fMRI of Human Olfaction

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Overview

Objectives

The Main Objective: a study of human olfaction and olfactory dysfunction detection (judical use)

Side Objectives:

1. decoding *surprise* in an olfactory oddball task
2. studying the effect of *stimulus length* on brain signals

Above methods are used to classify normal and dysfunctional olfaction

Literature Review

1. **Activation and Habituation in Olfaction**
   Poellinger et al. (2001), NeuroImage.
   - a study of olfactory stimulus duration effect on human BOLD response

2. **Olfactory fMRI: Implications of Stimulation Length and Repetition Time**
   Georgiopoulos et al. (2018), Chemical Senses.
   - Two stimulation lengths and two repititon times.
   - plotting the event related time course of brain activation in the four olfactory regions of interest.

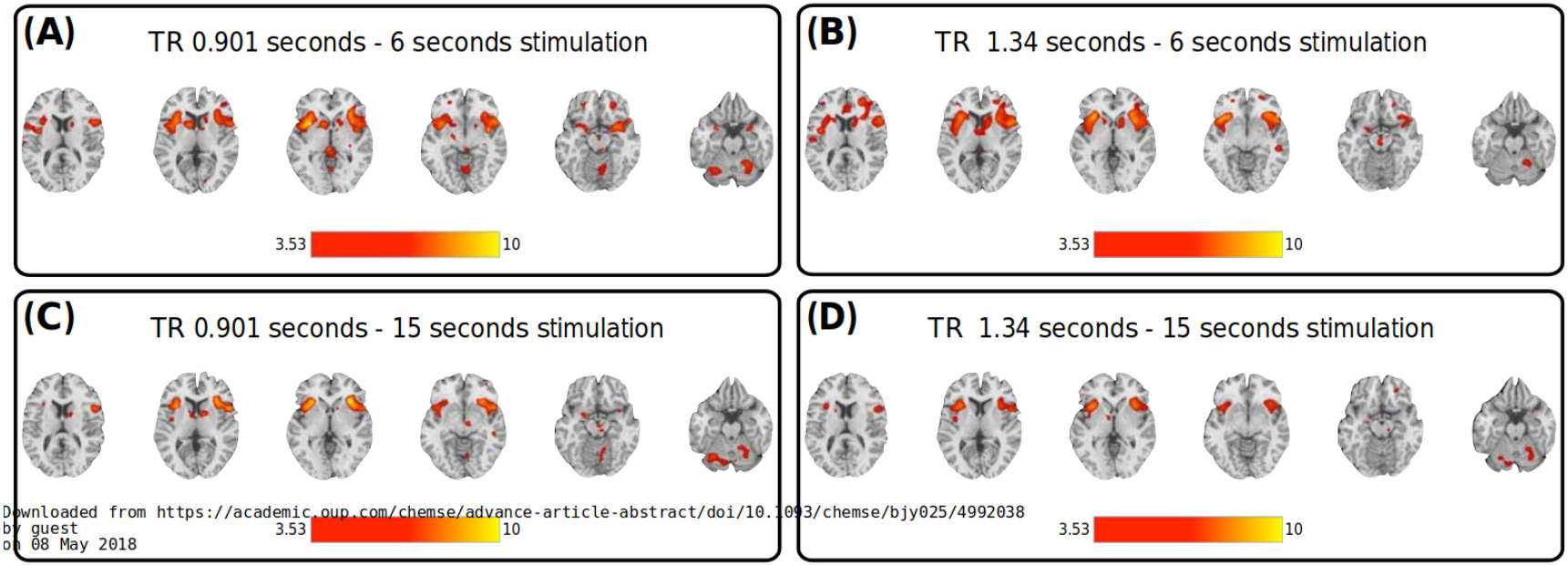
Literature Review

3. **Neural Correlates of Olfactory Change Detection**
   Merav Sabri et al. (2004), NeuroImage.
   - a study of both passive and active detection of olfactory change
   - fMRI and the common oddball paradigm

4. **Detection of Olfactory Dysfunction Using Olfactory Event Related Potentials in Young Patients with Multiple Sclerosis**
   Fabrizia Caminiti et al. (2014), PLOS ONE.
   - detection of olfactory dysfunction
   - Olfactory Event Related Potentials (OERP signals) used (no fMRI)

Literature Review

5. **A Computer-Controlled Olfactometer for fMRI and Electrophysiological Studies of Olfaction**
   Tyler S.Lorig et al. (1999), Behavior Research Methods, Instruments, & Computers.
   - design for an inexpensive and reliable olfactometer
   - computer-controlled odor administration
   - no ferrous material near the subject (for fMRI use)
6. **Methods for Building an Inexpensive Computer-Controlled Olfactometer for Temporary-Precise Experiments**
   Johan N. Lundström et al. (2010), International Journal of Psychophysiology.
   - a complete guide for building an olfactometer suitable for behavioral experiments



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Literature Review

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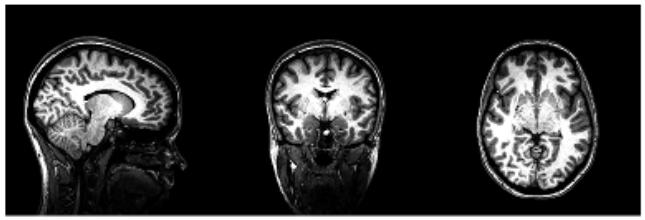
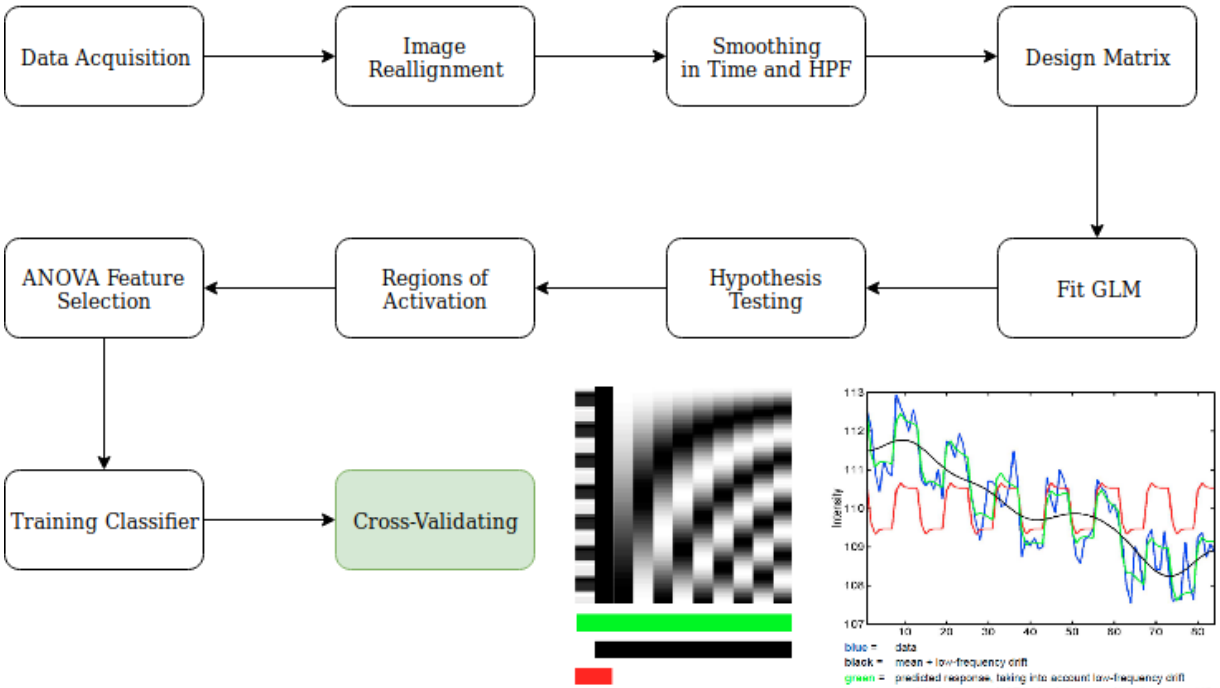
fMRI Data Analysis with SPM



$$y = X * \beta + \varepsilon$$



Stages of Data Analysis

Multiple Columns

Heading

1. Statement
2. Explanation
3. Example

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Theorem (Mass–energy equivalence)

$$E = mc^2$$

The End