

How do happy planet and financial savings posters influence the intention to use reusable cups?

Prepared by: Xinyang Liu, Yutong Song, Xiaoqing Xu, Yuxi Shen, & XuYing Liang

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Executive Summary

Introduction

In response to the environmental issue of single-use cup pollution, our study investigates the influence of gain-framed messaging on the intention to use reusable cups.

Research Question

How do posters that highlight the environmental benefits or the financial benefits of reusable cups influence the intention to use reusable cups?

Methods

We designed two types of posters: one highlighting the environmental benefits ("Happy Earth") and the other emphasizing financial savings ("Saving Money") to assess their impact on individuals' intentions compared to a control condition. Utilizing the Theory of Planned Behaviour, we surveyed 258 participants from the University of British Columbia, measuring their intention to use reusable cups after exposure to one of the three poster conditions.

Results

Contrary to our hypothesis, the results showed no significant difference in the intention to use reusable cups between participants exposed to the "Happy Earth" and "Saving Money" posters and those in the control group. This suggests that neither environmental nor financial incentives increased the likelihood of choosing reusable cups over single-use options.

Recommendations

This outcome calls for a reevaluation of the strategies used to promote environmentally responsible behaviours. It also displays the need for further research to explore more effective communication and incentive mechanisms to encourage the use of reusable cups. Future research should investigate the effects of different reminder formats (e.g., digital vs. physical) and the potential impact of social norms on encouraging reusable cup use.

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Introduction

According to UBC Food Services, Canadians dispose of 1.5 billion cups every year (Zhang et al., 2020). However, the thin layer of plastic in these cups makes them difficult to be recycled, and of all the plastic waste generated, merely 9% has been recycled, with an annual deposition of 4.8 to 12.7 million tons into the oceans (Wang et al., 2022). The use of single-use cups for takeaway drinks is a primary issue contributing to plastic pollution because plastic particles are pervasive, reaching remote regions worldwide and even infiltrating human bodies (Heidbreder et al., 2020). Besides pollution of the oceans, single-use cups also create other environmental problems, such as the creation of litter or contribution to the filling of landfills, thereby exacerbating environmental degradation. Pollution of the environment is not conducive to the sustainability of the planet, and it is our responsibility to urge students to use reusable cups. Zhang et al. (2020) state that UBC initiated the "Choose Reuse" program campaign to diminish disposable cup usage by promoting the adoption of reusable cups to protect the environment and our planet.

Many studies have suggested using poster design to solve this problem, such as how information is framed or presented in the poster, which can affect people's intention to protect the environment. Lele et al. (2018) describe framing as the choice to perceive certain aspects of reality and make them more prominent in the communication text, in such a way as to facilitate the definition of a particular problem, causal explanation, ethical evaluation, and/or treatment recommendations the project described. For the gain frame, gain-framed messages emphasize the benefits of the target activity. With these psychological constructs in mind, our posters are designed with the use of words and image elements to inform people about the benefits of being environmentally friendly. There are many ways to actively frame the information. One way is the use of environmental benefits to promote environmentally protective behaviour. As Baxter & Gram-Hanssen (2016) discovered, emphasizing the benefits about environmental actions can lead to higher rates of recycling. Aside from environmental benefits, the use of monetary incentives has the potential to persuade both environmentally aware consumers and those who are indifferent to the issue to utilize reusable coffee cups (Nicolau, 2022). Moreover, Isaksson & Palmqvist (2023) found that economic incentives can help consumers to choose reusable packaging. There are many strategies that can be used for behaviour change.

The strategies of environmental message and financial incentives (specifically charges on disposables) have many empirical supports for their effectiveness in promoting reusable cup use. Messages with environmental benefits are generally more effective than monetary incentives because monetary incentives can act as external motivators, which might diminish an individual's internal motivation to engage in pro-environmental behaviours (Poortinga & Whitaker, 2018). Although studies have demonstrated that both monetary incentives and environmental beneficial messages are useful for promoting environmentally friendly action, the effectiveness of these two elements on environmental posters is yet to be investigated.

Research question and hypothesis

The research question is, "How do posters that highlight the environmental benefits or the financial benefits of reusable cups influence the intention to use reusable cups?" We predicted that participants exposed to poster with monetary incentive elements (promoting money-saving) and poster demonstrating environmental benefit (presenting a happy earth) would be more willing to use reusable cups compared to participants in control conditions. Based on the study by Poortinga & Whitaker (2018), we predicted that environmental benefits condition would be more effective compared to monetary incentive condition.

Methods

Participants

Based on the small effect size of 0.2, alpha level = 0.05, and power = 0.8, we aimed to recruit more than 246 UBC students or employees as our participants. At the end of data collection, we recruited 290 participants, including 32 participants not associated with UBC. Therefore, we removed their responses and obtained 258 valid and completed questionnaires from UBC students and employees, of which males accounted for 25.2% (65 males), females accounted for 71.7% (186 females), and the rest 3.1% of the participants identified their gender as the third gender, others, or preferred not to say. Moreover, the analysis revealed an average age of 21.30 with a standard deviation of ± 3.04 .

Conditions

This study employed a between-subjects design focusing on the impact of informational posters designed to either highlight environmental benefits or monetary incentives. Participants were divided randomly into one of three groups: a control group presented with a neutral-themed poster, a "Happy Earth" group, and a "Saving Money" group. All posters shared a common green background to present the theme of environmental friendliness. With a total of 258 participants, we collected 79 data from control condition, and 85 data from happy earth condition, 94 data from saving money condition (See Appendix D Figure 1).

The control group's poster featured three main elements (See Appendix B Figure 1). At the top, a green cycle made of leaves symbolized the cycle of reuse, accompanied by text showing benefits of using reusable cups: ease of use, reusability, safety, and cleanliness. This information was inspired by UBC Sustainability. The center of the poster displayed the slogan "Bring your own cups," with "Bring us" placed underneath, reinforcing the motivation to use reusable cups. The bottom of the poster recommended specific reusable items, like mugs and water bottles, tying back to the central slogan and acting as a practical reminder.

In the "Happy Earth" condition, the elements from the control condition were replaced by an image and a slogan that reflects environmental benefits, based on research suggesting that informing environmental benefits can positively influence consumer behaviour and increase recycling rates (Baxter & Gram-Hanssen, 2016). First, we introduced a smiling earth image at the top, with the phrase "for a happy planet," to align with the idea that beneficial environmental actions can make the earth a better place. A new slogan, "Save Trees, Save the Planet," replaced the neutral message, aiming to highlight environmental benefits by reminding viewers that using reusable cup promotes tree conservation. The poster's lower half remained unchanged, promoting reusable cup usage with the same slogans and images as the control condition, thereby maintaining a consistent message (See Appendix B Figure 2).

Similarly, the "Saving Money" condition adjusted the neutral elements to emphasize financial savings. The primary message was simplified to "Save Money," directly linked to the condition focus. Accompanying this slogan was a coin image, the visual component symbolizes the monetary benefit of using reusable cups. Further clarity was provided by the addition of "Save 25 cents on using reusable cups," detailing the exact savings offered, a tactic suggested by Nicolau et al. (2022) to effectively increase consumer participation through monetary incentives. The poster's lower section mirrored the control condition,

featuring images of reusable cups alongside suggestions, ensuring the message remained consistent while highlighting the economic advantage (See Appendix B Figure 3).

This approach aimed to compare the effectiveness of different motivational strategies in promoting sustainable behaviours, with each condition tailored to trigger specific responses, whether through highlighting the benefits of environmental protection and financial savings.

Measures and Procedure

After finishing all survey settings, we distributed the survey link via social media, such as WeChat and Instagram, to UBC students and on-campus in-person invitations to students from other classes. The survey is structured as follows.

When participants clicked the link, they saw a consent form on the first page. They were required to read the consent form and feel free to leave the survey at any time. (See Appendix A Figure 1) They may click the next page button if they agree to continue the study. On the next page, participants from each condition were asked to read a poster. They were randomly assigned to one of the three posters (Control, Happy Earth, Saving Money) (See Appendix B Figure 1,2,3).

After reading the poster, the participants will see the question, "How likely are you to use reusable cups in the future?" measured with a 10-point rating scale (1- extremely unlikely; 10- extremely likely) (See Appendix C Figure 1). This question was used to measure our dependent variable, which was the participants' intention to use reusable cups. For the dependent variable, based on the Theory of Planned Behaviour (1991), humans are driven by the motivation to accomplish a task; those motivations are called intentions (Ajzen, 1991). Therefore, understanding participants' intentions regarding the use of reusable cups is crucial in predicting their actual behaviour.

On the next page, the question was adopted from the study by Nicolau et al. (2022), which measured the barriers preventing people from using reusable cups (See Appendix C Figure 2). This section was implemented for exploratory analysis purposes. In the questionnaire, participants were asked to rate five kinds of barriers using a 10-point Likert Scale (1 - extremely unlikely; 10 - extremely likely) in the following statements:

- i) High accessibility of disposable cups. According to the global disposable cups market size analysis (2024), the global disposable paper cups market size continues to be elevated. It is expected to grow at a CAGR of nearly 8.71% from 2024 to 2032 (Howard, 2024). The large market size indicates that customers have easy access to a significant number of disposable cups, and these disposable cups may also act as a deterrent to customers' use of reusable cups.
- ii) Forgetting to bring reusable cups. This barrier was adopted from the case study "A Second Cup" published by Dalhousie University, in which the results showed that forgetting to bring was one of the main barriers to using reusable cups regularly, as perceived by the majority of students who participated in the survey (Fairbairn et al., 2008).
- iii) Reusable cups provided by coffee shops are not clean enough.
- iv) Limited places to clean the used cups.
- v) Reusable cups are too expensive to buy. The last three barriers were all adopted from the study by Allison et al. (2021), and they succeeded in getting effective intervention results with similar problems.

On the last page of the survey, three questions aimed at collecting participants' demographic information, including their current status at UBC, how they identify themselves, and their ages (See Appendix C Figure 3,4,5).

We opted for a 10-point Likert scale to measure the dependent variable. This choice was informed by the successful use of a 7-point Likert scale by Nicolau et al. (2022). By adopting this approach and modifying it to a 10-point format, we aimed to provide participants with a more precise scale to express their opinions.

Results

We found the mean rating of the control condition ($M = 7.29$, $SD = 2.30$), the mean rating of the environmental benefits condition ($M = 6.87$, $SD = 2.29$), and the mean rating of the monetary incentives condition ($M = 6.50$, $SD = 2.54$) (See Appendix D Figure 1).

A one-way between-subjects ANOVA was performed on three conditions (environmental benefits, monetary incentives, and control). A one-way between-subjects ANOVA revealed no significant main effect of 3 conditions (environmental benefits, monetary incentives, and control) on the intention to use reusable cups in the future, $F(2, 255) = 2.36$, $p = .097$, $\eta^2 = .018$ (See Appendix D Figure 1). Since $p = .097 > \alpha = .05$. The hypothesis is not supported, thus as compared to control we cannot conclude any significant influence on changes in people's intentions.

Explanatory analysis section for barriers

The mean rating of accessible barriers ($M = 6.05$, $SD = 2.60$). The mean rating of expensive barriers ($M = 4.70$, $SD = 2.97$). The mean rating of forgetting barriers ($M = 7.55$, $SD = 2.42$). The mean rating of limited space barriers ($M = 6.06$, $SD = 2.85$). The mean rating of not clean barriers ($M = 5.98$, $SD = 2.98$) (see Appendix D Figure 3).

A two-way mixed ANOVA (see Appendix D Figure 2) was performed to evaluate the effects of 5 barriers (high accessibility, forgetting to bring, not clean enough, limited places to clean, too expensive) on 3 conditions (environmental benefits, Money Incentives, Control). The results indicated a significant main effect for 5 barriers, $F(4,1020) = 41.68$, $p < .001$, $\eta^2 = 0.14$; no significant main effect for 3 conditions, $F(2, 255) = 25.79$, $p = .15$, $\eta^2 = 0.93$; and no significant interaction between barriers and conditions, $F(8,1020) = 1.69$, $p = .10$, $\eta^2 = 0.013$ (see Appendix D Figure 2). Post hoc comparisons using the Tukey HSD test indicated that the mean rating of forgetting barriers is significantly higher than the mean rating of other four barriers, $p < .001$. The mean rating of expensive barriers is significantly lower than the mean rating of other four barriers, $p < .001$ (see Appendix D Figure 3). This highlights that participants perceived certain barriers as significant factors in impacting their reusable cup usage, in which the mean rating of the forgetting barriers was more impactful than other barriers, and the mean rating of the expensive barriers was less impactful than other barriers.

Discussion

Implications

This study does not provide sufficient evidence to support the hypothesis that informative posters with elements highlighting environmental benefits and monetary incentives reduce participants' intentions to use single-use cups more effectively compared to informative posters without these elements. We were unable to replicate the findings from Baxter & Gram-Hanssen (2016), which showed the effectiveness of positively framed environmental messages in enhancing recycling. And although monetary incentives have been shown to encourage reusable cup usage in the past literature, the monetary message on our poster did not yield the same effect (Nicolau, 2022). This lack of significant impact raises considerations about the effectiveness of message framing in environmental campaigns, particularly in promoting reusable cup use at the UBC campus. The null results could imply several aspects of behavioural change in environmental contexts that may require further exploration.

The absence of significant effect may imply that people are more motivated by concrete, visible monetary rewards rather than information about money-saving. Also, the \$0.25 incentives offered in the "Saving Money" poster may not have been compelling enough to influence behaviour change. This could suggest that the perceived value of saving \$0.25 per cup is insufficient to motivate people to change habits. This is consistent with the least impactful barrier identified, "reusable cups are too expensive" as it indicates that cost might not be a primary concern for this demographic. These results imply that barriers to behaviour change in environmental contexts may be more significant than previously understood and not easily mitigated by straightforward financial incentives. The lack of significance could be due to participants either not paying enough attention to or did not understand the posters' messages as intended. It is possible that the messages did not resonate strongly enough with the audience for behaviour change to occur or that the posters failed to capture people's attention effectively. Future studies could explore different designs or messaging strategies that might be more successful in engaging participants.

The implications of the results further indicate greater or more salient barriers for the use of reusable cups, such as convenience, habit, or a lack of more tangible benefits. Future research is recommended to involve more direct and personal incentives or even stronger educational campaigns around articulating the immediate and tangible benefits of reusable cup use or strategies that influence behavioural change at a more habitual level.

Limitations

Several limitations exist in this study. First, there is the potential for demand characteristics. The survey questions are straightforward, allowing participants to easily guess the study's purpose. Secondly, since a self-report measure is used, participants might have overstated their intention for environmentally friendly behaviour due to social desirability bias. Thirdly, our sample is drawn from the UBC population, including students and staff, but the majority of data collected are from students around the age of 21, which may not effectively represent the entire campus population. Moreover, we used electronic posters in the survey to ensure all participants who completed the survey had previously seen the poster, which doesn't represent the way and the environment of which wall posters are typically viewed on the

campus. As a result, the findings generated from the setting of our study may not generalize to real-life settings of wall posters in coffee shops and buildings.

If this study is rerun and circumstances allow, wall posters could be posted with a QR code for the survey on each poster. This approach could help researchers recruit a broader on-campus sample and might increase participants' engagement with the posters since the elements on the posters are more associated with their immediate drink consumption. Furthermore, questions in the survey could be rearranged to reduce subjective bias, and an "other" option should be added to the 'barrier against using a reusable cup' question for participants to propose other significant barriers not included in the current study.

Recommendations

Although this study aims to demonstrate the effectiveness of posters containing elements about environmental benefits and monetary incentives, we failed to find a significant difference in promoting the intention to reuse compared to an informative poster without those elements. A useful finding from this study is that students forgetting to bring their own mug is the most significant reason for consuming single-use cups. According to Poortinga & Whitaker (2018), environmental messages increase the use of reusable cups, and we can reasonably assume that environmental messages emphasizing reminders to bring reusable cups can further encourage reusable cup usage. Clients can display showcards and posters containing environmental information and a reminder sign “Don’t forget to bring your own mug!” around coffee shops. Future research should investigate the effects of different reminder formats (e.g., digital vs. physical) and the potential impact of social norms on encouraging reusable cup use. Expanding the demographic focus to include a broader section of the UBC community will also provide a more comprehensive understanding of effective strategies.

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Appendices

Appendix A - Survey Questionnaire

Figure 1: Consent form

Consent Form

Class Research Projects in PSYC 421 - Environmental Psychology

Principal Investigator:

Dr. Jiaying Zhao
Course Instructor
Department of Psychology
Institute for Resources, Environment and Sustainability
Email: jiayingz@psych.ubc.ca

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

https://ubc.yu11.qualtrics.com/survey-builder/SV_01kinanJ151CYDQ/edit

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Edit Survey | Qualtrics Experience Management

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

Appendix B - Posters For 3 Conditions

Figure 1: Neutral condition

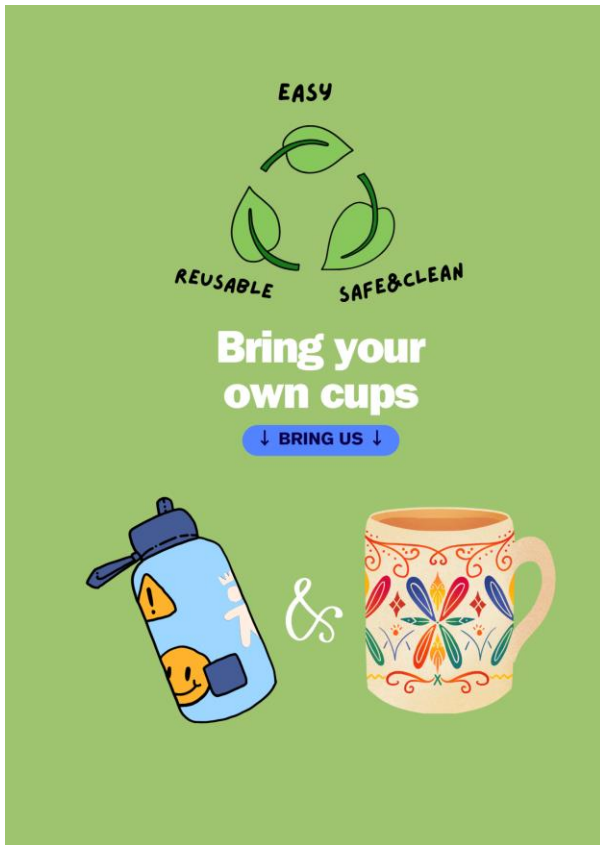
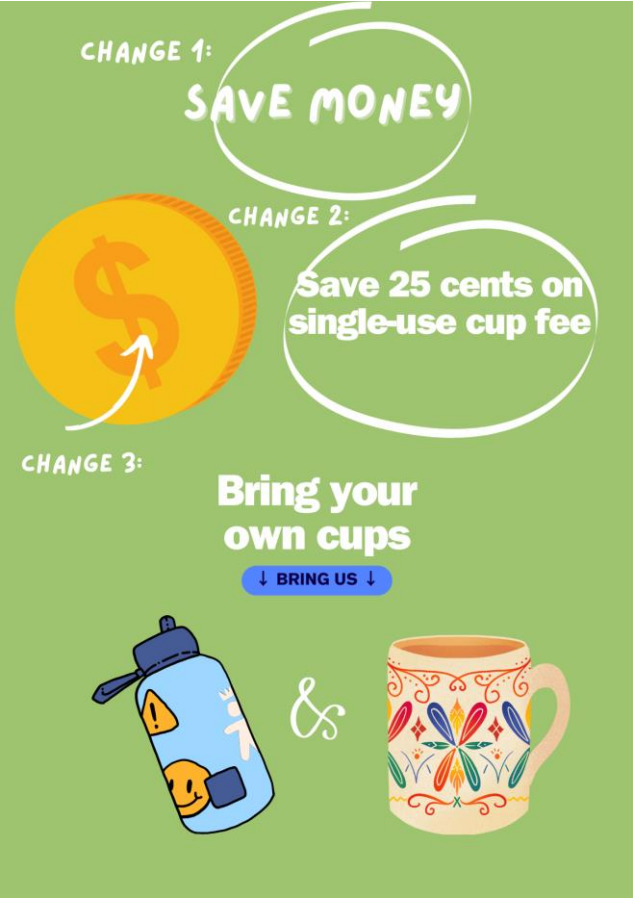


Figure 2: Happy earth condition



Figure 3: Saving money condition



Appendix C - Survey Questions

Figure 1: Intention of using reusable cups in the future



Figure 2: Barriers of using reusable cups

How likely is it that the following barriers will prevent you from using reusable cups? (1- Extremely unlikely; 10- Extremely likely)



Figure 3: Current status at UBC

What is your current status in UBC?

- Student
- Employee/Staff
- Not associate with UBC

Figure 4: Gender identification

How do you currently identify yourself?

- Male
 - Female
 - Non-binary / third gender
 - Prefer not to say
 - Other
-

Figure 5: Age

What is your age?

Appendix D- Result Diagrams

Figure 1: The one-way between-subjects ANOVA output from SPSS

Between-Subjects Factors

		N
condition	Control	79
	Happy_earth	85
	Money	94

Descriptive Statistics

Dependent Variable: reusablecupsfuture

condition	Mean	Std. Deviation	N
Control	7.29	2.299	79
Happy_earth	6.87	2.293	85
Money	6.50	2.539	94
Total	6.86	2.400	258

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

		Levene Statistic	df1	df2	Sig.
reusablecupsfuture	Based on Mean	1.169	2	255	.312
	Based on Median	1.187	2	255	.307
	Based on Median and with adjusted df	1.187	2	252.255	.307
	Based on trimmed mean	1.278	2	255	.280

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

a. Dependent variable: reusablecupsfuture

b. Design: Intercept + condition

Tests of Between-Subjects Effects

Dependent Variable: reusablecupsfuture

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	26.872 ^a	2	13.436	2.357	.097	.018
Intercept	12176.041	1	12176.041	2136.323	<.001	.893
condition	26.872	2	13.436	2.357	.097	.018
Error	1453.380	255	5.700			
Total	13637.000	258				
Corrected Total	1480.252	257				

a. R Squared = .018 (Adjusted R Squared = .010)

Figure 2: The two-way mixed ANOVA output from SPSS

Barrier	Dependent Variable
1	highaccessibility
2	forgettobring
3	notcleanenough
4	limitedplacestoclean
5	tooeexpensive

Between-Subjects Factors

condition	N
Control	79
Happy_earth	85
Money	94

Descriptive Statistics

	condition	Mean	Std. Deviation	N
highaccessibility	Control	5.5063291139	2.2694934356	79
	Happy_earth	5.9294117647	2.8401384746	85
	Money	6.6063829787	2.5366902706	94
	Total	6.0465116279	2.5955977850	258
forgettobring	Control	6.9873417722	2.8079268330	79
	Happy_earth	7.4352941176	2.2543453216	85
	Money	8.1382978723	2.0718339693	94
	Total	7.5542635659	2.4156914970	258
notcleanenough	Control	5.7848101266	3.0368290061	79
	Happy_earth	6.1176470588	2.8552865118	85
	Money	6.0106382979	3.0603066852	94
	Total	5.9767441860	2.9784311967	258
limitedplacestoclean	Control	6.3924050633	2.8348459983	79
	Happy_earth	5.8470588235	2.7233814868	85
	Money	5.9680851064	2.9854562435	94
	Total	6.0581395349	2.8531693804	258
tooeexpensive	Control	4.5569620253	3.0371496229	79
	Happy_earth	4.6352941176	2.7768046848	85
	Money	4.8723404255	3.0908607652	94
	Total	4.6976744186	2.9657044915	258

Box's Test of Equality of Covariance Matrices^a

Box's M	39.252
F	1.272
df1	30
df2	198394.464
Sig.	.146

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

- a. Design: Intercept + condition
Within Subjects Design: barriers

Multivariate Tests^a

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
barriers	Pillai's Trace	.371	37.093 ^b	4.000	252.000	<.001	.371
	Wilks' Lambda	.629	37.093 ^b	4.000	252.000	<.001	.371
	Hotelling's Trace	.589	37.093 ^b	4.000	252.000	<.001	.371
	Roy's Largest Root	.589	37.093 ^b	4.000	252.000	<.001	.371
barriers * condition	Pillai's Trace	.049	1.597	8.000	506.000	.123	.025
	Wilks' Lambda	.951	1.603 ^b	8.000	504.000	.121	.025
	Hotelling's Trace	.051	1.609	8.000	502.000	.119	.025
	Roy's Largest Root	.046	2.888 ^c	4.000	253.000	.023	.044

- a. Design: Intercept + condition
Within Subjects Design: barriers
- b. Exact statistic
- c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Mauchly's Test of Sphericity^a

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon ^b		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Barrier	.936	16.651	9	.054	.966	.991	.250

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

- a. Design: Intercept + condition
Within Subjects Design: Barrier
- b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Barrier	Sphericity Assumed	1032.982	4	258.246	41.675	<.001	.140
	Greenhouse-Geisser	1032.982	3.864	267.304	41.675	<.001	.140
	Huynh-Feldt	1032.982	3.962	260.715	41.675	<.001	.140
	Lower-bound	1032.982	1.000	1032.982	41.675	<.001	.140
Barrier * condition	Sphericity Assumed	83.604	8	10.450	1.686	.097	.013
	Greenhouse-Geisser	83.604	7.729	10.817	1.686	.100	.013
	Huynh-Feldt	83.604	7.924	10.550	1.686	.098	.013
	Lower-bound	83.604	2.000	41.802	1.686	.187	.013
Error(Barrier)	Sphericity Assumed	6320.519	1020	6.197			
	Greenhouse-Geisser	6320.519	985.435	6.414			
	Huynh-Feldt	6320.519	1010.340	6.256			
	Lower-bound	6320.519	255.000	24.786			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	Barrier	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Barrier	Linear	432.095	1	432.095	57.846	<.001	.185
	Quadratic	312.300	1	312.300	50.588	<.001	.166
	Cubic	63.790	1	63.790	12.071	<.001	.045
	Order 4	224.797	1	224.797	38.370	<.001	.131
Barrier * condition	Linear	42.451	2	21.225	2.842	.060	.022
	Quadratic	9.248	2	4.624	.749	.474	.006
	Cubic	24.750	2	12.375	2.342	.098	.018
	Order 4	7.155	2	3.577	.611	.544	.005
Error(Barrier)	Linear	1904.780	255	7.470			
	Quadratic	1574.213	255	6.173			
	Cubic	1347.569	255	5.285			
	Order 4	1493.957	255	5.859			

Levene's Test of Equality of Error Variances^a

		Levene Statistic	df1	df2	Sig.
highaccessibility	Based on Mean	3.161	2	255	.044
	Based on Median	2.915	2	255	.056
	Based on Median and with adjusted df	2.915	2	253.890	.056
	Based on trimmed mean	3.118	2	255	.046
forgettobring	Based on Mean	6.065	2	255	.003
	Based on Median	4.056	2	255	.018
	Based on Median and with adjusted df	4.056	2	226.969	.019
	Based on trimmed mean	5.743	2	255	.004
notcleanenough	Based on Mean	.425	2	255	.654
	Based on Median	.426	2	255	.653
	Based on Median and with adjusted df	.426	2	254.589	.653
	Based on trimmed mean	.386	2	255	.680
limitedplacestoclean	Based on Mean	.690	2	255	.503
	Based on Median	.824	2	255	.440
	Based on Median and with adjusted df	.824	2	254.967	.440
	Based on trimmed mean	.712	2	255	.492
toexpensive	Based on Mean	1.064	2	255	.346
	Based on Median	1.002	2	255	.368
	Based on Median and with adjusted df	1.002	2	254.937	.368
	Based on trimmed mean	1.081	2	255	.341

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

- a. Design: Intercept + condition
 Within Subjects Design: Barrier

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	47017.830	1	47017.830	3518.177	<.001	.932
condition	51.580	2	25.790	1.930	.147	.015
Error	3407.886	255	13.364			

Estimated Marginal Means

1. condition

Estimates

Measure: MEASURE_1

condition	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control	5.846	.184	5.483	6.208
Happy_earth	5.993	.177	5.644	6.342
Money	6.319	.169	5.987	6.651

Pairwise Comparisons

Measure: MEASURE_1

(I) condition	(J) condition	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
Control	Happy_earth	-.147	.255	.565	-.651	.356
	Money	-.474	.250	.059	-.965	.018
Happy_earth	Control	.147	.255	.565	-.356	.651
	Money	-.326	.245	.184	-.808	.156
Money	Control	.474	.250	.059	-.018	.965
	Happy_earth	.326	.245	.184	-.156	.808

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Measure: MEASURE_1

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	10.316	2	5.158	1.930	.147	.015
Error	681.577	255	2.673			

The F tests the effect of condition. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

2. Barrier

Estimates

Measure: MEASURE_1

Barrier	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.014	.160	5.699	6.329
2	7.520	.148	7.228	7.813
3	5.971	.186	5.604	6.338
4	6.069	.178	5.718	6.420
5	4.688	.186	4.323	5.054

Pairwise Comparisons

Measure: MEASURE_1

(I) Barrier	(J) Barrier	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
1	2	-1.506 [*]	.204	<.001	-1.908	-1.105
	3	.043	.232	.853	-.414	.500
	4	-.055	.214	.797	-.477	.366
	5	1.326 [*]	.233	<.001	.867	1.785
2	1	1.506 [*]	.204	<.001	1.105	1.908
	3	1.549 [*]	.225	<.001	1.106	1.992
	4	1.451 [*]	.212	<.001	1.033	1.869
	5	2.832 [*]	.235	<.001	2.369	3.296
3	1	-.043	.232	.853	-.500	.414
	2	-1.549 [*]	.225	<.001	-1.992	-1.106
	4	-.098	.206	.634	-.504	.308
	5	1.283 [*]	.220	<.001	.850	1.715
4	1	.055	.214	.797	-.366	.477
	2	-1.451 [*]	.212	<.001	-1.869	-1.033
	3	.098	.206	.634	-.308	.504
	5	1.381 [*]	.213	<.001	.962	1.800
5	1	-1.326 [*]	.233	<.001	-1.785	-.867
	2	-2.832 [*]	.235	<.001	-3.296	-2.369
	3	-1.283 [*]	.220	<.001	-1.715	-.850
	4	-1.381 [*]	.213	<.001	-1.800	-.962

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.371	37.093 ^a	4.000	252.000	<.001	.371
Wilks' lambda	.629	37.093 ^a	4.000	252.000	<.001	.371
Hotelling's trace	.589	37.093 ^a	4.000	252.000	<.001	.371
Roy's largest root	.589	37.093 ^a	4.000	252.000	<.001	.371

Each F tests the multivariate effect of Barrier. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

3. condition * Barrier

Measure: MEASURE_1

condition	Barrier	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Control	1	5.506	.289	4.938	6.075
	2	6.987	.267	6.461	7.514
	3	5.785	.336	5.123	6.447
	4	6.392	.321	5.760	7.025
	5	4.557	.335	3.898	5.216
Happy_earth	1	5.929	.278	5.382	6.477
	2	7.435	.258	6.928	7.943
	3	6.118	.324	5.480	6.756
	4	5.847	.310	5.237	6.457
	5	4.635	.323	4.000	5.271
Money	1	6.606	.265	6.085	7.127
	2	8.138	.245	7.655	8.621
	3	6.011	.308	5.404	6.617
	4	5.968	.294	5.388	6.548
	5	4.872	.307	4.268	5.476

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1
Dependent Variable

factor1	Variable
1	highaccessibility
2	forgettobring
3	notcleanenough
4	tooexpensive
5	limitedplacestoclean

Profile Plots

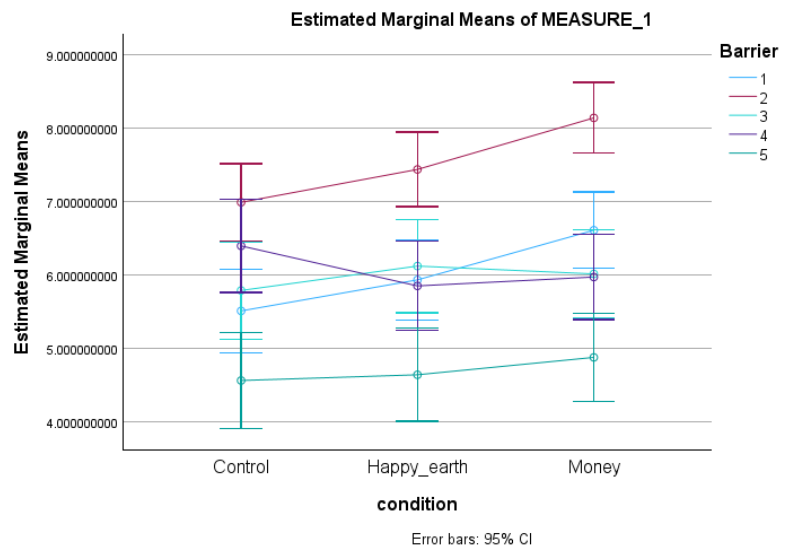


Figure 3: Post Hoc analysis of barriers from SPSS

Between-Subjects Factors

Barrier	N
Accessibility	258
Expensive	258
Forgetting	258
Limit space	258
Not clean	258

Descriptive Statistics

Dependent Variable: Rating

Barrier	Mean	Std. Deviation	N
Accessibility	6.05	2.596	258
Expensive	4.70	2.966	258
Forgetting	7.55	2.416	258
Limit space	6.06	2.853	258
Not clean	5.98	2.978	258
Total	6.07	2.911	1290

Multiple Comparisons

Dependent Variable: Rating

	(I) Barrier	(J) Barrier	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Accessibility	Expensive	1.35*	.244	<.001	.68	2.02
		Forgetting	-1.51*	.244	<.001	-2.17	-.84
		Limit space	-.01	.244	1.000	-.68	.65
		Not clean	.07	.244	.999	-.60	.74
	Expensive	Accessibility	-1.35*	.244	<.001	-2.02	-.68
		Forgetting	-2.86*	.244	<.001	-3.52	-2.19
		Limit space	-1.36*	.244	<.001	-2.03	-.69
		Not clean	-1.28*	.244	<.001	-1.95	-.61
	Forgetting	Accessibility	1.51*	.244	<.001	.84	2.17
		Expensive	2.86*	.244	<.001	2.19	3.52
		Limit space	1.50*	.244	<.001	.83	2.16
		Not clean	1.58*	.244	<.001	.91	2.24
	Limit space	Accessibility	.01	.244	1.000	-.65	.68
		Expensive	1.36*	.244	<.001	.69	2.03
		Forgetting	-1.50*	.244	<.001	-2.16	-.83
		Not clean	.08	.244	.997	-.58	.75
Not clean	Accessibility	-.07	.244	.999	-.74	.60	
	Expensive	1.28*	.244	<.001	.61	1.95	
	Forgetting	-1.58*	.244	<.001	-2.24	-.91	
	Limit space	-.08	.244	.997	-.75	.58	
Bonferroni	Accessibility	Expensive	1.35*	.244	<.001	.66	2.03
		Forgetting	-1.51*	.244	<.001	-2.19	-.82
		Limit space	-.01	.244	1.000	-.70	.67
		Not clean	.07	.244	1.000	-.62	.76
	Expensive	Accessibility	-1.35*	.244	<.001	-2.03	-.66
		Forgetting	-2.86*	.244	<.001	-3.54	-2.17
		Limit space	-1.36*	.244	<.001	-2.05	-.67
		Not clean	-1.28*	.244	<.001	-1.96	-.59
	Forgetting	Accessibility	1.51*	.244	<.001	.82	2.19
		Expensive	2.86*	.244	<.001	2.17	3.54
		Limit space	1.50*	.244	<.001	.81	2.18
		Not clean	1.58*	.244	<.001	.89	2.26
	Limit space	Accessibility	.01	.244	1.000	-.67	.70
		Expensive	1.36*	.244	<.001	.67	2.05
		Forgetting	-1.50*	.244	<.001	-2.18	-.81
		Not clean	.08	.244	1.000	-.60	.77
Not clean	Accessibility	-.07	.244	1.000	-.76	.62	
	Expensive	1.28*	.244	<.001	.59	1.96	
	Forgetting	-1.58*	.244	<.001	-2.26	-.89	
	Limit space	-.08	.244	1.000	-.77	.60	

Based on observed means.

The error term is Mean Square(Error) = 7.676.

*. The mean difference is significant at the .05 level.