intergroupavg-sess

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1 Introduction

intergroupavg-sess is a program for intergroup averaging. The individual groups are assumed to have been averaged using a random effects model (see **isxavg-re-sess**). Inter-group statistics are computed based on the t-statistic:

$$t = \frac{a_1 - a_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \tag{1}$$

where a_i is the average from Group i, s_i^2 is the variance measured from Group i, and n_i is the number of subjects in Group i. The degrees-of-freedom is $DOF = n_1 + n_2 - 2$. This formula is used to asses the significance of the difference between the averages of two groups with different and unknown variances. The average and variance for each group are computed according to a random effects model. To run the random effects averaging, the user chooses a contrast which is used to collapse the hemodynamic responses across time and condition to yield a single number for each subject. The group average will be the average of this number over all the subjects. The group variance will be the variance of this number across all the subjects in the group.

2 Usage

Typing intergroupavg-sess at the command-line without any options will give the following message:

```
USAGE: intergroupavg-sess
Options:
   -analysis analysisname : session-level functional analysis name
   -contrast contrastname : contrast used in the random effects avg
   -group1    groupname    : name of group1 (positive)
   -group2    groupname    : name of group2 (negative)
   -intergroup intergroupname : name of intergroup average
   -space    spacename    : space in which to average (native, tal, sph)
   -hemi     hemisphere   : with sph space <lh rh>
   -umask umask   : set unix file permission mask
   -version       : print version and exit
```

3 Command-line Arguments

-o analysis: analysis created by *mkanalysis-sess* and used with *selxavg-sess* on each individual session.

-i contrast: contrast created by *mkcontrast-sess* and used when running *isxavg-re-sess*. If the contrast is multivariate, then sig and minsig maps will be produced.

-group1 groupname: group name given when calling *isxavg-re-sess*. This refers to the group that will be "positive" (ie, a_1 in Equation **??**).

-group2 groupname: group name given when calling *isxavg-re-sess*. This refers to the group that will be "negative" (ie, a_2 in Equation **??**).

-intergroup name: Name given to the intergroup average. This name is used in subsequent commands just as one would use the session id or the group name (eg, to view results).

-space spacename: Space in which *isxavg-re-sess* was run. This is the space that each individual was transformed to so that all individuals across all groups are registered. Options are: tal (for talairach), sph (for spherical surface-based), or the name of a region-of-interest (created with func2roi-sess).

-hemi hemisphere: Specify a given hemisphere when using spherical-based averaging (ie, *-space sph*). Options are lh and rh.

-umask mask: unix file permission mask. Set to 0 to share files with everyone.

4 Example

Say you have 10 subjects in 2 groups (A and B) with sessids: subject1a, ..., subject5a, subject1b, ..., subject5b. Create sessid files called a.sid and b.sid and sessdir file sess.dir. Let the analysis name be "main". The contrast you are interested in is "up-vs-down".

1. Run selxavg-sess on all subjects:
   selxavg-sess -sf a.sid -sf b.sid -df sess.dir -analysis main
2. Resample them into talairach space:
   func2tal-sess -res 4 -sf a.sid -sf b.sid -df sess.dir -analysis main
3. Run random effects group averaging for each group:
   isxavg-re-sess -group GroupA -sf a.sid -df sess.dir -analysis main -contrast up-vs-down -space tal
   isxavg-re-sess -group GroupB -sf b.sid -df sess.dir -analysis main -contrast up-vs-down -space tal
4. Run intergroup averaging:
   intergroupavg-sess -analysis main -contrast up-vs-down -group1 GroupA -group2 GroupB -intergroup AMinusB -space tal
5. View the results on the talairach volume:
   tkmedit-sess -analysis main -s AMinusB -isxavg random -contrast up-vs-down -space tal -d .