

STAT 217: Quiz 10

Name: Solutions

1. When should you use a multiple comparison procedure? Circle all that apply.

- ☒ A You have multiple groups in the study, and you want to look at all the possible pairwise comparisons. EX: You have three groups, A, B, and C. You want to compare the means of A and B, B and C, and A and B.
- ☒ B You have multiple groups in your study, you see the data, get a little curious, and then you decide you want to compare the means of two of the groups.
- ☐ C You only have two groups in your study, and you are doing a two-sample t-test to compare the means.
- ☐ D You only have two groups in your study, and you want to make a confidence interval for the true difference in means.
- ☒ E You have multiple groups in your study, and you want to make a confidence interval for all the pairwise differences.

2. In class today, we talked about two multiple comparison procedures used to generate family-wise significance levels and family-wise confidence intervals. Circle them (you should circle two answers).

- ☒ A Tukey's HSD
- ☐ B Bootstrap intervals
- ☒ C Bonferroni's MCP
- ☐ D Scope of inference

See Back

The "warpbreak" data (manipulated below) gives the number of warp breaks per loom, where a loom corresponds to a fixed length of yarn. The tension refers to the tension of the loom, set at low, medium, or high.

```
require(multcomp)
tension <- factor(warpbreaks$tension, levels=c("H", "M", "L"))
amod <- aov(warpbreaks$breaks ~ tension)
ps <- glht(amod, linfct = mcp(tension = "Tukey"))
confint(ps)
```

```
##
## Simultaneous Confidence Intervals
##
## Multiple Comparisons of Means: Tukey Contrasts
##
##
## Fit: aov(formula = warpbreaks$breaks ~ tension)
##
## Quantile = 2.414
## 95% family-wise confidence level
##
##
## Linear Hypotheses:
##           Estimate lwr      upr
## M - H == 0  4.722   -4.839 14.284
## L - H == 0 14.722    5.161 24.284
## L - M == 0 10.000    0.438 19.562
```

3. Choose the correct interpretation of the confidence interval(s) above.

- (a) We are 95% confident that the true difference in mean breaks between those yarns at a low tension and those yarns at a high tension is between 24.282 and 5.163 breaks.
- (b) We are 95% confident that the high group has more breaks than the low group.
- (c) We are 95% confident that all of the intervals above contain their respective true differences in mean breaks.
- (d) We are more than 95% confident that all of the intervals above contain their respective true differences in mean breaks.