Organic vs. Nonorganic

A Taste Test with Apple Juice

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Section I: Introduction

As we were discussing project topics, our group came across the debate of organic vs. nonorganic products. It is a well-known fact that organic products are better for people, but it is a common belief that they will not taste as good. Our group wondered if people disliked organic products strictly based on this belief or if the taste of the two greatly varied, enough so that people would choose nonorganic products over the organic ones.

We decided to test this by creating an experiment that would make subjects choose their preference of regular, store-brand apple juice, and organic apple juice on taste alone. The subjects would not know the topic of the test. In other words, they would not know that one of the apple juices was organic and that the other was nonorganic. This was done to prevent subjects from trying to guess which one was organic and which one was not, preventing any possibility of a bias. Instead, we would simply ask subjects which one they preferred, with no other information.

The consensus of our group was that there would be a significant difference in the proportion of those who preferred organic and the proportion that preferred nonorganic. We expected that the proportion that preferred regular apple juice would be significantly higher. Through this experiment we wished to prove the hypothesis that the proportion of those who preferred regular apple juice was higher than those that preferred organic and to reject our null which stated that the proportions were the same. Therefore, our research question was “Do people truly prefer the taste of nonorganic apple juice to organic apple juice?”

There are several definitions necessary to fully understand the experiment:

* Organic apple juice: The brand of organic juice used was Greenway Apple Juice. Organic apple juice is juice that does not have any synthetic additives and is not treated with pesticides.
* Nonorganic apple juice: The brand of nonorganic juice used was America’s Choice. Nonorganic apple juice may be made of apples that have been treated with pesticides and may have additives like high fructose corn syrup.
* Success (in context): In this experiment, a success indicates a subject who chose regular apple juice over organic apple juice.
* Bias: A bias is “a systemic inaccuracy in data due to the characteristics of the process employed in the creation, collection, manipulation, and presentation of data, or due to faulty sample design of the estimating technique.”
* Convenience Sample: In this study, a convenience sample was used, preventing our results from being as accurate as they could have been. According to www.childrensmercy.org, a convenience sample is “a sample where the patients are selected, in part or in whole, at the convenience of the researcher. The researcher makes no attempt, or only limited attempt, to insure that his sample is an accurate representation of some larger group or population.”

Section II: The Study

In trying to answer the question “Do people truly prefer the taste of nonorganic apple juice to organic apple juice?” we decided to conduct an experiment. In order to prevent bias in the subjects, the experiment was blind. Small cups of apple juice were filled with either nonorganic or organic apple juice, and cups were marked discreetly so that those who were running the experiment could identify what type of apple juice was in the cup. Each subject was asked to taste each juice, and select which one they preferred. Their preference was recorded, creating the data for our significance test. The subjects were kept completely unaware of the type of juice they tasted. In creating a blind experiment, we expect to eliminate bias of subject’s believed preference of apple type.

When analyzing our data, we will calculate to see if there is a significant amount of subjects who prefer nonorganic apple juice over organic apple juice. We determined our null hypothesis to be that 20 subjects would select the nonorganic apple juice, and 20 subjects would select the organic apple juice. We will be testing against this hypothesis with our alternative hypothesis to see if the subjects chose nonorganic more often than they select the organic apple juice.

The experiment we have conducted was created using convenience sampling. In choosing subjects we selected Warren Hills Students who were willing to volunteer. Because we utilized convenience sampling rather than a simple random sample our results may not reflect the preferences of a larger population.

The choice of using convenience sampling will create a clear limitation. The condition of needing a simple random sample in order to conduct a 1-Proportion Z Test will not be met. Therefore, we will continue the calculations with this knowledge, knowing that our results regarding the preference of apple juice may not be entirely accurate and may not reflect an actual sample distribution.

Section III: Analysis of Data

|  |  |
| --- | --- |
| **Person** | **Preferred Juice** |
| 1 | Organic |
| 2 | Organic |
| 3 | Organic |
| 4 | Nonorganic |
| 5 | Organic |
| 6 | Organic |
| 7 | Nonorganic |
| 8 | Nonorganic |
| 9 | Nonorganic |
| 10 | Nonorganic |
| 11 | Organic |
| 12 | Organic |
| 13 | Nonorganic |
| 14 | Organic |
| 15 | Nonorganic |
| 16 | Organic |
| 17 | Nonorganic |
| 18 | Nonorganic |
| 19 | Nonorganic |
| 20 | Nonorganic |
| 21 | Organic |
| 22 | Nonorganic |
| 23 | Nonorganic |
| 24 | Organic |
| 25 | Nonorganic |
| 26 | Nonorganic |
| 27 | Nonorganic |
| 28 | Nonorganic |
| 29 | Nonorganic |
| 30 | Nonorganic |
| 31 | Organic |
| 32 | Organic |
| 33 | Nonorganic |
| 34 | Nonorganic |
| 35 | Organic |
| 36 | Organic |
| 37 | Nonorganic |
| 38 | Organic |
| 39 | Nonorganic |
| 40 | Organic |

Hypothesis:

Ho: p = .5

Ha: p > .5

where p is the proportion of surveyed people who prefer nonorganic apple juice to the organic apple juice. We set our proportion at .5 because it indicates in the null that the proportions are equal, and in the alternative that there is a greater proportion of people who will prefer the nonorganic apple juice.

po = .5

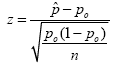
x = 23

n = 40

Conditions:

* *A simple random sample is used*.   
  For this study, a simple random sample was not used. Instead, a convenience sample was used. Because this condition is not met, we proceed our analysis with caution, keeping in mind that this may affect the accuracy of our conclusion
* *The sample includes at least 10 successes and 10 failures.*  
  Because the results of our study produced 23 successes and 17 failures, both of which are greater than 10, this condition is met.
* *The population size is at least 10 times bigger than the sample size.*  
  Our sample size consisted of 40 students and staff members. It is safe to assume that the number of students and staff members at Warren Hills totals at least 400. Therefore, this condition is met.

Calculations:

p-value = .17139

α = .05

We select the .05 significance level because neither a Type I nor a Type II error is more severe in this case.

.17139 > .05

Section IV: Conclusion

After conducting our experiment and coming up with our calculations, we were able to conclude that we fail to reject the null hypothesis that the proportion of those who prefer organic apple juice is equal to the proportion of those who prefer regular apple juice at the 5% level. As our p-value of the significance test was higher than our significance level of .05, we failed to reject. However, our conclusions may be flawed because instead of a simple random sample, a convenience sample was used instead. Therefore, we interpret this information with caution.

To extend this experiment we should use a stratified random sample. In order to do this we would obtain a list of all the students and staff members in the school, assign them a number, and then use a random number generator to pick a sample of subjects from each grade. This would make our results more accurate and less biased. Another extension could have been to include name-brand apple juice into the experiment to see if there was a preference between the three types of apple juice.

We felt that if people were told that they were choosing from organic and regular apple juice, most would pick regular because there is a notion that organic food does not taste as well as a result of less sugar and other flavoring additives. However, a *Los Angeles Times* study was conducted in which shoppers were asked to taste two different types of yogurt, one labeled organic, and the other labeled regular. Shoppers did not know that the yogurt was actually the same, just with a different label. The results showed that most people picked the organic yogurt, strictly because of the labeling. This could have also been an extension of our study. It would have been interesting to see if people chose products labeled organic simply because they want to appear healthier. We could have done a comparative study to see if our results would have matched the results of the *Los Angeles Times* Study.

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