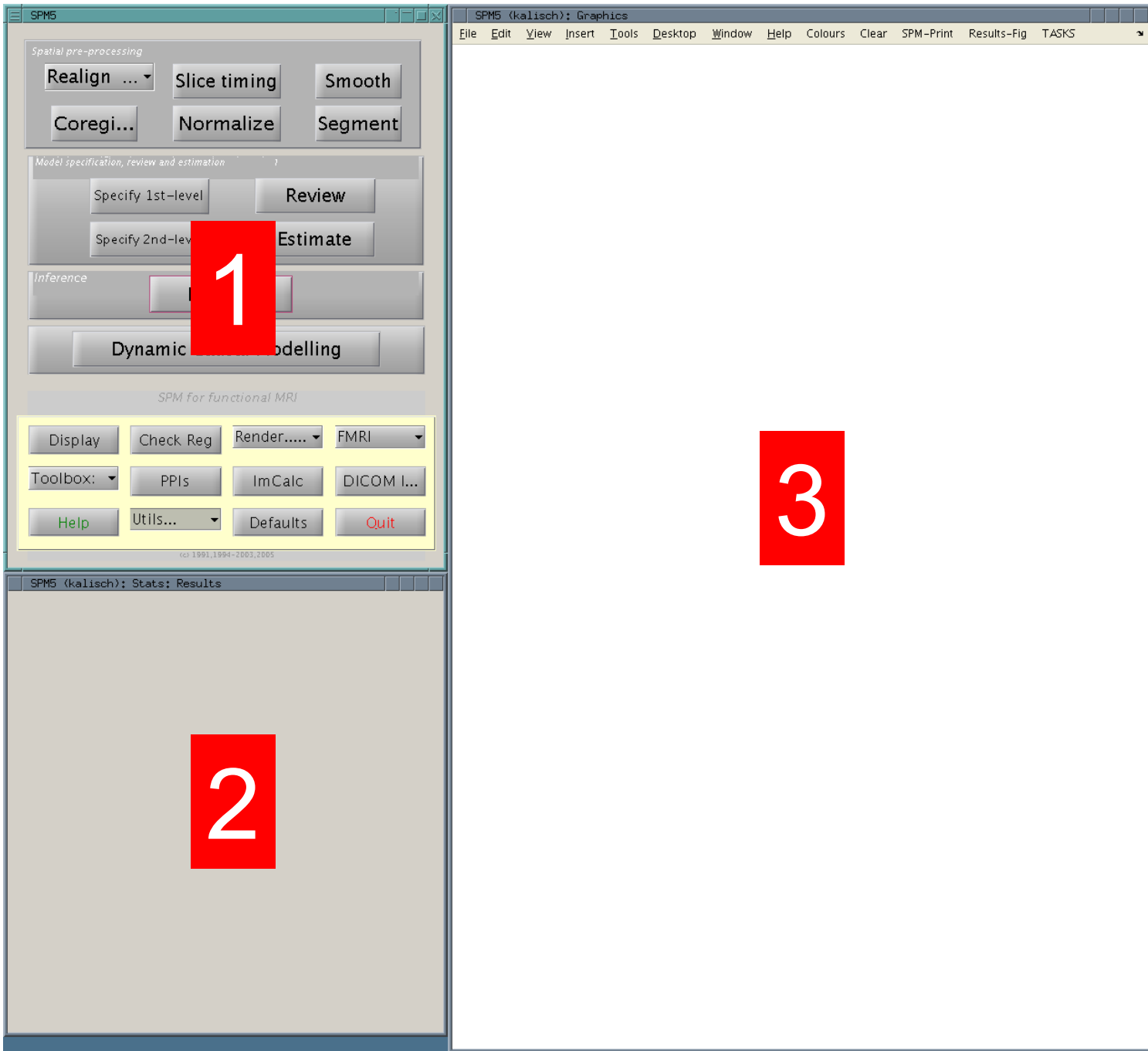


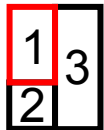
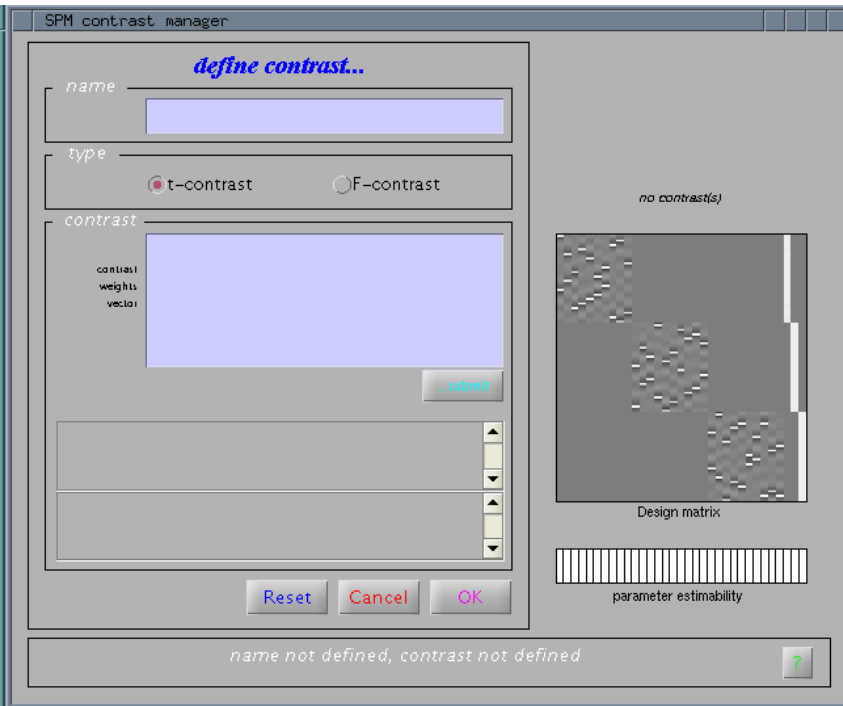
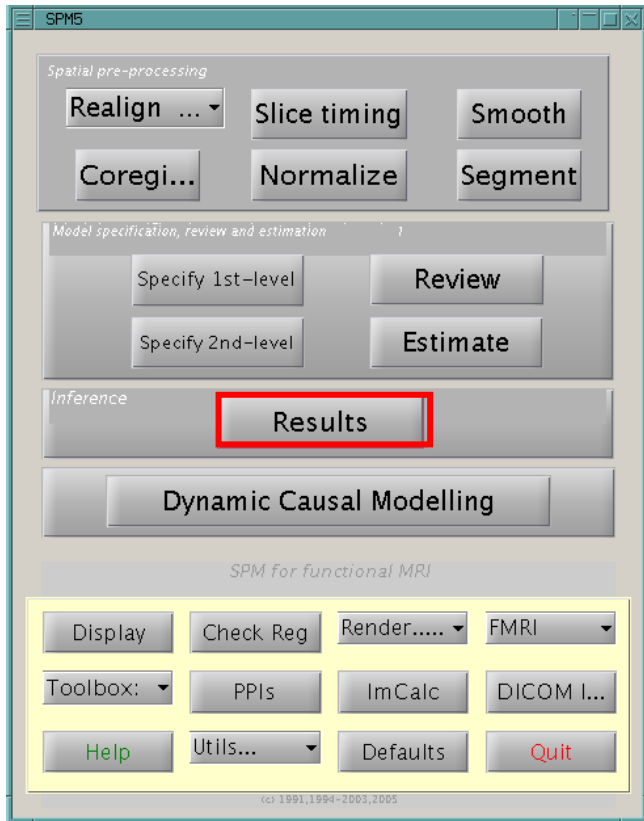
Ergebnisexploration und -darstellung

Raffael Kalisch

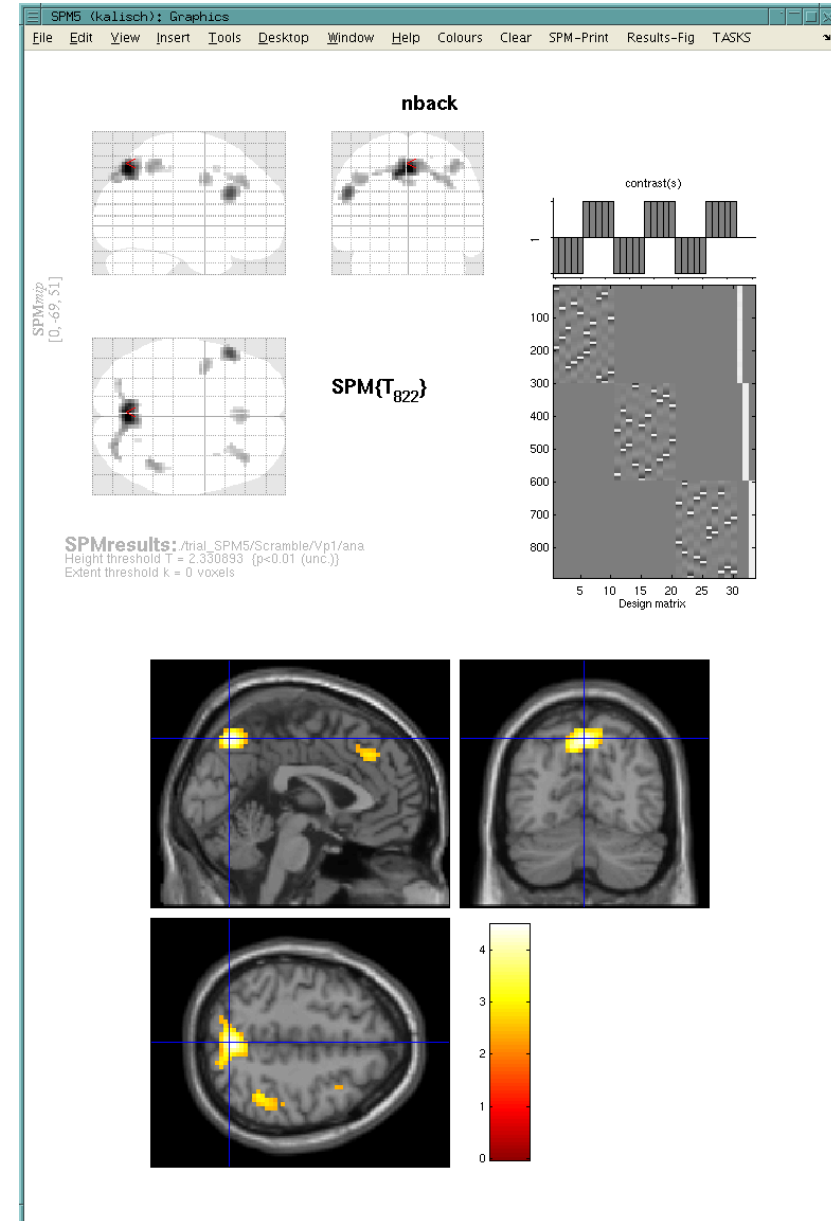
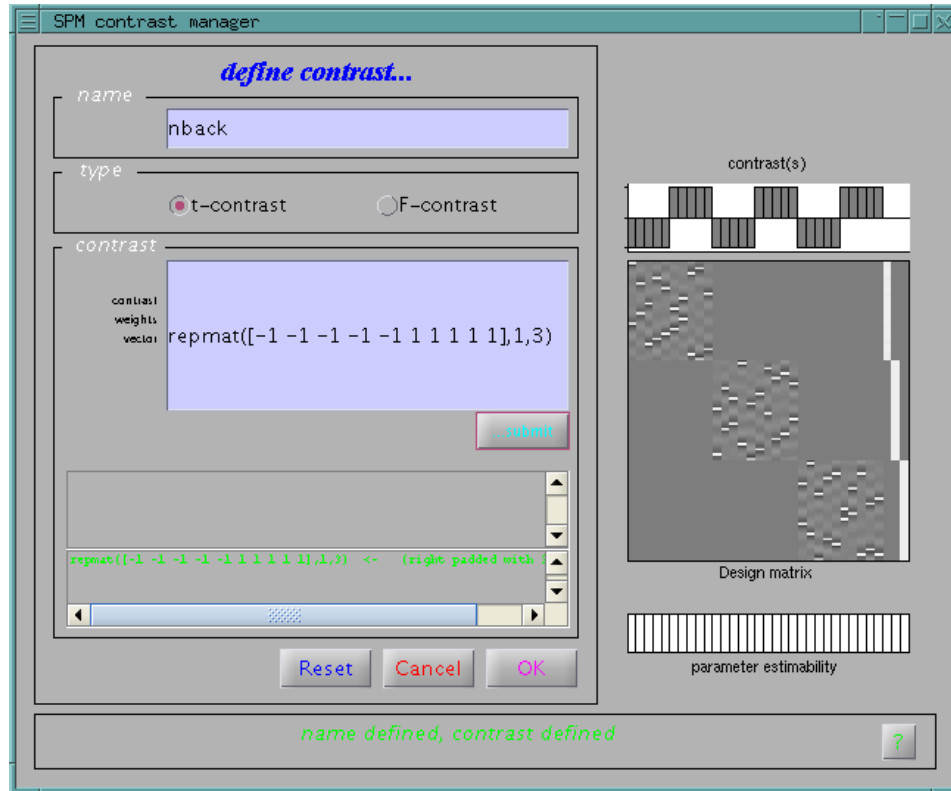
Institut für Systemische
Neurowissenschaften, UKE

SPM-Kurs 2010



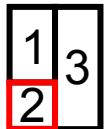
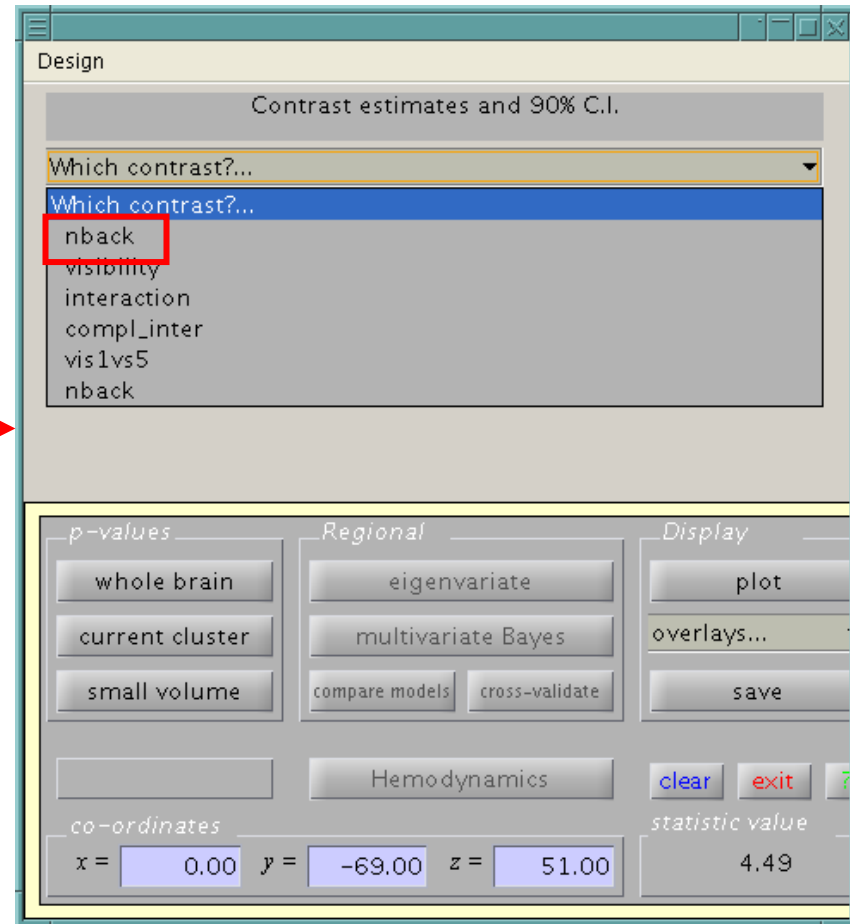
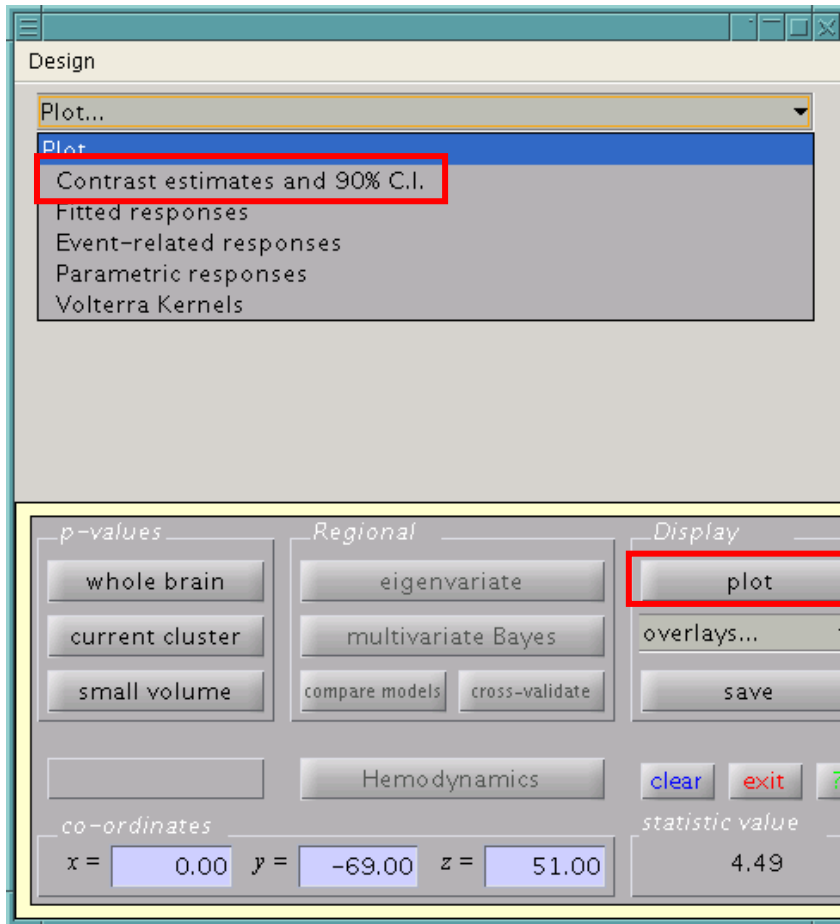


Kontrastdefinition

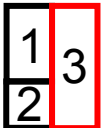
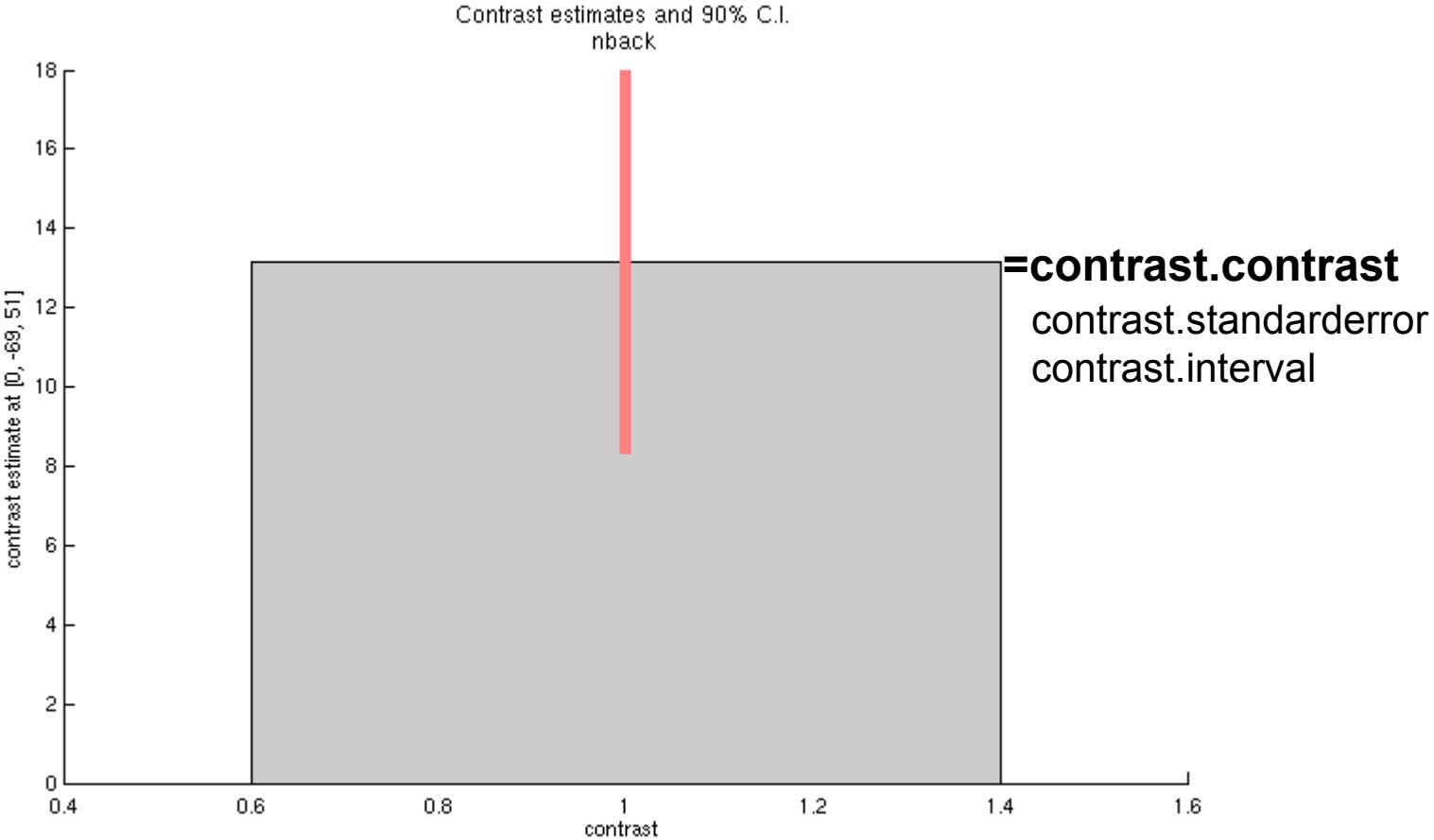


1	3
2	

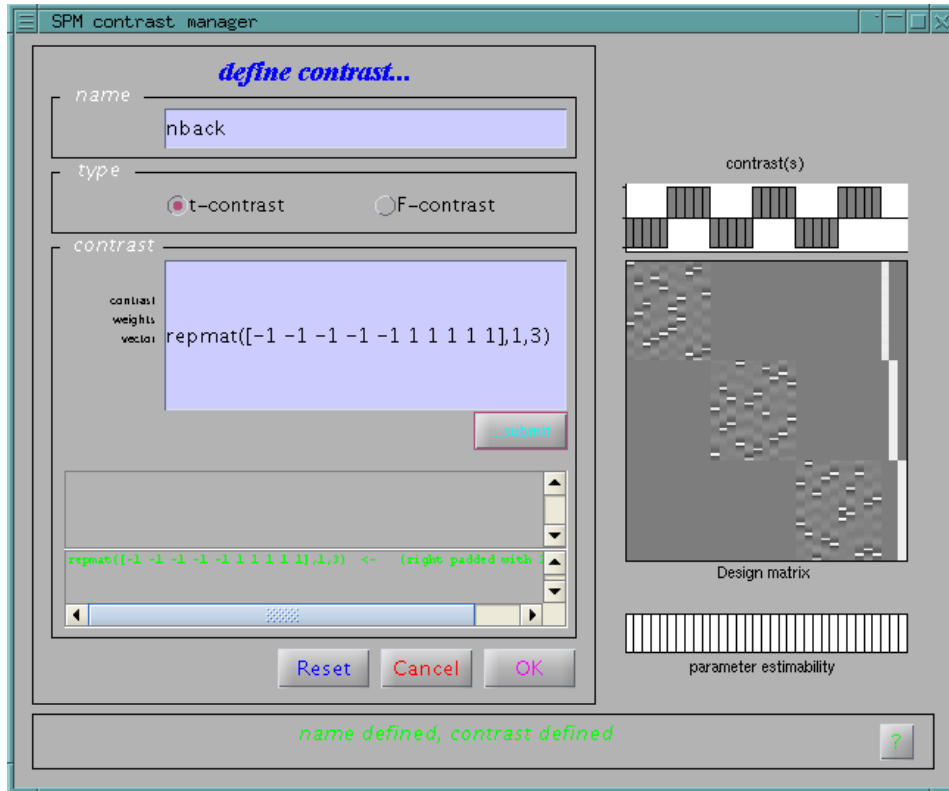
Plotten



Plotten: Contrast estimate für nback



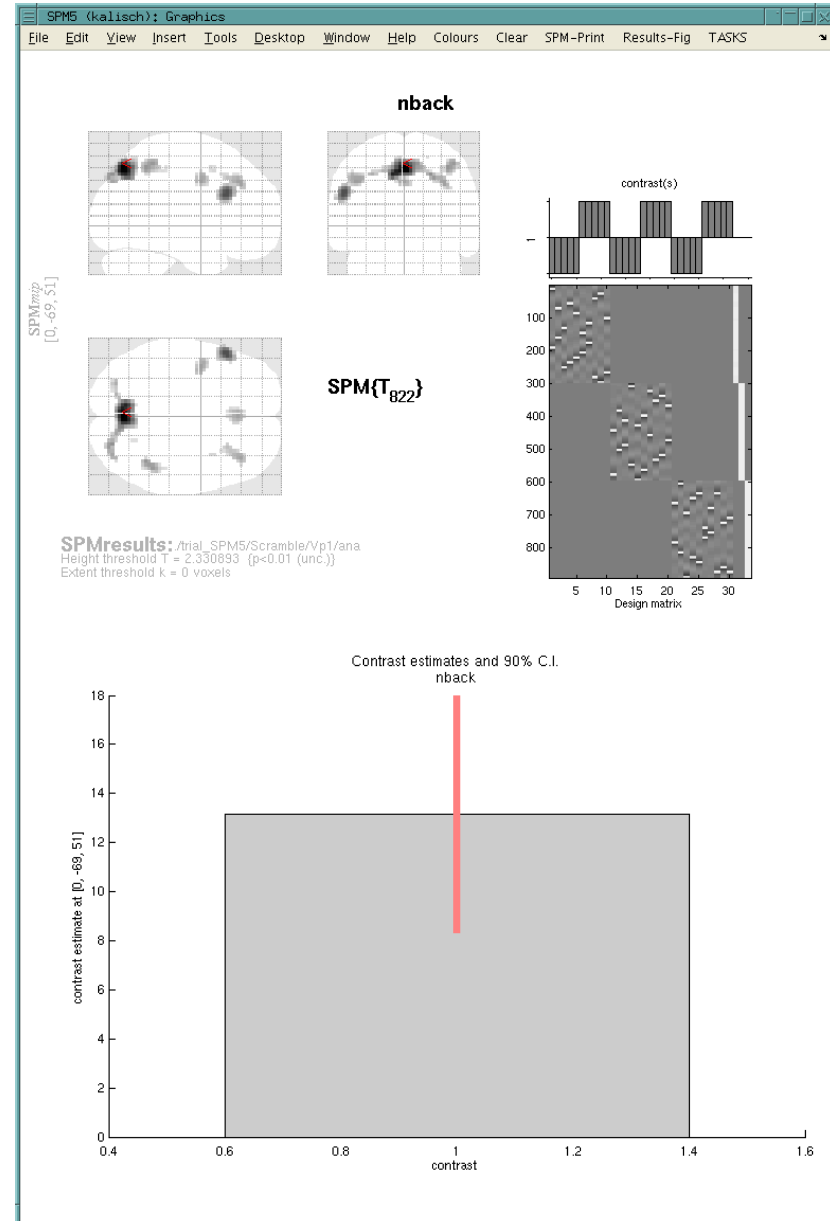
Plotten: Contrast estimate für nback



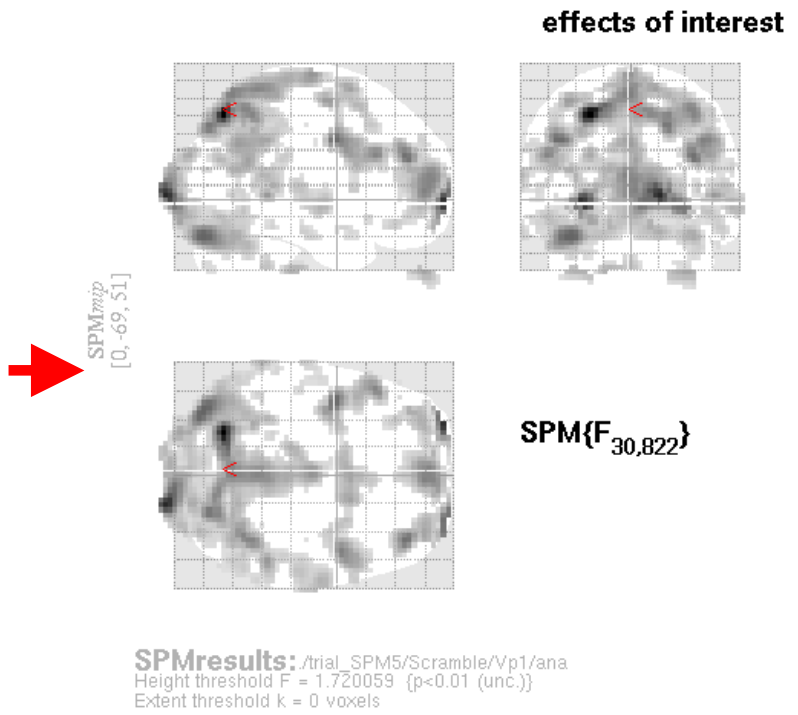
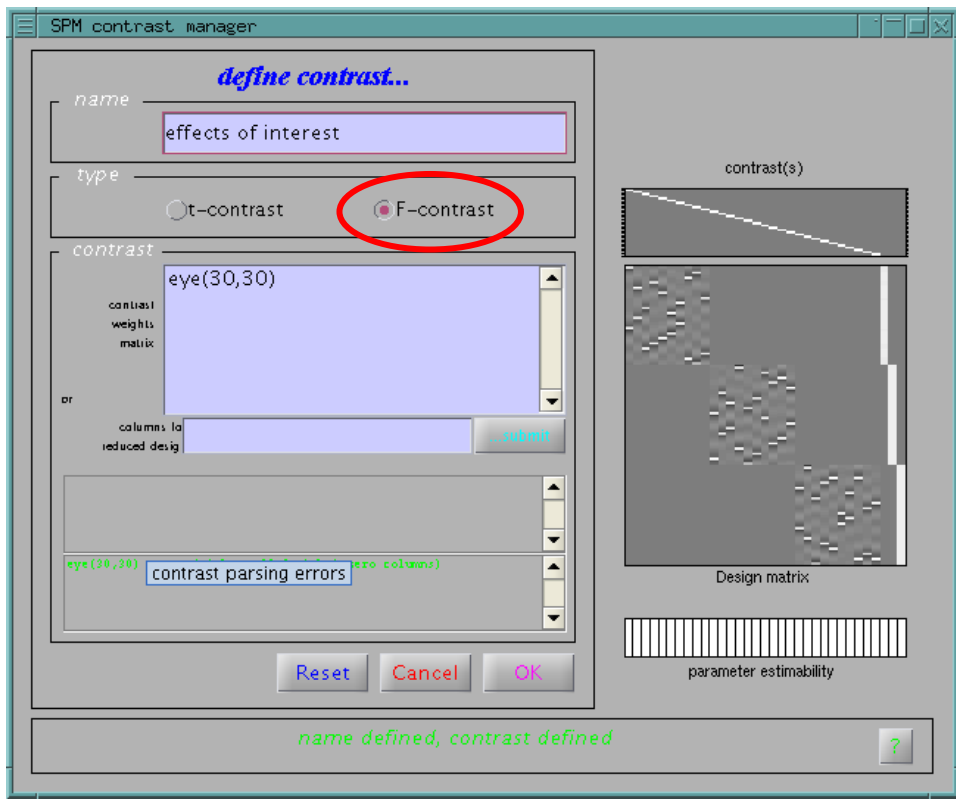
beta: Einzelwerte für jeden Regressor
im Modell (aus beta-images)
geeignete Linearkombination -->

contrast.contrast

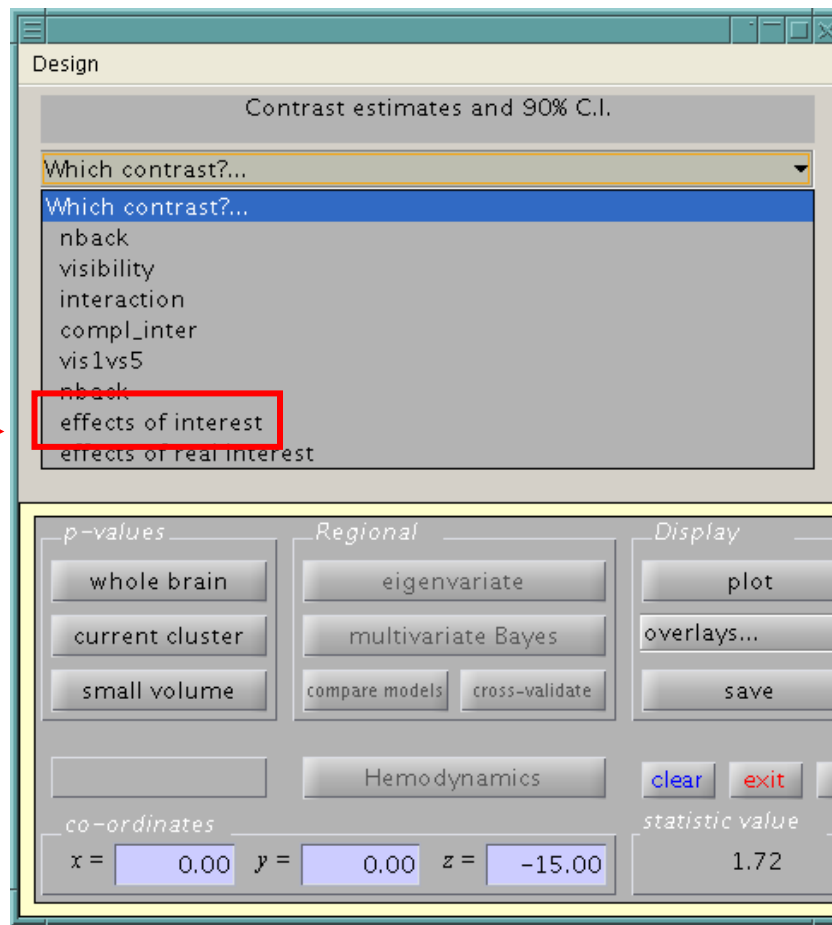
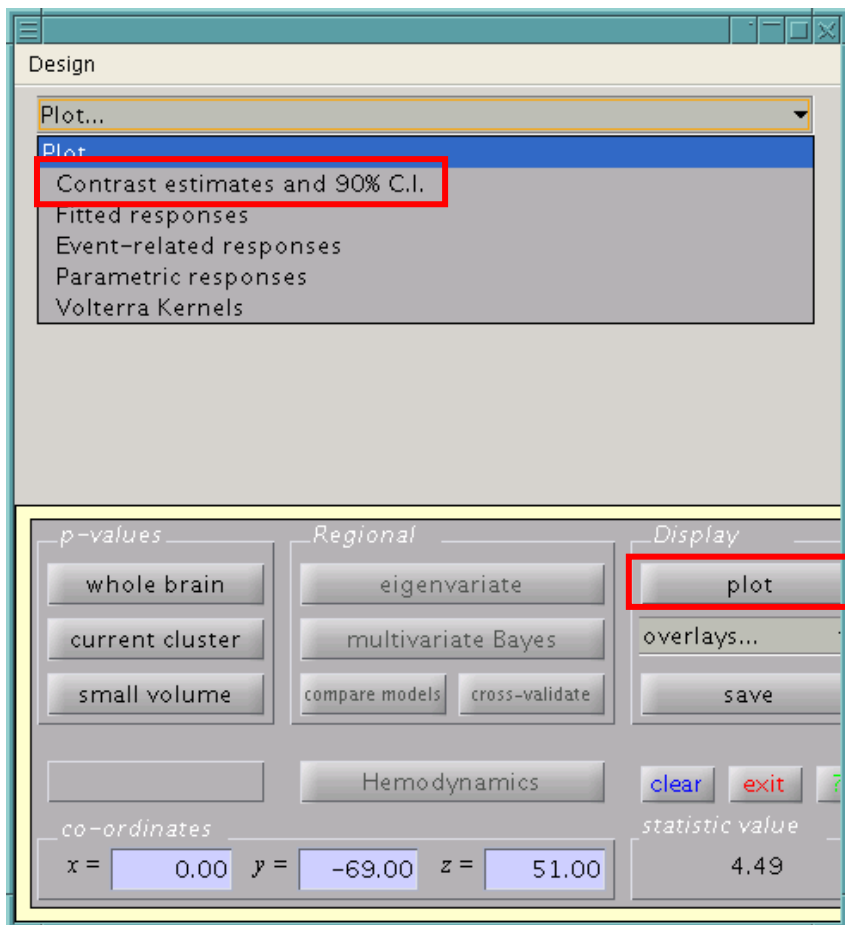
1	3
2	



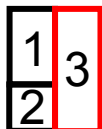
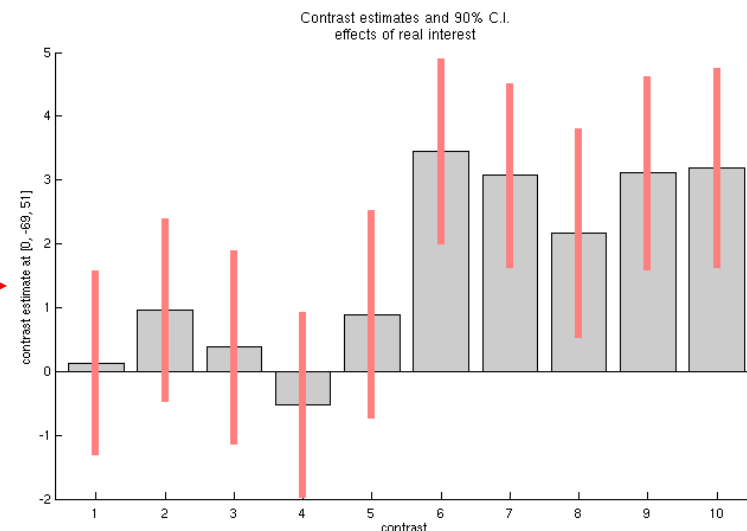
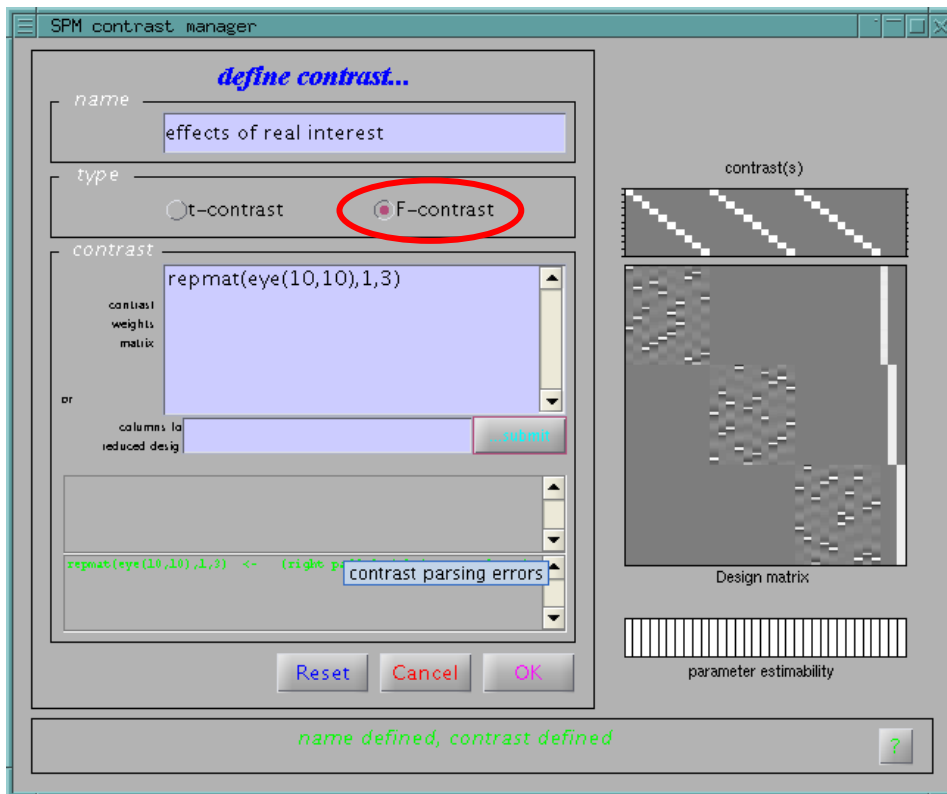
Plotten: Contrast estimates für alle Bedingungen (Regressoren)



Plotten: Contrast estimates für alle Bedingungen (Regressoren)

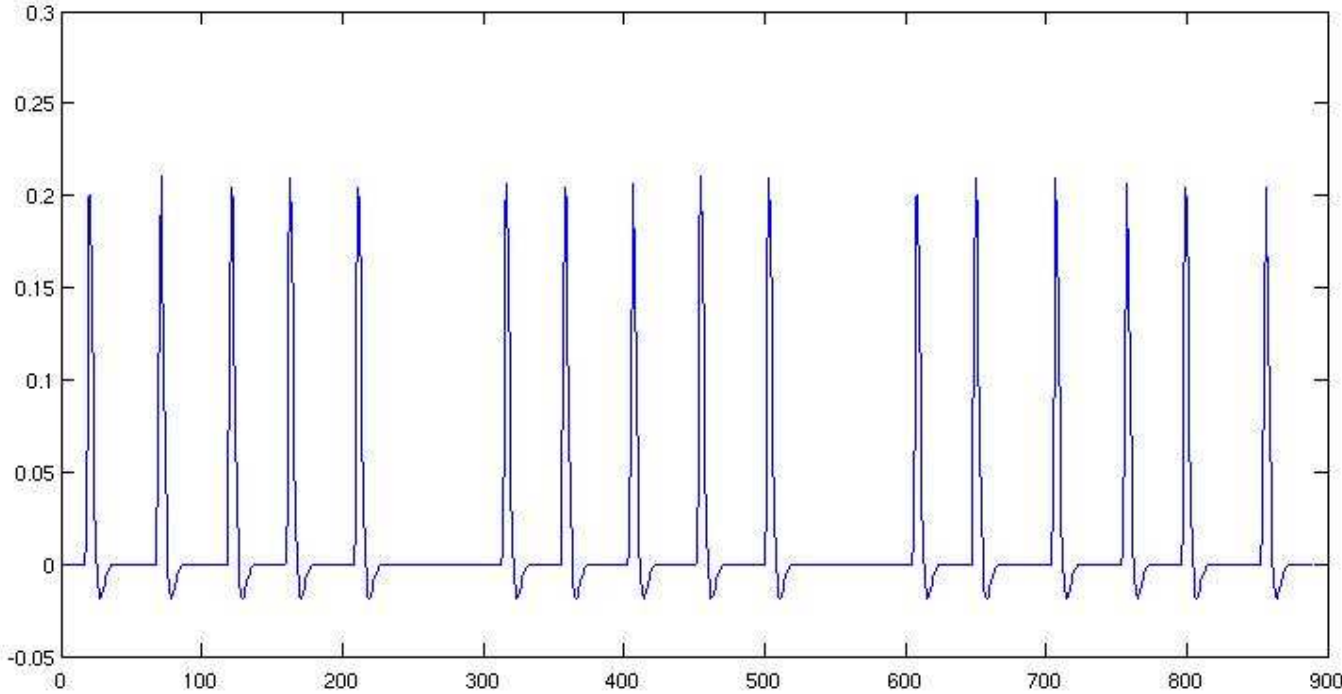


Plotten: Effects of real interest



Exkurs: Vergleichbarkeit von betas/contrast estimates

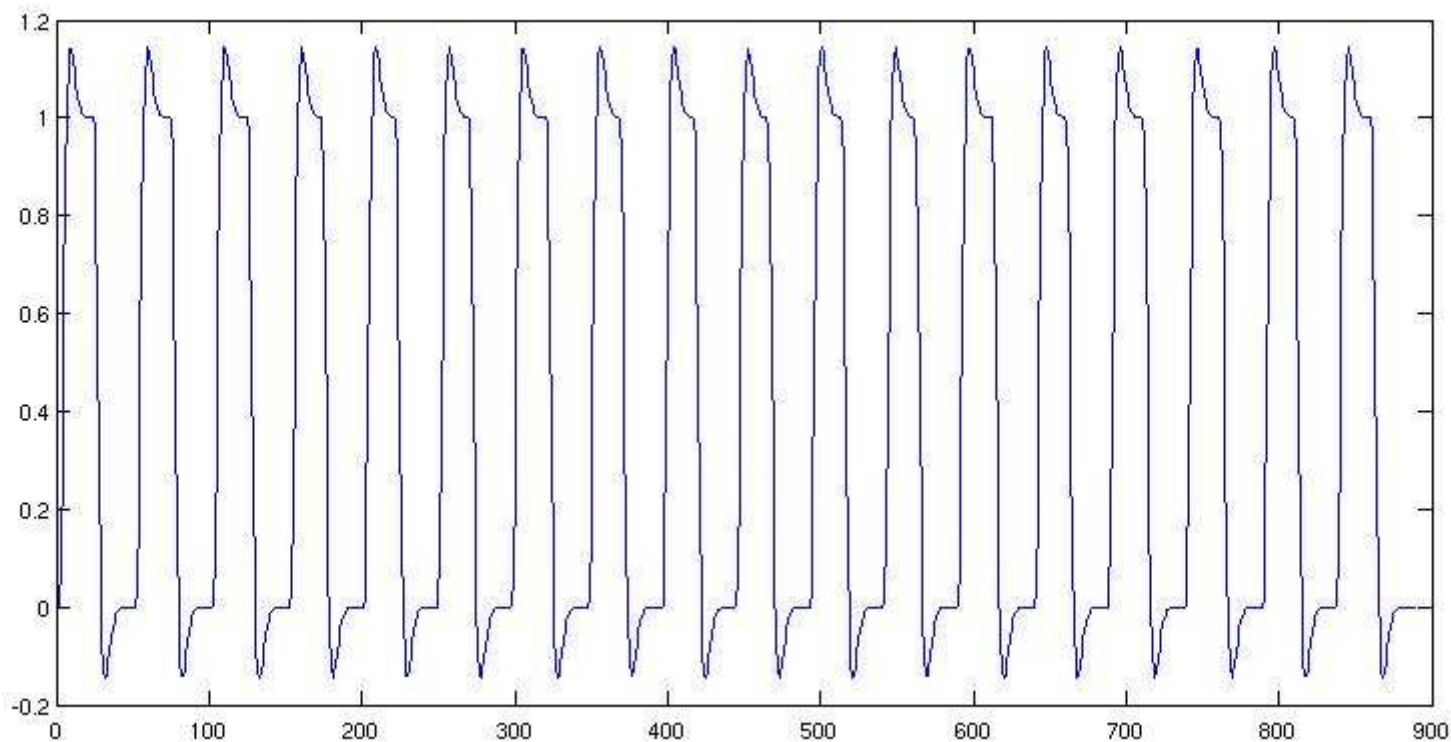
Event-Regressor aus SPM.xX.X:



(entspricht Basisfunktion in SPM.xBF.bf)

Exkurs: Vergleichbarkeit von betas/contrast estimates

Block-Regressor aus SPM.xX.X:

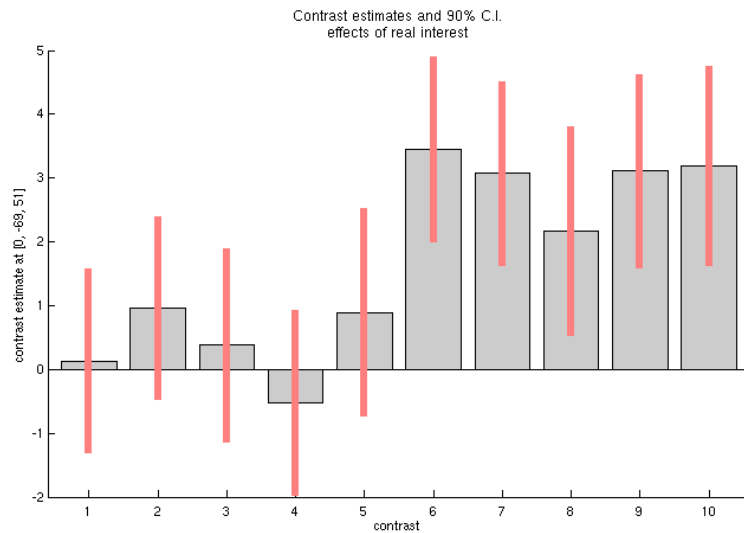


(Konvolvierung Basisfunktion mit box car)

1	3
2	

Nicht Äpfel mit Birnen vergleichen!

Plotten: Normierung



Skalierung:

spezifisch 1st level → global normalisation →

default: None:

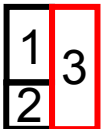
„session-specific grand mean scaling“

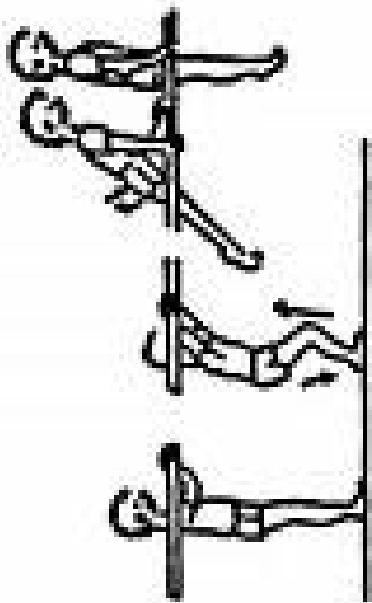
$$\frac{\text{Signal (Voxel)}}{\text{Mittel Signal (alle Voxel, alle Zeitpunkte)}} \times 100$$

=> Voxelwert = prozentuale Abweichung vom globalen Mittelwert

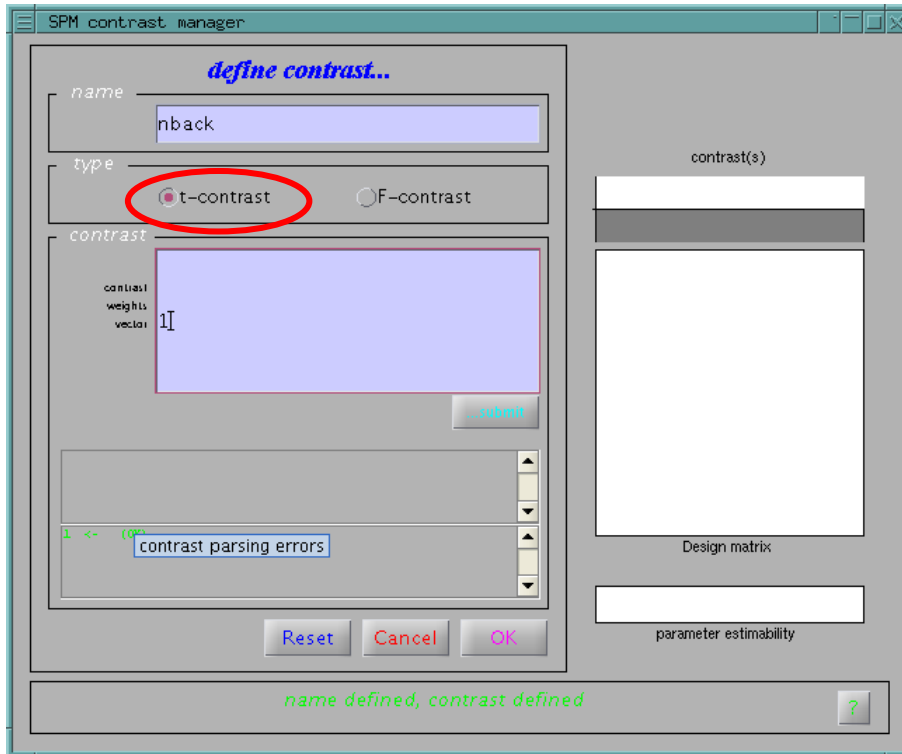
$$(\beta_x / \beta_{\text{const}}) \times 100$$

(„% local signal change“)



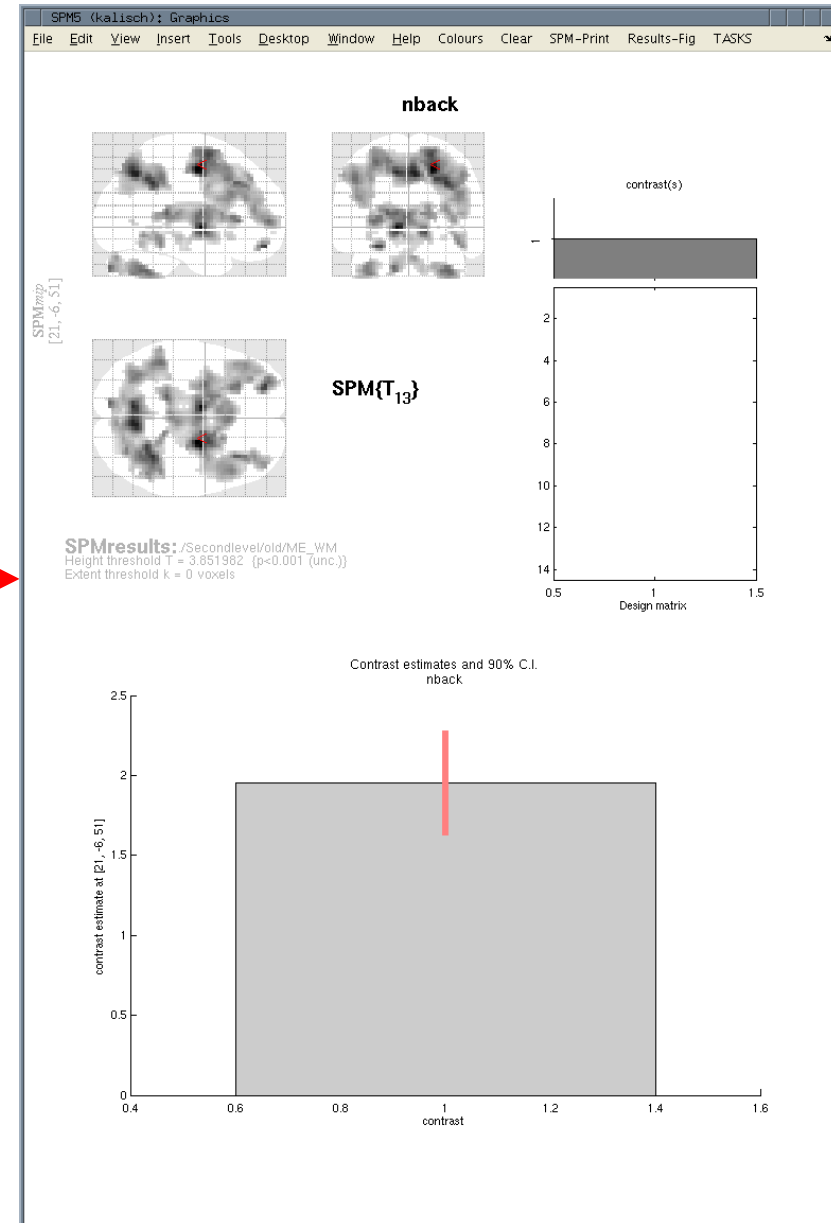


2nd level: one-sample t-test

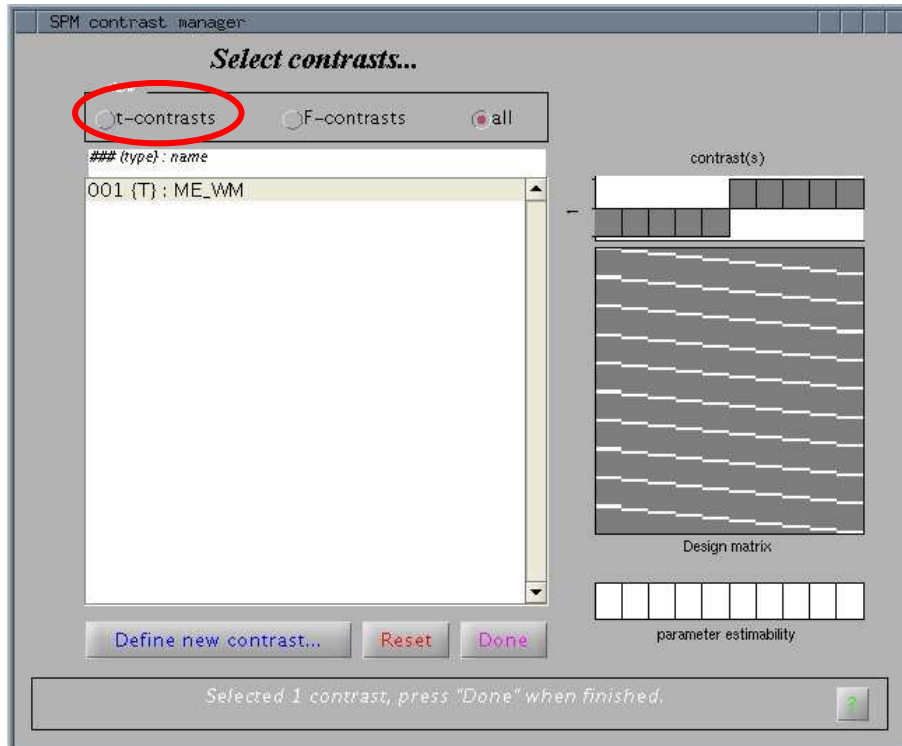


= contrast.contrast = beta = mean(y)
 y: Werte der Einzelprobanden
 (aus 1st-level con images)

1	3
2	

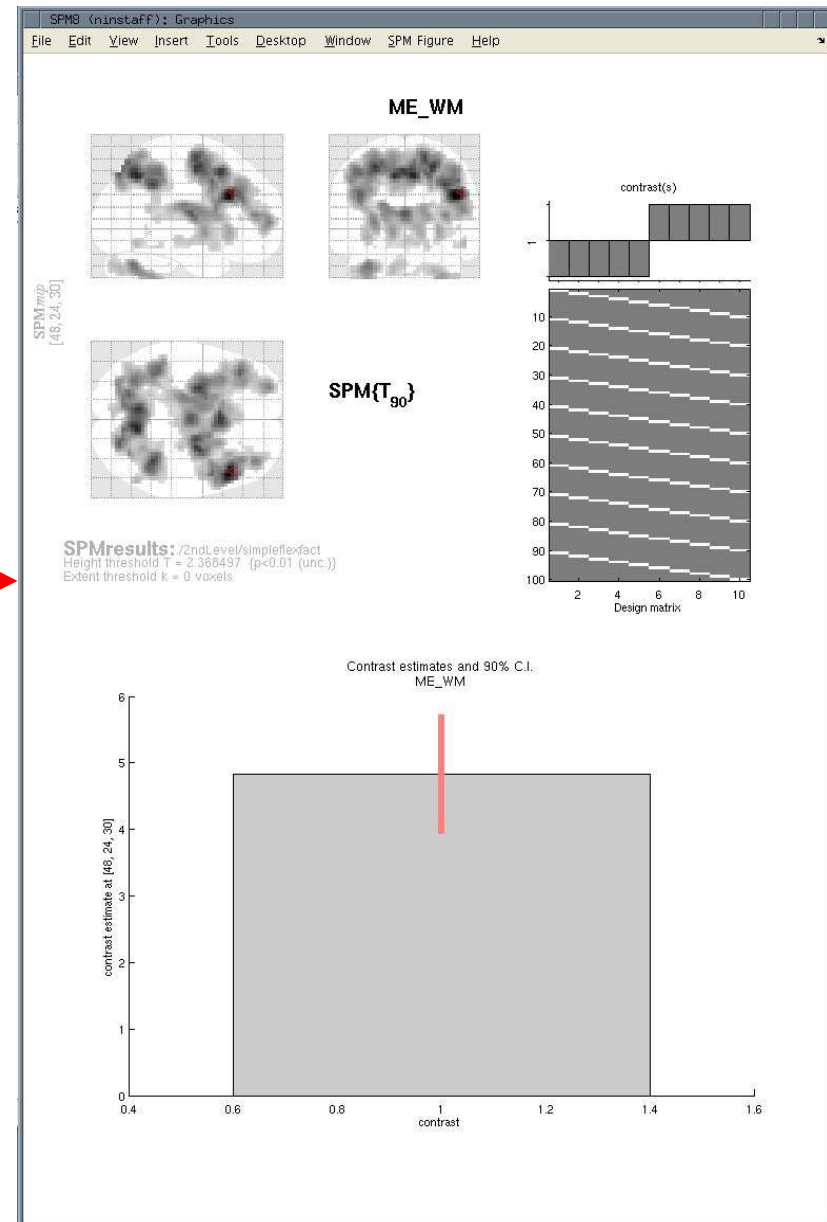


2nd level: flexible factorial (keine Korrektur für Nicht-Sphärizität)

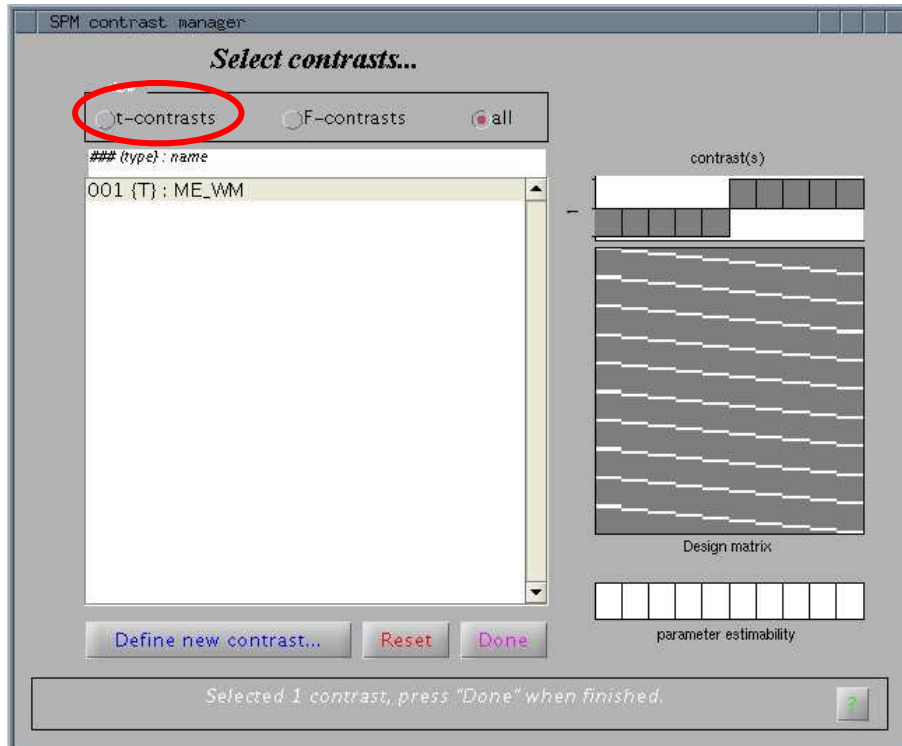


beta: Einzelwerte für jeden Regressor
geeignete Linearkombination -->
contrast.contrast

1	3
2	

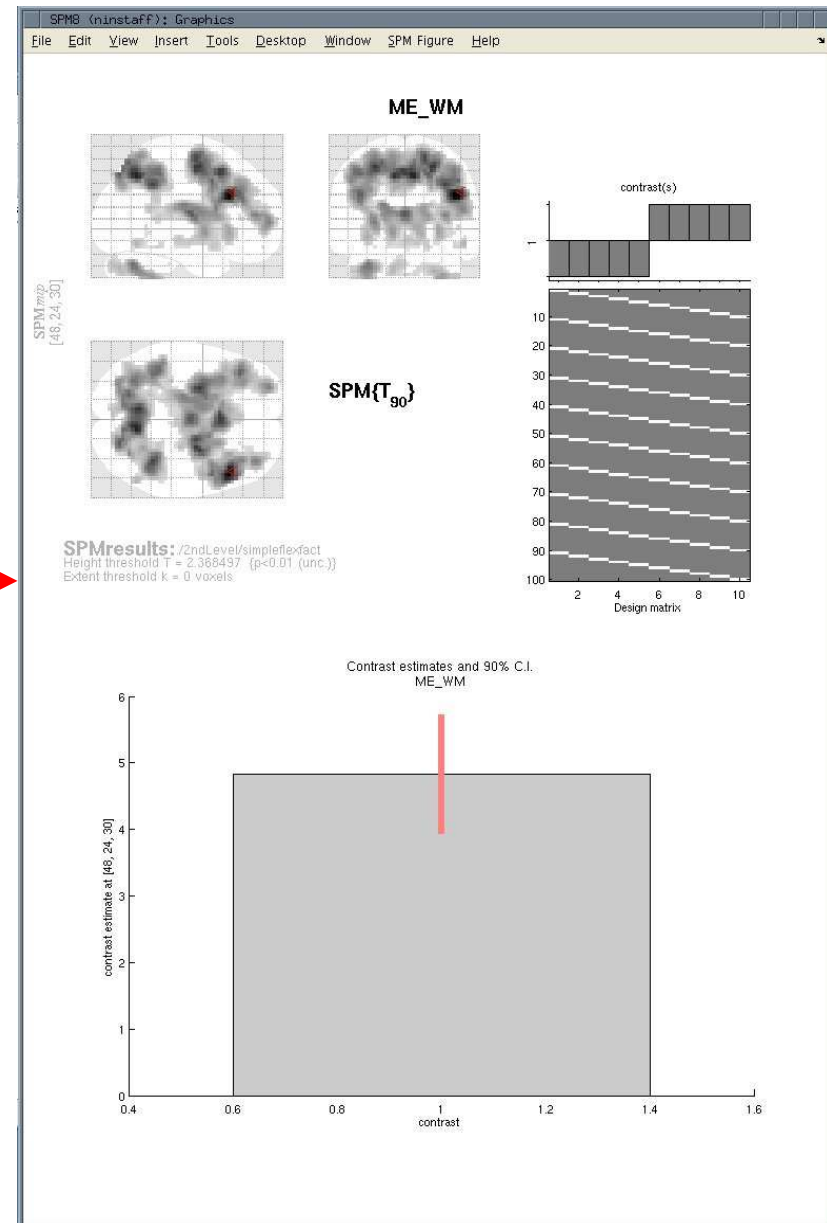


2nd level: flexible factorial (keine Korrektur für Nicht-Sphärizität)

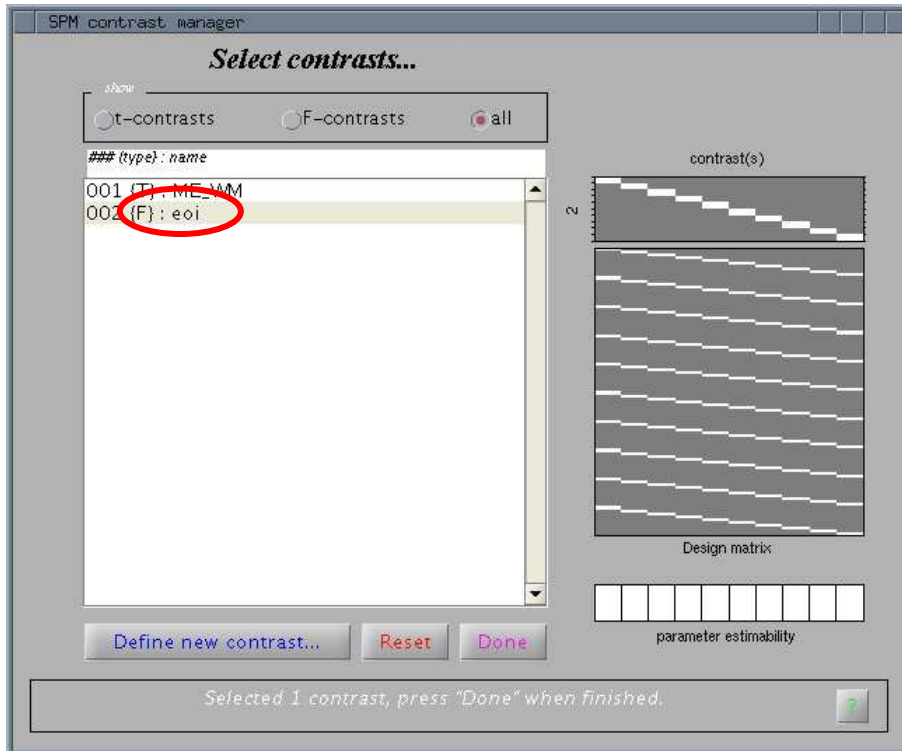


y: Daten (100 Werte, aus con images)
 $\text{beta}(1) = \text{mean}(y(1)+y(11)+\dots+y(91))$

1	3
2	

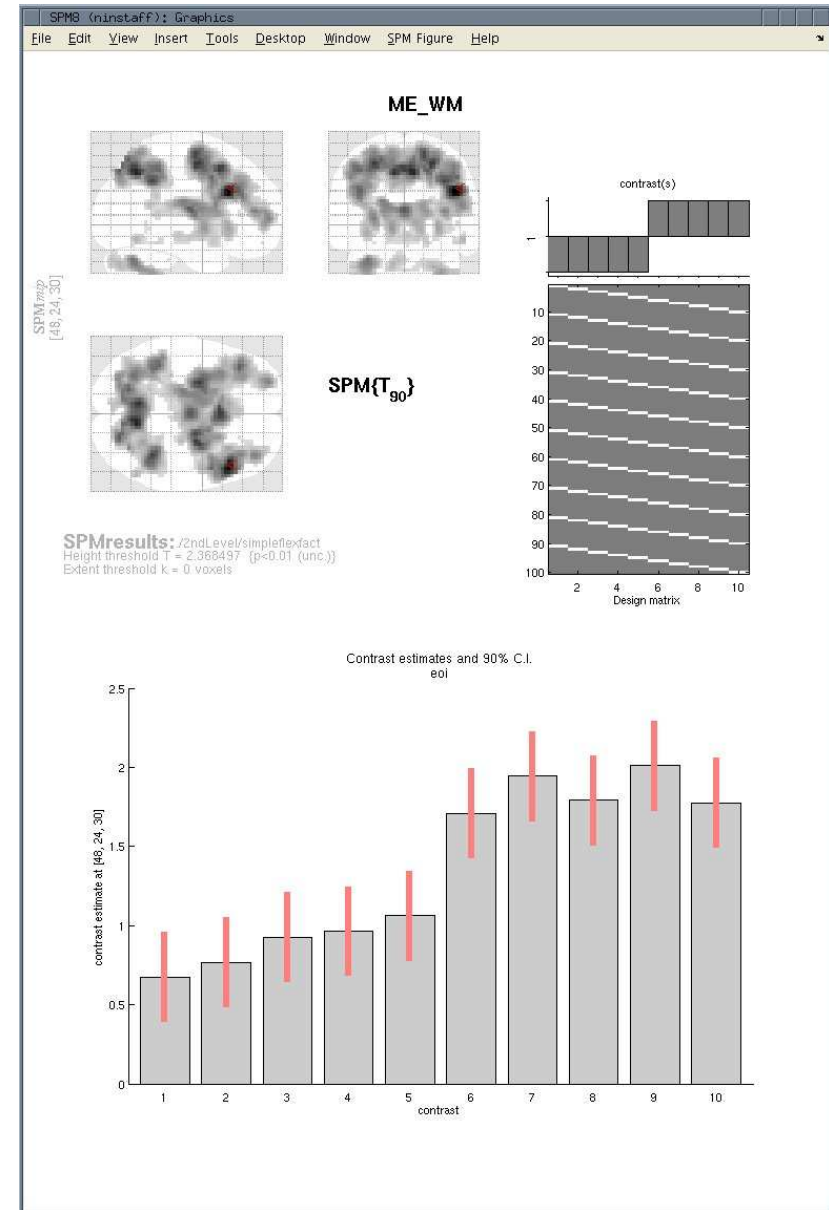


2nd level: flexible factorial (keine Korrektur für Nicht-Sphärizität)

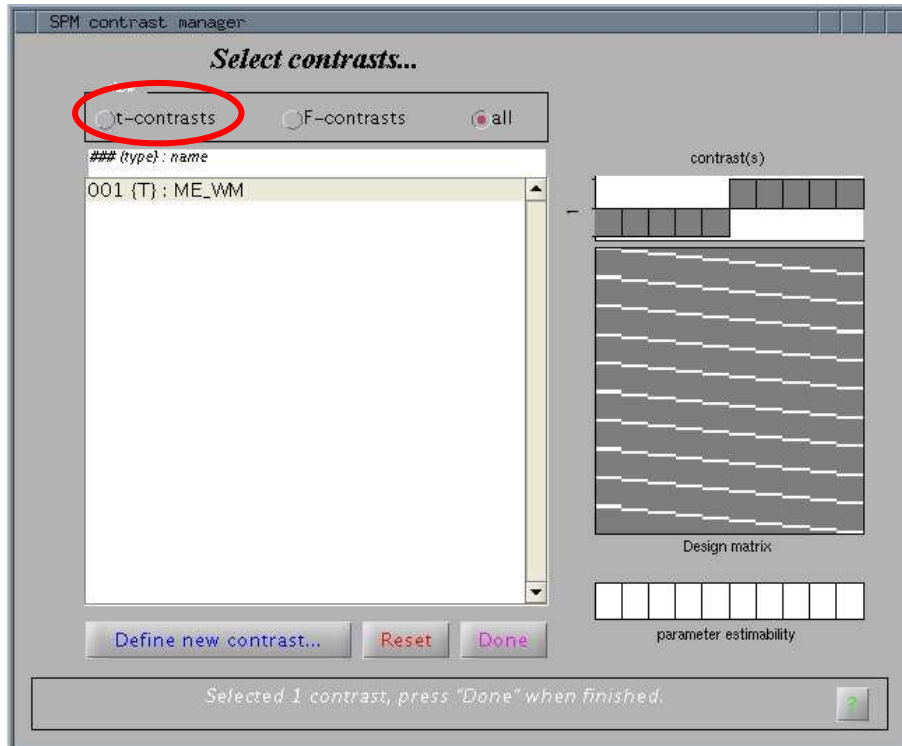


contrast.contrast=beta (10 Werte)
y: Daten (100 Werte), s.o.

1	3
2	

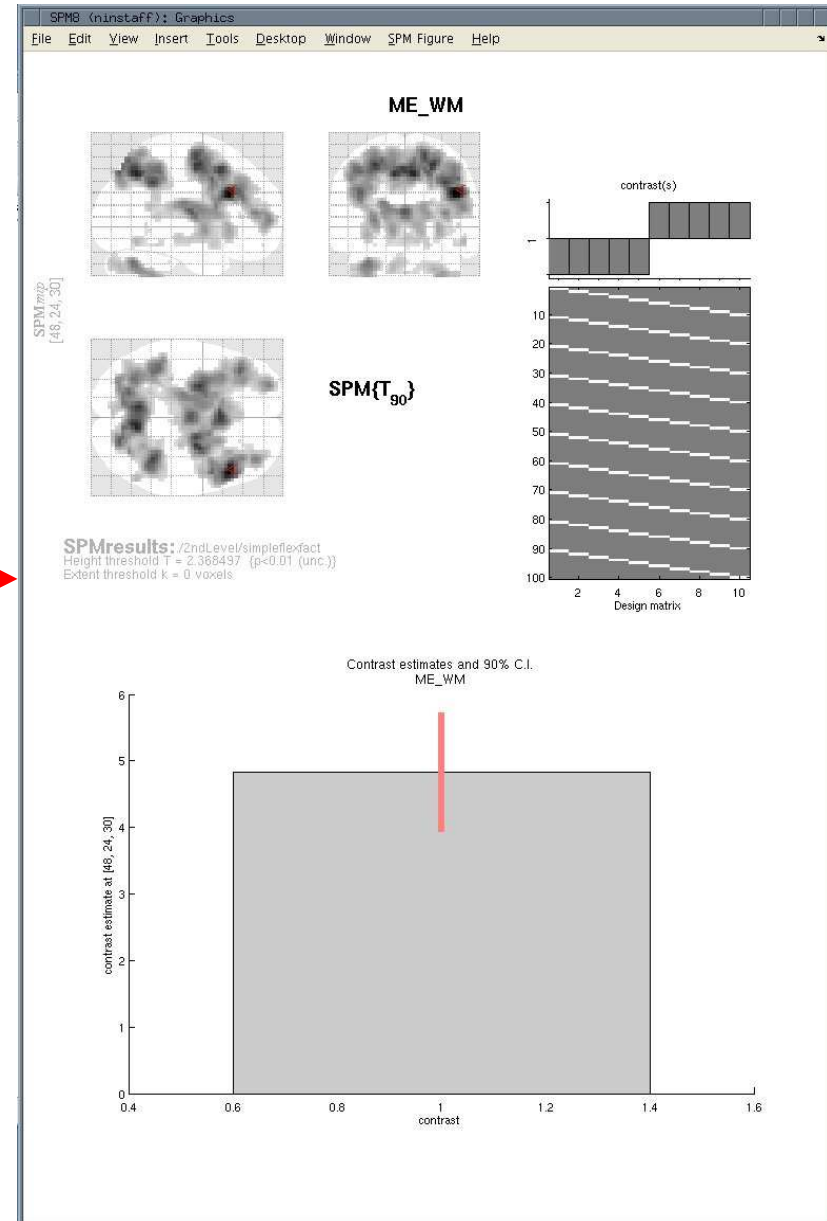


2nd level: flexible factorial (MIT Korrektur für Nicht-Sphärizität)

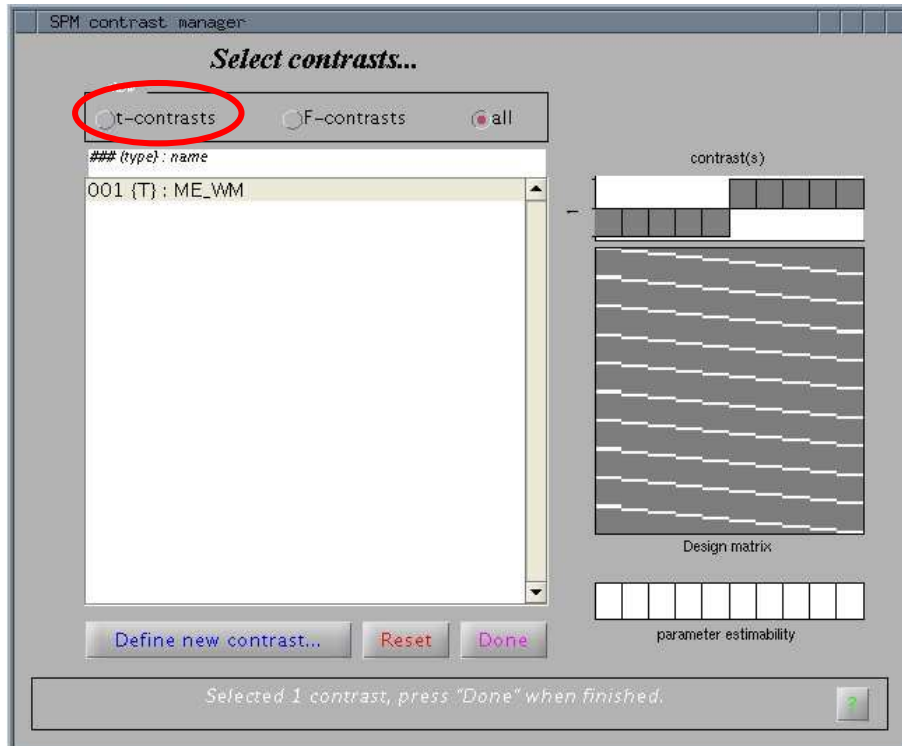


beta: Einzelwerte für jeden Regressor
geeignete Linearkombination -->
contrast.contrast

1	3
2	

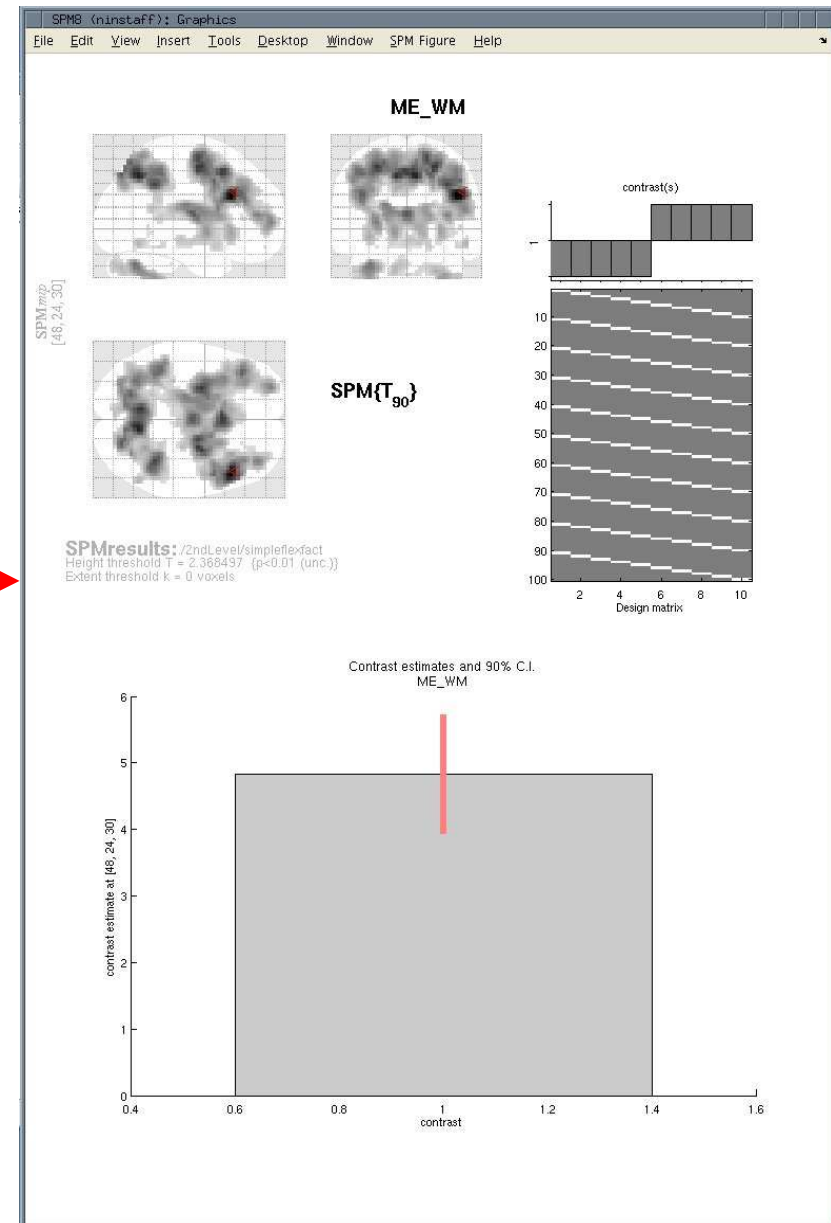


2nd level: flexible factorial (MIT Korrektur für Nicht-Sphärizität)

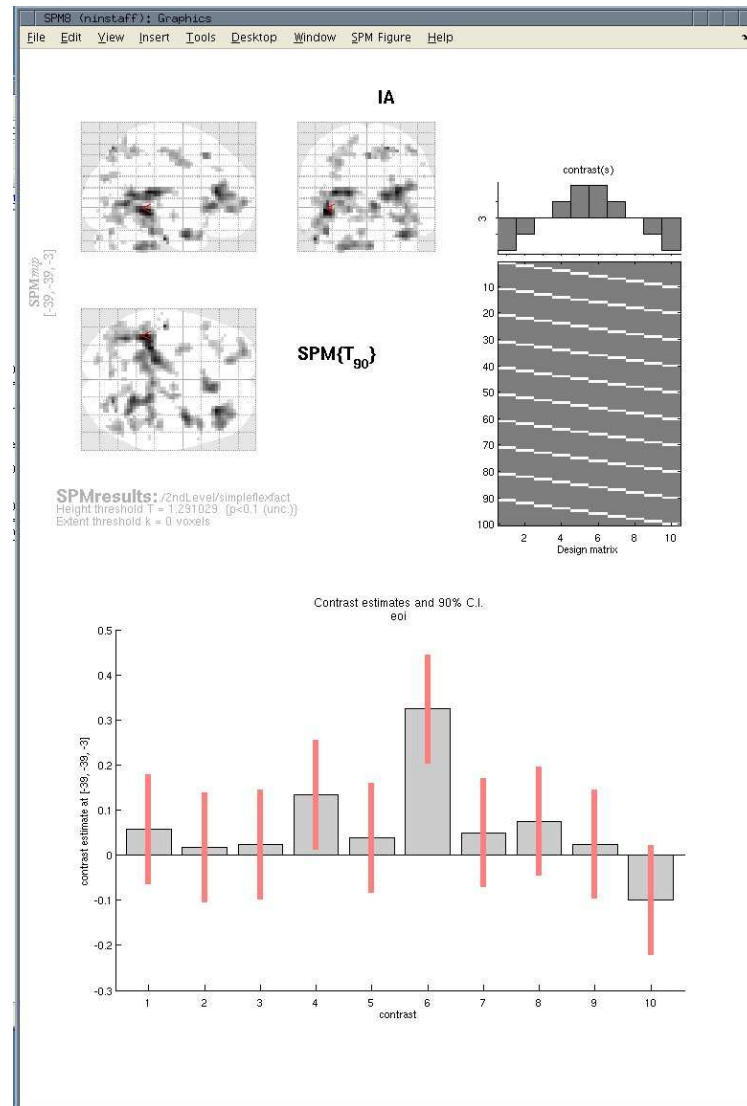
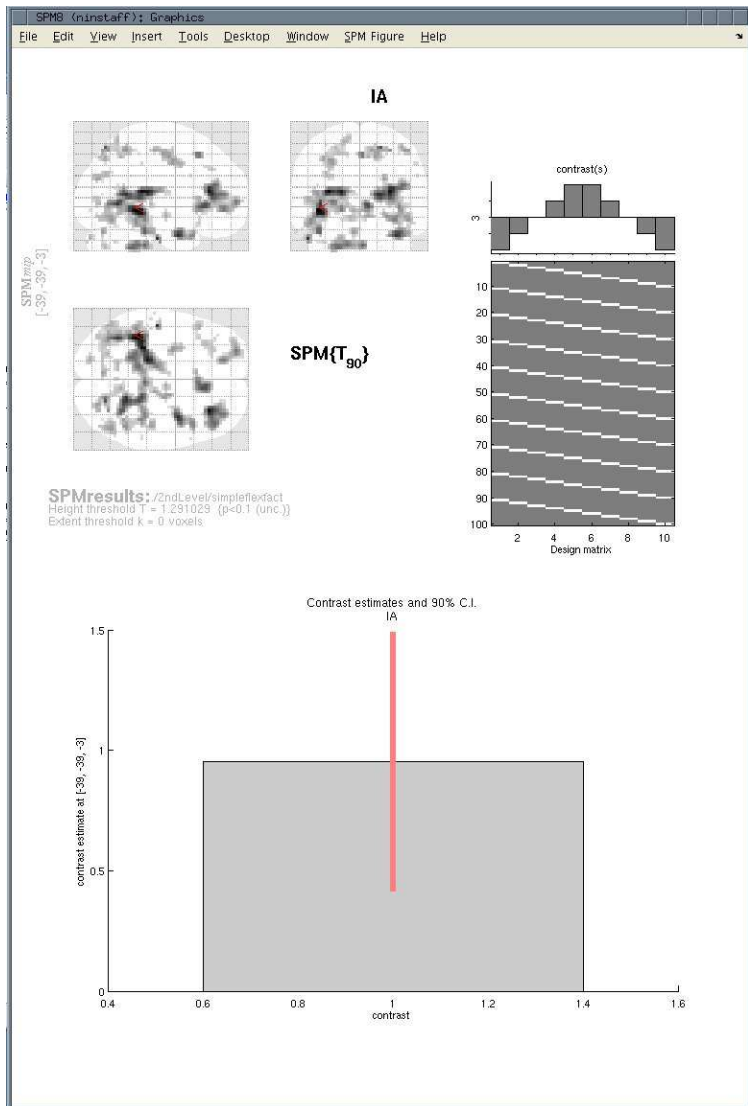


y: Daten (100 Werte \neq con images)
 $\beta(1) \neq \text{mean}(y(1)+y(11)+\dots+y(91))$
 !!!!!!!

1	3
2	



2nd level: Interaktion

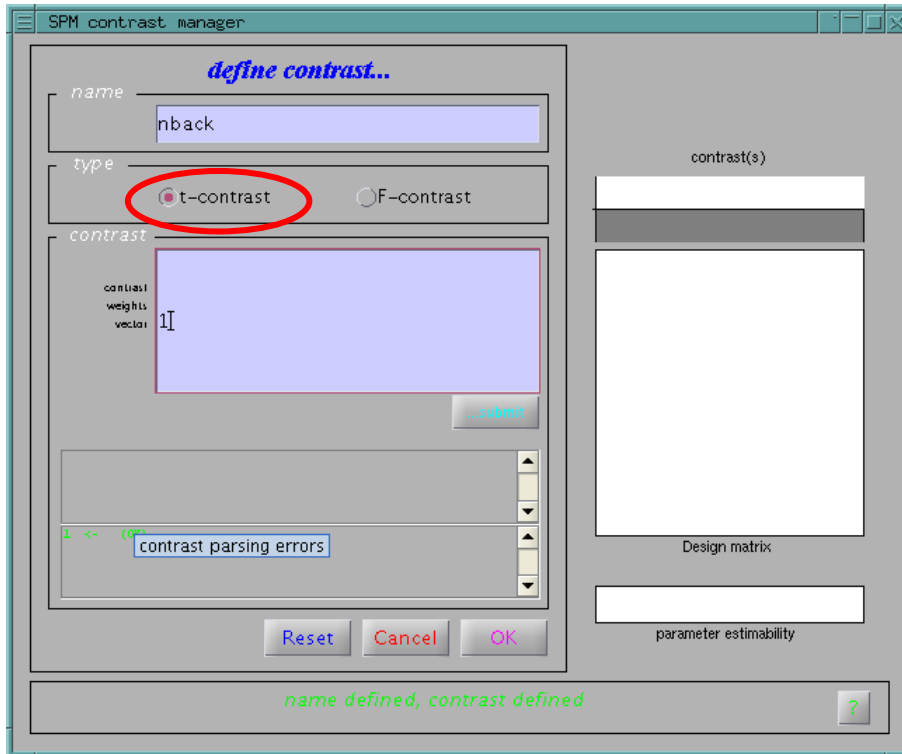


1	3
2	

Fitted responses

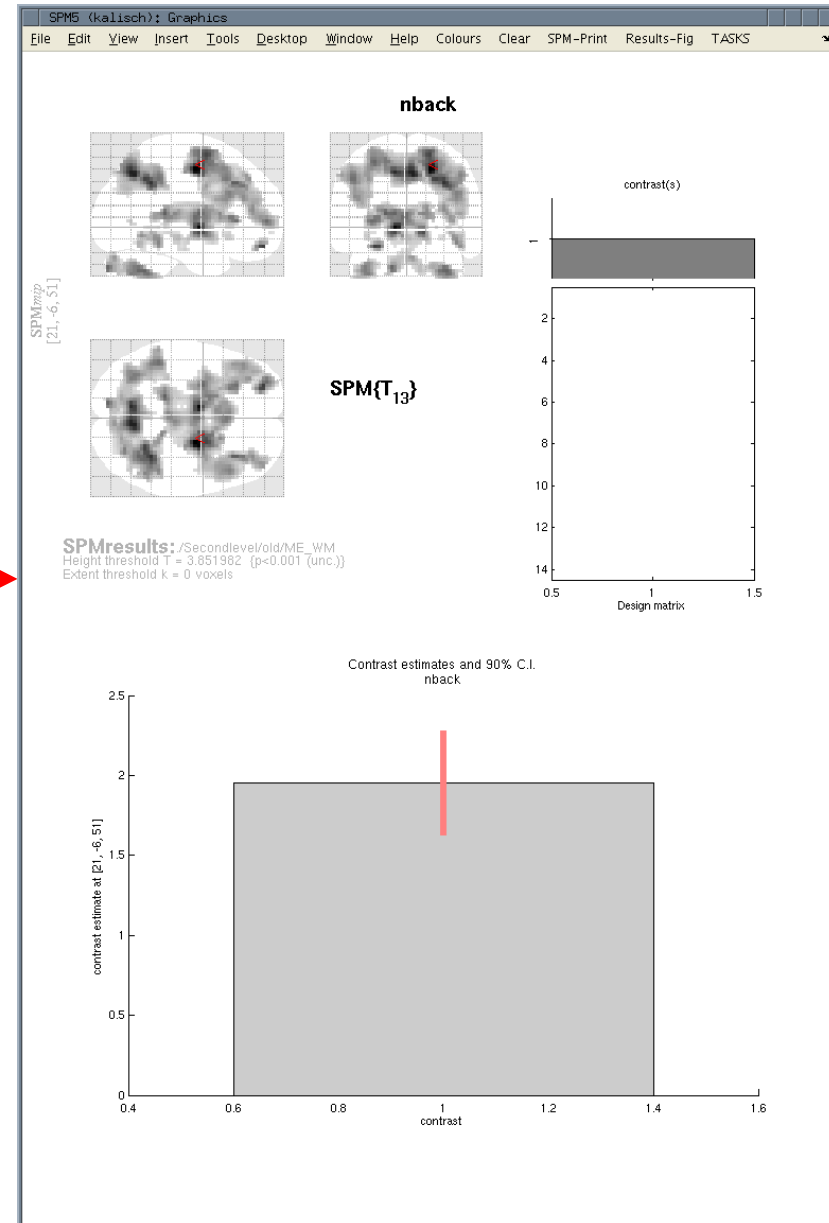
Fitted responses

Beispiel: one-sample t-test



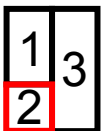
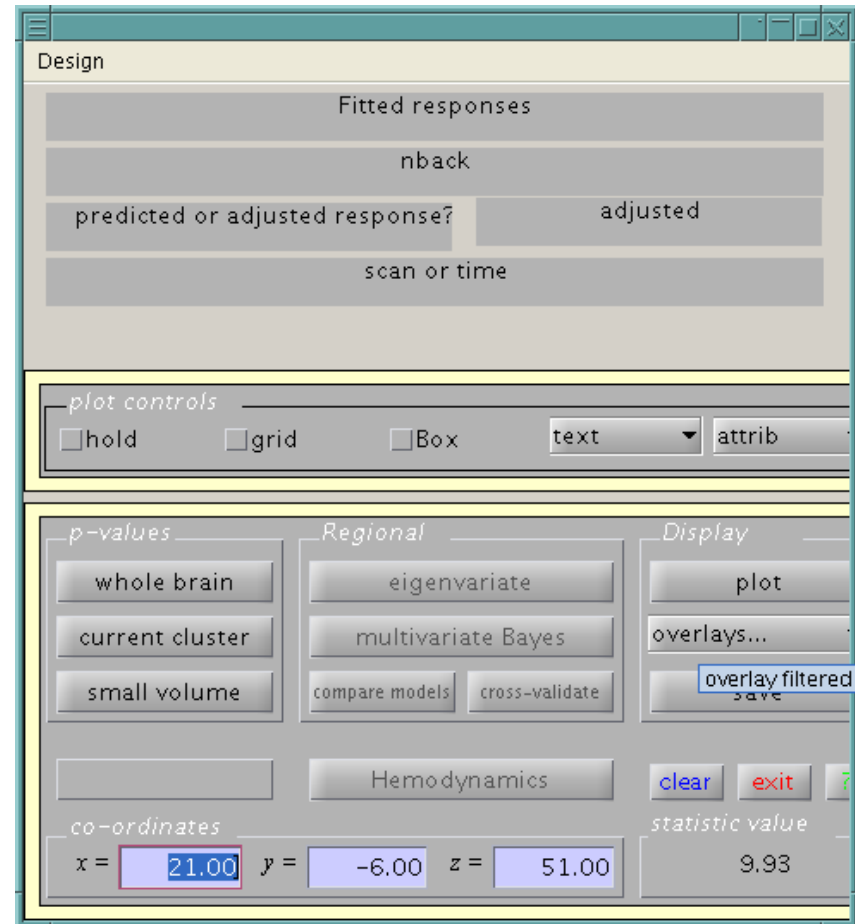
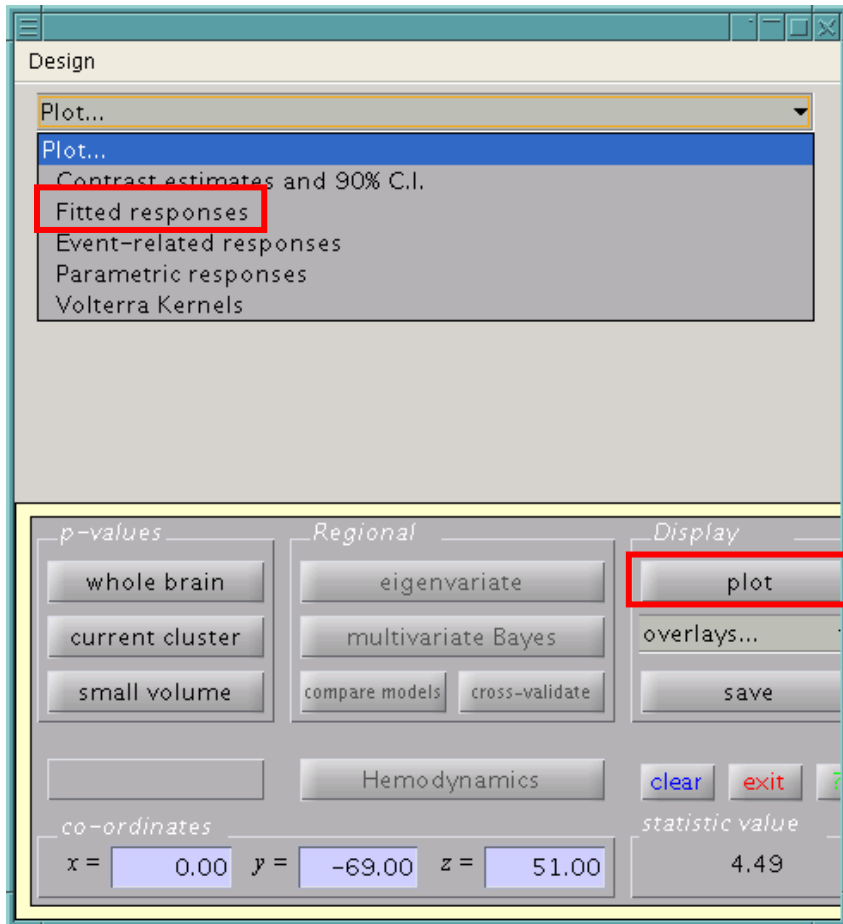
= $\text{contrast.contrast} = \beta = \text{mean}(y)$
 y : Werte der Einzelprobanden
 (aus 1st-level con images)

1	3
2	



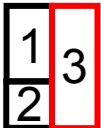
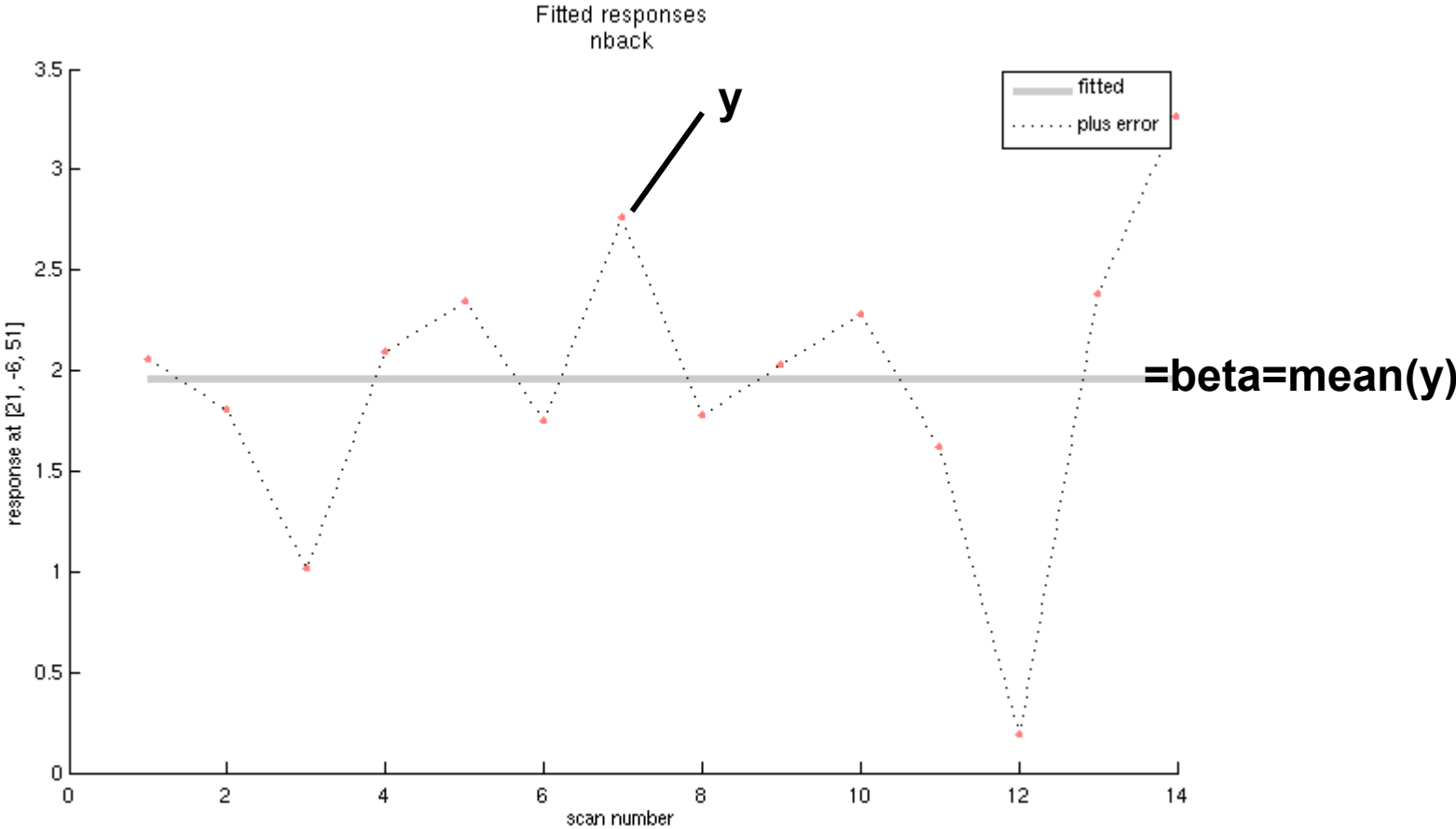
Fitted responses

Beispiel: one-sample t-test



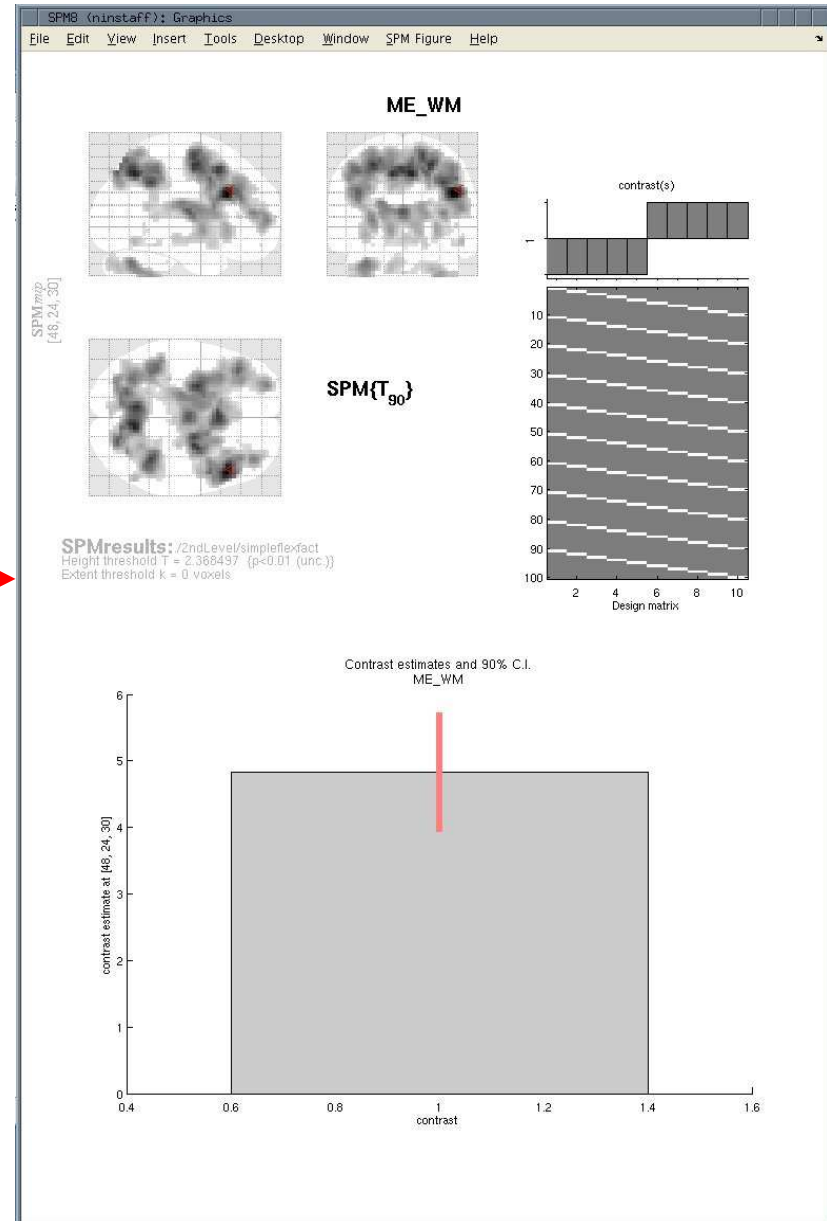
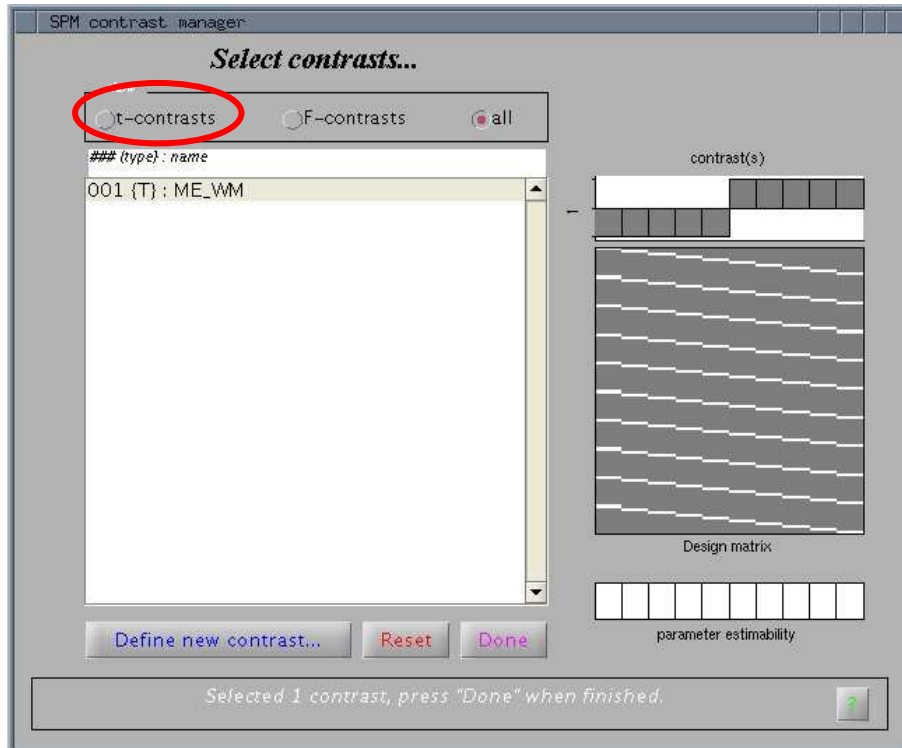
Fitted responses

Beispiel: one-sample t-test



Fitted responses

Beispiel: flex. fact. (keine Korrektur)

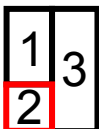
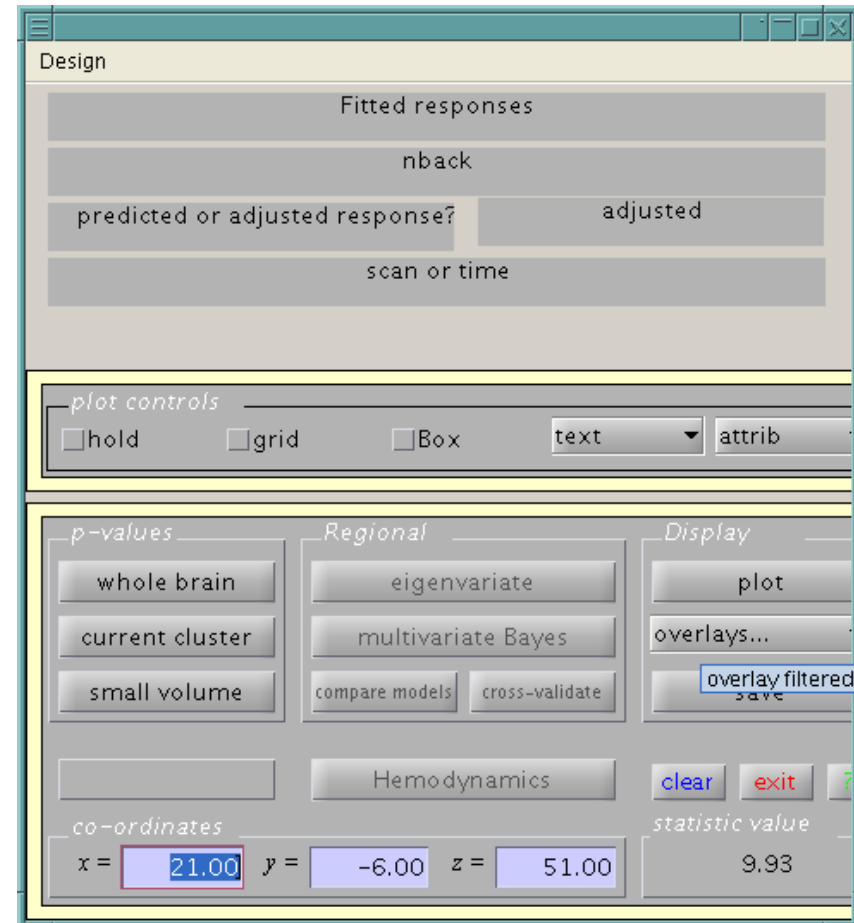
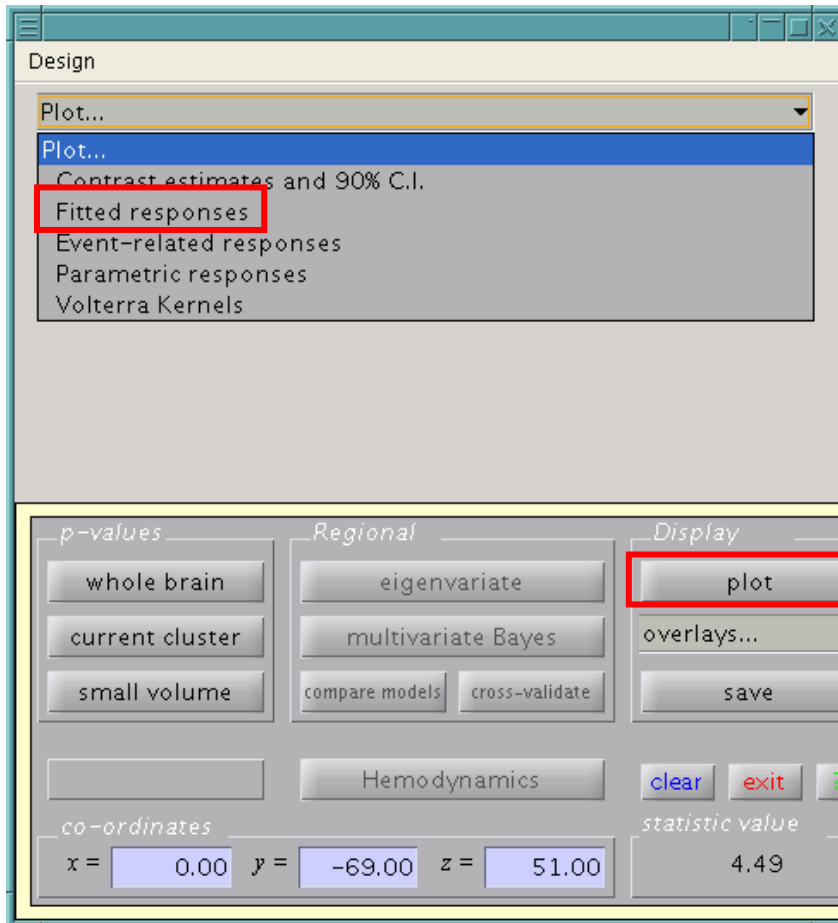


beta: Einzelwerte für jeden Regressor
geeignete Linearkombination -->
contrast.contrast

1	3
2	

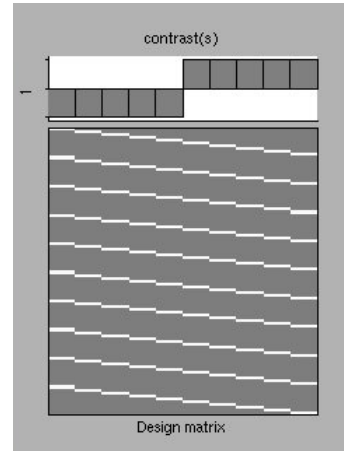
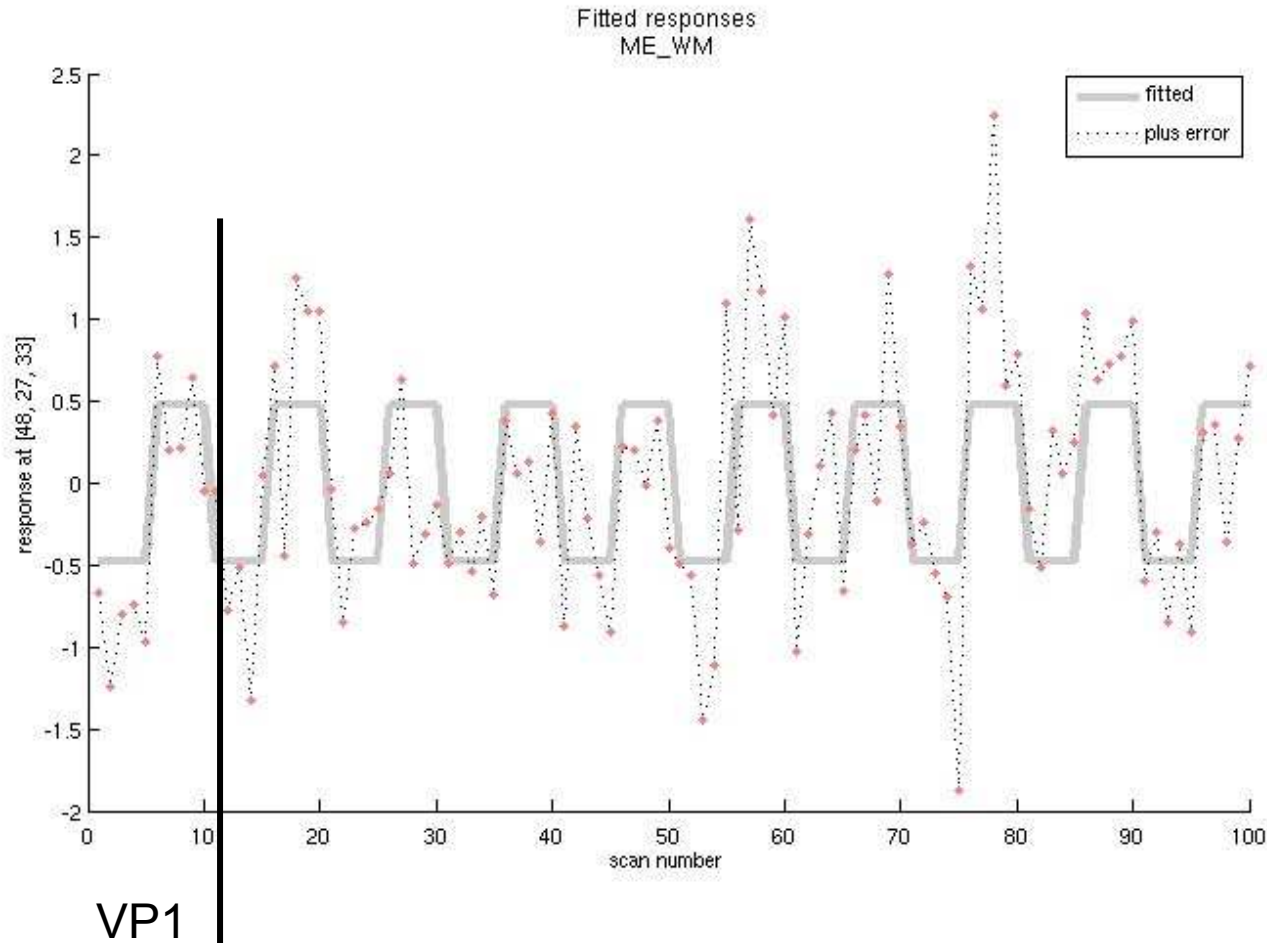
Fitted responses

Beispiel: flex. fact. (keine Korrektur)



Fitted responses

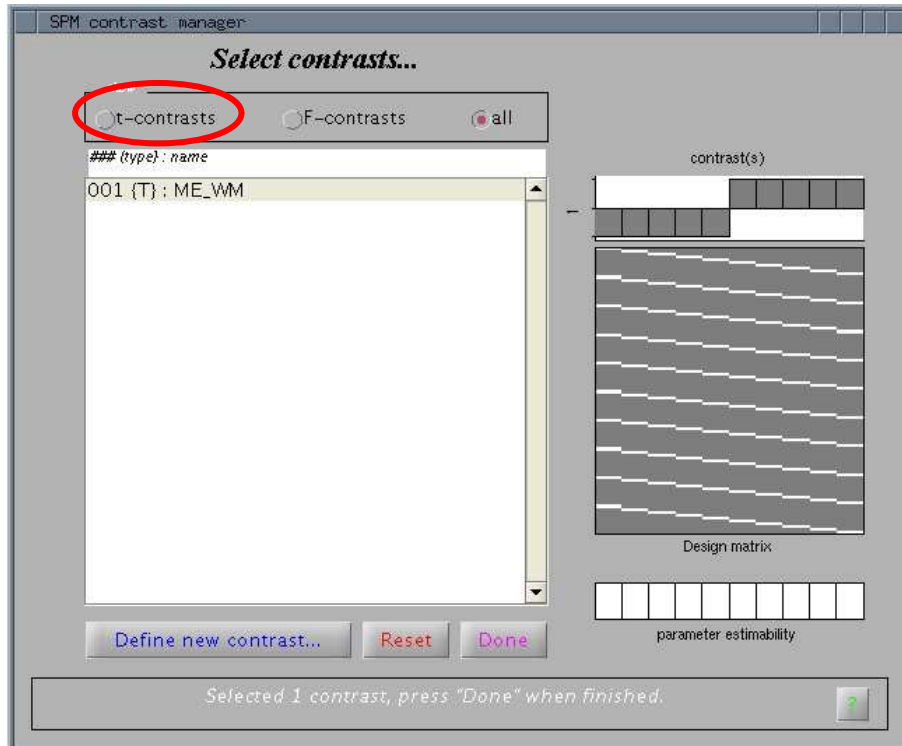
Beispiel: flex. fact. (keine Korrektur)



1	3
2	

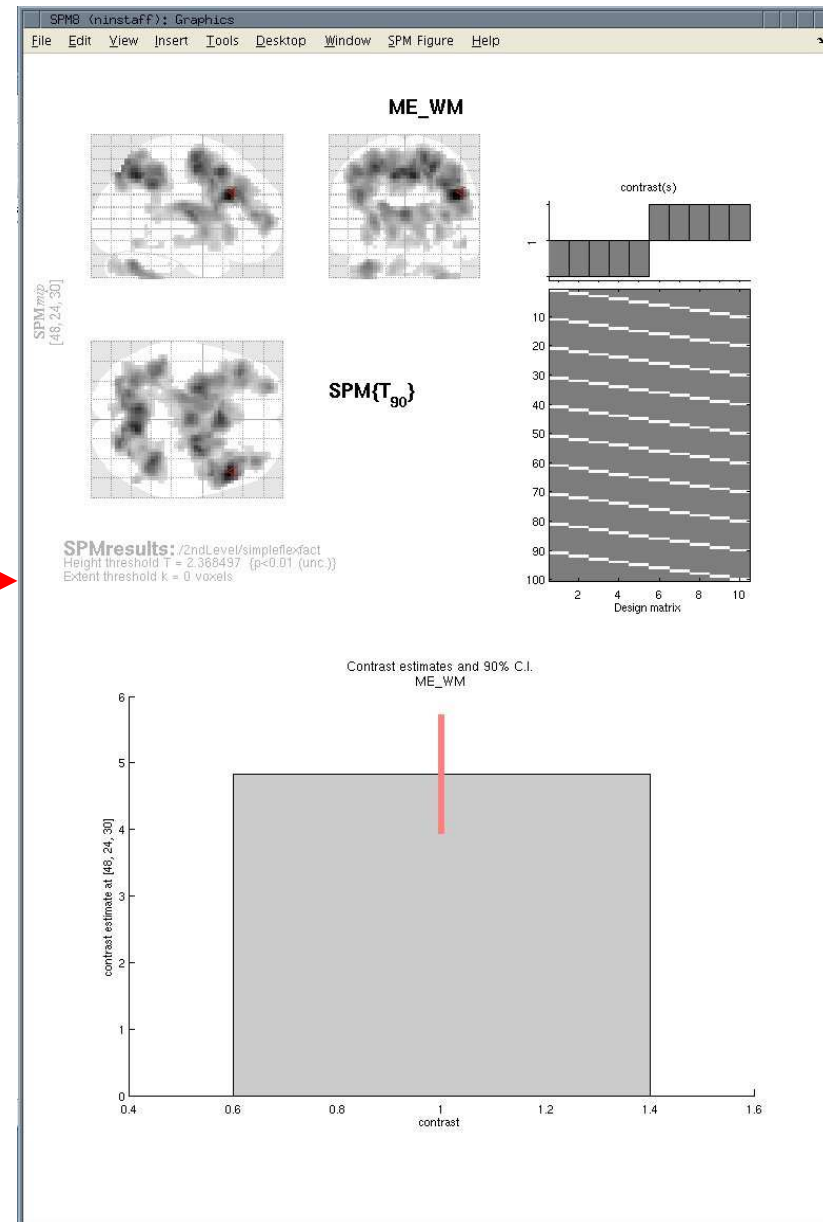
Fitted responses

Beispiel: flex. fact. (MIT Korrektur)



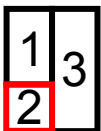
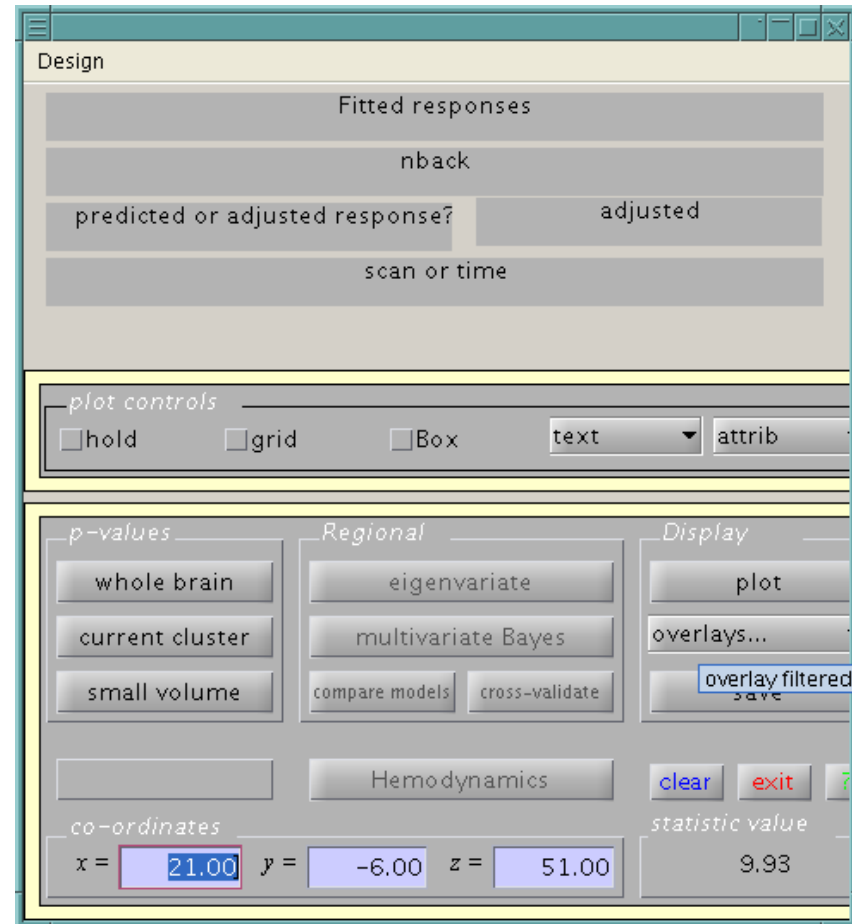
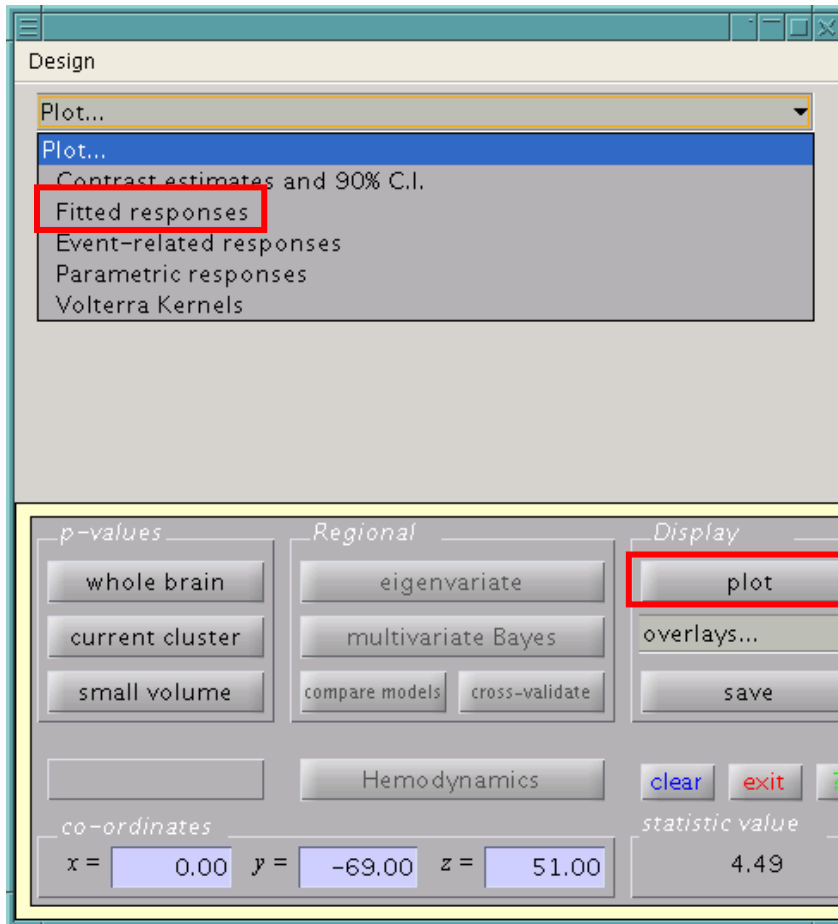
beta: Einzelwerte für jeden Regressor
geeignete Linearkombination -->
contrast.contrast

1	3
2	



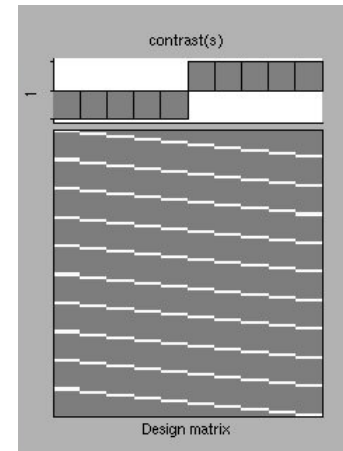
Fitted responses

Beispiel: flex. fact. (MIT Korrektur)

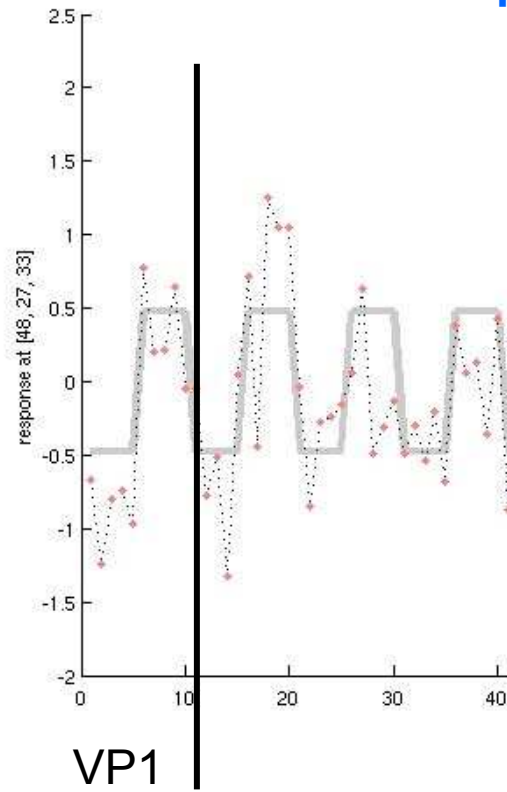


Fitted responses

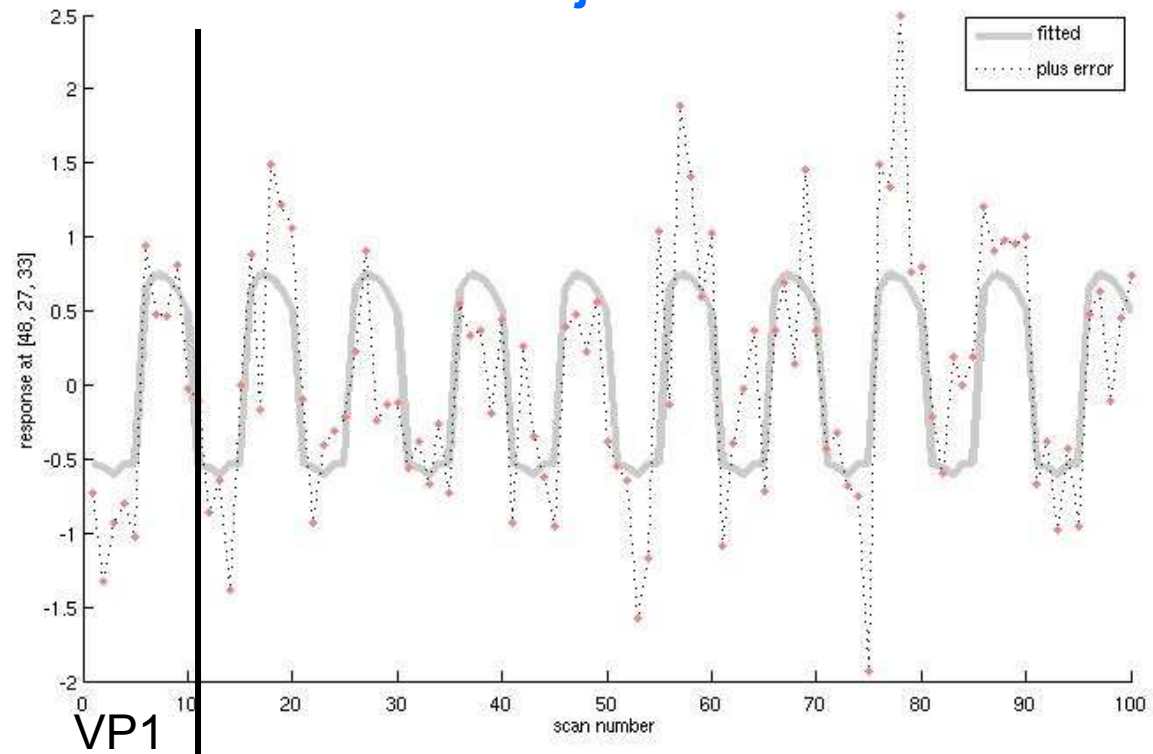
Beispiel: flex. fact. (MIT Korrektur)



predicted



adjusted



1	3
2	

Exkurs: Predicted - adjusted

$$y = \beta_1 * X_1 + \beta_2 * X_2 + \text{Fehler}$$



Treatmentvarianz Fehlervarianz

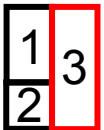
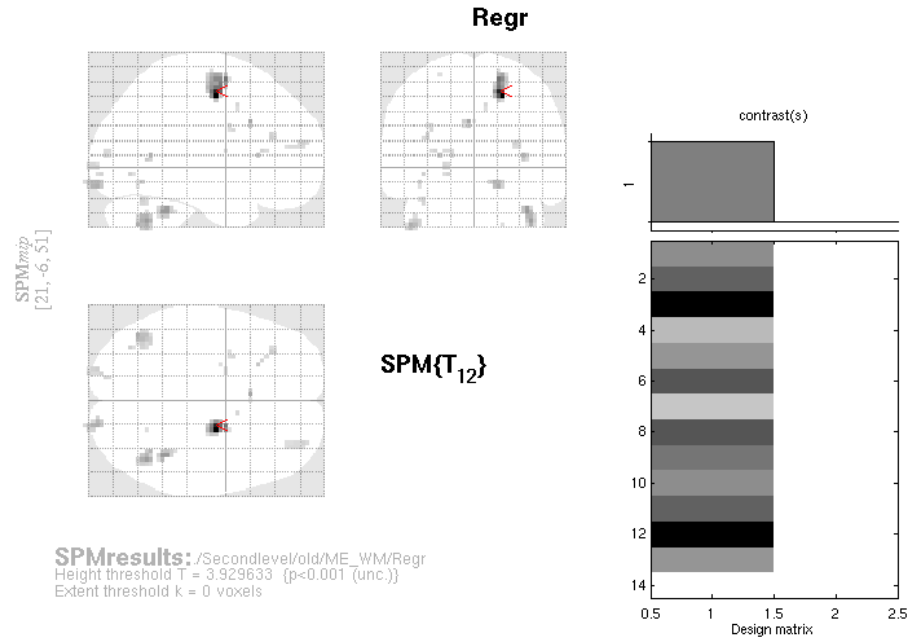
Effect of interest: $X_1 \rightarrow ?$

1. Entfernung nicht interessierender Varianz: X_2
(„effects of no interest“, „reduced model“)
2. \rightarrow **Adjusted response**: Fitted response für $X_1 + \text{Fehler}$
(X aus prewhitened Designmatrix: SPM.xX.xKXs.X)

Predicted response (SPM-spezifisch): X aus „roher“ Designmatrix SPM.xX.X

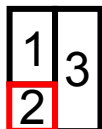
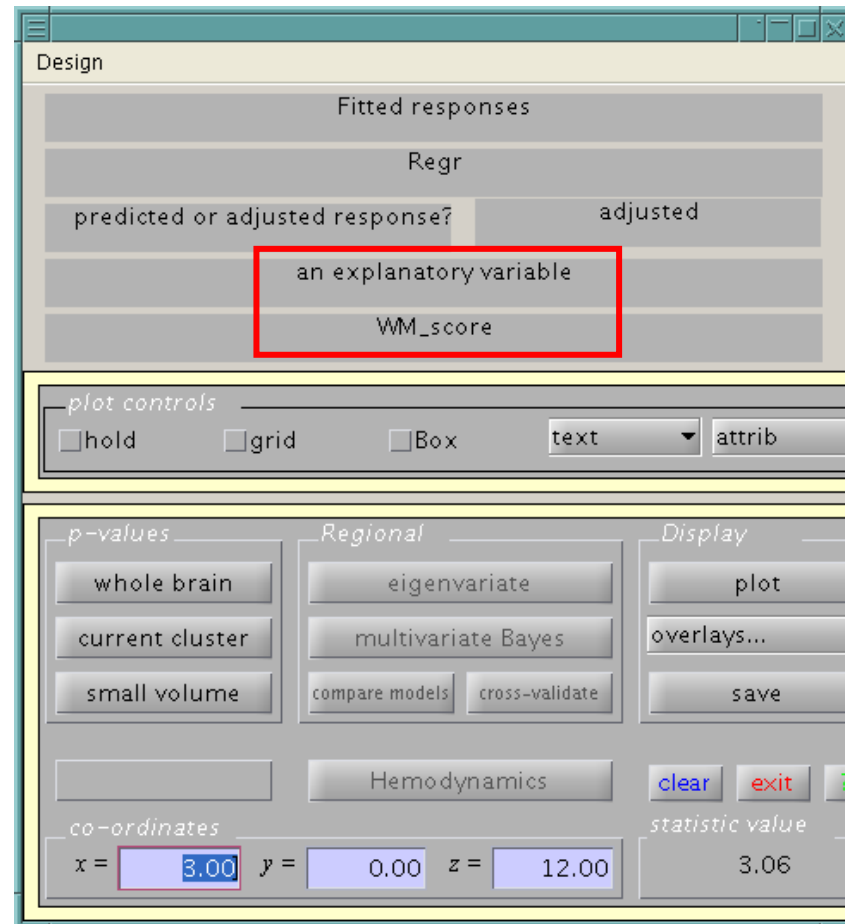
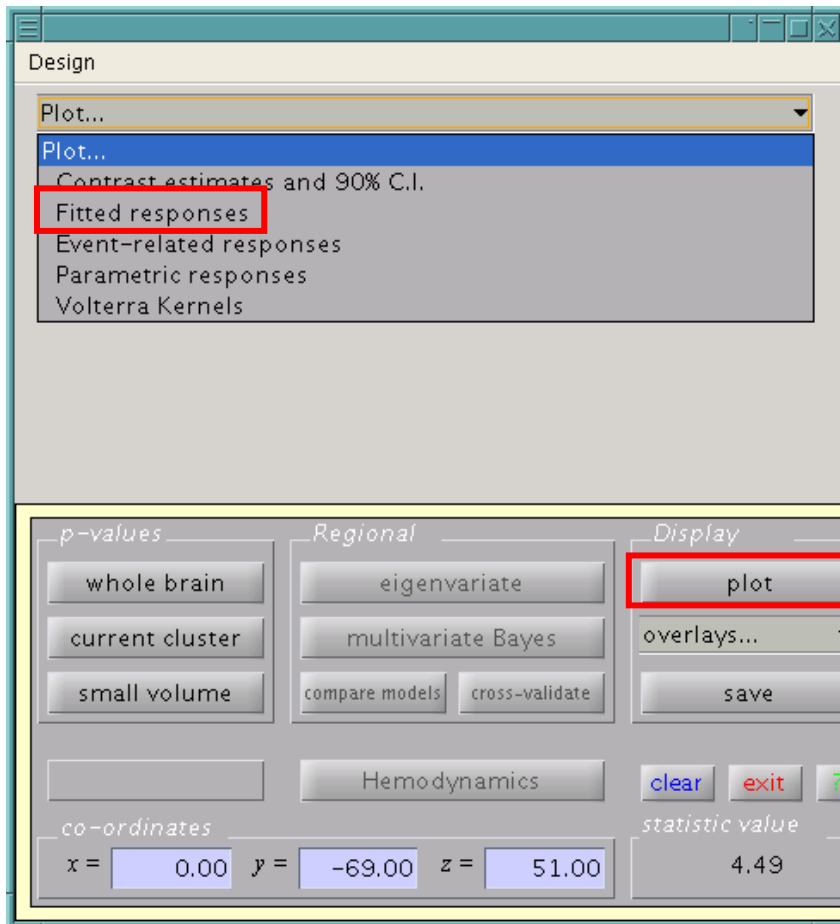
Fitted responses

Beispiel: simple regression



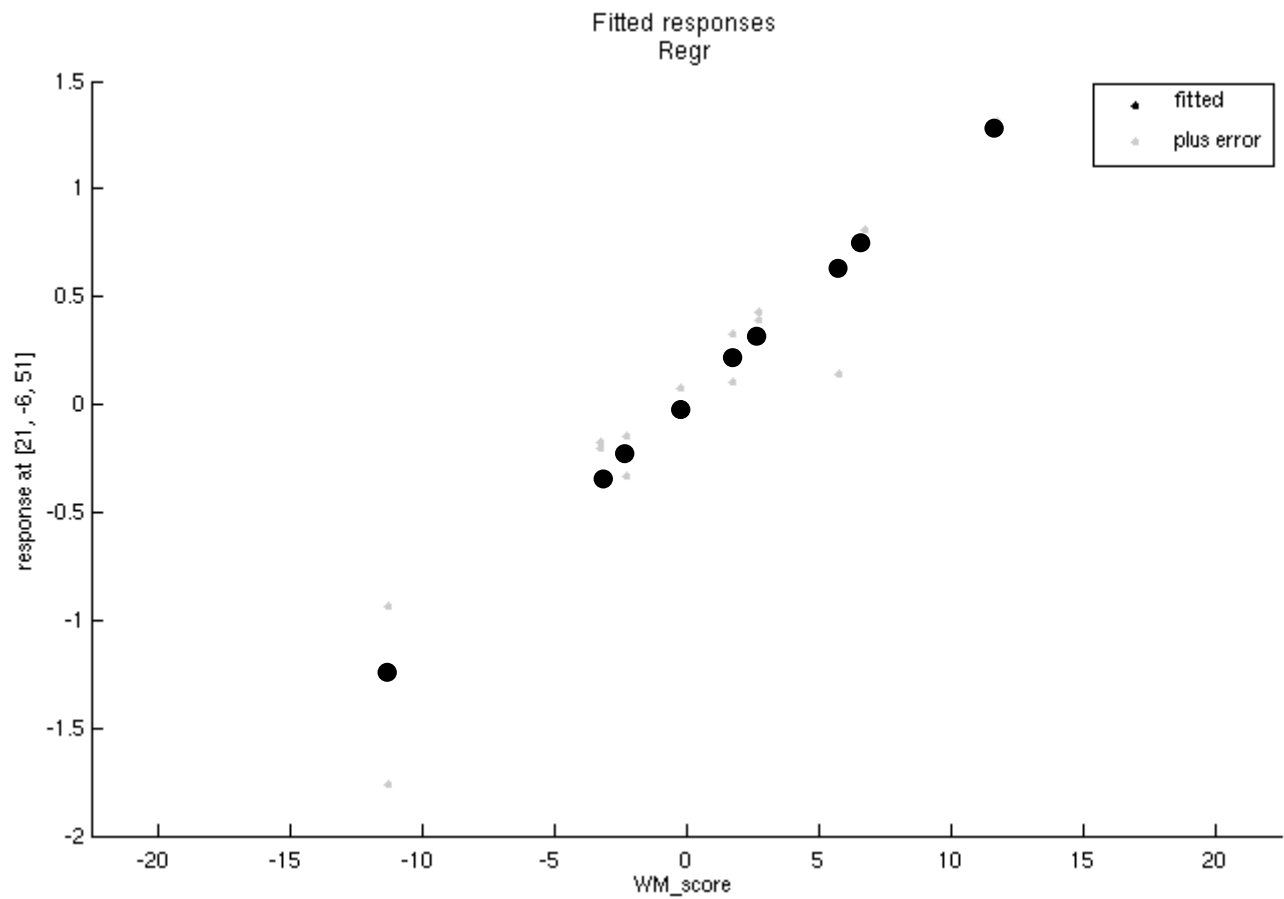
Fitted responses

Beispiel: simple regression



Fitted responses

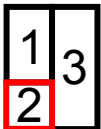
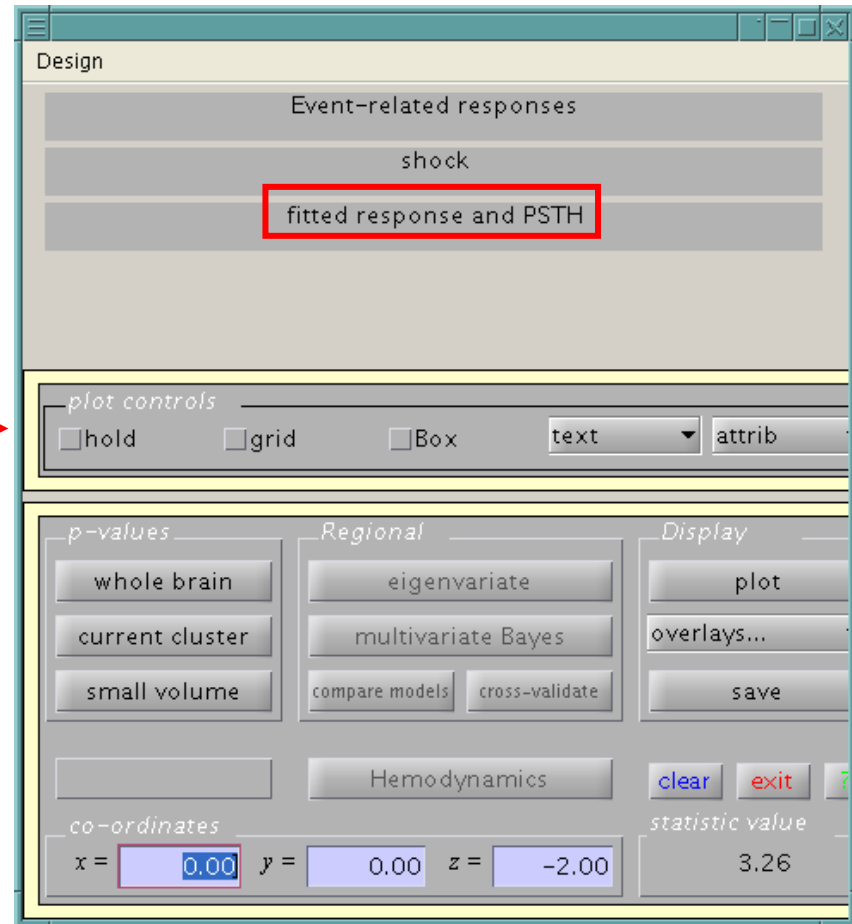
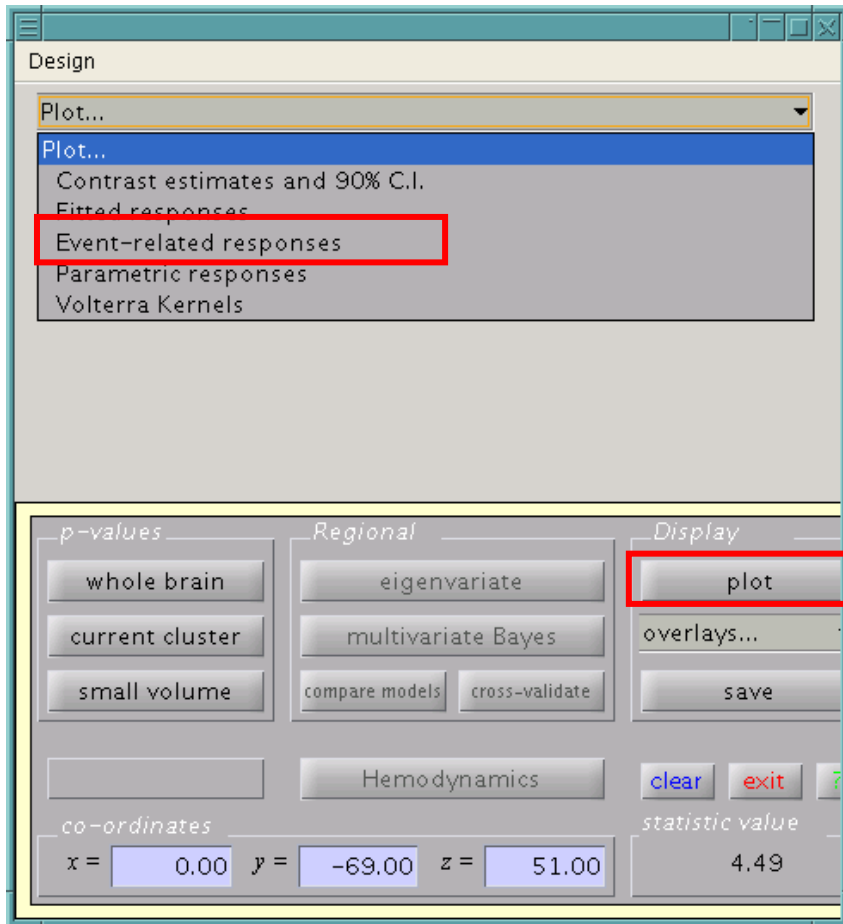
Beispiel: simple regression



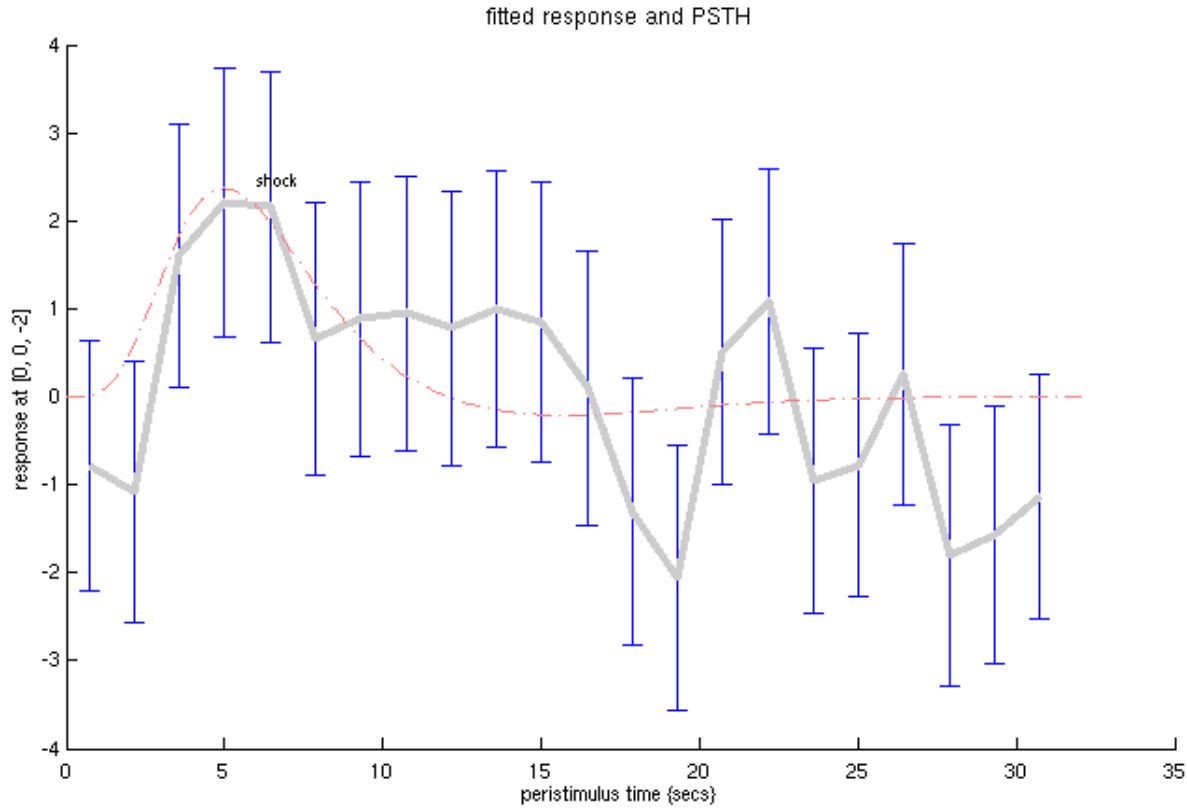
1	3
2	

Zeitverläufe

Event-related (1st level)



Event-related (1st level)

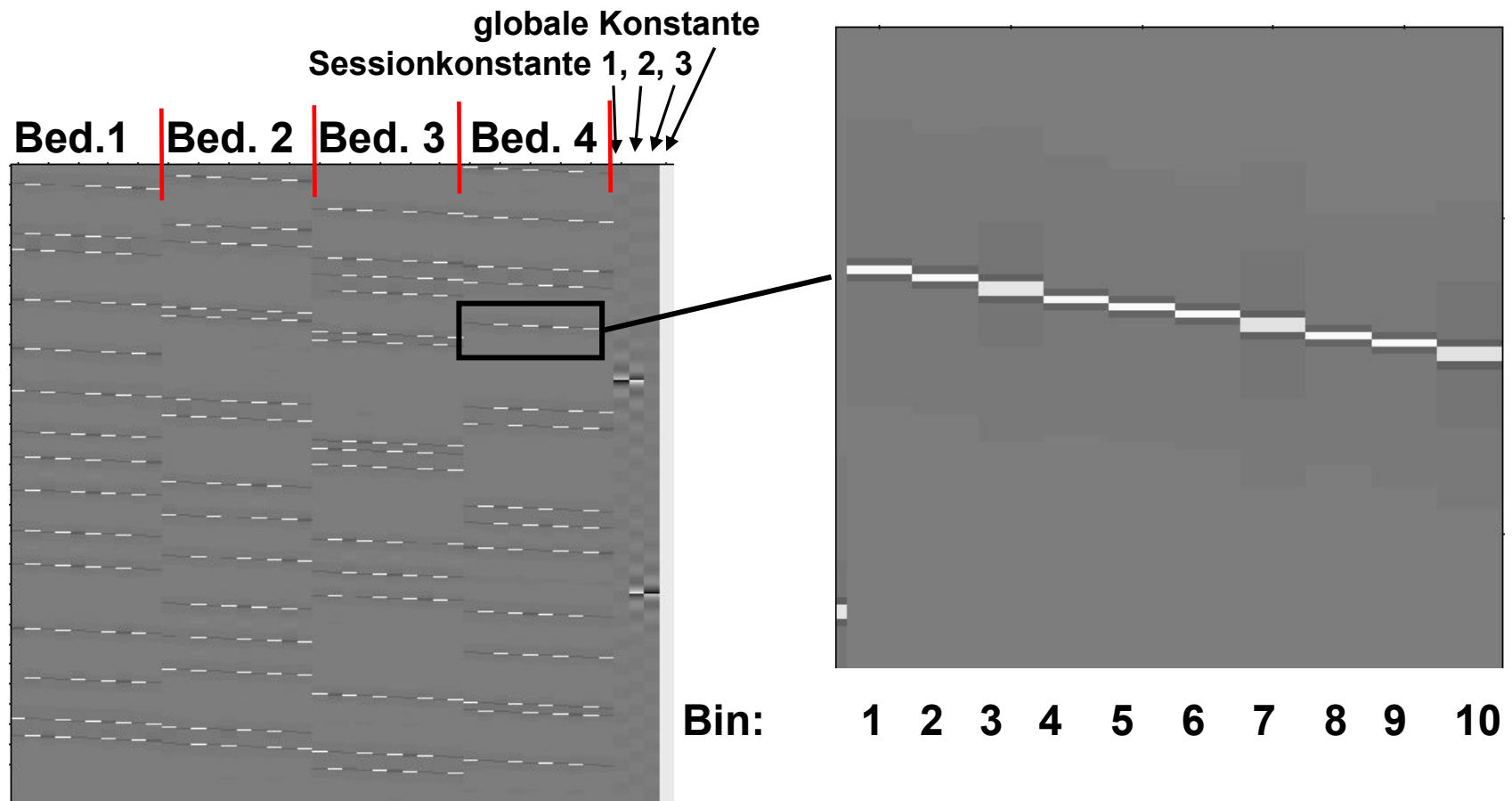


--- fitted response:
Regressor für 1 Event (X) * Beta

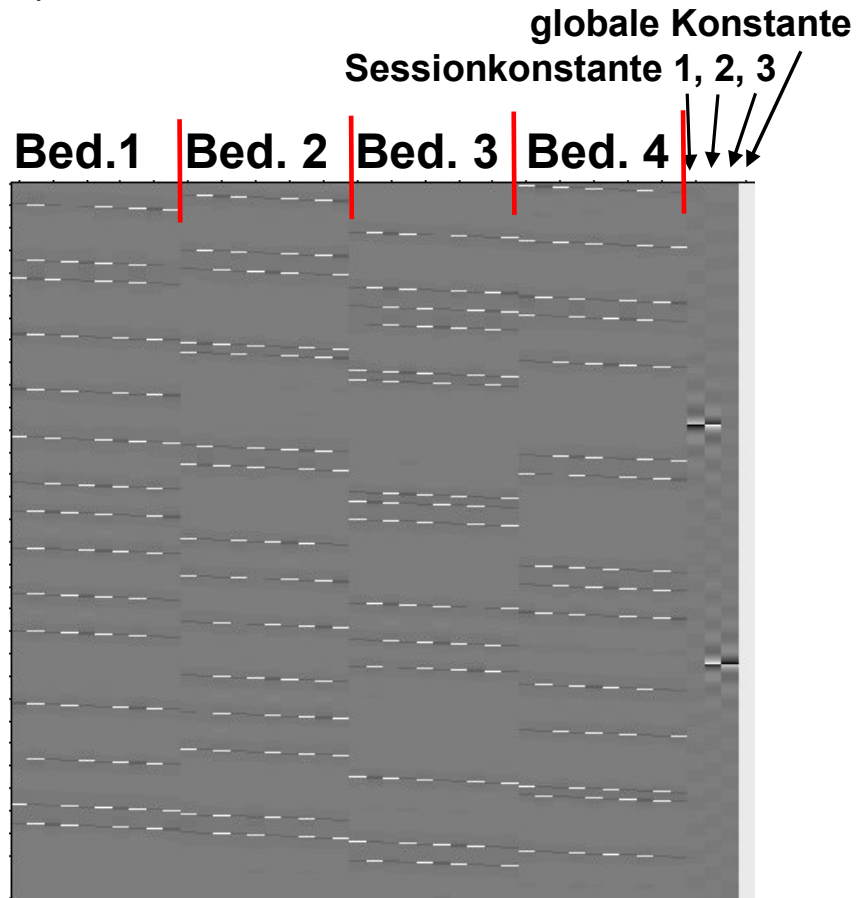
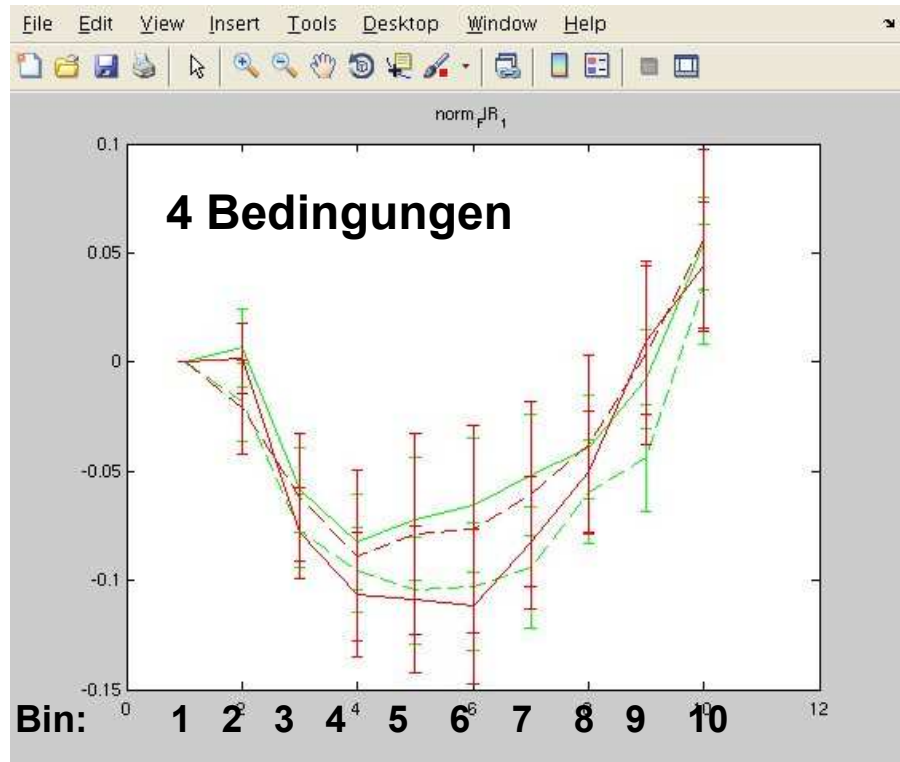
— PSTH:

- Alle Events übereinander-geschoben (ähnlich ERPs)
- Mittelwert und Konfidenzinter-vall
(genauer: Parameterschätzung für jedes Bin)

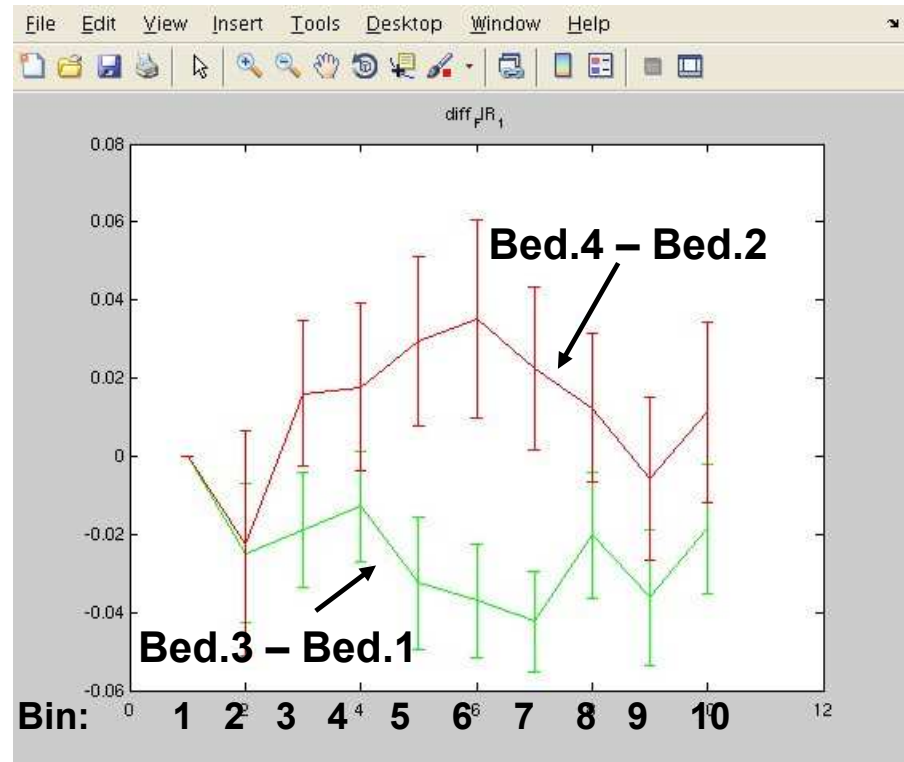
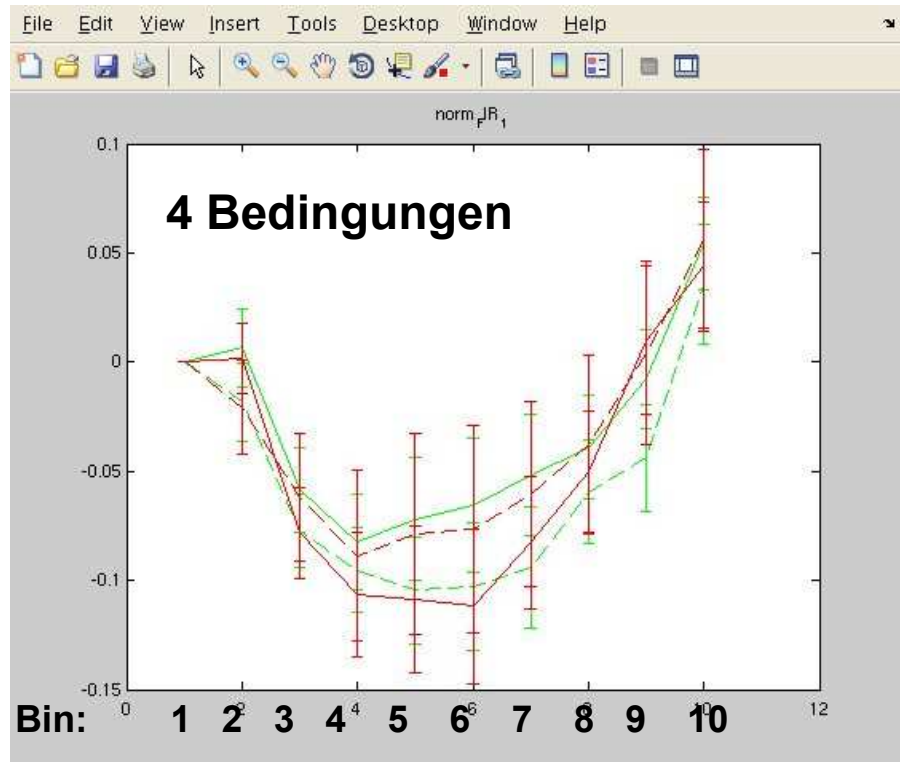
FIR-Modelle („finite impulse response“) (1st level)



FIR-Modelle („finite impulse response“) (1st level)

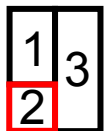
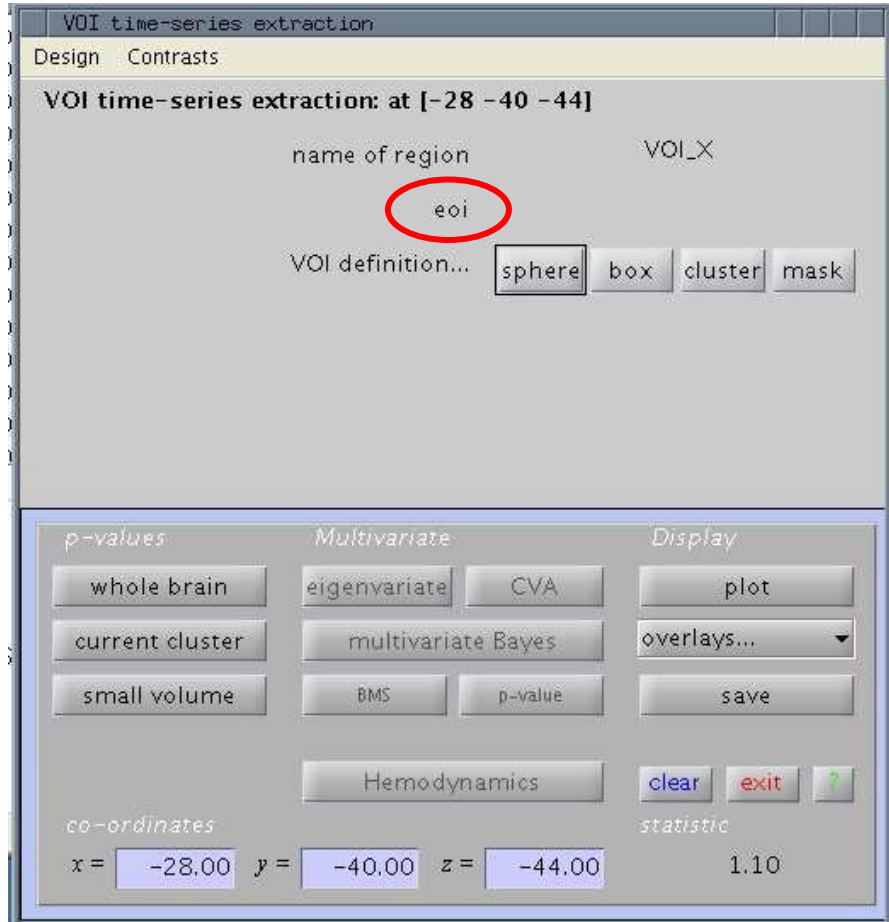
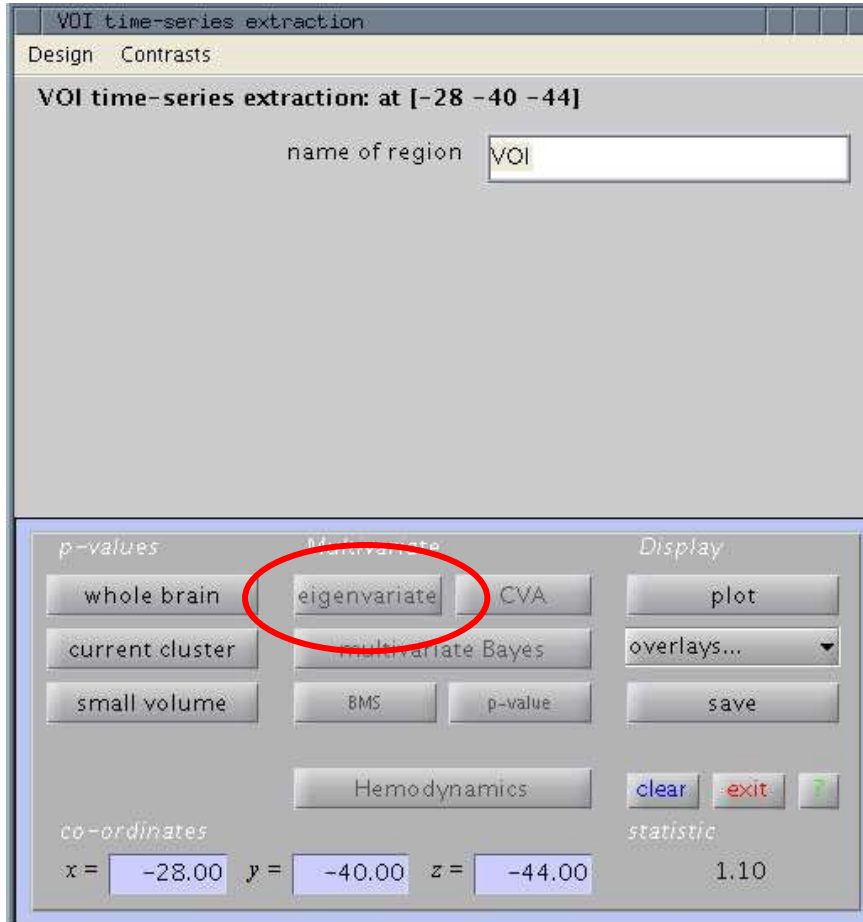


FIR-Modelle („finite impulse response“) (1st level)

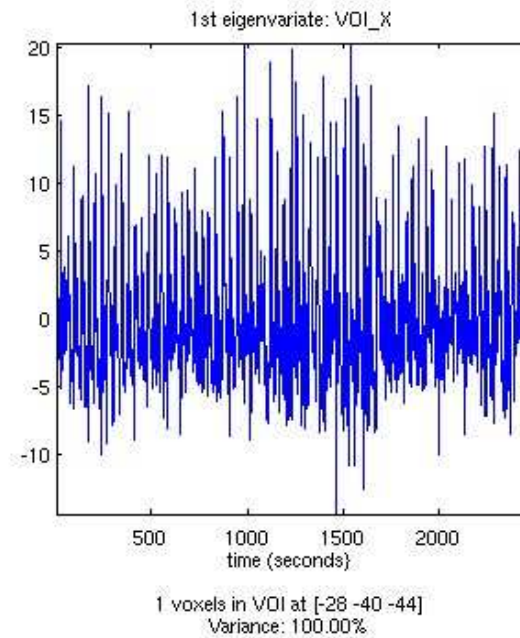


„Roh“signalverläufe! (1st level)

adjust for ... eoi



„Roh“signalverläufe! (1st level)

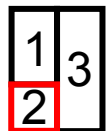
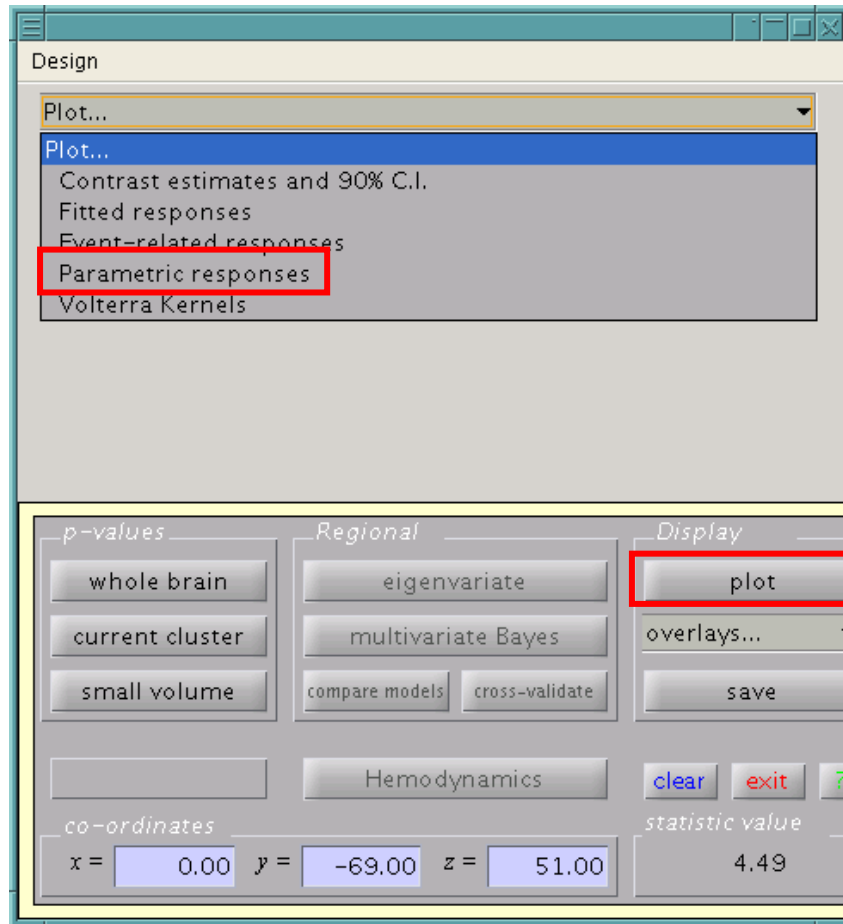


Y, gespeichert in VOI_[Name].mat

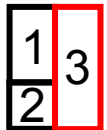
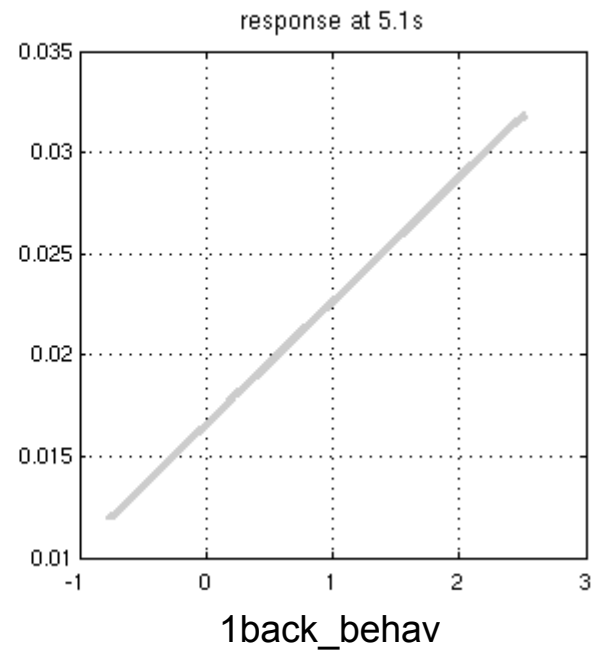
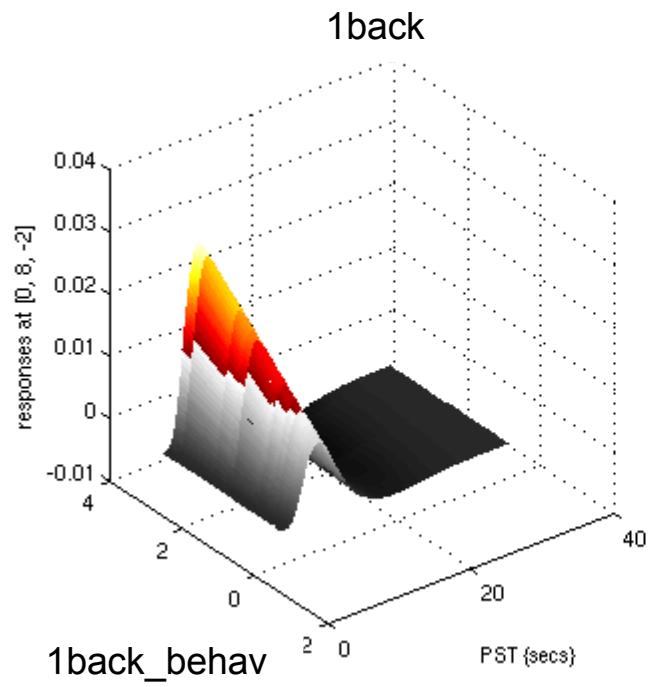
aber: Hochpass-Filter

1	3
2	

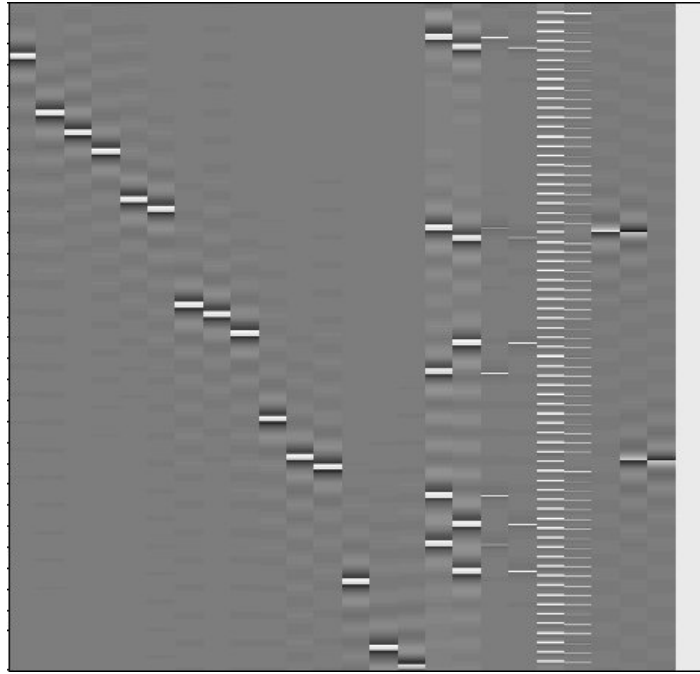
Parametrische Modulation (1st level)



Parametrische Modulation (1st level)



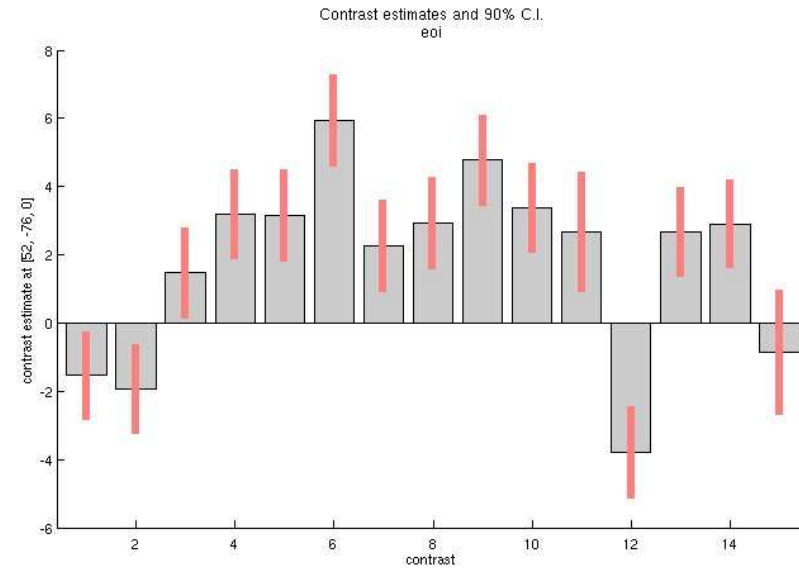
Modellierung einzelner Trials



15 Einzeltrials
derselben Bed.

no interest

aus eoi:



Empfehlung: rfxplot.sourceforge.net
(Jan Gläscher)