The basic idea is that I define an intersubject discrimination index, IDI. There's a multivariate version of the IDI, and a univariate version. I did this for each task separately. I also did this on GLMs that were fit separately per run. So for each task I had 2 sets of HiLo contrasts per person (one per run).  
  
Focusing now just on the multivariate version. First, I calculate the Euclidean distances between each subject's HiLo contrast vector in run 1, to their vector in run 2. Thus, these are *within-subject distances* (that are also *between-run* distances). For example, for subject i:

For 55 subjs, there are 55 within-subject distances.   
  
Then I calculate all the *between-subject* distances between runs. For example,

and also

For 55 subjs, there are 552 - 55 distances.

Thus, all of these within-subject and between subject distances can be formed into a 55 x 55 matrix. An example is displayed on slide 29. Each row/column is a subject. Rows are run 1, columns are run 2. Thus, all cells are between-run, and the matrix is asymmetric. The diagonal (orange) shows within-subject distances, the off-diagonals (blue) show between-subject distances.  
  
If patterns carry some individual-specific information, the between-subject distances (off-diagonals) should be larger than the within-subject distances (diagonal). So the IDI is a contrast:

which is also

That’s the multivariate IDI. The univariate IDI is calculated the same way (a contrast on distances). But the distances that go into the contrast are slightly different. Instead of calculating Euclidean distances between *patterns*, the distances are calculated between *means*. The PDF I sent shows that the distance between two means (two scalars) boils down to the absolute value of the difference, d = |mean(a) – mean(b)|. In other words, to compute univariate IDI, a “univariate distance matrix” is formed, similar to the matrix in slide 29 --- but instead of Euclidean distances between patterns, each cell of the matrix shows the absolute difference between means.

There is also a scaling operation that additionally needs to be done to the multivariate distances, so that they are directly comparable to the univariate distances (the multivariate distances need to be divided by the sqrt of the number of voxels).

Once all this is done, the two IDIs can be contrasted: *multivariate IDI – univariate IDI*.

The script <https://github.com/mcfreund/ub55/blob/master/code/fprint/est_dists.R> estimates and saves these two distance matrices per parcel\*subj (the univariate and multivariate distance matrices).

The main function that calculates the cross-run distance matrices is called *pdist2()* and is in this script: <https://github.com/mcfreund/ub55/blob/master/code/_funs.R>

The script <https://github.com/mcfreund/ub55/blob/master/code/fprint/boot_contrasts.R> performs the IDI contrast, and also does a bootstrap test to test the contrasts for significance.

The rmd <https://github.com/mcfreund/ub55/blob/master/code/fprint/multi-svd_hilo_target_schaefer400-07.rmd> compiles the results into the html report.