MuscleHub A/B Test
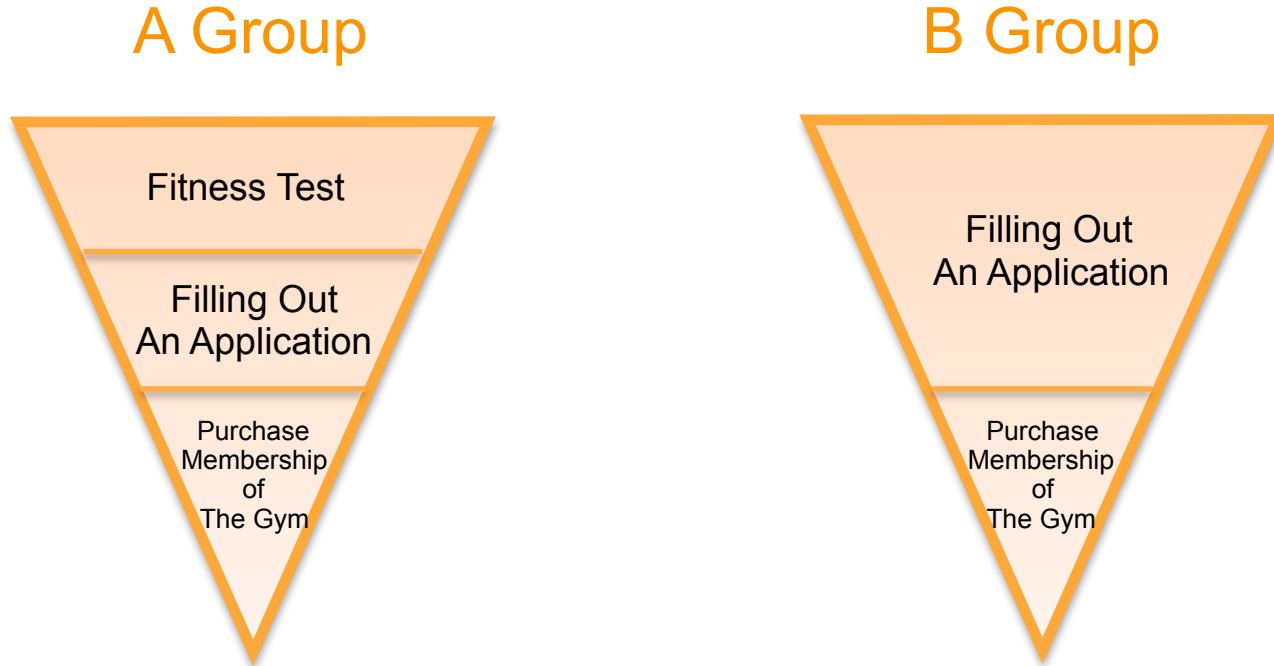Introduction to Data Science
Jill Lin
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MuscleHub A/B Test and Funnel Analysis of Contents

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1. The Background of A/B Test and Sample Descriptions

1.1 Membership Funnel of MuscleHub for A/B Test:

The below illustration shows the funnels of buying a membership for visitors in MuscleHub.

A Group

Fitness Test

Filling Out
An Application

Purchase
Membership
of
The Gym

B Group

Filling Out
An Application

Purchase
Membership
of
The Gym

1.2 Sample Descriptions of A/B Test:

- There are 5,004 samples in A/B test, A Group has 2,504 visitors and B Group has 2,500 ones, both of which account for 50.4% and 49.6% of all samples separately.

- According to the status of visitors, they are classified as just visitors, just applicants and members, which are plotted as the chart on the right side. A Group represents "Fitness Test" and B Group represents "No Fitness Test".

The Distribution of the Number of People from Visitors to Membership
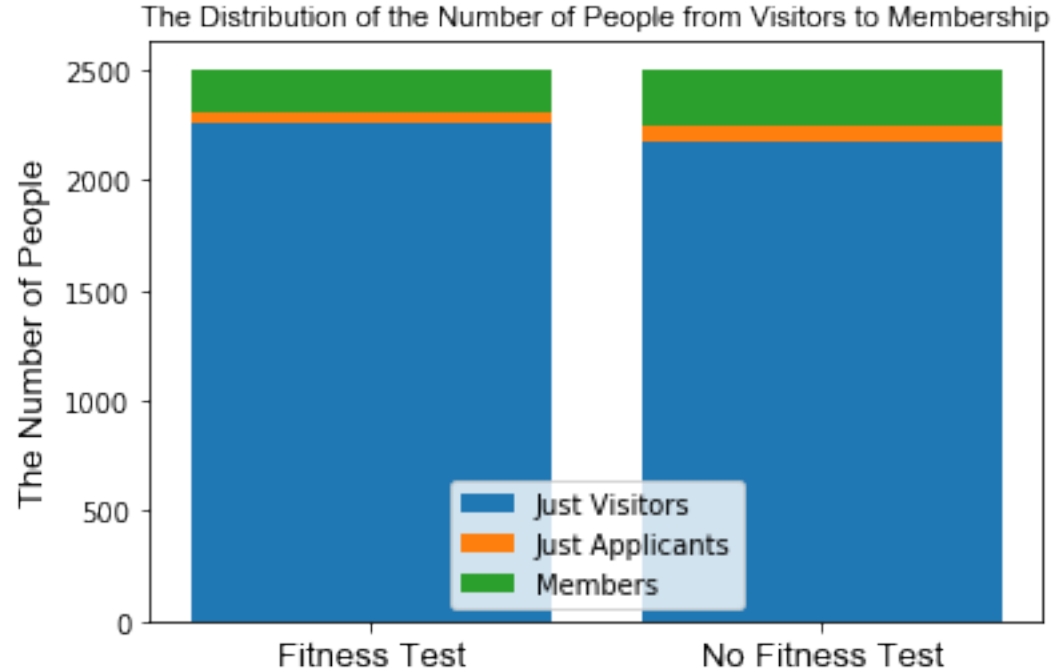
1.3 The Rate of Breakdown of Membership Funnel :

- Then, a breakdown of membership funnel figures into fitness test and no fitness test is plotted as Figure 1 ~ 3.

- The below charts show that the percent of visitors who apply with fitness test is less than that without fitness test, and the percent of visitors who purchase a membership as well. However, the percent of applicants who purchase a membership with fitness test is a bit more than that without fitness test.
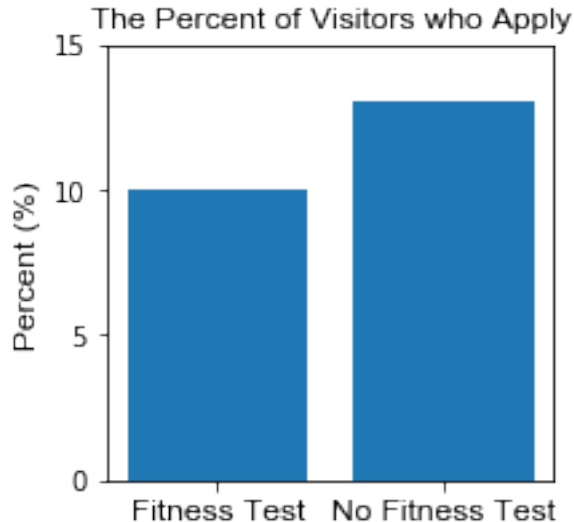
Figure 1

The Percent of Visitors who Apply

Figure 2

The Percent of Applicants who Purcahse a Membership
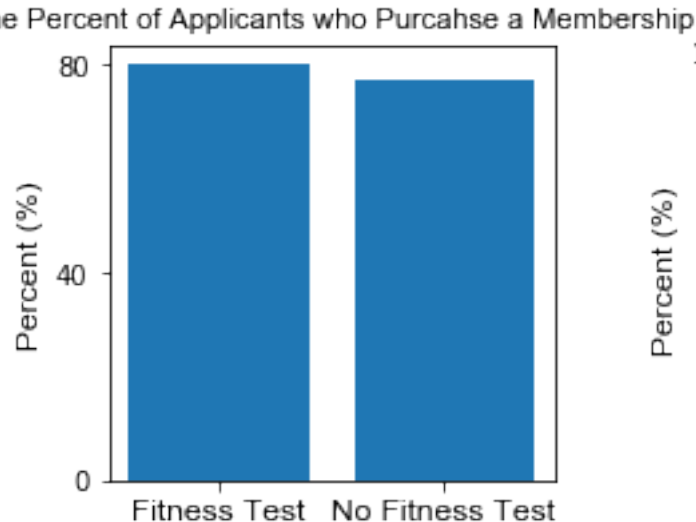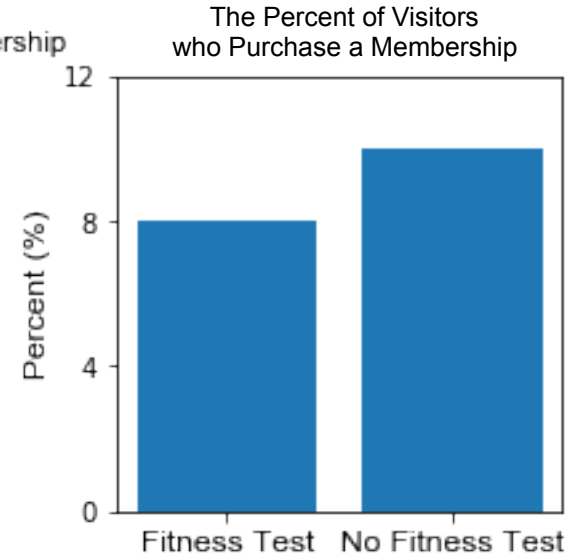

Figure 3

The Percent of Visitors who Purchase a Membership

1.4 Sample Descriptions by Gender :

- Please see the below table. There is no difference on the number of people between females and males in Group A, but the number of females is more than that of males in Group B.

- Whatever Group A and however Group B, it seems that there is nearly the same purchase rate between females and males in the same group.

Group A

| Gender	Number of Visitors	The Percent of Visitors (%)	Number of Picking Up An Application	The Percent of Picking Up An Application (%)	Number of Purchasing A Membership	The Percent of Purchasing A Membership (%)
Female	1,255	50.12	115	9.16	96	7.65
Male	1,249	49.88	135	10.81	104	8.33

Group B

Gender	Number of Visitors	The Percent of Visitors (%)	Number of Picking Up An Application	The Percent of Picking Up An Application (%)	Number of Purchasing A Membership	The Percent of Purchasing A Membership (%)
Female	1,309	53.36	170	12.99	133	10.16
Male	1,191	47.64	155	13.01	117	9.82

1.4 Sample Descriptions by Gender - Continued :

According to the status of visitors and gender, they are classified as female just visitors, female just applicants, female members, male just visitors, male just applicants and male members, which are plotted as the chart on the right side. A Group represents "Fitness Test" and B Group represents "No Fitness Test".

The Distribution of the Number of People Grouped by Gender from Visitors to Membership
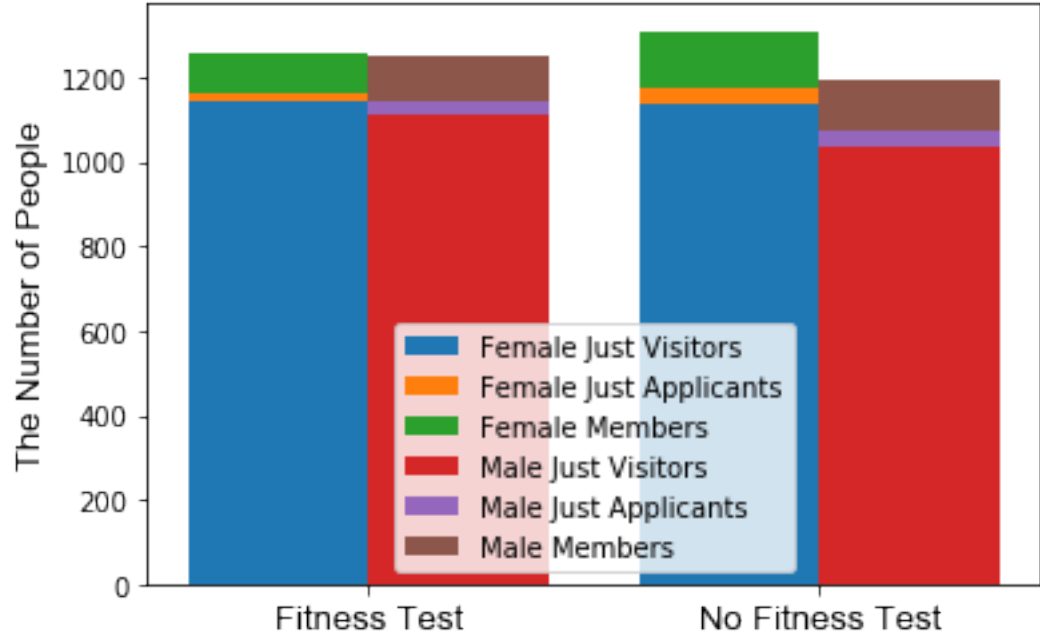
2. Hypothesis Test

2.1 The Type of Hypothesis Test We Should Use

- Firstly, our data demonstrates the visitors from MuscleHub whether picked up an application or not and either purchased a membership or did not purchase a membership.

- Then, we also want to dig into the relevance between picking up an application and buying a membership.

- Finally, we have two categorical datasets(A Group and B Group) that we want to compare, so we should use a Chi Square test.

2.2 The Results of Hypothesis Test for A/B Test

- Using contingency table 1 ~ 3 to perform a Chi Square test, we can get 3 p_values of 0.00096, 0.43259 and 0.01472 in sequence. We can state that there is a significant difference on picking up an application between A and B Group and purchasing a membership as well because 0.00096 and 0.01472 both are less than 0.05.
- Obviously, the visitors in B Group (No Fitness Test) are more willing to pick up an application and purchase a membership.
- Although there is not a significant difference on buying a membership for the applicants, the percent of the visitors who apply purchase a membership is almost up to 80% (See Figure 2 of Page 6), both A Group and B Group. It means that visitors are more likely to purchase a membership while they pick up an application.

Contingency table 1 :

Group	Number of Picking Up An Application	Number of Non Picking Up An Application
A	250	2,254
B	325	2,175

Contingency table 2 :

Group	Number of Applicants who buy a membership	Number of Applicants who do not buy a membership
A	200	50
B	250	75

Contingency table 3 :

Group	Number of Purchasing A Membership	Number of Non Purchasing A Membership
A	200	2,304
B	250	2,250

2.3 The Analysis of Hypothesis Test for A/B Test

- The following is to add the variant of gender into analytical dimensions to check if there is a significant influence on purchase rate, both in the same group and across groups.

- After performing a Chi Square test for several times(see the statistical figures in Page 7), we can find out :

  1. There is not a significant difference on picking up an application between females and males, purchasing a membership and the percent of applicants who buy a membership as well, both in A Group and in B Group.
  2. There is a significant difference on picking up an application for females across groups and purchasing a membership as well.
  3. There is not a significant difference on the percent of applicants who buy a membership for females across groups.
  4. There is not a significant difference on picking up an application for males across groups, purchasing a membership and the percent of applicants who buy a membership as well.

- In summary, females without fitness test are more willing to pick up an application and purchase a membership than those with fitness test.

3. Qualitative Analysis

3. The Analysis of Qualitative Data

- MuscleHub's introductory fitness test can help them know MuscleHub and its courses for a few visitors, but some visitors think the fitness test is too strong to take it.

- An improper test may make visitors have a misleading impression for fitness, hence most of them don't dare start to work out in MuscleHub by purchasing a membership.

- We find out that females who take a fitness test will be likely to be intimidated by the fitness test according to the qualitative data and the results of these hypothesis tests.

4. Recommendation for MuscleHub

4. Recommendation

To sum up, in contrast to females, the fitness test did not make an significant influence on the purchase rate for males. Therefore, we suggest :

- The male visitors should take a fitness test with a personal trainer to get familiar with MuscleHub and its courses when they come to the gym.

- The female visitors should skip the fitness test or may be able to take a light test to experience some courses if they ask for a trial.