

Exercise Set 13

1 Finishing the two-factor ANOVA from Exercise Set 12 [normal]

We follow up from Exercise Set 12. You can use the following results:

$$SS_E = \sum_{i=1}^2 \sum_{j=1}^2 SS_{i,j} = 127.11$$

$$SS_T = \sum_{i=1}^2 \sum_{j=1}^2 \sum_{k=1}^9 (X_{i,j,k} - \bar{X}_{\bullet,\bullet,\bullet})^2 = 181.56$$

$$SS_{B,skiing} = 9 * 2 * ((\bar{X}_{0,\bullet,\bullet} - \bar{X}_{\bullet,\bullet,\bullet})^2 + (\bar{X}_{1,\bullet,\bullet} - \bar{X}_{\bullet,\bullet,\bullet})^2) = 28.44$$

$$SS_{B,fondue} = 9 * 2 * ((\bar{X}_{\bullet,0,\bullet} - \bar{X}_{\bullet,\bullet,\bullet})^2 + (\bar{X}_{\bullet,1,\bullet} - \bar{X}_{\bullet,\bullet,\bullet})^2) = 25$$

Test if people who went skiing and ate fondue on the same day gained significantly more enjoyment from this combined action than just the sum of the individual actions (i.e. test if there is an interaction between the factors "skiing" and "fondue"). Use a level of significance of $\alpha = 0.05$.

2 The tuna-nutella sandwich [normal]

A new chef at a large convenience store wants to explore fusion cuisine. Her newest idea is a tuna-nutella sandwich. Before market launch, they hire a marketing company to conduct a field study. They find 36 volunteers to sample sandwiches and divide them into 4 equally sized groups. One group receives only bread, one bread with nutella, one bread with tuna, and one with nutella and tuna. The marketing company gives you the aggregated statistical results shown below. Would you recommend the company to launch the product? Use $\alpha = 0.05$.

Mean taste scores in each group:

	no tuna	tuna
no nutella	4.89	5.89
nutella	5.68	4.89

Sum of square of errors within each group

	no tuna	tuna
no nutella	2.89	2.89
nutella	4	4.89

The total values are $\bar{X}_{\bullet,\bullet,\bullet} = 5.33$ and $SS_T = 22$.