Capstone Project 1: MuscleHub AB Test

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The AB Test

- In 2017, MuscleHub ran an AB test involving 5004 gym visitors

- The test was designed to identify whether the gym's fitness test, up to that point the first step in joining, was in fact a deterrent to membership

- Group A, which contained 2504 visitors, were asked to undertake the fitness test when they arrived at the gym

- Group B, containing 2500 visitors, were not asked to undertake a fitness test and could instead go straight to application (completing an application form)
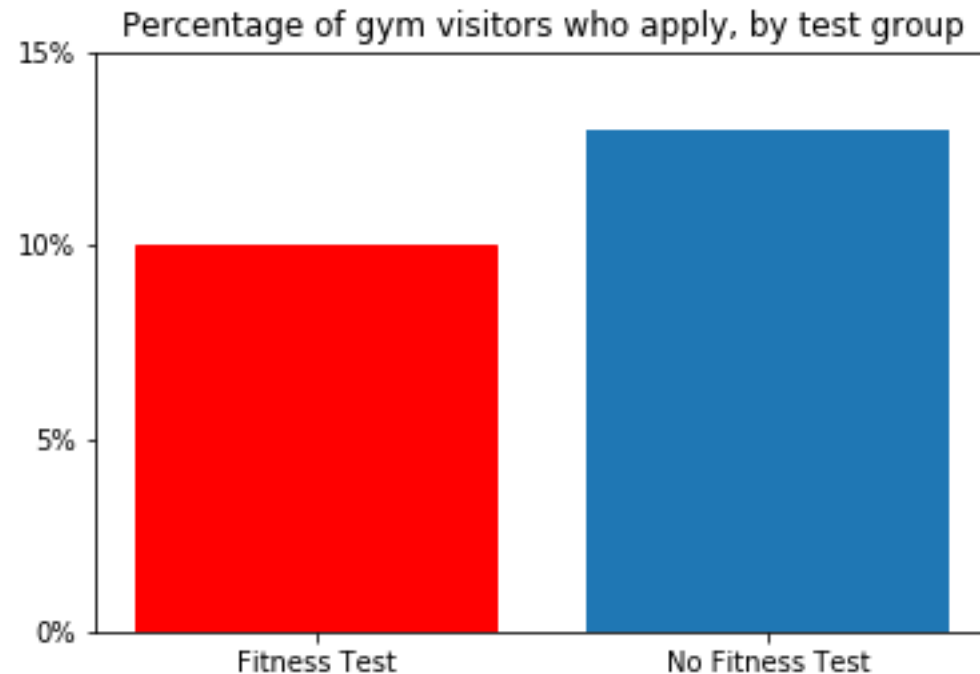
The AB Test – Visitor Split
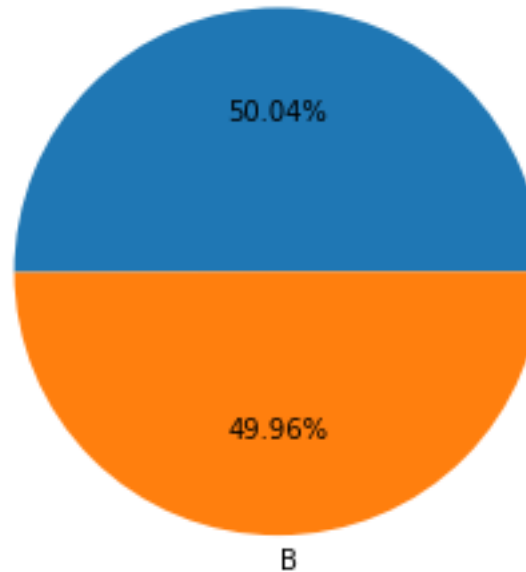
The two groups, A and B, were split relatively well - group A contained 50.04% of visitors while group B 49.96%.

The AB Test – Funnel

- MuscleHub's sign-up process had three steps:

  - Fitness test (during the AB test, to be taken only by group A)
  - Application form
  - Purchase of membership

- The AB test tested the likelihood of conversion (defined as progressing to the next step) at each of the three steps, based on whether visitors had been asked to complete the fitness test

- Overall, group B (no fitness test) had a significantly higher conversion rate

- From step 2 to 3 (purchase of membership once application form has been requested), there was no significant difference between the two groups

The AB Test – Submitting an Application

- The data showed that a higher proportion of group B visitors submitted an application


Percentage of gym visitors who apply, by test group

- 13% of group B (No Fitness Test) visitors submitted an application, compared to just under 10% of group A (Fitness Test) visitors

The AB Test – Application: Chi Square Test

- A Chi Square Test was used to assess whether the difference identified at step 2 was significant, as it is hypothesis test ideal for AB test result assessment

- The test showed a p value of 0.0009647827600722304

- This confirmed that there was a significant difference between the two conversion ratios. In other words, group B visitors were significantly more likely to complete an application

- This suggests that the fitness test (undertaken by group A, but not group B) was a significant barrier to applying to join MuscleHub

The AB Test – Membership Purchase After Application

- At the next step, purchasing a membership after submitting an application form, the data showed far more similar performance across the two groups

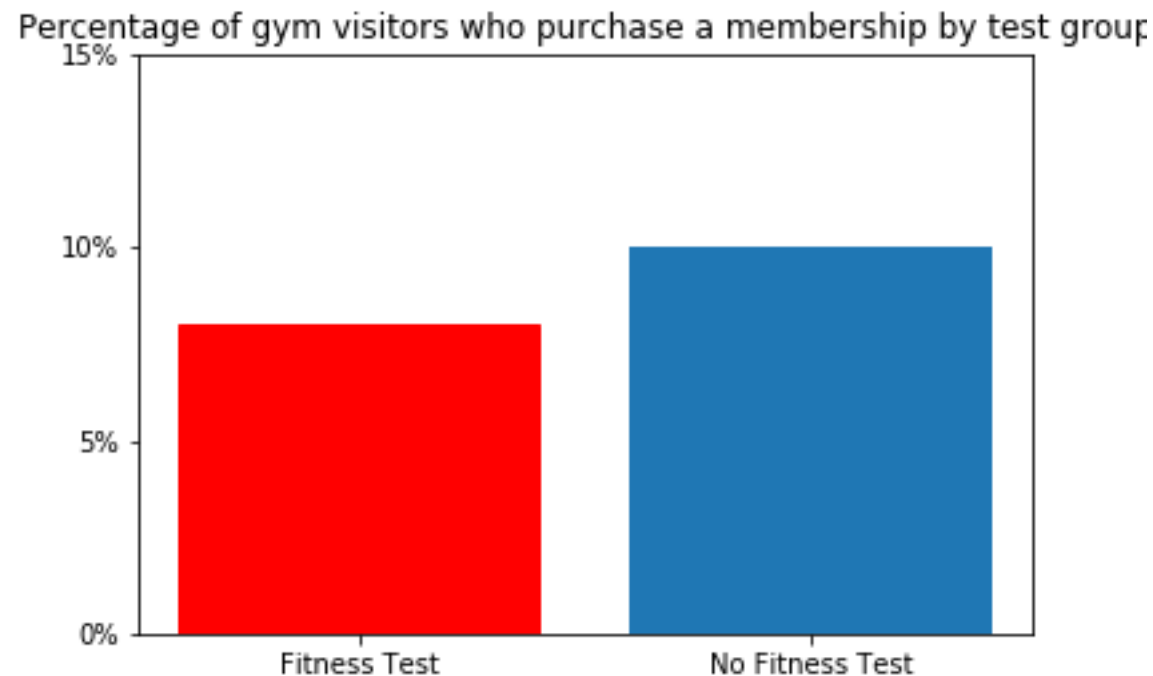Percentage of gym visitors who purchase a membership after applying
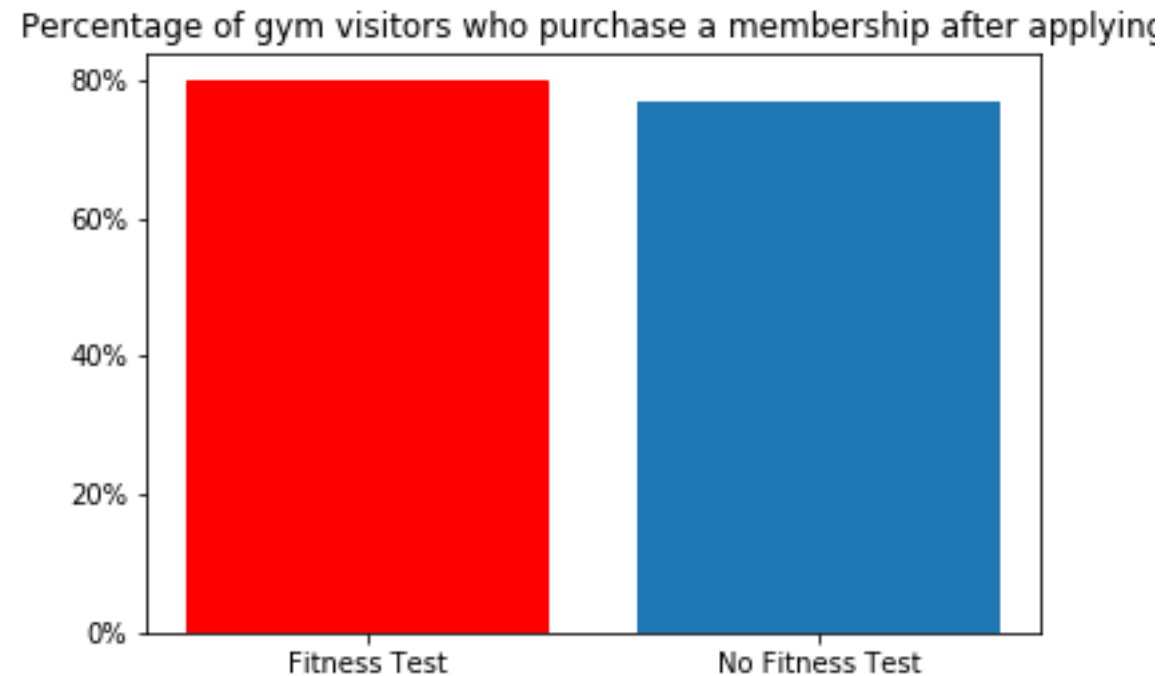
- 80% of group A (Fitness Test) visitors, but only under 77% of group B (No Fitness Test) visitors went on to purchase a membership after submitting an application form

The AB Test – Membership After Application: Chi Square Test

- A Chi Square Test was again used to assessed whether the difference in purchasing a membership after completing an application was significant

- The test showed a p value of 0.43258646051083327

- This told us that the difference between the two groups' conversion ratios was not, in fact, significant

- This is not surprising: once an application is submitted, visitors show an intent to join the gym, so we can expect the two groups to behave in a similar manner

The AB Test – Membership Purchase for All Visitors

- When considering the full process from visiting the gym to purchasing a membership, the data again suggested that group B performed better

Percentage of gym visitors who purchase a membership by test group

- Overall, just under 8% of group A (Fintess Test) visitors but exactly 10% of group B (No Fitness Test) visitors purchased a membership

The AB Test – Overall Membership: Chi Square Test

- A Chi Square Test was again used to assess whether the identified difference in membership purchase was significant

- The test showed a p value of 0.014724114645783203

- This confirmed that the difference was significant – group B visitors were, overall, significantly more likely to purchase a membership than group A visitors

- This confirms that the fitness test is a significant deterrent to joining MuscleHub

The Quantitative Data

- The AB test results were collected in 5 SQLite tables:
  - visits
  - fitness_tests
  - applications
  - purchases

- Each table contained an index, first_name, last_name, email, and gender column, as well as one of; visit_date, fitness_test_date, application_date, and purchase_date (as relevant)

- To make it possible to see the full funnel in one table, the 5 separate tables were combined into one large DataFrame (stored in the variable df) using a series of left joins on the email, first_name and last_name columns, and only for visitors whose first visit date was after 7-1-17

- The resulting DataFrame had 5004 rows and the columns first_name, last_name, gender, email, visit_date, fitness_test_date, application_date and purchase_date

The Quantitative Data – The Two Groups

- Once the large DataFrame df was created, the fitness_test_date column was used to identify groups A and B
  - All visitors with a fitness_test_date that was not null were grouped into group A
  - All visitors with a fitness_test_date that was null were grouped into group B
  - Each visitor's group was added to the DataFrame in the new column ab_test_group

- Once the groups were created, pivot tables and further groupings could be used to identify the number of visitors/group who'd submitted an application and purchased a membership
  - new column is_application, based on the values in column application_date
  - and new column is_member, based on the values in column purchase_date were used

- These pivot tables were used to calculate the percentage of visitors/group who'd carried out any of the conversion actions belonging to the joining funnel (i.e. submitting an application, purchasing a membership)

- The results of these calculations are summarised on slides 4-9.

The Qualitative Data

- MuscleHub also interviewed 4 visitors:
  - 2 had taken the fitness test
  - 2 had not taken the fitness test

- Overall, the answers showed no clear preference regarding the fitness test and would not have been enough to decide whether the fitness test was to be kept or abandoned:
  - 1 of the 2 visitors who'd had take the fitness test bought a membership
  - 1 of the 2 visitors who hadn't been asked to take the fitness test bought a membership
  - 1 visitor in each group did not sign up

- What the answers showed is that visitors generally have different preferences and it's a good idea to give them a choice – an appreciation of the personal touch was generally shared:
  - Jesse, although not a visitor to purchase a membership, appreciated that there was no fitness test
  - Cora, who did sign up, wanted to impress the trainer who'd carried out her fitness test
  - Shirley, who also purchased a membership, liked the friendliness of the staff (and the lack of a fitness test)

Recommendations

1. Do not include a compulsory fitness test at the start of the joining process
   - The quantitative data show that visitors who are not asked to carry out a fitness test are, overall, more likely to purchase a membership

2. Make it possible to take an optional fitness test at a later point of the joining process
   - The qualitative data show that some visitors enjoy the fitness test and the chance it gives them to bond with a trainer. It can be a useful optional part of the joining process after the application form is requested

3. Run another AB test to identify the best point at which to include the fitness test
   - The qualitative data do not clearly show where to carry out a fitness test (if at all), so more testing is recommended to optimise the joining process.