

Practice 3.2 (Level 1): Estimating Relationships of Interest

Task

In this practice, you continue the analysis of the **mydata.disks** data set by estimating relationships of interest.

Reminder: Make sure you've defined the **mydata** library.

1. Use an LSMEESTIMATE statement to compare the average service time for Bob for Brand 2 with the average service time for Justin for Brand 2. Use the ELSM option to verify that your coefficients are correct.

Is the average service time significantly different for these two technician and brand combinations?

Presuming that α represents **Technician** and β represents **Brand**, the equation for this contrast in terms of the cell mean is the following:

$$\mu_{22} - \mu_{32} = 0 \Rightarrow$$

$$0 * \mu_{11} + 0 * \mu_{12} + 0 * \mu_{13} + 0 * \mu_{21} + 1 * \mu_{22} + 0 * \mu_{23} + 0 * \mu_{31} - 1 * \mu_{32} + 0 * \mu_{33} + 0 * \mu_{41} + 0 * \mu_{42} + 0 * \mu_{43}$$

If you use approach 2, then consider the following two-way table:

Technician	Brand			Sum
	1	2	3	
Angela				
Bob		1		
Justin		-1		
Karen				
Sum				

Technician	Brand			Sum
	1	2	3	
Angela	0	0	0	
Bob	0	1	0	
Justin	0	-1	0	
Karen	0	0	0	
Sum				

```

title;
proc glm data=mydata.disks;
  class Technician Brand;
  model Time = Technician|Brand;
  store out=mydata.diskstore;
run;
proc plm restore=mydata.diskstore;
  lsestimate Technician*Brand
    'Bob Brand 2 vs Justin Brand 2'
```

```

0 0 0 0 1 0 0 -1 0 0 0 0 / elsm;
run;
quit;

```

Examine the results.

As shown in the Least Squares Means Estimate Coefficients table, the output from the ELSM options confirms that you are comparing repair times for Bob on Brand 2 to those for Justin on Brand 2.

The Least Squares Means Estimates table indicates that Bob takes a little more than 27 minutes longer on average than Justin to repair Brand 2, and the difference is significantly different from 0.

2. Use an LSMESTIMATE statement to compute the difference between the lowest and highest average service times: Angela for Brand 2 and Karen for Brand 3. Use the ELSM option to verify that your estimate coefficients are correct. As the input data set, use the item store that you created in step 1.

What is the estimate of the difference between the two service times? Are they significantly different?

```

proc plm restore=mydata.diskstore;
  lsestimate Technician*Brand
    'Lowest (Angela Brand 2) vs. Highest (Karen Brand 3) '
    0 1 0 0 0 0 0 0 0 0 -1 / elsm;
run;
quit;

```

Examine the results. As shown in the Least Squares Means Estimates tables, the estimate of the difference between Angela for Brand 2 and Karen for Brand 3 is -53.75 minutes. On average, Angela repairs Brand 2 in almost an hour less than Karen repairs Brand 3.

Hide Solution

Statistics 2: ANOVA and Regression

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