Moments of Truth: Nudges At the Point of Consumption in an Office Setting

Margaret Gorlin, Yale University, USA
Ravi Dhar, Yale University, USA
Zoe Chance, Yale University, USA

Three large field experiments explored nudges towards healthier eating at a technology company providing free food all day for employees. We observed and manipulated several factors that influence salience of food options (proximity to snacks, visual serving size guides, presence of candy wrappers and, and a promotional campaign for vegetables).

[to cite]:

[url]:
http://www.acrwebsite.org/volumes/1017925/volumes/v42/NA-42

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Zoe Chance, Yale School of Management, USA
Margaret Gorlin, Yale School of Management, USA
Ravi Dhar, Yale School of Management, USA

EXTENDED ABSTRACT

Three field studies tested the effects of temptation salience on consumption of free food, nudging employees in a technology company to make healthier choices at the office. Study 1 examined the effects of proximity and waiting time on the tendency to take snacks with a beverage. Study 2 tested three serving size manipulations in an effort to reduce candy consumption. Study 3 encouraged the trial of unappealing vegetables. All studies were conducted in a technology company providing free and delicious food all day. The food program is a cherished benefit that also creates unique challenges to healthy eating. The studies we report here offer a number of ways in which workplace food policy and practices might better support employees in feeling their best and achieving peak performance.

Study 1: Mindless consumption of snacks with a beverage

Study 1 was intended to test and extend the results of promising preliminary research on the salience of temptation by Wansink, Painter and Lee (2006). They suggested that people may eat more candy when it is within reach, and when it is more visible, based on observations of how many chocolates were consumed when proximity of a candy dish (within reach or 6 feet away) and visibility of the candy (opaque vs. transparent dish) were manipulated. Their findings warrant further investigation for a number of reasons. First, their sample size is very small (N=40), and findings based on small samples are notoriously unreliable (Button et al. 2013). Second, the behavior of their sample should not automatically be assumed to represent the general population: all 40 participants were female secretaries who self-selected into a “candy study” and reported eating at least three pieces of candy per week. Without any men in the sample, we cannot guess whether men would behave similarly or differently—but this is an important question. Third, the reported results might represent the upper bound for the potential effect of salience on the consumption of tempting treats because the sample represents the type of person most likely to eat more candy when they notice it is available: they are candy lovers who have enough slack at work to enroll in a study, and because they sit at a desk nearly all day, the candy on their desk will be within their field of vision the entire time they work. Fourth, interpretation of the findings is complicated by the inability to know how many of the candies were consumed by others. Although the secretaries were instructed not to share due to “cost constraints,” social norms dictate that candy in a dish on a secretary’s desk is a gesture of hospitality and designated for general consumption, so a secretary declining to share it would be considered rude. Therefore, we find it hard to imagine secretaries slipping eager hands away or calling out a warning. Furthermore, the observed differences could be explained by other employees being unaware of candies further away from the desk or in an opaque container. Finally, the within-subjects design of this study entailed changing and moving each secretary’s candy dish four times in four weeks without a cover story, making the researchers’ hypotheses “transparent” to the participants. For all these reasons, we felt a new, larger, more general, and less intrusive study was warranted.

We built on this research with an unobtrusive observational study testing the effect of snack proximity on whether employees in a break area took a snack along with their beverage. We also recorded gender, to see whether men and women responded differently to temptation, and we tested whether waiting time would further increase the likelihood of taking a snack along with a drink, since waiting in the presence of a temptation depletes self-control (Baumeister and Tierney 2011). We expected to replicate the main effect reported by Wansink, Painter and Lee, that proximity would increase snack consumption, we expected waiting time to increase snack consumption, and we expected that if gender differences were observed, women would be less affected by the environmental cues because they are more likely to have rules about eating and snacking (e.g. “no snacking before noon,” or “no sugar”) (De Bourdeaudhuij and Van Oost 1998).

Method

This study was run at a large and busy “microkitchen” containing two beverage stations, one 6 feet 5 inches from the snack bar (“near”), and one 17 feet 6 inches from the snack bar (“far”) (see Figure 1). Both beverage stations had a refrigerator containing bottled beverages and a brewing station for hot drinks. Hot drinks needed to be brewed individually, requiring a wait time of 30-60 seconds. The snack bar contained a variety of snacks such as nuts, crackers, candies, dried fruit, and cookies.

During seven days, five research assistants sat near the microkitchen, unobtrusively observing and recording for each employee who entered the microkitchen, whether they took a beverage and whether they used the near or the far beverage station, whether they took a snack, and their gender. Research assistants were blind to the hypotheses. The final sample was comprised of the 1,167 employees (378 female, 787 male, and 2 unknown) who took a beverage during that time period. The number of days of data collection was determined in advance and based on a power analysis taking into account initial findings from the pilot study, assumptions regarding what would constitute a meaningful effect in this situation, and budgetary considerations.

Results and Discussion

Of the 1,167 employees who consumed a beverage, 198 (17%) also consumed a snack. Supporting our main hypothesis that proximity to snacks would induce drinkers to succumb to temptation and consume more snacks, we found employees who took their drink from the beverage station near the snack bar (N=435) were 50% more likely to take a snack than those who took their drink from the beverage station far from the snack bar (N=732)—21% vs. 14%, \( \chi^2 (1, N=1,167) = 9.57, p = .001 \).

Excluding the employees who took both types of beverages, we compared snacking between hot beverage drinkers (N=786) and cold beverage drinkers (N=351). Hot beverage drinkers, who had to wait for their coffee or tea to brew, were twice as likely to take a snack as were cold beverage drinkers, who could grab and go, 24% vs. 12%, \( \chi^2 (1, N=1,137) = 14.22, p < .001 \). Both near and far beverage stations showed a similar effect of wait time-- there was no interaction between wait time and proximity. Given that beverage type (hot vs. cold) served here as a proxy for wait time, we hesitate to draw a strong conclusion that wait time affected snack consumption. It is possible that employees perceived snacks to be more compatible with tea and coffee than with bottled beverages.

Comparing genders, we found women were less affected by proximity than men. The proportion of women snacking was ap-
proximately the same between the near (18%) and far (15%) beverage stations, χ² (1, N=377) = .48, p = .29. For men, proximity had a dramatic effect—14% of those choosing a beverage from the near station versus 23% of those who took a beverage from the far station also snacked, χ² (1, N=785) = 10.22, p = .001. Waiting time predicted a marginal difference in snacking for women, 18% took snacks with hot beverages versus 12% with cold beverages, χ² (1, N=368) = 2.01, p < .10; and a significant difference in snacking for men, 20% took snacks with hot beverages versus 10% with cold beverages, χ² (1, N=764) = 12.83, p < .001. Again, there may be other reasons for this difference than waiting time, but the results suggest that men may be more likely to act on feelings of temptation and succumb to mindless snacking.

Assuming that snacks average 150 calories (a low estimate), keeping in mind that there are approximately 250 work days in a year, and estimating that an extra 3,500 calories yields a pound of body fat, we can extrapolate the potential effects of proximity on body weight in this setting. Brewing coffee at the station near the snacks means that each cup of daily coffee can yield an increase in body fat of three-quarters of a pound per year. For men, the estimated increase is one pound of fat per year resulting from each daily cup of coffee.

Study 2: Fun Packs

The free and delicious food provided at this firm, as in many technology companies and other workplaces, creates a temptation not only to snack frequently but also to indulge in large portions. Most microkitchen snacks are served from bulk containers with four ounce cups provided for convenience, and previous research has found people tend to consume the amount of food that fits the bowl, plate, or package (Lawless, Bender, Oman, and Pelletier 2006; Wansink 1996; Wansink and Cheney 2006; Wansink, van Ittersum, and Painter 2006). Consistent with this research, we noticed during our Study 1 observations that many employees taking bulk snacks seemed to be filling the four ounce cups. Study 2 attempted to reduce serving size by making it more salient, presenting serving size information in three different formats. We tested a salient numeric cue, a visual cue, and a physical barrier.

Eighty percent of supermarket shoppers find nutritional information labels confusing (Lempert Report 2010), and one of their difficulties is in converting a serving size in ounces to a quantity of actual food. So the first intervention we used was revising the nutritional label to change serving size to pieces, and to simplify the information.

To draw more attention to the label and make it even easier to translate serving size to a quantity of actual food, we also used visual serving sizes—diagrams of how full to fill a cup. Public health officials encourage people to use visual cues for portion control, for example by applying rules of thumb such as “vegetables should cover half your plate” or “a serving of meat should be no bigger than a pack of playing cards.” No matter how useful and persuasive these messages are, however, their success depends on attention, the conscious processing of information, a congruent goal (in this case, to limit food consumption), and sufficient willpower to follow through with an intent to resist temptation.

We wanted to compare the first two high-involvement treatments with a third, low-involvement treatment, so we chose to replace bulk candies with small packages of candy. We hypothesized that replacing loose M&Ms in bins with individually wrapped Fun Packs would reduce M&M consumption because the Fun Packs would allow people to “mindlessly” consume less. In a pilot study (N = 98), we had compared the approximate number of calories consumed when employees snacked on loose M&Ms to the calories consumed when they snacked on small individual pieces of wrapped chocolates, and had found they ate 80% fewer calories per serving (64 vs. 323 calories) from wrapped rather than loose chocolate candies. Previous investigation into the effects of the 100-calorie snack pack has yielded mixed results (Scott, Nowlis, Mandel and Morales 2008; Stroebele, Ogden and Hill 2009), but we surmised that small package interventions might work especially well for candy if a small serving of candy is perceived to fulfill the goal of enjoying a sweet treat (rather than trying to fulfill the goal of satisfying hunger).

Method

We compared the effect of numeric, visual, and prepackaged serving sizes on M&M consumption in three office microkitchens. We selected M&Ms because they were the most popular snack, so a reduction in M&M consumption could make a meaningful difference in a person’s overall calorie intake.

Before the experimental intervention began, research assistants unobtrusively observed the frequency and quantity of M&M snacking in the three microkitchens on 16 days during a 3-month baseline period (N=756 observations), recording which M&Ms were taken (peanut or regular), approximately what proportion of the cup was filled (1/8, 1/4, 1/2, 3/4, 1 cup, 2 cups, etc.), and the snacker’s gender. All the bulk M&M containers had signs approximately 4 inches by 3 inches displaying serving size (1.69 ounces for regular M&Ms, 1.74 ounces for peanut M&Ms) and nutritional content per serving (calories, fat, carbohydrates, a variety of vitamins, etc.).

The three experimental treatments took place simultaneously in the three microkitchens over a one month period, with research assistants observing and recording consumption as they had in the baseline period, during nine days matching the baseline observation days of the week as closely as possible (N=572 observations). Research assistants were blind to the hypotheses. In the first microkitchen, we replaced the existing nutritional labels with simplified information (only calories, fat, carbohydrates, sugar, and protein) and most importantly, with the suggested serving size translated to pieces, and reduced relative to the baseline condition (.55 ounces/18 candies for regular M&Ms, .65 ounces/8 candies for peanut M&Ms). In the second microkitchen, we replaced the existing nutritional labels with labels containing the same simplified nutritional information as in the first kitchen, but adding a colored diagram showing how the suggested serving size would look in the provided cup: the suggested serving size (1/8 snack cup for regular M&Ms; 1/5 snack cup for peanut). Finally, in the last break area, we replaced loose M&Ms with M&Ms in “Fun Packs,” providing a very salient serving size cue that would require no effort to process or follow. The number of days of data collection was determined in advance and based on a power analysis taking into account initial findings from the pilot study, assumptions regarding what would constitute a meaningful effect in this situation, and budgetary considerations.

Results and Discussion

For ease of interpretation, we have converted serving sizes into estimated calories. During the baseline period, M&M serving size did not differ between the three microkitchens (319 calories, 319 calories, 308 calories), F(2,603) = .20, p = .82, indicating that any differences in consumption observed between microkitchens in the treatment period can be attributed to the intervention and not to different types of people using three kitchens. During the treatment pe-

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1. Reducing the suggested serving size on the label between baseline and treatment was undesirable, but we chose to do this in order to match serving size between the three treatment conditions, so we were limited by the “fun pack” serving size sold by the manufacturer.
period, consumption was greatly reduced in the Fun Packs treatment condition, from 308 calories to 130 calories, \( t(279) = 10.70, p < .001 \). Consumption did not decrease in the other two conditions (311 calories in the numeric condition and 319 in the numeric condition and 326 in the visual condition, both \( p s > .6 \)).

However, we did observe an effect of gender: whereas the numerical and visual serving size interventions had no effect for men (\( p s > .2 \)), there was a significant decrease in M&M consumption for women for the numerical serving size intervention, from 299 to 224 calories, \( t(161) = 3.29, p < .001 \). This finding is consistent with the notion that women may have a stronger conscious goal to avoid snacking than men and pay more attention to serving size labeling, however it does not explain why visual serving sizes would not also affect women’s consumption for the same reason.

Study 3: Vegetable of the Day!

Whereas Studies 1 and 2 measured consumption of snacks with the intention of reducing consumption, Study 3 documented an attempt to use salience to increase the likelihood of eating a healthy food. We investigated the effect of point-of-consumption promotion to encourage trial of healthy dishes with relatively unappealing vegetables as their main ingredient. Research with children has shown that learning to enjoy unfamiliar foods can require many exposures (Berman 2010) therefore it seems hopeful that adults too can learn to enjoy disliked or less-preferred healthy foods if they continue to sample them.

Method

Five target vegetables were selected, based on being commonly disliked and seasonally available: Brussels sprouts, parsnips, beets, cauliflower, and squash. For each of the target vegetables, chefs selected a recipe for a hot dish and a recipe for a cold salad containing that vegetable as the dominant ingredient. During a baseline period of five Mondays, chefs made the hot and cold dishes for one vegetable each week. For example, warm roasted Brussels sprouts with candied chestnuts were served on the same day as shaved Brussels sprouts salad. These dishes were served simultaneously in the two largest cafeterias in this location, which offer a cornucopia of free food, buffet-style. During the five week experimental period, the same pairs of hot and cold dishes that had been served in the baseline period were served again in both cafeterias, and were advertised in only the treatment café with large colorful “Vegetable of the Day!” posters displaying an elegant picture of the raw vegetable and a bit of trivia, such as, “Did you know that Brussels sprouts originate from the same plant as cabbage, collard greens, kale, kohlrabi, cauliflower, and broccoli?” (Trivia was intended to be uninformative regarding taste and nutrition.) The control café was used to measure seasonal variation in fresh vegetable consumption, which was expected to decline during the study, which ran from October to December. During the five baseline and five treatment days, a team of ten research assistants unobtrusively recorded the number of people who entered each café, the number of people who took some of any of the target dishes, and their approximate serving size (1/4 scoop, 1/2 scoop, 3/4 scoop, 1 scoop, 2 scoops, etc). The hypotheses were not discussed with the research assistants. The number of days of data collection was determined in advance and based on observations of foot traffic in the cafes, feasibility for the chefs, assumptions regarding what would constitute a meaningful effect in this situation, and budgetary considerations.

Results and Discussion

Eight thousand four hundred fifty-three cafeteria visits were recorded, and the Vegetable of the Day campaign was a success. Promoting the unappealing vegetables in the treatment café dramatically increased the percentage of employees eating those vegetables in the hot dishes at the treatment café (from 10% during baseline to 17% during the campaign), even as the proportion decreased by 2% in the control café. The Vegetable of the Day campaign also increased the serving size for the target vegetable at the treatment café (from .17 scoops to .28 scoops). Adjusting for the seasonal decline in vegetable consumption in the control cafeteria (26% decline for the hot dish and 29% for the salad), we observed a 125% increase in the number of servings of the hot dish and a 27% increase in the number of servings of the salad as a result of the advertising intervention. Overall, advertising at the moment of choice more than doubled consumption of a hot vegetable dish placed at an already popular location in the treatment cafeteria. However, we saw an increase of only 27% in salad consumption when adjusting for the decline in consumption in the control café and a small raw decrease in consumption. The cold salads were placed farther away from the Vegetable of the Day signage, in a less-trafficked area, which also reduced the salience of the message.

Limitations

The three large field studies reported here explore the effect of nudges at the moment of consumption on motivating healthier eating behaviors at the office. Ecological validity is likely to be high, since all results were gathered through unobtrusive observations and the research hypotheses were not discussed with the research assistants collecting the data. However, these experiments are not without their limitations. One limitation of this work is that the average age of employees at this firm (late 20s) is younger than the average age at most firms, and the education and income levels are higher. As with any experimental findings, those intending to apply them to their own situation would be served by conducting their own small-scale experiments to test their applicability in the new environment.

Implications

Our findings suggest a number of procedural changes that an employer might consider, to nudge people toward healthy eating, and these can be applied at home as well. The coffee maker can be moved away from the kitchen, and snacks can be hidden from view in the microwave area, to reduce mindless snacking while waiting. Treats can be divided into small packages or cut into small servings, and potentially unattractive dishes could be treated as special. Overall, increasing the salience of healthy foods and decreasing the salience of unhealthy foods can help us take small steps toward health.

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