The need to automatize tasks

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Table of Contents

Why a workshop on Computer Science tools for Cognitive Science?

- Perform simulations
- Selecte 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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Reproducible Science

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
3. give up, hope you have not made mistakes, and will not need to check or rerun the experiment

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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.
    - they have their use notheless.
- Version control tools (git, mercurial, svn...) allow to keep track of the history of all files and (b) facilitate collaboration between several people
- Check lessons on http://software-carpentry.org/v4/index.html
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An example: Selecting nouns and verbs for an experiment

Suppose you need to select nouns and verbs that are 4 phonemes long and have 4-6 letters.

1. You can go to www.lexique.org and user the interface to obtain such lists.
2. (better) Download the current database and write a script to select your materials.

See demo in lexique_search