

DATA ANALYSIS

Week 11: concept review

lunch with Psychology faculty!



Lunch with Psychology Faculty

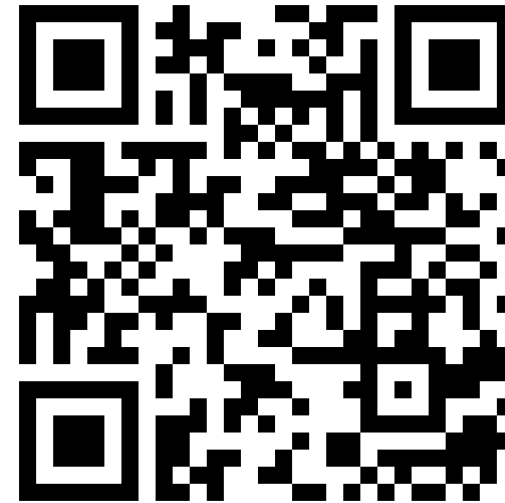
The Psychology Department is hosting lunches with faculty and students this semester.

All lunches will be in **Thorne Dining!** Please meet us at the check-in station at the times mentioned for the specific dates.

The lunches are on the following dates/times:

- Wednesday, February 21 2024 (**12 pm**): Prof. Erika Nyhus and Prof. Hannah Reese
- Tuesday, March 5 2024 (**12 pm**): Prof. Kacie Armstrong, Prof. Suzanne Lovett, and Prof. Thomas Small
- Friday, April 12 2024 (**1.10 pm**): Prof. Abhilasha Kumar and Prof. Samuel Putnam

We look forward to seeing you!



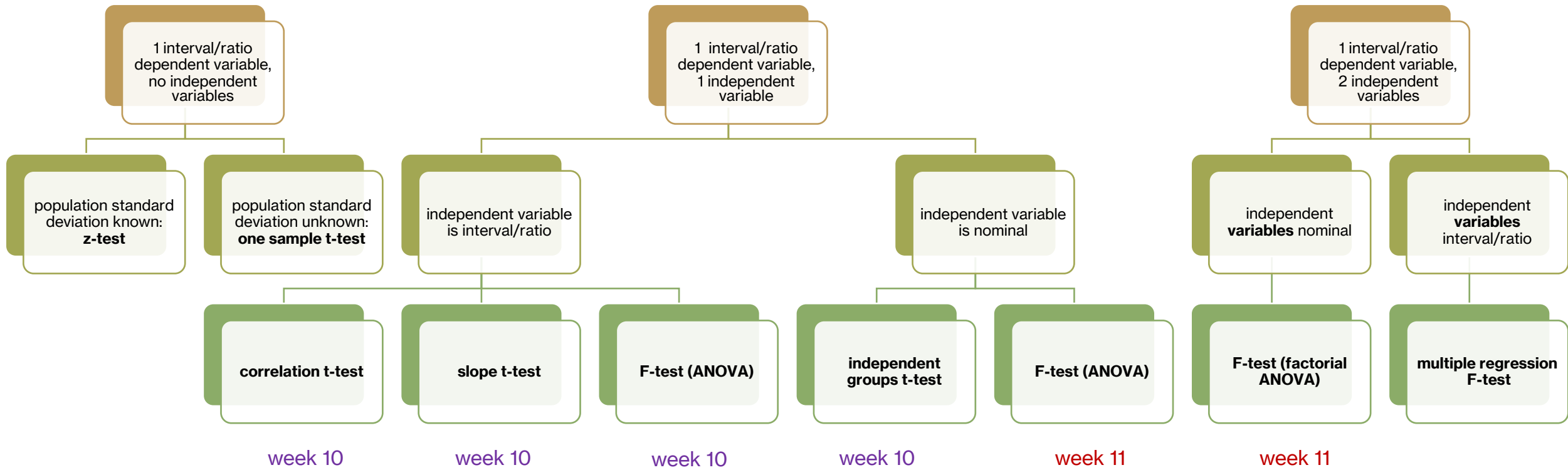
logistics

- [compiled slide deck for ALL tests](#)
- (also on Canvas)
- PS6 is ONLY Chapters 10 & 12
- office hours before midterm 2:
 - Yanevith: **Sun**, 3.30- 5 pm
 - Prof Kumar: **Mon**, 11-1 pm
 - Whitt: **Tues**, 4.15-5.45 pm
 - Prof Kumar, **Wed**, 2-5 pm
 - Prof Kumar, **Thurs**, 2-4 pm

11	W: April 3, 2024	W11: Modeling Relationships II
11	F: April 5, 2024	W11 continued...
12	T: April 9, 2024	Problem Set 6 due
12	W: April 10, 2024	W12: Loose Ends / Exam 2 review
12	F: April 12, 2024	Exam (Midterm) 2
13	W: April 17, 2024	W13: Factorial Designs
13	F: April 19, 2024	W13 continued...
14	T: April 23, 2024	Problem Set Opt-out Deadline 3
14	W: April 24, 2024	W14: Non-Independent/Miscellaneous Data
14	F: April 26, 2024	W14 continued...
15	T: April 30, 2024	Problem Set 7 due
15	W: May 1, 2024	W15: Odds and Ends
15	F: May 3, 2024	Final Exam
16	W: May 8, 2024	Wrapping Up!

statistical test chart

week 7



week 10

week 10

week 10

week 10

week 11

week 11

only for two groups!

plan for today

- key problems from problem set #5
- some practice questions

PS5: Chapter 15, Q12

Weight (X)	Income (Y)
1	115
1	78
4	53
3	63
5	37
2	84
5	41
3	51
1	94
5	44

- what are the independent and dependent variables in this problem?
- which tests are possible?

In the Chapter Preview we discussed a study by Judge and Cable (2010) demonstrating a negative relationship between weight and income for a group of women professionals. The following are data similar to those obtained in the study. To simplify the weight variable, the women are classified into five categories that measure actual weight relative to height, from 1 = thinnest to 5 = heaviest. Income figures are annual income (in thousands), rounded to the nearest \$1,000.

PS5: Chapter 9, Q22

- what are the independent and dependent variables in this problem?
- which tests are possible?

X (well being scores)
38
37
41
35
42
40
33
33
36
38
32
39

Oishi and Schimmack (2010) report that people who move from home to home frequently as children tend to have lower than average levels of well-being as adults. To further examine this relationship, a psychologist obtains a sample of $n = 12$ young adults who each experienced 5 or more different homes before they were 16 years old. These participants were given a standardized well-being questionnaire for which the general population has an average score of $\mu = 40$. The well-being scores for this sample are as follows: 38, 37, 41, 35, 42, 40, 33, 33, 36, 38, 32, 39.

- On the basis of this sample, is well-being for frequent movers significantly different from well-being in the general population? Use a two-tailed test with $\alpha = .05$.
- Compute the estimated Cohen's d to measure the size of the difference.
- Write a sentence showing how the outcome of the hypothesis test and the measure of effect size would appear in a research report.

PS5: Chapter 10, Q12

exercise group	control group
24	26
26	20
22	18
23	25
25	23
17	16
19	23
28	19
22	20
21	21
24	16
25	17
24	23
22	17
23	20
23	16

- what are the independent and dependent variables in this problem?
- which tests are possible?

Recent research has demonstrated that music-based physical training for elderly people can improve balance, walking efficiency, and reduce the risk of falls (Trombetti et al., 2011). As part of the training, participants walked in time to music and responded to changes in the music's rhythm during a 1-hour per week exercise program. After 6 months, participants in the training group increased their walking speed and their stride length compared to individuals in the control group. The following data are similar to the results obtained in the study.

PS5: mtcars

Car	miles_per_gallon (mpg = Y)	horsepower (hp = X)
Mazda RX4	21	110
Mazda RX4 Wa	21	110
Datsun 710	22.8	93
Hornet 4 Drive	21.4	110
Hornet Sportak	18.7	175
Valiant	18.1	105
Duster 360	14.3	245

- what are the independent and dependent variables in this problem?
- which tests are possible?

You will use the “mtcars” dataset. The data was extracted from the 1974 Motor Trend US magazine, and comprises fuel consumption and 10 aspects of automobile design and performance for 32 automobiles (1973–74 models). We will focus on two key variables, miles per gallon (mpg) and horsepower (hp).

Make a scatter plot that describes the relationship between horsepower (X) and miles per gallon (Y). Describe the relationship between horsepower and mileage verbally.

How well can horsepower predict how many miles a car will travel? Compute the equation of a line that predicts the miles per gallon (mpg) using horsepower (hp).

F tables: Chapter 12, Q11

The following summary table presents the results from an ANOVA comparing four treatment conditions with $n = 10$ participants in each condition. Complete all missing values. (*Hint: Start with the df column.*)

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	
Between treatments	_____	_____	10	$F =$ _____
Within treatments	_____	_____	_____	
Total	174	_____		

F tables: Chapter 12, Q12

A developmental psychologist is examining the development of language skills from age 2 to age 4. Three different groups of children are obtained, one for each age, with $n = 18$ children in each group. Each child is given a language-skills assessment test. The resulting data were analyzed with an ANOVA to test for mean differences between age groups. The results of the ANOVA are presented in the following table. Fill in all missing values.

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	
Between treatments	48	_____	_____	$F =$ _____
Within treatments	_____	_____	_____	
Total	252	_____		

conceptual questions

- a researcher uses analysis of variance to test for mean differences between three groups with a sample size of 10 participants in each group. What would the degrees of freedom for the F ratio be for this analysis?

conceptual questions

- which situation would lead to the largest standard error?

a large sample and a large standard deviation

a small sample and a large standard deviation

a large sample and a small standard deviation

a small sample and a small standard deviation

conceptual questions

- if a slope coefficient is calculated for 50 X and Y values, what distribution should be used to test for statistical significance and how many degrees of freedom should it have?

conceptual questions

- A new painkiller is claimed to be equally effective for headaches as well as body aches. If it works as expected, we would see a statistically significant result from a hypothesis test.
- TRUE or FALSE?

conceptual questions

- recall was measured for three groups in a memory experiment. One group simply read the original list of words, another tried to create a visual image of each word, and a third generated a synonym for each word. What type of hypothesis test is appropriate here?

next time

- **before** class
 - *complete*: Problem Set #6 (Chapter 10 and Chapter 12 problems)
 - *resubmit*: Problem Set #5 (second attempt)
 - *review*: midterm 2 practice quiz + computational problems
 - *review* : ALL slides + videos from Weeks 6-11
- **during** class
 - more review!