Stat 411/511

Review

Dec 2 2015

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This week

Today: Review…multiple comparisons, some of last year's final exam questions.

Fri: Office hours instead of lecture. Find me in Weniger 255 10-11am.

Finals week Office hours

Mon & Wed 10-11am in my office 255 Weniger

This week Office hours

as usual, Thursday 3-5pm Cordley 3003

Final Exam: Thu Dec 10th 6:00-7:50pm in **Milam 026**

The first question will be much like the quizzes on canvas multiple choice and mostly conceptual or basic calculations. You can expect questions that are similar to those from all quizzes, in addition to quiz like questions on regression. You will answer these on a scantron sheet.

The remaining three questions will involve short answer questions where you will need to identify appropriate methods to analyse data, interpret R output, interpret diagnostic plots, and write statistical summaries.

You may bring **one sheet (8.5 x 11in), double sided of notes** and a **calculator**.

You **must** bring a **pencil.**

Multiple Comparisons

The problem:

The more comparisons (tests or CIs) you do, even if the null is true is every case, the more likely you are to find a significant (reject null) result.

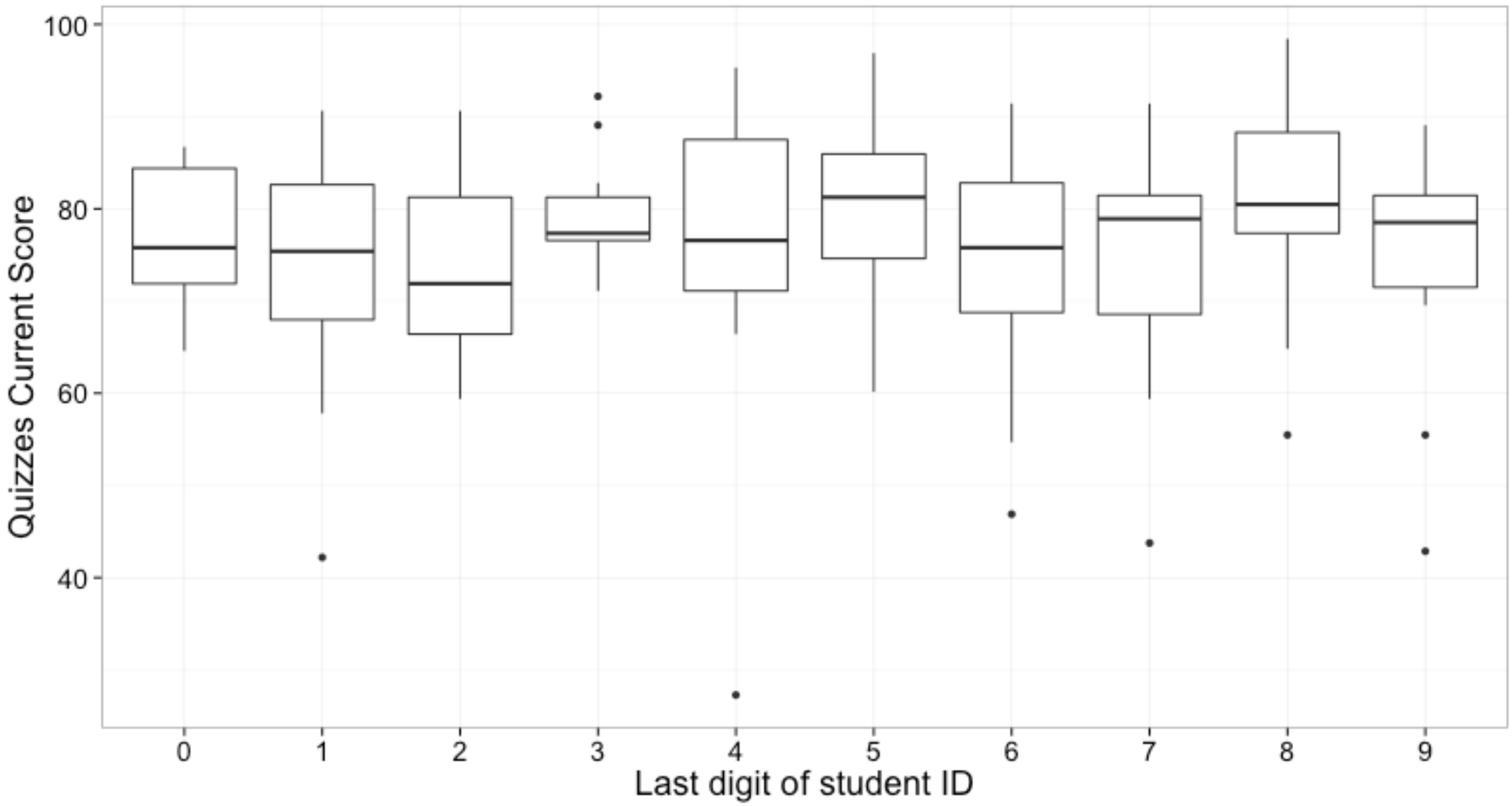
The solution:

Declare significance less often by making confidence intervals wider and p-values larger

(or alternatively for p-values, lower the significance threshold).

Example

Maybe there is a dependence in performance on Quizzes based on the last digit of a student's ID



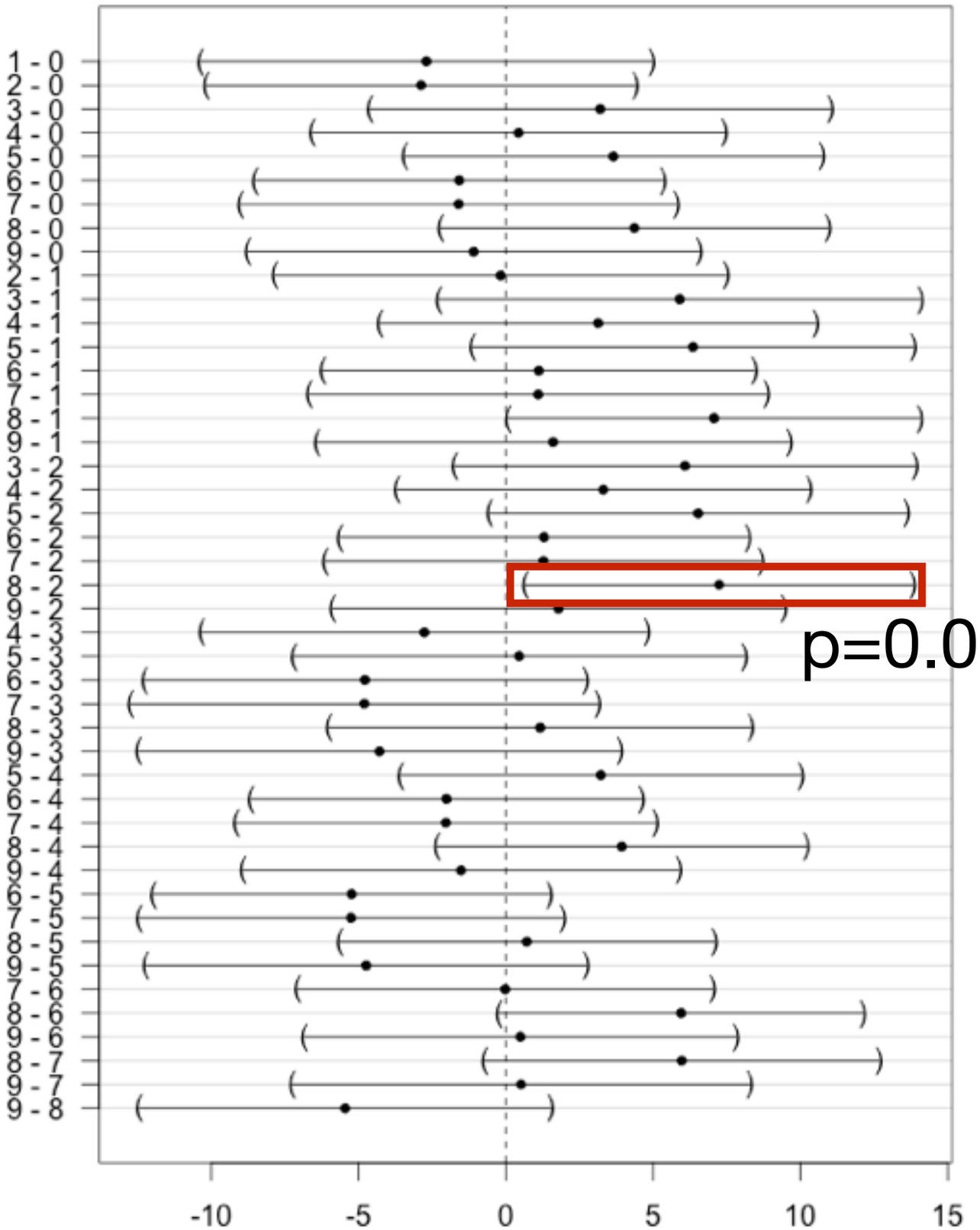
Example

There is convincing evidence students with an ID that ends in 8 score higher than students with an ID that ends in 2 (p-value = 0.03).

But you shouldn't believe that!

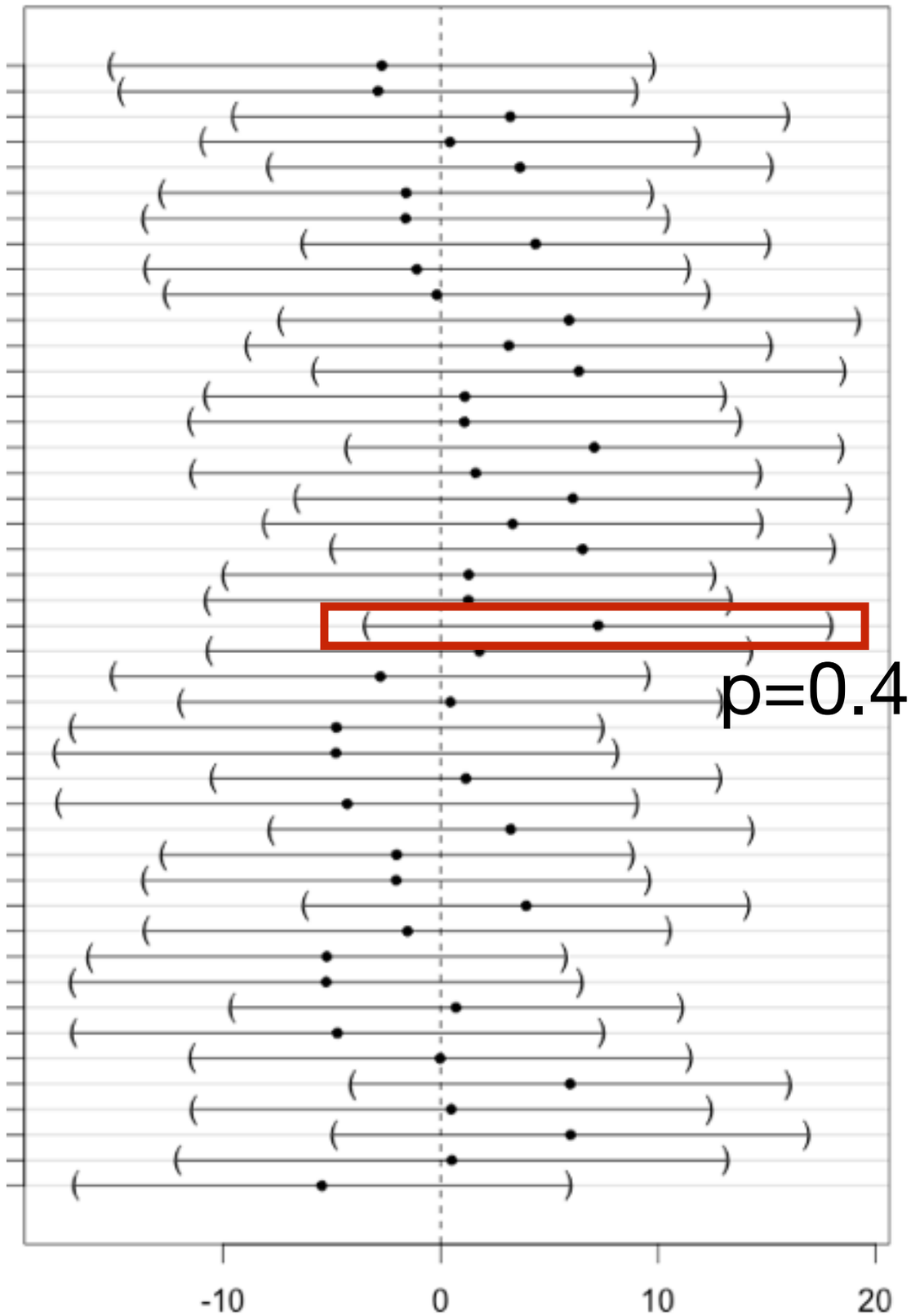
Behind the scenes, I looked at all pairwise comparisons using a pairwise t-test, this was the only one that was significant. That's a total of 45 comparisons! It isn't surprising I found one that was significant.

Unadjusted



p=0.03

Tukey-Kramer Adjusted



p=0.48

Other suggestions

1. Interpretation of p-value in SLR
2. Prediction intervals when and when not accurate
3. Final from last year: you suggest question numbers #8
4. Additive/multiplicative (cloud seeding?)

1. Interpretation in SLR

p-value, estimate from R, writing a statement…

p-value in R table, is always testing parameter = 0, interpretation depends on parameter.

Slope:

p-value = 0.03

We have moderate evidence the slope parameter is not zero (t-test on slope, n = , d.f. , p-value = 0.03).

We have moderate evidence the mean response depends on the explanatory variable (t-test on slope, n = , d.f. , p-value = 0.03).

It is estimated, that each one unit increase in the explanatory variable, is associated with a (estimate from table) increase in the mean response.

2. Prediction intervals

For prediction intervals to be appropriate we require two things: an appropriate model and appropriate data.

1. Are my assumptions satisfied?

2. Scope of inference. Is the object I'm trying to predict for, just like a sample from the same population as my data?

3. Additive/Multiplicative

Easiest to think about in randomized experiment case

Control & a treatment: treatment effect

Additive: We estimate the effect of seeding a cloud is to increase rainfall by 100 acre/feet. (Y + 100)

Multiplicative: We estimate the effect of seeding a cloud is to increase rainfall by 20%. (Y*1.2)

Where next?

ST412/512 Methods of Data Analysis II - Multiple Regression

(next term taught by Claudio Fuentes)

my notes at: http://stat512.cwick.co.nz/

ST415/515 Design of Experiments

ST431/531 Sampling Methods

ST421/521 Introduction to Mathematical Statistics