

CHAPTER 7: WASTE MANAGEMENT OF DISPOSABLE COFFEE CUPS

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7.1 Introduction

7.1.1 Overview

In the United States, more than 400 million cups of coffee are consumed daily, with most coffee drinkers having more than 2 cups a day. An unintentional consequence of this \$225.5 billion dollar coffee market is that over 50 billion paper cups get thrown away annually. Disposable coffee cups constitute only a small fraction of weight in the landfill, compared to the heavier and bulkier solid wastes such as textile and paper; yet it is a significant problem as paper cups are not easily repurposed or recycled. Unlike the many wastes that could potentially be reused or diverted from the waste stream, disposable cup waste is not a problem of overproduction like in the textile industry, nor is it a problem of actually getting into the recycling stream as it is with paper. Paper cups for hot beverages are made difficult to be recycled – industry standard is to line plastic resin (polyethylene) on top of the paper to keep beverage warm and prevent leakage – thus destined to end up in landfill once created, because it cannot be recycled.

The challenge to reduce paper cup uses remains one of the most difficult, as it involves changing consumer behavior. Therefore, a college setting, with a predictable population composition, is an ideal place to start testing strategies, and possibly transforming the recycling system. To embrace Chapman University's commitment to sustainability, such cradle-to-grave material should be evaluated and alternatives must be considered. The objective for this chapter is to investigate Chapman specific practices to reduce waste and increase recycling of disposable beverage containers. The hypothesis for this chapter is that the implementation of multiple appropriate practices on both consumers and producers (retailers) could successfully make Chapman University a more sustainable campus.

The problem of disposable cups is not one that is inevitable but 'an indicator of massive failure in both markets and market regulation' in the modern capitalist society. Consumption should not imply waste, but rather a cycle of creation and usage of goods and services, otherwise known as cradle to cradle. Therefore, 'reduce, reuse, recycle' should be regarded as requirement for sustainable economy instead of a far-reaching goal.

The economy is made possible by combining millions of mutually benefiting individual actions. Therefore, it is important to harness the power of each individual in redesigning the traditional linear economic model into a circular economy, in building a sustainable environment for the future.

7.1.2 Coffee's Role in College Life

Coffee is a big part of college life. Since 2015, Starbucks coffee (or tea) has been a staple for Chapman students and faculties alike. Given that hot coffee cups are non-recyclable, however, increased coffee consumption, thus disposal of coffee cups has gained attention among students in the Environmental Science and Policy. In the 2016 Waste Management and Dining Services Audit, results indicated that many of the plastic post-consumption coffee cups were mostly put into the garbage bin instead of the recycling. It was also shown that instructional recycling signage did not directly increase the recycling rate on Chapman campus in the 2016 Audit. Although most survey participants (97%) agreed that it would be easier to sort waste with pictures of recyclable items, the final audit result indicated that

there is more to environmental behavior change. These conclusions led to the question: How sustainable is our coffee consumption habit?

7.1.3 Starbucks

Starbucks Corporation, the largest coffeehouse chain in the global coffee market, captures a significant portion of the market share at 39.8%. As of 2017, this enormous corporation has over 25,000 locations worldwide, and almost 14,000 of which are located within the U.S. Consolidated net revenues of Starbucks grew 5%, rounding in \$22.4 billion, compared to the previous year.

At the beginning of 2017, Starbucks stated that 671,396,071 cups of coffee were sold the prior year. Stated on Starbucks website, under 2% of the transactions are made with personal tumblers, which means that approximately 657,968,149 disposable cups were used and disposed.

A corporate social responsibility chapter on the Starbucks website is dedicated to the 'Environment', and contains information regarding disposable cups. On a page titled 'Cup and Materials', efforts made to lower the environmental footprint and reduce waste are presented. However, the last active update on the page was 2013, which stated a not-yet fulfilled goal of increasing personal tumbler share of transactions to 5%. In 2016, Starbucks claimed to test out new, recyclable cups in the UK, a test of which there is no result available from Starbucks, nor do independent researchers believe that Starbucks has done it.

Dozens of leading environmental organizations came together in 2018 to launch a global campaign "Starbucks: Break Free from Plastic", demanding Starbucks to take responsibility on the plastic pollution.

7.1.4 Disposable Culture

7.1.4.1 *A Brief History*

To-go cups were first made for drinking water. In the late 19th century, people drank water (as a healthier alternative to the common alcoholic drinks) out of a communal cup made of ceramic, wood, or metal. A communal cup raised concern when germ theory began to be widely accepted in the United States. A Boston lawyer and inventor named Lawrence Luellen came up with Dixie Cup (then Health Kup), the first disposable paper cup that was made for both health and convenience at the beginning of the early 1900s.

As the idea of disposable paper cups for hot beverages became popular, the fathers of foam cups, William F. Dart and William A. Dart, began to manufacture expanded polystyrene cups in 1957. From 1960s to 1980s, foam cups were rapidly replacing paper cups.

The transition back from foam to paper disposable cups was marked by the rise of specialty coffee, specifically, the rise of Starbucks. In 1987, when Starbucks was rapidly expanding and needed to choose between foam and paper, owner Howard Schultz went with Solo paper cups because of the innovative Traveler lid design. The environmental movement was also a factor in such change: when compared to foam, paper does not offer the kind of insulation needed for hot beverages, thus the corrugated paper sleeve, and double and triple walled cups were then invented in the 1990s, replacing the common practice of double cupping.

Due to its light weight and convenience of disposal, paper cups have since dominated the global to-go coffee scene. Unlike a spotless white foam cup that is easily targetable by anti-plastic environmental groups, a paper cup appears harmless for most coffee drinkers. It appears to be more or less of a "natural" kind waste, biodegradable and does not contribute to the plastic ocean crisis, something similar to a piece of paper. Cold beverage cups made from polyethylene terephthalate (PET) also received similar negative connotation as a foam cup would, and therefore most people feel "worse" using a plastic, recyclable cup (recyclability of #5 plastic depends on facilities.)

7.1.4.2 Common Practice

Absurdly, it is somewhat a common coffee shop practice to automatically give out disposable cups at point of sales, unless customers specifically ask for a traditional ceramic cup or mug. Thus the majority of the customers unconsciously takes their hot coffee or tea in polyethylene lined cups, each topped with a polystyrene (same material is used to make foam) lid. Furthermore, rarely do coffee shops provide non-plastic cups for cold beverages such as iced coffee, a favorite for Southern Californians and Chapman students. Looking at this in an economic perspective, however, it is somewhat understandable that small coffee shops prefer customers using disposable cups: a printed logo on a disposable hot or cold cup is possibly the only advertisement that a small coffee shop could afford.

Many coffee shops offer a 10 to 20-cent discount if customers bring their own cups. However, because the cost of a cup is hidden in the price, a customer who sit down in a coffee shop has no specific incentive to prefer a mug or a disposable paper cup. Only a small fraction of the customers - the rare, environmentally conscious (or prefer to keep their drink hot/cold for some period of time) hippies - get this insignificant economic benefit of bringing their own cups.

However, some changes did happen - before 1997, double cupping for insulation was common. It was only a smarter design - a paper sleeve - that was needed to create change. Today, we needed to aim higher, to aim for a zero waste, sustainable future.

7.1.4.3 Life Cycle of a Paper Cup

The amount of material, energy and water for producing an items that only serve a purpose for half an hour cannot be overlooked. Today’s paper cup is typically made out of paper, lined with a thin plastic resin (polyethylene) or wax to prevent leakage. Some attempts had been made to make the cup out of a small percentage of recycled paper (due to concern on contamination), to be compostable or biodegradable, or to be recyclable through a traditional paper recycling system.

The following, “Environmental Impacts: Paper Cup” (see table X) outlines the environmental impacts of disposable paper cups, based on the 2000 report from Starbucks for the Environmental Innovation Joint Task Force.

Environmental	Impacts:	Paper	Cup
(Data are for every 10,000 paper cup with sleeves manufactured)			
Material	20 million trees are cut down to make the 1.9 million tons paper every year		
Energy	7.12 million BTUs energy used		
Water	8,095 gallons of water used ¹ (3288 gallons of effluent flow)		
Greenhouse Gas Emission	2479 lb (1124 kg) of greenhouse gas emitted		

End-of-use	386.1 lb (175.1 kg) of solid waste
	* Recyclability is low - only specific recycling facilities have the ability to recycle the paper cups

Table 7.1. Environmental Impacts: Paper Cup

Starbucks has measured the saving from providing reusable ceramic mugs to customers compares to disposables.

Reusables Analysis: Universal Coffee Shop			
ASSUMPTIONS:			
\$0.15	Cost of disposable packaging (cup, lid, and insulating sleeve)		
\$1.25	Cost of 16-oz. reusable ceramic cup (cup only)		
1,000 uses	Lifetime of reusable ceramic cups		
12 hours	Number of hours the coffee shop is open per day		
RESULTS:			
No. of reusable cups used per hour	Daily cost savings*	Annual cost savings†	
2	\$ 3.57	\$1,285	
4	\$ 7.14	\$2,570	
10	\$17.85	\$6,426	
No. of reusable cups used per hour	Annual water Savings (gal.)‡	Annual greenhouse gas reduction (lb.)‡	Annual solid waste reduction (lb.)‡
2	1,631	226	252
4	3,262	452	504
10	8,155	1,130	1,260
CRITICAL SUCCESS FACTORS:			
Excess Washing Capacity: The Starbucks-Alliance research indicated that the system had unused dishwashing capacity.			
Storage: The store needs to have storage space for a small supply of cups near the service area and additional storage for dirty dishes before they are washed.			
* = no. of reusable cups used per day cost of disposable packaging cost of reusable serveware/1,000.			
† Multiply by 360 days.			
‡ Based on the use of a 15-oz. ceramic mug in place of a 16-oz. cup with sleeve, by weight.			

Table 7.2. Reusable Analysis of Providing Reusables to Customers

7.1.4.4 Weak Economic Incentives

Compared to the widely popular plastic grocery bag ban, the incentive to bring-your-own mug (10-cent discount) provided by Starbucks and other retailers is not useful. Weighing the 10-cent off the \$3.5 or \$4 coffee against convenience, the ability to symbol your status, and the fact that it is a positive incentive (to gain a discount), but not a negative incentive (to lose certain amount) are all factors that play into the continuation of status quo.

Bewley's Tea and Coffee UK Ltd and Cardiff University conducted a study in 2016 to explore the easily implementable practices to encourage the use of reusable cups. It is found that a combination of negative economic incentive and education could help reduce the voluntary use of disposable cups.

7.2 History of Disposable Cups Waste and Recycling on Campus

Since Chapman released its first statement on sustainability in 2012, the concept has been given a significant weight when considering waste management on campus. Recycling bins are currently widely

accessible in both outdoor and indoor areas, mostly coupled with a trash bin. The advancement of collection bins available is outstanding: from installation of double-sided waste bins in the Argyros Forum in 2011, placement of three (now 15) BigBelly compacting trash cans in 2013, to installation of industrial composting following the 2016 Audit, Chapman had made huge progress in terms on bringing in new initiative. However, recycling efforts and issues, such as contamination or divergent rate, have not been measured or improved tremendously over time.

7.2.1 Past Audit

In the waste audit conducted during the 2016 Audit, recyclable coffee-related items present mostly in trash instead of recycling. Not only does it show that people do not know these cold drink containers are recyclable, but that they do not care to read the education signage placed above the collection bins. There is no improvement due to educational signage shown in the 2016 Audit.

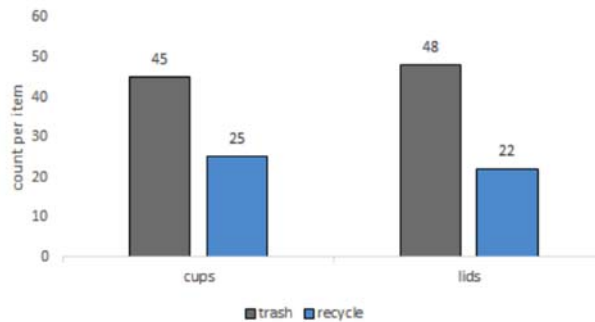


Figure 7.1. Number of plastic cups and lids found in trash vs. recycling bins in the second waste audit

In the 2016 Audit, educational signage was created and put above most recycling and waste bins. However, they do not find to have an effect on sorting behavior, possibly due to the vagueness of the information and the large effort required to read and interpret it.



Figure 7.2. Educational waste sorting signs posted following the first waste audit, during the 2016 Audit.

7.3 Current Status of Disposable Cups Waste and Recycling on Campus

Current status of disposable coffee-related items is analyzed from three aspects: procurement, recycling rate, and improvement overtime. 16 questions on consumption, recycling effort and acknowledgment of waste were included in the campus-wide survey.

Recyclable	Non-Recyclable
Cold Cup	Hot Cup
Hot Lid	Straws
Cold Lid	Splash Stick
Insulating Sleeve	

Table 7.3. Types of different coffee-related items analyzed in this research, separated by recyclability.

7.3.1 Procurement: Sodexo Purchasing for Coffee-Related Items

Currently, there are three franchise locations on Chapman main campus that sell coffee: Einstein Bros. Bagels, Rotunda Café, and Starbucks. Quantity and price for purchasing several subject items are provided by Sodexo.

7.3.1.1 Analysis: Cups in Einstein Bros. Bagels

Currently, there are three franchise locations on Chapman main campus that sell coffee: Einstein Bros. Bagels, Rotunda Café, and Starbucks. Quantity and price for purchasing several subject items are provided by Sodexo.

7.3.1.2 Analysis: Cups in Einstein Bros. Bagels

Sodexo purchases 1000 hot (paper) cups per week, accounting for 34000 cups per academic year. The amount of cups purchased every year has not changed since 2014. However, price for the hot cups increased over the years: there was a \$68 increase (6%) in hot cup purchasing in the 2015-16 academic year compared to previous year, and \$136 increase (12%) in the 2017-2018 year. Each cup costs about \$0.032 in 2014, and \$0.038 in 2017. Total percent increased over four years is 18%.

Sodexo purchases 800 cold (plastic) cups per week, which adds up to 27200 cups per academic year. The amount of cups purchased every year has not changed since 2014. Price for the Einstein plastic cups gradually increased over the years: there was a \$34 increase (3%) in cold cup purchasing in the 2015-16 academic year compared to previous year, and \$68 increase (6%) in the 2017-2018 year. Each cup costs about \$0.041 in 2014, and \$0.044 in 2017.

7.3.1.3 Analysis: Cups and accessories in Rotunda Café

Sodexo purchases 433 hot cups per week for the Rotunda Café (cold drink not available), which translates into 14722 cups per academic year. The amount of cups purchased every year has not changed since 2014. However, price gradually increased over the years: there was a \$68 increase in hot cup purchasing in the 2015-16 academic year, and the 2017-2018 year. Each cup costs about \$0.078 in 2014, and \$0.106 in 2017.

Sodexo purchases 500 hot lids per week (17000 lids per academic year). Similarly, the amount of lids purchased has not changed since 2014 while the price increased: there was a \$34 increase in the 2015-16 academic year compares to previous year, and a \$68 increase in the 2017-2018 year.

400 paper insulation sleeves are purchased per week, total for 13600 paper sleeves per academic year. There was a \$34 increase in price for the 2015-16 academic year compares to previous year; also for the 2017-2018 year.

7.3.2 Analysis: Cups in Starbucks

Sodexo purchases 3000 hot and 1870 cold cups per week, which equals to 102,000 hot and 63,580 cold cups per academic year (total: 165,580 cups). The amount of cups purchased every year has not changed since 2014. Similar to other retails, price increased over the years: there is a \$680 increase (22%) in hot cups purchasing since the 2014-2015 academic year, and \$510 increase (14%) in cold cup purchasing. Each hot cup costs \$0.030 in 2014, and \$0.036 in 2017; for cold cups, about \$0.056 in 2014 and \$0.064 in 2017.

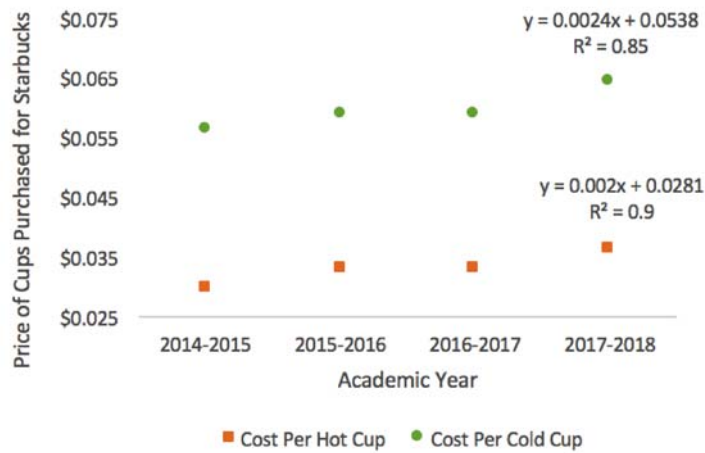


Figure 7.3. Increase in spending on cups for Starbucks franchise.

A general trend is observed: quantity purchased for all items remain unchanged throughout the years while price continue to increase. The increase is expected in the future as plastic is currently gaining international attention in terms of its impact on the environment, its origin from nonrenewable resource - petroleum, and that most nations-states are currently considering bans or restrictive use.

Acedemic Year	Cost for hot cup	Cost for cold cup
2014-2015	\$5,265.92	\$4,696.42
2015-2016	\$5,741.92	\$4,900.42
2016-2017	\$5,741.92	\$4,900.42
2017-2018	\$6,285.92	\$5,308.42

Table 7.4. Total spending on cups for the three franchise locations.

7.3.3 Waste Audit

Two waste audits were conducted to observe recycling rate on main campus. The trash and recycling materials were collected on two Tuesday in the three main sources of trash on campus: Argyros Forum, first floor Leatherby Library and first floor Beckman Hall. On March 14th and April 11th (the

following Wednesday,) coffee-related items from trash and recycling bins are picked out, weighted and counted.

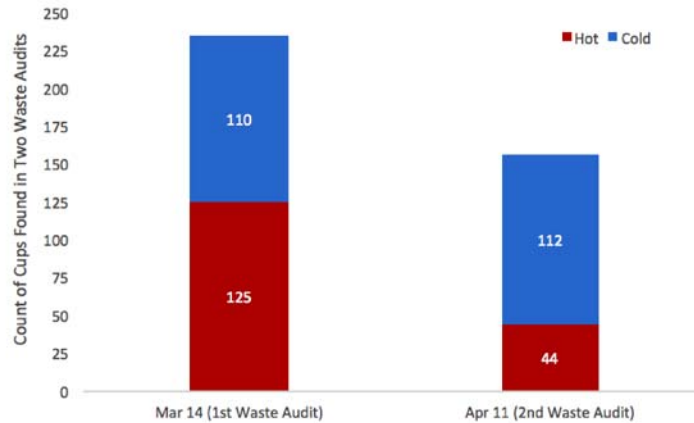


Figure 7.4. Count of hot and cold cups found in both trash and recycling from the two waste audits.

In terms of hot cups, difference between the first and second waste audit is insignificant, while the amount of cold cups found is consistent. Recycling rate for cold cups (plastic) is 31.7% on average. About 200 cups are disposed daily on main campus, accounting for (projection of) 1,000 cups disposed every week (5 days.) Regardless of placement, most cold cups are heavily contaminated by foam and cream, suggesting an even lower recycling rate.

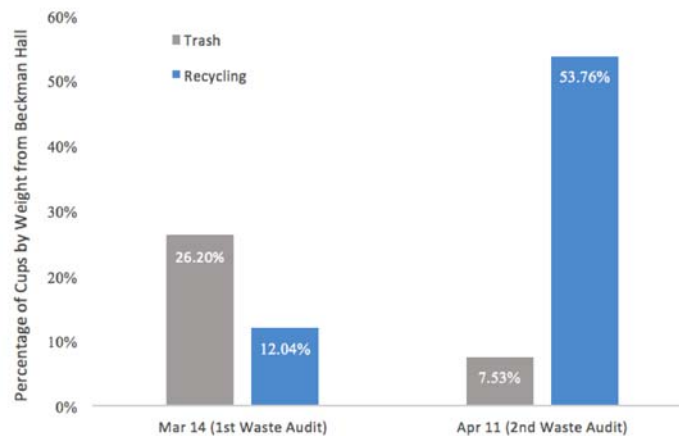


Figure 7.5. Percentage of cups by weight from first floor Beckman Hall, the most popular spot in terms of disposable cup collection. Result is not determined by correct recycling behavior but the general weight of cups (of which majority is the recyclable plastic cups.)

Cups waste generally account for a small percentage of waste: highest percentage of cups in trash is 26% (Starbucks), lowest is 1%; highest percentage in recycling is 53% and 2% lowest. Although a crude conclusion can be drawn from the differences on percentage of cups by weight, which seem to propose behavior change, data from the two waste audits are not statistically significant. More audits are needed to draw a careful conclusion on recycling behavior.

7.3.4 Visualization of Waste (VoW)

Visualization of Waste (VoW) was installed to measure effectiveness of signage and other strategies. Clear strings bins were set up on March 28th at the three main dining locations on main campus: Argyros Forum, Rotunda Cafe in the Leatherby Library, and Starbucks (Figure 7.7), along with educational signage (table A). Significant contamination issue and mixing of recyclable/non-recyclable materials were observed. On April 8th, the bins were double-bagged, and appropriate items that which belongs to each collection bins are displayed (table B). As mentioned above, any waste collection in Starbucks/Beckman location collect the most coffee-related items, thus the bins at the other two locations were removed. Signage changed twice over the course, and actual items on display was used at the end (seem to significantly create behavior change, although actual data are lacking.)



Figure 7.6. Educational signage posted at various locations on main campus.



Figure 7.7. Visualization of Waste displayed in a way that make data collection easier, and specific items tapped above.

Over time (April to May) the percentage of correct placement increased: proportion of hot to cold cup correctly placed in waste bin doubled at the end of installation. In another word, only over one month of displaying education signage of specific items that people slowly learn to sort coffee-related items. This

indicates the difficulty in bringing about much higher recycling rate. Therefore, effort should be placed at procurement.

7.3.5 Survey Data

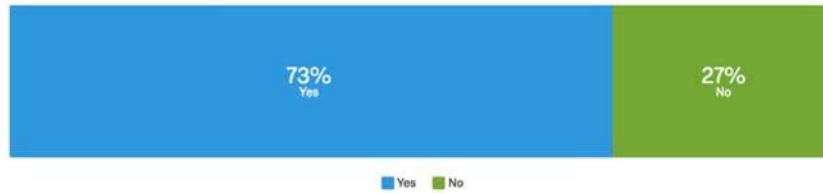


Figure 7.8. In response to the question "If there was a 10¢ charge for using a throw-away cup, would you bring your own mug/tumbler?" Majority of the respondents (n=590) reacts to this economic incentive to switch from disposable cups to bringing their own.

Loss aversion in decision theory indicates that people would try to avoid losses in a much dramatic way than they would try to achieve equivalent gains. A 'charge' compares to a 'discount' (of which could matter only in presentation) might be a financial incentive to consider.

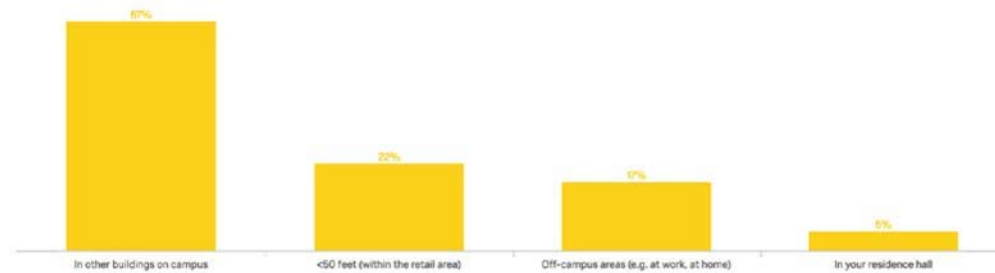


Figure 7.9. In response to the question "Normally, where do you consume the coffee/tea purchased from on-campus dining services?" 79% of the respondents (n=573) consume their coffee or tea on main campus.

As over majority of respondents consume their coffee on main campus, it could be safely conclude that disposable cups are not necessary and should not be the only options other than customers bringing in their own reusable tumblers. Mugs and Tumblers should be provided by on-campus dining services.

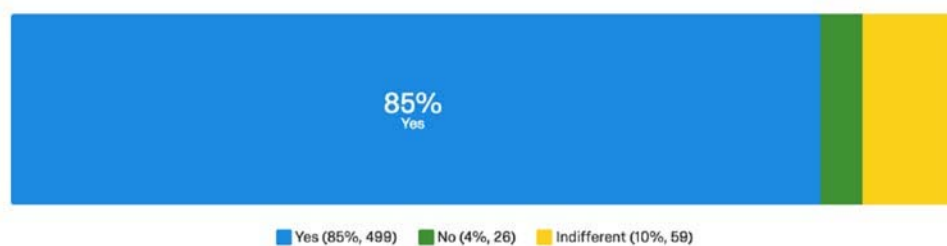


Figure 7.10. In response to the question "If you were given a free reusable tumbler/mug, would you use it?" Majority of respondents express great willingness to use reusable tumblers instead of disposable ones for coffee or other purposes, if tumblers are given free of charge.

One follow-up comment on this question reflects that some people might not use the free tumbler due to the fact that most of the free ones are made of plastic.

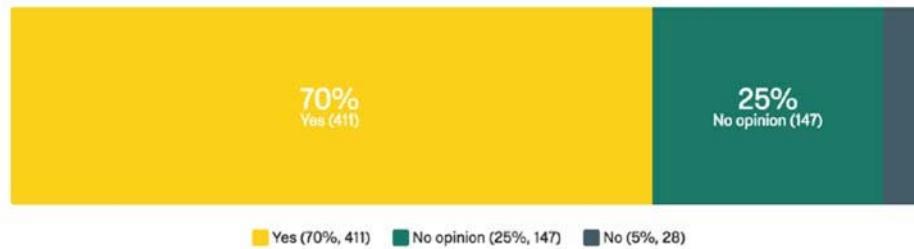


Figure 7.11. In response to the question "Do you feel that the university should be doing more to discourage the use of disposable cups on campus?" 70% of the respondents (n=583) feel that the university should be working towards reducing the amount of disposable cups on campus.

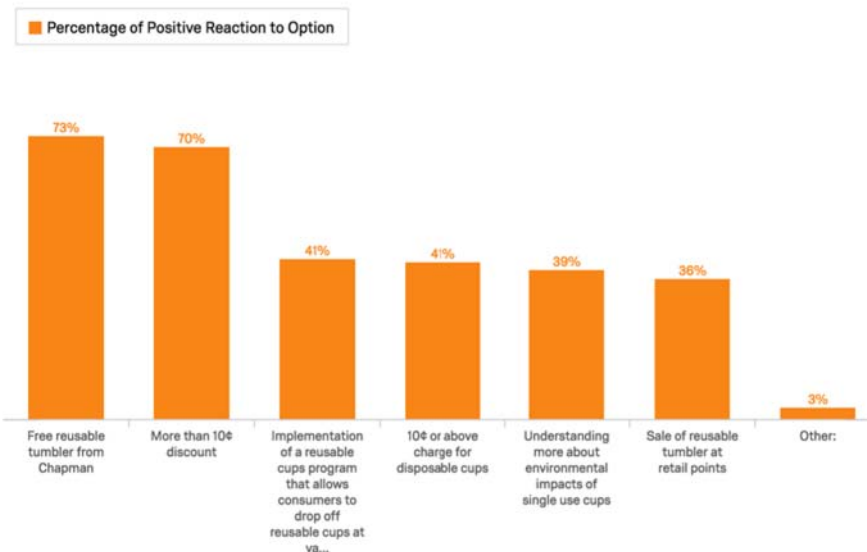


Figure 7.12. In response to the question "Which of the following would motivate you to use reusable tumbler/mugs when purchasing beverages on campus? (Select all that apply)" People react most positively to three incentives when it comes to choosing alternatives for disposables: when the school gives out reusable tumbler (supported by 73% of respondents), an over 10 cent discount when customers bring their own cup (supported by 70% of respondents) and the implementation of a reusable cups rental program (supported by 41% of respondents).

7.3.6 Additional Comments Recorded

Some interesting and insightful comments regarding reusable tumbler use are listed below:

'Washing Stations'

- "Provide washing stations!! What I hate is having to wash them in restrooms and then it's wet and has to go back in my bag for transport."
- "If my office had a sink to wash dishes"
- "A place to wash/rinse the mug when I'm done (maybe dish soap in the bathrooms?)"

Awareness-related

- "Really?"
- "Raising awareness that reusable cups is permitted when purchasing campus beverages (also that there is a 10 cent discount)"

Incentive-related

- "Receiving a 10- 20% off food purchases"

Design-related

- “I really really like the reusable cups program listed above”
- “Nice design”
- “My favorite drink to get comes in a plastic bottle. They don't offer it at the soda machine, so I would like to see it there if they were to take one-use bottles away.”
- “More places to fill up reusable mugs.”

7.4 Concluding Assessments about Disposable Cups Waste and Recycling

7.4.1 Areas of Progress

- Waste Visualization Proven Useful
 - Increased awareness of proper recycling habits
 - Increased awareness of waste production
 - Increased recycling of recyclable coffee-related products
- Increased awareness of environmental impacts regarding procurement and recycling through survey

7.4.2 Areas Needing Improvement

- Educational Signal Proven Not Useful
 - No significant change observed based purely on education signage
 - Different strategies must be combined with signage for it to be effective
- Stronger financial incentives is needed for reducing the amount of post-consumer waste
- Improve waste diversion - The University should create stronger incentives for waste reduction
- Contamination in Recycling should be addressed

7.5 Alternative Practices

7.5.1 Procurement

Biodegradable/compostable products available through:

- Harvest Straws (<http://www.harveststraws.com/>)
 - Straws made with stalks of grain grown in Southern California
- Lolistraws (<https://www.loliware.com/>)
 - Edible, flavored straws and cups
- Aardvark Straws (<https://www.aardvarkstraws.com/>)
 - Paper straws
 - \$97.06/case of 4,800 straws

Recyclable paper cups available through:

- reCUP (<https://www.recup.earth/>)
 - Paper cups made with new technology that which allows traditional recycling facilities to easily remove polymer from paper.

7.5.2 Redesign

Alternative System to disposables:

- Cup Club (<https://cupclub.com/>)
 - New Plastic Economy Initiative, Circular Design Challenge winner
 - Selling service on their reusable cups to businesses (retail cafes). Service include tracking the cups after customers bring them to-go, collecting the cups at various drop-off locations, washing and returning these reusable cups to businesses to use for the next day.

- Financial incentives for bring-your-own-mug (BYOM) for as high as 50% of the cost of a disposable cup

7.6 Recommendations about Disposable Products

7.6.1 Low Cost and/or Effort

- Display and distribute physical and digital educational signage on proper recycling and sorting tips
- Encourage students to skip the straws
- Change of in store operation: Encourage employees working at on-campus dining services to inform consumers regarding the different incentives for reusable tumblers, and alternatives to disposables.
- Provide dish soap in bathrooms
- Reduce recycling contamination by putting in more compost bins

7.6.2 Medium Cost and/or Effort

- Provide reusable tumblers for incoming freshman during orientation
- Provide reusable cups for on-campus beverage consumption (see Table 7.2)
- Distribute long-lasting educational products as gifts (e.g., pins)
- Provide higher financial incentives for using reusable tumblers (i.e., at least 50% of disposable product cost)
- Provide all available drinks that currently comes in single-used bottles in the soda machines

7.6.3 High Cost and/or Effort

- Washing stations for recyclables to avoid recycling contamination
- Washing stations for reusable tumblers in major dining areas
- Purchase biodegradable/compostable coffee cups and coffee-related consumer products
- Implement a reusable cups program that allows consumers to drop off reusable cups at various locations on campus

7.6.4 Future Areas of Research

Ideas for future research related this this chapter:

- Life-cycle analysis on coffee
- Effects of different incentives for waste reduction
- Impacts of educational signage on recycling habits
- Formulation of effective environmental messages
- Different incentive strategies for reducing the amount of post-consumer waste
- Improvement on waste management on campus

7.7 Contacts

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7.8 References

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7.9 Appendices

7.9.1 Survey Data

Q41 - Starbucks currently offers 10¢ off a drink when you bring a reusable tumbler/mug. Were you aware of the discount (regardless of whether you are using a reusable tumbler)?



Figure A1. In response to the question "Starbucks currently offers 10¢ off a drink when you bring a reusable tumbler/mug. Were you aware of the discount (regardless of whether you are using a reusable tumbler)?" Majority of the respondents (n=596) are aware of the discount.

Q45 - If there was a 10¢ charge for using a throw-away cup, would you bring your own mug/tumbler?

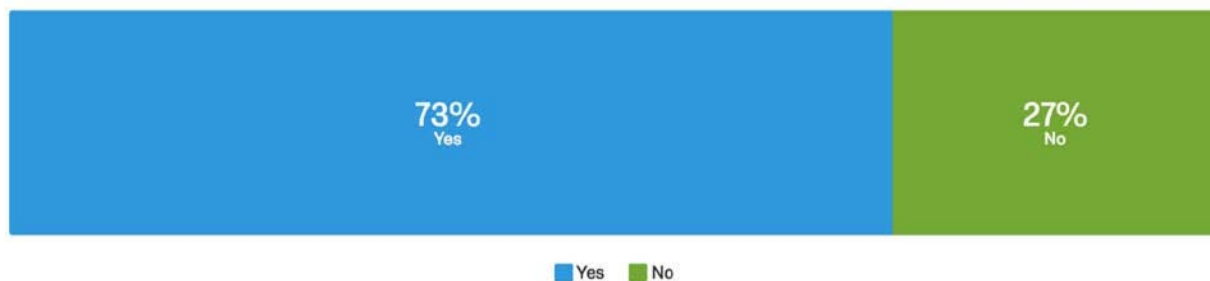


Figure A2. In response to the question "If there was a 10¢ charge for using a throw-away cup, would you bring your own mug/tumbler?" Majority of the respondents (n=590) reacts to this economic incentive to switch from disposable cups to bringing their own.