Muscle Hub A/B Test

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Data Analysis Capstone Project
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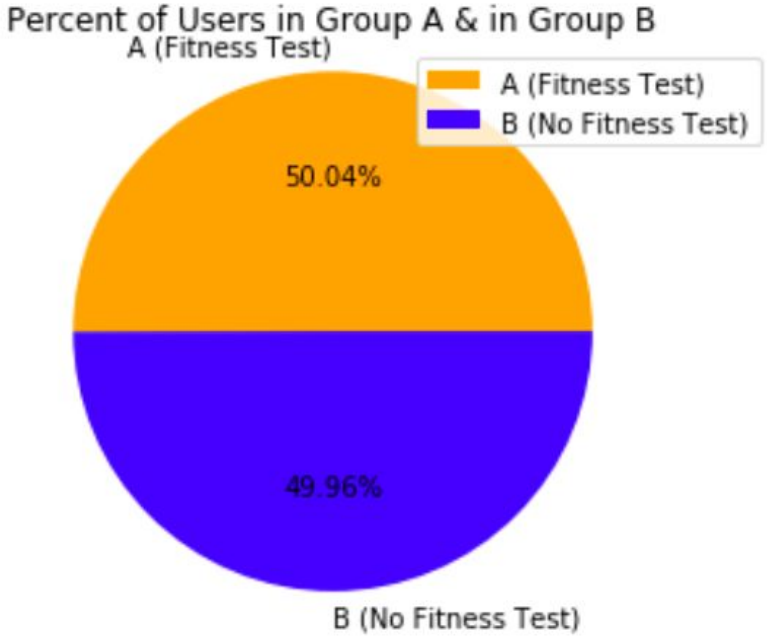
Introduction: The Muscle Hub A/B Test

- Janet from Muscle Hub wants to know if taking a fitness test will make visitors to the gym more likely to purchase a membership.
- To test this, visitors will be randomly assigned to one of two groups:
  - Group A will take a fitness test with a personal trainer
  - Group B will skip the fitness test and proceed directly to the application
- The two groups are approximately equal in size.



Sign-up Process for Muscle Hub

The sign-up process for Muscle Hub has several steps:

1. Fitness Test with a personal trainer (Group A only)
2. Fill out an Application for gym membership
3. Send in the first month’s payment

1. Picking up an Application

Let's look at how many visitors from each group picked up an application.

	Group A (Fitness Test)	Group B (No Test)
Picked up Application	250	325
Total Visitors per Group	2504	2500
% Application	9.98%	13.0%

It looks like more people from Group B picked up an application, perhaps because they were given the forms directly, without having to take a fitness test first. But let's see if this difference is statistically significant...

1. Filling out an Application

We have more than one discrete option of data per data set, so let's create a contingency table and use a Chi Squared Test to analyze the difference.

Our null hypothesis will be that there is no significant difference between Groups A and B in how many visitors pick up an application.

Contingency Table	Picked up Application	No Application
Group A	250	2254
Group B	325	2175

Using the Chi Squared test, we find that $p = 0.000965$. Since $p < 0.05$, we reject the null hypothesis; there IS a significant difference between the number of applications picked up per group.

2. Applicants who Purchase a Membership

Of those who picked up an application, how many purchased a membership?

	Group A (Fitness Test)	Group B (No Test)
Purchased Membership	200	250
Total Picked up Application	250	325
% Purchased Membership	80.0%	76.9%

It looks like more people from Group A who took the fitness test and filled out an application purchased a membership. Perhaps the fitness test motivates people to go to the gym. But let's find out if this difference is statistically significant...

2. Applicants who Purchase a Membership

Let's use a Chi Squared Test again to see if there is a significant difference between the groups in the number of people who purchased memberships **after picking up an application**.

Our null hypothesis will be that there is no significant difference.

	Purchased Membership	Application + No Membership
Group A	200	50
Group B	250	75

Using the Chi Squared test, we find that $p = 0.433$. Since $p > 0.05$, we cannot reject the null hypothesis; the fitness test does NOT significantly affect the number of people who become members after picking up an application.

3. Visitors who Purchase a Membership

Now let's see how many of the total visitors purchased a membership.

	Group A (Fitness Test)	Group B (No Test)
Purchased Membership	200	250
Total Visitors	2504	2500
% Purchased Membership	7.99%	10%

It looks like more people from Group B purchased a membership. Perhaps the fitness test is too intimidating, and scares visitors away from becoming members. Let's find out if this difference is statistically significant...

3. Visitors who Purchase a Membership

Let's use a Chi Squared Test to see if there is a significant difference between the groups in the number of people who purchased memberships **out of all the visitors**.

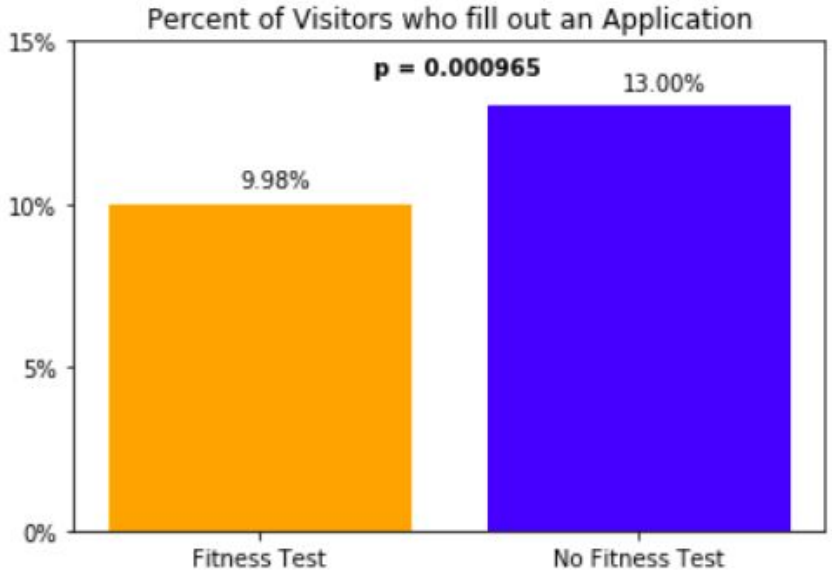
Our null hypothesis will be that there is no significant difference.

Contingency Table	Purchased Membership	No Membership
Group A	200	2304
Group B	250	2250

Using the Chi Squared test, we find that $p = 0.0147$. Since $p < 0.05$, we reject the null hypothesis; visitors who were NOT given the fitness were more likely to purchase memberships.

Summary: Test 1

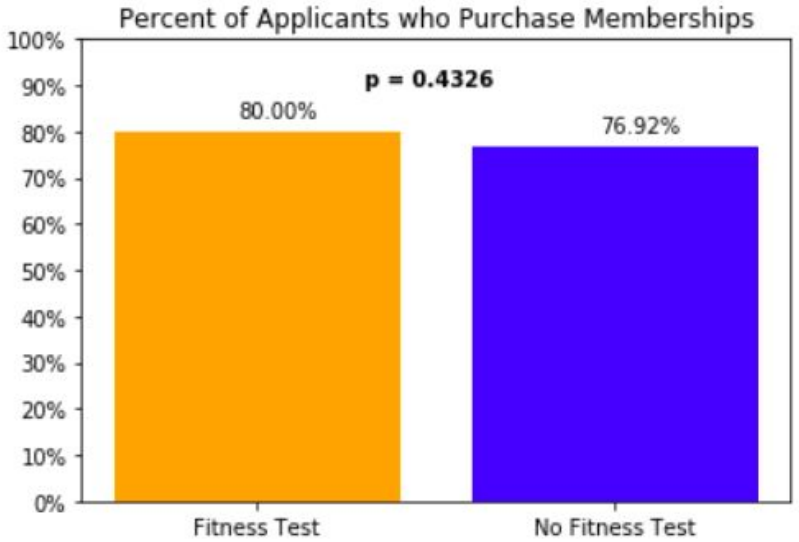
Out of all the visitors to the gym, significantly more people from Group B, who did not take a fitness test, filled out an application.



Summary: Test 2

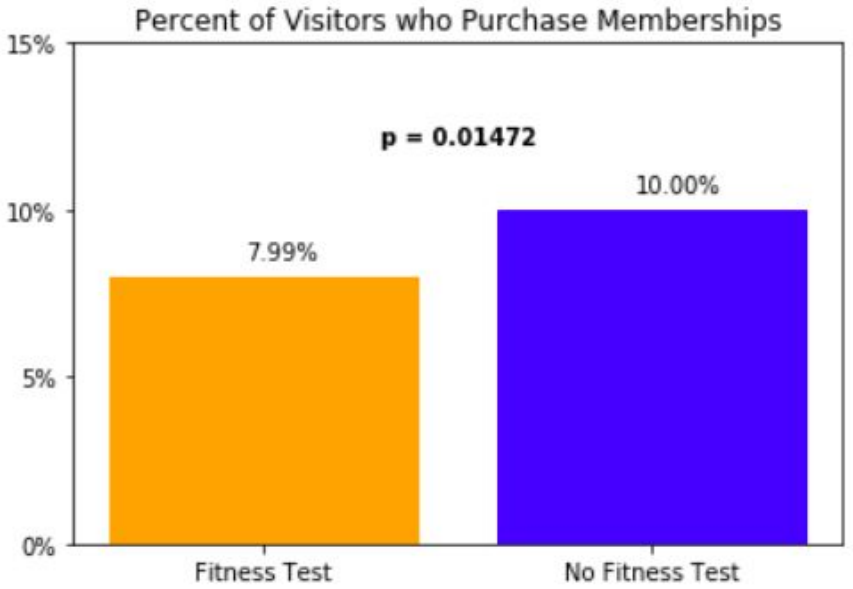
Of the people who picked up an application, there was not a significant difference between groups in the number of people who purchased a membership.

People who picked up an application were likely to purchase their first month's membership, regardless of whether or not they took the fitness test.



Summary: Test 3

Out of all the visitors to the gym, significantly fewer people from Group A, who were given the fitness test, ended up purchasing memberships.



Conclusion

From the results of the three hypothesis tests, we can conclude that:

1. People who **did not** take the fitness test were more likely to pick up an application and purchase a membership.
2. People who picked up an application were likely to pay for their first month's membership, **regardless** of whether or not they took the fitness test.

Therefore, instead of offering fitness tests to visitors and potentially scaring off new clients, Muscle Hub should focus on giving out membership applications to first-time customers.