TAIWAN TECH
NATIONAL TAIWAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

MRI
HW3-fMRI

Presenter：

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OUTLINE

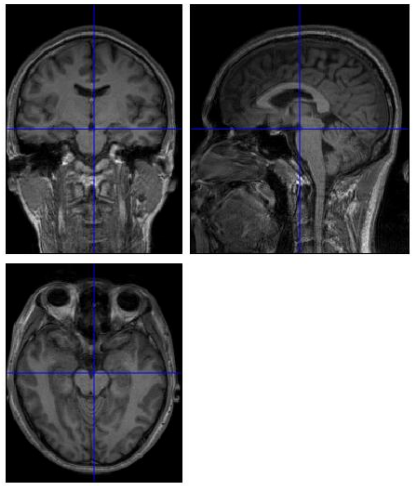
- fMRI Analysis
  - Introduction
  - Method
  - Experimental Results

Introduction - Data

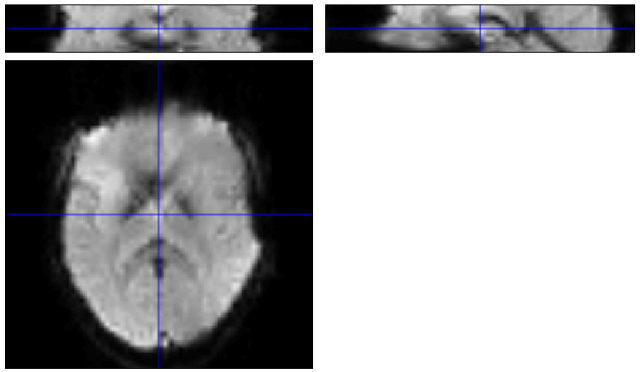
T1: 高解析度3D T1資料

fMRI: 實驗過程共100次掃描，受試者動作過程如下： 20off_20on_20off_20on_20off

T1



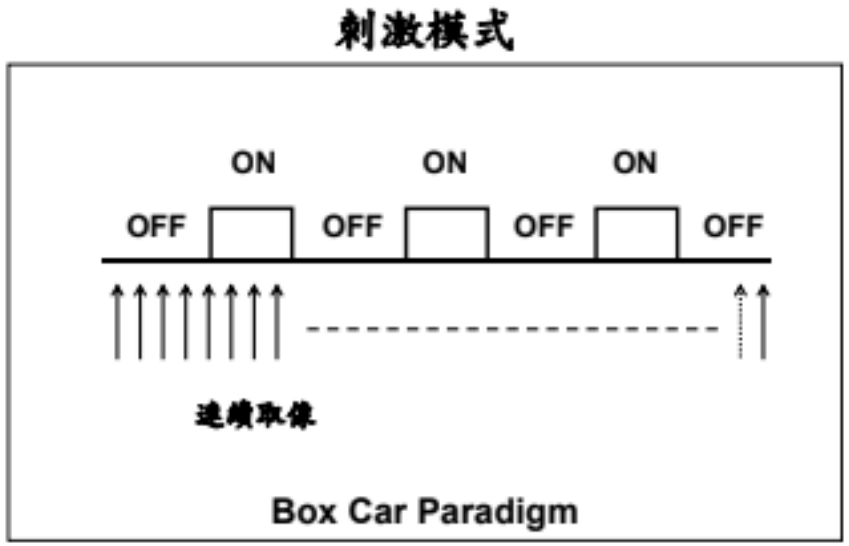
fMRI



Introduction - Analysis of fMRI

- Direct Subtraction (DS)

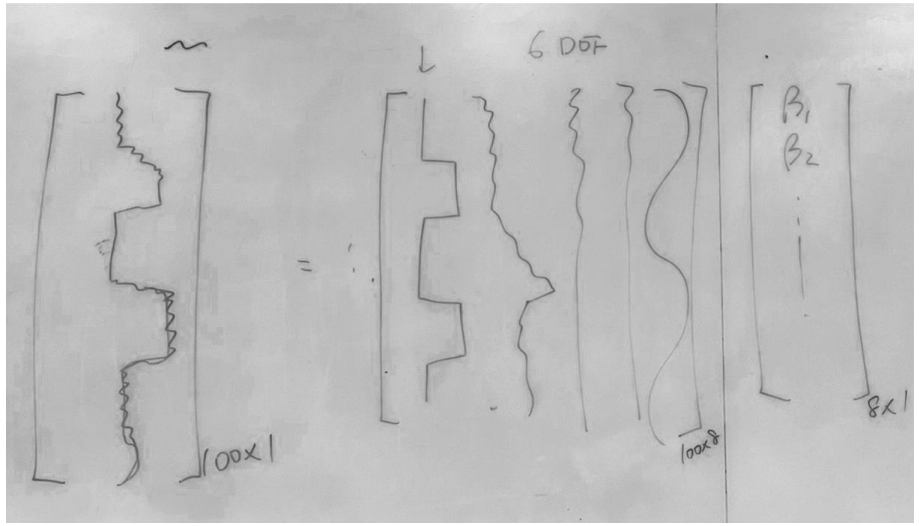
  全部刺激後平均 – 全部刺激前平均



$$t = \frac{\bar{y}_{on} - \bar{y}_{off}}{\sqrt{\frac{\sigma_{on}^2}{N_{on} - 1} + \frac{\sigma_{off}^2}{N_{off} - 1}}}$$

Introduction - Analysis of fMRI

- General Linear Model (GLM)

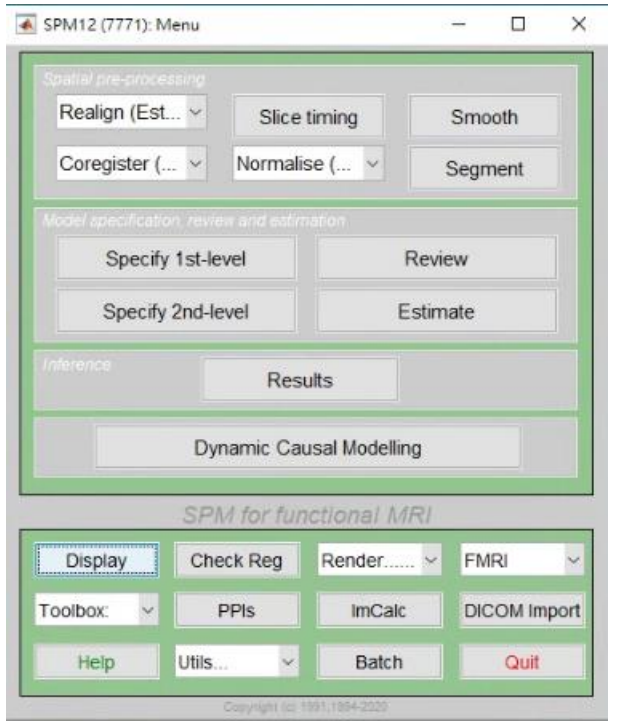


$$Y = X\beta + \epsilon$$

$$Y = \begin{bmatrix} x_{11} & \cdots & x_{1J} \\ \vdots & \ddots & \vdots \\ x_{T1} & \cdots & x_{TJ} \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_n \end{bmatrix} + \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ \vdots \\ \epsilon_n \end{bmatrix}$$

Method

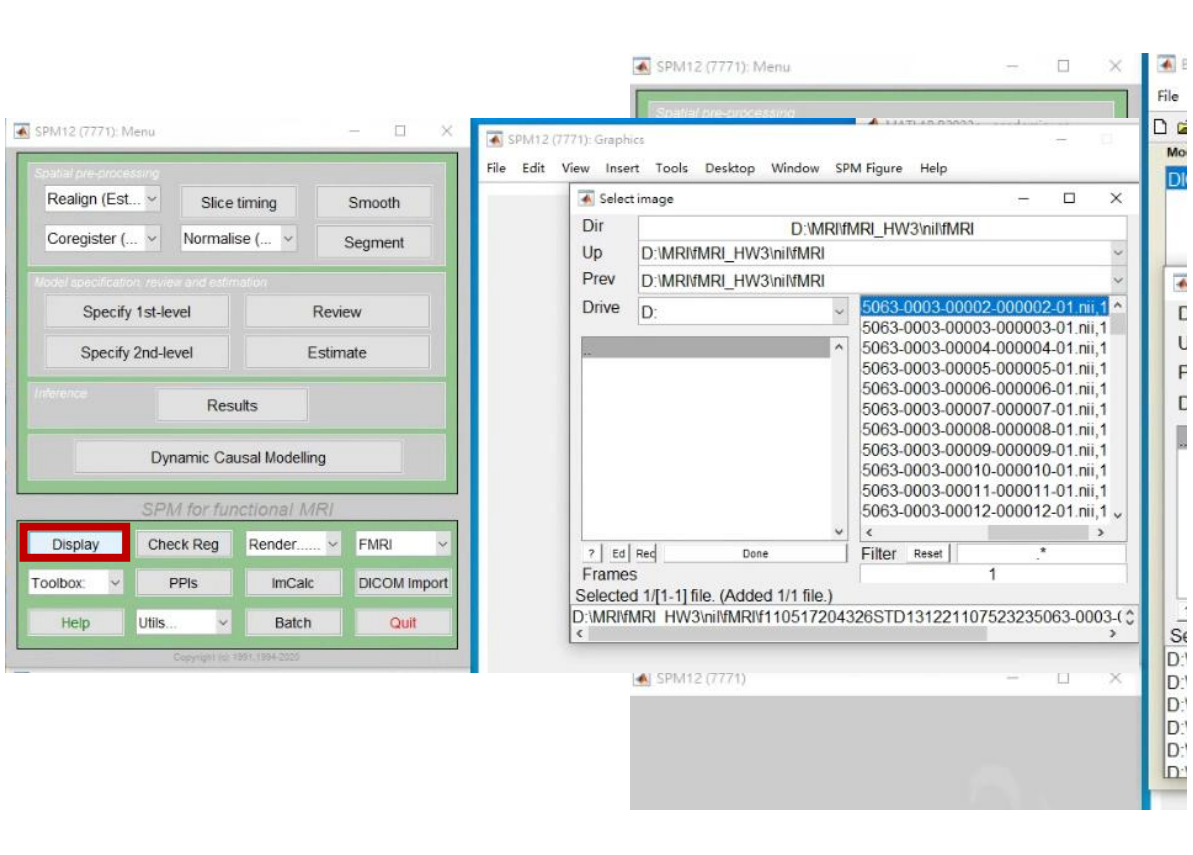
- SPM
  1. Load T1 and fMRI(EPI) files: DICOM to nil
  2. Slice Timing
  3. Realign: Estimate & Reaslice
  4. Coregister: Estimate
  5. Normalise: Estimate and Write
  6. Smooth
  7. fMRI Model Specification
  8. Model Estimation
  9. Result Review

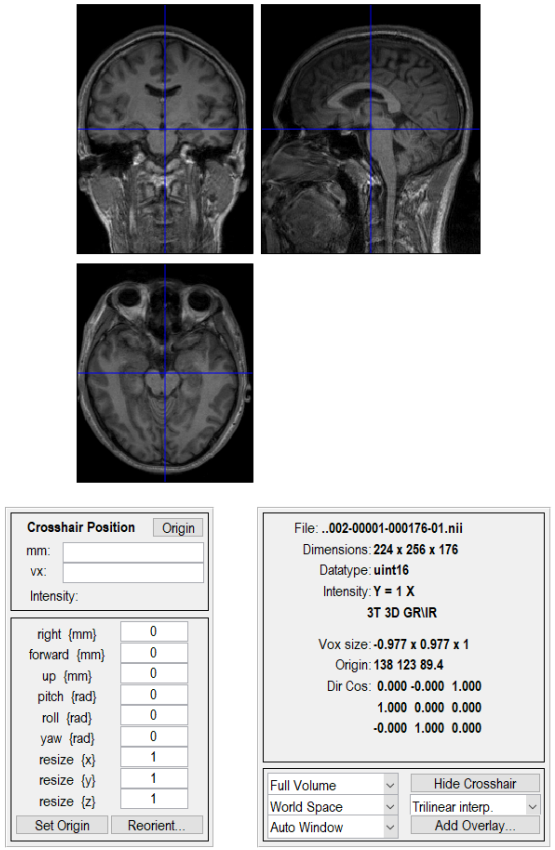


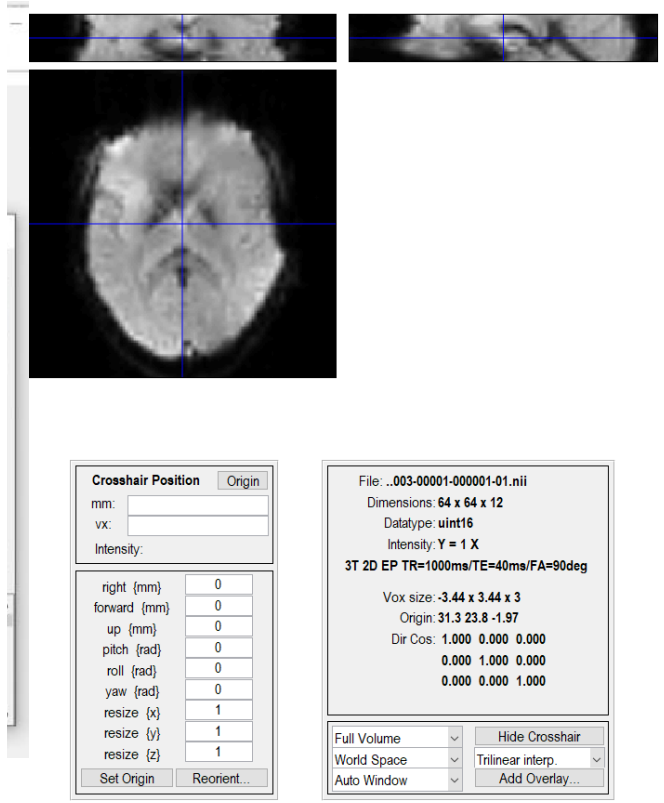
國立陽明大學-功能性磁振影像分析

Method

- Load files DICOM ➔ Nil

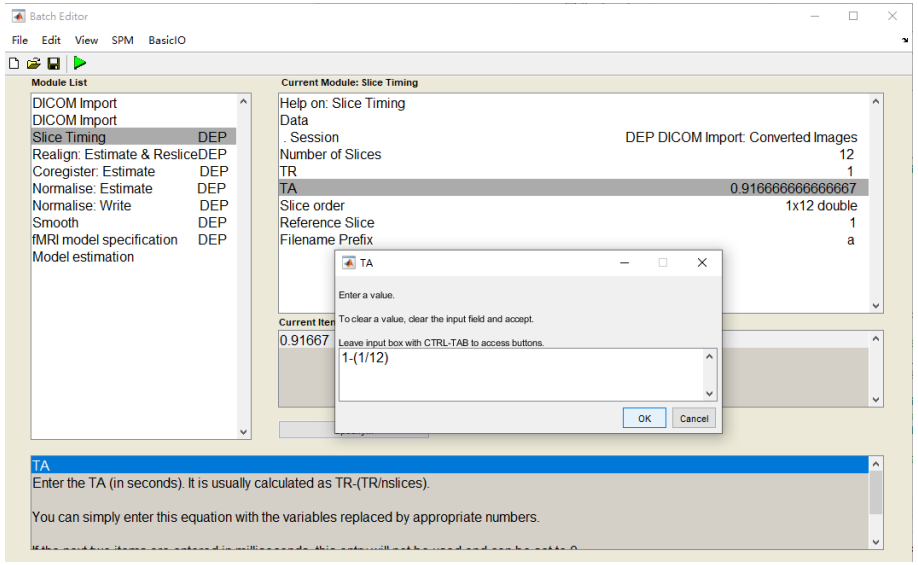


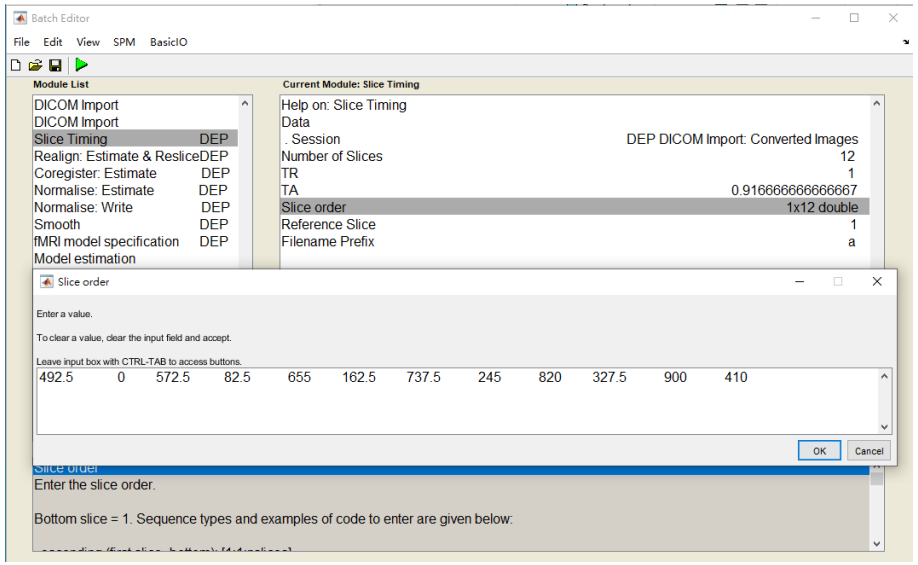




Method

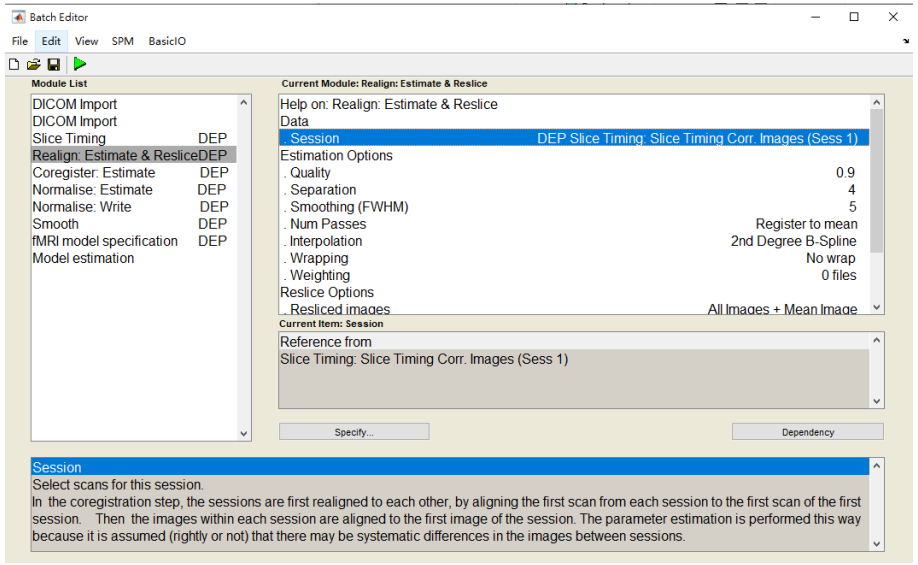
- Slice Timing

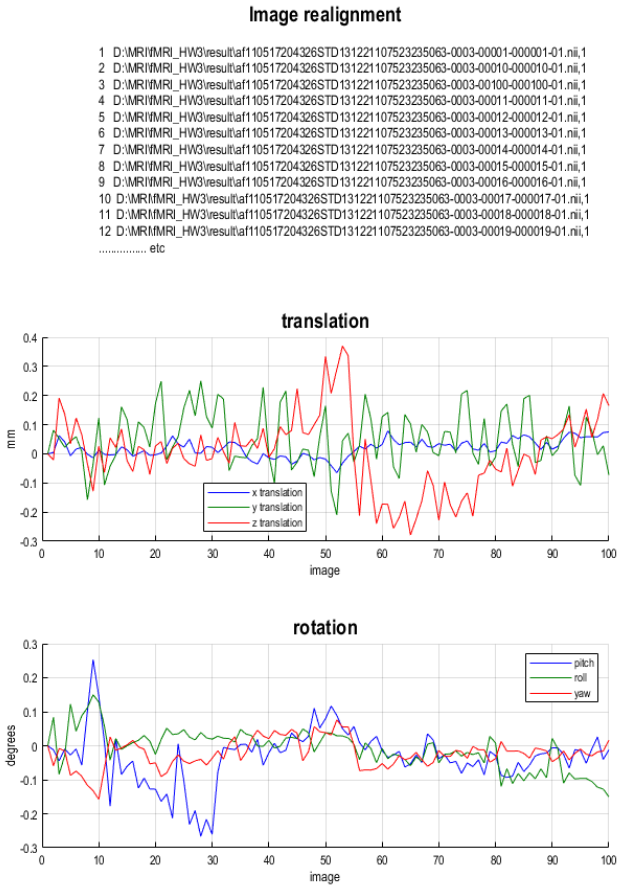




Method

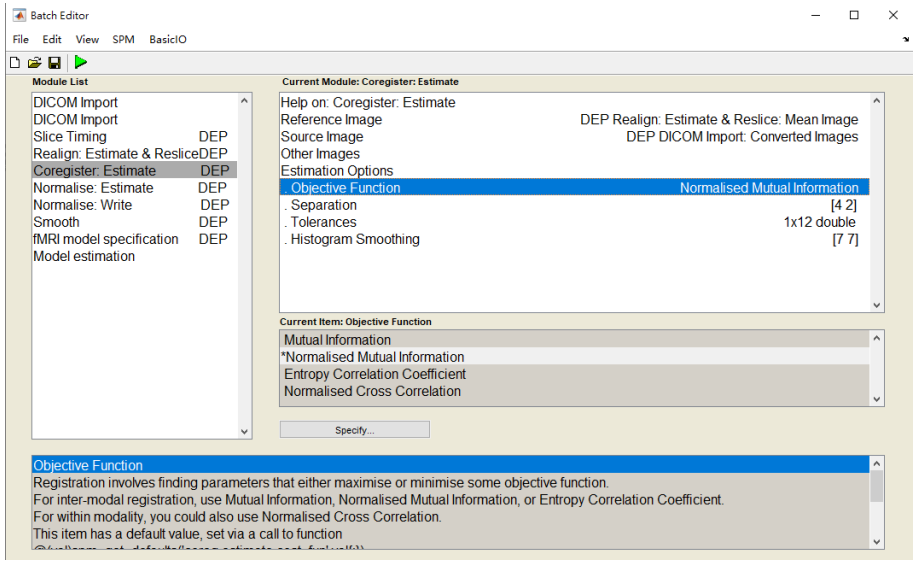
- Realign

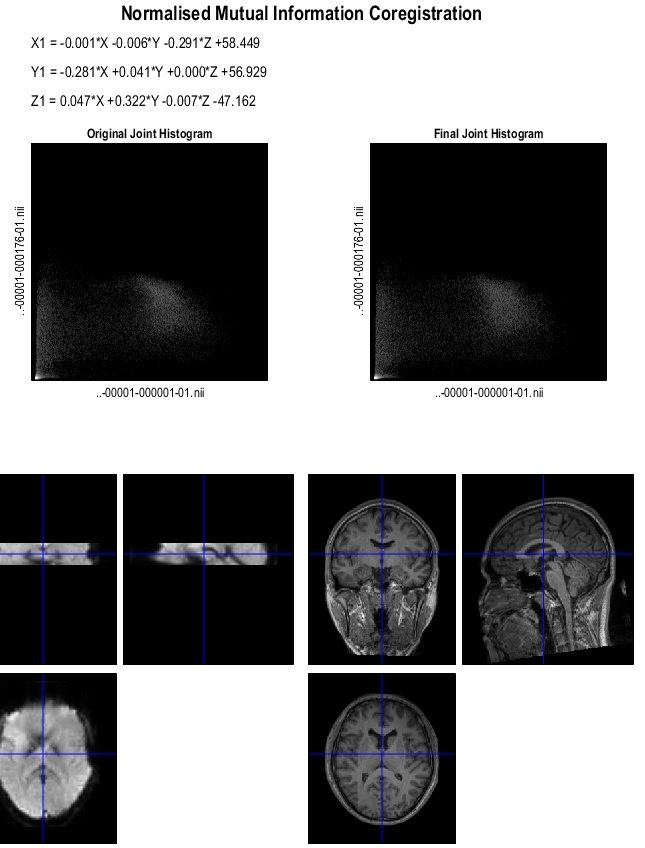




Method

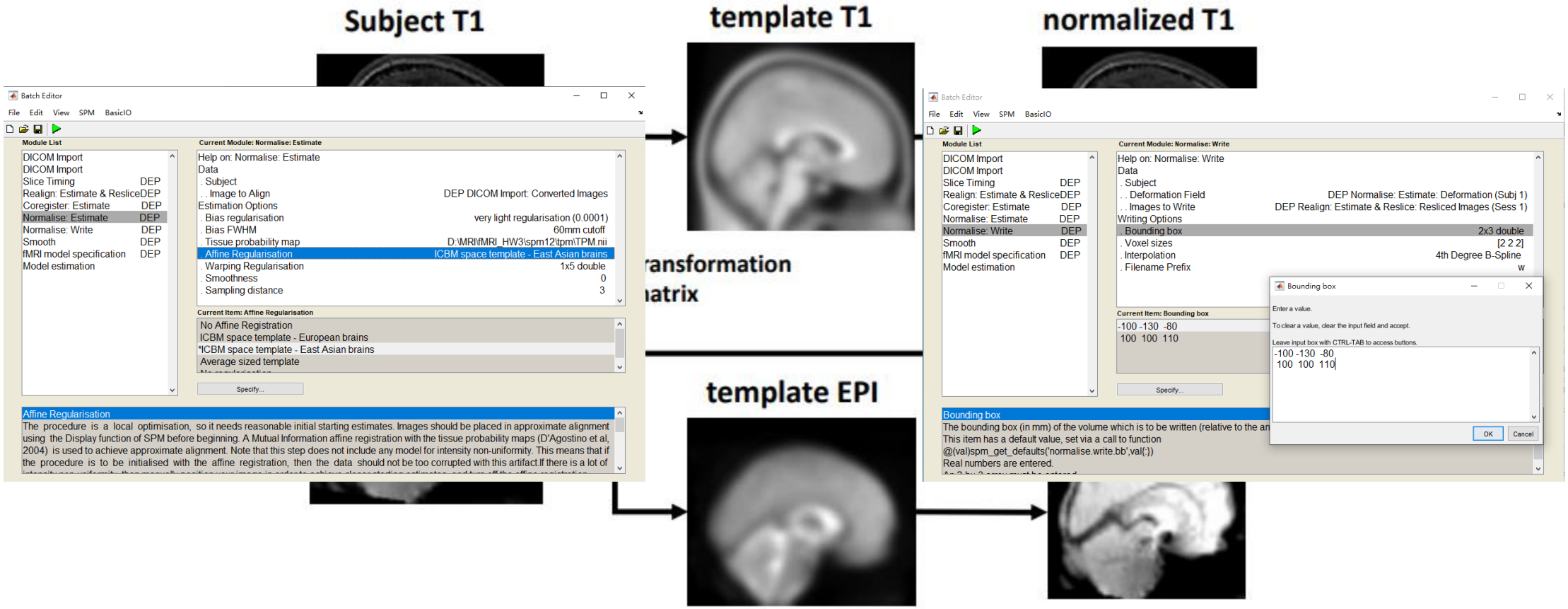
- Coregister





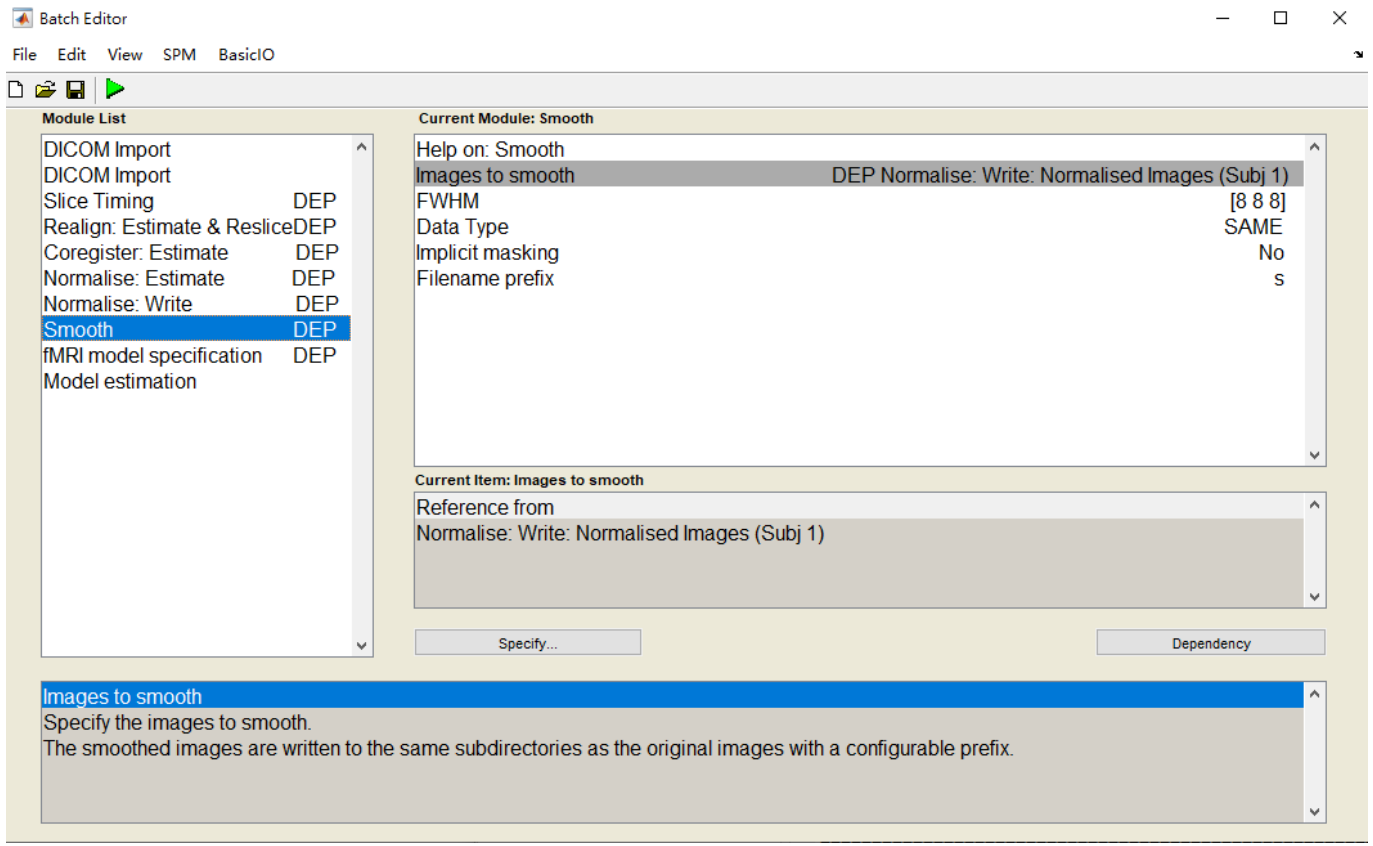
Method

- Normalise



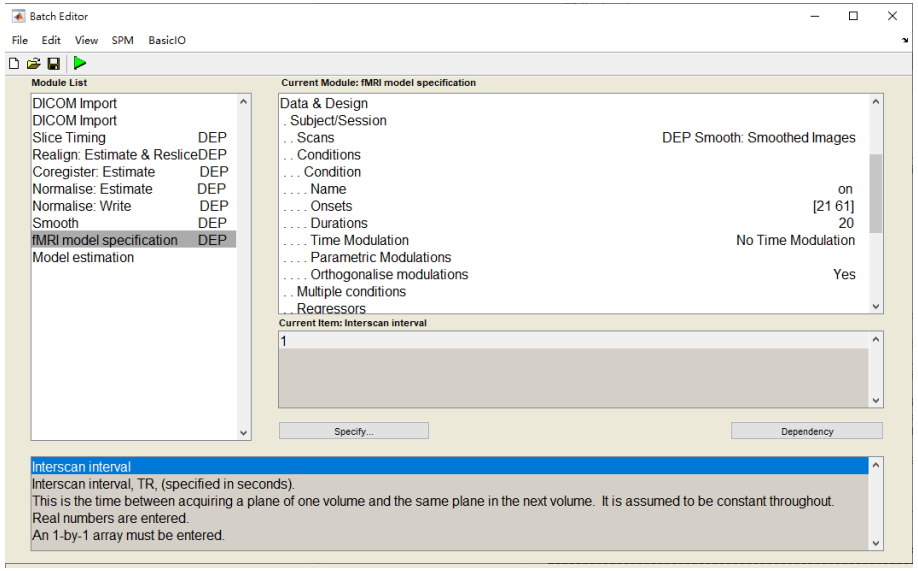
Method

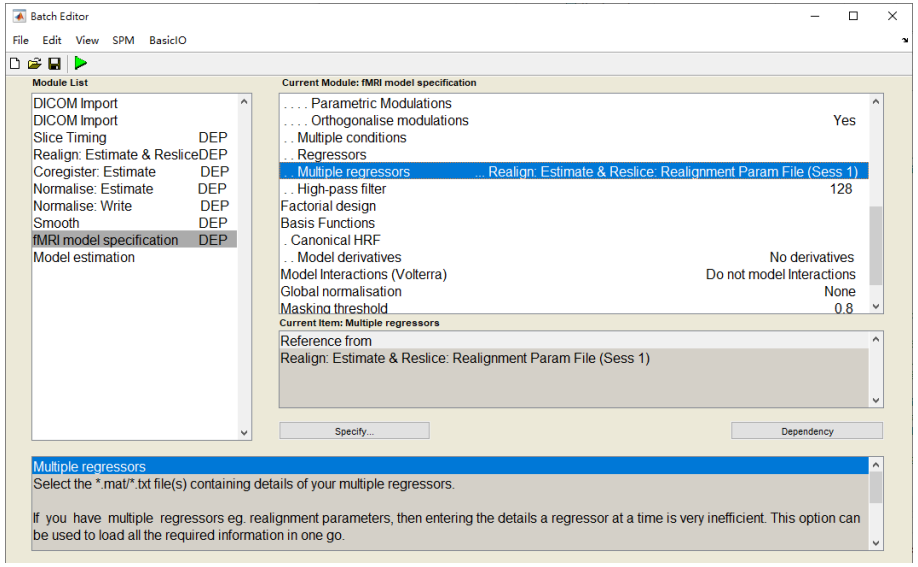
- Smooth



Method

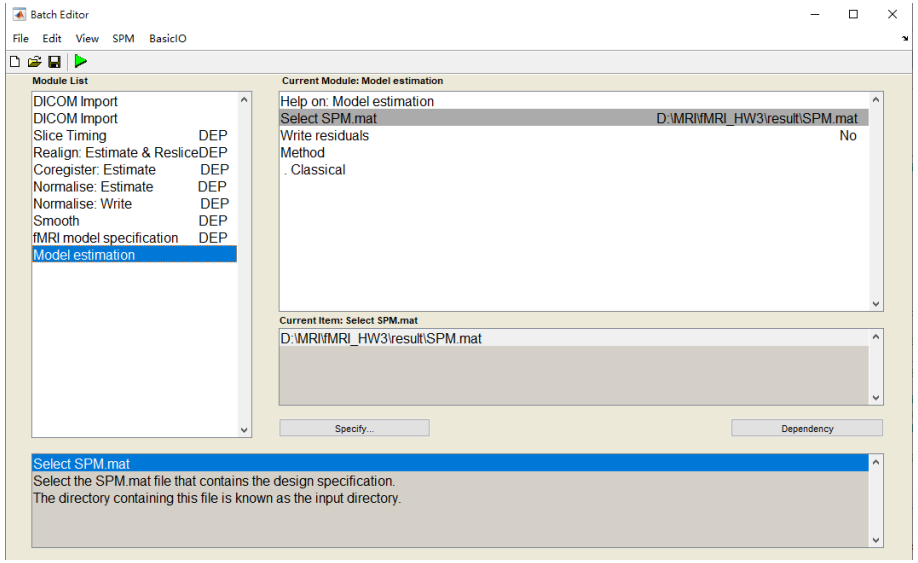
- fMRI Model Specification

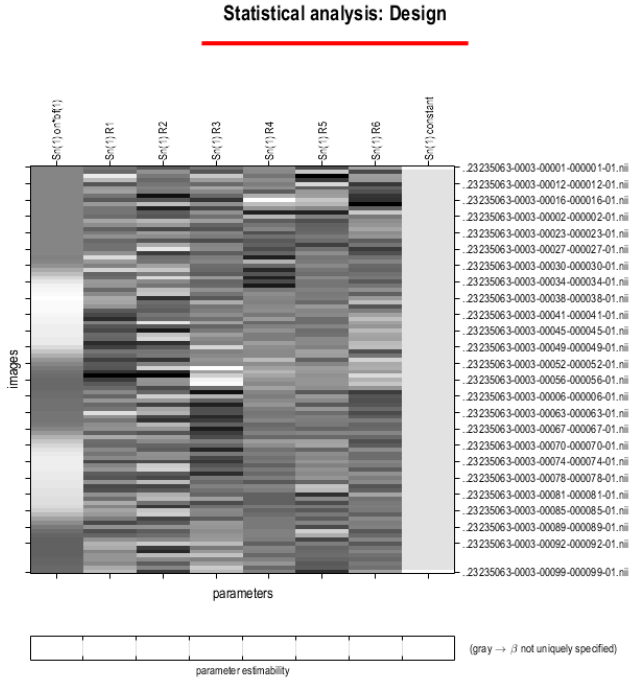




Method

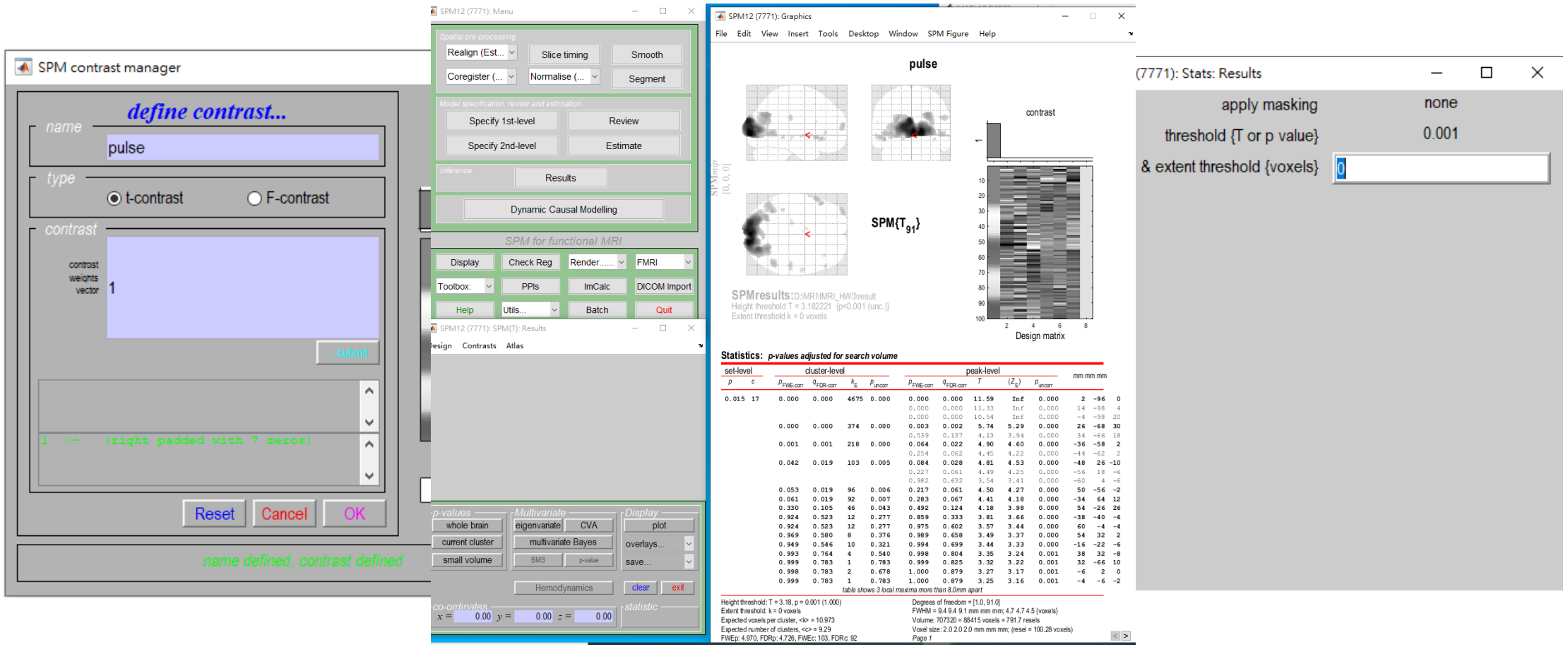
- Model Estimation





Method

- Result Review



Experimental Results

- xjview