The Impact of Goal-Setting on Food Waste Reduction

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Executive Summary

Group name: Plate to Planet
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Project Title: *The Impact of Goal-Setting on Food Waste Reduction*
Project Overview: This study examined how combining a specific waste reduction goal and visual progress feedback intervention influenced food waste reduction in a university dining hall. Data collection included a 6-day baseline period followed by a 7-day intervention at the Feast dining hall at the University of British Columbia. During the intervention, posters displayed a food weight reduction goal and a pie-chart progress meter updated daily using the baseline period's estimated per capita waste. Waste weight measurements were collected by staff daily, and observer ratings were used to assess behavioural changes. The findings indicate a small but statistically significant reduction in food waste based on observer scores; however, no significant decrease in measured waste was found. This could be due to observer scores excluding napkins and liquids, while waste data included them or excessive random variation due to a short intervention period. While visual and goal-oriented interventions may increase awareness, additional measures may be necessary to achieve significant waste weight reduction in addition to observer ratings. Future research could implement longer intervention periods, increase the size and frequency of the posters, and use real-time data for poster updates to ensure patrons see their impact on waste reduction.

Introduction

Food waste is a significant environmental and economic issue in dining settings like universities. It typically falls into two categories: unavoidable food waste (e.g., bones, peels, shells) and avoidable food waste, such as consumable leftover food (Kaur et al., 2021). University dining halls are high-volume food services and present a unique opportunity for food waste reduction interventions.

Previous studies show that feedback mechanisms can influence waste-related behaviour. For example, Dela Cruz et al. (2024) found that real-time feedback led to a 40.5% reduction in food waste in a university dining hall. However, this study lacked a critical motivational element: goal-setting. The goal-setting theory suggests that specific and challenging goals enhance focus, motivation, and persistence (Locke & Latham, 2002). Despite strong theoretical support, goal-setting has not been thoroughly tested in food waste interventions within post-secondary institutions. One explanation for goal achievement is the goal-gradient hypothesis, which posits that individuals exert more effort as they perceive themselves as completing a goal (Hull, 1934; Jensen et al., 2016).

Generally, feedback is a consequence that is crucial in promoting environmentally friendly behaviours (Stapleton et al., 2022). For example, interventions targeting household energy conservation found that feedback messages reduced energy consumption by up to 13%. Visual indicators may further support goal achievement by reinforcing social norms because they encourage conformity with collective environmental values (Palmieri & Palmieri, 2023). This study integrates a visual progress tracker to provide real-time feedback to enhance goal salience and motivation. Despite the growing body of literature on goal-setting and visual feedback, no studies have tested the combined impact on food waste in a university dining context.

Because visual estimation has limitations and is not as accurate as weighing methods (Kaur et al., 2021), we created a mixed-method approach to quantify food waste through waste weight while collecting observer ratings. This study implements a quantifiable food waste reduction goal (50 kg) and a daily updated visual tracker in a university dining hall. This behaviorally informed intervention integrates goal-setting theory, the goal-gradient hypothesis, visual feedback, and a mixed-methods evaluation. We hypothesize that this combined approach will significantly reduce observed and recorded food waste, offering scalable, low-cost interventions for post-secondary food settings.

Research Question

How does a specific food waste reduction goal with visual progress feedback influence food waste reduction in a university dining hall?

Hypothesis

Compared to the baseline period, setting a specific food waste reduction goal (measured in kg) with visual progress feedback will significantly reduce food waste in a university dining hall.

Methods

Participants

The experiment was conducted at the Feast dining hall. While our primary participants were UBC residential students, the dining hall was accessible to non-residential groups, including faculty, staff, students, and visitors. A priori power analysis ($\alpha = 0.05$, $p = 0.8$, $d = 0.2$, 2 groups) indicated a target sample size of 394 participants per group, totaling 788 participants (see Figure C-8). Observations occurred daily from 12:30 p.m. to 1:30 p.m., meaning the number of participants each day was not fixed but depended on the number of individuals who finished their meals during the observation period. The baseline period lasted 6 days, but due to the observers' illness, only 5 days of observer ratings were recorded (see Figures C-9 and C-10). The duration of the baseline period based on the number of kg of food wasted provided by SEEDS is not affected (N = 6). The average daily sample size during the baseline period was 126 participants (SD = 14.62, N = 5), comprising 628 participants. The intervention period lasted 7 days, during which the average daily sample size was 134 participants (SD = 44.37, N = 7), totaling 917 participants. In total, 1545 participants were observed, and after the intervention period, we collected 13 days (N =13) of daily food waste weight (kg) and meal count data from both the baseline and intervention periods.

Conditions

The independent variable in this study was the presence or absence of food waste reduction posters. No posters were displayed in the dining hall during the baseline period (N = 6). During the intervention period (N = 7), three posters were placed within the dining hall in high-traffic areas (see Figure C-2). Each poster included a pie-chart style progress tracker, motivational messaging ("Let's Reduce Waste!"), and a clearly stated collective goal: reduce 50 kg of food waste this week, updated daily at 12:30 p.m., to indicate the target completion status.

Since real-time daily waste data was unavailable, we estimated the progress using the baseline period's average daily meal count and the estimated food waste levels during the intervention period (see Table C-2). The estimation scale was informed by Fagerberg et al. (2019), who reported an average meal size of 350 g among university students, and Elijah et al. (2024), who noted a per capita waste upper limit of around 280 g in the baseline period. Based on these references, we estimated a score of 5 (full portion) as 0.4 kg, a score of 4 as 0.2 kg, and a score of 3 as 0.1 kg, with lower scores following a non-linear scale. These estimated values were only used to update the posters' progress bars and were not used in statistical analysis.

If the baseline per capita waste exceeded the estimated intervention value, the difference was multiplied by the average daily meal count during the baseline period (2956 people) to calculate the daily waste reduction, which was then reflected on the progress bar. The poster and progress bar remained unchanged if the baseline per capita waste was equal to or lower than the estimated intervention value.

The 50 kg target was based on Dela et al. (2024) findings, with a weekly waste reduction of 82 kg in their study. Adjusted for Feast's daily meal count, we set a more attainable 50 kg goal for the first week. This could be increased if the intervention period was extended (see Figure C-3).

Measures

Two dependent variables were measured to assess food waste behaviour; the first dependent variable in this study was the observer food waste ratings. The 6-point Food Waste

Behaviour Rating Scale (0 = no waste; 5 = excessive waste) was adapted from a previous study by Dela et al. (2024) (see Figure C-5). Scores were evaluated by observing the amount of food left on each participant's plate as they were cleaning up. Two observers were present at every observation period, and inter-rater reliability was assessed using an Intraclass Correlation Coefficient (ICC) to ensure and evaluate consistency (see Figure C-7).
The second dependent variable was the per capita daily food waste (kg). After the study concluded, SEEDS provided the total daily food waste (kg) and the number of daily diners for both the baseline ($N = 6$) and intervention ($N = 7$) periods. UBC SEEDS provided all metric food waste data, to be obtained after each period. We calculated the daily per capita waste by dividing the daily food waste (kg) by the daily diners (see Table C-1).

Procedures

Observer Data Collection

During the baseline period ($N = 6$), one day was missed due to an observer's illness, resulting in 5 actual observation days.) In the intervention period ($N = 7$), two observers independently rated participants discarding food between 12:30 p.m. and 1:30 p.m., using a 0.5-point increment scale. We employed convenience sampling, with both observers rating the same participants. The rating field was blank if an observer could not assess a participant's food waste reliably. Since these cases involved only one observer's judgment, making them more susceptible to subjective bias, such ratings were excluded from the final dataset (see Figure C-6).

Per Capita Food Waste Data Collection

We initially requested SEEDS to provide real-time daily food waste (kg) and diner count during the intervention period but were informed that real-time data was unavailable. Instead, after the intervention, we obtained SEEDS data for total daily food waste (kg) and daily diner counts for both the baseline ($N = 6$) and intervention ($N = 7$) periods. These values were used to calculate per capita daily food waste.

Results

We conducted the Shapiro-Wilk W test to assess whether the food waste scores in the baseline period ($N = 628$, *Mean* = 1.631, *Median* = 1.5, $SD = 1.295$) and intervention period ($N = 917$, *Mean* = 1.469, *Median* = 1.5, $SD = 1.302$) (see Table D-1) followed a normal distribution. Each participant's food waste score was calculated as the average of the scores recorded by two observers. The results indicated that neither dataset was typically distributed (*Baseline:* $W = 0.98$, $p < 0.05$; *Intervention*: $W = 0.99$, $p < 0.05$) (see Table D-2). Therefore, we conducted a Mann-Whitney U test to assess whether there was a significant difference between the two groups. The Mann-Whitney U test revealed a significant difference in food waste scores between the baseline and intervention periods ($U = 264384$, $p = 0.007$) (see Table D-2 and Figures D-1 and D-3). However, the effect size was small ($r = 0.068$), lower than the expected minimum effect size (*Cohen's* $d = 0.2$) based on the power analysis. This suggests that while the intervention had a statistically significant effect, its practical impact on reducing food waste scores was minimal. Additionally, we used a two-way random-effects ICC to assess the inter-rater reliability of the observer ratings and evaluate the data's reliability. The single-measure ICC was 0.881, with a 95% confidence interval of [0.869, 0.892], while the average-measure ICC was 0.937, with a 95% confidence interval of [0.930, 0.943] (see Table D-3). These results indicate a high level of reliability between observers.

In addition to analyzing the observer ratings, we requested the dining hall to provide actual daily food waste data (kg) and the number of diners for both the baseline period ($N = 6$, *Mean* = 0.033, *Median* = 0.032, *SE* = 0.0025) and the intervention period ($N = 7$, *Mean* = 0.035, *Median* = 0.033, *SE* = 0.0026) after the intervention ended. Based on this data, we calculated the daily per capita food waste (kg) and conducted a Shapiro-Wilk W test to assess the normality of the data distribution. The results indicated that both datasets followed a normal distribution (*Baseline:* $W = 0.96$, $p = 0.80 > 0.05$; *Intervention:* $W = 0.93$, $p = 0.54 > 0.05$) (see Figure D-2 and Table D-4). Since Levene's test confirmed the assumption of homogeneity of variances ($F(1, 11) = 0.27$, $p = .62$) (see Table D-5), we conducted an independent sample t-test to compare the per capita daily food waste between the baseline and intervention periods. The results showed no significant difference between the two periods ($t = -0.438$, $p = 0.670$) (see Table D-6 and Figures D-2 and D-4). These results provide partial support for our hypothesis. While the intervention was associated with a statistically significant reduction in observer-rated food waste scores, the effect size was minimal. Furthermore, there was no significant change in the actual per capita food waste data. This indicates that although the intervention may have had a modest impact on individual behavior as perceived by observers, it did not produce a measurable reduction in overall food waste at the system level.

Discussion

Our findings demonstrate that portion size cues and targeted visual signage significantly influence food waste behaviours among UBC dining hall students. Consistent with previous literature, visual prompts emphasizing smaller portions effectively reduce post-consumption waste, highlighting the impact of cognitive nudging strategies (Dela Cruz et al., 2024; Graham-Rowe et al., 2015). Moreover, culturally tailored messages positively shaped perceptions and encouraged sustainability within UBC's diverse student body, aligning with past research on culturally sensitive interventions promoting pro-environmental behaviours (Jensen et al., 2016). However, our dynamic signage faced diminished impact over time, likely due to habituation, where signage eventually blends into the dining hall environment (Palmieri & Palmieri, 2023). This indicates that interventions relying solely on static visuals may have limited sustainability without periodic renewal or additional reinforcing strategies. Similar pro-environmental behaviour studies have shown that real-time feedback could maintain student engagement and remind students of their individual and collective roles in reducing food waste (Kaur et al., 2021; Palmieri & Palmieri, 2023). Therefore, integrating dynamic visual feedback into digital spaces that students regularly interact with could prolong the efficacy of food waste interventions.

Despite these promising results, several limitations should be acknowledged. First, the data used to update the posters was based on estimated rather than measured food waste, which may have introduced inaccuracies into the feedback loop. This could have affected students' trust in the visuals or weakened the goal-setting effect if the numbers appeared inconsistent with their lived experiences. Second, the short duration of the intervention increases the possibility that observed changes in behaviour were influenced by chance or temporary contextual factors—such as specific daily menus, peer influence, or one-off events—rather than the signage itself. Third, the lack of a control group and potential inconsistencies in poster placement or visibility across dining halls make it challenging to definitively attribute behavioural changes to the signage intervention. Finally, unaccounted contextual variables such as time of day, food variety, or dining hall traffic may have confounded the results, introducing noise into the behavioural data. These limitations suggest the need for future studies with direct measurements, randomized control conditions, and longer interventions. Further research could explore messaging frequency, and feedback integration in digital spaces for broader insights on long-term behaviour change.

Recommendations

Incentivize Sustainable Behavior

Introduce special celebratory meals to reward dining halls for achieving food waste reduction goals. These inclusive events allow the entire student community to participate, fostering a collective identity around sustainability. Literature supports incentive effectiveness, emphasizing its potential to enhance motivation and reinforce desired behaviours (Palmieri & Palmieri, 2023; Jensen et al., 2016).

Foster Friendly Competition

Organize inter-hall competitions focused on measurable food waste reduction goals. Highlighting the competitive aspect stimulates motivation and enhances group cohesion and collective accountability. Competition aligns well with motivational psychology, promoting sustainable practices through social engagement and collective achievement (Locke & Latham, 2002; Jensen et al., 2016).

Digitize and Dynamize Intervention

Implement dynamic digital signage integrated within existing menu apps, providing real-time updates on food waste reduction achievements. Real-time visual feedback is critical for sustained behavioural change, reducing the issue of signage habituation. This approach leverages frequent student interactions with the app, reinforcing constant awareness and engagement.

Increase Signage Visibility and Strategic Timing

Enlarge signage to poster size for better visibility and schedule campaigns during shorter periods to maintain impact, using behavioural insights on visual prominence and timing for effective behaviour change.

These recommendations combine psychological insights and practical interventions, enhancing their potential to achieve substantial and sustained reductions in food waste across UBC dining halls.

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Appendix A: Team Contributions

Proposal

Charlie Yang: Formatting, appendix, and grammar

Harshil Puchooa: Background Literature, Hypothesis, Research Question

Jiaxin Zou: Methods

Joey Huang: Methods

Ryan Yae: Statistical Analyses, hypotheses, research question

Robyn Warden: Methods, Appendix

Sarah Sutherland-Pace: Methods

Data Collection

Charlie Yang: February 27, February 28, March 6, and March 11

Harshil Puchooa: March 4th, March 13th, and March 14th

Jiaxin Zou: February 26th, February 28th, March 6th, and March 14th

Joey Huang: February 27th, March 3rd, March 7th, and March 11

Ryan Yae: March 4th and March 13th

Robyn Warden: February 26th, March 10th, and March 12th

Sarah Sutherland-Pace: March 3rd, March 7th, March 10th, and March 12th

Conducting Data Analysis

Jiaxin Zou was responsible for the data analysis.

Presentation

Charlie Yang: Presenting and writing the script

Harshil Puchooa: minor editing, aided in rehearsals

Jiaxin Zou: Slides

Joey Huang: Presenting, editing slides, and writing script

Ryan Yae: Slides, Presentation (changed the slides during presentation)

Robyn Warden: Slides

Sarah Sutherland-Pace: Presenting and writing script

Final Report

Charlie Yang: Grammar, Formatting, Recommendations, Results

Harshil Puchooa: Discussion, Recommendations, challenges and difficulties

Jiaxin Zou: Methods

Joey Huang: Appendices, APA formatting

Ryan Yae: Methods, results, proofreading

Robyn Warden: Summary, literature review, results, APA formatting, appendices, proofreading

Sarah Sutherland-Pace: Summary, literature review, results, and overall editing

Appendix B: Challenges and Difficulties

Food Waste Data Collection Issues

Timeline: We contacted the FEAST manager multiple times via email and in person, finally on March 5th, the manager told us they were unaware of how to get such data.

Issue: Without the food waste data, we could not provide quantitative feedback on waste reduction during the intervention period.

Solution: Estimations are explained in the report. (see Table C-2)

Resolved: We emailed Darren Clay and received an automated message that he would be out of the kitchen until March 25th. He informed us that we could communicate with Ms. Amanda, the sous chef. We sent her an email on the 10th, and the data was received on March 17th.

Communication with FEAST Manager and Staff

Timeline: The FEAST manager was initially contacted on February 24th. However, no response was received until February 28th. When we arrived at the dining hall, the staff did not know about our project.

Issue: There was a lack of communication between manager and staff, hindering data collection. Additionally, we could not access real-time waste data in a usable format, which is crucial for our project. Staff were unaware of our presence and asked us to pay for dining hall access.

Solution: We explained our project directly to the staff, who allowed us to begin data collection without paying for access to the dining hall. Overall, there is no impact on the project.

Printing Posters for Intervention

Timeline: We contacted the manager on March 2nd about poster printing but received no reply. We met with them on March 4th, just before the intervention began.

Issue: The manager could only print the posters in standard paper size, limiting their visibility. This may impact participants' ability to discover and understand the poster.

Solution: The smaller paper posters were used for the intervention, and the search for larger, more visible posters continued.

Appendix C: Survey and Experimental Materials

Figure C-1

Location of Observation Point During Baseline and Intervention

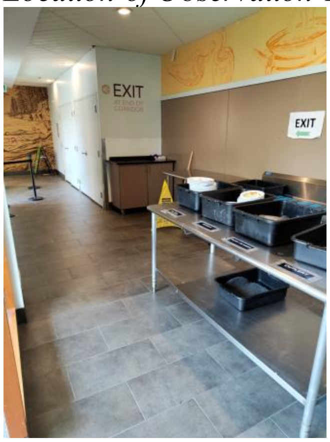


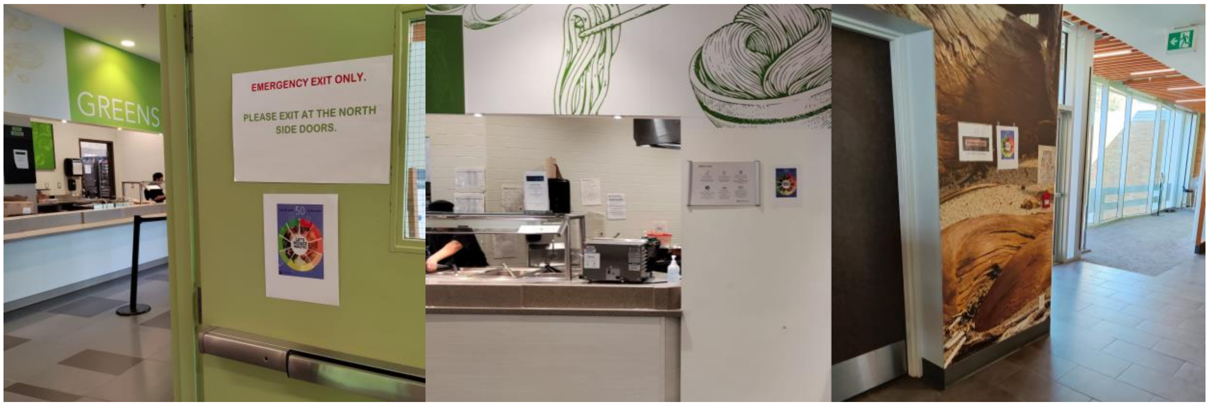
Table C-1

Actual Waste and Dine-in Data

Date	Waste (kg)	Covers	Daily per capita waste (kg)
Feb 24	118	3191	0.036979
Feb 25	75	3112	0.0241
Feb 26	78	3026	0.025777
Feb 27	84	2926	0.028708
Feb 28	92	2690	0.034201
March 1	30	2198	0.013649
March 2	78	2516	0.031002
March 3	112	2918	0.038382
March 4	91	3042	0.029915
March 5	121	2908	0.041609
March 6	86	2897	0.029686
March 7	103	2406	0.04281
March 8	19	1968	0.009654
March 9	88	2121	0.04149
March 10	93	2857	0.032552
March 11	74	2874	0.025748
March 12	89	2895	0.030743
March 13	105	2792	0.037607
March 14	108	2461	0.043885

Figure C-2

Location of the three Posters for the Intervention period



Note. The first was placed by the entrance, then another beside good noodles and finally, the third was placed right before students entered the dish pit.

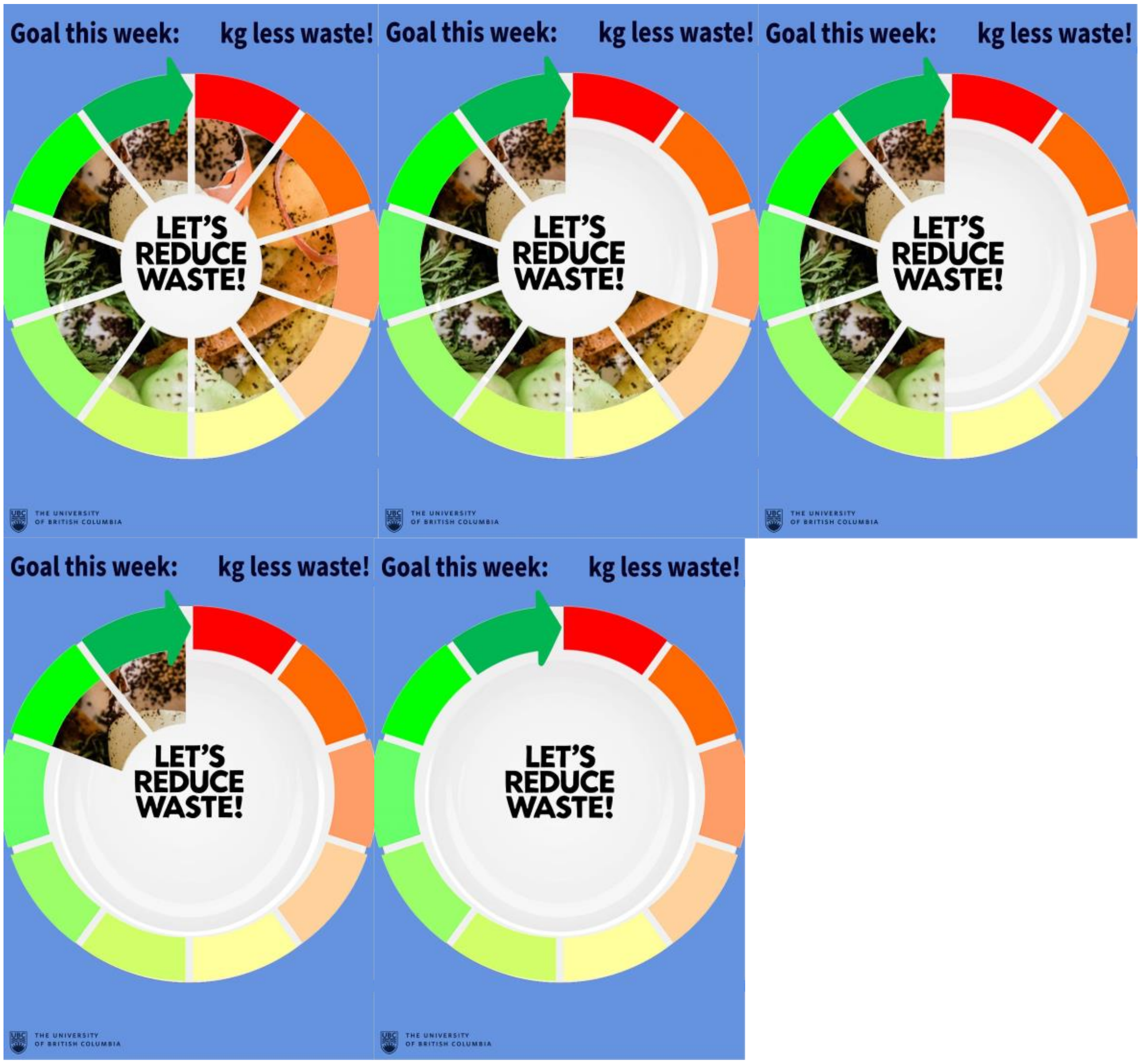
Table C-2

Food Waste Estimation Table

Rating	Food Waste (kg)
0.00	0.000 kg
0.25	0.0025 kg
0.50	0.005 kg
0.75	0.0075 kg
1.00	0.010 kg
1.25	0.020 kg
1.50	0.030 kg
1.75	0.040 kg
2.00	0.050 kg
2.25	0.0625 kg
2.50	0.075 kg
2.75	0.0875 kg
3.00	0.100 kg
3.25	0.125 kg
3.50	0.150 kg
3.75	0.175 kg
4.00	0.200 kg
4.25	0.250 kg
4.50	0.300 kg
4.75	0.350 kg
5.00	0.400 kg

Figure C-3

Dynamic Poster for the Intervention Period



Note. A copy of our dynamic poster at several stages when segments were removed as the dining hall progressed towards the waste reduction goal. Specific colours were chosen to provide a deeper visual contrast with the dining hall walls.

Table C-3

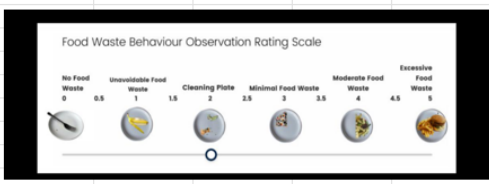
Baseline and Intervention Period Data

Conditions	Date(b&i)	Waste per capita (kg)
baseline	2025/2/26	0.02578
baseline	2025/2/27	0.02871
baseline	2025/2/28	0.0342
baseline	2025/3/3	0.03838
baseline	2025/3/4	0.03009
baseline	2025/3/5	0.04161
intervention	2025/3/6	0.02969
intervention	2025/3/7	0.04281
intervention	2025/3/10	0.03255
intervention	2025/3/11	0.02575
intervention	2025/3/12	0.03074
intervention	2025/3/13	0.03761
intervention	2025/3/14	0.04388

Figure C-4

Observation Data Sheet

Observers:		Location:		
Date:		Start Time:		
Observation Day:		End Time:		



Observer 1:				
Observer 2:				
	Observer 1	Observer 2		
Participant #:	Rating:	Rating:		
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

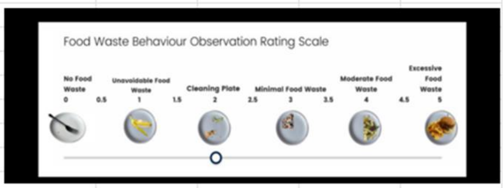
Figure C-5

Food Waste Behaviour Observation Rating Scale

Figure C-6

2025/2/26 Observer Rating Scale Sample Interface

Date: 02/26/25		Start Time:	12:41	
Observation Day:		End Time:	1:35	



Observer 1:	Robyn		
Observer 2:	Jiaxin		
	Observer 1	Observer 2	
Participant #:	Rating:	Rating:	Observed average
1	0	0.5	0.25
2	3	4	3.5
3	2	1	1.5
4	3	3	3
5	2	1.5	1.75
6	1	0.5	0.75
7	0	0	0
8	0	0.5	0.25
9	0.5	1	0.75
10	0	0	0
11	4	3.5	3.75
12	0	0	0
13	2	1.5	1.75
14	0	1	0.5
15	0		

Figure C-7

Intraclass Correlation Coefficient (ICC)

Type of ICC	ICC Value	95% Confidence Interval (CI)
Single Measure ICC (C,1)	0.881	0.869 ~ 0.892
Average Measure ICC (C,K)	0.937	0.930 ~ 0.943

Figure C-8

*G*Power - Priori efficacy analysis*

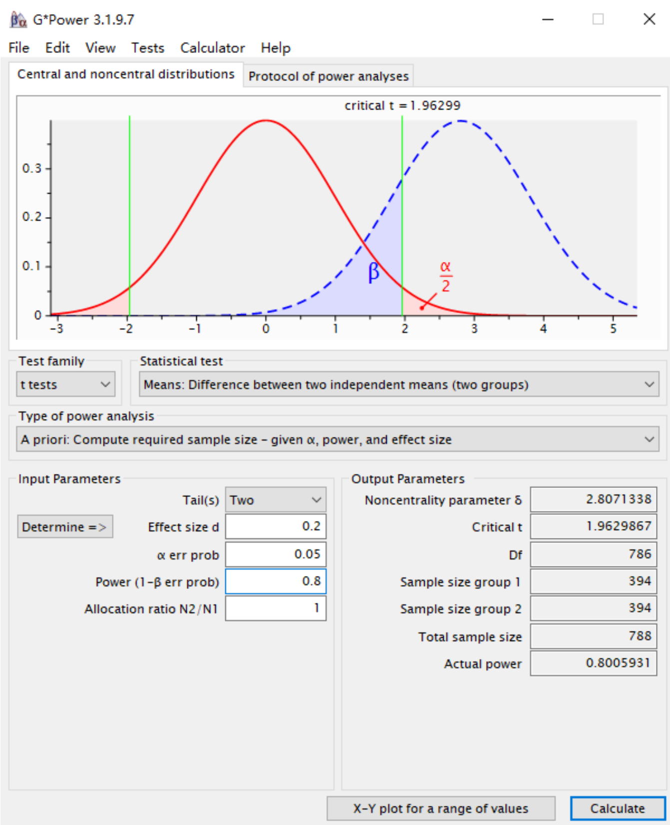


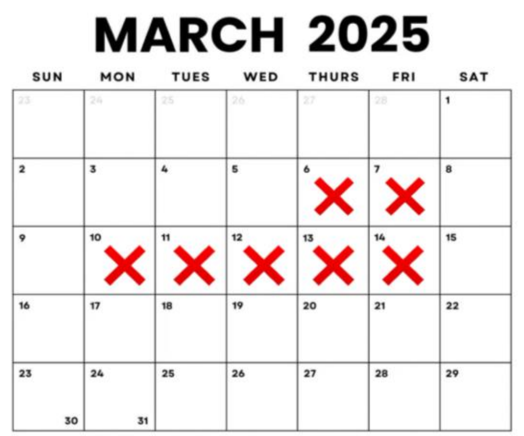
Figure C-9

Baseline Dates

Note. The baseline period included February 26th to 28th and March 3rd and 4th excluding 5th .

Figure C-10

Intervention Dates



Note. The intervention period was from March 6th to 7th and 10th to 14th.

Appendix D: Graphs

Table D-1

Food Waste score statistics

```
. sum participant_score if condition == "Baseline", detail

                      participant_score
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%            0              0       Obs                 628
25%           .5              0       Sum of wgt.         628

50%          1.5                      Mean           1.630812
                        Largest       Std. dev.      1.294511
75%          2.5              5
90%          3.5              5       Variance        1.67576
95%            4              5       Skewness       .3764321
99%         4.75              5       Kurtosis       2.242232

. sum participant_score if condition == "Intervention", detail

                      participant_score
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%            0              0       Obs                 917
25%            0              0       Sum of wgt.         917

50%          1.5                      Mean           1.469193
                        Largest       Std. dev.      1.302214
75%          2.5              5
90%         3.25              5       Variance       1.695761
95%            4              5       Skewness       .5255342
99%            5              5       Kurtosis       2.500941
```

Figure D-1

Box Plot of Participant Score for Baseline and Intervention Periods

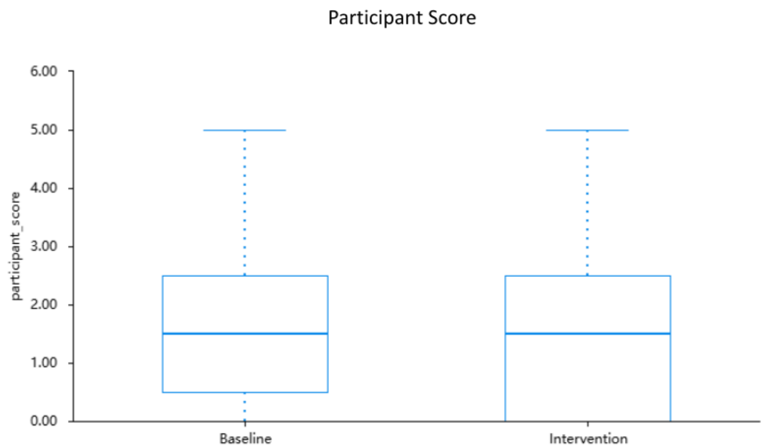


Table D-2

Shapiro-Wilk W test and Mann-Whitney U test for the waste score

```
. swilk participant_score if condition == "Baseline"

                   Shapiro-Wilk W test for normal data

    Variable |        Obs       W           V         z       Prob>z
-------------+------------------------------------------------------
participan~e |        628    0.98362      6.770     4.644    0.00000

.
. swilk participant_score if condition == "Intervention"

                   Shapiro-Wilk W test for normal data

    Variable |        Obs       W           V         z       Prob>z
-------------+------------------------------------------------------
participan~e |        917    0.98730      7.402     4.940    0.00000

.
. ranksum participant_score , by( condition )

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

   condition |      Obs    Rank sum    Expected
-------------+---------------------------------
    Baseline |      628      508338      485444
Intervention |      917      685947      708841
-------------+---------------------------------
    Combined |     1545     1194285     1194285

Unadjusted variance    74192025
Adjustment for ties  -1558991.5
                     ----------
Adjusted variance      72633033

H0: partic~e(condit~n==Baseline) = partic~e(condit~n==Intervention)
         z =   2.686
Prob > |z| = 0.0072
```

Figure D-2

Box Plot of Waste per Capita for Baseline and Intervention Periods

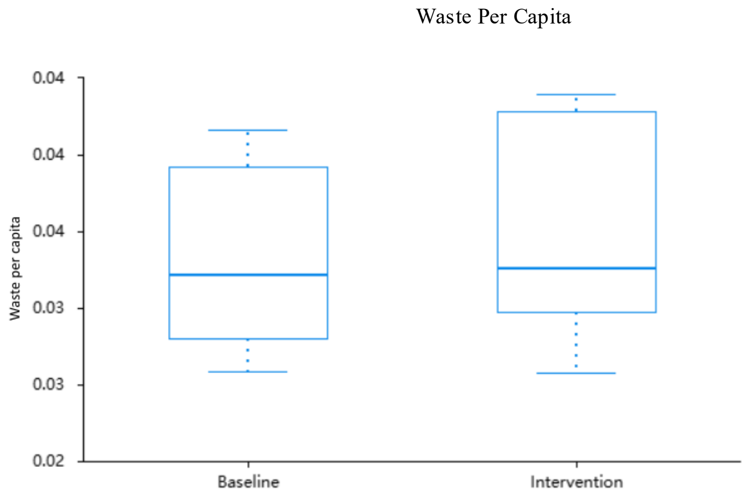


Figure D-3

Kernel Density Estimation for Participant Score during Baseline and Intervention

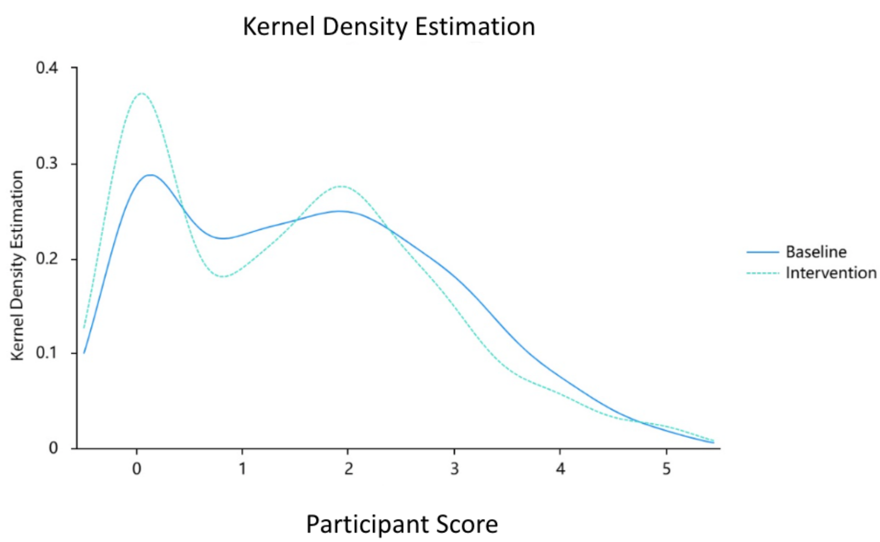


Table D-3

Intraclass Correlation Coefficient (ICC)

Type of ICC	ICC Value	95% Confidence Interval (CI)
Single Measure ICC (C,1)	0.881	0.869 ~ 0.892
Average Measure ICC (C,K)	0.937	0.930 ~ 0.943

Table D-4

Shapiro-Wilk W test for daily per capita waste

```
. swilk waste_per_capita if daily_condition == "Baseline"

                   Shapiro-Wilk W test for normal data

    Variable |        Obs       W           V         z       Prob>z
-------------+------------------------------------------------------
waste_per_~a |          6    0.95802      0.520    -0.857    0.80435

.
. swilk waste_per_capita if daily_condition == "Intervention"

                   Shapiro-Wilk W test for normal data

    Variable |        Obs       W           V         z       Prob>z
-------------+------------------------------------------------------
waste_per_~a |          7    0.92898      0.933    -0.106    0.54228
```

Figure D-4

Kernel Density Estimation for Waste Per Capita for Baseline and Intervention Periods

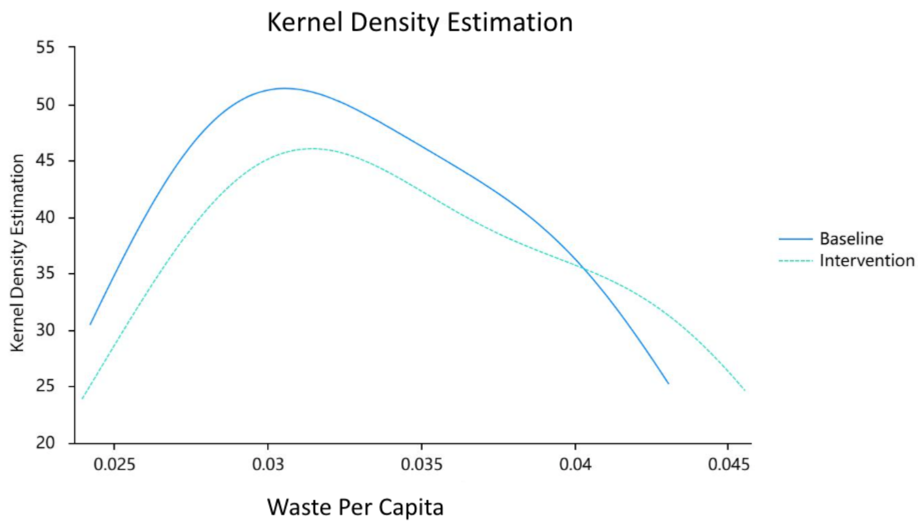


Table D-5

Levene's test for daily per capita waste

```
. robvar waste_per_capita , by( daily_condition )
```

daily_condition	Summary of waste_per_capita Mean	Std. dev.	Freq.
Baseline	.03312833	.00605752	6
Intervent..	.03471857	.00688133	7
Total	.03398462	.00629652	13

```
W0  =  0.26703352   df(1, 11)     Pr > F = 0.61555901

W50 =  0.06079189   df(1, 11)     Pr > F = 0.80978938

W10 =  0.26703352   df(1, 11)     Pr > F = 0.61555901
```

Table D-6

Independent Samples T-test for daily per capita waste

Variable	Group	Sample Size	Mean	SD	Mean Difference	95% CI of Difference	t	df	p
waste_per_capita	Baseline	6	0.03	0.01	-0.00	-0.010 ~ 0.006	-0.438	11.000	0.670
	Intervention	7	0.03	0.01					
	Total	13	0.03	0.01					