Management Science

Vice-Virtue Bundles

Peggy J. Liu, Kelly L. Haws, Cait Lamberton, Troy H. Campbell, Gavan J. Fitzsimons

Vice-Virtue Bundles

Peggy J. Liu
Fuqua School of Business, Duke University, Durham, North Carolina 27708, peggy.liu@duke.edu

Kelly L. Haws
Owen Graduate School of Management, Vanderbilt University, Nashville, Tennessee 37203,
kelly.haws@owen.vanderbilt.edu

Cait Lamberton
Katz School of Business, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, clamberton@katz.pitt.edu

Troy H. Campbell, Gavan J. Fitzsimons
Fuqua School of Business, Duke University, Durham, North Carolina 27708
{troy.campbell@duke.edu, gavan@duke.edu}

We introduce a simple solution to help consumers manage choices between healthy and unhealthy food options: vice-virtue bundles. Vice-virtue bundles are item aggregates with varying proportions of both vice and virtue, holding overall quantity constant. Four studies compare choice and perceptions of differently composed vice-virtue bundles relative to one another and to pure vice and pure virtue options. Although multiple consumer segments can be identified, results suggest that people overall tend to prefer vice-virtue bundles with small ($\frac{1}{4}$) to medium ($\frac{1}{2}$) proportions of vice rather than large ($\frac{3}{4}$) proportions of vice. Moreover, people generally rate vice-virtue bundles with small vice proportions as healthier but similarly tasty as bundles with larger vice proportions. For most individuals, choice patterns are different from those predicted by variety-seeking accounts alone. Instead, these findings provide evidence of asymmetric effectiveness of small vice and virtue proportions at addressing taste and health goals, respectively.

Data, as supplemental material, are available at http://dx.doi.org/10.1287/mnsc.2014.2053.

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 et al. 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 et al. 2009, Mishra and Mishra 2011, Wertenbroch 1998).[1] 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 quantity constant (discussed further in §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.

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 et al. 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 et al. 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 et al. 2002, Schwartz et al. 2012, Sharpe et al. 2008, Wansink 2006, Wansink et al. 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 et al. 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).

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),

---

[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 et al. 2008) and "hedonic products" versus "utilitarian products" (Dhar and Wertenbroch 2000).

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 ($\frac{1}{4}$-vice and $\frac{3}{4}$-virtue; $\frac{1}{2}$-vice and $\frac{1}{2}$-virtue; and $\frac{3}{4}$-vice and $\frac{1}{4}$-virtue) are added to a choice set that otherwise would consist of pure virtue (virtue alone) and pure vice (vice alone).

1.3. Maximizing Utility from Addressing Taste and Health Goals

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:

Utility of option A

$$= (\text{importance of taste goal} \times \text{effectiveness of option A at addressing taste goal})$$

$$+ (\text{importance of health goal} \times \text{effectiveness of option A at addressing health goal}).$$

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.

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 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.

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

---

[2] Note that in §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.

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)
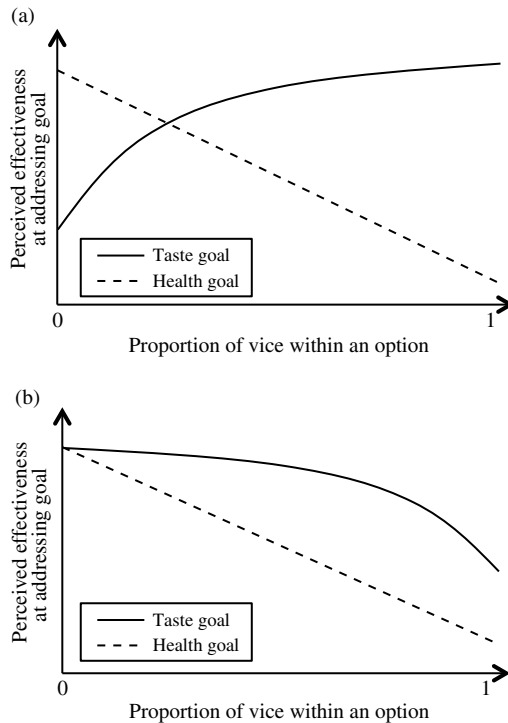
Note. These functional forms represent an option's perceived effectiveness at addressing a taste goal and a health goal as a function of the option's proportion of vice. In panel (a), an initial increase in vice proportion provides a substantial boost in perceived effectiveness at addressing a taste 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.

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 $\frac{1}{2}$-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 $\frac{1}{2}$-vice option, the $\frac{1}{4}$-vice option may often be preferred to the $\frac{3}{4}$-vice option—even though pure vice is preferred to pure virtue in the absence of vice-virtue bundles.

Note that this unique set of predictions for vice 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.

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

---

[3] Note though that preference for the $\frac{1}{2}$-vice option over the $\frac{1}{4}$-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., $\frac{1}{2}$-vice over $\frac{1}{4}$-vice).

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)

		Effectiveness at addressing taste goal (a)	Taste goal importance weight (b)	Effectiveness at addressing health goal (c)	Health goal importance weight (d)	Total utility of each option $(a \times b) + (c \times d)$
		Numeric example 1				
Segment 1: Vice lovers	Pure virtue	0	0.55	40	0.45	18.00
Select pure vice in the absence of vice-virtue bundles,	$\frac{1}{4}$-vice	23	0.55	30	0.45	26.15
based on favoring taste goal over health goal when both	$\frac{1}{2}$-vice	33	0.55	20	0.45	27.15
taste and health cannot be addressed simultaneously	$\frac{3}{4}$-vice	38	0.55	10	0.45	25.40
	Pure vice	40	0.55	0	0.45	22.00
		Numeric example 2				
Segment 2: Virtue acceptors	Pure virtue	0	0.45	40	0.55	22.00
Select pure virtue in the absence of vice-virtue bundles,	$\frac{1}{4}$-vice	23	0.45	30	0.55	26.85
based on favoring health goal over taste goal when both	$\frac{1}{2}$-vice	33	0.45	20	0.55	25.85
taste and health cannot be addressed simultaneously	$\frac{3}{4}$-vice	38	0.45	10	0.55	22.60
	Pure vice	40	0.45	0	0.55	18.00
		Numeric example 3				
Segment 3: Virtue lovers	Pure virtue	40	0.50	40	0.50	40.00
Select pure virtue in the absence of vice-virtue bundles,	$\frac{1}{4}$-vice	40	0.50	30	0.50	35.00
based on being able to address both taste and	$\frac{1}{2}$-vice	38	0.50	20	0.50	29.00
health simultaneously via pure virtue	$\frac{3}{4}$-vice	35	0.50	10	0.50	22.50
	Pure vice	31	0.50	0	0.50	15.50

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, $\frac{1}{4}$-vice, $\frac{1}{2}$-vice, $\frac{3}{4}$-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 $\times$ effectiveness of option A at addressing taste goal) + (importance of health goal $\times$ 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 ($\frac{1}{4}$-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 (see §1.4).

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.

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,

---

[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 of the appendix, 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.

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).

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 variety seek (discussed in §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.

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.

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

---

[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.

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. 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. We also checked whether offering vice-virtue bundles changes subsequent consumption. 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 $\frac{1}{4}$-vice or $\frac{1}{2}$-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.[6] 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 $\frac{1}{2}$-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 absence of the $\frac{1}{2}$-vice option, vice lovers exhibit preference shifts; consumers who would have selected a particular pure option (i.e., 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.

2.1. 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.

2.1.1. 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

---

[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.

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]

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 $\frac{1}{4}$-vice option ($\frac{3}{4}$ baby carrots and $\frac{1}{4}$ potato chips), a $\frac{1}{2}$-vice option ($\frac{1}{2}$ baby carrots and $\frac{1}{2}$ potato chips), and a $\frac{3}{4}$-vice option ($\frac{1}{4}$ baby carrots and $\frac{3}{4}$ 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 the appendix.

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.

2.1.2. 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.

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). Calories ordered was not significantly different when vice-virtue bundles were introduced ($M_{\text{5-option}} = 74$ calories, $M_{\text{2-option}} = 79$ calories; independent-samples t-test: $t(48) = 0.46$, $p = 0.648$;[8] 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.

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. 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

---

[7] The choice patterns observed are largely robust to including the six participants who observed another participant's snack choice. See the online appendix (available as supplemental material at http://dx.doi.org/10.1287/mnsc.2014.2053) for additional details.

[8] The degrees of freedom were adjusted because of the heterogeneity of variances.

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

Study condition	Choice option (% choosing)				
	Pure virtue or vice A	$\frac{1}{4}$-vice or vice B	$\frac{1}{2}$-vice or vice B	$\frac{3}{4}$-vice or vice B	Pure vice or vice B
Study 1: Choice among vice-virtue bundles					
Pure virtue–pure vice ($n = 33$)	63.6	—	—	—	36.4
Vice-virtue 50/50-included ($n = 29$)	24.1	37.9	31.0	3.4	3.4
Study 2: Choice and consumption of vice-virtue bundles					
Pure virtue–pure vice ($n = 46$)	63.0	—	—	—	37.0
Vice-virtue 50/50-included ($n = 49$)	22.4	22.4	40.8	4.1	10.2
Study 3: Perceptions of vice-virtue bundle options					
Pure virtue–pure vice choice 1 ($n = 100$)	57.0	—	—	—	43.0
Vice-virtue choice 2 (vice lovers) ($n = 43$)	0.0	9.3	51.2	9.3	30.2
Vice-virtue choice 2 (virtue acceptors) ($n = 21$)	19.0	71.4	9.5	0.0	0.0
Vice-virtue choice 2 (virtue lovers) ($n = 36$)	50.0	41.7	8.3	0.0	0.0
Study 4: Expanding a choice set with mixed bundles					
Vice-virtue 50/50-included choice 1 ($n = 95$)	52.6	—	—	—	47.4
Vice-virtue 50/50-included choice 2 (virtue choosers) ($n = 50$)	32.0	64.0	4.0	0.0	0.0
Vice-virtue 50/50-included choice 2 (vice choosers) ($n = 45$)	2.2	15.6	57.8	11.1	13.3
Vice-vice 50/50-included choice 1 ($n = 96$)	63.5	—	—	—	36.5
Vice-vice 50/50-included choice 2 (vice A choosers) ($n = 61$)	23.0	44.3	31.1	0.0	1.6
Vice-vice 50/50-included choice 2 (vice B choosers) ($n = 35$)	0.0	5.7	28.6	37.1	28.6
Vice-virtue 50/50-excluded choice 1 ($n = 94$)	58.5	—	—	—	41.5
Vice-virtue 50/50-excluded choice 2 (virtue choosers) ($n = 55$)	41.8	58.2	—	0.0	0.0
Vice-virtue 50/50-excluded choice 2 (vice choosers) ($n = 39$)	0.0	48.7	—	20.5	30.8
Vice-vice 50/50-excluded choice 1 ($n = 94$)	50.0	—	—	—	50.0
Vice-vice 50-50-excluded choice 2 (vice A choosers) ($n = 47$)	23.4	68.1	—	8.5	0.0
Vice-vice 50/50-excluded choice 2 (vice B choosers) ($n = 47$)	0.0	19.1	—	34.0	46.8

dietary recall data to examine whether offering vice-virtue bundles alters subsequent (post-snack) caloric consumption.

2.2.1. Method.

Participants and Design. One hundred participants ($M_{\text{age}} = 21.83$, 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

[9] For Studies 2–4, we set target sample sizes prior to data collection and analysis (Simmons et al. 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) 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). 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 $\frac{1}{4}$-vice (three apple slices and one Oreo), $\frac{1}{2}$-vice (two apple slices and two Oreos), and $\frac{3}{4}$-vice (one apple slice and three Oreos). These choice options were presented pictorially (see Figure A.1). For the food contents (grams of apples and Oreos) and calories on each plate, see Figure A.2.

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 discretely 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 were 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. 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 $\frac{1}{4}$-vice option and the $\frac{1}{2}$-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). Calorie consumption during the snack session was not significantly different when vice-virtue bundles were introduced ($M_{5\text{-option}} = 103$ calories, $M_{2\text{-option}} = 91$ calories; independent-samples t-test: $t(79) = 0.85$, $p = 0.396$;[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 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 $\frac{1}{2}$ 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 §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.

2.3. 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).

2.3.1. Method.

Participants and Design. One hundred 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) × 2 (ratings type: healthiness, tastiness) × 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 bundles included a $\frac{1}{4}$-vice option (a plate of $\frac{3}{4}$ salad and $\frac{1}{4}$ fries), a $\frac{1}{2}$-vice option (a plate of $\frac{1}{2}$ salad and $\frac{1}{2}$ fries), and a $\frac{3}{4}$-vice option (a plate of $\frac{1}{4}$ salad and $\frac{3}{4}$ fries). We selected these stimuli because restaurants frequently offer these side dish choices. See Figure A.1 for the

---

[10] The degrees of freedom were adjusted because of the heterogeneity of variances.

[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.

pictures shown to participants, and see Figure A.2 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,[12] 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.

Next, participants were told to imagine instead that they now faced the five options, including three vice-virtue bundles.[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*.

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 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, $\frac{1}{4}$-vice, $\frac{1}{2}$-vice, $\frac{3}{4}$-vice, pure vice) on ratings revealed a significant interaction ($F(2,243) = 260.63$, $p < 0.001$).[14]

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 Bonferonni-adjusted contrasts indicated that the $\frac{1}{4}$-vice option was rated as significantly higher in perceived tastiness than the pure virtue option ($p < 0.001$), the $\frac{1}{2}$-vice option was rated as marginally significantly tastier than the $\frac{1}{4}$-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 = 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

---

[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 the online appendix for additional details.

[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 the online appendix for additional details.

[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.

[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 the online appendix for additional details.

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 ANOVA of consumer segment (vice lover, Virtue acceptor, virtue lover), 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. 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 ($F(6, 315) = 19.26$, $p < 0.001$).[16] 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, $\frac{1}{4}$-vice, $\frac{1}{2}$-vice, $\frac{3}{4}$-vice, pure vice) on ratings.

For vice 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 ($F(3,135) = 218.35$, $p < 0.001$) (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 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 $\frac{1}{4}$-vice option was rated as significantly more tasty than the pure virtue option ($p < 0.001$), and the $\frac{1}{2}$-vice option was rated as significantly more tasty than the $\frac{1}{4}$-vice option ($p < 0.001$); tastiness ratings appeared to plateau at

---

[16] Mauchley's test of sphericity was significant for the three-way interaction test ($\chi^2(9) = 67.79$, $p < 0.001$), for the two-way interaction test for vice lovers ($\chi^2(9) = 33.24$, $p < 0.001$), for the two-way interaction test for virtue acceptors ($\chi^2(9) = 13.92$, $p < 0.001$), for the two-way interaction test for virtue lovers ($\chi^2(9) = 38.66$, $p < 0.001$), for the healthiness ratings for vice lovers ($\chi^2(9) = 43.78$, $p < 0.001$), for the tastiness ratings for vice lovers ($\chi^2(9) = 38.99$, $p < 0.001$), for the healthiness ratings for virtue lovers ($\chi^2(9) = 31.63$, $p < 0.001$), and for the tastiness ratings for virtue lovers ($\chi^2(9) = 40.22$, $p < 0.001$). Therefore, the Huynh–Feldt epsilon adjustment was made to the degrees of freedom for these F-tests.

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)
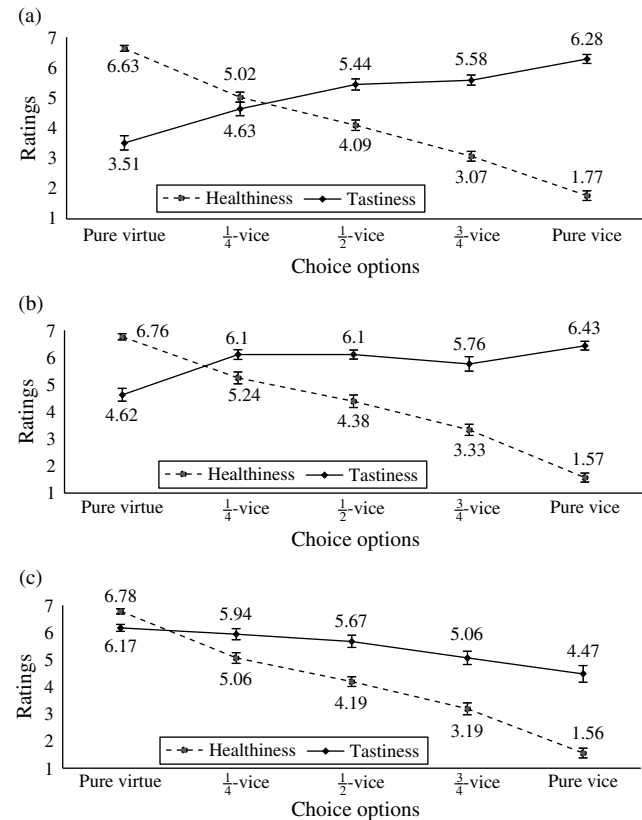
Note. Error bars denote standard errors of the mean.

the $\frac{1}{2}$-vice option because the $\frac{3}{4}$-vice option was rated as equally tasty as the $\frac{1}{2}$-vice option ($p = 1.00$). The pure vice option was rated as significantly more tasty than the $\frac{1}{2}$-vice and the $\frac{3}{4}$-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 $\frac{1}{2}$-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 $\frac{1}{2}$-vice option for vice lovers suggests that either the $\frac{1}{4}$-vice option or the $\frac{1}{2}$-vice option, and not the $\frac{3}{4}$-vice option, is likely to be the favored vice-virtue bundle among vice lovers.[17]

---

[17] As to whether the $\frac{1}{4}$-vice option or the $\frac{1}{2}$-vice option is likely to be the most popular vice-virtue bundle for vice lovers, we note

For virtue acceptors, 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 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 $\frac{1}{4}$-vice to $\frac{1}{2}$-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 $\frac{1}{4}$-vice option was rated as significantly more tasty than the pure virtue option ($p < 0.001$), but tastiness ratings appeared to plateau at the $\frac{1}{4}$-vice option because the $\frac{1}{2}$-vice, $\frac{3}{4}$-vice, and pure vice options were all rated as similarly tasty compared to the $\frac{1}{4}$-vice option (all three p's $= 1.00$). These ratings show that tastiness plateaus at the $\frac{1}{4}$-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 $\frac{1}{4}$-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 $\frac{1}{2}$-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).

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

---

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.

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 workplace 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).[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 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.

2.4. 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

---

[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). 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.

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 $\frac{1}{4}$-vice to other vice-virtue bundles.

When the $\frac{1}{2}$-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 $\frac{1}{2}$-vice option, whereas the most popular vice-virtue bundle for initial virtue choosers (i.e., virtue acceptors and virtue lovers) would be the $\frac{1}{4}$-vice option.

When the $\frac{1}{2}$-vice option was not included, we predicted that initial vice choosers would be more likely to choose a $\frac{1}{4}$-vice option than a $\frac{3}{4}$-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 $\frac{1}{2}$-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.

2.4.1. Method.

Participants and Design. Three hundred 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) × 2 (expanded choice set: five options (50/50-option included), four options (50/50-option excluded)) × 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.[19] See Figures A.1 and A.2 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.[20] They were told that the overall quantity of the side dish was 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)

---

[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-vice 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, $t(38) = 8.87$, $p < 0.001$).

[20] Because the potential for demand effects is generally stronger in within-subjects designs than in between-subject designs (Charness et al. 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 the online appendix for additional details.

condition saw the two options they had already seen and three mixed bundles ($\frac{1}{4}$-vice, $\frac{1}{2}$-vice, and $\frac{3}{4}$-vice), and participants in the four-option (50/50-option excluded) condition saw the two options they had already seen and two mixed bundles ($\frac{1}{4}$-vice and $\frac{3}{4}$-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).

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 $\frac{1}{2}$-vice option, are introduced. Second, we examine how consumers' choices change when mixed vice-virtue and vice-vice bundles, dropping the $\frac{1}{2}$-vice option, are introduced. Finally, we examine the impact of introducing vice-virtue bundles (including and dropping the $\frac{1}{2}$-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 ($p = 1.000$, 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 $\frac{1}{4}$-vice, 29.5% chose $\frac{1}{2}$-vice, 5.3% chose $\frac{3}{4}$-vice, and 6.3% chose pure vice. Thus, at the aggregate level, both the $\frac{1}{4}$-vice option and the $\frac{1}{2}$-vice option were more popular than the $\frac{3}{4}$-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 $\frac{1}{4}$-vice option (selected by 64.0% of participants; compared to 4.0% for the

$\frac{1}{2}$-vice option, $p < 0.001$, and no participants for the $\frac{3}{4}$-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 $\frac{1}{4}$-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). In addition, whereas the most popular option for initial vice choosers in the vice-virtue condition was a $\frac{1}{2}$-vice option (chosen by 57.8% of initial vice choosers), initial vice B choosers were equally likely to shift to $\frac{3}{4}$-vice B as to $\frac{1}{2}$-vice B (37.1% chose $\frac{3}{4}$-vice B and 28.6% chose $\frac{1}{2}$-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 $\frac{1}{2}$-vice bundle option.

First, we examined the impact of removing the $\frac{1}{2}$-vice option on initial virtue choosers and initial vice choosers. The removal of the $\frac{1}{2}$-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 $\frac{1}{4}$-vice option. Thus, we predicted that initial virtue choosers would continue to choose the $\frac{1}{4}$-vice option over the $\frac{3}{4}$-vice option when the $\frac{1}{2}$-vice option was removed. In contrast, the removal of the $\frac{1}{2}$-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 $\frac{1}{4}$-vice option over the $\frac{3}{4}$-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 $\frac{1}{4}$-vice option over the $\frac{3}{4}$-vice option when the $\frac{1}{2}$-vice option was excluded (58.2% chose the $\frac{1}{4}$-vice option and no participants chose the $\frac{3}{4}$-vice option; $p < 0.001$, exact binomial test). Recall that when the $\frac{1}{2}$-vice option was included in the expanded choice set, 64.0% chose the $\frac{1}{4}$-vice option and no participants chose the $\frac{3}{4}$-vice option. Essentially, removing the $\frac{1}{2}$-vice option has no impact on initial virtue choosers. Moreover, of particular interest, initial vice choosers were more likely to shift to the $\frac{1}{4}$-vice option than to the $\frac{3}{4}$-vice option (48.7% chose the $\frac{1}{4}$-vice option whereas 20.5% chose the $\frac{3}{4}$-vice option; $p = 0.052$, exact binomial test). Recall that when the $\frac{1}{2}$-vice option was included, 15.6% chose the $\frac{1}{4}$-vice option and 11.1% chose the $\frac{3}{4}$-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 $\frac{1}{2}$-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).

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) × 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 ($M_{\text{before}} = 152$ calories, $M_{\text{after}} = 119$ calories; paired-samples t-test: $t(188) = 3.96$, $p < 0.001$; 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 differently 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) × 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

---

[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 and then conducted follow-up contrasts using the Games–Howell procedure and came to the same conclusions.

on 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).

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 $\left(\frac{1}{4}\right)$ to medium $\left(\frac{1}{2}\right)$ proportions of vice to vice-virtue bundles with large $\left(\frac{3}{4}\right)$ 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.

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.

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 $\left(\frac{1}{4}\right)$ is considerably effective at addressing a taste goal, whereas a small proportion of virtue $\left(\frac{1}{4}\right)$ 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

Table 3   **Summary of Key Findings Across Studies**

Study	Key findings
1	• People were more likely to choose vice-virtue bundles with relatively small ($\frac{1}{4}$) or medium ($\frac{1}{2}$) vice proportions than vice-virtue bundles with relatively large ($\frac{3}{4}$) vice proportions when making actual choices.
2	• People were more likely to choose vice-virtue bundles with relatively small ($\frac{1}{4}$) or medium ($\frac{1}{2}$) vice proportions than vice-virtue bundles with relatively large ($\frac{3}{4}$) 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 1(a). Initial increases in the proportion of vice led to significant increases in perceived tastiness, with tastiness plateauing at the $\frac{1}{2}$-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 and with numeric example 1 in Table 1, when vice-virtue bundles were added to the choice set, the most popular vice-virtue bundle was the $\frac{1}{2}$-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 1(a). An initial increase in the proportion of vice led to a significant increase in perceived tastiness, with tastiness plateauing at the $\frac{1}{4}$-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 and with numeric example 2 in Table 1, when vice-virtue bundles were included in the choice set, the most popular vice-virtue bundle was the $\frac{1}{4}$-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 1(b). When vice-virtue bundles were included in the choice set, the most popular vice-virtue bundle was the $\frac{1}{4}$-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.
4	• Initial virtue choosers (virtue acceptors and virtue lovers) frequently switched to vice-virtue bundles with a relatively small ($\frac{1}{4}$) vice proportion, and initial vice choosers (vice lovers) frequently switched to a vice-virtue bundle with a medium ($\frac{1}{2}$) 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 ($\frac{1}{2}$-vice), initial vice choosers (vice lovers) were more likely to choose an option with a relatively small ($\frac{1}{4}$) vice proportion than one with a relatively large ($\frac{3}{4}$) 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 builds on research on the unhealthy = 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 = 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 = 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 et al. 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.

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), they may instead aim for highlighting either taste (affective attribute) or cost (cognitive attribute) (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.

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 et al. 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 et al. 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 $\frac{1}{4}$-vice) or an even simpler choice set might contain only two options (e.g., $\frac{1}{4}$-vice and $\frac{3}{4}$-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.

Supplemental Material

Acknowledgments
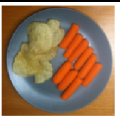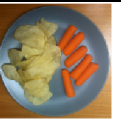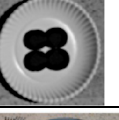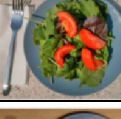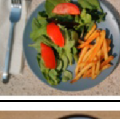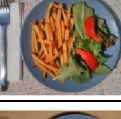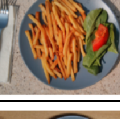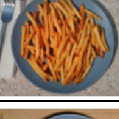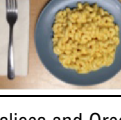
Appendix

Table A.1 Constructed Numeric Example for Weighted Sum Model of Choice Among Vice-Virtue Bundles for Virtue Acceptors If They Differed from Vice Lovers Because o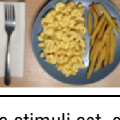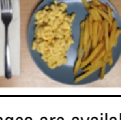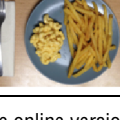f Heightened Effectiveness of Virtue at Meeting Taste Goal (Rather Than Heightened Importance of Health Goal over Taste Goal)

		Effectiveness at addressing taste goal (a)	Taste goal importance weight (b)	Effectiveness at addressing health goal (c)	Health goal importance weight (d)	Total utility of each option $(a \times b) + (c \times d)$
Segment 2: Virtue acceptors	Pure virtue	10	0.55	40	0.45	23.50
Select pure virtue in the absence of vice-virtue bundles, based on viewing pure virtue as slightly addressing a taste goal.	$\frac{1}{4}$-vice	33	0.55	30	0.45	31.65
	$\frac{1}{2}$-vice	38	0.55	20	0.45	29.90
	$\frac{3}{4}$-vice	40	0.55	10	0.45	26.50
	Pure vice	40	0.55	0	0.45	22.00

Notes. 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 the appendix 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 $\frac{1}{4}$-vice option rather than a $\frac{1}{2}$-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 A.1   (Color online) Study Stimuli

Menu	Study	Pure virtue or vice A	$\frac{1}{4}$-vice or $\frac{1}{4}$-vice B	$\frac{1}{2}$-vice or $\frac{1}{2}$-vice B	$\frac{3}{4}$-vice or $\frac{3}{4}$-vice B	Pure vice or vice B
Vice-virtue Baby carrots and potato chips	1					
Apple slices and Oreo cookies	2					
Salad and fries	3 and 4					
Vice-vice Macaroni & cheese and fries	4					

Note. For all sets of stimuli except the apple slices and Oreo cookies stimuli set, color images are available in the online version of this paper.

Figure A.2   Calories and Contents of Study Stimuli

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

Notes. For all sets of stimuli other than the apple slices and Oreo cookies stimuli set, the calories in this figure were calculated based on the actual grams of each food depicted in the photographs in Figure A.1. For the apple slices and Oreo cookies, the calories in this figure were calculated based on the following approximations: one apple slice weighs approximately 17.31 grams and has 9 calories (http://www.fatsecret.com); one Oreo cookie weighs approximately 11.33 grams and has 53.33 calories (http://caloriecount.about.com).

References

Baumeister RF, Bratslavsky E, Muraven M, Tice DM (1998) Ego depletion: Is the active self a limited resource? *J. Personality Soc. Psych.* 74(5):1252–1265.

Bublitz MG, Peracchio LA, Block LG (2010) Why did I eat that? Perspectives on food decision making and dietary restraint. *J. Consumer Psych.* 20(3):239–258.

Chandon P, Wansink B (2012) Does food marketing need to make us fat? A review and solutions. *Nutrition Rev.* 70(10):571–593.

Chandon P, Wansink B (2014) Slim by design: Redirecting the accidental drivers of mindless overeating. *J. Consumer Psych.* 24(3):413–431.

Chang J, Marsh M (2013) The Google diet: Search giant overhauled its eating options to "nudge" healthy choices. *ABC News Nightline* (January 25), http://abcnews.go.com/Health/google-diet-search-giant-overhauled-eating-options-nudge/story?id=18241908.

Charness G, Gneezy U, Kuhn MA (2012) Experimental methods: Between-subject and within-subject design. *J. Econom. Behav. Organ.* 81(1):1–8.

Cheema A, Soman D (2008) The effect of partitions on controlling consumption. *J. Marketing Res.* 45(6):665–675.

Chernev A (2011) The dieter's paradox. *J. Consumer Psych.* 21(2): 178–183.

Chernev A, Gal D (2010) Categorization effects in value judgments: Averaging bias in evaluating combinations of vices and virtues. *J. Consumer Res.* 47(4):738–747.

Dhar R, Simonson I (1999) Making complementary choices in consumption episodes: Highlighting versus balancing. *J. Consumer Res.* 36(1):29–44.

Dhar R, Wertenbroch K (2000) Consumer choice between hedonic and utilitarian goods. *J. Marketing Res.* 37(1):60–71.

Drewnowski A, Henderson SA, Driscoll A, Rolls BJ (1997) The dietary variety score: Assessing diet quality in healthy young and older adults. *J. Amer. Dietetic Assoc.* 97(3):266–271.

Finkelstein EA, DiBonaventura MD, Burgess SM, Hale BC (2010) The costs of obesity in the workplace. *J. Occupational Environ. Medicine* 52(10):971–976.

Finkelstein EA, Trogdon JG, Cohen JW, Dietz W (2009) Annual medical spending attributable to obesity: Payer- and service-specific estimates. *Health Affairs* 28(5):822–831.

Fishbach A, Dhar R (2005) Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *J. Consumer Res.* 32(3):370–377.

Fishbach A, Zhang Y (2008) Together or apart: When goals and temptations complement versus compete. *J. Personality Soc. Psych.* 94(4):547–559.

Flegal KM, Carroll MD, Ogden CL, Curtin LR (2010) Prevalence and trends in obesity among US adults, 1999–2008. *J. Amer. Medical Assoc.* 303(3):235–241.

Glanz K, Basil M, Maibach E, Goldberg J, Snyder D (1998) Why Americans eat what they do: Taste, nutrition, cost, convenience, and weight control on food consumption. *J. Amer. Dietetic Assoc.* 98(10):1118–1126.

Guenther PM, DeMaio TJ, Ingwersen LA, Berlin M (1997) The multiple-pass approach for the 24-h recall in the Continuing Survey of Food Intakes by Individuals, 1994–1996. *Amer. J. Clinical Nutr.* 65(4, Suppl.):1316S.

Hall KD, Sacks G, Chandramohan D, Chow CC, Wang YC, Gortmaker SL, Swinburn BA (2011) Quantification of the effect of energy imbalance on bodyweight. *Lancet* 378(9793): 826–837.

Hamilton RW, Koukova NT (2008) Choosing options for products: The effects of mixed bundling on consumers' inferences and choices. *J. Acad. Marketing Sci.* 36(3):423–433.

Harris J, Blair EA (2006) Consumer preferences for product bundles: The role of reduced search costs. *J. Acad. Marketing Sci.* 34(4):506–513.

Hastings D (2013) McDonald's CEO schooled by 9-year-old on healthy food at shareholders meeting. *New York Daily News* (May 24), http://www.nydailynews.com/news/national/fourth -grader-hannah-robertson-accompanied-healthy-food-advocate -mom-told-ceo-mcdonald-company-annual-shareholders-meeting -article-1.1354106.

Haws KL, Winterich KP (2013) When value trumps health in a supersized world. *J. Marketing* 77(3):48–64.

Haws KL, Lamberton C, Dzhogleva H, Fitzsimons GJ (2011) A life in balance or a slippery slope: Exploring the use and effectiveness of moderation versus avoidance self-control strategies. *Presentation, 2011 Association for Consumer Research Conference, October 2011, St. Louis, MO.*

Hsee CK, Rottenstreich Y (2004) Music, pandas, and muggers: On the affective psychology of value. *J. Experiment. Psych.: General* 133(1):23–30.

Hubert HB, Feinleib M, McNamera PM, Castelli WP (1983) Obesity as an independent risk factor for cardiovascular disease: A 28-year follow-up of participants in the Framingham Heart Study. *Circulation* 67(5):968–977.

Hui SK, Bradlow ET, Fader PS (2009) Testing behavioral hypotheses using an integrated model of grocery store shopping path and purchase behavior. *J. Consumer Res.* 36(3):478–493.

Inman JJ (2001) The role of sensory-specific satiety in attribute-level variety seeking. *J. Consumer Res.* 28(1):105–120.

Jeffery RW, French SA (1999) Preventing weight gain in adults: The Pound of Prevention Study. *Amer. J. Public Health* 89(5): 747–751.

Kahn B, Wansink B (2004) The influence of assortment structure on perceived variety and consumption quantities. *J. Consumer Res.* 30(4):519–533.

Kahneman D, Tversky A (1979) Prospect theory: An analysis of decision under risk. *Econometrica* 47(2):263–291.

Keohane J (2008) Fat profits. *Condé Nast Portfolio* (February): 90–97.

Khan U, Dhar R (2006) Licensing effect in consumer choice. *J. Marketing Res.* 43(2):259–266.

Köpetz C, Faber T, Fishbach A, Kruglanski AW (2011) The multifinality constraints effect: How goal multiplicity narrows the means set to a focal end. *J. Personality Soc. Psych.* 100(5): 810–826.

Laibson D (2001) A cue-theory of consumption. *Quart. J. Econom.* 116(1):81–119.

Lambert KG, Neal T, Noyes J, Parker C, Worrel P (1991) Food-related stimuli increase desire to eat in hungry and satiated human subjects. *Current Psych.* 10(4):297–303.

Laran J (2010) Goal management in sequential choices: Consumer choices for others are more indulgent than personal choices. *J. Consumer Res.* 37(2):304–314.

Liu PJ, Wisdom J, Roberto CA, Liu LJ, Ubel PA (2014) Using behavioral economics to design more effective food policies to address obesity. *Appl. Econom. Perspect. Policy* 36(1):6–24.

McDonald's (2013a) Nutrition and well-being. Accessed October 7, 2013, http://www.aboutmcdonalds.com/mcd/sustainability/ our_focus_areas/nutrition_and_well_being.html.

McDonald's (2013b) McDonald's USA nutrition facts for popular menu items. Accessed October 7, 2013, http://nutrition .mcdonalds.com/getnutrition/nutritionfacts.pdf.

McWilliams A, Siegel DS, Wright PM (2006) Corporate social responsibility: Strategic implications. *J. Management Stud.* 43(1): 1–18.

Mello MM, Rosenthal MB (2008) Wellness programs and lifestyle discrimination—The legal limits. *New England J. Medicine* 359(2):192–199.

Milkman KL, Minson JA, Volpp KGM (2014) Holding the hunger games hostage at the gym: An evaluation of temptation bundling. *Management Sci.* 60(2):283–299.

Milkman KL, Rogers T, Bazerman MH (2008) Harnessing our inner angels and demons: What we have learned about want/should conflicts and how that knowledge can help us reduce short-sighted decision making. *Perspect. Psych. Sci.* 3(4): 324–338.

Milkman KL, Rogers T, Bazerman MH (2010) I'll have the ice cream soon and the vegetables later: A study of online grocery purchases and order lead time. *Marketing Lett.* 21(1):17–35.

Mishra A, Mishra H (2011) The influence of price discount versus bonus pack on the preference for virtue and vice foods. *J. Marketing Res.* 48(1):196–206.

O'Donoghue T, Rabin M (2000) The economics of immediate gratification. *J. Behav. Decision Making* 13(2):233–250.

Polivy J, Coleman J, Herman CP (2005) The effect of deprivation on food cravings and eating behavior in restrained and unrestrained eaters. *Internat. J. Eating Disorders* 38(4):301–309.

Raghunathan R, Naylor RW, Hoyer WD (2006) The unhealthy = tasty intuition and its effects on taste inferences, enjoyment, and choice of food products. *J. Marketing* 70(4):170–184.

Redden J, Haws K (2013) Healthy satiation: The role of decreasing desire in effective self-control. *J. Consumer Res.* 39(5):1100–1114.

Rolls BJ, Morris EL, Roe LS (2002) Portion size of food affects energy intake in normal-weight and overweight men and women. *Amer. J. Clinical Nutr.* 76(6):1207–1213.

Schwartz J, Riis J, Elbel B, Ariely D (2012) Inviting consumers to downsize fast-food portions significantly reduces calorie consumption. *Health Affairs* 31(2):399–407.

Scott AR, Reed DB, Kubena KS, McIntosh WA (2007) Evaluation of a group administered 24-hour recall method for dietary assessment. *J. Extension* 45(1):1RIB3.

Sharpe KM, Staelin R, Huber J (2008) Using extremeness aversion to fight obesity: Policy implications of context dependent demand. *J. Consumer Res.* 35(3):406–422.

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

Shiv B, Fedorikhin A (2002) Spontaneous versus controlled influences of stimulus-based affect on choice behavior. *Organ. Behav. Human Decision Processes* 87(2):342–370.

Sifferlin A (2013) Have it the healthier way: Burger King reveals low-fat satisfries. *Time* (September 24), http://healthland.time.com/2013/09/24/have-it-the-healthier-way-burger-king-reveals-low-fat-satisfries/.

Simmons JP, Nelson LD, Simonsohn U (2011) False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psych. Sci.* 22(11):1359–1366.

Simonson I (1989) Choice based on reasons: The case of attraction and compromise effects. *J. Consumer Res.* 16(2):158–174.

Sonnenberg L, Gelsomin E, Levy DE, Riis J, Barraclough S, Thorndike AN (2013) A traffic light food labeling intervention increases consumer awareness of health and healthy choices at the point-of-purchase. *Preventive Medicine* 57(4):253–257.

Stewart H, Blisard N, Jolliffe D (2006) Let's eat out: Americans weigh taste, convenience, and nutrition. Report from the Economic Research Service, U.S. Department of Agriculture, Washington, DC. http://www.ers.usda.gov/media/860870/eib19.pdf.

Stroebe W, van Koningsbruggen GM, Papies EK, Aarts H (2013) Why most dieters fail but some succeed: A goal conflict model of eating behavior. *Psych. Rev.* 120(1):110–138.

Strom S (2013) With tastes growing healthier, McDonald's aims to adapt its menu. *New York Times* (September 26), http://www.nytimes.com/2013/09/27/business/mcdonalds-moves-toward-a-healthier-menu.html?emc=eta1.

Wansink B (2004) Environmental factors that increase the food intake and consumption volume of unknowing consumers. *Annu. Rev. Nutr.* 24:455–479.

Wansink B (2006) *Mindless Eating—Why We Eat More Than We Think* (Bantam-Dell, New York).

Wansink B (2012) Package size, portion size, serving size…market size: The unconventional case for half-size servings. *Marketing Sci.* 31(1):54–57.

Wansink B, Painter JE, North J (2005) Bottomless bowls: Why visual cues of portion size may influence intake. *Obesity Res.* 13(1):93–100.

Wansink B, Payne CR, Chandon P (2007) Internal and external cues of meal cessation: The French paradox redux? *Obesity* 15(12):2920–2924.

Werle COC, Trendel O, Ardito G (2013) *Unhealthy* food is not tastier for everybody: The "*healthy=tasty*" French intuition. *Food Quality Preference* 28(1):116–121.

Wertenbroch K (1998) Consumption self-control by rationing purchase quantities of virtue and vice. *Marketing Sci.* 17(4):317–337.

Wilcox K, Vallen B, Block L, Fitzsimons GJ (2009) Vicarious goal fulfillment: When the mere presence of a healthy option leads to an ironically indulgent decision. *J. Consumer Res.* 36(3):380–393.

Williamson DF, Kahn HS, Byers T (1991) The 10-y incidence of obesity and major weight gain in black and white US women aged 30–55 y. *Amer. J. Clinical Nutr.* 53(6, Suppl.):1515S–1518S.