Smelling Your Way to Satiety: Impact of Odor Satiation on Subsequent Consumption Related Behaviors

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Marketers are increasingly using food related olfactory-cues to stimulate consumer interest and increase the sale of food and beverage items. In contrast to the industry wisdom, we show that being exposed to an odor of a food item (for e.g., odor of Popcorn) for a long duration reduces subsequent consumption behaviors related not only to food but also beverages, a notion we term as odor-satiety. Interestingly, our results suggest that while odor-satiety reduces subsequent consumption of food and drink it does not reduce the appetite (wanting) for more food and drink. Further, our findings show that odor-satiety enhances liking for the utilitarian items.

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Symposia Summary
What’s Your Motivation?
Affective and Cognitive Processes that Motivate Behavior and Choices
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SESSION OVERVIEW

“People’s behavior makes sense if you think about it in terms of their goals, needs, and motives”
-Thomas Mann

Introduction: What drives us to pursue our goals, what motivates us to behave in certain ways, how does our motivational system work have all been questions that have evoked considerable interest through the ages. Greek Philosophers such as Aristotle believed human behavior to be motivated by a desire to pursue goals that led to pleasurable outcomes or to the avoidance of painful outcomes. Hindu philosophy, on the other hand, perceived human behavior to be tied to intrinsic motivation. The importance of understanding what motivates human behavior and choices has been recognized by the consumer researchers as well. Extant research in social as well as consumer psychology has examined the mechanics of motivation through a variety of lenses including rewards and incentives (Deci 1971; Kivetz 2005), drive reduction theory (Hull 1951; Mowrer 1960) and hedonic versus utilitarian motives (Shiv and Federikhin 1999; Dhar and Wertenbroch 2000; Kivetz and Simonson 2002). The three papers in this session integrate some of these perspectives in presenting a dynamic view of goals and motivation.

Session Objective and Overview: The broad purpose of this session is to present work that adds significantly to the growing body of research on motivational factors underlying choices and behaviors. The more specific objectives of the proposed session are—1) examining how mental framing of choice alternatives and incentives can motivate choices and performance on a subsequent task and 2) shedding light on the process by which motivational states get satiated and the impact of satiated motivational states on subsequent consumption related behaviors. Keeping in mind the overall theme of the 2007 ACR (“Building Bridges”), the papers in this session explore the factors that impact the motivation underlying consumer behavior from diverse, yet related perspectives.

The session will begin with a focus on how framing an incentive in terms of gains or losses affects task-motivation. The first paper by Goldsmith and Dhar examines how the threat of a loss can enhance motivation on a task. Goldsmith and Dhar demonstrate that though people predict the incentives framed in terms of gains to be more motivating, incentives framed in terms of losses act as more powerful motivator in experience.

The second paper by Zhang and Fishbach builds on the first paper by extending the impact of mental framing on consumer motivation into the domain of consumer choices. Zhang and Fishbach’s research explores how the mental framing of choice alternatives pertaining to goals and temptation motivates people’s choices. To elaborate, Zhang and Fishbach demonstrate that when choice alternatives pertaining to goals and temptations are presented as a unified choice set, people assign a greater value to the temptation option. In contrast, when the same choice alternatives are presented in two different choice sets, people assign a greater value to the higher goal related option.

Finally, the third paper by Nowlis, Shiv and Wadhwa complements the first two papers by demonstrating the factors that satiate consumers’ motivation to engage in consumption-related behaviors. Specifically, Nowlis, Shiv and Wadhwa demonstrate that being exposed to the odor of a food item can satiate the consumer and, therefore, reduce the subsequent consumption of not only the food item smelled to satiety but of other food and beverage items as well.

Collectively, the three papers provide cutting edge counterintuitive insights into the motivational processes that drive consumer behavior and decision making.

EXTENDED ABSTRACTS

“The Effect of Incentive Framing on Working Harder: Doing More Than We Predict”
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Although it is well established that consumer behavior is goal driven, reaching a goal target often requires exerting effort on multiple tasks (e.g., the goal to lose 10 lbs. requires choosing healthy meals on multiple occasions). Much recent research has focused on self-regulation through changes in intrinsic motivation or goal commitment (e.g., Fishbach & Dhar, 2005). The role of extrinsic rewards on self-regulation and goal motivation has not received the same degree of attention in the academic literature, though extrinsic rewards have long been used as motivators (See Deci et al., 1999 for review) and firms often use rewards to motivate consumer behavior. For instance, a recent government initiative designed to motivate performance on advanced placement tests is now offering high school students $100 per test passed along with hedonic gifts (e.g., iPods) for attending test prep classes (Hechinger & Warren, 2007).

The current project makes an initial attempt at addressing the effectiveness of extrinsic motivation (e.g., monetary payment) on meeting a goal target depending on whether the incentive is framed as a gain or a loss from a reference point. Consider an individual has to perform a set of eight challenging tasks in order to meet her goal. In one scenario, she learns that she will receive $25 for each task successfully completed for a maximum payment of $200. Now imagine a scenario where she is given a $200 at the outset then learns that $25 will be deducted for each task which is not successfully completed. Under both incentive structures, the goal target is identical (completing the set of tasks) and the incentive is the same ($25 per task successfully completed). Building on the research on loss aversion in the formation of preferences (Kahneman et al., 1991), we posit that motivation to perform a set of tasks will be enhanced when task accomplishment allows one to avoid incremental losses in relation to when the same value framed in terms of incremental gains.

We further examine whether people’s predictions of which monetary payment structure would be more motivating diverge from their real time persistence and performance. Specifically, while the real time motivation reflects the affective experience (e.g., the predicted pain or pleasure from the gain/loss of the external incentive), people’s prospective evaluations are often based on general beliefs or intuitions. Therefore, we hypothesize that when making predictions about how motivating an incentive
would be individuals may overweight how enjoyable it would be to work on the task in one scenario versus the other based on a belief that enjoyment and motivation positively correlate, rather than considering the effectiveness of the incentive at motivating persistence.

These hypotheses were tested in a series of eight studies. The first two studies tested real-time persistence and performance on challenging tasks, when incentives were framed in terms of gains or losses from a reference point. In the first study, participants were given a task to complete which involved unscrambling six anagrams, two of which were unsolvable. Time spent persisting at these unsolvable anagrams was used to measure motivation. Participants were either told that they would receive $0.25 per correct answer or they were given $1.50 at the outset and told that they would lose $0.25 per incorrect answer. Consistent with our predictions, people persisted longer when their incentive was framed in terms of losses. As Study 1 did not allow performance to vary with effort, Study 2 involved a task where increased effort was reflected in performance. In line with our predictions, performance was enhanced when the incentive was framed in terms of losses.

In order to test the participants’ intuitions about the effect of incentive framing on motivation, we conducted prediction studies designed to parallel to our real-time studies. Across different study designs (within vs. between participants), dollar amounts ($200 vs. $1.50) and tasks (anagram task vs. doctor’s visits) people consistently and incorrectly predicted that the gain-framed incentive would be more motivating.

We next sought to test the underlying mechanism for this divergence, assessing if an overweighting of predicted enjoyment contributes to this discrepancy. Our results supported this. We presented participants with descriptions of both gain and loss framed incentives and asked them to indicate which would be more enjoyable to work towards (“no difference” was also an option). Participants believed it would be more enjoyable to work towards an incentive framed in terms of gains (Study 5) and believed that incentives which are more enjoyable to work towards were more motivating (Study 6). To test for the belief in a positive correlation between motivation and enjoyment, we presented participants with either an incentive framed in terms of gains or one which is framed in terms of losses and had them rate both how enjoyable and how motivating the incentive would be (Study 7), finding that predicted enjoyment and motivation did significantly positively correlate.

Having demonstrated this prediction/experience disparity and identified an overweighting of predicted enjoyment as one driver, we lastly sought to empirically test for de-biasing manipulations to bring predictions more in line with real-time task persistence. We found that forcing participants to briefly work on difficult anagrams related to a goal pursuit, and evaluate goal-related options (e.g., vegetables) and temptation-related options (e.g., burger) either together in one image (“together” condition), or in two separate images arranged next to each other (“apart” condition). Participants rated the extent to which each of the featured items was visually appealing. We found that when the items were presented together in one picture, participants rated the goal-related items to be less appealing than the tempting items, while the items presented apart in two separate images next to each other, they rated the goal-related item to be more appealing than the tempting items.

Our next study extended Study 1 by using menu courses with verbal descriptions to ensure that the items were understood the same across conditions. Participants in the “apart” condition received two restaurant menus: one contained exclusively healthy courses (healthy menu), and the other exclusively unhealthy courses (unhealthy menu). In contrast, those in the “together” condition received a menu that contained all courses from the healthy and unhealthy menus, and the order was mixed (mixed menu). Participants in the control condition received either the healthy or unhealthy menu. All courses in the menus were followed by a short description. For the dependent measure participants rated the appeal of each of the courses. We found that participants in the control


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When browsing through a restaurant menu, how does the presence of fatty, yet tasty, courses influence the value of healthy menu items, or vice versa? In this research we propose that, when both goal- and temptation-related items are present, the value of these options will be influenced by the format of presentation as together in a unified choice set, or apart in two different choice sets sorted by the underlying goals. These presentation formats activate the corresponding dynamic of either balancing between goals and temptations or highlighting the high-order goal, which in turn influence value and choice.

Specifically, when goal- and temptation-related options are presented together in a unified choice set, they appear to complement each other, which justifies balancing between the options and increases the immediate value of temptations. For example, presenting tasty (yet unhealthy) candies and healthy fruits in the same plate elicits a sense that they complement each other and it is justified to consume temptation now and balance later. Consequently, the immediate value of candies increases, compared with fruits.

However, when choice alternatives are presented apart in two separate sets sorted by the underlying goals, they appear to compete with each other, which motivates highlighting the high-order goal and fosters a positive evaluation of goal-related options. For example, when candies and fruits are served in two separate plates, they appear to be in competition. This presentation format highlights the fact that fruits represent a more important goal and consequently the immediate value of fruits increases relative to candies.

To summarize, we expect that when goal- and temptation-related options are presented in a unified choice set, the plan to balance causes an increase in the value of tempting (vs. goal-related) alternatives and an immediate preference for temptations. Conversely, when goal- and temptation-related alternatives are presented in two choice sets organized by the underlying goal, people are motivated to highlight goal pursuits, and evaluate goal-related (vs. tempting) alternatives more positively.

Four studies tested this general hypothesis. The first study presented images of goal-related items (e.g., vegetables) and tempting items (e.g., burger) either together in one image (“together” condition), or in two separate images arranged next to each other (“apart” condition). Participants rated the extent to which each of the featured items was appealing. We found that when the items were presented together in one picture, participants rated the goal-related items to be less appealing than the tempting items, while the items were presented apart in two separate images next to each other, they rated the goal-related item to be more appealing than the tempting items.

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condition perceived the healthy and unhealthy courses as equally appealing. However, when the healthy and the unhealthy courses were presented apart in two separate menus, participants rated the healthy courses as more appealing than the unhealthy courses, but rated the unhealthy courses to be more appealing than the healthy ones when they were presented together in one mixed menu.

Our third study tested whether people indeed perceived the options to be complementing and planned to balance in the future when they were presented together, but perceived the same options to be competing and chose to highlight when presented apart. In this study participants were asked to hypothetically choose two magazines: one for immediate reading, the other for later. The options included equal number of high-brow (e.g., TIME, Newsweek) and low-brow magazines (e.g., Vogue, SI). We gave participants in the “together” condition one list that included all magazines in mixed order, and gave participants in the “apart” condition two separate lists, each containing only one type of magazines (high or low-brow). We found that presenting the options together (vs. apart) reduces an immediate choice of high-brow magazines but did not affect the subsequent intention to choose a high-brow magazine. In addition, participants were more likely to switch from a low-brow to a high-brow magazine when the options were presented together than when they were presented apart. The same pattern was found with menu courses.

Our final study tested whether these evaluations and plans influence people’s actual choices. Participants, after a filler task, were asked to make a choice between a chocolate bar and baby carrots. In the together condition, the chocolate bars and carrot bags were scrambled together in one plate; in the apart condition, the two options were put in separate plates placed next to each other. We found that participants chose more chocolate bars when the options were presented together (vs. apart). Further analyses indicated that participants’ dieting orientation predicted their choice when the options were presented apart from each other but not when these options were presented together.

In summary, in this research we found that when choice alternatives pertaining to goals and temptations appear together in a unified choice set, they seem to complement each other and prompt a self-regulatory dynamic of balancing. The result is that people assign greater value to temptation-related (vs. goal-related) options, and are more likely to choose them. However, when the same choice alternatives are presented apart from each other in two separate choice sets sorted by the goals they serve respectively, the options seem to compete against each other and prompt a self-regulatory dynamic of highlighting the more important goal. As a result, people evaluate goal-related (vs. temptation-related) more positively and are more likely to choose them.

“Smelling Your Way to Satiety: Impact of Odor Satiation on Subsequent Consumption Related Behaviors”
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Imagine reading a book sitting in the Barnes and Nobles book store with the odor of freshly baked cookies wafting from the café inside the store. Would the odor of these freshly baked cookies enhance or reduce your subsequent consumption of food and beverage? Common intuition would suggest that the appetitive odor of cookies is likely to increase subsequent consumption of food. In line with the common intuition, marketers are increasingly encouraging the use of food related olfactory cues in restaurants and hotels to enhance their sales.

On the contrary, is it possible that being exposed to food odors will reduce subsequent consumption of food? An emerging body of work on sensory satiety seems to point to this possibility. Specifically, research in the domain of sensory satiety suggests that the sense of satiety is not only influenced by the macronutrient properties of the food (i.e., energy consumed in the process of eating food), but also by other sensory properties of the food such as the odor of food (Rolls 1989, 2005). Thus, according to this notion that we will refer to as “odor-satiety,” it is likely that just being exposed to the odor of food for a long duration could reduce subsequent consumption of food.

In sum, the implications for odor-induced consumption behaviors arising from odor-satiety clearly contradict those arising from common intuition that seems to be reflected in the growing practice of using odors to stimulate consumers’ appetites. A broad goal of this research, therefore, is to examine which of the two contradictory predictions would receive empirical support in the context of odor-induced consumption behaviors.

To test the aforementioned hypothesis, in study 1, we randomly assigned participants to either an odor-present or odor-absent conditions. To disguise the purpose of the study, participants were informed that they would watch a documentary, purportedly as part of a study conducted for TiVo. Participants were further told that as compensation for taking part in the study, they would be provided with food. In both the odor-present and the odor-absent conditions, participants watched the documentary for 12-minutes. In the odor-present-condition, the room was filled with the odor of popcorn. Following the purported study for TiVo, participants responded to mood and fatigue measures. Thereafter, participants left the first room and proceeded to another room, one person at a time. On reaching the second room, where food items were on display, each participant indicated his/her choice of food and drink on a checklist that contained the five displayed food items (chips, cookies, M&Ms, popcorn and pretzels). Food choices formed the main dependent variable in this study. The results of study 1 seem to support the odor satiety effect. Specifically, being exposed to an appetitive food odor led to a decrease in subsequent consumption behaviors related not only to the cued food item but food in general. No differences in mood and fatigue level were found across conditions.

Our second study aimed to achieve the following three objectives. Our first objective was to examine whether exposure to a food odor can have broader cross-modal effects wherein the effects extend to beverage items as well. Another objective of study 2 was to examine whether the diminished effects on consumption are mediated by a loss of appetite (i.e., wanting) for food and beverage or by a diminished liking for food and beverage. Finally, study 2 examines the odor-satiation effects documented in study 1 extend to non food related odors as well.

The basic procedure of study 2 was similar to that used in study 1. In study 2, however, we included a non-food odor condition. As in study-1, participants in all the conditions watched a movie in a room infused with either the odor of popcorn (food-odor condition), lavender (non-food odor condition) or no-odor (control condition). Participants subsequently indicated on 11-point (not at all/very much) scales their urge to drink and urge to eat. Thereafter, participants were ushered to another room with various food and beverage items on display. Participants chose the food item(s) and the size of the drink item(s) they desired to consume in the next room, while working on the remaining part of the study. Subsequent to making the food and drink choices, participants moved to the adjoining room, where they rated their liking for various utilitarian and hedonic products.

The findings of study 2 suggest that odor satiety effects are not restricted to appetitive food odors. Specifically, these findings suggest that not only exposure to appetitive food odors, but expo-
sure to appetitive non-food odors can also lead to a decrease in subsequent consumption behaviors related to food. Moreover, study 2 results indicate that odor satiety leads to a broader cross-modal effects, such that participants in the appetitive food and non-food odor conditions, as compared to the control condition, showed reduced behavioral tendencies toward not only food but also beverage items. Interestingly, our findings also show that there were no differences in the urge to drink and eat across conditions. In other words, these results seem to suggest that the documented odor satiety effects are engendered through an impact on the anticipated hedonic value (liking) of the food and beverage items and not through an impact on the appetitive value (wanting) for the food and beverage items. Thought not predicted, another interesting finding was that while odor satiety reduces consumption behaviors related to food and drink, it actually enhances liking for the utilitarian items.

Taken together, our findings provide support for the odor satiety effect at a cross-modal level, whereby exposure to food odors on one hand reduced subsequent consumption of food and drink, while on the other hand it enhanced a liking for utilitarian items. Our findings have important implications for the use of odors to promote the sale of products especially those in the food and beverage category. In a third study that is currently in progress, we are attempting to 1) better elucidate the impact of odor satiety on liking versus wanting for the food and non-food consumer items and 2) examine the impact of odor satiety on impulsive behaviors.

REFERENCES