

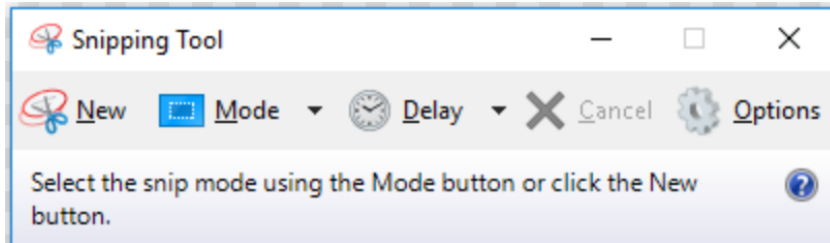
Assessment Brainstorm

Now that you've seen a lot of little apps, we want you to brainstorm on how to assess learning!!

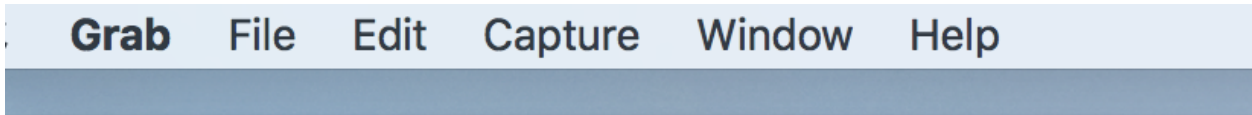
Your Task:

1. Get into groups of 2-3 people, create a section below for your team
2. Use a picture from one of the many little apps you've seen in the past two days, copy and paste into this document.
3. Come up with three assessment questions that you could ask on that picture.
4. Write in red what kind of solution you'd expect your students to say

To take a screenshot or picture of using the snipping tool on a PC:



Or on a MAC use Grab it:

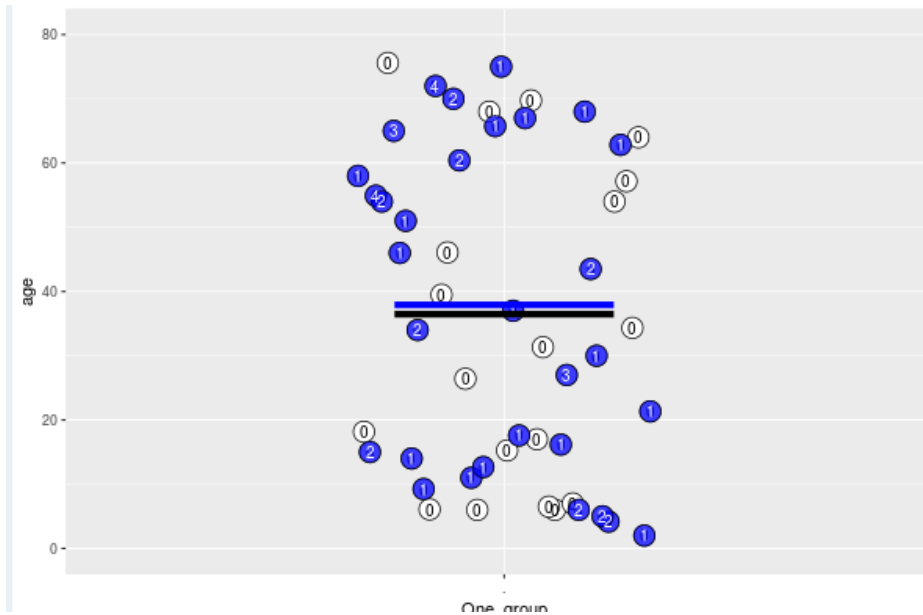


In Capture, pick Selection and then drag over what you want to capture. Then copy and paste the picture to put into document.

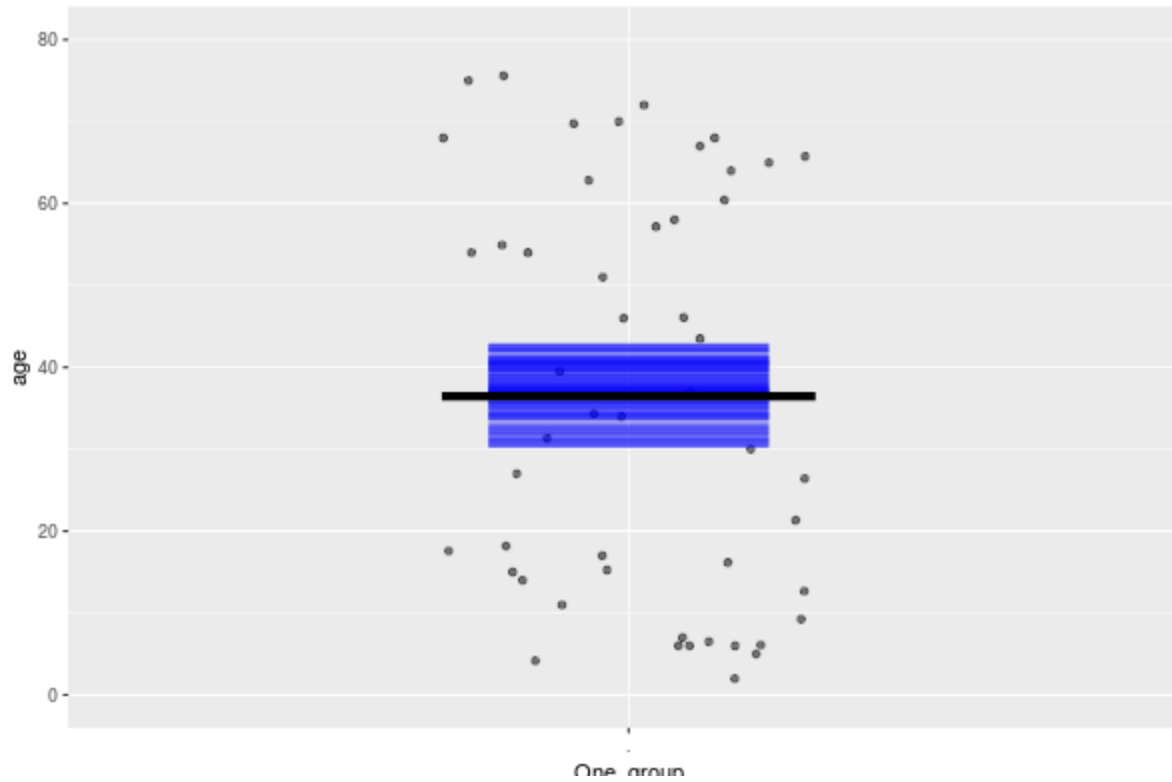
Here's an example:

Group Greg and NEF

A researcher at Trip Adviser wants to know the mean age of people who attend a large city museum. They randomly sample museum attendees and use the bootstrap method to determine the population mean age of museum attendees..



1. The picture above represents a bootstrap sample of 50 museum attendees' ages..
2. If the original sample was size 50 what size does the bootstrap sample need to be?
3. Explain what a "2" on one of the blue circles means.
4. .What does blue bar and black bar tell us?
5. What would change in blue and black bar if the sample size gets larger?
6. What would change in blue and black bar if the number of trials gets larger?
- 7.



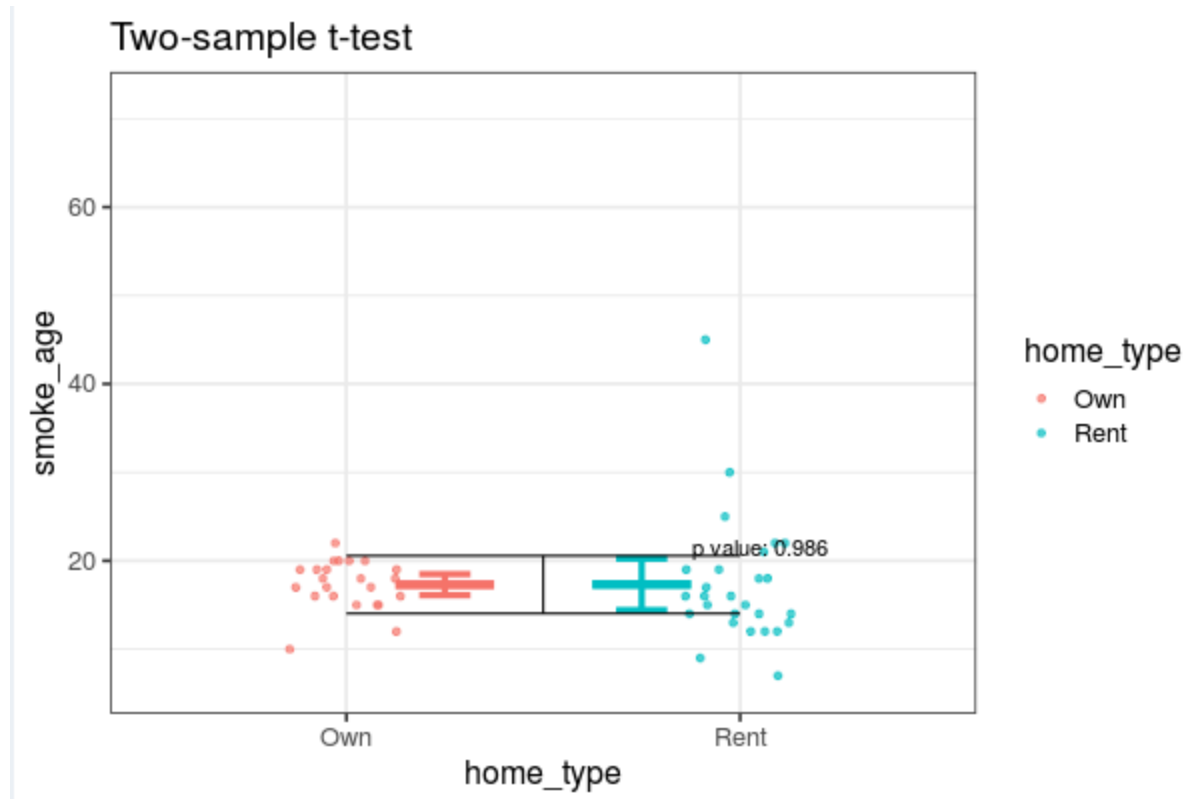
7. Explain the meaning of the blue shape on the picture above.
8. On the above picture, draw/sketch the 95% confidence interval for the population mean.
9. Estimate the 95% confidence interval for the population mean and interpret what it means in the context of the problem. *I am 95% confident that. . . .*

Extra-credit question

How would you use these simulations to describe the distribution of the sample mean to your best friend?

What are the key differences between bootstrapping and jackknife?

Group PI



1. List the variables and identify which is the explanatory variable and which is the response variable, and whether each is categorical or quantitative.
The explanatory variable is whether a smoker owns or rents their home. This is categorical.
The response variable is the age at which the person started smoking. This is quantitative.
2. There is one blue data point that's far above every other point. Interpret that point.
One renter started smoking in their early 40s.
3. Compare the means of smoking age of those who own homes and those who rent homes.
The means are about the same, both groups started smoking around 17 years old.
4. Compare the variability in smoking age of those who own homes and those who rent homes.

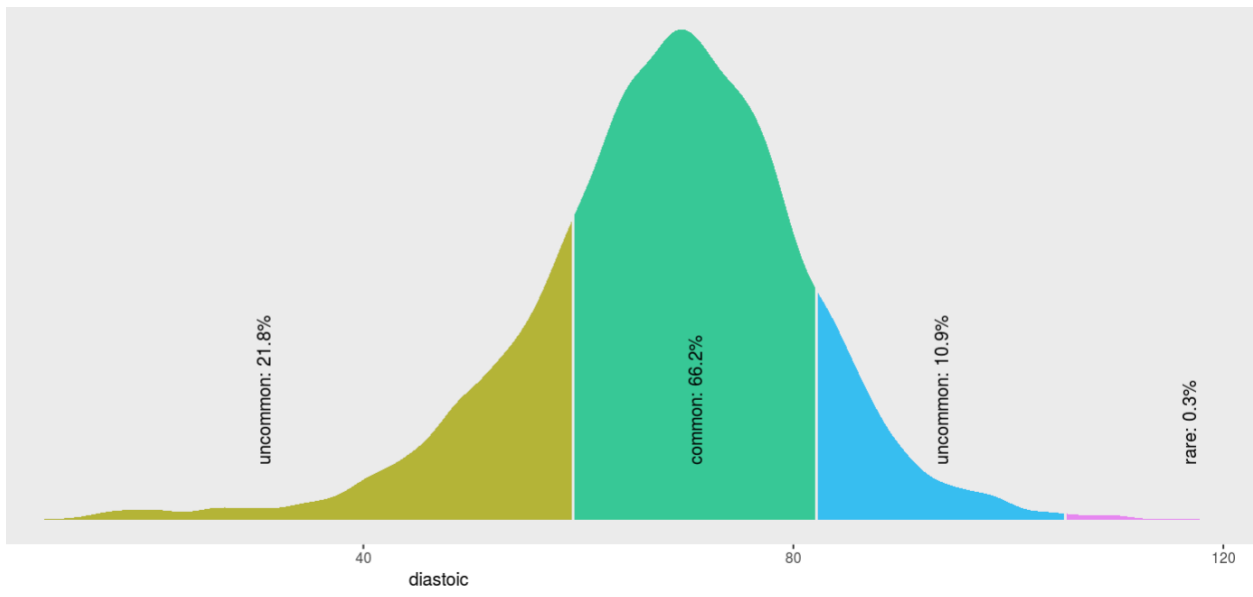
From this data, there appears to be more variability in smoking age among renters than among homeowners.

5. Would the p-value be close to zero or close to 1? Explain your reasoning. [Note: We'd not include the p-value in the image]

The p-value would be close to 1 because the means are nearly the same.

6. Suppose that the p-value is 0.986. Interpret this value in the context of home ownership and age that smokers started smoking.

If the mean age at which a person first started smoking is the same for owners and for renters, then in about 99% of samples of size 50, the difference of sample means would be at least as great as the difference in these samples.



Using the graph above, answer the following questions:

1. What would you approximate as the mean of the above graph? What does that interpret as?

The mean looks to be around 70. This suggests that typically a person's diastolic blood pressure is around 70.

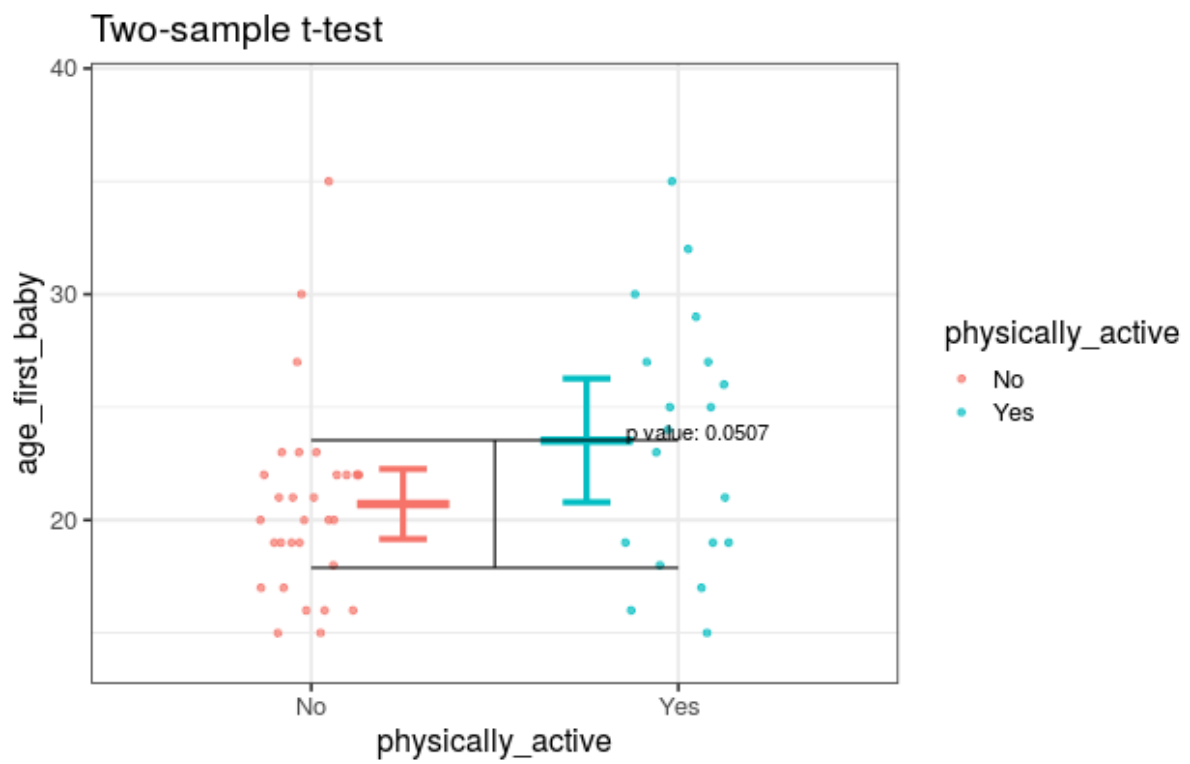
2. Approximately 68% of the data lies _____ 1 _____ standard deviation within the mean.

3. Approximate the standard deviation using the graph above. Show your work:

It seems like almost 68% of the data is in green, so from 60 to 85, or 25 long. One standard deviation would be $25/2$ or 12.5.

Now you try!!!!

The t-test

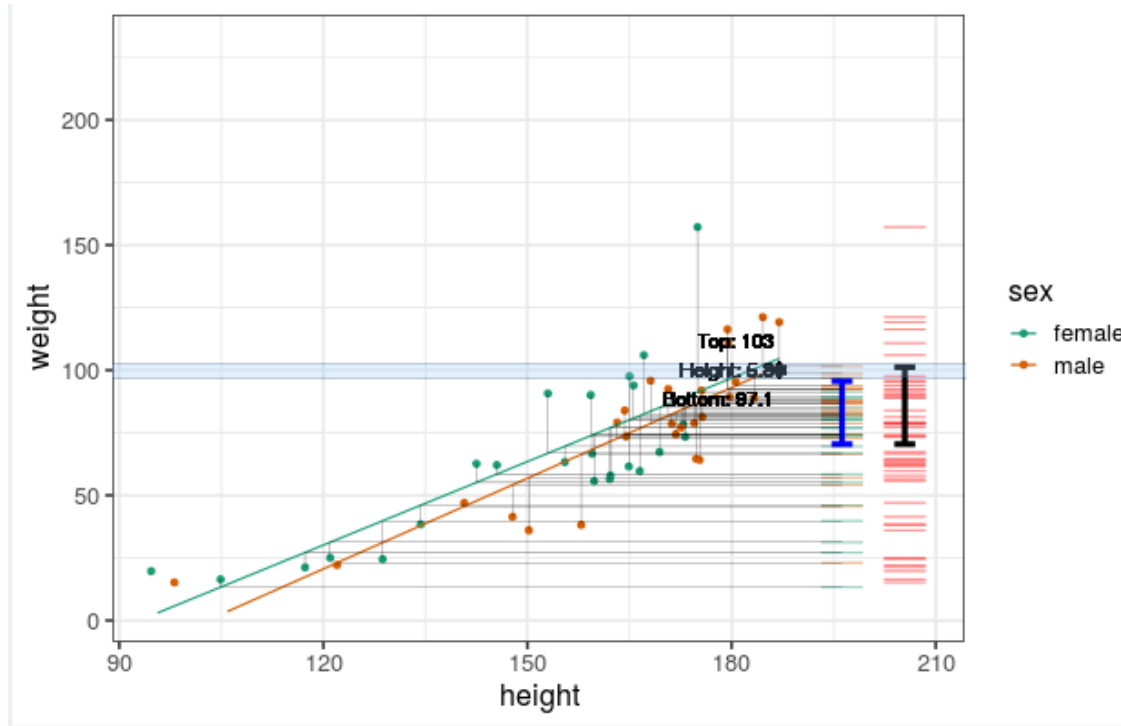


Two Sample t-test

```
data:  age_first_baby by physically_active
t = -2.0039, df = 48, p-value = 0.05074
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -5.642758388  0.009481647
sample estimates:
mean in group No mean in group Yes
      20.70968      23.52632
```

1. What are the hypotheses that are being tested with this output and graph?
 - a. Note: you may want to include the variable names from the code book.
 - b. **Ho: the mean age of the Yes and No group is the same.**
Ha: the mean age of the Yes and No group is different from 0.
2. Do you expect the p-value to stay the same with another sample of people? Explain your answer.
 - a. **No, because the sample will be different. Sampling Variability.**
3. Write the conclusion for the hypothesis test in question 1, in context of the data.
 - a. **There is fairly strong evidence that the average age at first baby is different between the exercise group and the non-exercise group. (Even if the p-value is larger than 0.05.)**
4. What significance levels would lead you to reject the null hypothesis? Not reject the null hypothesis?
 - a. **Answers may vary.**
5. Do the R results show a 1 or 2 sided hypothesis test? How do you know?
 - a. **The output shows "mean is not equal to 0", so this test is two-tailed.**
6. Compute the p-value for a 1-sided test.
 - a. **The p-value for a 1-tail test will be half of the p-value for a 2-tailed test:
.05074/2=0.02537.**
7. Which group has the larger mean? Use the confidence interval to support your answer.
 - a. **The Yes group has a larger mean because the lower endpoint of the interval is a negative number.**
8. What assumptions/conditions do you need to check before you conduct a hypothesis test? Have they been met? What assumptions/conditions can you check with the output that you've been provided? What assumptions/conditions cannot be checked with the output you've been given?
 - a. **Normality of the variables; sample size; independent samples;**
9. Is there a practical significance between the mean age groups?
 - a. **The answer may vary, especially based on WHO is answering the question.**

Phillip and Bret



1. Are there any potential outliers? Circle the points on the graph you would consider as outliers.
2. Put a square around the point that has the largest residual. Estimate this value, what do you think the unit of measurement is for this value?
3. What is the difference between the variability of the actual data and the linear regression model?
4. Estimate the R^2 value. What does this say about the predictability of our model?

