtue and vice-vice bundles, dropping the ½-vice option, are introduced. Finally, we examine the impact of introducing vice-virtue bundles (including and dropping the ½-vice option) on calories ordered, separately for initial vice choosers and initial virtue choosers.

Initial Choice Shares. Table 2 shows the initial choice shares across all four conditions. Replicating choice share findings from Study 3 and from the pure vice–pure
virtue condition in Studies 1 and 2, the initial choice shares of vice and virtue did not differ in either of the vice-virtue conditions \( (p = 0.682 \) in the vice-virtue 50/50-option included condition; \( p = 0.121 \) in the vice-virtue 50/50-option excluded condition, exact binomial tests). In the vice-vice conditions, the initial choice shares of the two vices differed in the vice-vice 50/50-option included condition \( (p = 0.010 \), exact binomial test) but not in the vice-vice 50/50-option excluded condition \( (p = 1.00 \), exact binomial test).

Although the initial choice shares of fries and macaroni & cheese were significantly different in the vice-vice 50/50-option included condition, we are still able to examine the relative shifts in choice shares when the vice-vice bundles were introduced.

*Introduction of Vice-Virtue and Vice-Vice Bundles, Including the Middle 50/50-Option.*

When vice-virtue bundles were added to the choice set, 17.9% chose pure virtue, 41.1% chose \( \tfrac{1}{4} \)-vice, 29.5% chose \( \tfrac{1}{2} \)-vice, 5.3% chose \( \tfrac{3}{4} \)-vice, and 6.3% chose pure vice. Thus, at the aggregate level, both the \( \tfrac{1}{4} \)-vice option and the \( \tfrac{1}{2} \)-vice option were more popular than the \( \tfrac{3}{4} \)-vice option \( (p's < 0.001 \), exact binomial test).

Next we assessed how adding vice-virtue bundles shifted participants away from the choice they had made from the pure vice–pure virtue choice set. As shown in Table 2 and replicating Study 3, for initial virtue choosers, the most popular vice-virtue bundle for them to shift to was a \( \tfrac{1}{4} \)-vice option (selected by 64.0% of participants, compared to 4.0% for the \( \tfrac{1}{2} \)-vice option, \( p < 0.001 \), and no participants for the \( \tfrac{3}{4} \)-vice option, \( p < 0.001 \), exact binomial tests); for initial vice choosers, the most popular vice-
virtue bundle to shift to was a $\frac{1}{2}$-vice option (selected by 57.8% of participants, compared to 15.6% for the $\frac{1}{4}$-vice option, $p = 0.001$, and 11.1% for the $\frac{3}{4}$-vice option, $p < 0.001$, exact binomial tests).

We then examined how adding vice-vice bundles shifted participants away from their initial choice from the pure vice–pure vice set. We hypothesized that introducing vice-vice bundles would not have the same impact on choice as the introduction of vice-virtue bundles. When choosing from expanded vice-vice choice sets, consumers should be guided by variety seeking and their taste preferences rather than by seeking to maximize utility from addressing both health and taste goals. Therefore, we hypothesized that consumers choosing from expanded vice-vice choice sets would not exhibit the same systematic preferences for bundles with relatively small ($\frac{1}{4}$) to medium ($\frac{1}{2}$) proportions of one option as consumers choosing from expanded vice-virtue choice sets, because they would be driven primarily by taste preferences and desire for variety.

As shown in Table 2, movement to vice-vice bundles indeed did not follow the same pattern that characterized movement to vice-virtue bundles. If we consider salad (pure virtue in the vice-virtue set) and macaroni & cheese (vice A in the vice-vice set) to be comparable options within their respective choice sets, then whereas the most popular option for initial virtue choosers was a 1-vice option (chosen by 64.0% of initial virtue choosers), vice A choosers were equally likely to shift to $\frac{1}{2}$-vice B as to shift to $\frac{1}{4}$-vice B (31.1% chose $\frac{1}{2}$-vice B and 44.3% chose $\frac{1}{4}$-vice B; $p = 0.302$, exact binomial test).
addition, whereas the most popular option for initial vice choosers in the vice-virtue condition was a ½-vice option (chosen by 57.8% of initial vice choosers), initial vice B choosers were equally likely to shift to ¼-vice B as to ½-vice B (37.1% chose ¾-vice B and 28.6% chose ½-vice B; \( p = 0.678 \), exact binomial test).

*Introduction of Vice-Virtue and Vice-Vice Bundles, Excluding the Middle 50/50-Option.*

We next examined the impact of introducing mixed bundles without the ½-vice bundle option.

First, we examined the impact of removing the ½-vice option on initial virtue choosers and initial vice choosers. The removal of the ½-vice option should not impact initial virtue choosers; very few initial virtue choosers (only 4.0%) selected that option when it was offered because they preferred the ¼-vice option. Thus, we predicted that initial virtue choosers would continue to choose the ¼-vice option over the ¾-vice option when the ½-vice option was removed. In contrast, the removal of the ½-vice option should impact initial vice choosers, because many (57.8%) selected that option when it was offered. Importantly, given our theory about the forms of the tastiness and healthiness functions, we predicted that initial vice choosers would gravitate towards the ¼-vice option over the ¾-vice option because taste and health goals can be more successfully addressed through a relatively large shift toward health.

As expected, initial virtue choosers continued to choose the ¼-vice option over the ¾-vice option when the ½-vice option was excluded (58.2% chose the ¼-vice option
and no participants chose the ¾-vice option; \( p < 0.001 \), exact binomial test). Recall that when the ½-vice option was included in the expanded choice set, 64.0% chose the ¼-vice option and no participants chose the ¾-vice option. Essentially, removing the ½-vice option has no impact on initial virtue choosers. Moreover, of particular interest, initial vice choosers were more likely to shift to the ¼-vice option than to the ¾-vice option (48.7% chose the ¼-vice option whereas 20.5% chose the ¾-vice option; \( p = 0.052 \), exact binomial test). Recall that when the ½-vice option was included, 15.6% chose the ¼-vice option and 11.1% chose the ¾-vice option. That is, a large percentage (48.7%) of initial vice choosers exhibited preference shifts, moving from a pure vice option to one with less than ½-vice, providing strong support for the notion that variety seeking alone cannot account for our findings for initial vice choosers.

Second, we examined the impact of removing the 50/50 middle option on pure vice A and pure vice B choosers. The removal of the 50/50 middle option should impact both pure vice A and pure vice B choosers because the 50/50 middle option was chosen by approximately one-third of participants (31.1% of pure vice A choosers and 28.6% of pure vice B choosers) when it was offered. However, given that vice-vice bundles do not offer the unique property of addressing both taste and health, we do not expect to see patterns of preference shifts (i.e., situations in which someone who would have selected a given pure option in fact selects an option that is less than half of that option when given the option of a bundle) in the presence of vice-vice bundles. Such a lack of
preference shifts would further support our theory because among vice-vice bundles, tastes and variety seeking alone are driving preferences. Therefore, an initial choice of vice A should indicate a taste preference for vice A, such that initial vice A choosers should rarely switch to an option consisting of less than half of vice A.

As expected, initial vice A choosers were indeed more likely to choose the \( \frac{1}{4} \)-vice B option than the \( \frac{3}{4} \)-vice B option (68.1% chose \( \frac{1}{4} \)-vice B whereas 8.5% chose \( \frac{3}{4} \)-vice B; \( p < 0.001 \), exact binomial test), and initial vice B choosers were directionally, although nonsignificantly, more likely to choose the \( \frac{3}{4} \)-vice B option than the \( \frac{1}{4} \)-vice B option (34.0% chose \( \frac{3}{4} \)-vice B whereas 19.1% chose \( \frac{1}{4} \)-vice B; \( p = 0.230 \), exact binomial test). Thus, preference shifts happen more frequently among initial vice choosers who are offered vice-virtue bundles than among initial vice choosers who are offered vice-vice bundles.

**Impact of Introducing Mixed Bundles on Calories Ordered in the Vice-Virtue Conditions.** We then calculated the calories in each participant’s two chosen options (see Figure A.2 in Appendix A).

First, we examined how introducing vice-virtue bundles impacts changes in calories ordered at the aggregate level. In keeping with our overall study design, we conducted a 2 (expanded choice set: 50/50-option included, 50/50-option excluded) x 2 (choice version: initial, expanded) mixed model ANOVA on calories ordered with expanded choice set as a between-subjects factors and choice version as a within-subjects
factor and found a significant main effect of choice version \((F(1, 187) = 15.64, p < 0.001)\) but no significant interaction \((F(1, 187) = 0.39, p = 0.533)\). This result suggests that the change in calories ordered did not differ depending on whether the 50/50-option was included in the choice set or not. However, calories ordered was significantly lower after the introduction of vice-virtue bundles \((M_{\text{before}} = 152 \text{ calories}, M_{\text{after}} = 119 \text{ calories}; \text{paired-samples } t\text{-test: } t(188) = 3.96, p < 0.001; \text{nonparametric related-samples Wilcoxon signed rank test: } p < 0.001)\), suggesting overall improvements in calorie profiles with the inclusion of vice-virtue bundles (with or without the \(\frac{1}{2}\)-vice middle option).

Second, and more important for our theoretical account, we examined how introducing vice-virtue bundles impacts calories ordered differentially for initial virtue choosers versus initial vice choosers. We first calculated the change in calories ordered for each participant (calories ordered after vice-virtue bundles were introduced minus calories ordered prior to vice-virtue bundles being introduced). A 2 (expanded choice set: 50/50-option included, 50/50-option excluded) x 2 (initial choice: pure virtue, pure vice) between-subjects ANOVA on change in calories ordered revealed a significant main effect of initial choice \((F(1, 185) = 360.30, p < 0.001)\) and no significant interaction \((F(1, 185) = 1.35, p = 0.247)\).\(^{21}\) Consistent with Study 3, initial virtue choosers ordered on

\(^{21}\) Because Levene’s test of homogeneity of variances was violated for the change in calories ordered \((p < 0.001)\), and we are not aware of a robust alternative procedure for a two-way ANOVA, we reran the two-way ANOVA as a one-way ANOVA with four groups. We used the Brown–Forsythe procedure for the one-way ANOVA.
average 50 more calories when vice-virtue bundles were introduced, whereas initial vice choosers ordered on average 136 fewer calories. The lack of a significant interaction indicates that this effect was similar regardless of whether the second choice set included four or five options. Again, the upward shift in calories for initial virtue choosers was less than the corresponding downward shift in calories for initial vice choosers.

**Discussion.** Study 4 replicates the finding that people tend to select vice-virtue bundles with $\frac{1}{4}$-vice or $\frac{1}{2}$-vice. As in Study 3, initial virtue choosers frequently switched to a $\frac{1}{4}$-vice option, consistent with a combination of asymmetric effectiveness of small vice proportions (virtue acceptors) and variety seeking (virtue lovers) at play, and initial vice choosers (vice lovers) frequently switched to a $\frac{1}{2}$-vice option, consistent with asymmetric effectiveness of small vice proportions.

To further test our account for initial vice choosers, Study 4 also tested the impact of excluding the $\frac{1}{2}$-vice option from the expanded choice set. Supporting our theorizing, in the absence of the $\frac{1}{2}$-vice option, initial vice choosers were more likely to choose the $\frac{1}{4}$-vice option than the $\frac{3}{4}$-vice option.
Finally, on a practical level, Study 4 replicated the finding from Study 3 that introducing vice-virtue bundles can decrease calories ordered, especially if a large proportion of consumers otherwise chooses pure vice. This finding is important because most patrons at many restaurants, including fast food restaurants, tend to choose pure vice in the absence of vice-virtue bundles (Wilcox et al. 2009).

2.3 General Discussion

Although a substantial amount of research has attempted to propose ways to shift consumers’ choices from vice to virtue options, there are reasons to believe such efforts may often be unsuccessful. In the present research, we propose that introducing vice-virtue bundles may offer some means of nudging at least some consumers toward healthier consumption. Specifically, across four studies, we find that people consistently prefer vice-virtue bundles with small (¼) to medium (½) proportions to vice-virtue bundles with large (¾) proportions of vice. We suggest that these choice patterns arise due to (1) asymmetric effectiveness of small vice and virtue proportions at addressing taste and health goals, respectively, by those who perceive pure vice as tastier than pure virtue (vice lovers and virtue acceptors) and (2) variety seeking by those who do not perceive pure vice as tastier than pure virtue (virtue lovers). We find tastiness and healthiness ratings as well as choice patterns that are consistent with this theoretical
account of two different mechanisms at play for three different consumer segments. See
Table 3 for a summary of key findings across studies.

Table 3: Summary of Key Findings across Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Key Findings</th>
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<tbody>
<tr>
<td>1</td>
<td>• People were more likely to choose vice-virtue bundles with relatively small (¼) or medium (½) vice proportions than vice-virtue bundles with relatively large (¾) vice proportions when making actual choices.</td>
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</table>
| 2     | • People were more likely to choose vice-virtue bundles with relatively small (¼) or medium (½) vice proportions than vice-virtue bundles with relatively large (¾) vice proportions when making actual choices.  
• The majority of participants consumed the entire option they selected, indicating that offering vice-virtue bundles does not increase food waste.  
• Offering vice-virtue bundles decreases subsequent post-study caloric intake. |
| 3     | • Vice-lovers (initial vice-choosers) exhibited tastiness and healthiness functions largely consistent in form with our predictions in Figure 1a. Initial increases in the proportion of vice led to significant increases in perceived tastiness, with tastiness plateauing at the ½-vice option within the bundles. In contrast, increases in the proportion of vice led to significant decreases in perceived healthiness and did not plateau. Consistent with these functions, when vice-virtue bundles were added to the choice set, the most popular vice-virtue bundle was the ½-vice option.  
• Virtue-acceptors (initial virtue-choosers who believe pure vice tastes better than pure virtue) also exhibited tastiness and healthiness functions consistent in form with our predictions in Figure 1a. An initial increase in the proportion of vice led to a significant increase in perceived tastiness, with tastiness plateauing at the ¼-vice option within the bundles. In contrast, increases in the proportion of vice led to significant decreases in perceived healthiness and did not plateau. Consistent with these functions, when vice-virtue bundles were included in the choice set, the most popular vice-virtue bundle was the ¼-vice option.  
• Virtue-lovers (initial virtue-choosers who believe pure vice does not taste better than pure virtue) exhibited tastiness and healthiness functions that made goal balancing irrelevant because a pure virtue option could address both taste and health, consistent in form with our predictions in Figure 1b. When vice-virtue bundles were included in the choice set, the most popular vice-virtue bundle was the ¼-vice option, consistent with variety seeking.  
• Introduction of vice-virtue bundles decreased aggregate calories ordered, via decreases in calories ordered among vice-lovers.  
• Vice-lovers and virtue-lovers indicated a significant preference for vice-virtue bundles to be offered, and virtue-acceptors indicated a directional preference for vice-virtue bundles to be offered. |
• Initial virtue-choosers (virtue-acceptors and virtue-lovers) frequently switched to vice-virtue bundles with a relatively small (¼) vice proportion, and initial vice-choosers (vice-lovers) frequently switched to a vice-virtue bundle with a medium (½) vice proportion.
• Further in support of the notion that the choice patterns that we predicted for initial vice-choosers (vice-lovers) cannot be explained by pure variety seeking, we found that in the absence of the middle bundle (½ vice), initial vice-choosers (vice-lovers) were more likely to choose an option with a relatively small (¼) vice proportion than one with a relatively large (¾) vice proportion.
• Movement to vice-vice bundles did not follow the same pattern that characterized movement to vice-virtue bundles.
• Introduction of vice-virtue bundles decreased aggregate calories ordered, via decreases in calories ordered among vice-lovers.

It would not be accurate to conclude that aggregate caloric consumption will necessarily be decreased by the introduction of vice-virtue bundles. Rather, our framework predicts differential effects on caloric consumption depending on consumers’ a priori choice of virtue or vice. Indeed, both Studies 3 and 4 demonstrate that the aggregate impact of introducing vice-virtue bundles is likely to be a decrease in calories ordered when the proportion of initial vice choosers (also known as vice lovers) in the population is high—a condition that may be predictable based on observable characteristics, such as dining context or prior sales data.

2.3.1 Relationship and Contribution to Prior Research

From a theoretical perspective, research on balancing taste and health goals tends to focus on either the choice of food (Dhar and Simonson 1999; Laran 2010; Wilcox et al. 2009) or the quantity of consumption (Haws and Winterich 2013; Redden and Haws 2013; Schwartz et al. 2012). In contrast, in the present research, we examine both choice
and quantity by focusing on single-decision contexts that incorporate choices about the relative quantities of vice and virtue within food decision-making contexts. This approach allows us to propose and test for unique tastiness and healthiness functional forms, which we argue underlie consumers’ preferred proportions of vice and virtue.

This approach is important because prior research on goal balancing is typically agnostic as to consumers’ preferred proportions of vice and virtue (Dhar and Simonson 1999; Fishbach and Dhar 2005; Fishbach and Zhang 2008; Laran 2010). Furthermore, work in licensing (Khan and Dhar 2006) tends to suggest that consumers alternate between virtue and vice choices over time. Our findings contribute to both of these literatures. We contribute to the literature on goal balancing by suggesting that a small proportion of vice (¼) is considerably effective at addressing a taste goal, whereas a small proportion of virtue (¼) is not considerably effective at addressing a health goal. It may be that including a small proportion of vice in a food option provides a small but powerful positive utility. This possibility would be consistent with the notion of a silver-lining effect that takes advantage of the steep part of the gain function associated with prospect theory (Kahneman and Tversky 1979).

Indeed, consumers’ perceptions of the healthiness and tastiness of vice-virtue bundles may make it relatively easy to restrict vice quantity because bundles with relatively small proportions of vice are perceived as healthier without being less tasty than vice-virtue bundles with larger proportions of vice. This notion is of particular
theoretical and practical interest because it builds on research on the unhealthy equals tasty intuition (Raghunathan et al. 2006) and extends understanding of this intuition to evaluations of multiple food combinations varying in relative quantities of each food. We show that the unhealthy equals tasty pattern occurs for most consumers mainly when they consider the anchors (pure virtue and pure vice) and that examining vice-virtue bundles reveals an asymptote, such that marginal increases in vice proportion produce little impact on perceived tastiness. This finding demonstrates an important boundary condition for the unhealthy equals tasty intuition and suggests ways to promote healthier food choices that are also perceived as tasty (Glanz et al. 1998).

Moreover, although we chose to focus on logical proportions of vices and virtues in our four studies, determining how far the boundaries could be pushed (e.g., would as low as 10% vice still be appealing?) and still maintain the present effects on choice could be examined in future research. Additionally, we focused on choice of relative quantities of vice and virtue in contexts with predetermined choice sets. Future research could examine the relative quantities of vice and virtue chosen in a context in which unlimited quantities of each were available, such as at a buffet.

We also provide some insights into “licensing” effects, whereby consumers use previous virtuous acts to justify subsequent indulgence (Khan and Dhar 2006). Such effects are often highlighted as a part of the goal-balancing process. In a sense, our results might speak to “simultaneous licensing” because consumers may view the virtue
within a vice-virtue bundle as licensing consumption of the vice, in that it allows consumers to rationalize their indulgent consumption (Bublitz, Peracchio, and Block 2010). However, in addition to differences in sequential versus simultaneous decision making, we also deviate from licensing literature by finding that a small amount of virtue may not compensate for a larger amount of vice.

Finally, it is uncommon in consumer behavior research to mix experimental interventions with customer segmentation. Yet this paper demonstrates that doing so has important theoretical and empirical implications; it enriches our understanding of perceptions, choice, and caloric consequences of vice-virtue bundles. Thus, future consumer behavior work may also want to consider using this approach because it may sometimes have both theoretical and practical benefits.

2.3.2 Generalization to Nonfood Domains

We focus on understanding vice-virtue bundles in the food domain for three main reasons. First, many consumers seek, yet often struggle, to address both taste and health goals (Dhar and Simonson 1999; Glanz et al. 1998; Stewart et al. 2006). Second, limiting consumption quantity of unhealthy foods (vices) is of concern to many stakeholders, including consumers, researchers, policy makers, and managers (Chandon and Wansink 2014). Finally, many in the food industry are actively seeking new,
healthier options that consumers will voluntarily choose (Sifferlin 2013; Strom 2013; Wansink 2012)—vice-virtue bundles may be such an option.

Given this focus on the food domain, the findings in our research may be specific to the characteristics of health and taste goals and to the functions presented in Figures 1(a) and 1(b). However, future research should explore contexts with similar trade-offs between affective and cognitive attributes, as the concepts of identifying functional shapes for affective and cognitive attributes and of identifying utility-maximizing bundle options are quite valid in domains beyond that of food decision making. We do note that research has shown that people do not always want to address both competing affective and cognitive attributes when it comes to their choices in a single consumption episode (Dhar and Simonson 1999). For instance, whereas people often aim for balancing (i.e., addressing both) taste (affective attribute) and health (cognitive attribute) because they are both considered goals, they may instead aim for highlighting either taste (affective attribute) or money/cost (cognitive attribute) because only the former is considered a goal and the latter is considered a resource (Dhar and Simonson 1999). When highlighting is preferred, the utility function for consumers may include an additional negative utility term for all bundle options, such that pure options provide greater utility than bundle options.
2.3.3 Practical Implications for Consumers and Managers

For consumers, there are important implications of shifting from pure vice options to vice-virtue bundles. First, the calorie savings can be clinically significant if such choice shifts persist over repeated decisions. Take, for instance, the example of an average overweight adult consumer shifting from a medium fries at McDonald’s (380 calories) (McDonald’s 2013b) to a McDonald’s fries–salad bundle with half fries (190 calories) and half side salad (10 calories). If this consumer visited McDonald’s once per week and made this choice shift every time for a year, she would eventually lose two to three pounds, with half that amount lost in one year and 95% of that amount lost in approximately three years, according to a dynamic simulation model of weight change (Hall et al. 2011). To put this into context, the average adult in the United States gains about one to two pounds per year (Jeffery and French 1999), a gain that can translate into significant health consequences (Hubert et al. 1983; Williamson, Kahn, and Byers 1991).

There are also implications for consumers shifting from pure virtue options to vice-virtue bundles. Our data show that introducing vice-virtue bundles leads some consumers who would otherwise choose pure virtue to shift to a vice-virtue bundle with a small proportion of vice. That the introduction of vice-virtue bundles may lead to higher caloric intake for some consumers raises the important question of when
introducing vice-virtue bundles is responsible from a consumer welfare perspective. We suggest that vice-virtue bundles should only be introduced when the population contains a large enough percentage of initial vice choosers that there is still an aggregate savings in calories. We note that because a typical shift for initial virtue choosers (i.e., from pure virtue to $\frac{1}{4}$-vice) is approximately half the size of a typical shift for initial vice choosers (i.e., from pure vice to $\frac{1}{2}$-vice), substantial calorie savings would still occur at the population level if there were equal percentages of initial virtue choosers and initial vice choosers in the population. In addition, Study 2 demonstrates that offering vice-virtue bundles appears to decrease subsequent caloric intake, suggesting that offering vice-virtue bundles may actually have positive consequences for subsequent caloric consumption. Future research may examine whether offering vice-virtue bundles with a small amount of vice may satisfy some consumers’ vice food cravings. Indeed, research has shown that depriving restrained eaters (who experience stronger food cravings) of vice foods can lead them to subsequently overeat these strongly desired foods (Polivy, Coleman, and Herman 2005). Therefore, offering fixed vice-virtue bundles with small proportions of vice may allow these eaters to satisfy their cravings for vice foods and stem subsequent overeating. Finally, although it does not mitigate the potential increase in caloric intake for initial virtue choosers, Study 3 does indicate that most consumers are in favor of introducing vice-virtue bundles.
This research also has important implications for managers, who are under increasing pressure to promote healthier selections. In a recent commentary, Wansink (2012) highlighted the history of the food industry’s response to the obesity epidemic, starting with denial of its role in obesity, shifting to appeals to consumer sovereignty via calls for moderation and increasing access to healthy choices, and finally shifting to development of “profitable win–win solutions to help consumers better control what and how much they eat” (p. 54). Vice-virtue bundles may fall squarely in this third category of profitable win–win solutions that many companies are now focusing on.

Given that consumers consistently find vice-virtue bundles to be attractive, managers should consider adding vice-virtue bundles to their product lines. For restaurants and food vendors that already offer pure vice and virtue options, vice-virtue bundles provide an opportunity for product line expansion through existing items rather than through development of completely new offerings. This opportunity may provide cost savings because many food establishments devote considerable resources to developing new product offerings (Sifferlin 2013; Strom 2013), which in turn can increase inventory or production costs.

In addition, if vice-virtue bundles are added to menu offerings, managers can consider whether to charge a price premium for them. In our studies, price is implicitly held constant across options to avoid activating any inferences that consumers might draw from different prices (Hamilton and Koukova 2008; Harris and Blair 2006) and to
avoid consumers choosing based on budget or monetary concerns. In this no-price-premium world, we found that most people favored the introduction of vice-virtue bundles. Thus, offering vice-virtue bundles potentially translates into more favorable attitudes toward the brand, increased long-term customer loyalty, and increased frequency of revisiting the firm (Wansink 2012). Of course, some managers might decide to charge a price premium for vice-virtue bundles. In this case, introducing vice-virtue bundles may allow managers to extract consumer surplus via higher prices.

To conclude, our research presents a first look at a novel choice offering—vice-virtue bundles—and examines its psychological underpinnings. To examine these psychological underpinnings, we did not use marketing messages, nor did we deviate from choice sets featuring two, four, or five options. However, in the real world, marketing messages could be added to explicitly promote preference for certain vice-virtue bundles (“You can get your cake and eat it too…especially if you have mostly fruit salad!”). Managers could also experiment with offering smaller choice sets while still promoting health and taste via vice-virtue bundles. For instance, a simple choice set might contain only three options (e.g., pure virtue, pure vice, and ¼-vice) or an even simpler choice set might contain only two options (e.g., ¼-vice and ¾-vice). Such smaller choice sets may be especially attractive to fast food restaurants, for which speed and convenience, and hence a limited menu, are highly important for operations. With the right marketing and the right choice sets, we believe that vice-virtue bundles offer
exciting directions for future research and practice aimed at maximizing health without compromising taste.
3. Essay 2: “Eat, Drink, and Be Merry? Decreasing Conflict Between Healthy Food Choices and Affiliation with Indulging Companions”

3.1 Introduction

Although many people report wanting to make healthier food choices (International Food Information Council Foundation 2012), many fail to follow this goal consistently (Ogden et al. 2014). The widespread failure to follow healthy eating goals suggests that numerous barriers hinder healthy food choice. One barrier may be the goal to have an enjoyable eating experience. However, existing research on goals conflicting with healthy eating has focused narrowly on the tastiness goal—the desire for enjoyment from the taste of food (Dhar and Simonson 1999; Etkin et al. 2015; Fishbach, Friedman, and Kruglanski 2003; Laran 2010; Liu et al. 2015; Raghunathan et al. 2006; Shiv and Fedorikhin 1999; Stroebe et al. 2013; Wilcox et al. 2009). Although people certainly derive enjoyment from the taste of food, it is not the only source of enjoyment in the eating experience (Block et al. 2011). In fact, another source of enjoyment from the eating experience comes from having a positive social interaction with one’s dining companion(s). Given how frequently people order and consume foods in social settings alongside others, surprisingly little research has examined people’s social goals (e.g., the goal to affiliate with, or relatedly, to be liked by a dining companion) as a potential
barrier to healthy eating.

The current research thus extends beyond the typical taste/health goal conflict in the food domain both to examine whether (and, if so, why) a social/health goal conflict occurs and to test strategies to decrease this conflict. We consider a dyad (a group of two consumers) with each member making a food choice for themselves. To preview the findings, our first set of studies find that consumers believe (and sometimes act on the belief) that choosing healthy foods conflicts with affiliation with an indulging dining companion and that this belief stems from healthiness being an attribute that is used to form many social judgments (Studies 1-3). Based on these findings, the second set of studies identified two strategies for making healthy food choices while still affiliating with an indulging companion (Studies 4-5). The first strategy is to attribute choice of a healthy option to a constraint, thereby mitigating the social judgments that can be formed based on the healthiness of one’s choice (Study 4). The second strategy is to offer to share one’s healthy option with an indulging companion but to attribute the sharing offer to the desire to provide variety, not healthiness (Study 5).

This research aims to make several contributions. First, by showing when a goal to be liked conflicts with healthy eating, this research contributes to the eating behavior literature by providing a more complete picture of sources of conflict with healthy eating. Second, whereas past research suggests that similarity on attributes promotes affiliation with others (Lakin and Chartrand 2003; Lowe and Haws 2014; Mead et al.
we suggest that people specifically prioritize matching on “socially meaningful attributes,” which we define as those relevant for social judgment and making identity inferences. We argue that healthiness is one such socially meaningful attribute. Third and finally, prior research finds that similarity in behaviors promotes affiliation more than dissimilarity (Chartrand and Bargh 1999; Hove and Risen 2009) and, particularly relevant to the present context, that matching an indulging consumer on healthiness leads to greater affiliation than mismatching (Leone, Herman, and Pliner 2008; Lowe and Haws 2014). We identify strategies that healthy consumers can use to promote affiliation with an indulging companion despite mismatching.

3.1.1 The Conflict Between Healthy Food Choices and Affiliation with an Indulging Companion

A large body of literature indicates that consumers believe (or act as if they believe) that matching another’s behaviors promotes affiliation. For instance, being socially excluded, which activates affiliation motives (Maner et al. 2007), leads people to exhibit the same consumption preferences as someone they want to affiliate with (e.g., to prefer the same store; Mead et al. 2011). Relatedly, having an affiliation goal leads people to mimic another person’s physical behaviors (Lakin and Chartrand 2003). Correlational studies also show that people high in sociotropy (a personality characteristic involving strong need for interpersonal acceptance; Beck, Epstein, and Harrison 1983; Robins et al. 1994) report trying to match a peer’s eating or the amount of
food selected by a confederate (Exline et al. 2012). Extensive research also shows that matching actions promote greater affiliation (as measured by liking) than mismatching ones (Chartrand and Bargh 1999; Hove and Risen 2009; Lowe and Haws 2014). For instance, mimicking another person’s physical behaviors promotes affiliation (Chartrand and Bargh 1999), as does matching another person’s decision to skip versus attend class (Lowe and Haws 2014). In the food context, consumers reported liking another person less if that person ate less (vs. more) than they did, suggesting that being mismatched by another person engaging in healthier (vs. unhealthier) behavior is particularly detrimental to liking (Leone et al. 2008). The only research suggesting that mismatching is better for affiliation finds that consumers with high need for uniqueness react negatively when matched on choice of a symbolic self-expression product (e.g., lip gloss; White and Argo 2011). Assuming that consumers do not seek unique identities as the only unhealthy eater (Berger and Heath 2007), this exception seems unrelated to the present context.

Although this extensive literature clearly indicates that people believe that “matching” in general is preferable to “not matching” for affiliation, we propose that people believe matching on healthiness to be particularly important to affiliate with others and suggest that this importance arises because healthiness is an attribute that conveys strong social meaning (Liu et al. 2013; Lowe and Haws 2014; Oakes and Slotterback 2004; Rozin 1996). We define a socially meaningful attribute as one that is
relevant for forming social judgments. Healthiness carries strong social norms and
evokes strong social judgments. People believe that whether a person chooses healthy
food or unhealthy food sheds light on that person’s self-control (Lowe and Haws 2014),
morality (Rozin 1996), and various other characteristics, such as laziness and selfishness
(Oakes and Slotterback 2004). In further support of the notion that healthiness conveys
important social information, people report that knowing the healthiness of a potential
roommate’s food choices would help inform whether they would get along (Lowe and
Haws 2014). Additionally, one sign of an attribute being highly socially meaningful is
whether people feel self-conscious about differences along that attribute. People feel self-
conscious when they believe that they are deviating from a social standard and infer that
others might thus evaluate them (James 2000; Leary 2007; Pechmann et al. 2005;
Thompson and Hirschman 1995). As one reader, calling herself “Not-As-Healthy
Heather,” put it when she wrote on the popular website PopSugar, “I feel really insecure
around [my healthy friend]... I feel like her super healthy lifestyle is putting distance
between us... I don’t want to lose her completely as a friend, so what can I do to make
me feel less annoyed and less self-conscious?” (Fitness 2010). In sum, we propose that
consumers believe that matching on healthiness is important for affiliation, because
healthiness is an attribute that is critical for social judgments.

Not all food-related attributes share the strong social meaning that healthiness
carries. For instance, another prominent attribute on which foods differ is flavor (Inman
2001). However, unlike healthiness, we suggest that flavor is not typically an attribute conveying strong social meaning. As the classic Latin saying goes, “De gustibus non est disputandum” (in English, “There is no accounting for tastes”), indicating that taste or flavor preferences are viewed as subjective and implying that people expect and accept differences along the flavor attribute without making strong social judgments based on one’s flavor selection (He and Bond 2015; Spiller and Belogolova 2015). Thus, in contrast to a dimension such as flavor, we hypothesize that people believe matching an indulging companion on healthiness to be particularly important for affiliation because it conveys social meaning.

To provide empirical evidence for this proposed link between matching on healthiness and affiliation, we conducted a pilot field study. In this study, we obtained field survey data from restaurant diners who completed a customer feedback survey while sitting at their tables at the conclusion of their meal. The field survey data were collected during the dinner meal period on an evening in early March 2016 by a separate research team, who allowed us to include four questions for our pilot study in the customer feedback survey they distributed. Of the 152 restaurant diners who agreed to complete the survey, 133 completed all four of our pilot survey questions. The four pilot study questions we included were as follows. First, for the dependent variable, we asked, “How close do you feel with the other person(s) you ate this meal with?” (1 = much less close than I did before we had this meal, 7 = much closer than I did before we had this meal).
meal). Second, for the healthiness similarity predictor variable, we asked, “How similar in terms of healthiness was the food that the other person(s) you were with ate compared to what you ate?” (1 = very different in terms of healthiness, 7 = very similar in terms of healthiness). Third, for the flavor similarity predictor variable, we asked, “How similar in terms of flavor was the food that the other person(s) you were with ate compared to what you ate?” (1 = very different in terms of flavor, 7 = very similar in terms of flavor). The final question was a covariate, intended to capture actual physical closeness to one’s dining companion(s) based on the restaurant’s crowding levels, and asked, “How crowded did you find the restaurant?” (1 = not at all crowded, 7 = very crowded). A linear regression in which the closeness consequences question was the outcome variable and the other three variables were the predictors revealed that healthiness similarity was a marginally significant predictor (B = .18, SE = .09, β = .18, t = 1.87, p = .064), flavor similarity was not a significant predictor (B = -.03, SE = .07, β = -.05, t = -.51, p = .614), and the covariate of physical crowding was a significant predictor (B = .44, SE = .16, β = .23, t = 2.67, p = .009). Thus, this pilot study conducted in the field provided initial correlational evidence that perceiving greater similarity between the healthiness of one’s food choices and one’s dining companion(s)’s food choices was linked with feeling closer after the meal, whereas perceiving greater similarity between the flavor of one’s food choices and one’s dining companion(s)’s food choices was not linked with feeling closer after the meal. As a preview, however, later in the paper, we consider a situation in
which flavor might be socially meaningful.

In sum, we theorize that people believe matching others on socially meaningful attributes is important for affiliation. Based on this notion, we hypothesize that people believe matching food choice with an indulging companion on the healthiness dimension will be especially facilitative of affiliation. Whether people believe affiliation with an indulging companion is served via matching on healthiness or whether matching on another attribute (such as flavor) will suffice is a question with theoretical and practical implications. From a theoretical perspective, the answer to this question extends work on the effect of an affiliation goal on behavior, which finds that an affiliation goal leads to matching in general (Exline et al. 2012; Lakin and Chartrand 2003; Mead et al. 2011), but does not delineate whether and why some matches are viewed as more important than others. From a practical perspective, if people believe that matching on healthiness is important for affiliation, then the conflict between making healthy food choices and affiliation with an indulging consumer is not just a matter of matching an indulging consumer on any attribute, and constituents interested in promoting healthy eating ought to be aware of this particular conflict and how to address it. To summarize, we hypothesize that:

**H1:** Consumers believe that matching a companion on healthiness in particular is important for affiliating. This belief about the importance of matching does not extend to all attributes (e.g., flavor) and arises because healthiness is a socially
meaningful attribute. This belief about the importance of matching on healthiness for affiliation thus leads to a conflict between a consumer’s health goal and an affiliation goal when one’s companion is indulging.

3.1.2 Decreasing the Conflict Between Healthy Food Choices and Affiliation with an Indulging Companion

Are there effective ways to mitigate this conflict without having to choose an unhealthy option? Thus far, we have considered the perspective of a consumer with a health goal, hypothesizing that such a consumer indeed perceives a health and affiliation conflict to occur when with an indulging companion (hypothesis 1). To test the effectiveness of strategies for mitigating such a conflict, we now shift the focal participant perspective. Namely, rather than examine the perspective of a consumer who has an indulging companion, we instead take the perspective of an indulging consumer and examine how much this indulging consumer likes their companion as a function of the companion’s food-related behavior. In doing so, we can examine whether there are ways in which a companion could choose healthy options while still being well liked by an indulging companion. If so, then such behaviors represent effective strategies that consumers who have both health goals and affiliation goals can use to mitigate the health versus affiliation conflict. Drawing from our notion that healthiness mismatches lead to disaffiliation due to the social meaningfulness of healthiness, we next discuss two strategies for decreasing the conflict between healthy eating and
affiliation and reasons why each might be effective.

The first strategy consists of attributing one’s healthy choice to a constraint for choosing a healthy item (e.g., a dietary restriction). This strategy ought to be effective, because by attributing a healthy food choice to such a constraint, the social meaning that can be drawn from the healthiness of one’s food choice is considerably diminished. Rather than functioning as a proxy for internal willpower and influencing various moral and social judgments (Lowe and Haws 2014; Oakes and Slotterback 2004; Rozin 1996), a healthy choice is instead attributed to the constraint. Of note, this strategy of attributing a healthy choice to a constraint has been examined in prior research, but only with respect to the personal consequences of such an attribution (Patrick and Hagtvedt 2012). The present research instead focuses on the social consequences of such an attribution. We discuss our findings in conjunction with Patrick and Hagtvedt (2012)’s findings later in the General Discussion. Put formally:

**H2:** Consumers can affiliate with an indulging companion despite mismatching on healthiness if consumers attribute their healthy choice to a constraint (e.g., attributing a healthy choice to a dietary restriction).

Of course, this first strategy is only truthfully available to people who have constraints requiring choice of healthy items. The second strategy is available more broadly: offer to share one’s healthy selection with an indulging companion. A large body of research has shown that sharing is a behavior that is strongly linked with social
connection (Belk 2010; Miller, Rozin, and Fiske 1998). Additionally, it is well known that people value variety in flavors (Inman 2001; Wansink 2004) and also value the ability to address both taste and health goals on a single occasion (Dhar and Simonson 1999; Liu et al. 2015). Importantly, however, we suggest that sharing will not be effective at increasing affiliation if the sharing offer is attributed to a desire to provide the indulging companion with something healthy. If attributed to a health reason, then the sharing offer is both a suggestion that the indulging companion should eat something healthier and also highlights that the two dyad members’ food choices differ on the healthiness dimension. Such an attribution might lead to reactance, as consumers may dislike being told to eat healthier (Stok et al. 2014). Additionally, given that healthiness differences are the basis for disaffiliation, highlighting such a difference is hardly productive. Thus, although sharing products in general—and food specifically—is strongly linked with social connection (Belk 2010; Miller et al. 1998), we propose that the attribution for why a consumer is sharing food matters. Put formally:

**H3:** Consumers can affiliate with an indulging companion despite mismatching on healthiness if consumers offer to share in a way that does not attribute the sharing offer to a healthiness reason (e.g., attributing sharing to wanting to provide variety).
3.2 Overview of Studies

Six studies test our hypotheses that healthy eating conflicts with affiliation with an indulging companion and test the effectiveness of two strategies to decrease this conflict. The first set of studies tests our first hypothesis that people believe choosing a healthy option will hinder affiliation with an indulging companion (Studies 1-3) and that this belief occurs because people view healthiness as a socially meaningful attribute (Studies 1, 3). The second set of studies instead take the perspective of indulging consumers to test our second and third hypotheses that choosing a healthy option can be compatible with affiliating with an indulging companion, either by attributing choice of a healthy option to a constraint (hypothesis 2; Study 4) or by offering to share, as long as sharing is attributed to wanting to provide variety, not healthiness (hypothesis 3; Study 5).

3.2.1 Study 1: The Importance of Matching on Healthiness for Affiliation as Evidenced in Consumers’ Beliefs

Study 1 examined consumers’ beliefs about the affiliation consequences (in terms of liking) of mismatching an indulging companion on healthiness, as opposed to another dimension—flavor. We hypothesized that consumers believe matching on healthiness in particular will benefit affiliation, whereas matching on flavor will have little (or less) effect on affiliation. Additionally, to test our hypothesis that these affiliation benefits of healthiness matching are linked to healthiness being an attribute
used for social judgment, we measured consumers’ beliefs about how self-conscious they thought an indulging companion would feel. We anticipated that beliefs about affiliation consequences would be linked with beliefs about self-conscious consequences, as self-conscious feelings occur when people worry that they have violated a social standard and infer that others might thus evaluate them (James 2000; Leary 2007; Pechmann et al. 2005; Thompson and Hirschman 1995).

3.2.1.1 Method

Participants and Design. Fifty-three participants (49.1% female; Mage = 37.57) recruited from Amazon’s Mechanical Turk (MTurk) completed this study, which had a 2 (healthiness: match, mismatch) × 2 (flavor: match, mismatch) + 1 (ordering no food) completely within-subjects design (53 participants in each cell). Participants were eligible for this study and the other online studies in this paper if they were ages 18+ (according to self-report) and located in the United States (according to MTurk’s qualifications).

Procedure. Participants read: “In the following situation, imagine that you and another person are at a small café in the afternoon. You plan to sit at the small café and chat for the next hour or so. You both look at the dessert display. The other person orders first and selects a bowl of full-fat chocolate ice cream. If you decide to order dessert, the options you can order are: low-fat chocolate ice cream, full-fat chocolate ice
cream, low-fat vanilla ice cream, and full-fat vanilla ice cream.” Participants then indicated, for each of the five potential choices (not ordering any ice cream, ordering one of the four ice cream options), how much they thought the other person would like them (1 = not at all, 6 = very much). Liking was used because it is a construct linked closely to affiliation and has been used as a proxy for affiliation in past research (Freeman 1992; Lakin and Chartrand 2003; Lowe and Haws 2014; Yabar et al. 2006). Participants also indicated how self-conscious they thought the other person would feel (1 = not at all, 6 = very much).

3.2.1.2 Results and Discussion

Anticipated Affiliation. A 2 (healthiness: match, mismatch) × 2 (flavor: match, mismatch) repeated-measures ANOVA was conducted on anticipated affiliation. See Figure 3(a). As predicted, there was a main effect of healthiness match (\(F(1, 52) = 25.08, p < .001, \eta^2 = .33\)). People thought they would be liked more if they matched (\(M = 4.86\)) versus mismatched on healthiness (\(M = 4.17\)). There was no main effect of flavor match (\(F(1, 52) = .63, p = .430\)) and no interaction between healthiness match and flavor match (\(F(1, 52) = 1.67, p = .201\)).

We also examined participants’ beliefs about how much they would be liked if they did not order any ice cream. According to paired t-tests, people thought they would be liked similarly if they ordered no ice cream (\(M = 4.00\)) as if they ordered low-
fat chocolate ice cream ($M = 4.09; t(52) = -.71, p = .480$) and would be liked marginally significantly less if they ordered no ice cream than if they ordered low-fat vanilla ice cream ($M = 4.25; t(52) = -1.76, p = .085$).

**Panel A**

![Beliefs about How Much Indulging Companion Would Like Participant](image)

**Panel B**

![Beliefs about How Self-Conscious Indulging Consumer Would Feel](image)

**Figure 3:** Beliefs about Effect of Matching on Healthiness and Matching on Flavor on Affiliation (Panel A) and Indulging Companion Feeling Self-Conscious (Panel B) (Study 1)

*Anticipated Self-Conscious Feelings.* A 2 (healthiness: match, mismatch) $\times$ 2 (flavor: match, mismatch) repeated-measures ANOVA was also conducted on beliefs about how
self-conscious the indulging companion would feel. See Figure 3(b). There was a main effect of healthiness match ($F(1, 52) = 47.52, p < .001, \eta^2_p = .48$), such that people anticipated that the indulging companion would feel less self-conscious if they matched on healthiness ($M = 1.74$) than if they did not match on healthiness ($M = 3.24$). There was no main effect of flavor match ($F(1, 52) = .51, p = .478$) and no significant interaction between healthiness match and flavor match ($F(1, 52) = .09, p = .771$).

We also examined participants’ beliefs about how self-conscious they believed their indulging companion would feel if participants did not order any ice cream. According to paired $t$-tests, people anticipated that the indulging companion would feel more self-conscious ($M = 3.91$) if they ordered no ice cream than if they ordered low-fat chocolate ice cream ($M = 3.28; t(52) = 3.11, p = .003$) or low-fat vanilla ice cream ($M = 3.19; t(52) = 3.58, p = .001$).

**Correlations Between Anticipated Affiliation and Anticipated Self-Conscious Feelings.**

We then examined the correlation between anticipated affiliation and self-conscious feelings, separately for each level of the within-subjects variable. All correlations were negative and significant, as predicted, ranging from $r = -.42 (p = .002)$ to $r = -.65 (p < .001)$.

**Mediation.** Finally, we used methods for testing mediation in within-subjects designs (Judd, Kenny, and McClelland 2001; Pennington and Roese 2003) to examine whether the differences in anticipated self-conscious feelings might account for the differences in anticipated affiliation. We focused on the main 2 (healthiness: match,
mismatch) × 2 (flavor: match, mismatch) within-subjects design. Given no main effect of flavor matching on anticipated affiliation ($p = .430$) and no interaction between healthiness matching and flavor matching ($p = .201$), we collapsed across flavor matching to focus on the effect of healthiness matching ($p < .001$). We first created four measures: 1) the average of the anticipated liking from choosing low-fat chocolate ice cream and low-fat vanilla ice cream, 2) the average of the anticipated liking from choosing full-fat chocolate ice cream and full-fat vanilla ice cream, 3) the average of the anticipated self-consciousness from choosing low-fat chocolate ice cream and low-fat vanilla ice cream, and 4) the average of the anticipated self-consciousness from choosing full-fat chocolate ice cream and full-fat vanilla ice cream. We then regressed the difference in the two anticipated liking scores (anticipated liking from choosing full-fat ice cream – anticipated liking from choosing low-fat ice cream) on two predictors: 1) the sum of each participant’s anticipated self-consciousness scores for low-fat ice cream and for full-fat ice cream, and 2) the difference in each participant’s anticipated self-consciousness scores for low-fat ice cream and for full-fat ice cream. The regression coefficient for the anticipated self-consciousness difference predictor was significant ($B = -.46, SE = .07, \beta = -.73, t = -6.97, p < .001$), indicating mediation of anticipated liking by anticipated self-conscious feelings.

Discussion. Study 1 showed that consumers believed that choosing an unhealthy option (thereby matching on healthiness) would lead an indulging companion to like
them more. In contrast, consumers did not believe that matching on flavor would lead an indulging companion to like them more. Having these beliefs about the affiliation benefits of matching on healthiness was linked to believing that mismatching on healthiness would make an indulging companion feel self-conscious, whereas mismatching on flavor would not. These findings provide evidence that the reason why healthiness mismatches are viewed as particularly detrimental to affiliation is because healthiness is a socially meaningful attribute. Specifically, because self-conscious feelings are thought to arise when people worry that they are violating a social standard (James 2000; Leary 2007; Thompson and Hirschman 1995), these findings suggest that the negative affiliation consequences of mismatching on healthiness are indeed linked to beliefs about violating social standards. Finally, this study also showed that people believe not ordering any dessert to be, if anything, worse for affiliation than choosing a healthy dessert. Indeed, not ordering any dessert might be considered a more extreme form of mismatching an indulging companion on healthiness than ordering a healthy food. In subsequent studies, except for Study 4, we thus focus on situations in which both consumers in the dyad order food. We do so for two reasons. First, examining a healthy food choice (vs. no food choice) offers a more conservative test of the hypothesis that healthy food choice conflicts with affiliation with an indulging companion. Second, if both consumers choose food, how similar this food’s flavor is to the flavor of the indulging companion’s food can be varied. Being able to vary flavor similarity is helpful
when we later show in Study 3 that it is not the case that people always prioritize matching on healthiness over flavor for affiliation—rather, the prioritization only occurs when healthiness is the only socially meaningful attribute in the situation.

3.2.2 Studies 2a-2b: The Importance of Matching on Healthiness for Affiliation as Evidenced through Choice

Another way to test whether a health versus affiliation goal conflict occurs when dining with an indulging companion is to examine whether such beliefs manifest accordingly in terms of peoples’ food choices. Specifically, we expect to observe that if consumers have both a health goal and an affiliation goal, then provided that the affiliation goal is sufficiently strong, consumers should make more unhealthy food choices than if they had a health goal alone. That is, an affiliation goal should push consumers in the opposite direction of the health goal. Thus, in both Studies 2a and 2b, participants were randomly assigned to have either a health goal alone or to have both a health goal and an affiliation goal. Participants were then asked whether they would match an indulging companion on healthiness alone, flavor alone, neither, or both. We predicted that having both a health goal and an affiliation goal would lead to increased matching on healthiness (i.e., increased choice of an indulgent option) and did not have a prediction about whether increased matching on flavor would also occur. Studies 2a and 2b test our predictions using different participant populations and different operationalizations of healthiness differences between food options. Specifically, Study
2a examines small versus large portions of indulgent products, whereas Study 2b examines light versus regular versions of indulgent products (Haws and Liu 2016).

### 3.2.2.1 Study 2a Method

*Participants and Design.* Ninety-seven participants (75.3% female; \(M_{age} = 23.77\)) recruited from a business school’s paid lab participant pool completed this study as part of a bundled session of unrelated studies. To sign up for this bundled session of studies, participants had to be affiliated with the university (e.g., student). This study had a 2 (health goal, health goal + affiliation goal) group between-subjects design.

*Procedure.* Participants for this bundled session of studies were divided between two different computer station rooms for the entire survey session. For this focal study, participants were told that they would be paired with a participant from the other computer station room to chat briefly and watch a movie clip together. Participants first waited while our survey ostensibly paired them up with another participant. Once ostensibly paired up, participants were asked to answer several questions about themselves while their partner also supposedly answered these questions. These questions consisted of both filler questions and focal questions to determine participant eligibility. Specifically, participants were asked their age, whether they are currently trying to eat a healthier diet (yes, no), their perceptions of the riskiness of various financial activities (Blais and Weber 2006), their favorite color, and which of the
following best described them (current student at the university, prospective student at the university, alumni of the university, or other). Based on these responses, 97 participants (out of the 119 who participated in the bundled session of studies) were eligible because they had a goal to eat healthier.

Participants were then shown a profile of their ostensible chat partner. See Figure 4 for profiles shown to participants. The chat profile always depicted the other participant as indulging by having selected a large cupcake (we counterbalanced the flavor of large cupcake that the other participant ostensibly chose). Importantly, we randomly assigned half of participants to have an affiliation goal with the other participant. Thus, half of participants only had a health goal, whereas the other half of participants had both a health goal and an affiliation goal. The affiliation goal manipulation consisted of telling participants that their chat partner was a prospective university student, so that on behalf of the university, we would very much appreciate it if participants could make their chat partner feel comfortable, as it matters a lot whether their partner likes them and enjoys their company. Participants in the health goal alone condition were told that their chat partner was already a student at the university and that participants did not need to go out of their way to make their chat partner feel comfortable, as it did not particularly matter whether their partner liked them and enjoyed their company.

(a) Health Goal + Affiliation Goal Condition
Your chat partner's ID: A44
Age: 18
Student status: prospective [university's name] student
Favorite color: red
Snack choice for session: large vanilla (or chocolate, depending on counterbalancing)
cupcake

(b) Health Goal Alone Condition

Your chat partner's ID: A44
Age: 18
Student status: [university's name] student
Favorite color: red
Snack choice for session: large vanilla (or chocolate, depending on counterbalancing)
cupcake

Figure 4: Chat Partner Profiles (Study 2a)

Participants were then asked to choose a snack for themselves from the following four options (mini chocolate cupcake, mini vanilla cupcake, large chocolate cupcake, large vanilla cupcake), such that we could examine whether participants matched their chat partner on healthiness, flavor, or both. Participants received their chosen cupcake as part of this study and were allowed to eat it during the bundled session of studies.

Finally, participants did not actually engage in movie watching and in-person chatting with another participant during this study (given that the chat partner profiles were not real).

3.2.2.2 Study 2a Results and Discussion

Snack Choice. Choice was significantly different across goal conditions ($\chi^2 (3) = 8.58, p = .036$, Cramer’s $V = .30$). See Figure 5.
First, we examined whether having both health and affiliation goals (vs. a health goal alone) leads to increased matching on healthiness by comparing the percentage choosing an unhealthy option (large cupcake) with the percentage choosing a healthy option (mini cupcake). A 2 (health goal, health goal + affiliation goal) binary logistic regression conducted on snack choice (unhealthy option, healthy option) was marginally significant, $B = .75$, Wald $\chi^2(1) = 3.13, p = .077$; odds ratio (OR) = 2.11. In the health goal condition, 38.5% chose an unhealthy option; in the health goal + affiliation goal condition, 61.5% chose an unhealthy option.

We also examined whether having the addition of an affiliation goal would lead to increased matching on flavor. A 2 (health goal, health goal + affiliation goal) group binary logistic regression on snack choice (same flavor, different flavor) was marginally significant ($B = -.80$, Wald $\chi^2(1) = 3.67, p = .055$; OR = .45). In the health goal condition,
60.5% chose the same flavor; in the health goal + affiliation goal condition, 39.5% chose the same flavor.

Discussion. Study 2a found that participants who had both a health goal and an affiliation goal (vs. a health goal alone) were marginally significantly more likely to match their indulging companion on healthiness than when they had a health goal alone. In terms of whether consumers also match on flavor, the addition of an affiliation goal appeared to decrease matching on flavor in aggregate. Given that the predicted finding about healthiness matching was marginally significant with a sample size of approximately 100 participants, Study 2b was next conducted in an online context with a larger sample size (approximately 200 participants) to observe whether we would replicate Study 2a’s finding.

3.2.2.3 Study 2b Method

Participants and Design. Two hundred and four participants (59.8% female; \( M_\text{age} = 34.21 \)) recruited from MTurk completed this study, which had a 2 (health goal, health goal + affiliation goal) group between-subjects design.

Procedure. All participants read the following: “Imagine that you and another person are at a small cafe in the afternoon. Your boss was supposed to take this person to the cafe to get ice cream but something came up at the last minute and he asked you to take this person instead.” Participants then read: “The other person orders a bowl of chocolate ice cream.” Participants were then shown a photo of a pint of Häagen-Dazs
chocolate ice cream. Participants then read: “It is your turn to order next. The options are light chocolate ice cream, light vanilla ice cream, chocolate ice cream, and vanilla ice cream.” Participants then saw photos of a pint of Häagen-Dazs light chocolate ice cream, a pint of Häagen-Dazs light vanilla ice cream, a pint of Häagen-Dazs chocolate ice cream, and a pint of Häagen-Dazs vanilla ice cream.

In the health goal + affiliation goal condition, participants were told, “Imagine that you’re trying to eat a healthier diet. Imagine also that this person is important to your boss, so it is very important that you make this person feel comfortable, as you need this person to like you and enjoy your company.” Participants in the health goal alone condition were told, “Imagine that you’re trying to eat a healthier diet. Imagine also that this person is not particularly important to your boss, so you do not need to go out of your way to make this person feel comfortable, as you don’t need this person to like you or enjoy your company.”

Participants were then asked which option they would choose for themselves (light chocolate ice cream, light vanilla ice cream, chocolate ice cream, or vanilla ice cream).

3.2.2.4 Study 2b Results and Discussion

*Snack Choice.* Choice differed significantly across goal conditions ($\chi^2 (3) = 21.58, p < .001, \text{Cramer’s V } = .33$). See Figure 6.
First, to examine whether having both affiliation and health goals leads to greater indulgence than having a health goal alone, we compared the percentage choosing a healthy option (light chocolate ice cream or light vanilla ice cream) with the percentage choosing an unhealthy option (chocolate ice cream or vanilla ice cream). A 2 (health goal, health goal + affiliation goal) binary logistic regression conducted on snack choice (unhealthy option, healthy option) was significant (B = 1.13, Wald \( \chi^2(1) = 14.97, p < .001 \), OR = 3.09). In the health goal alone condition, 35.9% chose an unhealthy option; in the health goal + affiliation goal condition, 63.4% chose an unhealthy option.

We also examined whether having the addition of an affiliation goal would increase matching on flavor as well. To do so, we first compared the percentage choosing the same flavor as their dining companion with the percentage choosing a different flavor. A 2 (health goal, health goal + affiliation goal) group binary logistic regression conducted on snack choice (same flavor, different flavor) was not significant.
(B = .31, Wald $\chi^2(1) = 1.24, p = .265, OR = 1.37$). In the health goal alone condition, 44.7% chose the same flavor; in the health goal + affiliation goal condition, 52.5% chose the same flavor.

Discussion. Study 2b thus replicated the main finding from Study 2a, showing that when participants had both a health goal and an affiliation goal (vs. a health goal alone), they were more likely to choose to match their indulging companion on healthiness. Additionally, the observed effect size was similar in both studies. Collectively, these two studies thus provide further evidence that people believe a health goal and an affiliation goal conflict when dining with an indulging companion. Unlike Study 2a, there was no evidence that having an affiliation goal decreased matching on flavor in Study 2b. Additionally, in a third study (details available from the authors), a conceptual replication of Studies 2a and 2b, we again found that having an affiliation goal and a health goal led to more matching on healthiness ($p < .001, OR = 6.37$) but found that this time, there was also increased matching on flavor ($p = .005, OR = 2.29$). Thus, across Studies 2a, 2b, and a third conceptual replication study, the consistent finding was that when participants had both a health goal and an affiliation goal, they were more likely to choose to match their indulging companion on healthiness than when they had a health goal alone. However, there was no consistent matching (or mismatching) on flavor across studies.
A potential alternative explanation for the results in Studies 2a and 2b is that having two active goals (and in this case, conflicting goals according to our theoretical account) always leads to greater indulgence than having a single active goal. In other words, perhaps having both a health goal and an affiliation goal might cause stress (Etkin et al. 2015), which might in turn lead to greater indulgence as a way to cope with the stress of having conflicting goals. To test this alternative explanation, we conducted a follow-up study in which we manipulated whether participants had two goals (health and affiliation) or a single goal (health) and whether participants anticipated interacting with someone who was indulging or not. In support of our account, we found that having both a health goal and an affiliation goal (vs. a health goal alone) only led to greater indulgence when one’s interaction partner was indulging. If one’s interaction partner was not indulging, then the levels of indulgence did not differ between the health goal alone condition and the health goal + affiliation goal condition.

3.2.3 Study 3: The Importance of Matching on a Socially Meaningful Attribute

Studies 1, 2a, and 2b find evidence that consumers believe that matching an indulging companion on the healthiness dimension in particular is important for affiliating. Additionally, Study 1 provided evidence that these beliefs about affiliation are linked with healthiness being an attribute used for social judgment, as anticipated affiliation consequences were linked to anticipated self-conscious feelings. Study 3
examines another way of testing whether the social meaningfulness of an attribute leads it to be important for matching on for affiliation purposes. Specifically, Study 3 tests whether making the flavor attribute socially meaningful leads consumers to believe that it is also important for affiliation to match on the flavor attribute as well. The rationale is that if consumers indeed view matching on healthiness as important for affiliation because healthiness conveys social meaning, then it follows that consumers may also view flavor matching as important for affiliation in situations in which flavor has social meaning. For instance, such a situation might occur if an Asian consumer chose green tea ice cream (an Asian flavor) at an American café on July 4th, a patriotic American holiday. In this situation, flavor could be socially meaningful for two reasons. First, on July 4th, there may be a social norm to choose an American flavor; thus, choosing an Asian flavor (i.e., green tea) might represent deviation from the social norm, causing the Asian consumer to potentially feel self-conscious. Second, although flavor choice (e.g., chocolate vs. vanilla) is not typically synonymous with any particular social identity, the choice of green tea (an Asian flavor) can also convey social identity information in this particular situation (Alba 1990; Devine et al. 1999). Given that flavor is likely to be a socially meaningful attribute for either or both reasons in this example, consumers may believe that matching an indulging companion on flavor is also important for making the companion feel comfortable, in addition to matching on healthiness.

In Study 3, all participants were provided with two choice options: they could
match their indulging companion on healthiness but not flavor, or they could match their indulging companion on flavor but not healthiness. We predicted that when healthiness is the only socially meaningful attribute, participants would choose to match on healthiness rather than flavor. However, when both healthiness and flavor are socially meaningful, we predicted that participants’ preference for matching on healthiness over flavor would be mitigated. Although consumers might still feel drawn towards the unhealthy option (matching on healthiness but not flavor) because matching on healthiness is viewed as important for affiliation, they now may also feel a draw in the opposite direction towards the healthy option (matching on flavor but not healthiness) because matching on flavor is also viewed as important for affiliation. Assuming the draw in the opposite direction is sufficiently strong, the likelihood of choosing the healthiness match (the unhealthy option) over the flavor match (the healthy option) should be mitigated. Additionally, Study 3 also measures anticipated self-conscious feelings, to follow up on the anticipated self-conscious feelings results in Study 1.

3.2.3.1 Method

Participants and Design. Two hundred and two participants (52.0% female; M_age = 34.43) recruited from MTurk completed this study, which had a 2 (health goal, health goal + affiliation goal) × 2 (healthiness is the only socially meaningful attribute,
healthiness and flavor are both socially meaningful attributes) group between-subjects
design.

Procedure. All participants read the following: “Imagine that it is July 4th, and you
and another person, who has recently arrived in the USA from China, are at a small café
in the afternoon. Your boss was supposed to take this person to the café to get ice cream
but something came up at the last minute and he asked you to take this person instead.”

Participants in the “healthiness is the only socially meaningful attribute”
condition then read: “The other person orders a bowl of full-fat chocolate ice cream. It is
your turn to order next. The two options that are left are low-fat chocolate ice cream and
full-fat vanilla ice cream.” Participants in the “healthiness and flavor are both socially
meaningful attributes” condition then read: “The other person orders a bowl of full-fat
green tea ice cream. It is your turn to order next. The two options that are left are low-fat
green tea ice cream and full-fat vanilla ice cream.” As stated earlier, flavor is socially
meaningful (used for social judgments) in this situation for two reasons. First, on July 4th,
there may be a social norm to choose an American flavor; thus, choosing an Asian flavor
(i.e., green tea) might represent deviation from the social norm, causing the Asian
consumer to potentially feel self-conscious. Second, the choice of green tea (an Asian
flavor) can also convey social identity information in this particular situation (Alba 1990;
Devine et al. 1999).

The same goal manipulation was used as in Study 2b. Participants were then
asked, “Which option would you order for yourself?” Thus, the dependent variable was whether participants chose to match on healthiness alone (by choosing the unhealthy option: full-fat vanilla ice cream) or on flavor alone (by choosing the healthy option: the low-fat version of the ice cream chosen by the indulging companion).

Participants then responded to a measure regarding making their companion self-conscious to tap into the notion that an affiliation goal leads participants to choose to match on healthiness (in the “healthiness is the only socially meaningful attribute” condition) due to the social judgments linked with healthiness. Specifically, participants responded to the statement: “I chose the [chosen option displayed] because I didn’t want the other person to feel self-conscious about their ice cream choice” (1 = not at all, 6 = very much so).

Participants also responded to a manipulation check verifying that in the “healthiness and flavor are both socially meaningful attributes” condition, people no longer viewed matching on healthiness as the better option for making the indulging consumer feel comfortable. Specifically, participants were asked, “Did you think the other person would feel more comfortable if you ordered low-fat [chocolate / green tea ice cream, depending on condition] or if you ordered full-fat vanilla ice cream?” (1 = Definitely low-fat [chocolate / green tea ice cream, depending on condition], 6 = Definitely full-fat vanilla ice cream).
3.2.3.2 Results and Discussion

Manipulation Check. Participants’ responses on whether they thought their companion would feel more comfortable if matched on flavor or on healthiness were analyzed using a 2 (health goal, health goal + affiliation goal) × 2 (healthiness is the only socially meaningful attribute, healthiness and flavor are both socially meaningful attributes) ANOVA. There was no main effect of goal condition \((F(1, 198) = 2.04, p = .155)\) and no interaction between goal condition and the social meaningfulness condition \((F(1, 198) = .10, p = .750)\). As expected, there was a main effect of the social meaningfulness condition \((F(1, 198) = 8.40, p = .004, \eta_p^2 = .04)\), such that participants were more likely to view matching on healthiness as better for making the other person feel comfortable in the condition in which healthiness was the only socially meaningful attribute \((M = 4.17)\) as opposed to the condition in which both healthiness and flavor were socially meaningful attributes \((M = 3.59)\). We also conducted one-sample \(t\)-tests (comparing to the midpoint of 3.5), which showed that when healthiness was the only socially meaningful attribute, people viewed matching on healthiness as better for making the other person feel comfortable than matching on flavor \((M = 4.17 \text{ vs. } 3.50 \text{ midpoint}; t(102) = 4.97, p < .001)\), whereas when healthiness and flavor were both socially meaningful attributes, people no longer viewed matching on healthiness as better than matching on flavor for making the other person feel comfortable \((M = 3.59 \text{ vs. } 3.50 \text{ midpoint}; t(98) = 0.57, p = .572)\).
Snack Choice. A 2 (health goal, health goal + affiliation goal) × 2 (healthiness is the only socially meaningful attribute, healthiness and flavor are both socially meaningful attributes) binary logistic regression on snack choice (unhealthy option, healthy option) revealed a significant interaction (B = -1.20, Wald $\chi^2(1) = 4.25$, $p = .039$, OR = .30). See Figure 7.

Figure 7: Choice of Unhealthy Option as a Function of Goal Condition and Socially Meaningful Attribute(s) (Study 3)

When healthiness was the only socially meaningful attribute, people were more likely to choose the unhealthy option when they had both a health goal and an affiliation goal (58.0%) than when they had a health goal alone (30.2%) (B = 1.16, Wald $\chi^2(1) = 7.86$, $p = .005$, OR = 3.19). In contrast, when both healthiness and flavor were both socially meaningful attributes, people were similarly likely to choose the unhealthy option when
they had both a health goal and an affiliation goal (42.0%) as when they had a health goal alone (42.9%; $B = -0.04$, Wald $\chi^2(1) = 0.01$, $p = .931$).

*Moderated Mediation Analysis.* We then tested the underlying mechanism through a moderated mediation analysis (Hayes 2013, PROCESS model 14). Specifically, we tested whether the desire to avoid making one’s indulging companion feel self-conscious mediated the relationship between goal condition and matching on healthiness when healthiness was the only socially meaningful attribute (but not when both healthiness and flavor were socially meaningful attributes). See Figure 8.

![Moderated Mediation Model (Study 3)](image)

**Figure 8: Moderated Mediation Model (Study 3)**

As expected, mediation occurred when healthiness was the only socially meaningful attribute (95% CI: [.7174, 1.9910]) but not when both healthiness and flavor were socially meaningful (95% CI: [-.2082, .5247]). An index of moderated mediation indicated that the indirect effects differed across social meaningfulness conditions (95%
CI: [0.5669, 1.8932]). Specifically, participants reported a greater motive to avoid making an indulging companion feel self-conscious when they had both a health goal and an affiliation goal ($M = 3.29$) versus when they had a health goal alone ($M = 1.75$; $t$-test not assuming equal variances: $t(169) = 6.26, p < .001$, Cohen’s $d = .88$), an effect that did not vary by the social meaningfulness condition ($F(1, 198) = .23, p = .631$). As Figure 6 shows, the motive to avoid making one’s indulging companion feel self-conscious was linked with increased choice of the unhealthy option when healthiness was the only socially meaningful attribute (significant, positive $b_{\text{healthiness-meaningful}}$, $B = .83$, Wald $\chi^2(1) = 26.26, p < .001$, OR = 2.28) but not when both healthiness and flavor were socially meaningful attributes (non-significant $b_{\text{healthiness-flavor-meaningful}}$, $B = .08$, Wald $\chi^2(1) = .59, p = .444$).

**Discussion.** Study 3 found further evidence that the social meaningfulness of an attribute (the tendency for that attribute to be used for social judgment) leads it to be important for matching on for affiliation purposes. This evidence took two forms. First, Study 3 showed that when flavor was also a socially meaningful attribute, then consumers also believed it important to match on flavor as well for affiliation. Second, Study 3’s mediation results built upon Study 1’s mediation results by indicating that in the common situation in which healthiness is the only socially meaningful attribute at play (not flavor as well), one reason that health and affiliation goals conflict is because of the desire to avoid making one’s indulging companion feel self-conscious. Thus, although other specific mediating pathways could also be at play, this link to self-
conscious feelings further points to the notion that healthiness matches are believed to be important for affiliation because healthiness is an attribute with strong social norms.

3.2.4 Study 4: Decreasing the Health and Affiliation Conflict By Attributing a Healthy Choice to a Constraint

In the studies thus far, we have taken the perspective of a consumer who has a health goal but is with an indulging companion. These studies have shown that such a consumer indeed perceives a health and affiliation conflict to occur when with an indulging companion. In the final two studies (Studies 4 and 5), our participant perspective shifts. Rather than examine the perspective of a consumer who has an indulging companion, we instead take the perspective of an indulging consumer and examine how much this indulging consumer likes their companion as a function of the companion’s food-related behavior. In examining liking as a function of the companion’s food-related behavior, we can examine whether there are ways in which a companion could choose healthy options while still being well liked by an indulging companion. If so, then such behaviors represent effective strategies that consumers who have both health goals and affiliation goals can use to mitigate the health versus affiliation conflict.

According to our proposed account, consumers believe healthiness mismatches to be detrimental to affiliation because healthiness is an attribute with strong social meaning, evoking strong social norms and judgments in terms of a person’s self-control.
(Liu et al. 2013; Lowe and Haws 2014), morality (Rozin 1996), and other characteristics, such as laziness and selfishness (Oakes and Slotterback 2004). This proposed account implies then that if a consumer attributes their healthy choice to a constraint that does not have anything to do with their own personal self-control, then they should still be liked by a companion who is indulging, despite the healthiness mismatch. Study 4 thus tests our prediction that attributing one’s healthy decision to a constraint allows one to still be liked by an indulging companion, despite the healthiness mismatch.

To test our hypothesis, Study 4 examines the perspective of consumers who have chosen to indulge, measuring how much they like another person as a function of whether the other person chose to indulge and whether the other person had a constraint that precluded indulging (in this case, a dietary restriction). We predicted that an indulging consumer would indeed like a companion more if they also indulged (vs. abstained from indulgence). More importantly, we predicted that this effect would be mitigated if the companion had a constraint that precluded indulging; in other words, we predicted that if the companion had a constraint that led to not indulging, then s/he would be liked more than if s/he did not have such a constraint and perhaps even as much as if s/he chose to indulge.
3.2.4.1 Method

*Participants and Design.* One hundred and thirty eight participants (66.7% female; $M_{age} = 25.88$) recruited from a business school’s paid lab participant pool completed this study as part of a bundled session of unrelated studies. This study had a 2 (matching on healthiness, mismatching on healthiness) × 2 (no constraint leading to healthy choice, constraint leading to healthy choice) group between-subjects design.

*Procedure.* To identify indulging participants for this study, participants in the bundled survey session were provided with a serving of 18 cheddar cheese crackers and asked to eat three crackers before answering some questions about the crackers. Among the questions they were asked was “Do you have any dietary allergies or restrictions (e.g., religious restrictions) that kept you from trying the cheese crackers?” After answering these cracker questions, participants were told that they could continue (but did not have) to eat the crackers for the rest of the study session and were asked whether they would continue eating the crackers or not (Yes or No). Participants were eligible for this study ($N = 138$) if they responded that they would continue eating the crackers, as this meant that they were taking the perspective of someone who had chosen to indulge.

These participants then filled out filler items (what is your favorite color and a measure of risk-taking likelihood (Blais and Weber 2006)), to strengthen our subsequent cover story about chatting with another participant. Specifically, after filling out these filler items, participants were told: “You are being paired with another participant today
to have a chat. Please wait as we pair you up and create a brief summary profile of the other participant you will chat with. This page will automatically advance once you are paired up and the summary profile has been created.” After a brief delay, participants were then shown a profile of their ostensible chat partner. See Figure 9 for profiles shown to participants. The chat profile shown to participants depended upon random assignment. All chat profiles contained the same filler information about their chat partner’s favorite color and risk-taking tendency. Importantly, we varied whether the chat partner planned to continue eating the cheddar crackers and whether the chat partner had dietary allergies or restrictions affecting their cheddar cracker consumption.

(a) Unhealthy Choice (Match on Healthiness) & No Constraint Leading to Healthy Choice

(b) Healthy Choice (Mismatch on Healthiness) & No Constraint Leading to Healthy Choice
(c) Healthy Choice (Mismatch on Healthiness) & Constraint Leading to Healthy Choice

Favorite color: Blue
Risk-taking tendency: Medium (score = 4.2 out of 7)
Cheddar crackers: Will not continue eating them for rest of today’s study session
Dietary allergies or restrictions affecting cheddar crackers consumption: No

(d) Unhealthy Choice (Match on Healthiness) & Constraint Leading to Healthy Choice

Favorite color: Blue
Risk-taking tendency: Medium (score = 4.2 out of 7)
Cheddar crackers: Will not continue eating them for rest of today’s study session
Dietary allergies or restrictions affecting cheddar crackers consumption: Yes
Note. The three focal conditions were (a), (b), and (c). The fourth condition, (d), was not focal for this study but was included for completeness of the $2 \times 2$ design.

**Figure 9: Chat Partner Profiles Viewed by Indulging Participants (Study 4)**

Participants were then asked to indicate how much they liked the other person (“I like this person”; 1 = *not at all*, 9 = *very much*), as liking has been used as a measure of affiliation in prior research (Lakin and Chartrand 2003; Lowe and Haws 2014). They were told that after answering this question, they would begin the chat with their partner but in actuality, after answering this question, they were informed that they would not be chatting with their partner in order to save time during today’s study session.

### 3.2.4.2 Results and Discussion

**Results.** A 2 (matching on healthiness, mismatching on healthiness) × 2 (no constraint leading to healthy choice, constraint leading to healthy choice) ANOVA on liking revealed a significant interaction ($F(1, 134) = 6.04, p = .015, \eta^2_p = .04$). See Figure 10.
Figure 10: Indulging Participants’ Liking of a Companion, as a Function of the Companion’s Food Choice and the Presence of a Constraint Leading to a Healthy Food Choice (Study 4)

We then conducted several follow-up contrast tests. First, as predicted, in the absence of any constraint to make a healthy choice, indulging participants indeed liked their chat partner more if they thought that their chat partner also chose to indulge rather than making a healthy choice ($M = 5.77$ vs. $M = 4.93$, $p = .006$, $d = .79$). Second, and more importantly, this effect was mitigated when their chat partner had a constraint to make a healthy choice. Indulging participants liked their chat partner more if their partner chose to make a healthy choice but had a constraint to do so versus not having a constraint to do so ($M = 5.56$ vs. $M = 4.93$, $p = .043$, $d = .51$). Indeed, indulging

Note. Figure 10 depicts standard errors of the means.
participants liked their chat partner as much, whether their chat partner chose to indulge or chose to make a healthy choice but had a constraint to do so ($M = 5.77$ vs. $M = 5.56$, $p = .448$). Although not a focal comparison, we also found that when one’s chat partner had a constraint to make a healthy choice, there was no significant difference between liking of a chat partner who had indulged versus made a healthy choice ($M = 5.37$ vs. $M = 5.56$, $p = .524$).

Discussion. Study 4 found support for hypothesis 2, showing that having a constraint requiring choice of a healthy option allows one to still be liked by an indulging companion, despite the healthiness mismatch. From a theoretical perspective, this finding is noteworthy because it suggests a boundary condition to the consistent finding that matching—especially on healthiness—always leads to greater affiliation than mismatching (Hove and Risen 2009; Lakin and Chartrand 2003; Lowe and Haws 2014). Additionally, whereas prior research examining attributions of healthy choices to constraints has identified personal consequences of doing so (Patrick and Hagtvedt 2012), Study 4 identifies a social benefit of doing so. Finally, from a practical perspective, this finding is reassuring for consumers who have constraints for engaging in healthy eating, indicating that attributing healthy eating to a constraint can allow such consumers to simultaneously engage in healthy eating while affiliating with indulging companions.
3.2.5 Study 5: Decreasing the Health and Affiliation Conflict By Sharing for a Non-Health Reason

In Study 5, we test the effectiveness of another strategy for mitigating the conflict between choosing a healthy option and affiliation with an indulging companion. Drawing from the literature showing that sharing is strongly linked with social connection (Belk 2010; Miller et al. 1998), we propose that offering to share a healthy option with an indulging companion can help to mitigate this conflict. Importantly, however, we propose that sharing will only be an effective affiliation strategy if sharing is attributed to a non-health reason, such as the desire to provide variety. If an offer to share is attributed to a health reason, then we propose that sharing would only serve to highlight the healthiness mismatch between the two consumers and thus would not be an effective affiliation strategy.

As in Study 4, Study 5 examined the perspective of indulging participants. Accordingly, we measured how much indulging participants liked a companion, depending on whether and if so, why, the companion offered to share their healthy choice with the indulging participant. Study 5 had five conditions in a one-way design: companion matches on healthiness (i.e., also indulges), companion mismatches on healthiness (i.e., chooses healthy), companion mismatches on healthiness but offers to share for healthiness reason, companion mismatches on healthiness but offers to share for variety reason, and companion mismatches on healthiness but offers to share
without a specified reason. The first two conditions served to replicate the basic effect also found in Study 4 that indulging participants indeed like a companion more if the companion also indulges versus if the companion chooses a healthy option. These first two conditions then served as baseline conditions that we used to gauge the relative effectiveness of the three different sharing conditions. We predicted that offering to share for a variety reason would be a more effective sharing strategy than offering to share for a health reason. We also included a sharing condition in which the reason for sharing was left unspecified to provide insight into consumers’ default inferences about others’ reasons for sharing.

3.2.5.1 Method

Participants and Design. Two hundred participants (52.5% female; $M_{age} = 34.11$) from MTurk completed this study, which had a 5 (matching on healthiness, mismatching on healthiness, mismatching on healthiness but offering to share for healthiness’s sake, mismatching on healthiness but offering to share for variety’s sake, mismatching on healthiness but offering to share for an unspecified reason) group between-subjects design.

Procedure. All participants read the following: “Imagine that you and another person are at a small café in the afternoon. This is your first time meeting this person. An acquaintance of yours was supposed to take this person, a distant cousin, to get dessert
but had to work at the last minute and asked you to take this person to get dessert instead. You both look at the dessert display. Imagine that you select apple pie for yourself.” Thus, all participants were asked to take on the perspective of someone who had chosen to indulge.

Participants were then told either that the other person ordered fruit cheesecake (matching on healthiness condition) or that the other person ordered fruit (mismatching on healthiness conditions). Participants in the offering to share for health’s sake group were additionally told that the other person offered to share some of their order by saying, “Feel free to have some of my fruit if you want something healthy.” Participants in the offering to share for variety’s sake group were additionally told that the other person offered to share some of their order by saying, “Feel free to have some of my fruit if you want some variety.” Participants in the offering to share group in which no reason was specified were additionally told that the other person offered to share some of their order by saying, “Feel free to have some of my fruit.”

Participants were then asked how much they would like the other person (“I would like this person”; 1 = not at all, 9 = very much). Finally, participants in the three sharing conditions were asked to indicate which reason they believed better explained why the other person was offering to share (answer options: “in case I wanted some variety” or “in case I wanted something healthy”).
3.2.5.2 Results and Discussion

Manipulation Check. First, we conducted a manipulation check of the two sharing conditions in which a reason for sharing was explicitly specified. The manipulation check was successful: 73.0% of participants in the sharing for variety’s sake condition thought the other person was offering to share in case the participant wanted variety, whereas only 23.7% thought so in the sharing for health’s sake condition ($\chi^2(1) = 18.25, p < .001$). In the sharing condition in which no reason for sharing was explicitly specified, most participants believed that the companion was offering to share to provide them with variety (77.3%).

Results. A one-way ANOVA on liking was significant ($F(4, 195) = 6.52, p < .001, \eta_p^2 = .12$). See Figure 11.
Note. Figure 11 depicts standard errors of the means.

Figure 11: Indulging Participants’ Liking of a Companion, Depending on Companion’s Behavior (Study 5)

We then conducted our focal planned contrasts. First, we found that matching on healthiness led to being marginally significantly more liked than mismatching on healthiness ($M = 6.45$ vs. $M = 5.77$, $p = .061$, $d = .53$). We then examined the effectiveness of the three different sharing manipulations at increasing affiliation with the indulging participants by comparing each sharing condition to the two non-sharing conditions. First, we examined the sharing condition in which it was explicitly specified that the sharing was for health’s sake. Mismatching on healthiness but offering to share for health’s sake ($M = 5.00$) led to significantly lower liking than mismatching on healthiness ($M = 5.77$) ($p = .040$, $d = .44$) and than matching on healthiness ($M = 6.45$) ($p < .001$, $d = .80$). We then examined the sharing condition in which it was explicitly specified that the sharing was for variety’s sake. As predicted, mismatching on healthiness but offering to share for variety’s sake ($M = 6.68$) led to significantly higher liking than mismatching on healthiness ($M = 5.77$) ($p = .016$, $d = .67$) and similar liking as matching on healthiness ($M = 6.45$) ($p = .545$). Finally, examining the offer to share condition in which no reason for sharing was specified, we found that offering to share ($M = 6.32$) led to directionally (although non-significantly) higher liking than mismatching on healthiness without offering to share ($M = 5.77$) ($p = .128$) and similar liking as matching on healthiness ($M = 
Discussion. Study 5 demonstrates that offering to share can effectively decrease the conflict between healthy eating and affiliation with an indulging consumer, but only if the offer to share is attributed to a reason other than healthiness—in this case, variety. These findings also further emphasize the social consequences of healthiness mismatches. Indeed, whereas past research indicates that consumers often choose on their own to address competing indulgence and self-control goals within a single eating occasion (Dhar and Simonson 1999; Liu et al. 2015), Study 5 suggests that indulging consumers may be reactant to others’ offers to help them simultaneously address a health goal.

3.3 General Discussion

Whereas much prior research has focused on the conflict between a health goal and a taste goal, we instead focused on the conflict between a health goal and a social goal. The first set of studies found that consumers believe that making healthy food choices conflicts with affiliation with an indulging dining companion (Studies 1-3) and that this belief stems from healthiness being an attribute that conveys considerable social meaning (Studies 1, 3). Evidence of this conflict was provided both in terms of consumers’ beliefs (Study 1) and their choices (Studies 2, 3). In terms of consumers’ beliefs, we found that consumers believe that there are affiliation consequences of
mismatching an indulging companion on healthiness but not of mismatching on flavor (Study 1). In terms of consumers’ choices, we found that when there was a strong affiliation goal, having both an affiliation goal and a health goal (vs. a health goal alone) could lead to unhealthier food choices (Studies 2a-2b), further indicating that an affiliation goal is in conflict with a health goal in this context. Additionally, we found both mediation (Studies 1, 3) and moderation evidence (Study 3) that one reason why healthiness mismatching is believed to be particularly negative for affiliation with an indulging companion is because healthiness is a socially meaningful attribute that forms the basis for various social judgments. As a result, mismatching is perceived to make the indulging consumer feel self-conscious or uncomfortable.

The second set of studies showed that the decrease in liking caused by choosing a healthy option (vs. an unhealthy option) when with an indulging companion can be eliminated via two different strategies (Studies 4-5). The first strategy is to attribute choice of a healthy option to a constraint, thereby mitigating the social judgments that can be formed based on the healthiness of one’s choice (Study 4). The second strategy is to offer to share one’s healthy option with an indulging companion but to attribute the sharing offer to the desire to provide variety, not healthiness (Study 5).

3.3.1 Theoretical Contributions

This research offers several theoretical contributions. First, prior research on
conflict between healthy eating and a pleasurable eating experience has nearly exclusively focused on conflict between healthy eating and a food-derived source of pleasure—taste (Dhar and Simonson 1999; Etkin et al. 2015; Fishbach et al. 2003; Laran 2010; Liu et al. 2015; Raghunathan et al. 2006; Shiv and Fedorikhin 1999; Stroebe et al. 2013; Wilcox et al. 2009). The current research focuses on the understudied conflict between making healthy food choices and a socially-derived source of pleasure: being liked by indulging companions. Indeed, although some prior research has examined the indulging consumer’s perspective and shown that people like others more when they make a more unhealthy food choice versus a less healthy food choice (Leone et al. 2008), the only prior research that we are aware of which examines the perspective of people interacting with indulging consumers is either correlational (Exline et al. 2012), or does not involve social affiliation processes but rather involves the extent to which simply observing another consumer’s consumption quantity affects one’s own consumption quantity (McFerran et al. 2010). Thus, our research is the first that we are aware of to provide causal evidence that a goal to affiliate with an indulging consumer is believed by consumers to conflict with a health goal and can push consumers to neglect health goals and choose more unhealthy choices for themselves (Studies 1-3). Thus, this research identifies a new motivator for indulging, contributing to an emerging area of research examining social influences that contribute to indulgence (Cavanaugh 2014; Dzhogleva and Lamberton 2014; McFerran et al. 2010). This research may also relate to a
large body of work on warmth and competence, which are theorized to be the two primary social dimensions on which people evaluate others (Fiske, Cuddy, and Glick 2007). If pursuing a health goal can be considered a demonstration of competence (in the self-control context), whereas pursuing an affiliation goal can be considered a demonstration of warmth, then the present research shows a case in which people may be willing to trade-off how competent they appear in order to appear warmer. This finding would be consistent with the notion that warmth is considered the more primary dimension for social evaluation, affecting evaluators’ behavioral and affective reactions to a greater extent (Fiske et al. 2007).

Second, this research is the first that we are aware of to show whether and, if so, why an affiliation goal leads people to prioritize matching on one attribute over another. Past literature shows that an affiliation goal leads people to engage in similar behaviors and to express similar product preferences as consumers they want to affiliate with (Exline et al. 2012; Lakin and Chartrand 2003; Mead et al. 2011). However, to our knowledge, prior research has not examined whether people believe similarity along some attributes matters more for affiliation than similarity along other attributes. Furthermore, we found evidence that the reason why healthiness matching is prioritized is at least in part because healthiness conveys social meaning, affecting various social judgments (Studies 1, 3). This research thus bears some analogy to research by Chan, Berger, and van Boven (2012), who examined social group identification motives and
uniqueness motives. They showed that people believe similarity in terms of brands is better for demonstrating one’s social group identity, whereas colors are better for demonstrating one’s uniqueness (Chan et al. 2012). If we draw an analogy between a goal to be liked (i.e., an affiliation goal) and a goal to demonstrate one’s social group identity, then the healthiness of one’s choice may function somewhat like the brand one chooses, whereas flavor may be somewhat more analogous to color.

Third, we identified two strategies to mitigate this conflict, such that mismatching on healthiness can still lead to affiliation with an indulging companion. Specifically, we build on our notion that healthiness mismatches are particularly detrimental to affiliation because making a healthy choice has social meaning, affecting social judgments (e.g., conveying perceptions of having high personal willpower; Lowe and Haws 2014; Oakes and Slotterback 2004; Rozin 1996). We first tested whether a strategy of attributing a healthy choice to a constraint can mitigate the health versus affiliation conflict, such that indulgers like someone who is engaging in healthy behavior just as much as they would like a fellow indulger (Study 4). By showing that attribution of a healthy choice to a constraint can have social benefits for one’s interactions with indulgers, this finding provides a key differentiation from past work examining attributions for healthy choices (Patrick and Hagtvedt 2012). This past work has focused on consequences of attributions about one’s healthy choices for one’s own personal health goals, finding that attributing a healthy choice to a restriction (“I can’t”) rather
than an internal willpower reason (“I don’t”) was detrimental for one’s personal health
goal pursuit (Patrick and Hagtvedt 2012). Putting their findings together with ours, it
appears that attributing a healthy choice to an “I can’t” reason may be detrimental for
one’s personal health goals (Patrick and Hagtvedt 2012), but may be beneficial for one’s
social goals (the present research). Second, building on past literature on the link
between sharing and social connection (Belk 2010; Miller et al. 1998)—and on our
finding that mismatches on healthiness are particularly detrimental to affiliation—we
tested a second strategy: choosing a healthy option but offering to sharing with an
indulging companion for a non-healthiness reason (Study 5). Study 5 finds that offering
to share only decreases the conflict between healthy eating and affiliation with an
indulging consumer if the offer to share is attributed to a reason other than healthiness.
Thus, we identify an important boundary condition for the usual positive relationship
between sharing and social connection (Belk 2010; Miller et al. 1998) while also further
emphasizing the social consequences of healthiness mismatches. Indeed, although past
research indicates that consumers often choose on their own to address health and
indulgence goals within a single eating occasion (Dhar and Simonson 1999; Liu et al.
2015), our findings suggest that indulging consumers do not always appreciate others
offering to help them address both health and indulgence goals. In sum, the third
contribution of the present research is in being the first that we are aware of to show that
mismatching on healthiness can lead to as much affiliation as matching by identifying
two strategies resulting in such an effect. Indeed, other than the finding that consumers high in need for uniqueness react negatively when matched on choice of a symbolic self-expression product (White and Argo 2011), these findings are the first that we are aware of to show that mismatching product choices can lead to as much affiliation as matching ones.

3.3.2 Practical Implications

The present research offers several practical implications for consumers and other parties interested in promoting healthy eating. First, many consumers may want to eat healthier without decreasing affiliation with indulging dining companions (Macdiarmid et al. 2013). This research offers two strategies for such consumers (attributing the choice of a healthy option to a restriction or offering to share one’s healthy selection for variety’s sake). Our research shows both strategies to be effective at decreasing the conflict between healthy eating and affiliating with an indulging companion.

Second, parties that are interested in promoting healthy eating (e.g., doctors, nutritionists, policymakers, and some food industry members) should be aware of social barriers that contribute to unhealthy food choices or make choosing healthy foods more difficult. They should then address these barriers when providing advice or designing menus, policies, and advertising aimed at promoting healthy eating. For instance,
doctors and nutritionists coaching obese patients may equip them with strategies (e.g., offering to share for variety’s sake) for choosing healthier foods without decreasing affiliation with indulging companions. As another example, many food retailers are seeking ways to promote healthier options (Chandon and Wansink 2012; Wansink 2012). To help make healthy eating compatible with fitting in socially, these firms might offer easily shareable healthy options and encourage customers to share healthy food through promotions highlighting the variety in flavors that sharing can provide.

### 3.3.3 Potential Limitations and Future Directions

These implications, and the limitations in this research, offer multiple directions for future research. First, this research focused on affiliation in dyadic food contexts, given that the food context is an important consumption domain in which many consumers report facing social barriers to self-control goals (Macdiarmid et al. 2013) and because a dyad is the most basic social unit to examine. However, future research may examine to what extent these findings extend to other self-control domains and to group settings. For instance, in terms of extending to other self-control domains, might trying to save money by choosing more affordable goods conflict with affiliating with a high-spending consumer and, if so, could conceptually similar strategies (e.g., attributing saving money to a financial restriction or offering to share an affordable good for a reason other than encouraging frugality) be used to decrease this conflict? Or, in terms
of extending to large group settings (Ariely and Levav 2000), do consumers feel less responsibility for making an indulging companion feel comfortable in large groups because of diffusion of responsibility? Finally, we focused on healthiness and flavor as examples of attributes that vary in terms of how socially meaningful they typically are. Our rationale for focusing on healthiness is clear, given our focus on identifying and overcoming social barriers to healthy eating, and we also focused on flavor, as it is another prominent feature of foods (Inman 2001). However, foods differ on other attributes besides healthiness and flavor, such as ethicality and price. Future research may thus examine whether matching on these other attributes is important for affiliation and to what extent those attributes map onto the socially meaningfulness aspect. For instance, purchasing ethical versus conventional foods has recently been shown to strongly affect social judgments (Olson et al. 2016), suggesting that ethicality may be another socially meaningful dimension.

Second, we focused on a benevolent, other-focused reason for matching an indulging companion: avoiding making that companion feel self-conscious (Studies 1, 3). One reason why we examined the motive to avoid making others feel self-conscious is because self-conscious feelings are a key marker for whether an attribute is indeed socially meaningful (James 2000; Leary 2007; Pechmann et al. 2005; Thompson and Hirschman 1995). Thus, we were able to test our hypothesis that the social meaningfulness of healthiness is one reason why people believe matching on it is
important for liking and making others feel comfortable. However, self-focused reasons may also be at play simultaneously (Batson and Shaw 1991). For instance, consumers might believe that acquiescing on their health goals to match indulging companions could also allow them to derive positive emotional benefits or image benefits (e.g., the appearance of being less selfish). Additionally, although outside the scope of the present research, future work might consider less benevolent social goals that could drive matching or mismatching of indulging companions, such as the desire to signal social status (Dubois, Rucker, and Galinsky 2012).

Finally, we focused on considering affiliation in the context of first-time encounters between consumers, with the potential exception of the correlational pilot field study in which the relationship between consumers was unspecified. This look at initial liking between strangers is highly consistent with much research on interpersonal attraction (Berg and Clark 1986) and is also representative of many important encounters we often have in which affiliation goals can be quite strong (e.g., meeting new acquaintances, school and job interviews). Additionally, examining such initial impressions might be important for understanding closer relationships to the extent that people may come to decisions about the nature of relationships fairly early on (Berg and Clark 1986). Nonetheless, future research may also consider long-standing relationships. For instance, it is possible that in long-standing relationships, consumers have much more information about their companions, which can buffer the affiliation consequences
of a particular dining occasion. Consumers may also already have come to terms with their relationship partners’ consumption choices (or have already chosen relationship partners whose consumption choices they feel comfortable with), such that personal health goals conflict to a lesser extent with their affiliation with such relationship partners. Finally, besides considering long-standing relationships, future research might also consider how varying characteristics of one’s indulging companion (e.g., obesity level; Liu et al. 2013; McFerran et al. 2010) could alter the strength of the conflict between a health goal and an affiliation goal.
4. Conclusion: A Multiple Goal Perspective on Eating Behavior

Across the two essays in this dissertation, I took a multiple goal perspective on eating behavior and focused on the conflict that arises between healthy eating and a pleasurable eating experience. I distinguished between two potential sources of pleasure in eating experiences—pleasure from the taste of food itself (Essay 1: “Vice-Virtue Bundles”) and pleasure from affiliating with one’s dining companions (Essay 2: “Eat, Drink, and Be Merry? Decreasing Conflict Between Healthy Food Choices and Affiliation with Indulging Companions”). I then examined ways to decrease the conflict between healthy eating and tastiness (Essay 1) and healthy eating and affiliation (Essay 2). Specifically, I found that vice-virtue bundles are a way to decrease conflict between healthy eating and tastiness (Essay 1) and that attributing one’s healthy choice to a constraint or offering to share one’s healthy selection for a non-health reason are ways to decrease conflict between healthy eating and affiliating with an indulging companion (Essay 2).

Research on decreasing conflict between healthy eating and eating enjoyment can clearly make practical contributions by suggesting better ways to encourage healthier eating. The research also makes important theoretical contributions. First, Essay 1 demonstrates an important boundary condition for the unhealthy equals tasty intuition (Raghunathan et al. 2006), showing that it weakens when evaluating
combinations of vices and virtues. Additionally, Essay 1 differentiates between three consumer segments (vice lovers, virtue acceptors, and virtue lovers), which exhibit different perceptions of the tastiness of food options and different preferences among food options. Essay 2 offers three theoretical contributions. First, Essay 2 contributes to the eating behavior literature by providing a more comprehensive picture of sources of conflict with healthy eating. Specifically, conflicts arise not only from characteristics of food, but also from the social context. Second, whereas prior research has shown that an affiliation goal leads consumers to behave more similarly to those they want to affiliate with (Lakin and Chartrand 2003; Mead et al. 2011), Essay 2 shows that not all dimensions are created equal for affiliation. Specifically, a goal to affiliate leads consumers to prioritize similarity on socially meaningful attributes—in the food context, healthiness over flavor. Finally, prior research indicates that similarity in behaviors promotes affiliation more than dissimilarity (Chartrand and Bargh 1999; Hove and Risen 2009; Lowe and Haws 2014). However, drawing from our proposal that healthiness mismatches lead to disaffiliation because healthiness is an attribute used for social judgment, Essay 2 identified two strategies that can lead mismatching an indulging companion on healthiness to lead to as much affiliation as matching on healthiness. The first strategy is to attribute healthy choices to a constraint (e.g., a dietary restriction), and the second strategy is to offer to share one’s healthy selection—but only for a non-health reason. Essay 2 thus also contributes by examining social consequences of attributing
healthy choices to constraints, whereas past research has focused on the personal consequences (Patrick and Hagtvedt 2012), and by demonstrating a boundary condition to the consistently positive relationship between sharing and social connection (Belk 2010; Miller et al. 1998).

This perspective on a) establishing conflict between healthy eating and aspects of a pleasurable eating experience and b) decreasing this conflict can be extended in multiple directions in future research. Next, I discuss some potential future directions.

4.1 Future Directions: When Affiliation and Healthy Eating Conflict Due to Identity-Inconsistency of Healthy Eating

One direction for future research is to focus on other ways in which affiliation and healthy eating conflict. Whereas Essay 2 focused on how healthy eating and affiliation conflict when one’s dining companion indulges, another case in which healthy eating and affiliation may often conflict is when eating healthy food is incompatible with one’s in-group image. This conflict is particularly likely to exist for racial-ethnic minorities in the United States and for men. That is, many low socioeconomic status racial-ethnic minorities in the United States view healthy behaviors as the domain of white, middle-class people (Oyserman, Fryberg, and Yoder 2007). Similarly, healthy eating behavior is viewed as less masculine (Bock and Kanarek 1995; Rozin et al. 2012; White and Dahl 2006), and men are often embarrassed to admit to having a healthy eating goal (Ajmera 2014). This inconsistency between healthy behavior and one’s in-
group image can be demotivating (Oyserman et al. 2007), and healthy eating efforts can
be met with social exclusion threats and reduced enjoyment of the social eating
experience (Peters, Aroian, and Flack 2006). Indeed, African Americans have noted that
healthy eating could lead to the insulting accusation of “acting white” (Peters et al.
2006), and men have reported secretly engaging in healthy eating to avoid social
judgment (Ajmera 2014).

Therefore, much opportunity exists for examining ways to decrease the identity-
inconsistency of healthy eating for racial-ethnic minorities and for men. One way might
be to re-name menu items to be more identity-consistent (e.g., baked Southern-style
chicken vs. baked chicken). Another way, related to the vice-virtue bundles idea
explored in Essay 1, might be to dilute healthy food signals by promoting combos
bundling together a small proportion of an identity-consistent unhealthy option with a
large proportion of identity-inconsistent healthy options (e.g., a piece of Southern fried
chicken with two healthy vegetable sides). By consuming such combos, African
American or male consumers might be less susceptible to criticisms that they are “acting
white” or “eating like a girl” than if they wholly abandoned identity-consistent
unhealthy options.

4.2 Future Directions: When Healthy Eating Conflicts With
Conservation of Resources (E.g., Time and Money)

A second direction for future research is to consider other goals, besides having
an enjoyable eating experience, that interfere with healthy eating. For instance, the goal to conserve resources (e.g., time or money) may often conflict with a healthy eating goal (Haws and Winterich 2013). Indeed, healthy foods are typically considered to be more expensive and less convenient than unhealthy foods (Drewnowski and Darmon 2005; Drewnowski and Specter 2004).

In this context of conflicts involving resource constraints, Fernbach, Kan, and Lynch (2015) differentiate between “priority planning” (sacrificing less important goals to conserve resources) and “efficiency planning” (stretching resources). These two approaches might be considered versions of a goal prioritization approach and a decreasing goal conflict approach—versions that are specific to contexts involving resource constraints. Future research could thus identify ways to increase the resource “efficiency” of healthy eating (i.e., making healthy eating cheaper and more convenient).

4.3 Future Directions: Single Options that Can Address Two Conflicting Goals

A third direction for future research is to better understand single options that can simultaneously address two conflicting goals (Pocheptsova, Petersen, and Etkin 2015). For instance, does exposure to a single option that can simultaneously address two conflicting goals (e.g., vice-virtue bundles) decrease perceived conflict? Is a single option that can simultaneously address two conflicting goals categorized as addressing both goals or might motivated categorization processes (Poynor and Haws 2009) lead it
to be categorized as primarily addressing one goal? Answers to these questions may improve our understanding of sequential decisions in multiple goal contexts with conflicting goals (Fishbach and Dhar 2005).

4.4 Future Directions: A Goal Prioritization Strategy and a Decreasing Goal Conflict Strategy

Finally, although I focused on strategies for decreasing goal conflict, a common alternative way that people naturally address two conflicting goals is to prioritize one goal over the other. A better understanding of factors that lead consumers to prioritize one goal over another is important (Dzhogleva and Lamberton 2014), as is an understanding of consequences of pursuing one goal at another’s expense. For instance, when does success at one goal lead to ignoring the accompanying failure on another goal? One possibility is that if the prioritized goal is positioned as justified (such that one should not feel guilt for pursuing it), then consumers will ignore failure on the other goal. For instance, if consumers were encouraged to view an eating enjoyment goal as justified, then they may ignore the accompanying failure on a health goal. Examining such possibilities can provide contributions to the literature on conflicting goal pursuit while also informing policymakers about levers that influence the effectiveness of health promotion initiatives.
4.5 Final Concluding Remarks on A Multiple Goal Perspective on Eating Behavior

While much evidence has established that healthy eating is perceived to conflict with pleasure derived from the taste of food, research on ways to decrease this conflict is relatively scarce, as is research on other sources of pleasure within the eating experience. This dissertation presents the perspective that (a) multiple elements of having an enjoyable eating experience can conflict with healthy eating and that (b) this conflict can be addressed through solutions and strategies that make healthy eating compatible with having an enjoyable eating experience. Essay 1 identified vice-virtue bundles that consist of large proportions of healthy food and small proportions of unhealthy— but tastier— food as a solution to the conflict between health and taste. Essay 2 identified attribution of a healthy choice to a constraint and offering to share a healthy option for variety’s sake as solutions to the conflict between health and affiliation with indulging dining companions. Overall, this perspective can provide a richer theoretical understanding of influences on eating behavior and consequences of eating behavior while also having practical implications for better understanding how to encourage healthier eating.
### Appendix A: Additional Table and Figures for Essay 1

**Table A1.** Constructed Numeric Example for Weighted Sum Model of Choice Among Vice-Virtue Bundles for Virtue Acceptors If They Differed from Vice Lovers Because of Heightened Effectiveness of Virtue at Meeting Taste Goal (Rather Than Heightened Importance of Health Goal over Taste Goal)

<table>
<thead>
<tr>
<th>Segment 2: Virtue-Acceptors</th>
<th>Pure Virtue</th>
<th>¼-Vice</th>
<th>½-Vice</th>
<th>¾-Vice</th>
<th>Total Utility of Each Option (a<em>b) + (c</em>d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select pure virtue in the absence of vice-virtue bundles, based on viewing pure virtue as slightly addressing a taste goal.</td>
<td>10</td>
<td>33</td>
<td>38</td>
<td>40</td>
<td>23.50</td>
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</tbody>
</table>

**Note.** To interpret this table, the notes for Table 1 also apply. This table presents an alternative constructed numeric example for virtue acceptors if virtue acceptors were to differ from vice lovers because they believe that pure virtue could be somewhat effective at meeting a taste goal rather than because they prioritize a health goal over a taste goal (as was the case in numeric example 2 in Table 1). In this example in this table, we assume that a virtue acceptor places greater importance on addressing a taste goal than a health goal, like a vice lover (see numeric example 1 in Table 1). However, rather than use the same tastiness function as in the vice lover example, we assume that the tastiness function for virtue acceptors is shifted relative to that of vice lovers—virtue acceptors feel that a pure virtue can meet a taste goal better than do vice lovers. As this table shows, the more effectively an individual believes that a virtue can meet a taste goal, the greater the preference for an option with a somewhat lower vice proportion. Indeed, like numeric example 2 in Table 1, this example in Appendix A leads to the same prediction that virtue acceptors are likely to prefer a vice-virtue bundle with a lower proportion of vice than vice lovers prefer (e.g., a ¼-vice option rather than a ½-vice option). Thus, either reason for differentiating virtue acceptors from vice lovers (differences in goal importance or differences in perceived effectiveness of pure virtue at addressing a taste goal) can lead to the same choice prediction for virtue acceptors, and in reality, both reasons may operate.
**Figure A1. Study Stimuli**

<table>
<thead>
<tr>
<th>Menu</th>
<th>Study</th>
<th>Pure Virtue or Vice A</th>
<th>(\frac{1}{4}) Vice or Vice B</th>
<th>(\frac{1}{2}) Vice or Vice B</th>
<th>(\frac{3}{4}) Vice or Vice B</th>
<th>Pure Vice or Vice B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Carrots and Potato Chips</td>
<td>1</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>Apple Slices and Oreo Cookies</td>
<td>2</td>
<td><img src="image6.png" alt="Image" /></td>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
<td><img src="image9.png" alt="Image" /></td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
<tr>
<td>Salad and Fries</td>
<td>3 and 4</td>
<td><img src="image11.png" alt="Image" /></td>
<td><img src="image12.png" alt="Image" /></td>
<td><img src="image13.png" alt="Image" /></td>
<td><img src="image14.png" alt="Image" /></td>
<td><img src="image15.png" alt="Image" /></td>
</tr>
<tr>
<td>Macaroni &amp; Cheese and Fries</td>
<td>4</td>
<td><img src="image16.png" alt="Image" /></td>
<td><img src="image17.png" alt="Image" /></td>
<td><img src="image18.png" alt="Image" /></td>
<td><img src="image19.png" alt="Image" /></td>
<td><img src="image20.png" alt="Image" /></td>
</tr>
</tbody>
</table>

**Figure A2. Calories and Contents of Study Stimuli**

<table>
<thead>
<tr>
<th>Menu</th>
<th>Study</th>
<th>Pure Virtue or Vice A</th>
<th>(\frac{1}{4}) Vice or Vice B</th>
<th>(\frac{1}{2}) Vice or Vice B</th>
<th>(\frac{3}{4}) Vice or Vice B</th>
<th>Pure Vice or Vice B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Carrots and Potato Chips</td>
<td>1</td>
<td>Calories: 33 Contents: 12 baby carrots (91 g.)</td>
<td>Calories: 68 Contents: 9 baby carrots (63 g.), potato chips (8 g.)</td>
<td>Calories: 96 Contents: 6 baby carrots (45 g.), potato chips (14 g.)</td>
<td>Calories: 130 Contents: 3 baby carrots (27 g.), potato chips (21 g.)</td>
<td>Calories: 160 Contents: potato chips (28 g.)</td>
</tr>
<tr>
<td>Apple Slices and Oreo Cookies</td>
<td>2</td>
<td>Calories: 36 Contents: 4 apple slices (69 g.)</td>
<td>Calories: 80 Contents: 3 apple slices (52 g.), 1 Oreo cookie (11 g.)</td>
<td>Calories: 125 Contents: 2 apple slices (35 g.), 2 Oreo cookies (23 g.)</td>
<td>Calories: 169 Contents: 1 apple slice (17 g.), 3 Oreo cookies (34 g.)</td>
<td>Calories: 213 Contents: 4 Oreo cookies (45 g.)</td>
</tr>
<tr>
<td>Salad and Fries</td>
<td>3 and 4</td>
<td>Calories: 14 Contents: lettuce mix (30 g.), 4 tomato slices (38 g.)</td>
<td>Calories: 91 Contents: lettuce mix (22 g.), 3 tomato slices (25 g.), fries (25 g.)</td>
<td>Calories: 169 Contents: lettuce mix (15 g.), 2 tomato slices (18 g.), fries (50 g.)</td>
<td>Calories: 247 Contents: lettuce mix (8 g.), 1 tomato slice (10 g.), fries (75 g.)</td>
<td>Calories: 325 Contents: fries (100 g.)</td>
</tr>
<tr>
<td>Macaroni &amp; Cheese and Fries</td>
<td>4</td>
<td>Calories: 400 Contents: macaroni &amp; cheese (250 g.)</td>
<td>Calories: 377 Contents: macaroni &amp; cheese (187 g.), fries (24 g.)</td>
<td>Calories: 359 Contents: macaroni &amp; cheese (125 g.), fries (49 g.)</td>
<td>Calories: 346 Contents: macaroni &amp; cheese (62 g.), fries (76 g.)</td>
<td>Calories: 325 Contents: fries (100 g.)</td>
</tr>
</tbody>
</table>

**Note:** For the sets of stimuli other than the apple slices and Oreo cookies stimuli set, the calories in this figure were calculated based upon the actual grams of each food depicted in the photographs in Figure A1. For the apple slices and Oreo cookies stimuli set, the calories in this table were calculated based upon the following approximations: one apple slice weighs approximately 17.31 grams and has 9 calories (fatsecret.com); one Oreo cookie weighs approximately 11.33 grams and has 33.33 calories (caloriecount.com).
Appendix B: Information for Essay 1’s Footnotes

Appendix B contains additional information regarding footnotes 7, 12, 13, 15, and 20 in Essay 1.

**Footnote 7 (Study 1):** “The choice patterns observed are largely robust to including the six participants who observed another participant’s snack choice.”

Adding the six participants who observed another participant’s snack choice results in a total sample of 68 participants (n = 37 in the two-option choice set condition and n = 31 in the five-option choice set condition).

Of the 37 participants in the two-option choice set condition, 67.6% chose pure virtue and 32.4% chose pure vice (p = .047, exact binomial test). These choice patterns are similar to those when we exclude participants who observed another participant’s snack choice: 63.6% chose pure virtue and 36.4% chose pure vice, although this was not significant (p = .163, exact binomial test). Indeed, a two-proportion Z-test indicated that the proportion of participants selecting pure virtue was the same regardless of whether we excluded participants who observed another participant’s snack choice (Z = .35, p = .726).

Of the 31 participants in the five-option choice set condition, 25.8% chose pure virtue, 38.7% chose ¼-vice, 29.0% chose ½-vice, 3.2% chose ¾-vice, and 3.2% chose pure vice. These choice patterns are similar to those when we exclude participants who observed another participant’s snack choice: 24.1% chose pure virtue, 37.9% chose ¼-vice, 31.0% chose ½-vice, 3.4% chose ¾-vice, and 3.4% chose pure vice. Recall that our two main predictions were that both the ¼-vice option and the ½-vice option would be more popular than the ¾-vice option. This was indeed the case regardless of whether we excluded participants who observed another participant’s snack choice.

**Footnote 12 (Study 3):** “To ensure that the classification of participants as initial vice-choosers and initial virtue-choosers was not affected by first rating the five options, we compared these participants’ choices from this two-option choice set with the choices made by a separate group of participants who chose from the same two-option choice set without first rating the five options. Using a two-proportion Z-test, we confirmed
that the choice shares did not differ depending upon whether participants first rated the five options.”

Below, we describe the methods and results from a separate study from which we obtained the comparison group mentioned in Footnote 12. This separate study (a.k.a. “the comparison group study”) was not included in the main paper. Participants in the comparison group study chose an option from their assigned choice set without first rating any options or making another choice. Thus, participants’ choices in this study serve as a useful comparison group for participants in Studies 3 and 4, who first rated options and/or made a choice from another choice set before selecting from a focal choice set. We thus use the data from the comparison group study to address issues described in Footnotes 12, 13, and 20.

Comparison Group Study Method

Participants and Design. Two hundred and twenty-three participants ($M_{age} = 30.59$, 42.6% female) from Amazon’s Mechanical Turk panel completed this study. This study had a between-subjects design with participants randomly assigned to one of three choice sets: 1) “pure vice – pure virtue” (a two-option choice-set with pure virtue and pure vice); 2) “vice-virtue 50/50-included” (a five-option choice-set with pure virtue, $\frac{1}{4}$ vice, $\frac{1}{2}$ vice, $\frac{3}{4}$ vice, and pure vice); and 3) “vice-virtue 50/50-excluded” (a four-option choice-set with pure virtue, $\frac{1}{4}$ vice, $\frac{3}{4}$ vice, and pure vice).

Procedure. All participants were asked to imagine getting lunch from their workplace cafeteria and having to select a side option. Participants were then shown their randomly assigned choice set and asked to select one option. Participants in the pure vice – pure virtue condition saw a plate of only salad and a plate of only French fries. Participants in the five-option vice-virtue 50/50-included condition saw these two pure options plus three vice-virtue bundles ($\frac{1}{4}$ vice, $\frac{1}{2}$ vice, and $\frac{3}{4}$ vice), and participants in the four-option vice-virtue 50/50-excluded condition saw the two pure options plus two vice-virtue bundles ($\frac{1}{4}$ vice and $\frac{3}{4}$ vice). See Appendix Figures A1 and A2 for pictures, food contents, and calorie content of each plate. Participants in the 50/50-included and 50/50-excluded conditions were told that the overall quantity of the side was still the same in all options.

Comparison Group Study Results

The results from the comparison group study are summarized in the table below.
**Online Appendix Table.** Number of Participants in the Comparison Group Study Choosing Each Choice Option Depending Upon Choice Set

<table>
<thead>
<tr>
<th>Study Condition</th>
<th>Pure Virtue</th>
<th>¼ Vice</th>
<th>½ Vice</th>
<th>¾ Vice</th>
<th>Pure Vice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure Virtue – Pure Vice (n = 72)</td>
<td>42</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>30</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Included (n = 77)</td>
<td>15</td>
<td>30</td>
<td>17</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Vice-Virtue 50/50-Excluded (n = 74)</td>
<td>16</td>
<td>38</td>
<td>--</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

We used the data from the Pure Virtue – Pure Vice condition (n = 72; 42 chose pure virtue, 30 chose pure vice) in the comparison group study to address **Footnote 12.** Specifically, we conducted a two-proportion Z-test to confirm that participants’ choices in this condition did not differ from Study 3 participants’ choices from the same two-option choice-set (N = 100; 57 chose pure virtue, 43 chose pure vice): Z = .18, p = .865.

**Footnote 13 (Study 3):** “To ensure that participants’ choice among the five options was not affected by first rating the five options and then selecting an option from the two-option choice set, we compared these participants’ choices from this five-option choice set with the choices made by a separate group of participants who chose from the same five-option choice set without first rating the five options and selecting from the two-option choice set. Using a Chi-squared test, we confirmed that the choice shares did not differ.”

We used the data from the Vice-Virtue 50/50-Included condition (n = 77; 15 chose pure virtue, 30 chose ¼-vice, 17 chose ½-vice, 4 chose ¾-vice, 11 chose pure vice) in the comparison group study to address **Footnote 13.** Specifically, we conducted a Chi-squared test to confirm that participants’ choices in this condition did not differ from Study 3 participants’ choices from the same five-option choice-set (N = 100; 22 chose pure virtue, 34 chose ¼-vice, 27 chose ½-vice, 4 chose ¾-vice, 13 chose pure virtue): $\chi^2(4) = 1.04$, $p = .903$. 
Footnote 15 (Study 3): “In a separate study using a between-subjects design in which participants only rated one of the five options, we found similar aggregated tastiness and healthiness results.”

Below, we describe this separate study, in which a between-subjects design was used to elicit healthiness and tastiness ratings of the five options (pure virtue, ¼-vice, ½-vice, ¾-vice, pure vice) such that participants see all five options but then rate only one of the five options.

Method

Participants and Design. Two hundred and seventy-three participants ($M_{age} = 32.65, 54.6\%$ female) from Amazon’s Mechanical Turk panel completed this study. This study had a between-subjects design with five levels: pure virtue, ¼ vice, ½ vice, ¾ vice, and pure vice.

Procedure. All participants were asked to imagine getting lunch and having to select a side option. All participants were then shown the five options presented to participants in Studies 3 and 4: pure virtue (a plate of only salad), pure vice (a plate of only fries), a ¼-vice option, a ½-vice option, and a ¾-vice option (see Appendix Figures A1 and A2). Participants were told that they would next be shown one option and be asked to imagine having gotten that as their side option. Participants then saw one randomly assigned side option and rated this option on the same measures of healthiness and tastiness as used in Study 3. Following these ratings, participants indicated which side option they would select from the five options.

Results and Discussion

We first examine choice share among the five options. We then examine participants’ ratings of the tastiness and healthiness of each of the five options.

Choice Share. Choice share did not differ depending upon which option participants were randomly assigned to rate, $\chi^2(16) = 18.25, p = .310$. Therefore, we collapsed across condition to examine choice share among the five options (22.0% chose pure virtue, 42.5% chose ¼-vice, 20.1% chose ½-vice, 5.1% chose ¾-vice, and 10.3% chose pure vice). As predicted, participants more frequently selected the ¼ vice option (42.5%) than the ¾-vice option (5.1%), $p < .001$ (exact binomial test). In addition, participants were significantly more likely to select the ¼-vice option than the ½-vice option, $p < .001$ (exact binomial test).

Aggregated Healthiness and Tastiness Ratings. A two-way mixed ANOVA of ratings type (healthiness, tastiness) and rated option (pure virtue, ¼-vice, ½-vice, ¾-vice, pure vice) on ratings, with ratings type as a within-subjects
factor and rated option as a between-subjects factor, revealed a significant interaction \((F(4, 268) = 126.29, p < .001)\).

Follow-up tests were then conducted in the form of two separate one-way repeated-measures ANOVAs of rated option, predicting healthiness and tastiness. The figure below depicts the healthiness and tastiness ratings. A one-way ANOVA on healthiness was significant \((F(4, 268) = 177.74, p < .001)\), and follow-up contrasts indicated that healthiness ratings consistently followed a “more vice = more unhealthy” rule, such that perceived healthiness decreased significantly with each increase in vice proportion \((p’s < .001)\). A one-way ANOVA on tastiness was also significant \((F(4, 268) = 7.35, p < .001)\), and similar to Study 3, the \(\frac{1}{4}\)-vice option was rated significantly higher on tastiness than the pure virtue option \((p = .002)\) but was rated similarly on tastiness as the \(\frac{1}{2}\)-vice option \((p = .237)\), the \(\frac{3}{4}\)-vice option \((p = .595)\), and the pure vice option \((p = .075)\). Thus, these results largely replicated the aggregate results from Study 3’s within-subjects design.

**Online Appendix Figure.** Tastiness and Healthiness Ratings of Each Option (Between-Subjects).

![Graph showing healthiness and tastiness ratings for different options](image)

**Footnote 20 (Study 4):** “Because the potential for demand effects is generally stronger in within-subjects designs than in between-subject designs (Charness et al. 2011), we compared Study 4 participants’ second choice from the vice-virtue four-option choice set and the vice-virtue five-option choice set with a separate group of participants’ first (and

\[22\] Because Levene’s test of homogeneity of variances was violated for healthiness \((p = .001)\) and tastiness ratings \((p = .007)\), we re-ran the ANOVA using the Brown-Forsythe procedure and the follow-up contrasts using the Games-Howell procedure and came to the same conclusions. Neither the Brown-Forsythe procedure nor the Games-Howell procedure relies upon the assumption of homogeneous variances.
only) choice from the vice-virtue four-option choice set and the vice-virtue five-option choice set. Using Chi-squared tests, we confirmed that the choice shares from the vice-virtue four-option choice set and the vice-virtue five-option choice set did not differ between the within-subjects and between-subjects designs. Thus, the second choice that Study 4 participants made does not seem to be driven by demand effects from using a within-subjects design.”

We used the data from the Vice-Virtue 50/50-Included condition (n = 77; 15 chose pure virtue, 30 chose ¼-vice, 17 chose ½-vice, 4 chose ¾-vice, 11 chose pure vice) and the Vice-Virtue 50/50-Excluded condition (n = 74; 16 chose pure virtue, 38 chose ¼-vice, 8 chose ¾-vice, 12 chose pure vice) in the comparison group study to address Footnote 20.

First, we conducted a Chi-squared test to confirm that participants’ choices in the Vice-Virtue 50/50-Included condition did not differ from Study 4 participants’ choices from the same five-option choice set (N = 95; 17 chose pure virtue, 39 chose ¼-vice, 28 chose ½-vice, 5 chose ¾-vice, 6 chose pure virtue): χ²(4) = 3.73, p = .444.

Second, we conducted a Chi-squared test to confirm that participants’ choices in the Vice-Virtue 50/50-Excluded condition did not differ from Study 4 participants’ choices from the same four-option choice set (N = 94; 23 chose pure virtue, 51 chose ¼-vice, 8 chose ¾-vice, 12 chose pure virtue): χ²(3) = .79, p = .853.
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164


Biography

Peggy Jie Liu was born August 8, 1989 in Ann Arbor, Michigan. She graduated summa cum laude with a B.S. in Psychology from Yale University in May 2011.

Peggy has published the following articles in marketing and management journals: 1) “Vice-Virtue Bundles” in Management Science with Kelly Haws, Cait Lamberton, Troy Campbell, and Gavan Fitzsimons; 2) “Matching Choices to Avoid Offending Stigmatized Group Members” in Organizational Behavior and Human Decision Processes with Troy Campbell, Gavan Fitzsimons, and Gráinne Fitzsimons; and 3) “Should Firms Use Small Financial Benefits to Express Appreciation to Consumers? Understanding and Avoiding Trivialization Effects” in Journal of Marketing with Cait Lamberton and Kelly Haws.

Peggy has also published the following articles in public health, public policy, nutrition, and medical journals: 1) “Combining Food Type(s) and Food Quantity Choice in a New Food Choice Paradigm Based on Vice-Virtue Bundles” in Appetite with Kelly Haws; 2) “Half-Size Me? How Calorie and Price Information Interact with Portion Size on Healthy Choices from Restaurant Menus” in Appetite with Kelly Haws; 3) “Potential Problems with Increasing Serving Sizes on the Nutrition Facts Label” in Appetite with Steven Dallas and Peter Ubel; 4) “How Many Calories Are in My Burrito? Improving Consumers’ Understanding of Calorie Range Information” in Public Health Nutrition.

She is a recipient of the 2014 ACR-Sheth Foundation Dissertation Proposal Award, a 2014 AMA-Sheth Foundation Doctoral Consortium Fellow, a recipient of the American Public Health Association’s Student Abstract Award, a recipient of the Duke University Scholars Fellowship, and a recipient of the James B. Duke Fellowship.