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Testing the “Double Stuf” Claim

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Abstract

The objective of this study was to test Nabisco’s claim that Double Stuf Oreos contain double the “stuf” when compared to original Oreos. Six packages of each type of cookie were purchased from 3 local grocery stores. For each package, 10 cookies were randomly selected using a random number generator. Sixty of each cookie type was used in this study. Total cookie weight, weight of each cookie side and cream weight were measured in grams for each cookie. Results from a t-test indicate no evidence that consumers are getting less than double the “stuf” and a 95% confidence interval constructed for the ratio of means also supports this.

Introduction

Oreos, also known as ‘Milk’s Favorite Cookie’, were introduced to the United States in 1912[4] and have since become the best-selling cookie in the country[3]. Traditional Oreos are sandwich cookies with two chocolate disks and a cream filling, though over the years Nabisco has released a number of variations including ‘Birthday Cake Oreos’, ‘Lemon Twist Oreos’, and more. The variation that has piqued the most interest and controversy is the ‘Double Stuf Oreo’. Double Stuf Oreos were introduced in 1974, and claim to have double the cream filling as the traditional Oreo cookie. While Nabisco has assured skeptical customers that Double Stuf Oreos truly have double the ‘stuf’, they have refused to release the average amount of filling that is supposed to be in traditional and Double Stuf Oreos.

In 2013, a high school class in upstate New York headed by math teacher, Dan Anderson, decided to investigate the validity of Double Stuf Oreos by weighing the traditional and Double Stuf Oreos, and comparing the results. Ten regular Oreos and 10 Double Stuf Oreos were weighed, and the students found that the Double Stuf Oreos only contained 1.86 times the ‘stuf’ as the regular Oreo[1]. After these findings were released, there was an uproar among all cookie-lovers; Fox News even named it the ‘great cookie controversy of the century[2].’ Throughout this controversy, Nabisco stood by the Double Stuf product and persisted that it did contain double the cream filling. The purpose of this Creative Inquiry project was to test the Double Stuf Oreo claim.

Methods

The study was conducted using 60 cookies of each type and two different student groups of three, each using the same experimental technique. Four Oreo packs, enclosing 36 original Oreo cookies per pack, and four packs of Double Stuf Oreos, containing 30 cookies per pack, were collected from Publix, Walmart, and Food Lion grocery stores. For each pack, 10 numbers were randomly selected using www.randomizer.org to ensure that cookies were randomly selected. Each group examined 5 cookies per package. First, the mass of each Oreo cookie was recorded in grams.

Then, the first wafer was removed and weighed . Next, the cream was scraped off the remaining wafer using a knife and the cream was weighed alone. Then, the other Oreo wafer was weighed individually and recorded. This same procedure was repeated for the Double Stuf Oreos. Finally, the mean and standard deviations of the creams were calculated. A two independent sample t-test was performed and statistical significance was determined at a significance level of 0.05. In addition, confidence intervals to estimate the ratio of mean cream mass was also determined using www.graphpad.com/quickcalcs/errorProp2.





Results

“Table 1: Descriptive Statistics for the Cream of Both Types of Cookies”

	Oreo	Double Stuf
Sample Mean	3.305 grams	6.84 grams
Sample Standard Deviation	0.25738252 grams	0.15315883
Sample Size	60	60

Since we were interested in testing if there was less than double the “stuf” in Double Stuf Oreos in comparison to original Oreos, the following hypotheses were tested:

$$H_o: \mu_{DS} - 2\mu_O = 0$$
$$H_A: \mu_{DS} - 2\mu_O < 0$$

where μ_o = Mean cream mass for all Oreo cookies
μ_{DS} = Mean cream mass for all Double Stuf Oreos

The test statistic was determined using the following formula:

$$\text{Test statistic} = \frac{6.84 - 2(3.305)}{\sqrt{((0.15315883^2/60) + 4(0.25738252^2/60))}} = \mathbf{3.317}$$

The resulting p-value for this lower tail test was **0.999 < p-value < 0.9995**

We failed to reject the null hypothesis that the mean cream mass of Double Stuf Oreos is double that of original Oreos because our approximate p-value was greater than the significance level of 0.05. Therefore we concluded that there was insufficient evidence to conclude that the mean cream mass for Double Stuf Oreos is less than twice the mean cream mass of Original Oreos.

“Table 2: Confidence Intervals”

Confidence Intervals	(LCL, UCL)
90%	(2.034, 2.106)
95%	(2.028, 2.113)
99%	(2.014, 2.128)

Conclusion

Our results were in disagreement with the results from the New York high school class. However the classroom in New York had several different techniques than the ones used in this experiment which may explain the conflicting results. The students only tested 10 cookies of each Original and Double Stuf Oreo; this sample size is not large enough to offset the variation between each individual cookie. They also did not account for possible variation between different packages and stores. It is also unclear if they selected the cookies to be tested at random. Another factor is the method of separating the cream from the wafer. It is extremely important to have all of the cream scraped from the wafer to get an accurate reading. This was an especially difficult task to perform on the original Oreo cookies. Finally, the calculation they used to determine the cream mean mass was completely different. The ten cookies were weighed altogether and then 20 times the mean mass of five wafers was subtracted from the total mass[1]. Although the calculation seem logical, it is incorrect to assume each Oreo weighed the same. With these factors taken into consideration, it is reasonable to expect the discrepancies and is right to assume this experiment is more statistically correct than that of the New York high school study.

In addition, confidence intervals for estimating the ratio of mean cream mass for Double Stuf and Oreo were determined (Table 2). If the Double Stuf claim is true, it would be expected that this ratio would be 2.

Based on these confidence intervals, the mean cream mass for Double Stuf Oreos was in fact just over twice that of the mean cream mass for Original Oreos. It seems that Nabisco has put safeguards in place in order to live up to their advertising claim. The confidence intervals were also in agreement with the results of the hypothesis test we conducted.

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