The need to automatize tasks

Christophe Pallier

CNRS
Unité INSERM-CEA de Neuroimagerie Cognitive
Gif-sur-Yvette

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Why?

Reproducible Science

Why a workshop on Computer Science tools for Cognitive Science?

- Perform simulations
- Select stimuli in databases, or generating them
- Create experimental lists (distribution of conditions, order of trials...)
- Stimulate participants and record their responses
- Analyse Data (Reaction times, EEG, fMRI)
- Generate Reports/publication quality figures
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You should strive to make your experiments and analyses reproducible... by others, but also by yourself!

- you should keep track of exactly how you selected your materials
- you should keep track of what you did exactly for the analyses
- someone else should be able to check what you did, and reproduce it
- This is often very difficult to achieve!

Possible strategies:

1. keep a detailed lab notebook (I only know one person who can do it)
2. write computer programs that can entirely reproduce your experiments and your analyses
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Tools for reproducible science

- It is worth learning how to program cleanly! The aim is not simply to write a program that works but a program that can be reread and modified. In the end, you will spend less time in front of the computer
- Programming tools
  - Good ones: Python, R, Matlab ...
  - Less good ones: Excel, E-prime...
    - impossible to check thouroughly.
    - compatibility not assured between successive versions (binary formats).
- Version control tools (git, mercurial, svn...) allow to keep track of the history of all files and (b) facilitate collaboration between several people. See github.com
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An example: designing a lexical decision experiment

Research question: is visual word recognition influenced by the length in lettters) and the frequency of use? Are short or frequent words more easily recognized than longer or less frequent ones?
We are going setup a real lexical deicision experiment.

1. Creating the materials (using lexique.org)
2. Programming the experiment (using opensesame)
3. Analysing data (Using R and Rstudio)