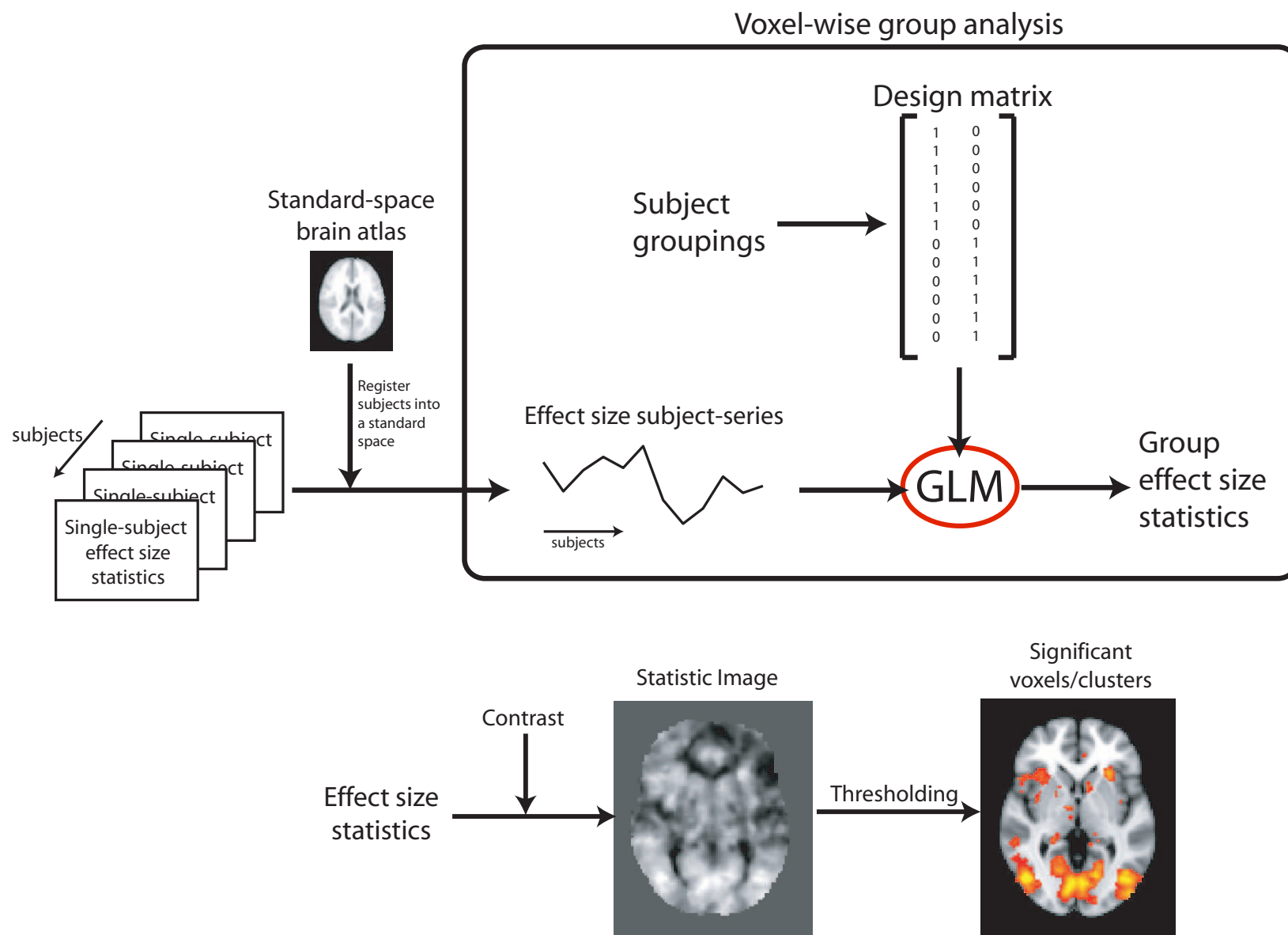


FMRI Group Analysis: Examples





Examples

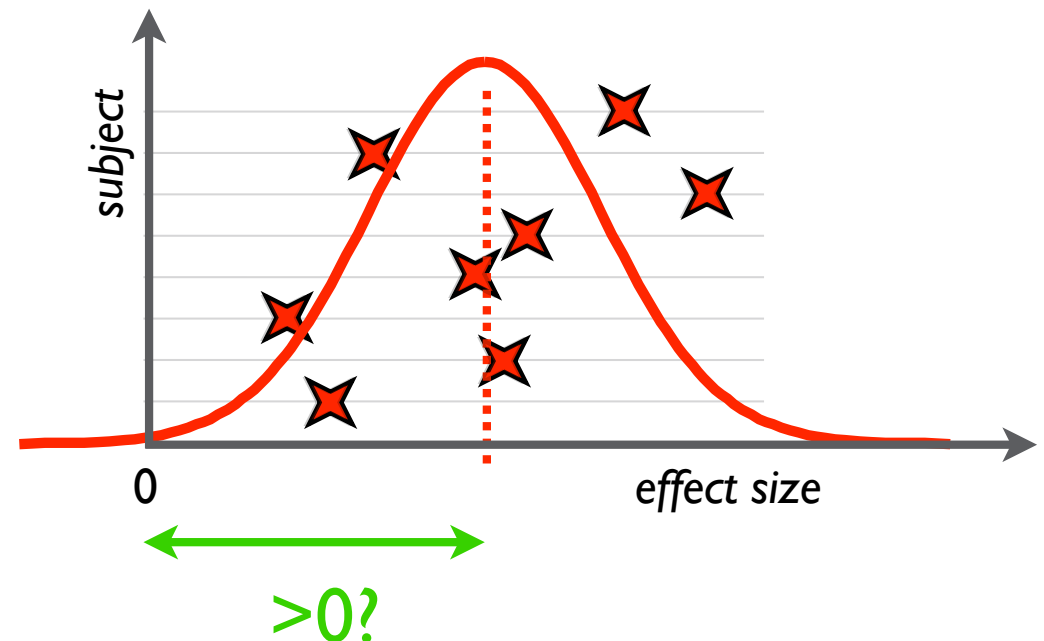


Single Group Average

- We have 8 subjects - all in one group - and want the mean group average:

Does the group activate on average?

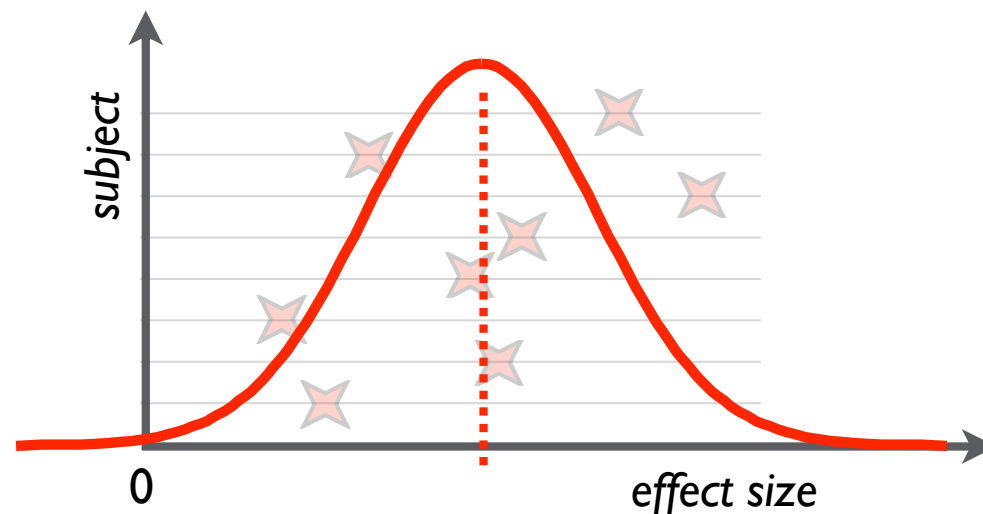
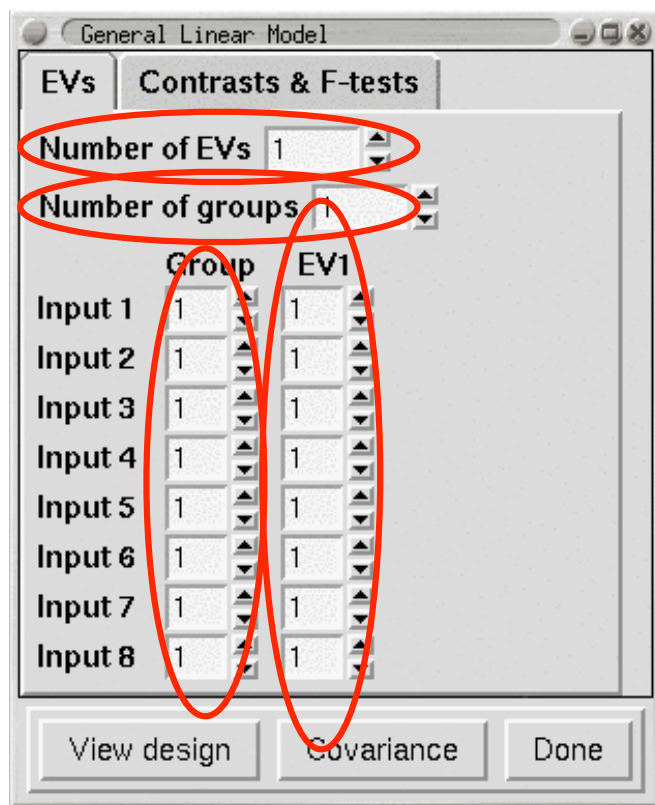
- estimate mean
- estimate std-error (FE or ME)
- test significance of mean > 0





Single Group Average

Does the group activate on average?





Single Group Average

Does the group activate on average?

General Linear Model

EVs Contrasts & F-tests

Number of EVs 1

Number of groups 1

	Group	EV1
Input 1	1	1
Input 2	1	1
Input 3	1	1
Input 4	1	1
Input 5	1	1
Input 6	1	1
Input 7	1	1
Input 8	1	1

View design Covariance Done

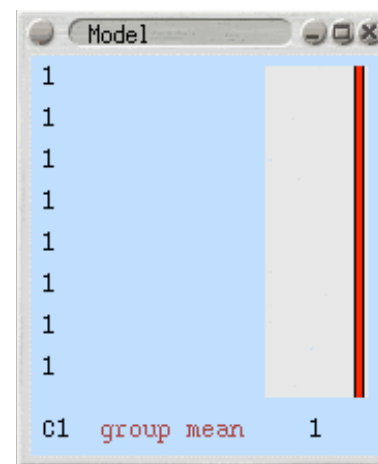
General Linear Model

EVs Contrasts & F-tests

Contrasts 1 F-tests 0

	Title	EV1
C1	group mean	1

View design Covariance Done



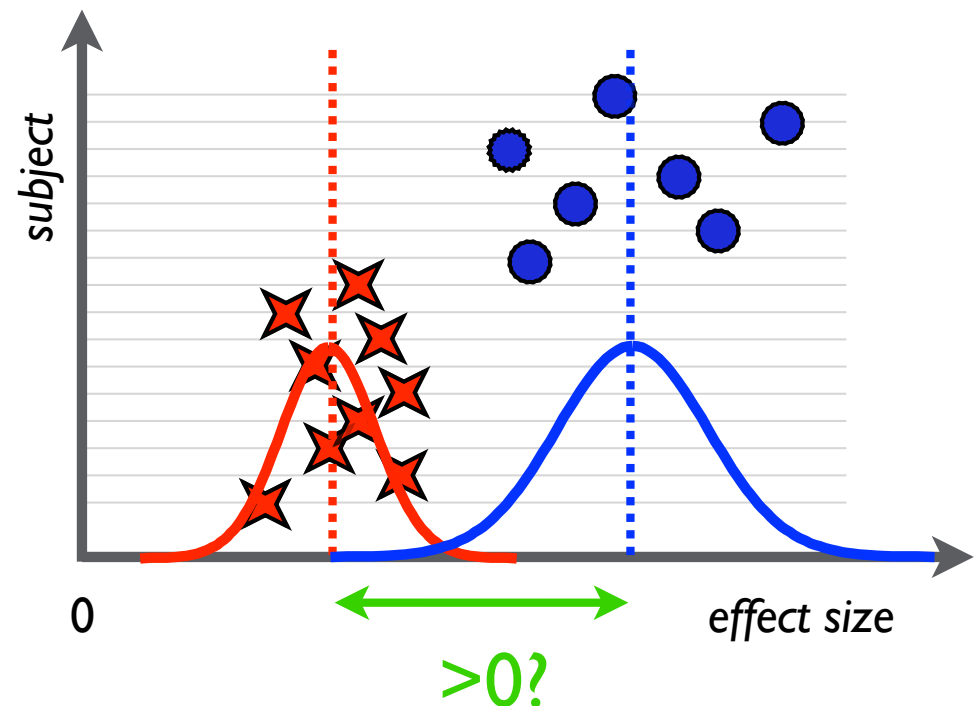


Unpaired Two-Group Difference

- We have two groups (e.g. 9 patients, 7 controls) with different between-subject variance

Is there a significant group difference?

- estimate means
- estimate std-errors (FE or ME)
- test significance of difference in means





Unpaired Two-Group Difference

Is there a significant group difference?

General Linear Model

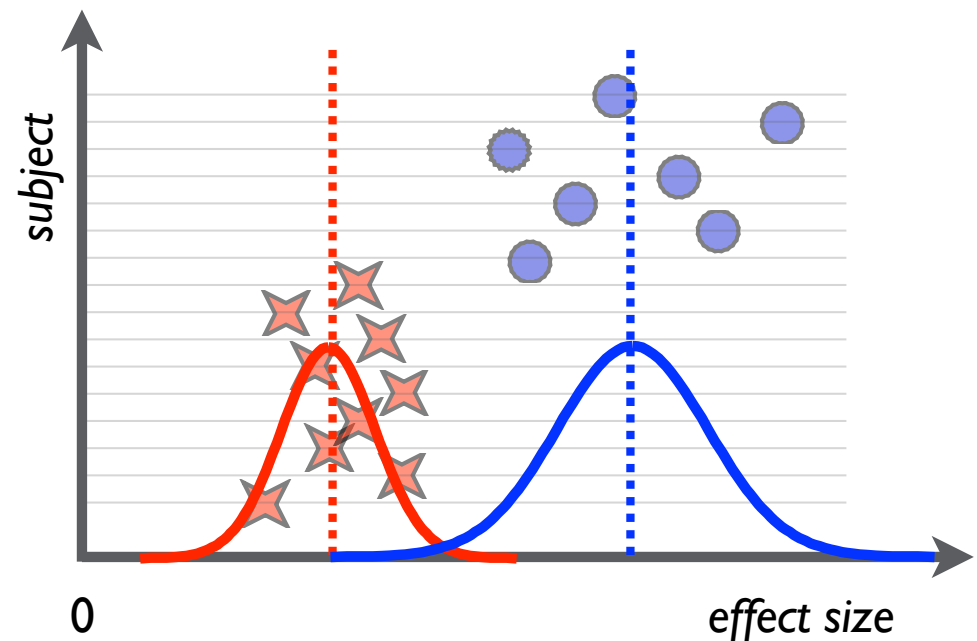
EVs Contrasts & F-tests

Number of EVs 2

Number of groups 2

	Group	EV1	EV2
Input 1	1	1	0
Input 2	1	1	0
Input 3	1	1	0
Input 4	1	1	0
Input 5	1	1	0
Input 6	1	1	0
Input 7	1	1	0
Input 8	1	1	0
Input 9	1	1	0
Input 10	2	0	1
Input 11	2	0	1
Input 12	2	0	1
Input 13	2	0	1
Input 14	2	0	1
Input 15	2	0	1
Input 16	2	0	1

View design Covariance Done





Unpaired Two-Group Difference

Is there a significant group difference?

General Linear Model

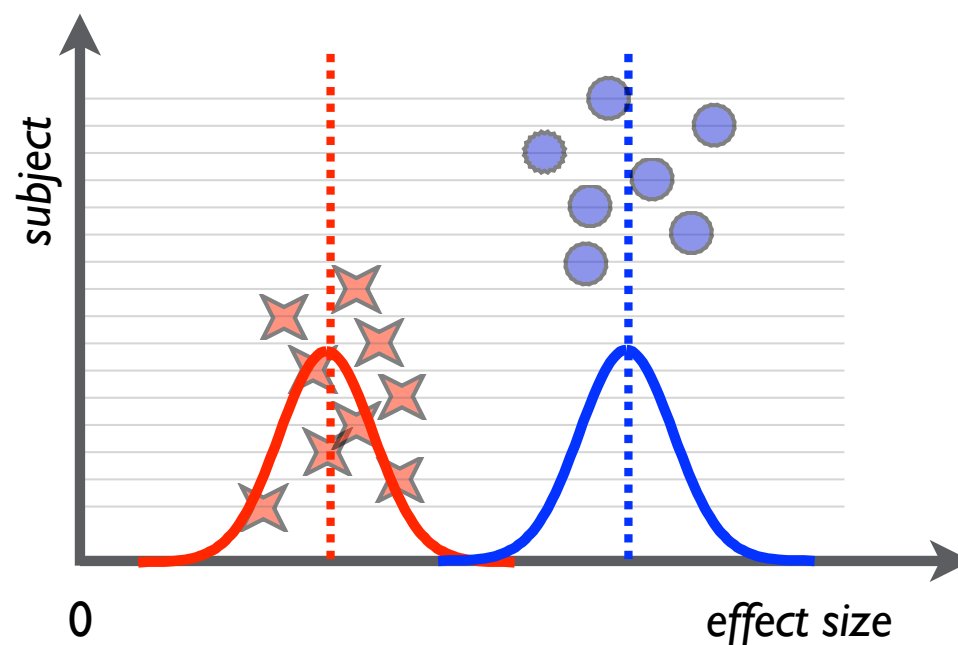
EVs Contrasts & F-tests

Number of EVs 2

Number of groups 1

	Group	EV1	EV2
Input 1	1	1	0
Input 2	1	1	0
Input 3	1	1	0
Input 4	1	1	0
Input 5	1	1	0
Input 6	1	1	0
Input 7	1	1	0
Input 8	1	1	0
Input 9	1	1	0
Input 10	1	0	1
Input 11	1	0	1
Input 12	1	0	1
Input 13	1	0	1
Input 14	1	0	1
Input 15	1	0	1
Input 16	1	0	1

View design Covariance Done





Unpaired Two-Group Difference

Is there a significant group difference?

General Linear Model

EVs Contrasts & F-tests

Number of EVs 2

Number of groups 2

	Group	EV1	EV2
Input 1	1	1	0
Input 2	1	1	0
Input 3	1	1	0
Input 4	1	1	0
Input 5	1	1	0
Input 6	1	1	0
Input 7	1	1	0
Input 8	1	1	0
Input 9	1	1	0
Input 10	2	0	1
Input 11	2	0	1
Input 12	2	0	1
Input 13	2	0	1
Input 14	2	0	1
Input 15	2	0	1
Input 16	2	0	1

View design Covariance Done

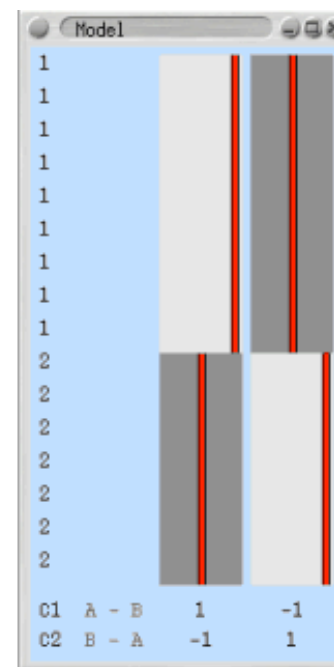
General Linear Model

EVs Contrasts & F-tests

Contrasts 2 F-tests 0

	Title	EV1	EV2
C1	A - B	1	-1
C2	B - A	-1	1

View design Covariance Done

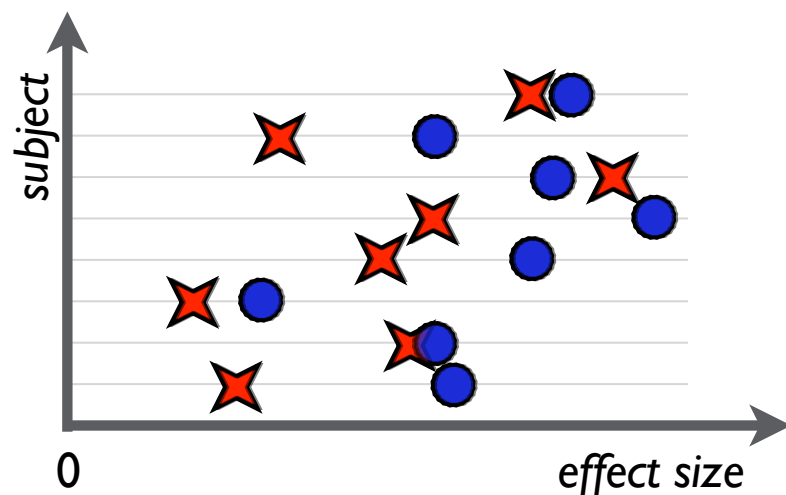




Paired T-Test

- 8 subjects scanned under 2 conditions (A,B)

Is there a significant difference between conditions?



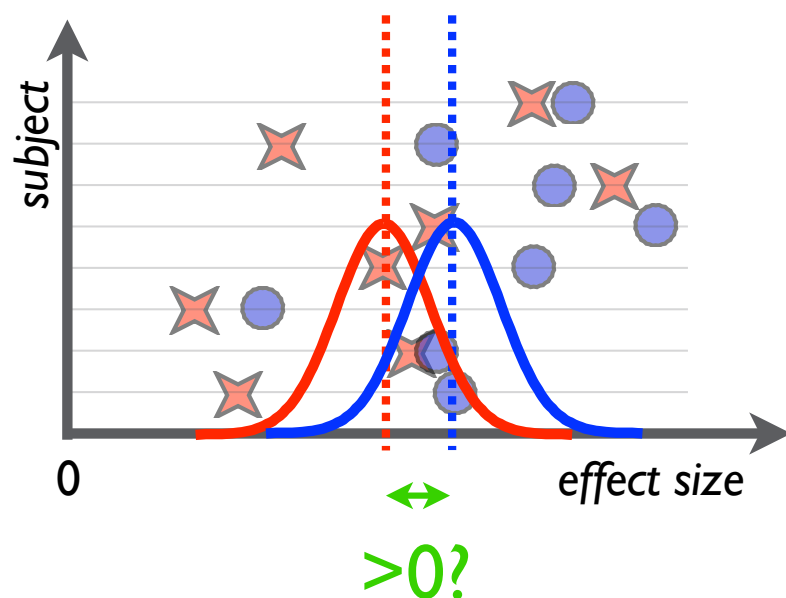


Paired T-Test

- 8 subjects scanned under 2 conditions (A,B)

Is there a significant difference between conditions?

try non-paired t-test



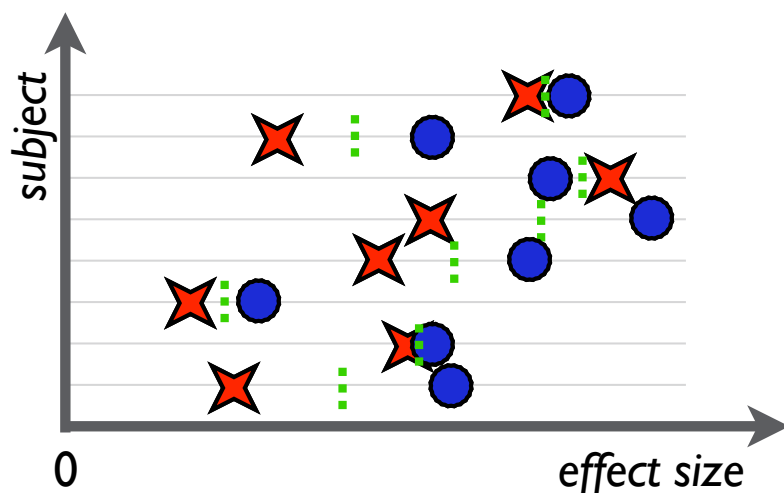


Paired T-Test

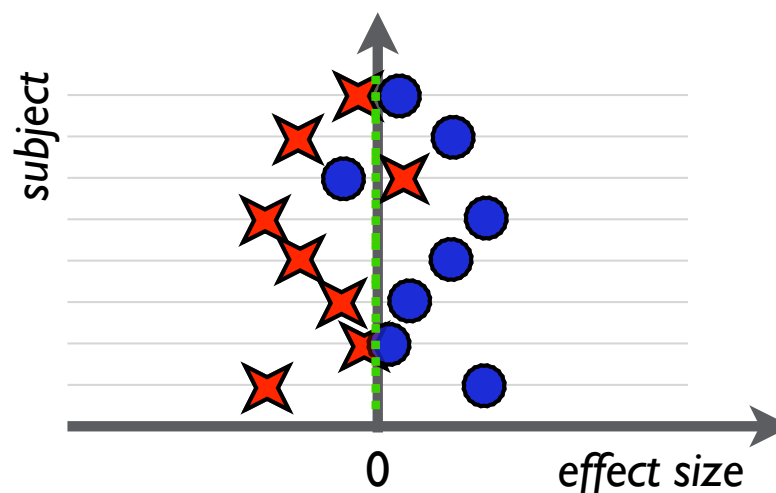
- 8 subjects scanned under 2 conditions (A,B)

Is there a significant difference between conditions?

data



de-meaned data



subject mean
accounts for large prop.
of the overall variance

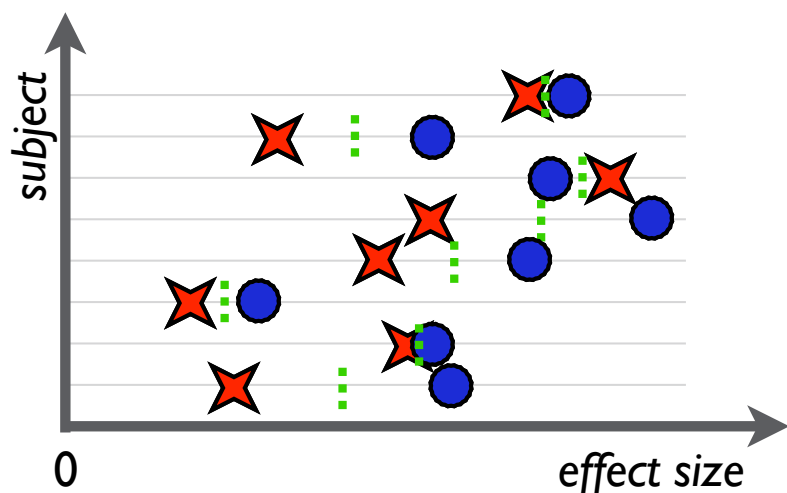


Paired T-Test

- 8 subjects scanned under 2 conditions (A,B)

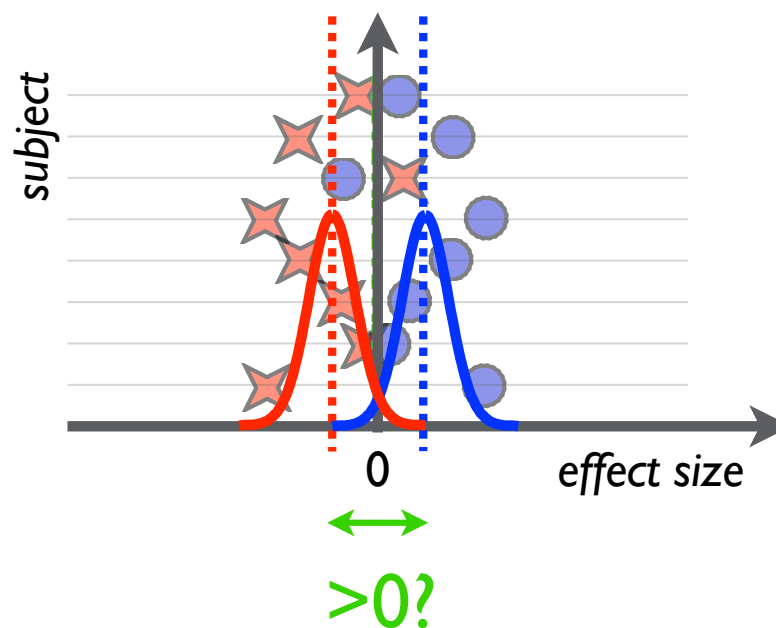
Is there a significant difference between conditions?

data



subject mean
accounts for large prop.
of the overall variance

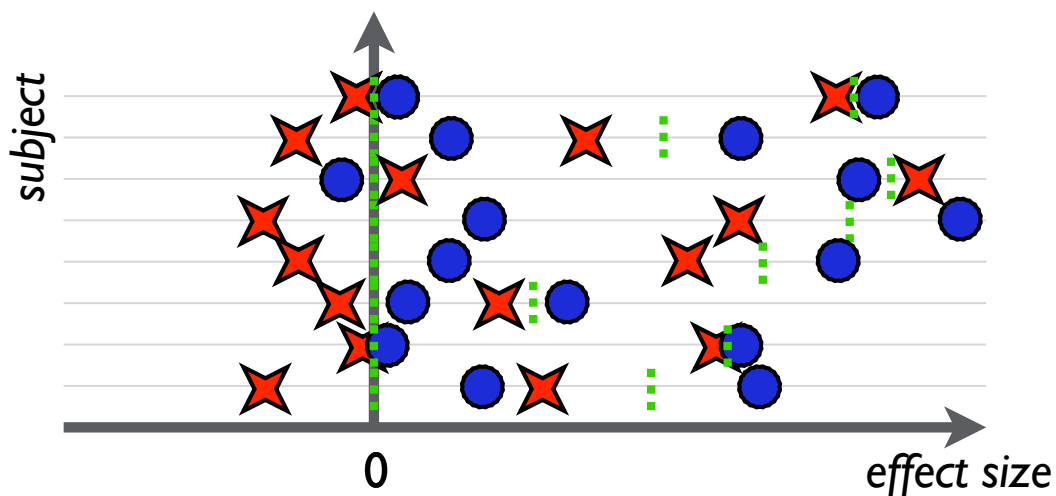
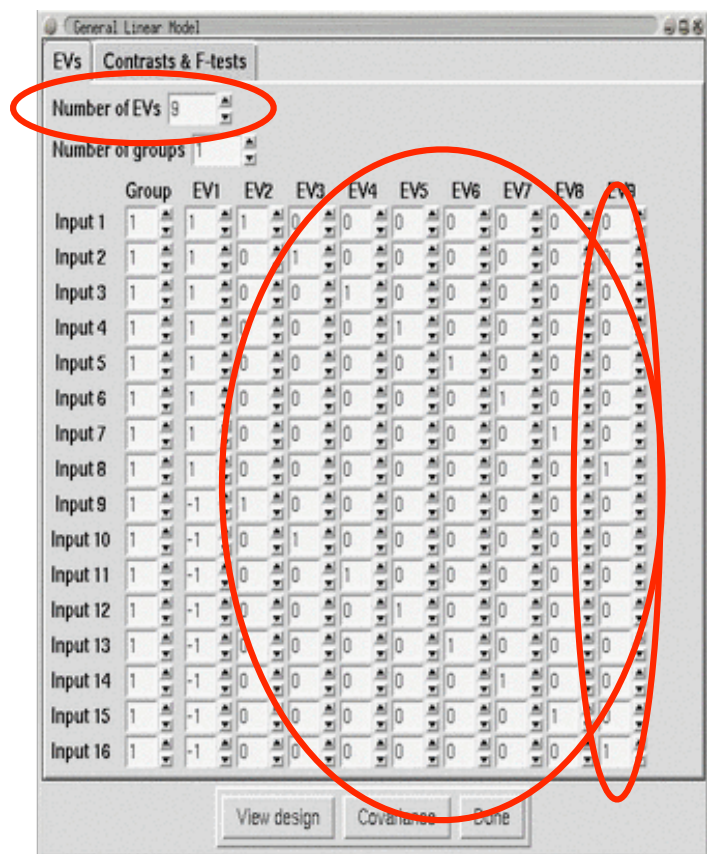
de-meaned data





Paired T-Test

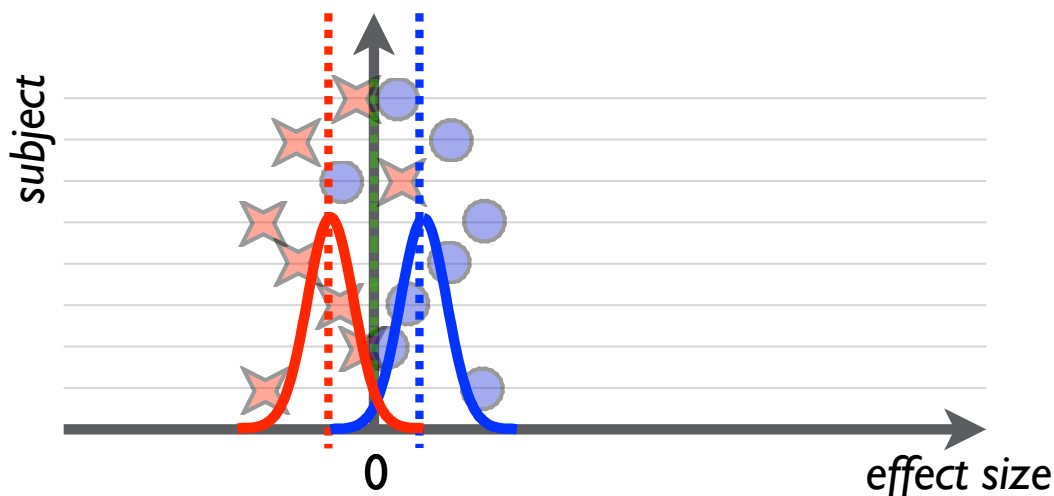
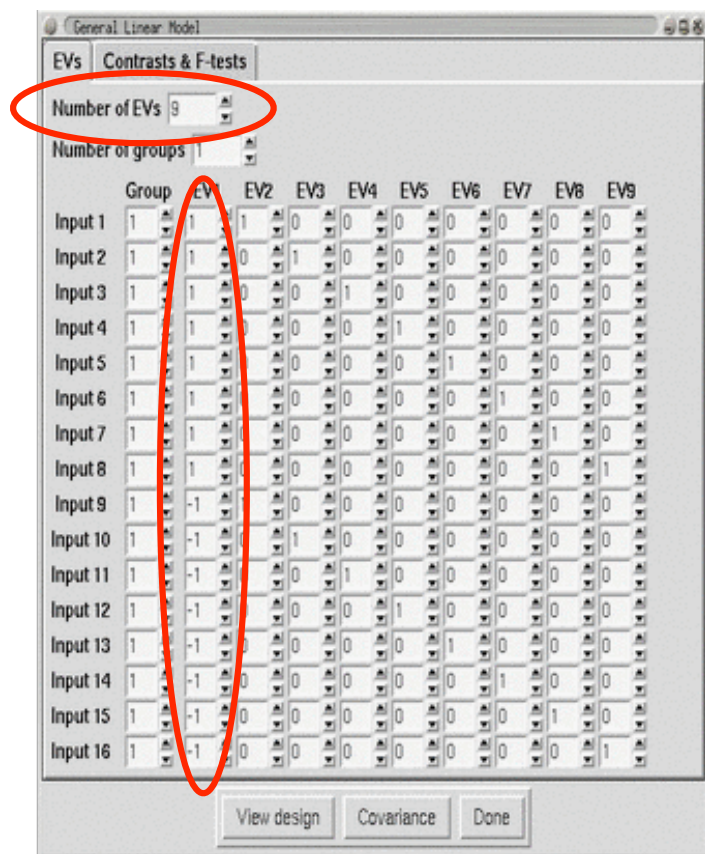
Is there a significant difference between conditions?





Paired T-Test

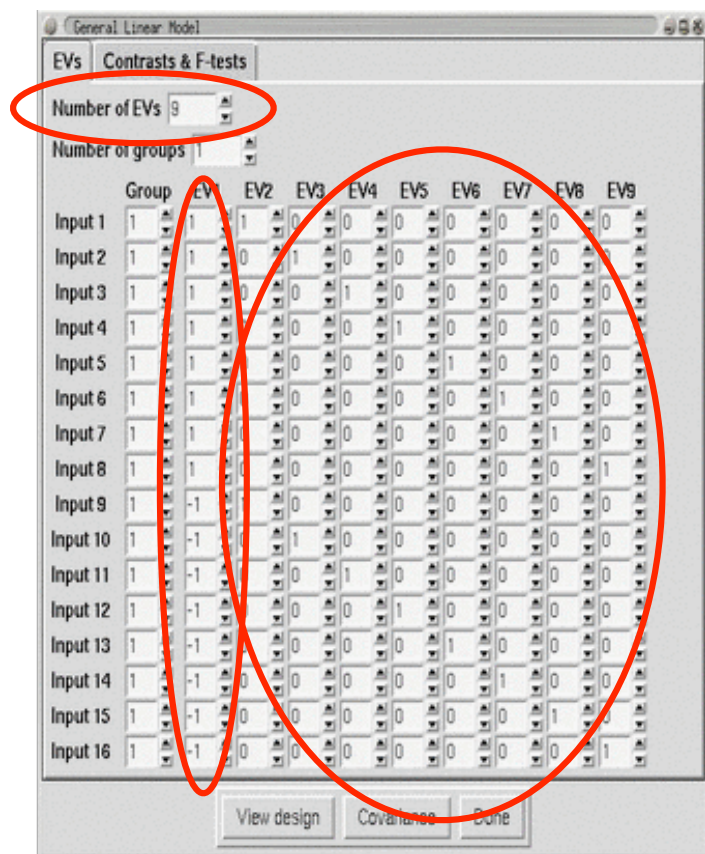
Is there a significant difference between conditions?





Paired T-Test

Is there a significant difference between conditions?



EV1 models the A-B
paired difference; EVs
2-9 are confounds
which model out each
subject's mean

