

Introduction

Plastic's presence on earth has drastically increased over the past hundreds of years, and human dependence on plastic has grown with it. According to the Environmental Protection Agency (EPA), it is estimated that 4.8 to 12.7 million metric tons of plastic waste went into marine ecosystems in 2010 alone [1]. This number is only increasing each year. Plastics are incredibly harmful to the environment due to their inability to degrade and their synthetic toxicity [4].

While Boston College's campus is a small section of the human population, campus plastic use impacts the surrounding environment and the earth as a whole. Understanding how a small population, such as Boston College students, perceives and utilizes plastic is a first step in creating solutions for the growing dependence on a polluting chemical compound. This project studies the economic and social aspects of plastic use on a college campus.

Objectives:

1. To complete a cost-benefit analysis of Boston College's plastic use and reusable china.
2. To understand student behavior and preferences in regards to dining materials and reusable.
3. To explore the unnecessary use of "to go" containers at Addies dining hall in Lower.

Methods

Part One:

Data collection from Boston College dining services and subsequent independent research, resulted in an extensive cost benefit analysis on Boston College's China and plastic usage. Dining services provided an excel document on the amount of individual units of plastic bought for each building in the past semesters [3]. Additionally, the Sustainability Team provided a PowerPoint with data on how much china and the cost of the china that must be purchased in a given semester [6]. Due to confidentiality, research on plastic unit price was researched to best approximate cost [2].

Part Two:

A 20 question survey regarding plastic use and reusable dishware preferences was distributed through Boston College class pages on Facebook. Students living on campus, N = 76, completed the survey. The questions assessed preferences towards reusable dishware, quantitative plastic use, and Addies reusable dishware.

Part Three:

7 observational studies were completed at Addies. Observers would sit outside of Addies in Lower for 45-75 minutes and record the reusable behavior. Observers noted three groups. One group was students who used reusable dishware. The second group was students who used "to go" containers and took it "to go" (To Go: To Go). The third group was students who used "to go containers and stayed to eat at lower (To Go: Stay).

Boston College's Plastic Use and Student Behavior Regarding Reusable Dishware

By: Olivia Meyer, Natalie Saul, and Colton Cardinal
Boston College

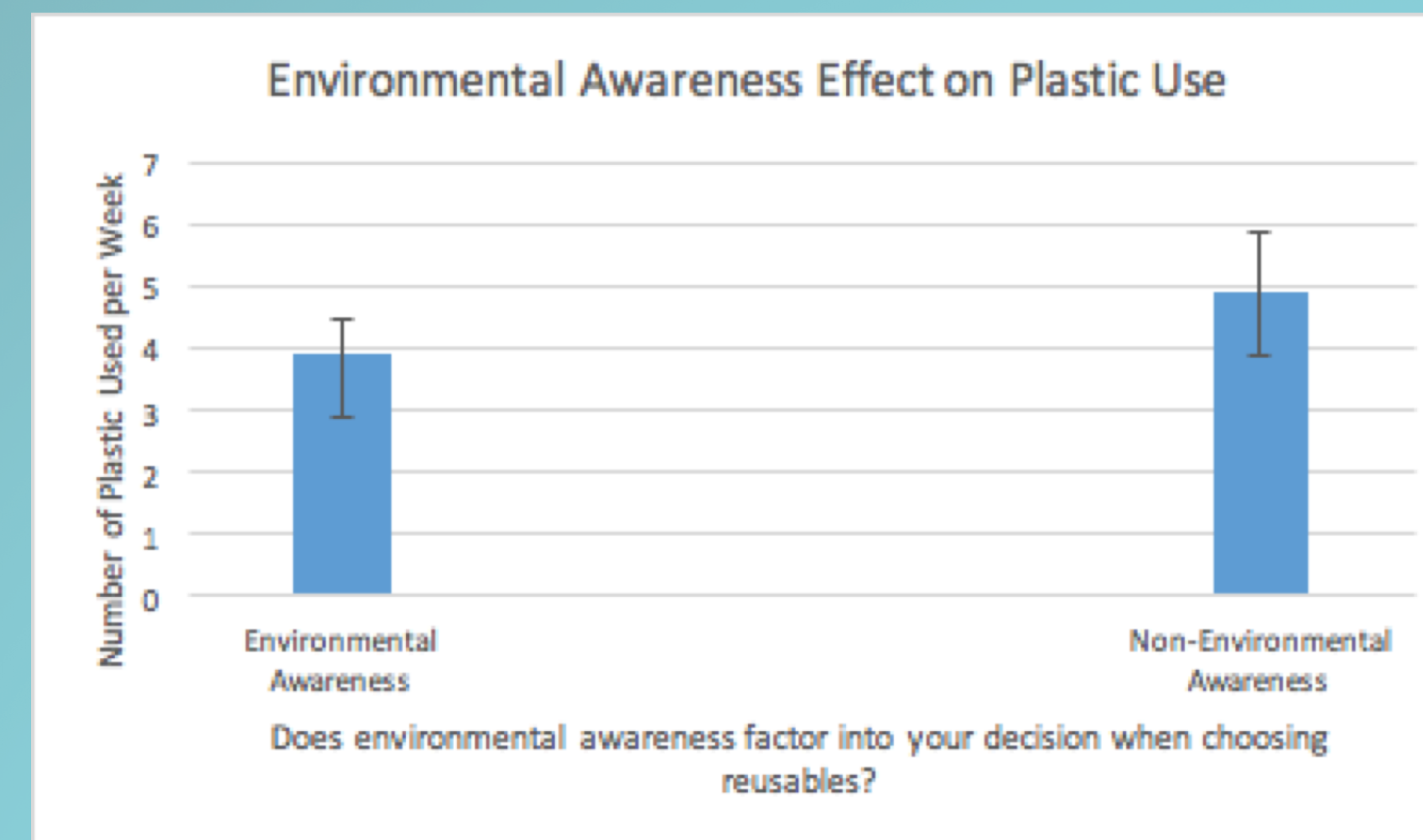


Figure 3

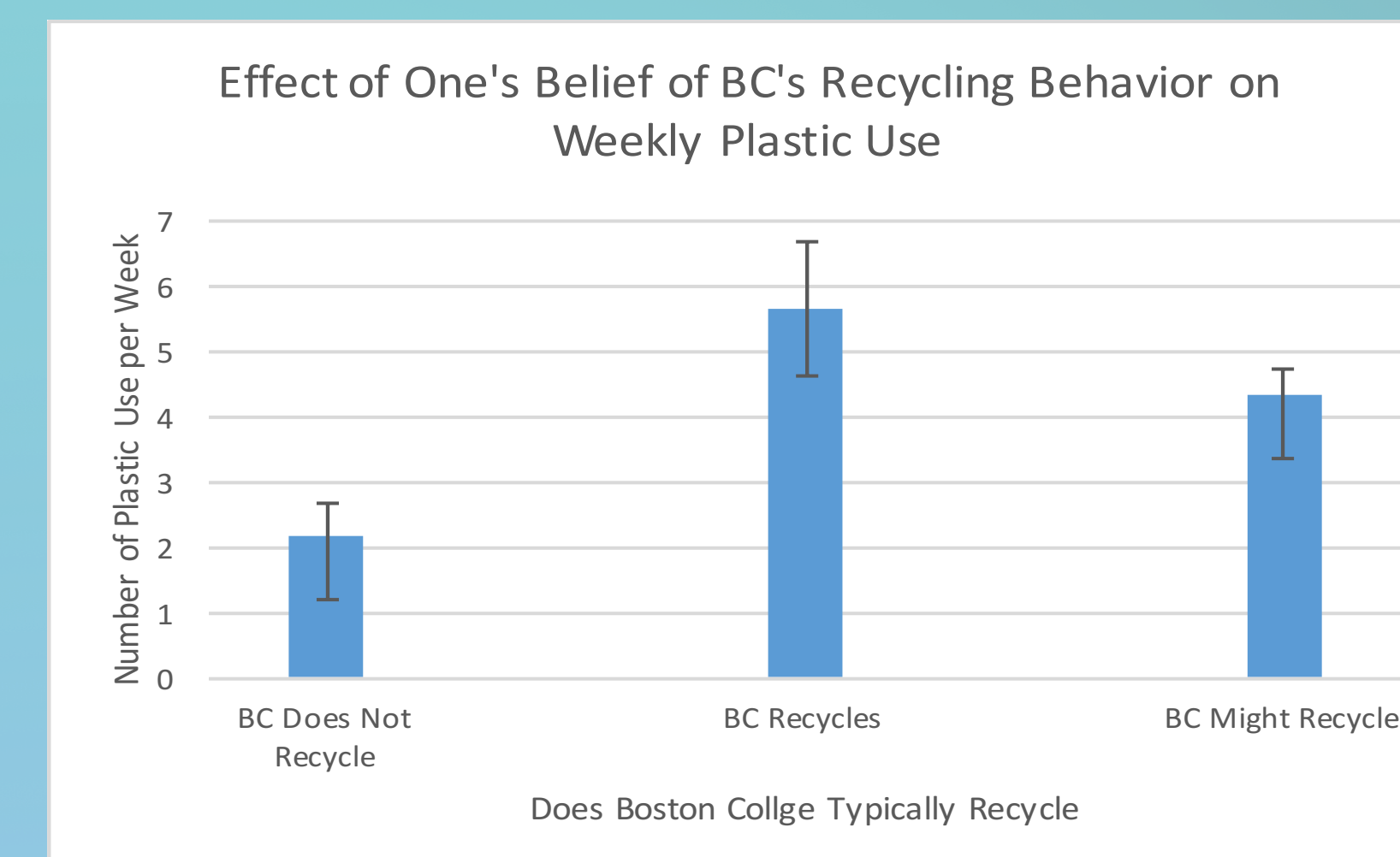


Figure 2

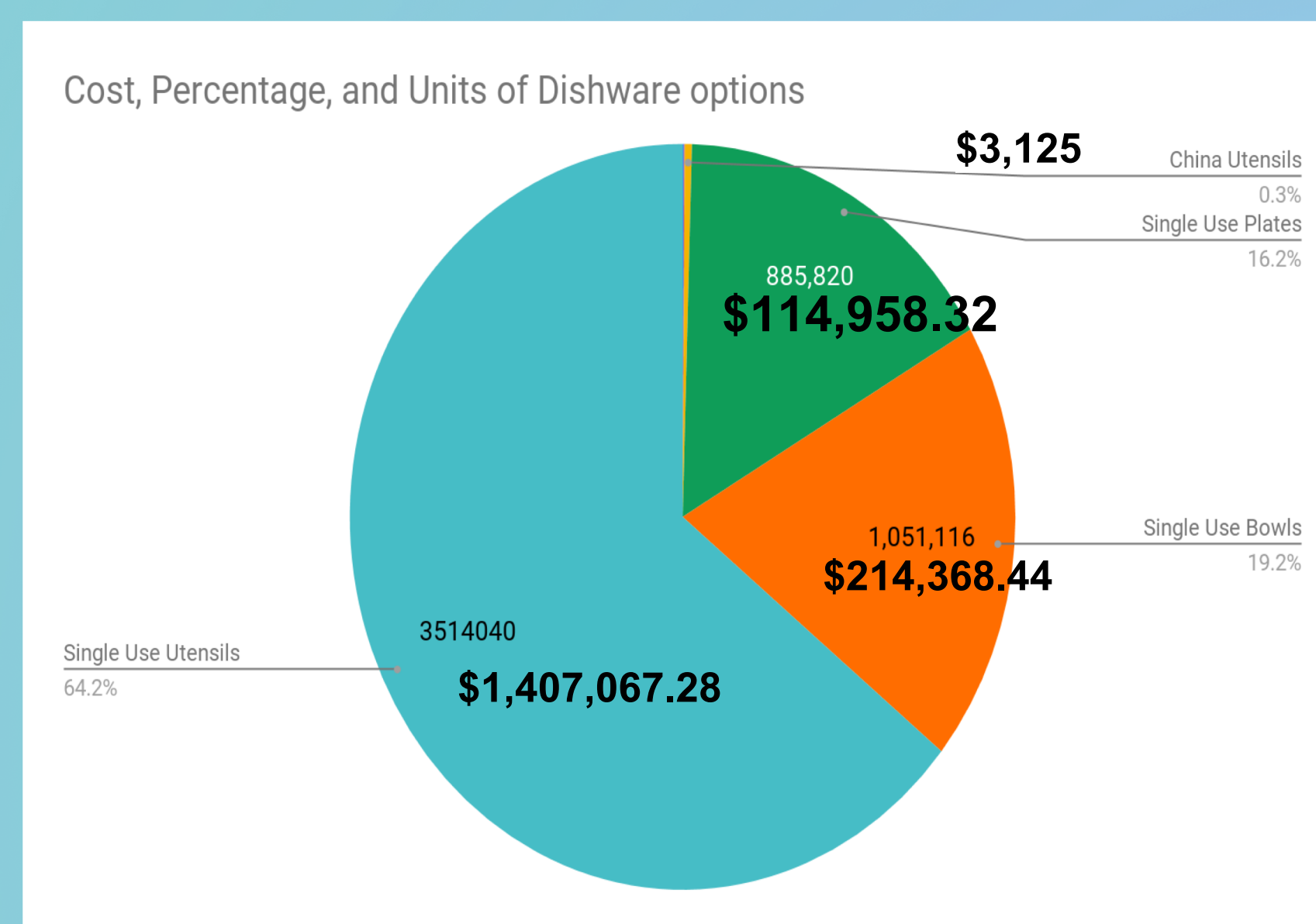


Figure 1

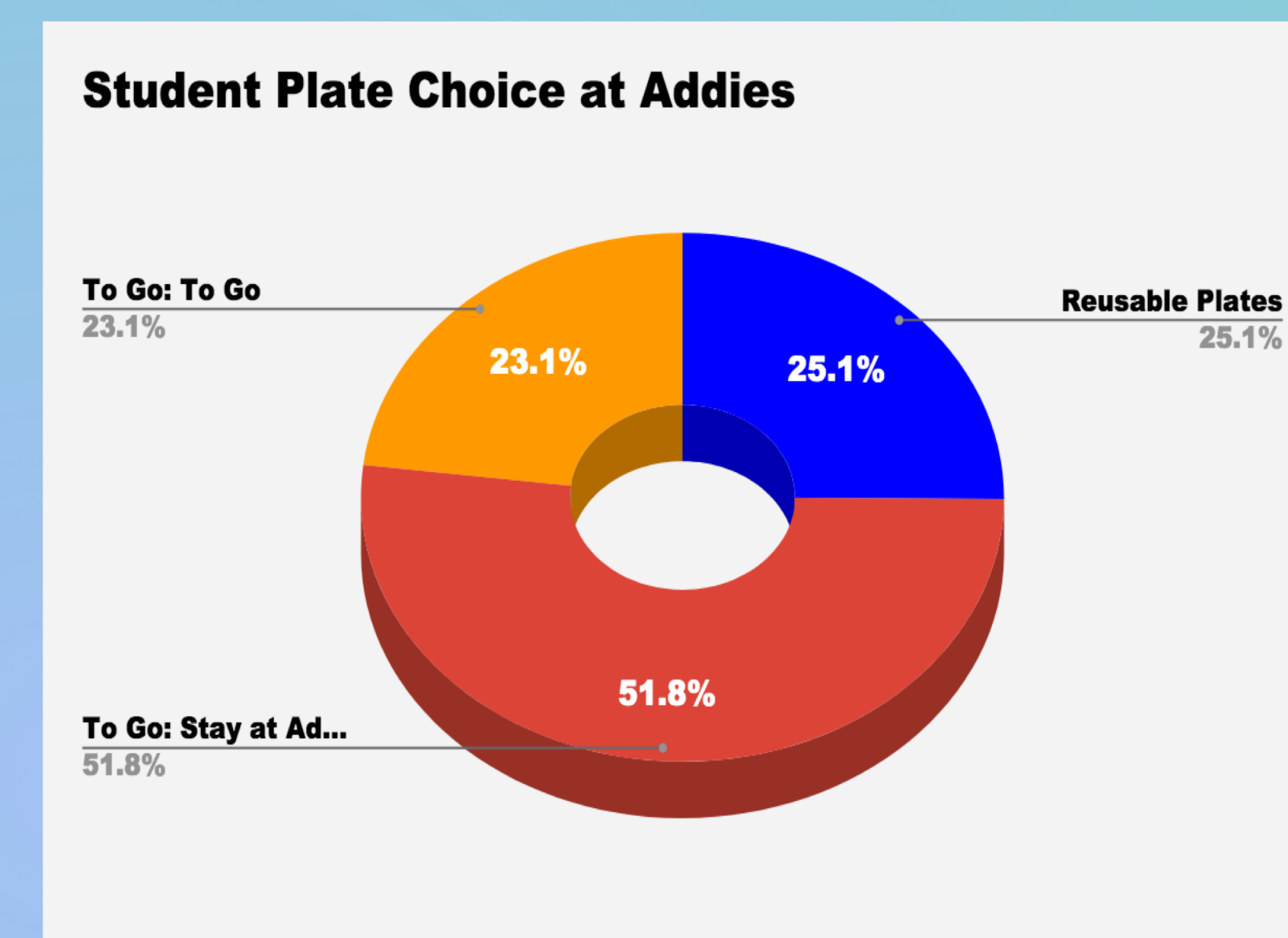


Figure 4

	Purchased FY18	Total Cost FY18
Units of China	24,450	\$34,375.00
Units of Disposable	10,243,052	\$1,976,262.03

Table 1

Results

Part One: Table 1 shows a cost benefit comparison of units of china purchased in 2018 (due to theft) to units of disposable plastic ware. Figure 1 depicts the cost, percentage and units of dishware options for china that have a direct alternative in plastic. A total of 10,243,052 units of single use plastic items are bought/used and cost the College around \$1,976,262.03 dollars in 2018 (FY18). With plastic forks being the highest in consumption.

Part Two: Using an alpha level of $p < .05$, results found there was no significant difference between the upperclassmen and underclassmen in regards to amount of plastic used per week, $t(67) = -.93, p = .36$. Figure 2 shows the significant finding that one's belief of Boston College's recycling behavior has on the amount of plastic coffee cups and straws used per week, $[F(2, 66) = 2.45, p = .094]$. An independent sample t test was conducted to assess average plastic use between academic classes. Using an alpha level of $p < .05$, results found there was no significant difference between upperclassmen and underclassmen, $t(67) = -.93, p = .36$. The Environmental Awareness group ($M = 4.56, SD = 6.02$) and Non-Environmental Awareness group ($M = 3.81, SD = 4.01$) did not have statistically significant different weekly plastic use behavior. Figure 3 the amount of plastic used per week according to environmental awareness group.

Part Three: The 7 observations led to a total of N = 490 data collections: Reusable Plates N = 123, To Go-Stays N = 254, To Go-To Go N = 113. Figure 4 depicts the percentage breakdown. The survey on Addie's behavior reported that 32% of students tell Addies' workers they were taking the food "to go" when they are actually eating in the dining halls.

Discussion

Part One: Table one shows significant use and purchase of single use plastic that costs more per year than replacing the stolen china. Figure 1 shows the cost, percentage and units of dishware options that have a direct alternative in plastic. This means that other single use plastic items were not included in this chart, however, it shows a more equal comparison between china and single use plastic alternatives at Boston College. The percentage of china bowls is included in this figure, however it is not large enough to appear on the graph.

Part Two: From the survey, there was only one main statistically significant finding. A student's belief on BC recycling behavior impacts their weekly plastic use. Those who believe BC does not recycle uses significantly less plastic per week. Students who believe BC recycles may think it is then okay to use plastic. Expanding sample size and accuracy is important in future studies. However, students may be incorrectly reporting their plastic use.

Additionally, while Figure 3 does not depict a significant finding, it still shows that environmental awareness is reducing plastic use. Creating programs and projects that educate students on the detrimental impact that plastic is having on our earth could help reduce overall plastic use in dining halls.

Part Three: Majority of students are telling Addies workers they are eating "to go" when they are staying to eat at Addies. Students prefer non-reusable dishware due to sanitation and ease of carrying. Majority of survey respondents reported that they never take "to go" containers when eating in lower. There were some limitations to the design of the observations, such as inability to control for workers behavior. For example, workers may have forgotten to ask some students if they were eating here or "to go". Survey respondents also may not want to admit they are giving workers false information for the non-reusable dishware.

Recommendations

- Research reusable dishware that has the ease and cleanliness of the single-use items.
- Create programs that incentivizes reduction over just recycling. Recycling is important, but reduction is priority. Making students aware that recycling does not correspond to environmentally-safe plastic use is necessary.
- Observe a small, diverse group of students for each meal eaten in a weeks time, to represent a microcosm for the remaining student population.
- Pitch reduction ideas from other colleges to Boston College, such as limiting the sale of plastic water bottles on campus [5].
- Create a more open dialogue between BC students and dining services.

References

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