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Labovitz School of Business & Economics, University of Minnesota Duluth, 11 E. Superior Street, Suite 210, Duluth, MN 55802

Does Reducing Nutritional Information Complexity Promote Healthier Food Choices?

Hristina Dzhogleva, University of Pittsburgh, USA

Jeff Inman, University of Pittsburgh, USA

Jim Maurer, Catalina Marketing Corporation, USA

We examine how the ease-of-processing of nutritional information at the point of purchase impacts consumers' food choices. Our work reveals that facilitating consumers' understanding of nutritional information by disclosing nutritional facts in a simple and easy-to-process format can help them make healthier food decisions.

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Nudging Consumers in the Right Direction: Effective Interventions for Tackling Obesity

Chair: Hristina Dzhogleva, University of Pittsburgh, USA

Paper #1: ‘Does This Tax Make Me Look Fat?’: Using Stigma-Inducing Labels to Decrease Unhealthy Food Consumption

Avni Shah, Duke University, USA
James R. Bettman, Duke University, USA
Punam Anand Keller, Dartmouth College, USA
Peter Ubel, Duke University, USA

Paper #2: Does Reducing Nutritional Information Complexity Promote Healthier Food Choices?

Hristina Dzhogleva, University of Pittsburgh, USA
J. Jeffrey Inman, University of Pittsburgh, USA
Jim Maurer, Catalina Marketing Corporation, USA

Paper #3: Promoting Portion Downsizing by Improving Consumer Response to Percentage Cost vs. Percentage Benefit Offers

Bhavya Mohan, Harvard Business School, USA
Pierre Chandon, INSEAD, France
Jason Riis, Harvard Business School, USA

Paper #4: Choosing to Participate: The Effects of Message Type on Enrollment and Participation

Eleanor Putnam-Farr, Massachusetts Institute of Technology, USA
Jason Riis, Harvard Business School, USA

SESSION OVERVIEW

The United States is the most obese country in the developed world, with obesity rates already reaching epidemic proportions. About two thirds of adults and one third of children in the US are either overweight or obese. Moreover, obesity is considered to be one of the costliest plagues of the 21st century since it contributes significantly to the already high healthcare costs of the nation - obesity-related healthcare costs are expected to exceed \$300B by 2018.

Past efforts to address the problem of obesity have been largely unsuccessful and public policy makers are looking for new initiatives that could prove helpful in curbing the obesity epidemic. Therefore, the four papers in this session (all in advanced stages of completion) offer interventions that have the potential to solve the obesity problem by tackling two of its leading causes – the increased consumption of unhealthy foods and the lack of physical activity.

The first three papers focus on ways in which consumers could be encouraged to make healthier food choices. Specifically, Shah, Bettman, Keller, and Ubel assess the effectiveness of economic and stigma-inducing interventions in reducing unhealthy food choice and consumption and show that stigma-inducing signals prove superior to economic interventions alone (‘unhealthy’ label versus 17.5% tax). The second paper by Dzhogleva, Inman, and Maurer examines how the ease-of-processing of nutritional information at the point of purchase impacts consumers’ food choices. The authors reveal that facilitating the understanding of nutritional information by disclosing nutritional facts in a simple manner helps consumers make healthier food decisions. Mohan, Chandon, and Riis study the moderating role of cognitive ability on consumers’ ability to objectively assess the value of percentage-based promotions. Importantly, the authors demonstrate that providing ratio-based rates nudges consumers away from obesogenic, higher-calorie percentage benefit offers (33% bonus size) in favor of healthier, lower-calorie percentage cost offers (33% price discount) that are also superior from a unit-price perspective. Finally, Putnam-Farr and Riis seek to combat the lack of physical activity part of the obesity problem and evaluate the effectiveness

of different recruitment messages on enrollment and participation in a physical activity tracking program. Results show that active choice leads to higher enrollment and equally strong participation as opt-in; moreover, messages focused on intangible health benefits and non-quantified rewards lead to higher duration of participation than those emphasizing quantifiable rewards.

Using diverse methods (lab and field experiments, household shopping data) and offering the perspectives of diverse researchers and a practitioner, all papers in this session aim to make a difference in consumers’ lives by answering collectively the following question: How should we structure consumers’ choice environments such that they promote healthier choices? Thus, all papers converge around the common theme of nudging consumers in the right direction and helping them make decisions that would benefit their long-term wellbeing. We expect this session to be of great interest to a broad audience of researchers, consumers, public policy makers, and health practitioners interested not only in combating obesity but also in improving consumer welfare in general.

‘Does This Tax Make Me Look Fat?’: Using Stigma-Inducing Labels to Decrease Unhealthy Food Consumption

EXTENDED ABSTRACT

Obesity and unhealthy food consumption are two of the largest public health concerns nationwide. Obesity rates have more than doubled in the past few decades. While there is debate regarding the cause of obesity, most research has argued that increased consumption of unhealthy food and beverages is a major driver of obesity (Chandon and Wansink 2007, 2011; Young and Nestle 2002). Many public health advocates have suggested that large-scale interventions are necessary to combat the epidemic. While there are proponents of increased nutrition education, others have suggested the use of a tax on unhealthy food and drinks.

Although an economic approach is one possible way to attenuate consumption of unhealthy food, will consumers even notice a price change? Are there other approaches that may be equally, if not more so effective? For example, an intervention that explicitly associates unhealthy food choices to an undesirable social identity may actually be more effective at reducing consumption. Consumer research has shown that individuals attribute a wide array of traits and characteristics such as social appeal, morality, and gender roles to others based on their food choices and consumption habits (Rozin et al. 2012). As a result, what one chooses to eat can have important implications for not only one’s sense of self but also impression management, social judgment, and status (Vartanian, Herman, and Polivy 2007). One of the most devalued and negative identities in social contexts is stigma, which Goffman (1963) characterized as one of the greatest social risks that reduces the stigma bearer “from a whole and usual person to a tainted, discounted one” (p. 3). Given that individuals are conscious of their social identity and strongly seek to avoid social stigmatization from engaging in negative or deviant behavior, it is surprising how little research has examined the influence of explicit stigma-inducing signals on how individuals make food choices, a major area of interest in public health. Using the context of food choice and consumption in a real-world social setting and in controlled lab experiments, we examined the unique and combined effect of economic and stigma-inducing interventions on food choice and consumption. We also investigated

whether gender and social context (i.e., whether one dines with a friend or alone) moderated the effectiveness of these interventions. Finally, we examined whether self-construal differences between men and women, specifically independent self-construal versus interdependent self-construal, mediated the effectiveness of these interventions on unhealthy food choices.

In Experiment 1, we used a real-world restaurant context to test our initial hypotheses. Over a 16-day span we measured entrée choice and consumption (measured in grams) at a local, mid-priced tapas restaurant open from 4pm-midnight. We ran the study from Monday-Thursday for 4 weeks counterbalancing conditions ($N=464$ tables, 1063 people, 669 women). We used four different menus containing the same entrée items: *Control* (no unhealthy food tax or stigma label), *Food Tax* (17.5% price increase on unhealthy food items, no stigma label), *Stigma Label* (marked unhealthy items with an asterisk and an explicit 'Unhealthy' label, no food tax), *Combined* (unhealthy food tax plus stigma label). Stigma labels significantly reduced unhealthy entrée choice ($p<0.01$) and unhealthy food consumption ($p<0.01$) more than the food tax alone or the control group. The effect of unhealthy stigma labels was moderated by gender, where higher proportions of men at the table significantly increased unhealthy choices and consumption of unhealthy food ($p<0.01$).

In Experiments 2 and 3, we used a hypothetical food choice scenario to examine whether we could replicate our findings from the field in a more controlled laboratory setting. Experiment 2 tested whether gender moderated the effect of economic and stigma-inducing signals on food choices. An MTurk sample ($N=1800$) of men and women selected an entrée items from a hypothetical menu with six items (2 beef, 2 chicken, 2 fish, with 1 healthy and 1 unhealthy item within each food group). We used the same four menu conditions as Experiment 1. Replicating the field study, stigma labels are significantly more effective at reducing unhealthy food choices than an unhealthy tax alone or the control group ($p=0.007$). There was also a significant Gender X Food Tax X Stigma Label interaction ($p=0.05$): women chose healthier dishes when unhealthy items had a stigma label ($p<0.01$). Men and women selected more healthy items when unhealthy food was taxed and there was a stigma label ($p<0.01$).

In Experiment 3, we examined how dining with a same-sex friend influenced the interaction between gender and economic and stigma-inducing interventions on the proportion of individuals choosing an unhealthy menu option. In addition, Experiment 3 sought to investigate a potential mechanism for these effects. Specifically, using the same food choice scenario as Experiment 2, we examined whether self-construal differences between men and women mediated the effectiveness of economic and stigma-inducing interventions on unhealthy food choices. Men eating with other men chose more unhealthy options ($p<0.01$) while women eating with other women chose healthier options ($p<0.01$) in comparison to dining alone. Self-construal differences among men and women fully mediate the effects of the stigma label: Men chose more *unhealthy* items when there was an 'Unhealthy' label, the more they were concerned that others would think they were wimpy and less masculine, a more interdependent mindset. In contrast, women chose more *healthy* items when there was an 'Unhealthy' label, the more they felt uncomfortable by others and wanted distance from unhealthy individuals, a more independent mindset.

In the field and lab setting we demonstrate that increasing the tax on unhealthy items alone, even substantially by 17.5% is insufficient for reducing the proportion of individuals choosing an unhealthy entrée. A combination of food tax and a stigma label such

as marking items as 'Unhealthy', significantly reduced unhealthy choice, regardless of gender and dining partner. We also demonstrate that interdependent/independent self-construal differences among men and women drive these effects. These studies have important practical implications and also demonstrate that social constructs such as stigma may moderate previous notions of gender and self-construal mindsets.

Does Reducing Nutritional Information Complexity Promote Healthier Food Choices?

EXTENDED ABSTRACT

The Nutritional Labeling and Education Act (NLEA) was one of the biggest efforts by policy makers to promote healthy eating among Americans. Unfortunately, it has failed to curb the obesity epidemic, so policy makers and marketers are seeking new ways to impact consumers' dietary decisions. A recent trend among food retailers is to implement in-store nutrition scoring systems that communicate the nutritional value of foods in a simplified manner (e.g., Guiding Stars, NuVal). Our research examines whether facilitating the understanding of nutritional information through such nutrition scoring systems at the point of purchase helps consumers make healthier food choices.

Past research demonstrates that the complexity of understanding nutritional information has impeded consumers from making smarter food choices. Cohn et al. (2012) report that point-of-purchase calorie postings in restaurants are not effective in encouraging consumers to embrace healthier eating because consumers find it difficult to comprehend and use the provided information. This suggests that in order for nutritional information to be incorporated into consumers' decisions, it does not have to be only available at the point of purchase but also easily "processable" (Betman 1975; Russo 1975). Russo et al. (1986) argue that consumers face three types of costs in incorporating nutritional information into their food decisions: collection costs (time and efforts to acquire the information), computation costs (efforts in combining the gathered information into an overall evaluation), and comprehension costs (efforts to understand the nutritional information). Reducing all three costs leads to greater reliance on products' nutritional content in making food choices (Russo et al. 1986).

Although the NLEA largely eliminated consumers' collection costs, it had less impact on their computation and comprehension costs. Therefore, we propose that providing simpler and easy-to-process nutritional information which reduces all three types of costs will prove helpful in prompting consumers to purchase healthier foods. In other words, we anticipate that the nutrition content of shoppers' purchases will be higher after the introduction of the nutritional scoring system than before the scores were available at the store (H1). We further predict that this effect will be stronger in categories with greater variability in the healthiness of the offered products (H2). In such categories consumers have a wider variety of products to switch to. Moreover, purchasing a healthy product from a mixed set of both relatively healthy and unhealthy alternatives provides consumers with greater utility than when such a purchase is made from a homogeneous opportunity set (Dhar and Wertenbroch 2012). We also propose that the effect in H1 will be stronger in healthier product categories (H3) because past research suggests that consumers are more likely to use nutritional information in categories which are perceived to be more nutritious (Brucks, Mitchell, and Staelin 1984). Finally, we anticipate that consumers who do not switch away from unhealthy foods after the introduction of the scoring system at the store will buy fewer items of those foods (H4).

We test our predictions using 12-months of individual shopper sales data for over 528K shoppers of a Northeast grocery chain. The data consists of 40.2M purchases in eight product categories: frozen pizza, ice-cream, salad dressing, soup, spaghetti sauce, tomatoes, granola bars, and yogurt. In early 2009, the grocery chain implemented the NuVal Nutritional Scoring System, which assigns each SKU a 1-100 score based on its nutritional value. Since the NuVal scores were displayed on the shelf tags, after their introduction, consumers could easily determine and understand the nutritional value of all foods. Our data contains information about consumers' purchases before and after the NuVal introduction in the chain, allowing us to use the first 6 months as the baseline and assess its impact on consumers' food choices using a quasi-experiment.

To test H1-H3, we estimate a hierarchical linear model in which shoppers' purchases (level 1) are nested within the categories (level 2). The dependent variable is the average volume-weighted NuVal score of each shopper's purchases (i.e., the nutrition content of shoppers' purchases), which is predicted by the period (contrast coded: -1=pre-NuVal introduction; 1=post-NuVal introduction). We allow both the intercept and the slope of period to vary randomly across the eight different product categories (the level-2 units); moreover, the slope of period is specified as a function of two category-level variables – the perceived category healthiness and the variability in the healthiness of the offered products in each category. The perceived healthiness was obtained from a separate survey in which shoppers from an online panel were asked to rate the healthiness of the eight product categories on a 7-point scale (1="Very Unhealthy," 7="Very Healthy"). The variability in the healthiness of the offered products is operationalized using the standard deviation of the NuVal scores of all products in the category. Both level-2 predictors are grand-mean centered.

Results support H1, revealing that the nutritious content of shoppers' purchases in the post-NuVal introduction period was significantly higher than in the pre-NuVal period ($p < .0001$). Furthermore, in line with H2 and H3, the cross-level interactions of period with the two category-level predictors are significant (both $p < .0001$), suggesting that the effect of the nutrition scoring system on shoppers' food choices was stronger in healthier categories and those with greater variability in the healthiness of the offered products.

To test H4, we estimate a separate two-level random-intercept, random-slope hierarchical linear model in which the change in total units purchased by each shopper (post – pre) is predicted by the change in the nutrition content (NuVal score) of the shopper's purchases (post – pre). Results demonstrate that shoppers who did not improve the nutritious content of their purchases after the introduction of the scoring system at the store reduced the number of units they bought ($p < .0001$), thus supporting H4.

In sum, our work reveals that facilitating consumers' understanding of nutritional information by disclosing nutritional facts in a simple and easy-to-process format can help them make healthier food decisions. Our findings have important practical implications for consumers, food manufacturers, grocery retailers, and public policy makers interested in combating obesity.

Promoting Portion Downsizing by Improving Consumer Response to Percentage Cost vs. Percentage Benefit Offers

EXTENDED ABSTRACT

Marketing communication, particularly in the domain of food, frequently contains percentage information about benefit changes

(e.g., 50% larger food packages) or about cost changes (e.g., 50% price reduction). Nominally equivalent percentage changes to the cost versus the benefit associated with an offer are not economically equivalent in terms of cost/benefit or benefit/cost ratio. To compare two percentage changes in cost and benefit requires knowing whether $x\%$ is bigger or smaller than $-x/(1+x)\%$; this comparison involves multiple arithmetic operations and is very difficult to do mentally, even in the simplest cases (e.g., +50% vs. -33%). Chen, Marmorstein, Tsiros, and Rao (2012) have shown that, when comparing offers with percentage information (e.g., a 50% quantity increase vs. a 33% price reduction, which has the same unit price consequence), consumers focus on the nominal percentage and fail to take into account the base levels of these percentages, a phenomenon that they called "base value neglect".

Across four studies, we examine the robustness of the effect found for bonus packs vs. price changes by Chen, et al. (2012), and demonstrate the moderating roles of consumer goals (minimize cost, maximize benefit, or maximize value), cognitive reflection (Frederick, 2005), and provision of a cost/benefit vs benefit/cost ratio (such as unit price) (Manning, Sprott, & Miyazaki, 2003; Larrick & Soll 2008).

Study 1 asked participants to choose between a 33% quantity increase and a 33% price decrease (or a 33% quantity decrease and a 33% price increase) for their favorite brand of yogurt or ice cream. Overall, consumers were indifferent between the % price and % quantity offers, regardless of category and whether people were choosing between two gains or two losses. However, there was a strongly statistically significant interaction between outcome valence (gain or loss) and consumer goal ($p < .001$). For example, consumers who were seeking to minimize cost strongly preferred the 33% price decrease over the 33% quantity increase in the gain condition and strongly preferred the 33% quantity decrease to the 33% price decrease in the loss condition. We also find that the Cognitive Reflection Test (Frederick, 2005) is a particularly good predictor of base value neglect because it captures the tendency to follow the intuitive (but wrong) answer instead of engaging in more effortful system-2 computation. Participants who scored above a 0 on the CRT test strongly preferred the economically-superior 33% price change over the 33% quantity change. Finally, we show that providing rate information such as price per unit reduces consumer errors when comparing percentage offers, regardless of CRT score. Participants who were exposed to the unit price were no longer indifferent, and strongly preferred the 33% price change over the 33% quantity change.

In the subsequent 3 studies, we demonstrate the moderating role of CRT, and the corrective effect of providing a ratio, across a variety of tasks and domains. In Study 2, we asked participants to rank printers by speed after taking account either a % change in pages per minutes (benefit) or a % change in the minutes (cost) needed to print a page. Once again, we find that those scoring high on the CRT made better choices. Providing a ratio, in the form of pages per minute, also has a significant effect on participant accuracy ($p < .01$). Next, we examined whether the way a ratio is presented (cost/benefit vs. benefit/cost) influences a consumer's likelihood of responding to the unit price implications of a cost versus a benefit percentage change. In Study 3, we asked participants to assess percent changes when comparing wireless plans, and manipulated the ratio type by providing either seconds/cents or cents/seconds. We find that people fail to realize that a percentage cost change is better than the opposite percentage benefit change, even when the cost and benefit base values are identical. Moreover, in the presence of a ratio, significantly more participants correctly chose the economically-

superior cost change when the ratio was framed as a cost/benefit as opposed to a benefit/cost, particularly when choosing between 2 losses. Finally, in Study 4 participants completed a word search puzzle at a given wage (6 cents/word), and subsequently chose between the following two payment options for completing a bonus puzzle: a 50% increase in the wage paid per word (9 cents/word), or a 50% decrease in the number of words needed to make the same wage (12 cents/word). Participants with a CRT score greater than zero, as well as participants given the unit wage, were more likely to make the economically optimal choice in this incentive compatible field experiment.

Our results suggest that marketers should frame their offers as a percentage benefit change, which produces the largest nominal percentage, rather than by the equivalent percentage cost change. In general however, framing offers as a percentage benefit change rather than a percentage cost change will lead consumers to sub-optimal choices. There are practical implications for consumers making food choices when faced with percentage promotions without accompanying unit prices. If a consumer fails to comprehend that 35% price reduction is better than a 50% quantity bonus from a unit price perspective, they will tend to choose the larger portion, thus increasing the likelihood of overeating (Wansink, 1996; Young & Nestle, 2002). Conversely, consumers are less likely to choose a healthier but smaller portion (e.g., pastry made from real butter instead of palm oil) if someone points out that it is 50% smaller than the regular portion than if the comparison highlights that it is 35% more expensive. At the moment, unit prices are not mandatory for retail distribution in all US states and are never mandatory when accompanying percentage price promotions and in non-retail domains (U.S. Department of Commerce, 2013). Thus, our findings have important implications for public policy. They reaffirm the effectiveness of providing unit price information, which is currently only mandatory in brick-and-mortar retailers (and not in restaurants, for example). We think that rate information, in particular unit prices, should be made mandatory everywhere and not just for brick and mortar retailers.

Choosing to Participate: The Effects of Message Type on Enrollment and Participation

EXTENDED ABSTRACT

As more services (including health services) move online, the development of communication strategies to maximize enrollment and engagement has become increasingly important. Programs like Boost (activity tracking) are increasingly used as relatively low cost ways to engage consumers and employees in activities that can improve healthy behaviors and reduce problems related to obesity and its associated diseases. While some research has shown that message framing and choice architecture can affect enrollment, these studies have usually taken place in a forced choice environment where the consumer's attention is high. The reality is that most recruitment for most online services comes through email or other cluttered channels where attention is lower. Furthermore, engagement (or participation after enrollment) has rarely been examined, yet engagement is a major objective of services that require renewal, or for services that are designed specifically to help consumers manage their own behavior, particularly in the domain of health.

We address both of these issues in a large scale field experiment where over 17,000 employees of a large American company were invited to enroll and participate in an activity tracking program (Boost) and find strong benefits to active choice along with significant differences in participation resulting from the different message

frames. Focusing on a high quantified reward is most effective for getting people's attention, but it does not yield the best outcomes for participation. Thus, marketers who want to involve participants for the long term, such as in diet and exercise programs, would be best served by using an active choice frame which emphasizes a non-quantified reward.

While research on choice architecture has focused initially on the differences between opt-in and opt-out, a number of recent studies (e.g., Carroll et al. 2009; Keller et al. 2011) have started to include an active choice component, where participants are forced to choose between enrolling or not enrolling rather than being presented with a default. Active choice has generally been used synonymously with forced choice because the scenarios have forced participants to choose one or the other option (usually a yes/no for enrollment), yet forced choice opportunities are relatively rare under most recruitment situations.

Despite the knowledge among researchers that expected rewards can have a deleterious effect on intrinsic motivation (Deci, Koestner, and Ryan 1999), practitioners continue to use rewards as a means of attracting participants due to their strong immediate impact. We contrast the effects of rewards (both quantified and non-quantified) on enrollment and participation to demonstrate the differing short term and long term effects and to highlight the potentially negative consequences of quantifying rewards when aiming to promote long term engagement.

Participants (N=17,093) were recruited for participation in an activity tracking program run by RedBrick Health and were assigned to one of seven message conditions in a randomized field experiment. All participants were given the same introductory text with basic information about the health and rewards benefits of participating in the activity tracking program. All participants were eligible for \$2 per day that they tracked at least 30 minutes of activity, with a quarterly maximum of \$125 (other programs also provided rewards). All participants had previously completed a health assessment survey as the basis for program eligibility.

Participants in the control condition were given a standard opt-in message with a link to the enrollment page. The 6 treatment conditions were constructed by crossing two between subject factors pertaining to the yes/no response options. The first factor was message type (3 conditions) whereby different benefits of the program were emphasized. One message focused on health benefits (health), the second focused on the rewards (non-quantified rewards), and the third quantified the rewards (quantified rewards). The second factor was the strength of the "no" option (strong versus weak – 2 conditions). The strong "no" option included a reference to the lost benefit, while the weak "no" condition did not. For example, participants in the health condition all saw the following "yes" text: "Yes, I would like to participate in the Boost tracking program. I want to track my activities to help improve my health" and one of the following "no" options: [STRONG] No, I do not want to participate in the Boost tracking program because tracking my activities to improve my health is not important to me at this time. [WEAK] No, I do not want to participate in the Boost tracking program.

We found that all six active choice messages prompted higher enrollment than opt-in. Despite the expectation that the repetition of benefits in the strong no would increase loss aversion, we found no difference between the strong and weak no. Once enrolled, we found that there were no significant overall differences between opt-in and active choice in terms of their duration or frequency of participation, leading to an overall strongly positive relationship between receiving an active choice email and participation in the program.

Looking at the messages by type, we found that rewards and health were both equally effective in terms of duration of participation, but quantification of the rewards message resulted in lower average duration of participation. This lower average duration is driven by a substantially higher proportion of participants who drop out in the first two weeks after enrollment (25% versus 15% in the non-quantified reward condition). We hypothesize that the \$125 message sets a high target and that a lower than expected rate of rewards accumulation in the first two weeks results in demoralization and abandonment. Further work (analysis and follow up experiments) is underway to determine the exact mechanism.

This paper provides insights to managers interested in recruiting participants to programs where their active engagement is an important objective. Involving participants by means of an active choice makes them more aware of the potential benefits of a program that they might otherwise ignore, but marketers should beware that setting a high target for achievement might result in abandonment of the program if participants do not see early success.

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