Exersices — ANOVA tests for d-primes in **sensR**

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Topics:

ANOVA tests for d' values from Triangle, Duo-Trio, Tetrad, 2-AFC and 3-AFC tests using the **sensR** functions

- `dprime_compare`
- `dprime_test`
- `dprime_table` and
- `posthoc`

Exercise 1

You have been trying to lower the saturated fat content in one of your products and so you have been experimenting with a number of different formulations. You have compared 5 alternate products to your current standard in discrimination tests and received the following data table.

```
  correct total protocol
1      46   100 triangle
2      70   200   tetrad
3      86   150   tetrad
4     139   200  duotrio
5      35    50 triangle
```

1. Test if the discriminability (d') of the five alternate products differs from each other.

2. What is the concensus discriminability if all alternate products are considered together? Is it appropriate to talk about a common/concensus d-prime here?

3. Summarize any differences among the alternate products:

   (a) Do one or more products differ significantly from the concensus?
   (b) Can the alternate products be categorized in two or more significantly different groups?

4. Your boss favours the third alternate product in particular. Test which of the other products have d'-values that are significantly different from this one.

Exercise 2

A company has launched a product that seems remarkably similar to one of your products. In order to test just how similar the competitors product is to your product, and ultimately to clarify if you should demand your competitors product of the market, you initiate consumer discrimination tests in a number of different locations to cover the custumer base. You receive the following results:

```
    location correct total protocol
1 location 1      19    50    tetrad
2 location 2      20    50 triangle
3 location 3      19    50 triangle
4 location 4      24    50  duotrio
5 location 5      32    50  duotrio
6 location 6      16    50 triangle
```

1. Use `dprime_table` to summarize the data. Now try to set the argument `restrict.above.guess` to `FALSE` in `dprime_table`. What happens to the `pHat` estimates? Which results make most sense to you?

2. Now test if there are any differences among d-primes between the different locations using `dprime_compare` - compare the results of using all four different `statistics` arguments and both of the `estim` arguments. Which gives similar results and which would you avoid?

3. The main goal with the analysis is to assess similarity — perform a similarity test by taking all the data into account on the 5% level. How similar can you say that the products are? Is there statistical significance if you adopt $d_0' = 1$?

4. Now perform similarity tests for each location separately — how similar are you able to say the products are in this case? Is there statistical significance if you adopt $d_0' = 1$?