

Materials Needed:

None.

Instructions:

Is there a difference between the self-esteem of men and women? Do NOT put your name on the quiz sheet, this should remain anonymous. The self-esteem quiz is a shortened version of one available online at http://www.circle-of-grace.com/self_esteem_quiz.htm.

1. Take the self-esteem quiz at the end of this sheet, score it, and give it to the instructor who will read the results back to the class.
2. Record the self-esteem scores for each gender in the tables below.

Males

Females

Test the claim that there is no difference in the self-esteems of men and women.

3. Summarize the data

	n	\bar{x}	s
Males			
Females			

4. The male and female results are (independent / dependent).

5. All of our parametric hypothesis testing involves normality in some manner. How is that requirement satisfied for this type of test?
- The esteem scores come from a normal population (use qq-plot to test).
 - The sample size is at least 31, so the Central Limit Theorem applies.
 - The expected frequency of each category is at least 5.
6. If you answered that the scores are normally distributed (answer a) in the last question, the construct a normal probability plot for each gender's data and see if they are normally distributed.
- The male data (does / does not) appear to be normally distributed.
 - The female data (does / does not) appear to be normally distributed.
 - Besides using a qq-plot, what are two additional ways you could check the normality of data?
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Since we're testing two means with small sample sizes and unknown population variances, we need to know whether or not to assume the variances are equal.

7. Conduct an F-test to see if the variances are equal (sect 8.5).
- The claim that $\sigma_1^2 = \sigma_2^2$ is the (null / alternative) hypothesis.
 - Write the null and alternative hypotheses.
 H_0 :
 H_1 :
 - This is a (left tail / two tail / right tail) test.
 - We will use the (uniform / binomial / normal / student's t / chi-square / F) distribution to test our hypothesis.

- e. The test statistic is _____.
- f. The critical value is _____.
- g. The probability value is _____.
- h. The decision is to (reject / fail to reject) the null hypothesis that the variances are equal.
- i. We will assume that the variances are (equal / unequal).

If you fail to reject the claim that the variances are equal, then you must use the pooled variance, and the degrees of freedom for the means test is the sum of the two degrees of freedom. If you reject the claim that the variances are equal, then you use each variance, and the degrees of freedom for the means test is the smaller of the two degrees of freedom.

Either way, we now resume with the main hypothesis test to see if there is a difference in the mean scores between men and women (sect 8.6).

- 8. Write the original claim symbolically.
- 9. The original claim is the (null / alternative) hypothesis.
- 10. Write the null and alternative hypotheses:
 H_0 :
 H_1 :
- 11. This is a (left tail / right tail / two tail) test.
- 12. The level of significance is $\alpha =$ _____.
- 13. We will use the (uniform / binomial / normal / student's t / chi-square / F) distribution to test our hypothesis.
- 14. We (will / will not) be using the pooled variance in this case.
- 15. The degrees of freedom is _____.

16. The critical value(s) is/are _____.
17. The test statistic is _____.
18. The probability value is _____.
19. The test statistic (does / does not) lie in the critical region.
20. The decision is to (reject / fail to reject) the null hypothesis.
21. There is (sufficient / insufficient) evidence to (reject / support) the claim that there is no difference in the self-esteems of men and women.
22. There is (sufficient / insufficient) evidence to (reject / support) the claim that there is a difference in the self-esteems of men and women.

Do NOT put your name on this sheet.
Circle your gender in the box to the right.

Gender: Male Female

Answer the questions on this sheet honestly
by checking one box for each question.

Self-Esteem Score: _____

	Always	Often	Occasionally	Never
When I look in the mirror, I like what I see				
I find it easy to interact socially at parties				
I am able to stand up for myself				
I am able to say no to people asking favors				
I take time for myself				
I can forgive myself for making mistakes				
My personal relationships are fulfilling				
I am able to handle crises in my life				
I like my job				
When someone criticizes me, I can examine it logically, and not take every word to heart if it is not true				

When you are done answering the questions, give yourself 3 points for each “always”, 2 points for each “often”, 1 point for each “occasionally”, and 0 points for each “never”. Total the points and write the score in the box at top of the page.