

Two-Sample Inference (Lectures 8-10)

BIOSTAT 201A Fall 2025

Discussion 5 – October 31, 2025

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Outline

1. Motivation for Two Sample Inference Problems
2. Two Sample Inference for Paired Data (Lecture 8)
3. Two Sample Inference for Independent Samples (Lecture 9 & 10)

Two Sample Problems

- Goal of Two Sample Problems:
 - (1)
 - (2)
- Types
 - 1.
 - 2.
 - Unpaired is more likely to reject but why should we still use a paired test?
- Situations where we do matched-pairs in clinical research:
 - 1.
 - 2.

Two-Sample Problems	Dependent Groups (Paired Data)
Hypotheses	
Data	
Assumptions	
Test Statistic	
Decision Rule	
Confidence Interval	

Renal Disease. We are interested to see if the raw scale of urinary protein changes after 8 weeks.

(a) Identify the appropriate statistical procedure to do this. Explain.

(b) Did urinary protein change after 8 weeks? Use a hypothesis test to determine this.

Patient	Raw scale urinary protein (g/24 hr)	
	Before	After
1	25.6	10.1
2	17.0	5.7
3	16.0	5.6
4	10.4	3.4
5	8.2	6.5
6	7.9	0.7
7	5.8	6.1
8	5.4	4.7
9	5.1	2.0
10	4.7	2.9

(c) Compute a 95% confidence interval for the differences in urinary protein change. How does your created confidence interval support your conclusions in part (b)?

Two-Sample Problems	Independent Groups		
	Equal Variances	Unequal Variances	Test for Equality of Variances
Hypotheses			
Data			
Assumptions			
Test Statistic			
Decision Rule			
Confidence Interval			

Nutrition. The mean ± 1 sd of ln [calcium intake (mg)] among 25 females, 12 to 14 years of age, below the poverty level is 6.56 ± 0.64 . Similarly, the mean ± 1 sd of ln [calcium intake (mg)] among 40 females, 12 to 14 years of age, above the poverty level is 6.80 ± 0.76 .

- (a) Test for a significant difference between the variances of the two groups.
- (b) Test for whether there is a significant difference in means between the two groups.
- (c) Create a 95% Confidence Interval for the difference in means between the two groups.