Quantitative/Experimental tools in Linguistics
(Advanced Undergraduate Workshop)

Instructors:
- **Dr. Adam Chong**   **(a.chong@qmul.ac.uk)**
- **Dr. Kathleen McCarthy**   **(k.mccarthy@qmul.ac.uk)**
- **Dr. Adib Mehrabi**   **(a.mehrabi@qmul.ac.uk)**

Date/Time/Location:
10 June 2019 (Monday): 10am-12pm, 2pm-4pm   (ArtsOne 1.28)
11 June 2019 (Tuesday): 10am-12pm, 2pm-4pm (ArtsTwo 3.20)
*Note different rooms for both dates

Overview:
This intensive workshop is aimed at providing you with further advanced foundational skills to be able to carry independent experimental and quantitative research. The workshops will allow students to gain further experience with experimental design considerations and statistical analysis methods. Students will be build an experiment from scratch using existing (free) experimental building tools (e.g. Gorilla, Open Sesame). Students will also be introduced to R which is a software environment that is incredibly versatile for data processing manipulation, visualisation and statistical analysis. Students should note that this is not a workshop on specific experimental paradigms (e.g. self-paced reading etc), but rather more foundational skills that can be applied for use with any experimental paradigm.

We will assume that you have done LIN5202 Research Methods in Linguistics. Given the pace of the workshop, we will expect students to be comfortable with the concepts introduced in that module before attending this workshop (in particular Weeks 3, 6, 9-11). These will only be briefly reviewed at the start of these workshops. If you need access to the module site/slides/handouts, please contact Adam directly.

Note that these workshops are run as seminars, and given their hands-on nature they will not be recorded. All materials will be posted online after the workshops.

We ask that students bring their own laptops to these workshops so that they can work on their own computers. If this is not possible, please let Adam know in advance (we have a few laptops we can lend out for the workshops).

Learning outcomes – after attending this workshop, I will…
- Be comfortable designing an experiment from scratch (understanding the potential design choices and pitfalls for a given method)
- Be comfortable implementing an experiment using software or some coding

- Understand how basic experimental design principles are applicable to any type of experimental paradigm
- Be comfortable consulting online resources/tutorials to be able to independently learn further skills that might be necessary for own individual project
- Understand how data is structured in an experimental output (and input)
- Be comfortable using R to manipulate, process, visualise and analyse data, and be able to consult online R resources to learn further skills as the need arises
- Understand basic statistical concepts/considerations and apply them to my own data
- Be able to conduct basic statistical test (e.g. chi-square, t-tests, and ANOVAs) using R, and interpret the output of these results
- Understand what is expected in the reporting of these results in experimental write-ups.
- Recognise the transferable nature of the skills introduced in this workshop

(Tentative) Workshop Outline

Day 1

Part A: Intro, basic stats theory, experimental design and considerations
- Intro and background/purpose
- Recap of basic experimental concepts
- Things to consider in designing experiments
- Dealing with confounds: Blocking, randomisation, counterbalancing etc.
- Reading experimental papers and understanding what was done and how to apply it to your own work

Part B: Building and running an experiment
- Creating an experiment using 'drag-and-drop' software (from scratch)
  - We will provide stimuli and paradigm
- Tentative: Running the experiment with classmates and getting data

Day 2

Part A: Intro to R and Data Manipulation
- Intro to R
  - Setting workspace
  - Variables
  - Functions
  - Packages
  - Documentation (how to find help)
  - Data wrangling
- Basic stats course
  - Descriptive stats (with plotting)

- ○ Distributions
- ○ Parametric vs non-parametric
- ○ Neyman-pearson method

Part B: Inferential statistics in R
- Plotting data
- Basic stats (t-test, chi sq, ANOVA)
  - ○ Testing assumptions
  - ○ Running models
  - ○ Interpreting output
- Reporting results

Required software:

Please **download and install** the following (free) software **before** attending this workshop.

OpenSesame: https://osdoc.cogsci.nl/

R Statistical Computing: https://www.r-project.org/
RStudio: https://www.rstudio.com/products/rstudio/#Desktop
For RStudio - download the "Open Source Edition" of R Studio Desktop