## Pairwise Comparison Exercises (in lieu of those of Section 8.2)

Answer the questions below related to pairwise comparisons. When the exercise is along the same lines as one in the textbook, the exercise number will be given. Nevertheless, answer the questions as written on this sheet using the information provided here; do not do the exercise as it is written in the textbook.

1. (This one mirrors Exercise 8.46.) The **StudentSurvey** data set contains categorical variable

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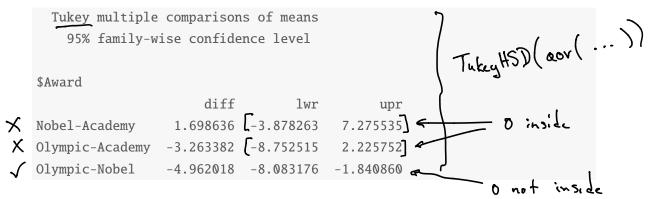
- (a) What groups/populations are being compared? That is, what are the values of the explanatory variable?
- (b) State null and alternative hypotheses for the 1-way ANOVA test.
- (c) The ANOVA table appears below. Use an *F*-distribution to obtain a *P*-value corresponding to the test statistic. Why is it valid to obtain the *P*-value this way?

Analysis of Variance Table Response: Pulse Df Sum Sq Mean Sq F value 2047 1023.62 7.1039 Residuals 359 51729 144.09

Command in RStades
which produces this table:

anova (Im (Pulse ~ Award, date=Studentsweey))

- (d) State your conclusion, in contex Comment to pt P-value 1-pf (7.1039, 2,359)
- (e) When the *F*-statistic of 1-way ANOVA is significant, we do pairwise comparisons. Below are 95% confidence intervals for the difference in (population) group means, constructed using the TukeyHSD approach. Use the computer output to determine which pairs of means have a difference that is significant at the 5% level.



2. (This one mirrors Exercise 8.52, and extends the work done in Exercise 8.32.) The 1-way ANOVA test in Exercise 8.32 leads to a significant result, one that leads to rejection of the null hypothesis. So, which group means are different? Use the TukeyHSD pairwise comparison output below to determine which difference in means are significant at the (adjusted) 5% level.

## Questions:

- How many values does our categorical ver. take? Ans. 3, Low/Med./High - Do you know any nos. in the ANOVA table?

	46	SS	MS	F
Groups	2			
From				
Total				

- If we assume the F-stat. was significant (led to rejection of H.), then doing the TukeyHSD is a sensible follow-up step. What is its aim? What conclusion does it suggest?

