



Save or Pay: The Framing Effect of a Single-use Cup Fee on Consumer Cup Choice

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Executive summary

Introduction

This study explores how framing of the single-use cup fee affects consumer choice and reported future intentions of bringing reusable cups to UBC cafés. Based on past studies on prospect theory, we hypothesized a lower likelihood of choosing single-use cups and a higher intention of bringing reusable cups when asked to "pay a fee." UBC charges 25 cents for a single-use cup fee to discourage customers from using single-use cups, but often, coffee shops do not personally inform customers of this charge.

Research Question

How does the Save and Pay framing influence consumers' cup choice (single-use or reusable cups) and reported future intention of bringing a reusable cup?

Methods

Participants completed a survey simulating a beverage buying experience and were randomly assigned to one of three conditions: Save condition (presented the fee as a potential saving), Pay condition (presented as a potential payment), and Control condition (which automatically added the fee without specific framing). Recruitment was done through social media and in-person outside cafés at UBC.

Results

The results suggest that neither hypothesis was supported. However, though not significant, the participants in the Save condition were more likely to choose the reusable cup option. There was also a small significant increase in reported future intention of bringing reusable cups in the Save condition.

Recommendations

We recommend making the 25-cent fee more salient and framing it as a Save within the coffee buying experience. However, future replications - specifically field experiments with bigger and more representative samples - can further help solidify our understanding of the framing effect and determine whether this increase in self-reported future intention of bringing reusable cups translates to behavioural change.

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Introduction

Currently, many patrons are unaware of single-use cup fees, and many who are aware only find out through reviewing their receipts, which ineffectively informs and disempowers customers from making the more environmentally conscientious decision. This ineffective communication may be leading to a default effect (Giuliani et al., 2023). Having a default option streamlines a person's view on what they can do, making alternatives such as reusable cups less likely to be used. Consequently, our study wants to investigate whether changing how a single-use cup fee is framed would lead to consumers considering, bringing, and using reusable cups.

Tversky & Kahneman (1981) explored the effects of framing (as a gain or loss) on consumer decision-making. Based on prospect theory, consumers are more risk/loss averse than benefit/gain seeking (Tversky & Kahneman, 1981, p. 454). The single-use cup fee can be framed as either a potential gain or loss, more specifically as Save or Pay. The contrast in connotations between Save and Pay should help produce clearer differences in perception of the fee and thus have different effects on consumer cup choice. The subjective values of gaining \$X versus losing \$X differ because the displeasure of losing \$X is larger than the pleasure of gaining \$X (Tversky & Kahneman, 1981, p. 454). Thus, we believe that participants will be less likely to choose single-use cups in the loss framing of the single-use cup fee than in the gain framing, as consumers will be more averse to "Pay 25 cents" than motivated to "Save 25 cents". A control should reflect the status quo and contrast the two options above. What this looks like is not informing participants of the \$0.25 charge and automatically adding the fee to their receipt.

However, participants reported future intentions will likely be exaggerated. This is due to there being no real-world barriers, as well as due to the hypothetical bias. This refers to how people often over-report their willingness to pay for a moral good in a hypothetical setting compared to their actual behaviour (Nilsson, Erlandsson, & Västfjäll, 2016). Moreover, a meta-analysis of 87 behaviours conducted by Sheppard, Hartwick and Warshaw (1988) found wide variations across measures of intentions and types of behaviour (Chandon, Morwitz, & Reinartz, 2005). In other words, reported future intention of bringing reusable cups might not strongly correlate with behaviour. However, their intention will likely reflect the direction of their single-use cup choice.

Research Question

How does the Save and Pay framing influence consumers' cup choice (single-use or reusable cups) and reported future intention of bringing a reusable cup?

Research Hypotheses

Hypothesis 1: Participants are less likely to use single-use cups if they are asked to pay the single-cup fee, than if they are asked to save the fee.

Hypothesis 2: Participants will report a higher intention to bring a reusable cup if they are asked to pay the single-cup fee than if they are asked to save the fee or if they are not asked.

Methods

Participants

To achieve an effect size = 0.2, alpha = 0.05, and power = 0.8, the study initially aimed for a minimum of 246 participants. Table 1 summarizes the collected sociodemographic information. A total of 267 participants (N = 267) were collected: 89 for the Save condition, 90 for Pay condition, and 88 for the control condition. On average, the mean age is 24.54 years old (SD = 13.18), 50.6% of participants identified as male, 44.5% identified as female and 4.9% as other genders. 51.9% of participants had an annual income of less than \$10,000, and 97% were affiliated with UBC. Non-UBC respondents were also included, as UBC Vancouver has a public campus whose amenities are regularly availed by non-affiliated individuals. The inclusion of their responses aided the study to be more ecologically valid.

Conditions

The independent variable is the framing effect and is operationalized as either a Save frame, Pay frame, or control. Participants were randomly assigned to one of three conditions, utilizing a between-subject design. Participants went through the same coffee shop simulation in all conditions but were asked different questions at checkout. Between experimental conditions (Save and Pay), participants were either asked to (1) "Save 25 cents by using a reusable cup" or (2) "Pay 25 cents for a single-use cup". In the control condition, this question was omitted, and the single-use cup fee was added to the receipt automatically (i.e., participants were forced to opt into using single-use cups); all other questions in the control condition were kept the same.

Measures

Our dependent variables include (1) participant cup choice and (2) reported future intentions of bringing a reusable cup. Participant cup choice was recorded binarily (i.e., single-use cup or reusable cup) by having them make a forced Yes/No choice to purchase a single-use or reusable cup depending on their assigned condition. Only the Save and Pay condition received this question, noting that no questions were asked in the control condition. A chi-squared test was then performed to detect significant differences in cup choice between the Save and Pay conditions. The control condition was omitted from the analysis of participant cup choice to be more ecologically valid (i.e., our control is that the single-use cup fee is not mentioned).

Secondly, reported future intention of bringing reusable cups was administered to all three conditions and used a 10-point Likert scale (1= Extremely Unlikely to 10=Extremely Likely). One-way Analysis of Variance (ANOVA) was performed to determine whether there are significant differences among the three conditions. An effect size of 0.02 was chosen to increase sensitivity, and Tukey's HSD is further conducted to identify specific pairwise differences among the three conditions if the ANOVA yields a significant result.

Procedure

Participants went through 3 different sections: the coffee shop simulation (including cup-choice question), reported intention of bringing a reusable cup, and sociodemographic data (age, gender, income, UBC affiliation). Initially, participants were collected online through social media (e.g.

Instagram stories). However, after failing to reach our target sample size of 267 after collecting data for two days, additional participants were gathered using convenience sampling in person at the UBC Nest and Life Building.

Results

Consumer Cup Choice

The Save condition had a larger number of participants selecting reusable cups, shown in Figure 1. A chi-square test was conducted (summarized in Table 2), and the cross-tabulation is able to present the data and how participants in each condition answered the questions under three levels of the independent variable. The Chi-Square test results yielded a strong association between the experimental condition and the participant's choices of cup $X^2(4, N = 180) = 2.698, p = .100$, with a $V = 0.122$. The differences in consumer cup choice between the two conditions were not significant and yielded a small effect size. The observed relationship could be due to chance. Our results did not support our hypothesis.

Reported future intention of bringing a reusable cup

In Table 3 and Figure 2, the mean reported future intention of bringing a reusable cup was significantly lower in the control condition ($M = 3.94, SD = 3.06, 95\% CI [3.30, 4.59]$) than in the Save condition ($M = 5.42, SD = 2.71, 95\% CI [4.85, 5.99]$) and in the Pay condition ($M = 4.49, SD = 2.99, 95\% CI [3.86, 5.12]$), $F(2, 223) = 5.992, p = .004$. The results suggest that the Save condition is the most optimal way to get consumers' future intention to be higher.

One-way ANOVA

Table 4 presents the data and how participants in each condition answered the questions under three levels of the independent variable. One-way ANOVA was performed to determine whether there is an effect of framing on participants' reported future willingness to bring their own reusable cup, and it revealed a statistically significant difference between at least two groups ($F(2, 264) = 5.749, p = .004$). The effect size, as measured by η^2 (eta squared), was $\eta^2 = 0.042$ (computed as $SS_{\text{between}}/SS_{\text{total}}$), indicating a small effect. We are able to reject the hypothesis. Since the mean square for between groups is higher than within groups, this suggests that there is a higher variance between the people taking different tests, when compared to the participants that are taking the same tests, suggesting that our independent variable has an effect (small to moderate) on the dependent variable.

To better understand the likelihood of participants' future intention to bring their own reusable cups, a one-way ANOVA was conducted, followed by a Tukey HSD post hoc analysis to interpret individual group differences. The independent variable was operationalized into three distinct conditions, and the dependent variable was measured on a scale from 1 (very unlikely) to 10 (very likely). The one-way ANOVA found significant differences across the conditions ($F(2, 264) = 5.749, p = .004$). The conditions, coded as 1.00 ($N = 89$), 2.00 ($N = 90$), and 3.00 ($N = 88$), demonstrated mean scores of 5.4157, 4.4889, and 3.9432 respectively.

Tukey's HSD

It is important to understand that Tukey's HSD test also utilizes the harmonic mean of the three groups due to unequal sample sizes between the three conditions, thus having an effect on the Type 1 error levels that are not guaranteed. The post hoc analysis revealed that while the overall

ANOVA was significant, only differences between the Save and Control condition was significant (1.00 vs. 3.00, $p = .089$).

Levene's Test for Equality of Error Variances by Condition

The Levene's Test indicates that there was homogeneity of variance among three conditions. Table 7 summarizes that the significance values for all three independent variable levels were above $p = 0.05$ ($M = 0.329$, $Mdn = 0.519$, $Mode = 0.366$), which means that the test did not detect any statistically significant differences in variances between the groups. As a result, we can assume that the variances were equal across the conditions, and the assumption of homogeneity of variances is met.

Shapiro-Wilk Test and Kruskal-Wallis Test for Normality

The Shapiro-Wilk test was conducted to assess the distribution of participants' reported future intention to bring a reusable cup. The results yielded significant values less than 0.001 for all conditions, strongly suggesting that the data deviated from a normal distribution.

The Kruskal-Wallis test was conducted to determine whether there are statistically significant differences in the distribution of ranks among the independent groups. Summarized in Table 9, the differences between the rank totals of 156.17 (Save), 130.49 (Pay) and 115.16 (Control) were significant, $H(2, n = 267) = 13.009, p = .001$. These results indicate a statistically significant difference in the distribution of ranks regarding the likelihood of bringing a reusable cup next time among the three conditions, implying that not all conditions had the same effect on participants' intentions to bring a reusable cup. The results increase our confidence that the Save condition correlated with the greatest future intention to use a reusable cup, compared to the Pay and Spend conditions. Albeit not meeting the assumptions of normality, the ANOVA results still indicate a statistically significant influence of the framing effect condition levels on participants' reported future intention of bringing a reusable cup.

Discussion

Our study did not detect significant differences in (1) consumer cup choice and (2) reported future intention of bringing reusable cups between the Save and Pay framing. Additionally, the results were the inverse of the first hypothesis, i.e., participants in the Save condition were significantly more likely to choose reusable cups and report a higher future intention of bringing a reusable cup than those in the Pay condition. This suggests that the Save frame may be the better option to reduce the likelihood of selecting a single-use cup option.

Mentioning the fee (i.e. making it more salient) also seems to make a difference in getting participants to choose reusable cups or report higher future intentions to bring a reusable cup. The default effect could be an explanation for the control condition yielding the lowest reported future intention. Although the Pay condition did not significantly differ from the control condition, it does suggest that mentioning the fee resolves the default effect by forcing customers to make a decision on cup choice.

Contrary to Tversky and Kahneman's prospect theory (1981), framing the small fee as a potential positive gain had a significant and bigger impact on reported future intentions of bringing reusable cups than framing it as a potential loss. The immediacy of the fee could explain why our findings go against prospect theory. That is, the immediate incremental gain could be perceived as a more 'attractive' option than the immediate incremental loss. Another explanation for the incongruencies between our research and prospect theory is that the \$0.25 fee could be perceived as too small an amount for most university students to invoke a loss mindset using the Pay framing. Rather than invoking a loss mindset, framing the fee as a potential save seems to better motivate students to reduce single-use cup usage. In brief, our findings illustrate that within an interpersonal experience of buying coffee, the mere mention of the single-use cup fee as a possibility to save money could be an effective nudge towards more reusable cup usage.

Limitations

There are issues with the real-life generalizability of the results. The first issue is that there are variables present in a real-world coffee shop that were not present and accounted for in the simulation. Some barriers, such as forgetting or financial barriers, could influence consumer cup choice and intentions to bring reusable cups in the future, yet were beyond the scope of the study. This leads to possible issues with generalization of the results. In addition, results could be exaggerated by the hypothetical bias: participants may report a higher willingness to bring reusable cups in a survey than they may in real life due to the survey merely simulating the coffee-buying experience.

Furthermore, our sample is skewed: a majority of participants in both conditions chose reusable cups. There could be a few explanations. Considering the sample consists of UBC students, who could be more conscientious than the general population, this makes our findings not fully generalizable to other populations. Therefore, this limitation suggests a need for more representative samples of the population in future studies.

However, our study indicates that the Save condition seems to be effective at increasing consumers' reported future intention of bringing a reusable cup, holding most (if not all) real-life practical barriers for reducing single-use cup usage constant. Nonetheless, real-life replications are still needed to look at the framing effect on consumer cup choice, and future reported intentions within an actual coffee shop environment.

Recommendations

Holding other factors constant, we recommend making the 25-cent fee more salient and framing it as a Save within the coffee buying experience. This could be done by having baristas ask customers: "Would you like to save 25 cents by using a reusable cup?" Mentioning and framing the fee as a Save - as opposed to a Pay or not mentioning it at all - should improve consumers reported future intentions of bringing a reusable cup, thus suggesting a reduction in single-use cup usage. However, future replications - specifically field experiments with bigger and more representative samples - can further help solidify our understanding of the framing effect and determine whether this increase in self-reported future intention of bringing reusable cups translates to behavioural change.

References

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Appendices

Survey

Consent Form

Class Research Projects in PSYC 421 - Environmental Psychology

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Introduction and Purpose

Students in the PSYC 421 – Environment Psychology class are required to complete a research project on the UBC campus as part of their course credit. In this class, students are required to write up a research proposal, conduct a research project, collect and analyze data, present their findings in class, and submit a final report. Their final reports will be published on the SEEDS online library (<https://sustain.ubc.ca/teaching-applied-learning/seeds-sustainability-program>). Their projects include online surveys and experiments on a variety of sustainability topics, such as waste sorting on campus, student health and wellbeing, food consumption and diet, transportation, biodiversity perception, and exercise habits. The goal of the project is to train students to learn research techniques, how to work in teams and work with UBC clients selected by the UBC SEEDS (Social Ecological Economic Development Studies) program.

Study Procedures

If you agree to participate, the study will take about 10 minutes of your time. You will answer a few questions **in the study**. The data will be strictly anonymous. Your participation is entirely voluntary, and you can withdraw at any point without any penalty. Your data in the study will be recorded (e.g., any answer you give) for data analysis purposes. If you are not sure about any instructions, please do not hesitate to ask. Your data will only be used for student projects in the class. There are no risks associated with participating in this experiment.

Confidentiality

Your identity will be kept strictly confidential. All documents will be identified only by code number and kept in a locked filing cabinet. You will not be identified by name in any reports of the completed study. Data that will be kept on a computer hard disk will also be identified only by code number and will be encrypted and password protected so that only the principal investigator and course instructor, Dr. Jiaying Zhao and the teaching assistants will have access to it. Following the completion of the study, the data will be transferred to an encrypted and password protected hard drive and stored in a locked filing cabinet. Please note that the results of this study will be used to write a report which is published on the SEEDS library.

Remuneration

There is no remuneration for your participation.

Contact for information about the study

This study is being conducted by Dr. Jiaying Zhao, the principal investigator. Please contact her if you have any questions about this study. Dr. Zhao may be reached at (604) 827-2203 or jiayingz@psych.ubc.ca.

Contact for concerns about the rights of research subjects

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time. You also may postpone your decision to participate for 24 hours. You have the right to choose to not answer some or any of the questions. By clicking the "continue" button, you are indicating your consent to participate; hence, your signature is not required. The researchers encourage you to keep this information sheet for your records. Please feel free to ask the investigators any additional questions that you have about the study.

Ethics ID: H17-02929

I consent to participating in this study.

Yes

No

Choose one drink

<input type="radio"/> Latte	<input type="radio"/> Chai
<input type="radio"/> vanilla late	<input type="radio"/> Hot chocolate



▼ Spend condition

Q4.1 ★ x→

Would you like to **pay** 25 cents for a single-use cup?

No
 Yes

▼ Save condition

Q4.1 ★ x→ ...

Would you like to **save** 25 cents by using a reusable cup?

No
 Yes, I will use a reusable cup

Here is your receipt

Order#1901		
Tillie Cafe	Date:	
	2024-02-13	
<u>Qty</u>	<u>Description</u>	<u>Price</u>
1	Cafe	6.00
2	Taxes	.72
3	Cup fee	.25
	<hr/>	
	Total:	6.97



Here is your receipt

Order#1901

Tillie Cafe Date:
 2024-02-13

<u>Qty</u>	<u>Description</u>	<u>Price</u>
1	Cafe	6.00
2	Taxes	.72

Total: **6.72**

Final questions all blocks

Q6.1 *

How likely are you to bring your own cup next time?

1 2 3 4 5 6 7 8 9 10

(1 being very unlikely and 5 being very likely)



Import from library

Add new question

Q7.1 *

What is your age?

Q7.2 * x→

What is your aligned gender?

Male

Female

Non-binary / third gender

Prefer not to say

Q7.3 *

What is your annual income?

Less than \$10,000

\$10,000 - \$30,000

\$30,000 - \$50,000

\$50,000 - \$70,000

\$70,000 - \$90,000

More than \$90,000

Q7.4 x→

Are you affiliated with UBC?

Yes

No

Tables and Figures

Table 1: Demographic Characteristics of Participants

Characteristics

Age

Male

Other gender(s) Median annual income

UBC Affiliated?

¹Mean (SD); n (%)

N = 267¹

24.54 (13.18) 135 (50.6%) 13 (4.9%)

Less than \$10,000 (55.8%)

259 (97%)

Figure 1: Differences in cup choice among the Save and Pay Condition

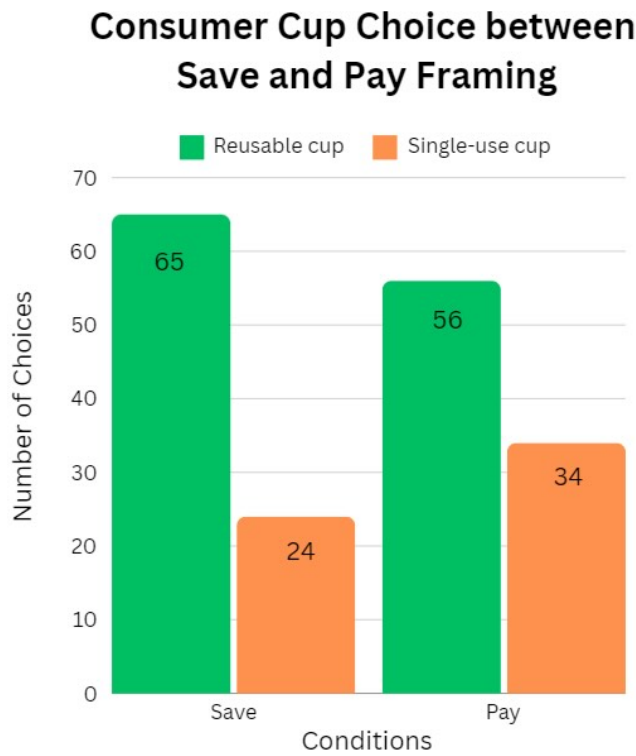
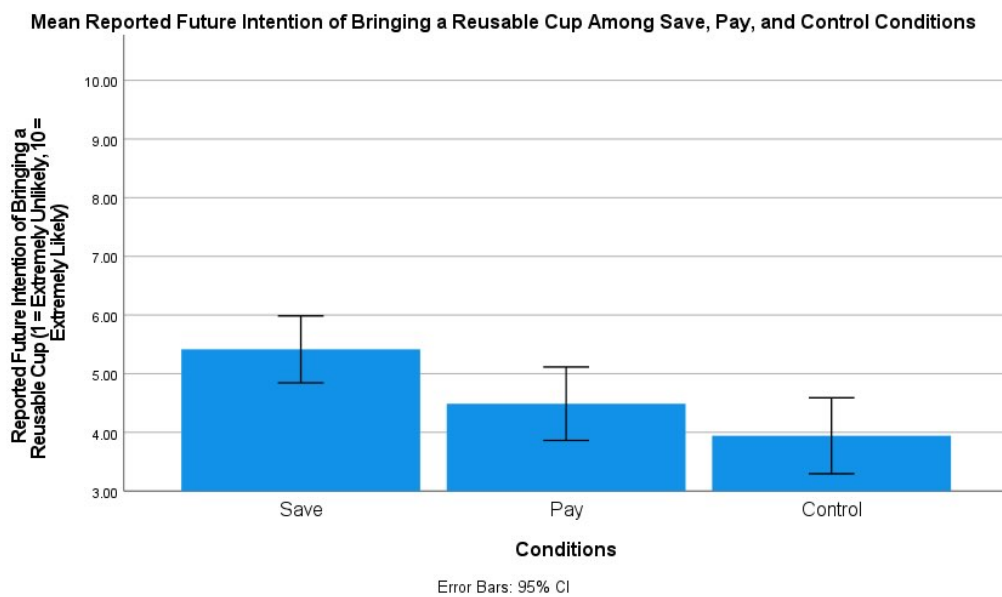


Figure 2: Differences in Mean Reported Future Intention of Bringing a Reusable Cup Among Save, Pay, and Control Conditions



Count

		UnifiedCupChoice		Total
		Single-Use Cup	Reusable Cup	
Condition	Save	24	65	89
	Pay	35	56	91
Total		59	121	180

Table 2: Chi-Square Tests

Condition Numbers: 1 - Save, 2 - Pay

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.698 ^a	1	.100		
Continuity Correction ^b	2.202	1	.138		
Likelihood Ratio	2.711	1	.100		
Fisher's Exact Test				.114	.069
Linear-by-Linear Association	2.683	1	.101		
N of Valid Cases	180				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 29.17.

b. Computed only for a 2x2 table

Table 3: Descriptive Statistics

Condition Numbers: 1 - Save, 2 - Pay, 3 - Control

Descriptives

How likely are you to bring your own reusable cup next time? - (1 = very unlikely and 10 = very likely)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	89	5.4157	2.70861	.28711	4.8452	5.9863	1.00	10.00
2.00	90	4.4889	2.99154	.31534	3.8623	5.1155	1.00	10.00
3.00	88	3.9432	3.05640	.32581	3.2956	4.5908	1.00	10.00
Total	267	4.6180	2.97422	.18202	4.2596	4.9764	1.00	10.00

Table 4: One-way ANOVA on the effects of framing on reported future intention of bringing a reusable cup

Oneway

ANOVA

How likely are you to bring your own reusable cup next time? - (1 = very unlikely and 10 = very likely)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	98.211	2	49.105	5.749	.004
Within Groups	2254.823	264	8.541		
Total	2353.034	266			

Table 5: Tukey's HSD Multiple Comparisons of Mean Reported Future Intention of Bringing Reusable Cup by Condition

Condition Numbers: 1 - Save, 2 - Pay, 3 - Control

Multiple Comparisons

Dependent Variable: How likely are you to bring your own reusable cup next time? - (1 = very unlikely and 10 = very like

Tukey HSD

(I) ConditionNum	(J) ConditionNum	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.92684	.43688	.087	-.1029	1.9566
	3.00	1.47255*	.43934	.003	.4370	2.5081
2.00	1.00	-.92684	.43688	.087	-1.9566	.1029
	3.00	.54571	.43813	.427	-.4870	1.5784
3.00	1.00	-1.47255*	.43934	.003	-2.5081	-.4370
	2.00	-.54571	.43813	.427	-1.5784	.4870

*. The mean difference is significant at the 0.05 level.

Table 6: Tukey HSD Means to Compare

Condition Numbers: 1 - Save, 2 - Pay, 3 - Control

How likely are you to bring your own reusable cup next time? - (1 = very unlikely and 10 = very likely)

Tukey HSD^{a,b}

ConditionNum	N	Subset for alpha = 0.05	
		1	2
3.00	88	3.9432	
2.00	90	4.4889	4.4889
1.00	89		5.4157
Sig.		.427	.089

Means for groups in homogeneous subsets are displayed.

- a. Uses Harmonic Mean Sample Size = 88.993.
- b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table 7: Levene's Test for Equality of Error Variances by Condition

Levene's Test of Equality of Error Variances^{a,b}

		Levene Statistic	df1	df2	Sig.
How likely are you to bring your own reusable cup next time? - (1 = very unlikely and 10 = very likely)	Based on Mean	1.117	2	264	.329
	Based on Median	.658	2	264	.519
	Based on Median and with adjusted df	.658	2	253.043	.519
	Based on trimmed mean	1.008	2	264	.366

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

- a. Dependent variable: How likely are you to bring your own reusable cup next time? - (1 = very unlikely and 10 = very likely)
- b. Design: Intercept + ConditionNum

Table 8: Shapiro-Wilk Test of Normality

Tests of Normality

	ConditionNum	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
How likely are you to bring your own reusable cup next time? - (1 = very unlikely and 10 = very likely)	1.00	.148	89	<.001	.944	89	<.001
	2.00	.146	90	<.001	.900	90	<.001
	3.00	.192	88	<.001	.848	88	<.001

a. Lilliefors Significance Correction

Table 9. Kruskal-Wallis Test of Normality

Test Statistics^{a,b}

How likely are
you to bring
your own
reusable cup
next time? - (1
= Extremely
unlikely and
10 =
Extremely
likely)

Kruskal-Wallis H	13.009
df	2
Asymp. Sig.	.001

a. Kruskal Wallis Test

b. Grouping Variable:
ConditionNum