Musclehub A/B Test

Results of Data Analysis

Analysis and Presentation by Oliver Stockman

The Test Conditions

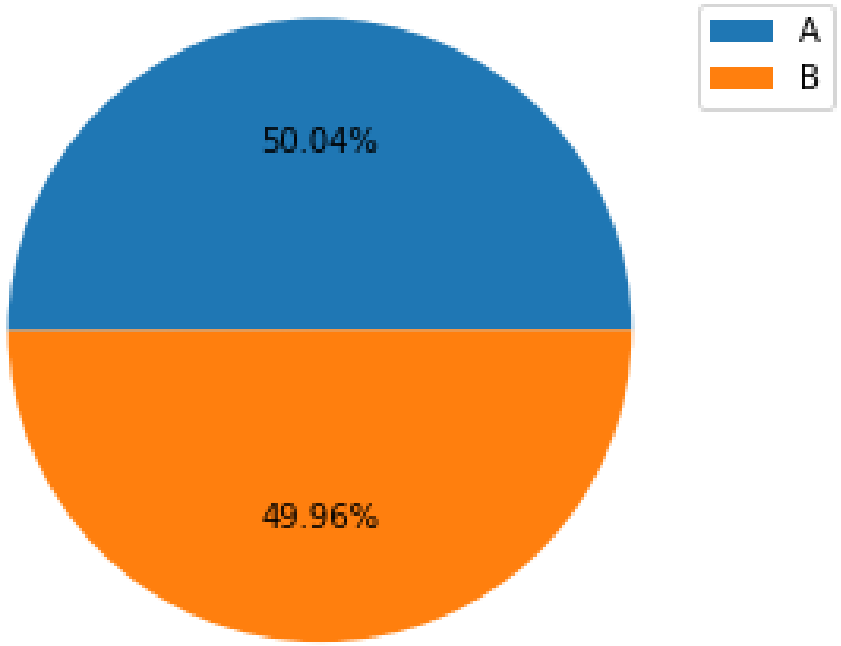
- The purpose of the test was to determine whether undergoing an initial fitness test had an effect on the proportion of visitors becoming members of Musclehub.
- In order to investigate this, all those that visited Musclehub on or after 07/01/2017 were assigned to one of two groups. Group A were asked to undergo a fitness test prior to completing an application while Group B were simply offered application forms.
- A record was made of each visitors' details. Subsequently, the date they completed the fitness test, the date they completed an application, and the date they purchased a membership were also recorded.

The Resultant Dataset I

- The results of the A/B test were held in four SQLite tables:
    - visits: contained details of potential customers.
    - fitness_tests: contained the details of all visitors in Group A who had undergone the fitness test, along with the date of that test.
    - applications: contained details of all visitors that filled out an application form, along with the date it was received.
    - purchases: contained the details of all customers who had purchased a membership, along with the date of purchase.
- These tables were combined in a single master table and imported to python for analysis.

The Resultant Dataset II

- Musclehub received 5004 visitors in the period the A/B test was running; 2504 in Group A (fitness test), and 2500 in Group B (no fitness test). The pie chart below represents this data in the form of percentages:

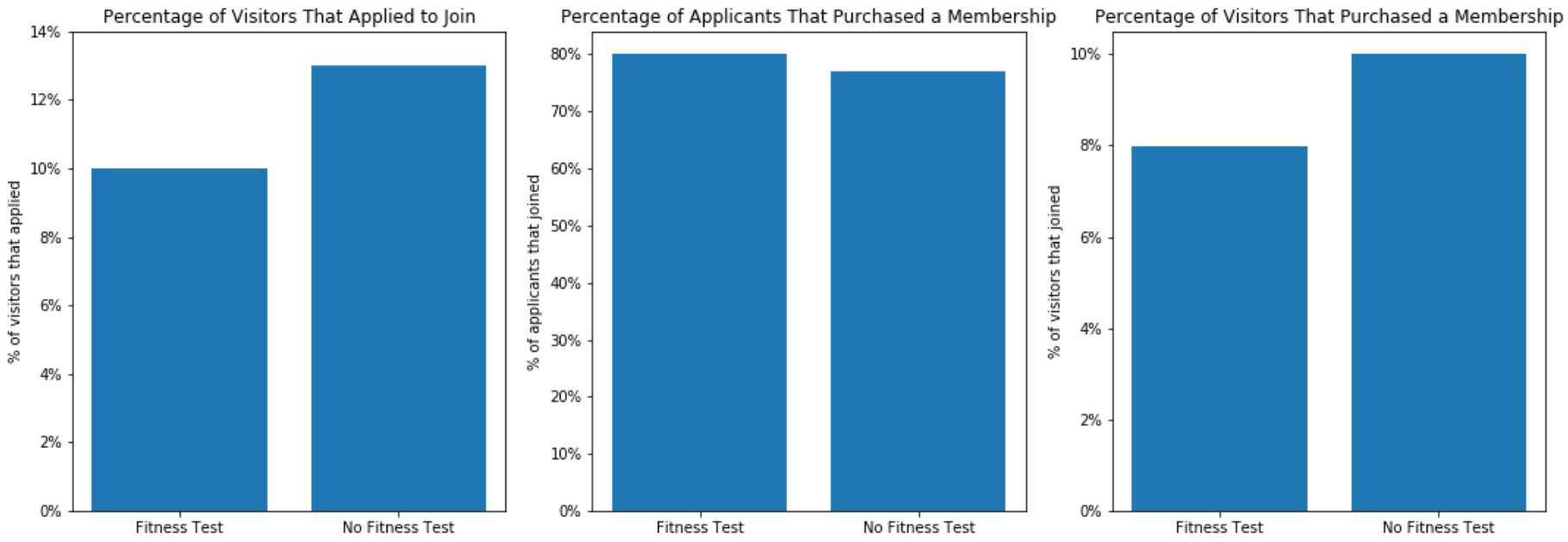


Object of the data analysis

- There are three key questions that need to be answered to determine what effect the fitness test was having on membership rates:

1. Was there a difference between the number of visitors in Group A and Group B that completed an application form?
2. Of those who completed an application, was there a difference between the proportions in Group A and Group B that went on to purchase a membership?
3. Was there a significant difference in the proportion of visitors in Group A and Group B that purchased a membership?

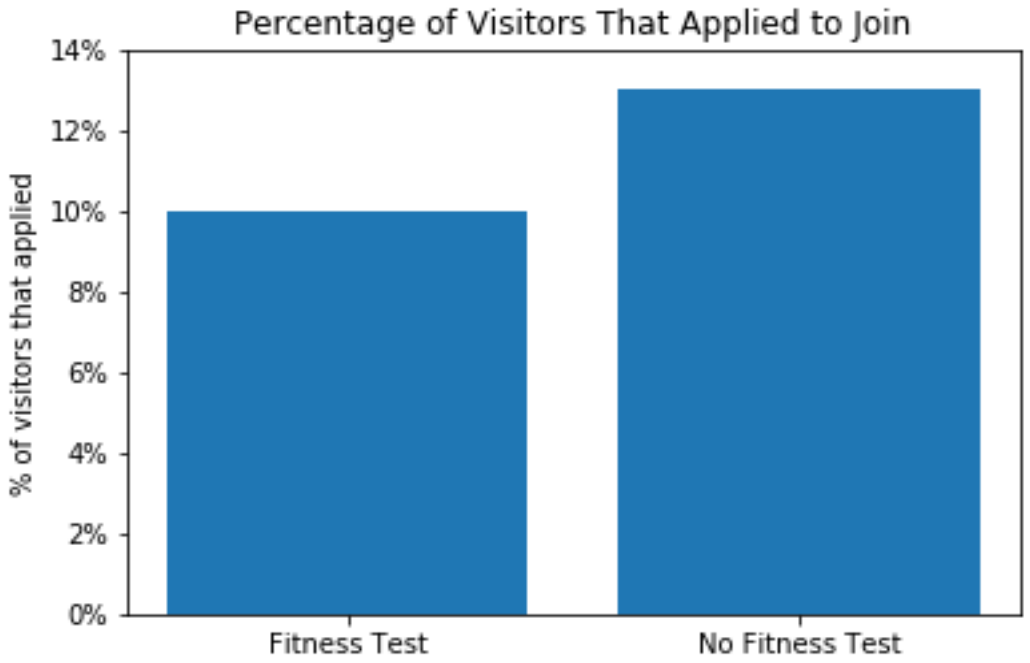
Summary of Results



- The above plots show the initial results of the data analysis.
- Initial observations:
  - It appears that taking a fitness test made visitors less likely to complete an application.
  - It appears that, among those that applied, those that took the fitness test were more likely to purchase a membership to Musclehub.
  - It seems that taking a fitness test resulted in less visitors going on to purchase a Musclehub membership.
- The following section of this presentation will explore these results in more detail and determine whether these observations are supported statistically.

1. How Many Visitors Applied To Join Musclehub?

- 250 of those in Group A completed an application; the corresponding number in Group B was 325.
- This represents 9.98% of Group A, and 13.00% of Group B, as indicated in the bar chart below.
- The implication here is that visitors that were not required to undertake a fitness test were more likely to apply to join.

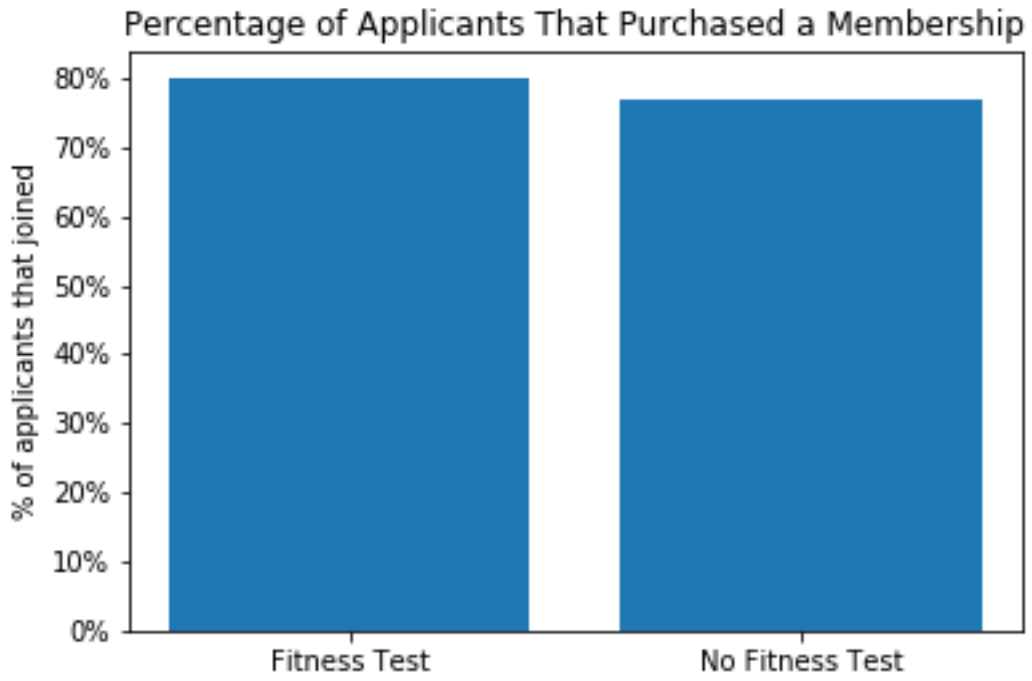


1. How Many Visitors Applied To Join Musclehub?

- In order to determine whether the observed difference between Group A and Group B was statistically significant a chi-square test was performed on the data.
- This was the most appropriate test to perform as the data in question consisted of two categorical datasets.
- The null hypothesis in this test was that there was no significant difference between the number of applicants in Group A and Group B; i.e. that the administering of a fitness test had no effect on the likelihood of a visitor completing an application.
- The resulting p-value for the chi-square test was 0.00096, well below the 0.05 significance level.
- This means that the null hypothesis can be rejected; and it is reasonable to conclude that a significantly larger number of people in Group B, where no fitness test was administered, applied to join Musclehub.
- The implication of this is that it would be in Musclehub's interest not to make visitors undergo fitness tests if their goal is to increase the number of applicants.

2. How many visitors that applied to join Musclehub went on to purchase a membership?

- As previously indicated 575 visitors completed an application; 250 in Group A, and 325 in Group B.
- From these applicants 450 (78.26%) went on to purchase memberships; 200 (80.00%) in Group A, and 250 (76.92%) in Group B, as displayed in the bar chart below:



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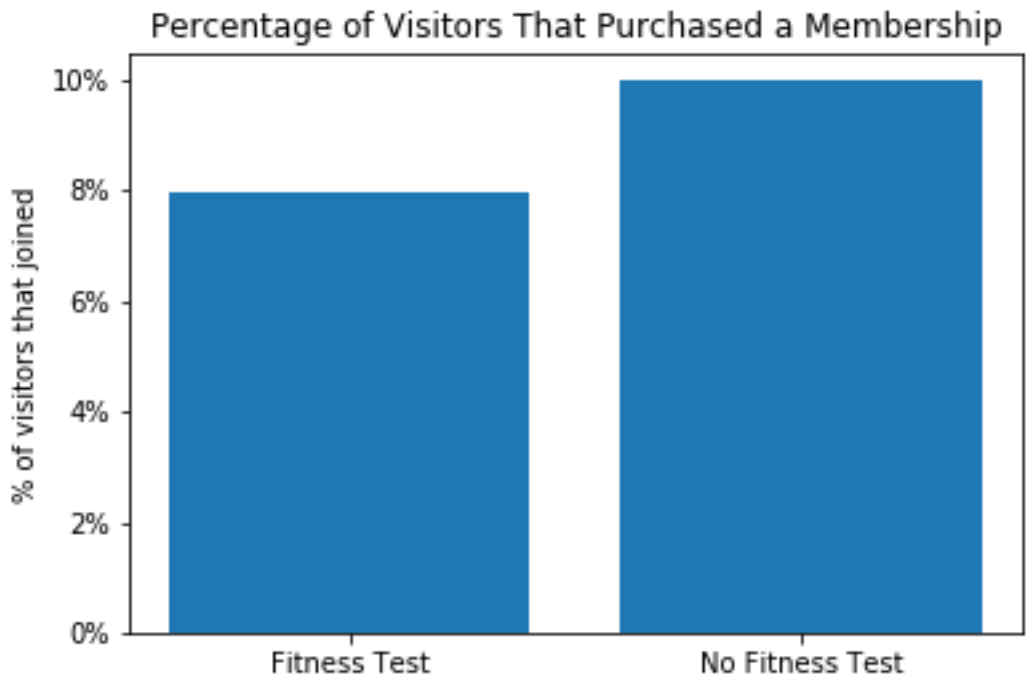
- This was the most appropriate test to perform as the data in question consisted of two categorical datasets.
- The null hypothesis in this test was that the observed difference between the number of applicants in Group A and Group B that went on to purchase a membership was not statistically significant.
- The resulting p-value for the chi-square test was 0.4326, well above the 0.05 significance level.
- This means that the null hypothesis cannot be rejected; there was no statistically significant difference between the number of purchasers in Group A and Group B for the sub-set of visitors that completed applications.
- This suggests that, for those that completed applications, undergoing a fitness test had no effect on their likelihood to purchase a Musclehub membership.

3. How many visitors in Group A and Group B purchased a membership?

- The 200 visitors in Group A that purchased a membership represent 7.99% of the Group.
- The corresponding percentage of the 250 Group B visitors was 10.00%.



3. How many visitors in Group A and Group B purchased a membership?

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- This was the most appropriate test to perform as the data in question consisted of two categorical datasets.
- The null hypothesis in this test was that the observed difference between the proportion of visitors that purchased a membership in Group A and Group B was not statistically significant.
- The resulting p-value for the chi-square test was 0.0147. This means that the null hypothesis can be rejected, as it is below the significance level of 0.05.
- From this result, it can be concluded that undergoing a fitness test made visitors to Musclehub less likely to purchase a membership.

Qualitative Data And Its Relationship To The Statistics

- In addition to the collection of quantitative data interviews were conducted with a selection of visitors in order to gauge their reasons for joining, or not joining, Musclehub.
- The results of these interviews show a varied response to the fitness test amongst the visitors questioned. However, on the whole, interviewees seem to have been put off by fitness tests conducted both by Musclehub, and at other gyms.
- One interviewee did cite the fitness test as an encouragement to join, although in terms of being an introduction to working out.
- Taken together, the interviews suggest that, rather than having a compulsory fitness test, it may be in Musclehub's interest to offer an optional introductory session with a trainer. This would avoid deterring less confident visitors whilst providing encouragement to beginners.

Conclusions and Recommended Action

- The statistical analysis has shown that it would not be in Musclehub's interest to require prospective members to undergo fitness tests before joining.
- The group of visitors that took fitness tests, Group A, were both less likely to complete applications following their initial visit, and less likely to purchase a membership.
- For those that did complete an application the fitness test did not seem to have an effect on their eventual decision to purchase a membership; this suggests that the fitness test discouraged those that had not yet made a decision to join.
- Overall, the qualitative data supports the conclusions drawn from the quantitative data and suggests that administering a fitness test to prospective members was more likely to discourage, rather than encourage, membership for most people.
- It may be worthwhile for Musclehub to rub a second A/B test, with a subset of new visitors being offered introductory sessions with trainers, in order to determine whether this would provide a better encouragement to join.