NUTRITION FOR ALL: HOW AUTONOMY, SOCIOECONOMIC STATUS, AND A NUDGE INFLUENCE FOOD CHOICE

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ABSTRACT

In accordance with legal requirements, restaurant menus provide calorie information, but grocery store items provide additional nutritional information to consumers. This study explores whether autonomy, a wider array of nutritional information, and SES might affect food choice. A sample of 511 participants were recruited via Amazon's Mechanical Turk, but only 169 were used in the analyses due to contamination with bot responding. Subjects were randomized into an SES priming condition and a menu condition with (1) only calories, (2) calories, fat, sugar, protein and allergen information, or (3) calories plus any nutritional information they selected. Across conditions, the total nutritional value of their orders and influence of nutritional information on food choice was compared using ANOVAs and regressions in SPSS. SES affected what people wanted to see on their menu and what they said influenced their choices, but not the total nutrient content of their orders. Neither priming SES nor giving consumers autonomy in their choices of nutritional information had an effect on the nutritional content of what they ordered. Participants might want to see more information on their menus even if they use it in unanticipated ways, and factors beyond SES may affect how participants use nutritional information to make choices.

INTRODUCTION

The United States government has tried to improve consumers' food choices by providing some of the nutritional information on packaged goods on restaurant menus via the Patient Protection and Affordable Care Act (ACA). While government mandated nutritional information provides a wide array of information, why does the ACA require large chain restaurants to include only caloric information regarding each menu item? Perhaps providing additional information, or giving consumers a chance to choose what nutritional information they want on their menus, would lead to better food choices. Personalizing the nutritional information on a menu is feasible for both online ordering and digital kiosk settings.

The government and many television shows (e.g., *The Biggest Loser*) have fixated on calorie reduction as the best way to improve America's weight and diet problems. Listing calories is intended to help those experiencing weight problems to reduce the number of calories eaten. Those at lower socioeconomic status (SES) are more likely to be heavier and have poor diet quality compared to those at higher SES (Darmon & Drewnowski, 2015; Alkerwi et al., 2015; Daniel, 2020; Pechy and Monsivais, 2016). Studies also suggest that calorie labels on menus have little impact on orders placed (Maerty, Jones, & Robinson, 2020), particularly for individuals at low SES (Marty, Reed, Jones, & Robinson, 2021; Sarink et al., 2016). A review by Fernandes et al. (2016) found that providing a wider array of nutritional information did not affect the number of calories, number of healthy items, or amount of other nutritional content purchased by participants, but this information was selected by the researchers. Perhaps giving consumers control over what information is provided could be more effective.

Recent research suggests that informational interventions might not promote positive dietary changes among low SES groups (Bauchamp, Backholer, Magliano, & Peeters, 2014; Adams, Mytton, White, & Monsivais, 2016) because of poor nutritional literacy, which is often linked to lower education levels (Miller & Cassady, 2015). Additionally, the process of interpreting and integrating nutritional

information into the decision-making process requires more effort and motivation, which those from higher SES groups are more likely to invest (Adams, Mytton, White, & Monsivais, 2016). In any event, there is no clear consensus that one's ability to understand nutritional information really leads to changes in choice behavior (Yoon & George, 2012).

The studies discussed so far measure reductions in calories, weight, or the selection of items endorsed by certified nutritionists as part of a healthy diet. However, classifying healthy eating solely on these three dimensions neglects others. In particular, a narrow focus on weight by government agencies and by researchers is not necessarily shared by the participants or consumers who may have other health concerns.

NUDGES AND AUTONOMY

To better understand consumers' food choices, it is important to examine the cognitive processes that underlie how consumers use nutritional information to make these choices. Most menus provide nutritional information chosen by some authority (e.g., a government mandate or researchers' experimentation), which is a kind of paternalism. Paternalism is when an authority restricts autonomy or interferes "with a person's liberty to make their own decision in an attempt to promote the welfare, good, happiness, needs, interests or values of the person being coerced" (Weiss, 1985, p. 184). Paternalism is usually intended to encourage people to make better choices, but one difficulty is that paternalists may substitute their goals and preferences for those they are ostensibly trying to help. The ACA's requirement of calorie labeling is an example of paternalism which attempts to steer people toward low-calorie choices by providing calorie information, but it's not obvious that many use this information as intended. For example, when trying to feed a family on a tight budget, one might implicitly or explicitly divide the number of calories by price to stretch each food dollar.

The opposite of paternalism is free choice, which disentangles the incentives of the consumer and a paternalistic outsider. To make the best choices, however, this may require some degree of knowledge and experience, particularly when the available information is inadequate, ambiguous, or complex. To help navigate these challenges with unassisted free choice, various approaches have been proposed that are designed to take advantage of our cognitive biases and shortcuts. One prominent type of assistance is a nudge, which Thaler and Sunstein (2008, pg. 6) define as an "aspect of the choice architecture that alters people's behavior in a predictable way, without forbidding any options or significantly changing their economic incentives."

Nudges can come in the form of default settings, feedback on choices made, restructuring choices, or even giving incentives. Nudges operate within a framework known as "libertarian paternalism." The paternalistic component of a nudge intends to help people make better choices, and the libertarian component accommodates individuals' preferences in that individuals remain free to make their own choices. In other words, this is a gentler form of paternalism that allows people to define a smart choice on their own terms, rather than having an authority define this for them.

This study tests the impact of attempting to nudge participants towards better food choices by allowing them to choose what nutritional information they will see on a menu. This not only expands the nutritional information beyond just calories, it does so in a way that the individual chooses. This nudge empowers consumers by granting them the autonomy to choose what nutritional information they think is important rather than having someone else decide this for them.

The effectiveness of nudges in a restaurant setting is not well studied. Nonetheless, research on nudges in grocery stores show informational nudges such as nutritional labeling near food items were much less effective (Habers et al., 2020), but reminding participants to look at nutritional facts before a purchase could lead to different outcomes. When participants choose what nutritional facts they want to see, it gives them greater control over their diet and may increase their confidence in their ability to select healthy foods (Weihrauch & Huang, 2021).

The present study will also shed light on what nutritional information individuals in low versus high SES prefer and use to inform their food choices. Of course, other factors like price, taste, or

familiarity with certain menu items might be more important than any nutritional information provided (Fenko, Nicolaas, & Galetzka, 2018). It will be interesting to see whether the impact of a nudge can compete with the strength of pre-existing preferences.

RESEARCH QUESTIONS

Better to understand the interaction between cognitive and contextual factors in food choice, this research considers several broad questions:

1. What nutritional information would participants like to see on a restaurant menu, and what information is most important when making food choices?
2. Do these preferences and influences vary across levels of SES?
3. Does allowing participants to select nutritional information for their menu affect their total nutrient consumption and satisfaction with their food choices?
4. Do effects for this nudge change when SES is primed to make it more salient?
5. Does priming SES affect how SES itself or menu types affect the influence of certain menu information (like nutritional information, images, and price) on participants' food choice?

METHOD

Participants

The final sample included 169 usable responses from participants who completed the survey study through Amazon's Mechanical Turk. The average age of participants was 38.5 years (*SD* = 10.53), 63.9% of participants identified as male, 87% identified as white, 57.4% reported having a bachelor's degree, 78.1% work full time, and 42.6% reported earning $50,000-99,999. On a ladder-style scale where the lowest rung (1) describes the lowest SES and the highest rung (10) describes the highest SES, participants' mean response was 5.27 (*SD* = 2.01), and the most popular choice (20.1%) was rung 4. Participants were told that their food preferences would be assessed and were compensated with $1.70 for their time. On average they took 10.7 minutes to complete the survey.

Design

This study has a 2 × 3 between-subjects factorial design. Half of the participants were randomly assigned to the primed SES condition in which questions about education, employment status, income, and self-reported SES appeared before the menu was presented and the other half were assigned to the non-primed SES condition where these measures were presented after food choices had been made. Participants were also randomized into one of three menu conditions (control, specific, or autonomous; see the Materials section for details).

MATERIALS

Menu. For each of 62 items drawn from Panera Bread's menu, there was an image, description, price, and nutritional information. In accordance with the ACA, all menus had calorie labels, but the amount of additional nutritional information differed across conditions. The control menu provided no additional information. The specific menu provided calories, fat, sugar, protein, and allergen information. The autonomous menu provided calories plus any additional nutritional information a participant selected from the following list: calories from fat, fat, saturated fat, trans fat, cholesterol, carbohydrates, sugar, fiber, protein, sodium, and allergens. Nutritional information appeared beneath an item's image, description, and price. In addition, 'Customer Favorite' items were chosen based on online reviews of the Panera Bread menu. Finally, FDA daily nutritional recommendations were provided at the end of the menu.

Self-Reported SES Measure. Participants were shown an image of a 10-rung ladder and given the following instructions:

> Think of this ladder as representing where people stand in the US. The lowest rung represents those at the very bottom of society and the highest rung represents those at the very top of society. In terms of your own income, educational history, and job status, where would you place

yourself on this ladder? Please select the number that corresponds to the rung where you think you stand. (Cheon & Hong, 2016, p. 73)

Satisfaction with Purchase Experience. Participants answered 3 questions to assess their satisfaction with their choice environment. The items asked participants to "please indicate how satisfied you are with the following" facets of the menu: "the information provided on the menu", "the user-friendliness of the menu", and "your ordering experience". All were measured on a 7-point Likert scale where 1 = "not at all satisfied" and 7 = "extremely satisfied".

Need for Cognition. This 18-item measure assesses the degree to which people enjoy and engage in cognitively effortful tasks (Cacioppo, Petty, & Kao, 1984; Hevey et al., 2012). Participants indicated how strongly they agreed or disagreed with statements like "I find satisfaction in deliberating hard and for long hours" on a 7-point Likert scale from 1 = "strongly disagree" to 7 = "strongly agree". The 18-item scale is highly correlated with the original 34-item scale ($r > .95$; Cacioppo, Petty, & Kao, 1984). In the present study, the scale demonstrated strong internal consistency ($\alpha = 0.94$).

Healthy Eating and Weight Self-Efficacy (HEWSE). This 11-item scale assesses how confident individuals are about their ability to choose healthy patterns of eating and maintaining weight. This scale has two factors, but for the purposes of this study, only the first factor that measured the consumption of healthy foods ($\alpha = 0.82$) was used. Participants used 5-point Likert scales (1 = "strongly disagree" to 5 = "strongly agree") to indicate whether they agreed with statements like "I am able to eat a variety of healthy foods to keep my diet balanced" and "If I choose to indulge in unhealthy food, I am able to appropriately compensate later" (Wilson-Barlow, Hollins, & Clopton, 2014).

Hunger Level. Hunger at the time of food choice was measured using a single item. Participants rated "how hungry do you feel at the moment?" using a Likert scale from 1 = "not at all hungry" to 7 = "extremely hungry" (Weihrauch & Huang, 2021).

Positive and Negative Affect Scale (PANAS). This 20-item scale measures the level of positive emotions (e.g., excitement, pride, and enthusiasm) and negative emotions (e.g., guilt, fear, and irritability) one feels. Participants rate each item on a Likert scale from 1 = "very slightly or not at all" to 5 = "Extremely" to indicate the extent to which they have felt this way at the moment (Watson, Clark, & Tellegen, 1988). The positive affect (PA) and negative affect (NA) subscales demonstrate convergent validity the Depression Anxiety and Stress Scale and Hospital Anxiety and Depression Scale (Crawford & Henry, 2004). Internal consistency was strong for both the PA subscale ($\alpha = .90$) and the NA subscale ($\alpha = .97$).

PROCEDURE

To make sure food preferences did not differ because of the time of day, the study was posted at 4:00 PM EST (1:00 PM PST) with the expectation that most participants were between meals during the study. Participation was restricted to mainland U.S. adults (aged 18 years and above), and all participants gave consent at the beginning of the study. Participants were randomized into a priming condition as well as one of three menu conditions. Participants in the autonomous menu condition indicated what information they would like to see on an online menu before proceeding to the menu. Participants in the control and specific menu conditions provided this information only after they made their food selections from the menu. All participants then saw instructions describing how to interact with the menu. Participants would hypothetically order items, by using the 'Add to Cart' button, for a single person's lunch delivery. All 62 items were, by default, initially "removed from cart".

After choosing their item(s), participants across all menu conditions indicated to what extent various types of nutritional information and contextual information (i.e. price, image appeal, description, customer favorites, habitual orders) influenced their food choice, using a Likert scale from 1 = "Not at all influential" to 5= "Extremely influential". Participants in the autonomous menu condition re-evaluated what nutritional information they would like to see on an online menu while participants in the control and specific menu conditions were asked to provide this information for the first time. All participants evaluated whether they were satisfied with their choice environment, reported their level of hunger, completed the PANAS, NCS, and HEWSE subscale concerning healthy eating. Finally, demographic

information (age, sex, race, and ethnicity) was collected. Those in the non-primed SES condition answered questions about education level, job status, family income, and their self-reported SES using the 10-rung ladder visualization after the demographics.

RESULTS

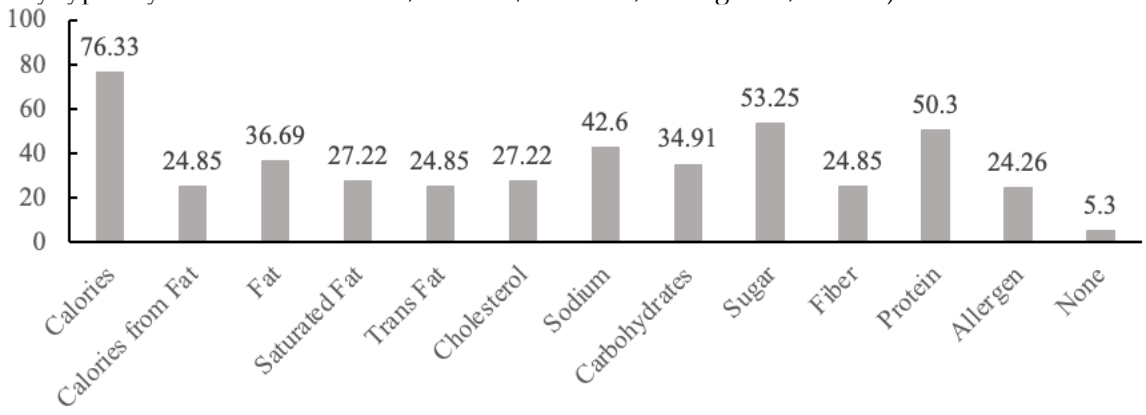
Data Cleaning

Initially, there were 511 responses to the Qualtrics survey, but a majority were clearly provided by bots or individuals giving random responses. For example, many cases contained dozens of menu selections, which is not plausible for a human being ordering lunch. Cases were excluded if there were 0 menu items chosen, more than two full entrees, more than 4 half-entrees, or more than 3 drinks. This left N = 169 cases of data believed to be provided by people, rather than bots, and in accordance with the task instructions. On average these individuals ordered 1.54 full entrees.

The total nutritional content (e.g. total calories, total protein) of the "Add to Cart" items were calculated along with total price. These variables and the influence variables (e.g. how much calorie information influenced your food choice) were the dependent variables in subsequent analyses.

Descriptive Analyses

Most participants wanted to see calorie, sugar, and protein information on an online menu (see Figure 1, top). Most participants in the autonomous menu condition (N = 65), who indicated their preferences before seeing the menu, chose to see calorie (78.5%), sugar (61.5%), and protein (55.4%) information as well. Participants reported that they were most strongly influenced by price (M= 3.33, SD= 1.24), appearance (M= 3.66, SD= 1.03), description (M= 3.40, SD= 1.12), and habitual choices (i.e., items they typically order at a restaurant; M= 3.18, SD= 1.13; see Figure 1, bottom).



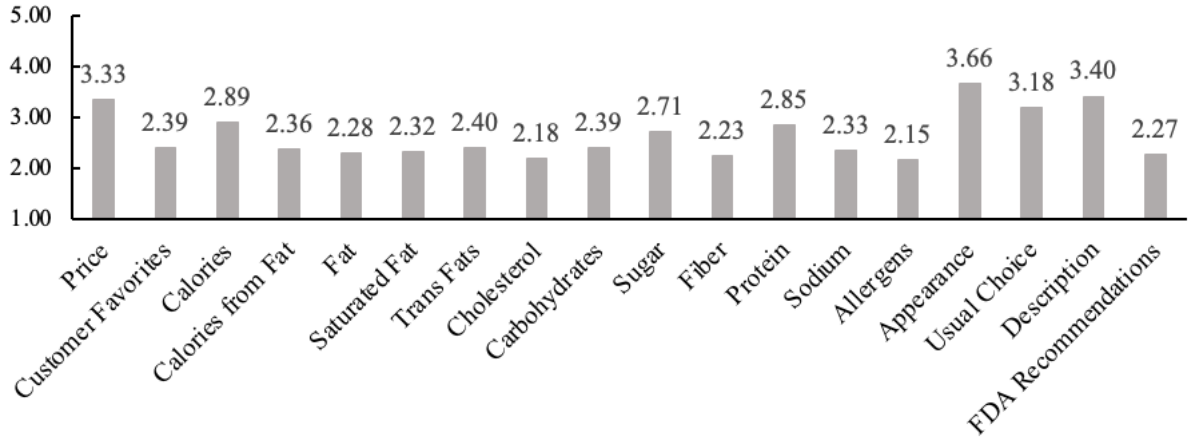


Figure 1. *Percentage of participants that wanted to see certain nutritional information (top) and the average self-reported influence that certain menu information had on food choice (bottom).*

Menu Condition Analyses

Across menu conditions, ANOVAs revealed that the perceived influence of nutritional information or menu information on participants' food choice did not differ. None of these effects were statistically significant (all $p \geq .092$), and all effect sizes were small (all $\eta^2 \leq .029$). There was only one statistically significant difference in the nutritional content of the items ordered across conditions, and that was for the fiber content ordered by participants in the control ($M = 12.28$, $SD = 7.21$), specific ($M = 8.49$, $SD = 6.00$), and autonomous ($M = 9.42$, $SD = 6.05$) menu conditions, $F(2, 162) = 5.03$, $p = .008$, $\eta^2 = .057$. For all other nutritional content ANOVAs, $p \geq .139$ and $\eta^2 \leq .024$.

Moreover, across menu conditions, most correlations between participants' nutritional preferences and the total nutritional content of their orders were not statistically significant (see Figure 2). The only exception, which may be a Type I error, is that participants in the autonomous condition who preferred to see the fat content on the menu ordered more fat ($r = .37$, $p = .006$) than those who preferred not see the fat content.

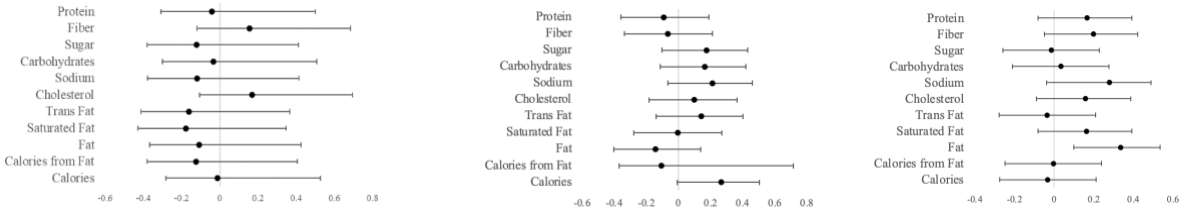


Figure 2. *95% confidence intervals of point biserial correlations between preferred nutritional information and actual amount of that nutrient ordered in each menu condition (left = control, middle = specific, right = autonomous).*

Surprisingly, there was no significant difference in satisfaction across menu condition with respect to the information provided on the menu, $F(2, 165)=1.70$, $p = .186$, $\eta^2= .020$, the user-friendliness of the menu, $F(2, 165) = 0.43$, $p = .652$, $\eta^2= .005$, or the ordering experience, $F(2, 165) = 0.04$, $p = .960$, $\eta^2 = .000$. Most participants rated satisfaction highly even though the menus were actually somewhat hard to use.

Self-Reported SES and Primed SES Analyses

Self-reported SES was not statistically significantly correlated with the nutritional value of food choices (see Figure 3, upper portion). There were large, statistically significant positive correlations between self-reported SES and the influence of nutritional information on their choices (see Figure 3, middle portion). In particular, those in higher SES groups were more likely to say that customer favorites, calories, calories from fat, fat, saturated fat, trans fats, cholesterol, carbohydrates, sugar, fiber, protein, sodium, and even allergen information and FDA recommendations, which came at the very end of the menu, influenced their food choices more than those in lower SES groups (all $p < .001$). Some of the correlations between self-reported SES and nutritional information preference were statistically

significant (see Figure 3, bottom portion). Lower SES individuals preferred to see calorie, sodium, carbohydrate, and allergen information more than higher SES individuals. Higher SES individuals preferred to see calories from fat information more often than those at lower SES levels (though this was only marginally significant, $p = .069$). Despite the differences in preferences for and (self-reported) influence of nutritional information across SES levels, the total nutritional content and price of their orders did not differ.

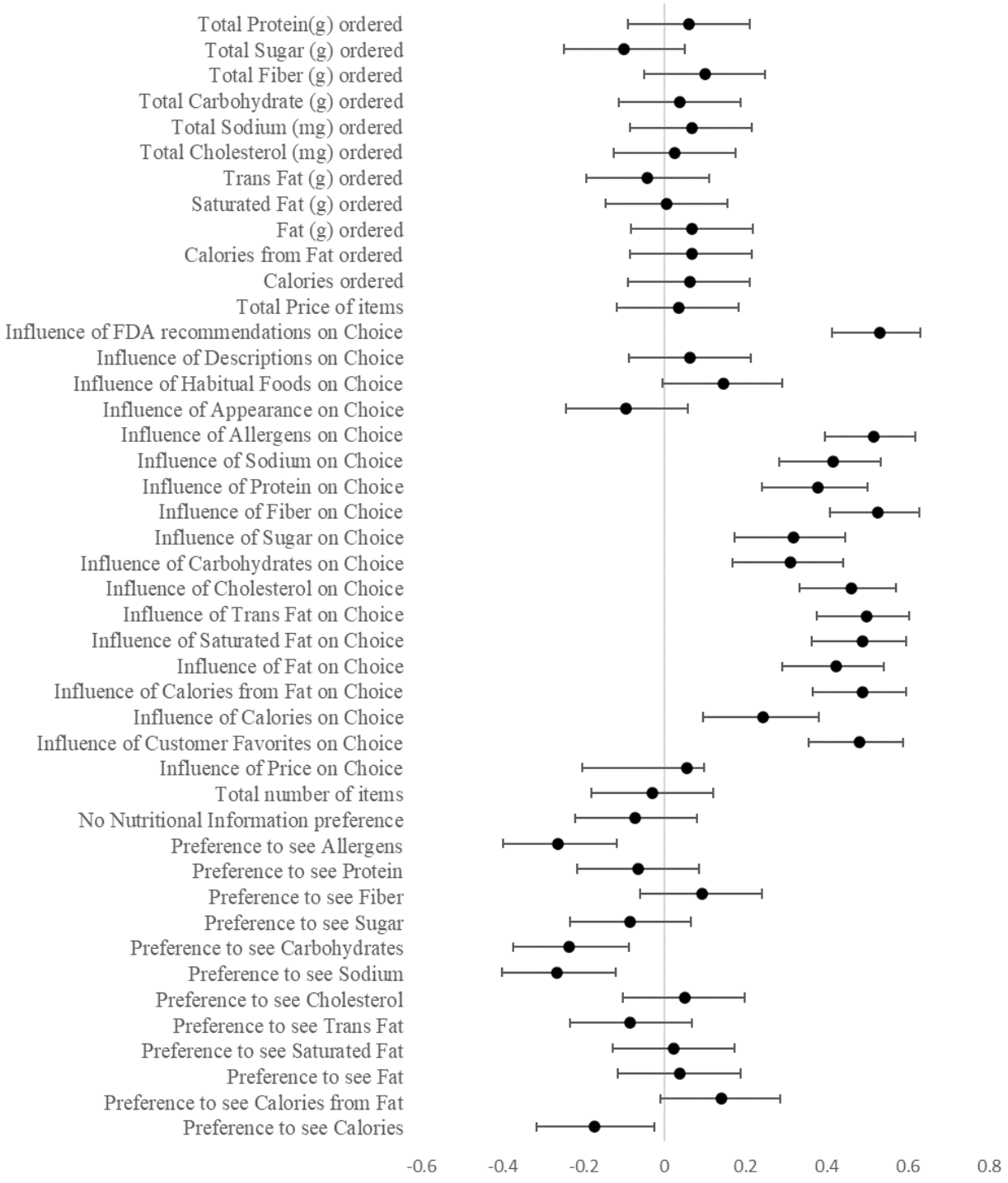


Figure 3. *95% confidence interval of correlations between SES and dependent variables.*

Priming SES had no significant correlation with participants' nutritional information preferences, nor did it affect the total nutrient content ordered. There was also no significant correlation between priming SES and how menu information influenced participant's food choice.

DISCUSSION

This study investigated the relationship between a nutritional nudge and food choice across self-reported SES levels. This nudge gave participants the autonomy to select what nutritional information they preferred to see on a menu, rather than having someone else make this selection for them. The results show that participants who were granted this autonomy did not systematically change what they ordered. This finding is consistent with Fernandes et al. (2016) and Sarink et al. (2016), who found that calorie and other nutritional information had little effect on the number of calories or "healthy" items ordered.

Although participants were encouraged to consider the nutritional content of their orders, there was little correlation between participants' nutritional preferences and what they ordered. One exception is that participants in the autonomous menu condition who chose to see the fat content of their food ordered more fat than those who did not choose to see the fat content. These participants may have found that the food they want has less fat than expected, so they ordered more fat compared to those who did not want to see this information (Crockett, Jebb, Hankins, and Marteau, 2014). Alternatively, they may have preferred to see fat content to help them avoid low-fat items that may be less tasty or filling. This study also found that participants in the control menu condition ordered more fiber than those in the specific and autonomous menu conditions. Because there is no obvious reason for such a preference, or a consistent finding for any other nutrients, this could just be a fluke.

Menu conditions did not affect the extent to which nutritional information influenced food choice or how satisfied participants were with their choice environment. Since most participants gave high ratings for menu satisfaction, this may have undercut any differences between the menu types. The autonomous menu condition was unfamiliar to most participants and—due to the constraints of working with Qualtrics—lacked visual appeal, and the nutritional information was given without context (e.g., the total recommended daily intake). These factors could mitigate any effects of the autonomous menu condition not only on participants' food choices, but also on their satisfaction ratings.

Interestingly, most individuals wanted to see more than just calorie information on their menu. More than half of the participants wanted to see the sugar and protein content of the menu items. Participants that were in lower SES groups were more likely to ask for sodium, carbohydrate, calorie, and allergen information compared to higher SES groups, who were more likely to ask for calories from fat. This clearly shows that a paternalistic, "one size fits all" nutritional labeling guideline cannot provide each individual with all (and only) the nutritional information they desire.

This investigation also found that participants in higher SES consistently reported that nutritional information was more influential in their food choice than lower SES individuals. Yet, the nutritional profiles of food choices did not differ by SES. This incongruency might be attributed to how little nutritional information influenced participants' food choice overall. Some individuals might use a rule of thumb that cannot be gleaned by analyzing the total nutrient content they ordered or by assessing how certain pieces of information influenced their food choice. Other studies have suggested that the restaurant setting can play a big role in whether calorie labelling (and possibly other nutritional information) actually affect the number of calories ordered across SES (Marty, Jones, & Robinson, 2020; Marty, Reed, Jones, & Robinson, 2021). Marty et al. (2020) notes that in a fast-food restaurant setting there was almost no difference in the number of calories ordered across SES despite calorie labelling; this conclusion may apply to the online ordering setting.

The ACA does not require restaurants to provide much information on a menu, but, in grocery stores, food items require detailed nutritional labels. Nutritional labels provide estimates of the appropriate amount of nutrients to consume in an average diet by reporting daily value percentages. Restaurant menus, however, keep the FDA daily recommendations, or the estimated amount of nutrients to consume in an average diet, at the bottom of the menu in small or faint font. Thus, this information is

often overlooked when participants go to order online. This means that there is a lack of context for the nutritional information provided on menus, which might help to explain the lack of differences in food choices across menu types.

Although adding nutritional information did not affect food choices, the autonomous menu gave participants access to information they wanted. Allergens, in particular, can be extremely helpful even if they do not affect the total number of calories or nutrients in the food ultimately ordered. Most participants asked to see sugar and protein information along with calorie information, but mandating sugar and protein information to appear on menus, as an addendum to the ACA, ignores the preferences of lower SES individuals that wished to see sodium, carbohydrates, and allergen information. Furthermore, a fixed list of nutrients on a menu can limit changes in trends. Today sugar is vilified and protein idolized thanks to the craze for Keto Diets, but in the future we may see a new trend (Cleveland Clinic, 2021). Granting consumers autonomy in the nutritional information provided on a menu would help menus keep pace with new scientific findings or other trends better than relying on legislatures to update menu mandates.

When the nutritional information on a menu is limited, governments and researchers are implicitly encouraging participants to ignore any other information when making judgements about the menu items. Unless people seek out nutritional information at restaurants, they will make food choices based on the information provided because they believe that what they see is all there is (Kahneman, 2011). Giving consumers the opportunity to see additional nutritional information on a menu may improve their judgments by giving people a more complete understanding of each menu item (Mittelman, Goncalves, & Andrade, 2019).

Although such an effect was not observed in this study, it might be more likely to occur once consumers become accustomed to having such a choice and become better informed about how to select, and how to use, various types of nutritional information. The present study was an initial foray into this domain, but the idea merits further investigation in a variety of contexts, with larger samples, and with repeated exposure to an autonomous menu condition.

The results and analyses in the present study were constrained by the small sample size caused by bot infiltration. Since the menu conditions and self-reported SES did not significantly influence the total nutrient content ordered, interactions between these variables were not analyzed. It is possible that greater statistical power might have yielded a different pattern of results that would have supported the testing of these interactions. Many of the planned analyses involved controlling for other variables (e.g., need for cognition, hunger levels, positive and negative affect) or complex interaction effects, and they were not carried out due to the lack of statistical power. With a larger sample, researchers could perform a wider array of analyses.

This study measured hypothetical food choices only, not real choices that cost money or participants' actual food consumption. Findings might differ if actual costs are imposed on participants or if their food intake, rather than ordering, is assessed. Also, the menu format was not like a standard menu in various ways. For example, Qualtrics does not enable one to easily move between sections of a menu, meaning that participants had to navigate and sift through all 62 items. Future research could construct menus that better emulate online or kiosk ordering systems, which are visually appealing and user-friendly, to investigate the choice process in a more powerful and naturalistic manner.

Finally, better to assess the effectiveness of the nudge, participants should have more than one chance to interact with an autonomous menu. Through repeated purchases, participants will become more familiar with the format and understand their preferences, and researchers can track changes in nutritional preferences and total nutrient content ordered each time. This iterative format could record how participants use the nudge and whether they grow more interested in the nutritional content of their foods after each order. Despite the underwhelming findings of the present study, the personalization of a menu, may hold considerable promise as a way to help consumers make better food choices. This might be especially true if autonomy is paired with information on the meaning and use of various types of nutritional information.

REFERENCES

Adams, J., Mytton, O., White, M., & Monsivais, P. (2016). Why are some population interventions for diet and obesity more equitable and effective than others? the role of individual agency. *PLOS Medicine*, *13*(4). https://doi.org/10.1371/journal.pmed.1001990

Alkerwi, A., Vernier, C., Sauvageot, N., Crichton, G. E., & Elias, M. F. (2015). Demographic and socioeconomic disparity in nutrition: Application of a novel correlated component regression approach. *British Medical Journal Open*, *5*(5). doi:10.1136/bmjopen-2014-006814

Beauchamp, A., Backholer, K., Magliano, D., & Peeters, A. (2014). The effect of obesity prevention interventions according to Socioeconomic Position: A systematic review. *Obesity Reviews*, *15*(7), 541–554. https://doi.org/10.1111/obr.12161

Burton, S., Creyer, E. H., Kees, J., & Huggins, K. (2006). Attacking the obesity epidemic: The potential health benefits of providing nutrition information in restaurants. *American Journal of Public Health, 96*(9), 1669–1675. doi:10.2105/AJPH.2004.054973

Cacioppo, J. T., Petty, R. E., & Feng Kao, C. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment*, *48*(3), 306–307. https://doi.org/10.1207/s15327752jpa4803_13.

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*(1), 116–131. https://doi.org/10.1037/0022-3514.42.1.116

Cheon, B. K., & Hong, Y.Y. (2017). Mere experience of low subjective socioeconomic status stimulates appetite and food intake. *Proceedings of the National Academy of Sciences*, *114*(1), 72–77. https://doi.org/10.1073/pnas.1607330114

Cleveland Clinic. (2021, November 17). *Diet trends: What works and what doesn't*. Cleveland Clinic. Retrieved May 4, 2022, from https://health.clevelandclinic.org/trending-diets/

Daniel, C. (2020). Is healthy eating too expensive?: How low-income parents evaluate the cost of food. *Social Science and Medicine, 248*, 11282. doi: 10.1016/j.socscimed.2020.112823.

Darmon N. & Drewnowski A. (2015). Contribution of food prices and diet cost to socioeconomic disparities in diet quality and health: a systematic review and analysis. *Nutrition Reviews,73*(10), 643-660. DOI: 10.1093/nutrit/nuv027.

Fenko, A., Nicolaas, I., & Galetzka, M. (2018). Does attention to health labels predict a healthy food choice? an eye-tracking study. *Food Quality and Preference*, *69*, 57–65. https://doi.org/10.1016/j.foodqual.2018.05.012

Fernandes, A. C., Oliveira, R. C., Proença, R. P., Curioni, C. C., Rodrigues, V. M., & Fiates, G. M. (2016). Influence of menu labeling on food choices in real-life settings: A systematic review. *Nutrition Reviews, 74*(8), 534-548. doi:10.1093/nutrit/nuw013

Harbers, M. C., Beulens, J. W., Rutters, F., de Boer, F., Gillebaart, M., Sluijs, I., & van der Schouw, Y. T. (2020). The effects of nudges on purchases, food choice, and energy intake or content of purchases in real-life food purchasing environments: A systematic review and Evidence Synthesis. *Nutrition Journal*, *19*(1). https://doi.org/10.1186/s12937-020-00623-y

Hevey, D., Thomas, K., Pertl, M., Maher, L., Craig, A., & Chuinneagain, S. N. (2012). Method effects and the Need for Cognition Scale. *The International Journal of Educational and Psychological Assessment, 12*(1), 20–33.

Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux.

Marty, L., Jones, A., & Robinson, E. (2020). Socioeconomic position and the impact of increasing availability of lower energy meals vs. menu energy labelling on food choice: Two randomized controlled trials in a virtual fast-food restaurant. *International Journal of Behavioral Nutrition and Physical Activity*, *17*(1). https://doi.org/10.1186/s12966-020-0922-2

Marty, L., Reed, S. M., Jones, A. J., & Robinson, E. (2021). Increasing availability of lower energy meals vs. energy labelling in virtual full-service restaurants: Two randomized controlled trials in participants of higher and lower socioeconomic position. *BMC Public Health*, *21*(1). https://doi.org/10.1186/s12889-021-11007-0

Miller, L. M., & Cassady, D. L. (2015). The effects of nutrition knowledge on food label use. A review of the literature. *Appetite, 92*, 207–216. Doi: 10.1016/j.appet.2015.05.029

Pechey, R., & Monsivais, P. (2016). Socioeconomic inequalities in the healthiness of food choices: Exploring the contributions of food expenditures. *Preventive medicine, 88*, 203–209. https://doi.org/10.1016/j.ypmed.2016.04.012

Sarink, D., Peeters, A., Freak-Poli, R., Beauchamp, A., Woods, J., Ball, K., & Backholer, K. (2016). The impact of menu energy labelling across socioeconomic groups: A systematic review. *Appetite*, *99*, 59–75. https://doi.org/10.1016/j.appet.2015.12.022

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063.

Wertenbroch, K., Schrift, R.Y., Alba, J.W., Barasch A., Bhattacharjee, A.,Giesler, M., Knobe, J., Lehmann, D. R., Matz, S., Nave, G., Parker, J.R., Puntoni, S., Zhenf, Y., & Zwebner, Y. Autonomy in consumer choice. *Mark Lett, 31*, 429–439 (2020). https://doi.org/10.1007/s11002-020-09521-z

Wilson-Barlow, L., Hollins, T. R., & Clopton, J. R. (2014). Construction and validation of the healthy eating and weight self-efficacy (HEWSE) scale. *Eating Behaviors*, *15*(3), 490–492. https://doi.org/10.1016/j.eatbeh.2014.06.004

Weihrauch, A., & Huang, S.-C. (2020). EXPRESS: Portraying Humans as Machines to Promote Health: Unintended Risks, Mechanisms, and Solutions. *Journal of Marketing*, *85*(3), 184-203. https://doi.org/10.1177/0022242920974986

Weiss, G. B. (1985). Paternalism modernised. *Journal of Medical Ethics, 11*(4), 184–187. https://doi.org/10.1136/jme.11.4.184

Yoon, H. J., & George, T. (2012). Nutritional information disclosure on the menu: Focusing on the roles of menu context, nutritional knowledge and motivation. *International Journal of Hospitality Management, 31*(4), 1187–1194. https://doi.org/10.1016/j.ijhm.2012.02.006