MuscleHub Gym

Fitness Test or Not?

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Background

- Currently, visitors who wish to purchase a membership to MuscleHub Gym are asked to take a fitness test prior to submitting an application with payment for the first month of membership.

- Does it make sense to offer a fitness test to visitors who wish to purchase a membership to the gym?

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Visitor Feedback

I always wanted to work out like all of the shredded people on the fitness accounts I see on Instagram, but I never really knew how to start. MuscleHub's introductory fitness test was super helpful for me! After taking the fitness test, I had to sign up and keep coming back so that I could impress my trainer Rachel with how much I was improving!
- Cora, 23, Hoboken

When I walked into MuscleHub I wasn't accosted by any personal trainers trying to sell me some mumbo jumbo, which I really appreciated. Down at LiftCity they had me doing burpees 30 seconds after I walked in the door and I was like "woah guys slow your roll, this is TOOOO much for Jesse!" I still ended up not signing up for a membership because the weight machines had all those sweat stains on them and you know, no thanks.
- Jesse, 35, Gowanes

I took the MuscleHub fitness test because my coworker Laura recommended it. Regretted it.
- Sonny "Dad Bod", 26, Brooklyn

I saw an ad for MuscleHub on BookFace and thought I'd check it out! The people there were suuuuuper friendly and the whole sign-up process took a matter of minutes. I tried to sign up for LiftCity last year, but the fitness test was way too intense. This is my first gym membership EVER, and MuscleHub made me feel welcome.
- Shirley, 22, Williamsburg

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Review of Visitor Feedback

Based on these interviews, the feedback regarding fitness tests is not all that promising.

Four key variables that affect the success of the fitness test are not being monitored and taken into account:

- Difficulty of the fitness test

- personal trainer

- cleanliness of equipment / environment

- interest, skill, familiarity with the fitness routine culture

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Review of Feedback (continued)

Fitness tests work when

- there is a match between the trainer who oversees the fitness test and the prospective member.

- when the fitness test is not overwhelming or too difficult.

Fitness tests fail when

- the equipment is dirty or appears unhygienic.

- the person is unfamiliar or not really into a fitness routine

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Description of the A/B Test

Janet, the manager of MuscleHub, thinks that the fitness test intimidates some prospective members, so she has set up an A/B test.

In order to conduct an A/B Test, visitors will be randomly assigned to one of two groups

- Group A will be given a fitness test.

- Group B will not be given a fitness test.

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Description of the A/B Test (continued)

Group A and Group B will be tracked through two funnels.

1. Funnel 1: Application Submission > Membership Purchase

   - How many people pick up an application in Group A, Group B?

   - Of those who submit an application, which group has a higher percentage rate of purchasing a membership to MuscleHub Gym?

2. Funnel 2: Group A / Group B > Membership Purchase

   - Which group has a higher percentage rate of membership purchase.

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Summary of Dataset

The original dataset for MuscleHub Gym is stored in four tables in SQLite, an SQL database.

All four tables repeat personal information regarding visitors. The only difference between the tables are the dates recorded for each activity: visit, fitness test, submission of application, purchase. The tables are:

- **visits**: visit date and personal information.

- **fitness_tests:** fitness test date and personal information.

- **applications**: application date and personal information

- **purchases**: purchase date and personal information

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Jupyter Notebook, Pandas, SciPy and Matplotlib all belong to the Python programming world. All of these tools are open source, easily accessible and easy to use. In addition, they are powerful tools for performing data analysis of visitor information through the A/B Test.

- Jupyter Notebook - online Python programming environment.

- Pandas - data summarization.

- SciPy - statistical analysis.

- Matplotlib - plotting utility to graph results produced by Pandas.

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Jupyter Notebook

The Jupyter Notebook is an online GUI Python programming environment that combines a programming text editor window with an output window.

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Python

Python is a general purpose, object-oriented programming language which is used extensively for data analysis and other scientific applications.

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Pandas

Pandas is a Python module offering a number of functions and methods that allow you to work with data.

Data is loaded into the Pandas equivalent of a table called dataframe.

Pandas offers methods to sort, manipulate, and summarize data stored in dataframes.

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SciPy

SciPy Python module offers a number of methods to perform scientific and statistical analysis of data.

Although SciPy offers several statistical analysis tests and two specifically designed to work with categorical data, we used the Chi2_Contingency Test.

Reasons for selecting the Chi2_Contingency Test:

- two categories of data: Data for Group A and data for Group B.

- compare a table of results with different totals.

We will use a P-Value of 0.05 which is commonly used to determine if results are statistically significant.

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Matplotlib

Matplotlib is a Python module which offers the ability to plot graphs in order to visualize data.

Matplotlib is used to make bar graphs, histograms, line graphs, pie charts.

Matplotlib was used to create the pie chart and bar graphs of MuscleHub Gym's A/B Test data and results.

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Procedure for Conducting Analysis of Data

Step 1: We used Jupyter Notebook as the programming environment to perform our data analysis of MuscleHub Gym's A/B Test.

Step 2: Inspect data in original tables in the SQLite database.

- Tables were inspected using SQL Queries and sql_query( )

- We passed SQL Queries to sql_query( ) , a method written in Python, to view the tables.

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Step 3: Extract data from the four tables in the SQLite database and consolidates the desired information into one Pandas dataframe.

- Four SQLite tables are used to create a Pandas dataframe: visits, fitness_tests, applications, purchases.

- Data was selected using the following criterion: Visits must have been made after 7-1-2017

- The newly created Pandas dataframe, called *df*, keeps a record of all visitors to MuscleHub Gym and their progress through the various stages of becoming a MuscleHub member: visit date, fitness test date, application date, and purchase date.

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Step 4: Count Number of People in Group A and Group B (continued from previous slide).

- There are 5004 records in our dataframe.
- Number of visitors assigned to Group A and Group B

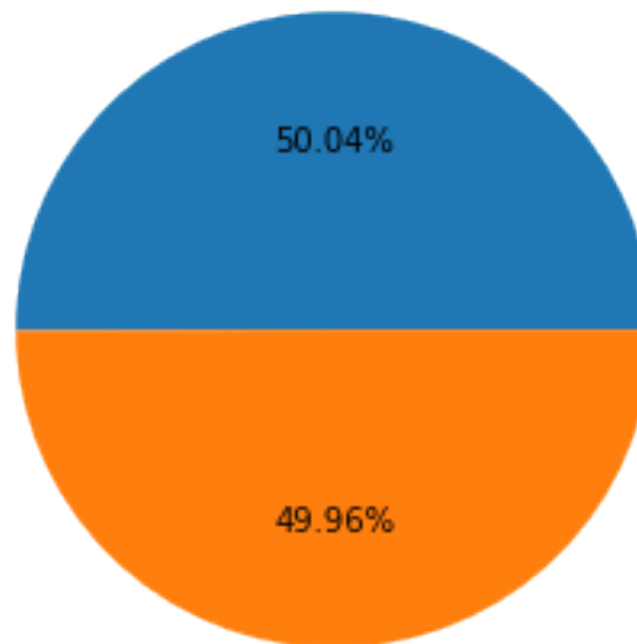| Group	Count
Group A	2504
Group B	2500
Total	5004

- Even though Group A had slightly more people - by 4 people, the two groups were fairly evenly divided.

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MuscleHub Visitors In Group A or Group B

Total Number of Visitors: 5004 | Group A: 2504 | Group B: 2500

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Step 5: How many people submit an application in Group A and Group B?

Group	Application	No Application	Total	Percentage
A	250	2254	2504	10%
B	325	2175	2500	13%

It looks like Group B (No Fitness Test) had a higher application submission rate than those from Group A (Fitness Test).

Values to be used in Chi2 Contingency Test: [[250, 2254], [325, 2175]]

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Percent of People Who Submit An Application
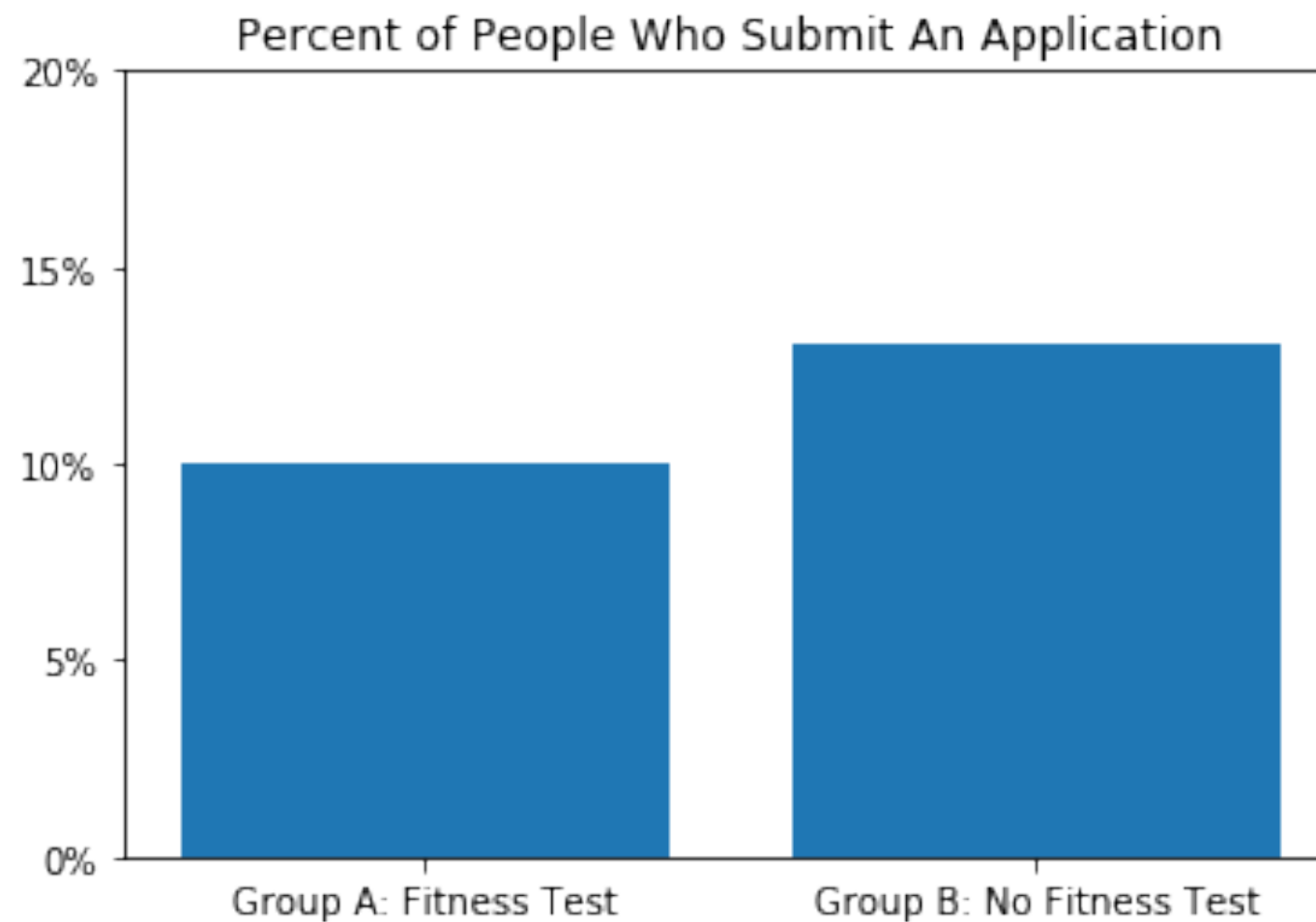
Group B (13%) had a higher application submission rate than Group A (10%).

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Step 6: Of those who submitted their applications from both Group A and Group B eventually purchased a membership to MuscleHub Gym?
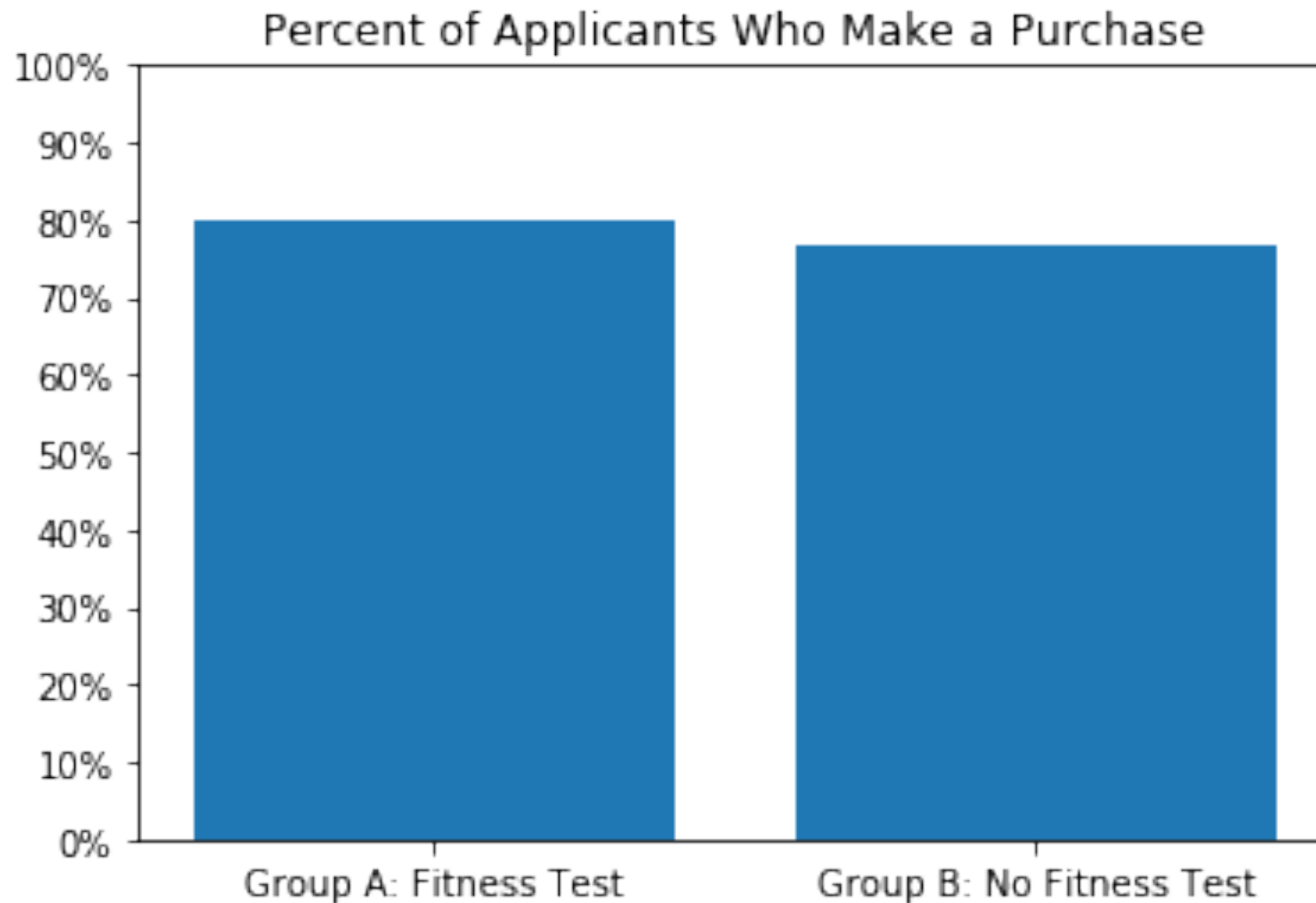
Group	Member	Not Member	Total	Percent
A	200	50	250	80%
B	250	75	325	77%

Group A (Fitness Test) were more likely to purchase a membership after submitting an application.

Values to be used in Chi2 Contingency Test: [[200, 50], [250, 75]]

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Percent of Applicants Who Make a Purchase

Of those who had submitted an application, Group A (76%) were more likely to complete their purchase of a membership to MuscleHub Gym.

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Step 7: Determine how many people purchased a membership to MuscleHub Gym in Group A and Group B.

Group	Member	Not Member	Totals	Percentages
A	200	2304	2504	8%
B	250	2250	2500	10%

Group B (10%) were more likely to purchase a membership to MuscleHub Gym.

Values to be used in Chi2 Contingency Test: [[200, 2304], [250, 2250]]

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Percent of Visitors Who Make a Purchase
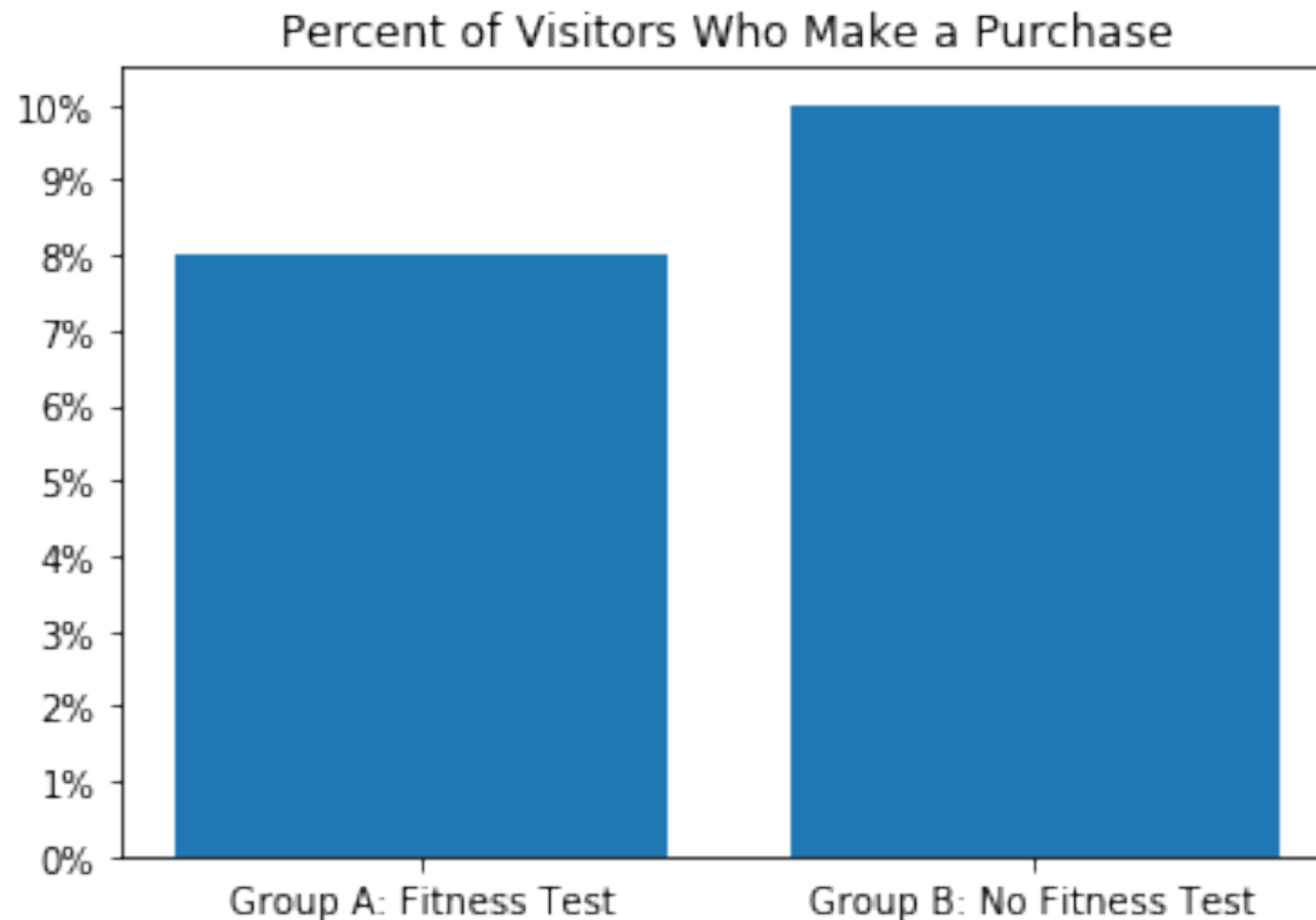
Group B (10%) were more likely to purchase a membership to MuscleHub Gym than Group A.

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Statistical Significance of Results

Before performing these tests, a P-value of 0.50 was selected. If a statistical analysis of the results came out less than 0.5, the differences in results were to be considered statistically significant. Else, the differences were due to random chance.

We used the Chi2 Contingency test from SciPy to obtain p-values for our data.

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Statistical Significance of Results

Test 1: Which Group was more likely to pick up an application?

- chi2_contingency([[250, 2254], [325, 2175]])

- p-value: 0.00096478276007223038

- Is p-value < 0.5 ? : True

The difference in results between Group A and Group B is statistically significant and not a result of random variation.

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Statistical Significance of Results

Test 2: Of those who picked up an application, which group had a higher percentage of purchasing a membership?

- chi2_contingency([[200, 50], [250, 75]])

- p-value: 0.43258646051083327

- Is p-value < 0.5 ? : True

The difference in results between Group A and Group B is statistically significant and not a result of random variation.

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Statistical Significance of Results

Test 3: Which group had a higher percentage of purchasing a membership?

- chi2_contingency([[200, 2304], [250, 2250]])

- p-value: 0.014724114645783203

- Is p-value < 0.5 ? : True

The difference in results between Group A and Group B is statistically significant and not a result of random variation.

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Conclusions

1. Group B: No Fitness Test (10%) were more likely than Group A (8%) to purchase a membership to MuscleHub Gym.

2. Of those who submitted an application, Group A (80%) were more likely than Group B (77%) to purchase a membership to MuscleHub.

3. Group A (10%) were less likely than Group B (13%) to submit an application, but if they did submit an application, Group A (80%) were more likely than Group B (77%) to purchase a membership to MuscleHub Gym.

4. Group B were more likely (13%) to submit an application but less likely to make a purchase after submitting an application.

5. The P-Value for all three tests suggest that these results are statistically significant and not a result of random variation.

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Recommendations

Janet's intuition seems to be accurate and is verified by the A/B Test.

It is advisable to eliminate the Fitness Test from the Enrollment Procedure based on:

- numerical summary provided by Pandas

- P-values generated by the chi2_contingency test from SciPy

- feedback from the users

If inclusion of the Fitness Test is desired, consider

visitor's familiarity and comfort with fitness tests

cleanness of facility

pairing visitor with a personable and competent trainer.