UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Nudging motivations to donate to UBC's food insecurity program

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Executive Summary

Can food-secure students be nudged to "pay it forward" at a three-tier pricing café, using a poster reflecting research on the motivations behind charitable behavior? We conducted two studies examining the effect of a poster in nudging food secure students to pay an extra $5 to support food insecure students at the UBC Foooood Café. In Study 1, sales data for each pricing option at the café ($5/$10/$15) was analyzed to see if $15-option sales would increase after the poster was displayed. In Study 2, we used an online survey in which we manipulated whether participants were shown the poster, to see if the poster would increase $15 choices as well as motivations to donate. We also measured participants' food-security to see how motivations to donate and price choices differed by food insecurity. In both studies, the poster did not have the desired effect, with $15 purchases decreasing in Study 1. However, our exploratory analyses found that food secure and insecure participants differ in their motivations to donate and in their price choices. These results may provide important insight into the cafe's sustainability, boosting donations, and the efficacy of the pay-it-forward business model.

Introduction

A recent study showed that 37% of the UBC Vancouver campus is food insecure (Carry, Thistle, & Buszard, 2019). In fact, Meal Exchange Canada estimates that 39% of students throughout Canadian universities are food insecure (Silverthorn, 2016). To combat food insecurity at UBC, the UBC SEEDS (Social Ecological Economic Development Studies) Program created a café called the Fooood Café. This café has a three-tiered payment option for their meals. The payment options are either $5, $10, or $15. The $5 option is catered towards those who are food insecure, the $10 is the average price to keep the café running, and the $15 option is for those who want to pay it forward and support food insecure students. Food insecurity is a stigmatized subject that some people may feel uncomfortable to confront in a public setting. A study by Eckhardt and Dobscha (2017) found that customers can feel uncomfortable when asked to address social issues such as food insecurity through their consumer choices. Therefore, it is important that the café's pricing system makes food secure students comfortable with choosing the $15 option, but does not discourage food insecure students from choosing the $5 option due to the associated stigma.

The current study attempts to motivate food secure students to choose the $15 option without adding to the stigma. Our approach is to build a nudge into the choice architecture of the café by putting up posters throughout the café (see Figure 1 for the poster design). The poster created for this study is designed to nudge food secure students to choose the $15 option by highlighting the prevalence of food insecurity at UBC. The poster design was informed by research examining the factors that make charitable donation psychologically rewarding (Dunn, Aknin, & Norton, 2014). The study found that donating makes people happier when it fulfills one or more of the three core human needs: 1) *relatedness*, the level of closeness one feels to the recipient(s); 2) *competence*, the level of belief that the spending will make a meaningful difference; 3) *autonomy*, the level of freedom one feels when making the decision to prosocially spend. These three needs, which we will refer to as donation motivations, were considered when designing our poster to be an effective nudge. If effective, our poster will: 1) satisfy relatedness needs by suggesting that customers will likely know someone who is food insecure; 2) satisfy competence needs by describing what customers can do to help; 3) avoid restricting autonomy by presenting the choice in a non-coercive form, via a nudge. The first two points should help increase $15 purchases from food secure students, while the third point should help prevent food insecure students from feeling pressured to choose an option other than $5.

In the first of two studies, we measured sales data from the café at two time periods: before and after the posters were displayed. We hypothesized that the proportion of $15 purchases would increase after our posters were displayed. In Study 2, we conducted an online survey in which we described the café, asked participants which price option they preferred, and assessed their levels of food insecurity and donation motivations. Using two conditions, we manipulated whether or not participants were shown an image of our poster. We hypothesized that participants shown the poster would be more likely to choose the $15 option. Additionally, we expected participants to choose prices based on their level of food insecurity, with food insecure participants tending to choose $5 and food secure participants tending to choose $15.

Method: Study 1

Participants. Our participants were customers at the UBC Foooood Café, whose purchases we recorded via sales data. We conducted an *a priori* power analysis using G*Power to determine the sample size for our analysis of the sales data. To detect a small effect size for

our chi-square test with 80% power, we required a sample size of 964. We were able to exceed this sample size due to the fact that we had access to a large amount of sales data in the pre-poster time period (3,477 purchases).

Study Design and Procedure. Pre-intervention Sales and Post-Intervention Sales were our two conditions in Study 11), based on the three donation motivations, acted as the intervention and was placed on the cashier counter and on the pillars in the café. However, this was never followed through due to COVID-19 events shutting down UBC, and no results from this survey are reported. Sales data was collected from January 20 to February 29 pre-intervention, and March 9 to March 13 post-intervention, and consisted of recorded sales from the Cafe's register. Post-intervention sales data collection was intended to last 5 more business days (March 16-20) but COVID-19 events halted collection. If our poster was to increase $15 donations, as predicted, the sales data would allow us to see this by comparing the pre and post intervention periods.

Measures. To see whether the poster had an effect on the amount of donations, we used the daily sales data to see whether the frequency of $5, $10, or $15 options changed from before the poster intervention. Sales reports were provided to us by the cafe management.

Method: Study 2

Participants. Fifty-eight participants (16.1% male, 82.1% female and 1.8% non-binary) ages 18 to 26 ($M = 20.7$, $SD = 1.39$) were recruited for the survey (see Table 1 for complete demographics). We reached out to UBC students by posting the survey to social media and sending it through direct messages. Due to time constraints and the shutdown of the cafe, we were unable to recruit cafe customers as originally intended. Due to the very narrow window we had to collect data, we were limited in our ability to achieve an appropriate sample size. Therefore, we did not conduct an *a priori* power analysis as in Study 1, and instead we sought to simply maximize the number of participants we could recruit.

Study Design and Procedure. In an online Qualtrics survey, we began by describing the cafe and its pricing system to participants and assessing their level of food insecurity. Next, we randomly assigned participants to one of two conditions; the experimental group was shown our poster for a minimum of 15 seconds and the control group was not shown the poster. Following the experimental manipulation, participants were given three questions about their donation motivations, as well as which price they would choose if they ate at the cafe. To conclude the survey, participants completed a brief demographics questionnaire. Survey data was collected from March 17 to March 30. Study 2 was set up to test both of our hypotheses; if viewing our poster increases $15 donations at the cafe, then those who view it in the survey should be hypothetically more willing to donate and if level of food insecurity moderates this relationship, then willingness to donate should be higher as food security increases.

Measures. We used a previously validated 6-item version of the Household Food Security Survey Module (HFSSM) to assess food security (Blumberg, Bialostosky, Hamilton, & Briefel, 1999). Participants were categorized as food secure or food insecure based on the number of affirmative responses to the six items (see Appendix B for the items and scoring procedure). Based on the presence of the poster and participant's food security score, we intended to observe if there were differences in the following variables; participants' willingness to donate, which was measured by whether they chose $5, $10, $15 option, and donation motivations. The latter are (a) their levels of relatedness to food insecure students (one item e.g. "How connected do you feel to food insecure students?"), and (b) their perception of the

competence of the donation (one item e.g. "Do you feel like you can do something to help food insecure students?") and (c) autonomy in choosing to donate (two items e.g. "Do you feel like you are able to choose the $15 option?" and the free choice of any price point). All donation motivation items were measured on a 7-point Likert scale (1 = not at all, 7 = extremely/very much). Near the end of the survey, we asked a variety of demographic questions (see Table 1 for demographic characteristics).

Results

Study 1. We conducted a chi-square test of independence on the pre-poster and post-poster sales data to detect a significant difference in the proportion of price options chosen by café customers. Table 2 shows the results of our analysis. We detected a significant difference between the two conditions in the proportion of price options chosen. Contrary to our prediction, the percentage of $15 purchases decreased after the poster was displayed.

Study 2. We conducted a chi-square test of independence to detect a significant effect of the poster condition on the proportion of prices chosen by our survey participants. Table 3 shows the results of our analysis. Our hypothesis was not supported; there was no significant difference between conditions in the proportion of prices chosen. We explored the effect of the poster condition on participants' responses to the three donation motivation measures. Table 4 shows the results of independent samples *t*-tests to detect between-condition differences in these measures. We found no significant differences between conditions in our relatedness, competence, and autonomy measures.

Additionally, we conducted exploratory analyses to examine how responses to our price choice and donation motivation measures differed between food secure and food insecure participants. We conducted a chi-square test of independence to examine the relationship between food insecurity and the price options chosen (see Table 3 for the results). Consistent with our expectations, we found that a greater percentage of food secure participants chose the $15 option, compared to food insecure participants who in turn showed a greater percentage of responses choosing the $5 option. To test whether participants differed in their responses to the donation motivation measures based on food insecurity, we conducted independent samples *t*-tests comparing food secure and insecure participants. Table 5 shows the results of our analyses. We found significant differences between food secure and food insecure participants on all three measures. Food insecure participants scored higher in the relatedness measures, indicating that they felt more connected to food insecure students, but scored lower in the autonomy and competence measures, indicating that they felt less free to choose the $15 option and thought that choosing the $15 would do less to help food insecure students.

Discussion

Our results suggest that using an informative poster as an intervention to motivate food secure students to donate is not an effective nudge. Rather than supporting our hypotheses, our poster had the opposite effect as we witnessed an increase in $5 purchases and a decrease in $15 purchases after it was put up. Although we cannot rule out the possibility of a backfire effect occurring, another likely explanation for the lack of extra spending among customers is the time at which we collected this data. Our after-poster sales data was collected at the end of the semester, while the threat of COVID-19 was reaching a high point. Both factors could have conceivably contributed to a general lack of spending by students. In Study 2, the poster also

failed to have the desired effect — showing no effect on participants' price choices, as well as no effect on their donation motivations.

There was a large discrepancy between the proportions of prices chosen by the customers in Study 1 and the survey participants in Study 2. The sales data showed that a large majority of customers chose $5 and very few chose $15, whereas the survey data showed a far more balanced distribution of price choices (see Table 3). One explanation is that because we did not exclusively recruit café customers, our survey sample was not representative of the population of café customers represented in our sales data. Some evidence for this is that our survey sample was only 22.8% food insecure — far below the 37% shown in recent surveys of UBC students (Carry, Thistle, & Buszard, 2019). If our survey sample included a disproportionate number of food secure participants, this may account for the larger proportion of $15 responses we found in our survey. Another explanation for this disparity is the fact that our price choice data were based on behavioral measures in Study 1 but self-report measures in Study 2. Accordingly, the larger proportion of $15 responses may have been due to socially-desirable responding, in which participants may be choosing the $15 option more readily when it does not cost them any extra money.

Our Study 2 survey results indicate that participants tended to choose the appropriate option based on their level of food insecurity. This suggests that the pricing system is not being taken advantage of by food secure students, and is being taken advantage of by food insecure students, as intended. However, it remains to be seen whether these results will replicate among café customers, given the potential differences between these two populations we have outlined, and the fact that socially-desirable responding does not apply to real-world behavior. Participants who had the highest level of relatedness to food insecure students tended to be participants who were food insecure themselves, meaning that this population is not only lacking financial support from food secure students via $15 purchases, but lacking in a shared identity and solidarity with food secure students who are most able to help. This supports the idea that the well-being of the food insecure population is negatively impacted by the attitudes and lack of connectedness with the food secure student population.

Limitations. A significant limitation in our data collection was the closure of the café and reduction of people coming to campus as a result of the progression of COVID-19. Panic about the virus and its financial strain may have confounded any potential effects on our poster. Our results may have also been impacted as other donation programs on campus were created to support food insecure students during the COVID-19 outbreak, possibly resulting in fewer customers donating in our study. There may have been a seasonal effect resulting in more $5 purchases as students generally become more financially stressed towards the end of term. The sudden shutdown of the café forced us to make a last-minute adaptation to our survey methods. We were no longer able to study café customers, and we had to resort to an online experiment using a virtual poster manipulation and self-report measures. As such, our sample size for Study 2 was sub-optimal and our results cannot be neatly applied to the population of café customers. Our recruitment methods involved advertising the survey to our friends and acquaintances, which may have contributed to the gender imbalance we observed in our sample (82.1% female, see Table 1). The differences in results for both studies could be due to having two small, qualitatively different samples, however, it was impossible to gather data for both studies simultaneously. Rather than having an equal number of male and female participants like in Study 1, Study 2 was 82.5% female which may have contributed to the increase in donations.

Future studies should consider extending the data collection period across both semesters would allow us to increase our sample size and potentially get more proportionate demographic groups, remove the seasonal effect and COVID-19's financial impact on people's donation behaviors. Furthermore, in addition to putting up posters we could give individuals in line at the café flyers that would essentially be a miniature sized poster, to increase the chances that they actually viewed the poster and received the manipulation for our study.

Recommendations. Given that particularly food insecure customers may feel uncomfortable ordering from the Fooood Café with its current setup, we recommend that they try to maximize their discretion for customers' price choices. The café should ensure that all employees follow the pointing system (currently there is lots of variability in usage), change the layout or line location so other customers cannot observe price selection, or switch to online ordering. This poses technology challenges as the café currently does not have the equipment, but it is the most discrete and sustainable option. With our poster being an ineffective nudge to increase donations, we recommend that the café increases its promotion in a more attention-grabbing matter. For example, if the café decides to implement an online ordering system, this could provide a great opportunity to improve discretion and to implement nudges on a captive audience. A short video could be played that explains its business model and positive impact on food-insecure students. This may be a much more effective method than our poster of focusing customers' attention towards any nudges designed to induce donations. First-time customers would be less hesitant ordering from the café after learning about the business model, and food-secure customers would potentially increase their awareness and connectedness with food-insecure students and be more likely to donate or choose the appropriate price option for them.

Future studies should explore ways to motivate customers to choose appropriate price options so the café can continue operating and serving food-insecure students. Furthermore, they should explore how to increase customers' autonomy, competence, and connection to food-insecure students to encourage donations. Although our hypotheses were not supported, these contributions provide critical suggestions on how the Fooood Café can improve as well as future research ideas that can better the experience of food-insecure students on campus. With approximately 37% of UBC's population being food-insecure, these findings are important in learning how the café can better provide for and ultimately improve the well-being of food-secure individuals.

Appendix A: Tables and figures

Table 1.

Study 2: Survey Participant Characteristics

Demographic dimension	
Age (years)	
Minimum	18
Maximum	26
Mean (SD)	20.7 (1.39)
Gender (%)	
Male	16.1
Female	82.1
Non-binary	1.8
Social class (10-point scale)	
Minimum	3
Maximum	9
Mean (*SD*)	6.8 (1.38)
Food insecurity (%)	
Food secure	77.2
Food insecure	22.8
Ethnicity (%)	
White	42.1
East Asian	26.3
South Asian	17.5
Middle Eastern	3.5
Black	1.8
Hispanic	1.8
None of the above	7.0
Domestic/International student (%)	
Domestic	80.0
International	20.0
Tuition payment (%)	
Not through student loans	76.8
Partly through student loans	10.7
Primarily through student loans	12.5

Table 2.

Study 1: Proportions of prices chosen compared by condition

	Price				
Group	$5	$10	$15	χ^2	*p*
Condition *n* (%)				0.897	0.638
Pre-poster	2860 (82.3)	546 (15.7)	71 (2.0)		
Post-poster	677 (87.2)	92 (11.9)	7 (0.9)		

Table 3.

Study 2: Proportions of prices chosen compared by condition and food insecurity

	Price				
Group	$5	$10	$15	χ^2	*p*
Condition *n* (%)				0.897	0.638
No poster	6 (17.1)	17 (48.6)	12 (34.3)		
Poster	4 (18.2)	13 (59.1)	5 (22.7)		
Food insecurity *n* (%)				6.97	0.031
Food secure	5 (11.4)	23 (52.3)	16 (36.4)		
Food insecure	5 (38.5)	7 (53.8)	1 (7.7)		

Table 4.

Study 2: t-test results comparing charity motivation means between conditions

Independent samples *t*-test

				95% Confidence Interval		
	t	*df*	*p*	Lower	Upper	Cohen's *d*
Relatedness	1.051	55.0	0.298	-0.435	1.393	0.286
Competence	-0.391	55.0	0.697	-1.073	0.722	-0.106
Autonomy	0.779	55.0	0.439	-0.549	1.248	0.212

Group descriptives

	Group	*N*	Mean	Median	*SD*	*SE*
Relatedness	no poster	35	3.34	3.00	1.78	0.301
	poster	22	2.86	3.00	1.49	0.318
Competence	no poster	35	4.14	4.00	1.65	0.278
	poster	22	4.32	4.50	1.64	0.351
Autonomy	no poster	35	4.49	5.00	1.65	0.279
	poster	22	4.14	4.00	1.64	0.350

Table 5.

Study 2: t-test results comparing charity motivation means between food insecurity levels

Independent samples *t*-test

				95% Confidence Interval		
	t	*df*	*p*	Lower	Upper	Cohen's *d*
Relatedness	3.25	55.0	0.002	0.608	2.5701	1.025
Competence	-2.14	55.0	0.037	-2.072	-0.0679	-0.675
Autonomy	-3.23	55.0	0.002	-2.511	-0.5899	-1.021

Group descriptives

	Group	*N*	Mean	Median	*SD*	*SE*
Relatedness	Food insecure	13	4.38	4.00	1.94	0.538
	Food secure	44	2.80	3.00	1.42	0.215
Competence	Food insecure	13	3.38	3.00	1.76	0.488
	Food secure	44	4.45	5.00	1.53	0.231
Autonomy	Food insecure	13	3.15	4.00	1.46	0.406
	Food secure	44	4.70	5.00	1.53	0.231

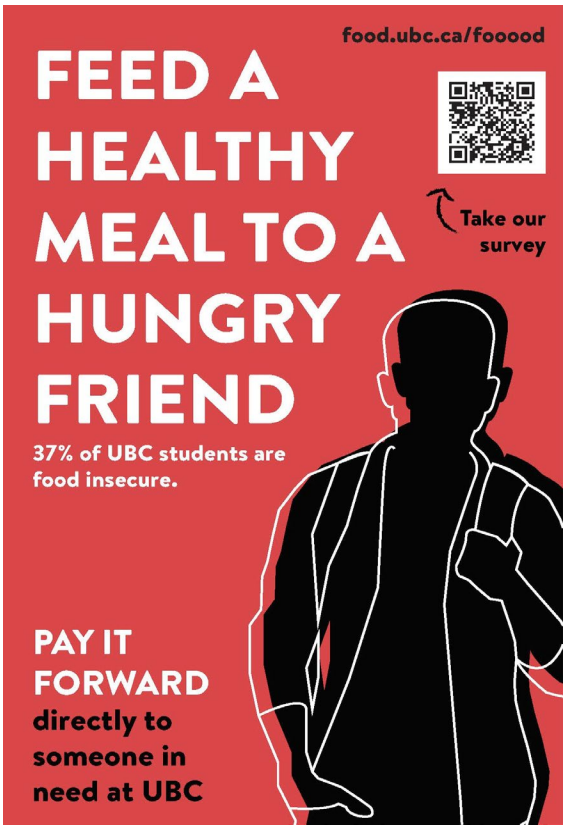

Figure 1. Image of the poster displayed in the café.

Appendix B: 6-item HFSSM measures and scoring procedure

These next questions are about the food eaten in your household in the last 12 months, and whether you were able to afford the food you need. For these statements, please select whether the statement was often true, sometimes true, or never true for you in the last 12 months. If you are in first-year or a new student, please only think about the time since you enrolled at UBC.

Q1. The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more
Often true
Sometimes true
Never true
Don't know / Prefer not to answer

Q2. I couldn't afford to eat balanced meals.
Often true
Sometimes true
Never true
Don't know / Prefer not to answer

Q3. Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?
Yes
No

Q4. How often did this happen?
Almost every month
Some months but not every month
Only 1 or 2 months
Don't know

Q5. Did you ever eat less than you felt you should because there wasn't enough money for food?
Yes
No
Don't know

Q6. Were you ever hungry but didn't eat because there wasn't enough money for food?
Yes
No
Don't know

[End of HFSSM]

6-item HFSSM scoring procedure: Responses of “often” or “sometimes” on questions Q1 and Q2, and “yes” on Q3, Q5, and Q6 are coded as affirmative. Responses of “almost every month” and “some months but not every month” on Q4 are coded as affirmative. The sum of affirmative responses to the six questions determines the participants’ level of food insecurity. Participants with two or more affirmative responses are categorized as food insecure and participants with less than two affirmative response are categorized as food secure.

Appendix D: References

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