

# Introduction to R

## *Session 7 exercises*

Statistical Consulting Centre

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### 1 *t*-tests

Carry out a two-sample *t*-test to determine whether:

- (i) males and females have different mean nerdy scores.
- (ii) the mean nerdy score of respondents living with their partners differs from that of respondents who do not live with their partners.

### 2 ANOVA

- (i) Perform a one-way anova to test mean nerdy score differs between the three age groups we have been considering.
- (ii) What are your conclusions from the one-way anova?  
*At least one age group's mean nerdy score differs from that of the others.*
- (iii) Find the estimated mean nerdy score over all age groups and for individual age groups.
- (iv) Perform pair-wise comparisons of mean nerdy scores between all age groups using Tukey's Honest Significance Difference method to compute *p*-values adjusted for multiple comparisons.
- (v) Which pairs of age groups differ in mean nerdy score?
- (vi) Perform a two-way anova of nerdy score on age group and gender.
- (vii) Which rows of the two-way ANOVA table are statistically significant?  
*Those corresponding to `age.group` and `gender`. The interaction between `age.group` and `gender` is not statistically significant at the 5% level since  $\Pr(>F) > 0.05$ .*
- (viii) Calculate the estimated means for each `age.group`, `gender` and `age.group-gender` combination. Perform *appropriate* pair-wise comparisons of means.

### 3 Tests of Independence

- (i) Produce a two-way frequency table of counts between `income` and `gender`.
- (ii) Do you think that income level depends on gender? Perform an appropriate test to find out.