

## Question 13

- **13a. Explain what the terms in equation 7.1 (p. 146) correspond to in the regression model from last week (predicting RT from frequency).**
- $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$
- $Y_i$ : RT for observation i
- $\beta_0$ : Intercept; average RT when frequency = 0
- $\beta_1$ : Slope; change in RT as frequency increases
- $X_i$ : Frequency of observation i
- $\varepsilon_i$ : Residual error for observation i

## Question 13

- **13b. Consider a new regression model that allows individual subjects to have different overall differences in reaction times and be differentially affected by frequency. This model would be defined by an equation like 7.4 (p. 152) [although note that frequency isn't centered].**
- **Explain what the terms in 7.4 would correspond to in such a model.**
- $Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij}$
- $Y_{ij}$ : RT for observation i from subject j
- $\beta_{0j}$ : Intercept for school j; average RT for subject j when frequency = 0
- $\beta_{1j}$ : Slope for school j; change in RT for subject j as frequency increases
- $X_{ij}$ : Frequency of observation i from subject j
- $\varepsilon_{ij}$ : Residual error for observation i from subject j

## Question 13

- **13c. Let us augment the model in (2b) to allow native English speakers and non-native speakers ('other' language speakers) to have overall RT differences. This would correspond to equation 7.13 (p. 155).**
- **Explain what the terms in 7.13 would correspond to in such a model.**

## Question 13

- $Y_{ij}$ : RT for observation  $i$  from individual  $j$
- $\gamma_{00}$ : RT for native speakers at frequency 0
- $\gamma_{01}$ : Difference in RT for non-native vs. native speakers at frequency 0
- $W_j$ : Indicator variable; 1 when individual  $j$  is non-native, 0 when individual  $j$  is native.
- $\gamma_{10}$ : Slope of frequency effect for native speakers; change in RT as frequency increases
- $\gamma_{11}$ : Change in frequency effect for non-native vs. native speakers
- $X_{ij}$ : Frequency of observation  $i$  from individual  $j$
- $\varepsilon_{0j}$ : Deviation from intercept ( $\gamma_{00}$ ) for individual  $j$
- $\varepsilon_{1j}$ : Deviation from overall frequency slope ( $\gamma_{10}$ ) for individual  $j$
- $\varepsilon_{ij}$ : Residual error for observation  $i$  from subject  $j$