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Student Research Report

Influence of Disclosure vs. Reminder Nudges on Food Purchase Behaviour

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Influence of Disclosure vs. Reminder Nudges on Food Purchase Behaviour

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Executive Summary

The use of visual nudges has shown to be an effective way to address the intention-action gap. Specifically, memory-based interventions using retrieval cues have demonstrated to be more effective at nudging people's behaviour than perceptual-based interventions that disclose information requiring conscious interpretation (Luo et al. 2022). However, when exploring the influences of these nudges towards food specific purchases, literature primarily suggests that use of disclosures has a positive impact on purchase behaviour. Little to minimal information is available on the effectiveness of memory-based nudges in relation to food related purchase behaviour, especially when compared with disclosure nudges. Thus, we address this gap by performing a comparative analysis of the influences of reminder and disclosure nudges on food purchase behaviour, within a real-life experimental setting. We hypothesise that both visual nudges, i.e. reminders and disclosures will increase food related purchases and that reminders will be more effective than disclosures at nudging food purchases. Our results provide evidence for both visual nudges improving food purchase behaviour, with disclosures being more effective than reminders. These findings can be used to create more effective marketing and promotional materials to boost sales, more specifically within the context of food products.

Introduction

With humans facing the task of making thousands of decisions each day, it is understandable why people often make some poor choices. However, with the help of a directional push—or nudge—individuals can be led to making better decisions. This can be attributed to the intention action-gap, which refers to the phenomenon wherein despite having intentions of engaging in behaviour that promotes health and well-being, e.g., eating healthy, exercising, getting adequate sleep, etc., one simply fails to engage in such acts. Although unintuitive, communication, persuasion and education do not always elicit desired behaviours and can fail to be effective in many real-life instances (Zhao, 2023). This is likely because people are aware of the reasoning and science behind such actions, and therefore already accept that these actions are beneficial. One important reason that the gap exists is that human beings are extremely “time poor”. The increasing demands to meet and exceed expectations in numerous domains of lives like work, family and friends, usually wellbeing fails to get mindshare and is neglected.

Past research has shown that simple nudges have proven to be more effective in producing desirable behaviours. Nudge Theory is based upon the idea that by shaping the environment, also known as choice architecture, one can influence the likelihood that one option is chosen over another by individuals. A key factor of nudge theory is the ability for an individual to maintain freedom of choice and to feel in control of the decisions they make (Thaler & Sunstein, 2008). There are several types of nudges, from which reminder and disclosure nudges will take main focus for this paper. Reminder nudges are a type of nudge used in choice architecture to encourage people to make certain decisions or actions by reminding them of options that they may have overlooked. Disclosure nudges, on the other hand, involve providing people with clear and transparent information about the choices they are making, in order to help them make more informed decisions. The idea behind disclosure nudges is that people are more likely to make better decisions when they have access to accurate and relevant information about the options available to them. By making information more transparent and accessible, disclosure nudges can help to empower people to take control of their decisions and improve their outcomes.

Luo et al. (2022) compared the effectiveness of six cognitive frameworks for nudges to determine the effectiveness of each when compared to each other. Of these frameworks, memory interventions, such as reminders, were found to be more effective than perception interventions, such as informative/disclosure nudges. When looking specifically at food choice and purchases, a systematic review into the effectiveness of nudging interventions in real-life food purchasing environments found that most research evidence mainly focuses on information and position nudges, with lesser focus on other types of nudges (Haberers et al., 2020). Additionally, research by Kroese et al. (2016) showcases that the disclosure of repositioning healthy food products to consumers has a positive impact on customer likelihood of purchase. While these studies support the overall use of visual nudges, little information is available that specifically compares the influence of reminder and disclosure nudges in making food purchases in real time. Thus, a knowledge gap exists in understanding the effectiveness of these types of nudges in affecting food purchase behaviour, especially comparatively.

Thus, our present study will explore how reminder and disclosure visual nudges influence food purchase behaviour at the Food Hub Market (FHM), an at-cost grocery store, in real time. Additionally, we also attempt to compare the effectiveness of each type of nudge to determine which has a larger influence on customer’s food related purchase behaviour.

Research Question and Hypotheses

Our main research question examines whether reminder and disclosure visual nudges

influence customer food purchase behaviour at the FHM. Therefore, the question we aimed to answer with the present study is “how is customer likelihood of purchasing food products at the Food Hub Market influenced by visual nudges like reminders and disclosures?” We hypothesise:

H1: FHM customers are more likely to purchase food products when influenced by visual nudges compared to shopping in the absence of nudges.

H2: FHM customers are more likely to purchase food products when influenced by reminder nudges over disclosure nudges.

Methods

Our present study aimed to test our hypotheses that explore the impact of types of visual nudges on purchasing behaviour in a real life setting. To carry this out, we temporarily introduced visual nudges at a local at-cost market located on a university campus and examined its impact on purchasing behaviour.

Participants

A sample size of 246 customers was determined by a priori power analysis for a power of 0.80 with an estimated effect size of 0.2. We collected sales data from over 2000 customers at the FHM. This included all the customers at the FHM, primarily students, faculty or staff, who made any transactions during the three weeks that the study was run.

Conditions

The independent variable was the type of visual nudge used in each condition, and the dependent variable was the food purchase behaviour.

Week 1 was set as the control condition, wherein no nudges were put up. Week 2 was set as the reminder condition, and Week 3 was the disclosure condition, wherein the respective visual nudges were placed accordingly.

Stimuli

The stimuli used were physical visual nudges printed on A5 sized cardstock paper. Both reminder and disclosure nudges included a picture of the selected target product, along with a corresponding statement depending on the experimental condition. All nudges used consistent grey backgrounds and fonts to avoid any confounds attributed to different levels of attention evoked due to disfluency (see Appendix A).

For the reminder condition, the statements were phrased as a simple question that asked the customer if they forgot to buy the target product. For example, the nudge for instant oatmeal asked “Did you forget to grab a pack of oatmeal?” In contrast, the disclosure condition used research backed and evidence based statements that provided information about the target product. For instant oatmeal, this said “Oatmeal promotes a healthy heart and weight! Oatmeal helps maintain low cholesterol- both total and ‘bad’ cholesterol.” References for these statements were also provided at the bottom right of the nudge, in case a customer wanted to retrieve more information from the source. No stimuli was used in the control condition. Our dependent variable was likelihood of purchase operationalized by sales percentages while our independent variables were the nudges - reminder and disclosure.

Procedure

The study took place at the Food Hub Market (FHM) at the University of British Columbia and ran over three weeks in March 2023. During this period, five target food items were chosen for analysis. These items were chosen on the basis of what constitutes staple food items in a students diet as the student population forms the primary demographic of customers at the FHM. Additionally, products that were fast-selling and exceedingly popular, determined by a prior analysis of the FHM sales data, were excluded. On these grounds, the final five products selected were rice crackers, egg noodles, instant oatmeal, beans and apples. Various measures to control for confounds were made while setting up the conditions

while also taking into account the regular functioning of the market. For example, the nudges were put up and taken down at the same time and location to maintain consistency. Additionally, the nudges were put up for four days of each week followed by a three day interval in between conditions to control for interference and carryover effects. No additional manipulations were made to the shopping experience for this study. Sales data for each of the five target products as well as the overall sales data for all items sold at the market were then later retrieved through the FHM sales database to be used for analysis

Data Analysis Strategy

Sales trends for each target product were examined using percentage sales. For instance, percentage sales for apples during reminder week were calculated using the formula below:

$$\text{percentage sales}_{\text{apples}} = \frac{\text{total sales of apples during reminder condition}}{(\text{total sales during reminder condition} - \text{total sales of apples during reminder condition})}$$

Percentage sales were calculated for each of five products during each condition. To examine overall changes of all five target products across the three conditions, percentage changes in total product sales (sum of sales for all five food products) were also compared across weeks.

Results

We performed chi-squared analysis on the product sales comparing results from::

1. reminder condition against the control condition,
2. disclosure condition against control condition, and
3. reminder condition against disclosure condition (See Appendix B, Table 1, 2, and 3)

We observed an insignificant increase of 4.22% in the total sales of our target products in the reminder condition when compared to the control condition, $X^2(1, N=821) = 0.25, p = .614$. Furthermore, we observed a significant increase of 28.54% in total sales of target food products in the disclosure condition when compared to sales in the control condition, $X^2(1, N=921) = 6.63, p = .010$. Lastly, we observed a significant increase of 23.33% in total sales of target food products in the disclosure condition when compared to sales in the reminder condition, $X^2(1, N=938) = 4.12, p = .042$. This indicates that disclosures were significantly better at influencing customer likelihood to purchase target products when compared to reminders.

Notably, when comparing sales within products, oatmeal sales were 82.14% higher during reminder week and 96.43% higher during disclosure week when compared to control week. This was the largest change in sales during the course of our experiment. Rice cracker sales saw a decrease over the two weeks where nudges were put up, dropping by 19.15% during reminder week and by 44.68% during disclosure week. This was the only constant decline in sales observed during our experiment.

With regards to our hypothesis, our data suggests that both reminders and disclosure nudges can influence customer likelihood to purchase food products, however only disclosure nudges can do so to a significant degree. Comparing the two nudges reveals that disclosure nudges are also significantly more likely to influence customer purchase behaviour than reminders.

Discussion

The first hypothesis stated that customers of the Food Hub Market who shop in the presence of the visual nudges are more likely to purchase the nudged food products than the customers who shop in the absence of visual nudges. Our findings corroborate this hypothesis, revealing that customers were more likely to make a purchase when their

decisions were influenced by visual nudges. While both reminder and disclosure nudges demonstrated an uptick in product sales (4.22% for reminder and 28.54% for disclosures), it is noteworthy that the employment of disclosure nudges were significantly associated with an increase in total sales, as compared to the control or reminder condition.

Another hypothesis posited was that customers of the Food Hub Market who shop in the presence of Reminder Visual Nudges are more likely to be influenced by the nudges than the customers who shop in the presence of disclosure nudges, a notion supported by previous research conducted by Luo et al. However, our empirical analysis failed to validate this hypothesis. In fact, the data we collected demonstrated that total sales for the items of interest were 23% higher during the disclosure week than during the reminder week. Further analysis using a chi-squared test revealed a statistically significant increase in sales for the chosen products (p-value = 0.04).

This contradiction to our hypothesis may be explained by numerous confounds or reasonings, though one plausible explanation may be the participant demographic. As the FHM is located on a university campus, it is arguable that most customers are either university students or members of academia. Thus, such a population may be persuaded by the features of a disclosure nudge, rather than a reminder nudge, due to the former's more educational nature. To validate this theory further, future research may explore interactions of this study at other markets on university campuses.

Another explanation as to why our second hypothesis, and the work of Luo et al., (2022) were not supported and are likely to be our framing choices for the reminder nudges. The reminder nudges took the form of "Did you forget ..." which suggested an accusatory tone and could have potentially discouraged customers. This is different from reminders as they generally take an affirming or suggestive tone. However, further research needs to be conducted in order to understand the plausible effects.

Our findings suggest that visual nudges have the potential to effectively steer consumer purchasing behaviour towards healthier options. Furthermore, our study provides evidence to suggest that disclosure nudges may hold greater efficacy in influencing such behaviour as compared to reminder nudges, which contradicts previous literature on the topic. It is worth noting that the p-value for the observed increase in total sales during the disclosure week was 0.01, indicating a statistically significant relationship. However, in order to further support this claim, it is essential that future research replicates our findings, and find this relationship with other products.

The superior efficacy of the visual nudges for apples and oatmeal could be explained by the fact that these items were positioned at the eye-level in the market, compared to the other three items which were situated either above or below eye-level. Research conducted by Rozin et al (2011) demonstrated that decreasing the accessibility of food items can lead to reduction in consumption. Thus it is plausible that the placement of food items in the market might have impacted customers' purchasing behaviour (See Appendix C Table 4). It is recommended that future research takes this factor into consideration.

As mentioned earlier, the nudges were in place for four days, followed by a three day interval where the market was closed off. While this was not a factor that was controlled by us and was rather simply due to the market's pre-existing schedule, we believe that this interval helps mitigate any significant carryover effects.

While the research we conducted was a targeted study of the Food Hub Market, our research was broad in regard to the study of visually nudging different food products. Specifically, the findings of our study can be applied to the nudging of certain products that are linked to improved human wellbeing. Future studies could investigate the effectiveness of using visual nudges on such products, in order to promote human wellbeing not only within the Food Hub Market, but in various grocery stores around the world. Ultimately, the results

of our study can be applied to markets and stores beyond the UBC campus, and holds relevance to the broader area of human wellbeing.

Implications

Upon analysis of our study's results, we've identified particular implications and limitations of our research. Firstly, our data predominantly implies that disclosure nudges proved to be significantly effective in driving purchases, while reminder nudges did not. However, this rejects our second hypothesis as well as the literature, and future iterations of our study could be done to corroborate our data.

Another implication of our findings was that nudging products near eye-level to the consumer yielded an increase in purchasing. This increase is contrasted to products that were below or above eye-level. However, determining the extent to which nudging products at eye-level plays a role in driving purchase was not the primary goal of our research, and thus our data cannot support this implication claim. Therefore, future research must be done to explore such a relationship.

The data we collected also implies that there is a certain convenience factor that consumers take into consideration when purchasing products. This implication is found in how ingredient-type products such as egg noodles and black beans did not experience a significant increase in purchase, while snack-type food such as oatmeal did. Similarly to the previous implication, more research must be done to confidently attribute this significant increase to the aforementioned convenience factor.

Ultimately, we acknowledge the limitations of our study and assert that further research may look at how the purchase of other products are influenced by these visual nudges.

Conclusion

Our research project aimed to contribute to the success of the Food Hub Market, as well as the promotion of human wellbeing for individuals at UBC campus. Our research aimed to examine whether reminder and disclosure visual nudges influence customer food purchase behaviour at the FHM. We hypothesised visual nudges would influence customer purchase behaviour, and moreover, when comparing reminders and disclosures, we hypothesise that FHM customers are more likely to purchase food products when influenced by reminder nudges over disclosure nudges. The findings support our first hypothesis. Moreover, contradictory to our second hypothesis, they suggest that disclosure nudges do significantly increase the purchase of food products. Considering our findings, it is likely that these results could lead to more in-depth research in this field including the placements of products in a market, the use of different types of visual nudges depending on the population demographics.

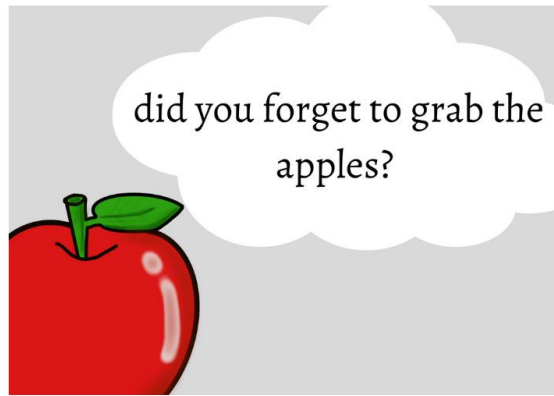
Recommendation for the client

Based on the academic nature of our study's demographic, our research found that disclosures are more influential on a customer's purchase behaviour, therefore, we recommended the Food Hub Market to opt for the use of disclosure nudges over reminder nudges. Additionally, based on our research that supports existing literature on placement of products, we suggest that when you want to increase the purchase of certain products, place these products and their respective nudges at or around eye-level. Lastly, we recommend that you focus on nudging easy, convenient products, rather than ingredient-type products.

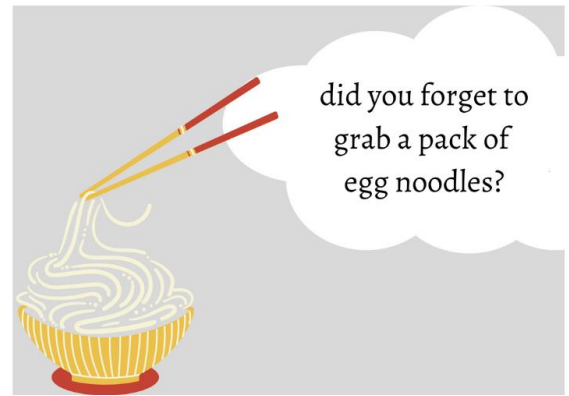
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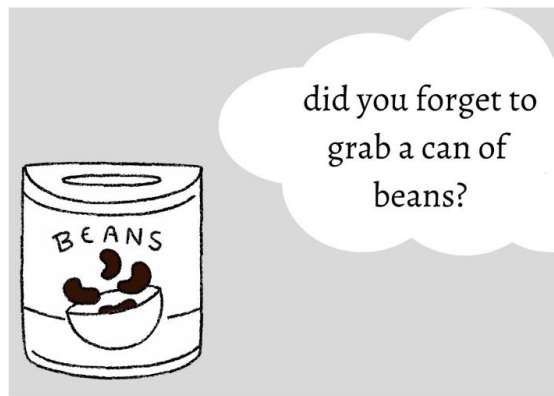
Appendix A
Images of the Visual Nudges



Apples



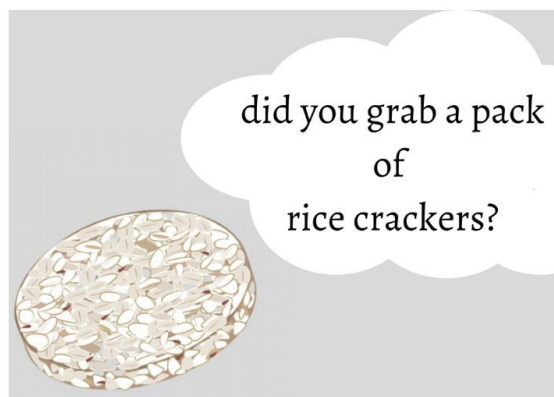
Egg Noodles



Beans



Instant Oatmeal

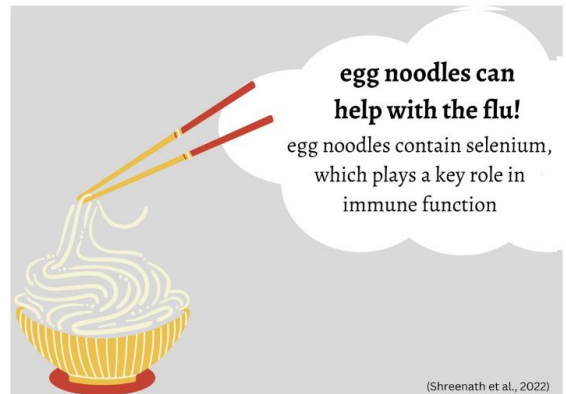


Rice Crackers

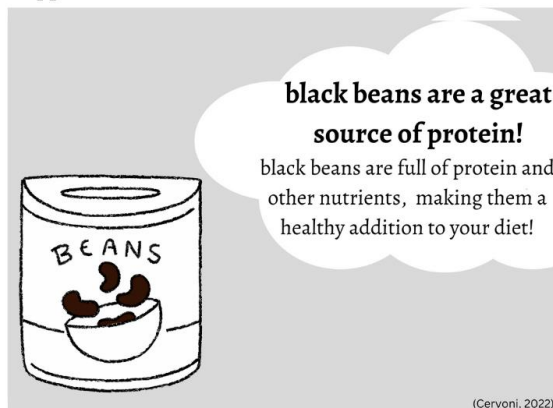
Figure 1: Reminder Nudges for the Five Target Products



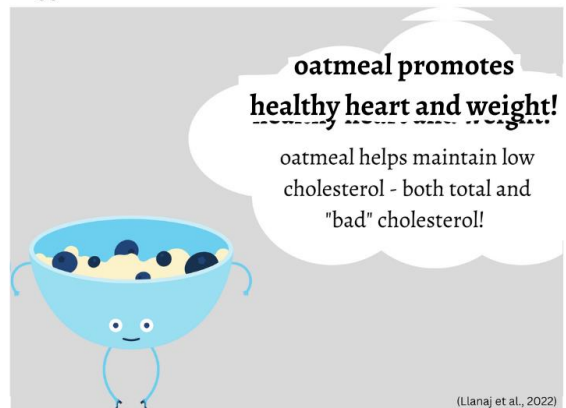
Apples



Egg Noodles



Beans



Instant Oatmeal



Rice Crackers

Figure 2: Disclosure Nudges for the Five Target Product

Appendix B
Tables of Data Collected and Analysed

Product	Quantity Sold per Week		
	Control	Reminders	Disclosures
Apples	310	315	418
Rice Crackers	47	38	26
Egg Noodles	7	8	7
Black Beans	11	8	12
Oatmeal	28	51	55
Total	403	420	518

Table 1: Quantity of target products sold across conditions

Product	Change in Product Sold (%)		
	Control vs Reminder	Control vs Disclosure	Reminder vs Disclosure
Apples	1.61	34.84	32.70
Rice Crackers	-19.15	-44.68	-31.58
Egg Noodles	14.29	0.00	-12.50
Black Beans	-27.27	9.09	50.00
Oatmeal	82.14	96.43	7.84
Total	4.22	28.54	23.33

Table 2: Percentage change in quantity of target products sold across conditions

Product	Statistics from χ^2 tests					
	Control vs Reminder		Control vs Disclosure		Reminder vs Disclosure	
	$\chi^2(1)$	p-value	$\chi^2(1)$	p-value	$\chi^2(1)$	p-value
Apples	0.0097	.9217	8.5069	.0035	7.7271	.0054
Rice Crackers	0.8018	.3705	7.3909	.0066	2.9014	.0885
Egg Noodles	0.0000	1.0000	0	1.0000	0.0234	.8760
Black Beans	0.2215	.6379	0	1.0000	0.2419	.6229
Oatmeal	6.061	.0138	6.1304	.0133	0	1.0000
Total	0.2545	.6139	6.634	.0100	4.1207	.0424

Table 3: P-values obtained from chi-squared tests comparing product sales across conditions

Appendix C

Product	Placement
Apples	At eye-level
Rice Crackers	At eye-level
Egg Noodles	Below eye-level
Black Beans	Below eye-level
Oatmeal	At eye-level

Table 4: Placements of visual nudges and products at FHM

Appendix D: Group Work Distribution

Contribution to writing the proposal: Chadd, Judith, Sarah, Theekshitha, Vaidehi, Yajas

Running data collection: Chadd, Judith, Sarah, Theekshitha, Vaidehi, Yajas

Running data analysis: Chadd, Judith, Sarah, Theekshitha, Vaidehi, Yajas

Making the presentation: Chadd, Judith, Sarah, Theekshihta, Vaidehi, Yajas

Writing the final report: Chadd, Judith, Sarah, Theekshitha, Vaidehi, Yajas