Experimental Methods in Psycholinguistic Research
Summer semester 2015

Worksheet 1: Creating an experiment in Experiment Builder

0. Lab matters

You will all need to use the EyeLink II PC in lab 1.07 (building C7.4). Make sure that your working times in the lab do not overlap. You can book the lab by e-mail'ing your course instructor.

Login under "ExpMethods2015".
Password: ExpMethods2015

General rules:

- Food is not allowed in the lab. Drinks are allowed but only in a covered container.
- Do not leave any garbage behind.
- Do not install or delete anything without consulting with the course instructor.
- Do not forget to power off the computers and closing windows after you are done.

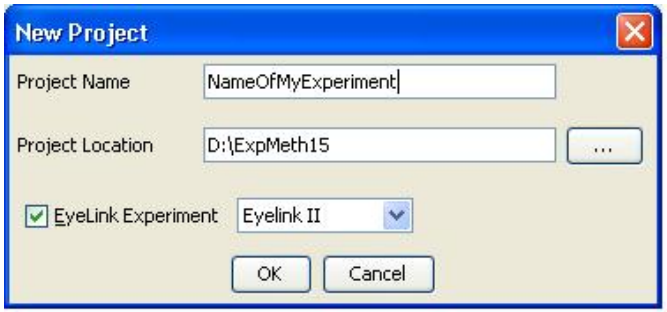
1. New Session in Experiment Builder

Start > All Programs > SR Research > Experiment Builder > Experiment Builder

- File > New

In the New Project dialogue that will appear select:

- Project Name: ExpMe15_experiment
  (or whatever name is more convenient to you, as long as you don't use any space characters)
- Project Location: D:\ExpMeth15
- Check the EyeLink Experiment box and select EyeLink II from the dropdown menu
- Click on *OK*



Now, a warning message will pop up. Read it through and click on *OK*.

You should now be able to see a bunch of folders and files in your experiment directory.

2. Create welcome screen

- Drag DISPLAY_SCREEN icon and drop it in the workspace (under the START icon).
- Draw a link between them (left click on the source icon –in this case START- drag towards target icon –in this case DISPLAY_SCREEN- and release).
- Click on the DISPLAY_SCREEN icon in order to make changes. You will see the action's details in the Project explorer window (the left part of the screen) and a new text-editor-like tab in the Graph editor window (the top-right part of the screen).
- In the Project explorer window, under Properties:
  - Label value: "WELCOME_SCREEN"
  - Rest properties: default values
- In the Graph editor window, double click on the DISPLAY_SCREEN now labeled as WELCOME_SCREEN:
  - Select the Insert Text Resource icon from the toolbar (third from the left) and then click anywhere on the blank workspace.
  - In the textbox that will appear type in your welcome message, e.g. *Welcome and thank you for your participation in this experiment!*
  - You can position your text on the screen by selecting the appropriate alignment buttons from the toolbar (right, center, left and top, center, bottom).

Now you need to tell Experiment Builder under what conditions the welcome message should disappear:

- Click on the Experiment tab at the top of the Graph editor window to take you back to our experiment flow diagram.
- Click on the Trigger tab (right side of the toolbar) to see the trigger buttons.
- Drag the EyeLinkButton (EL_BUTTON) icon and drop it under the WELCOME_SCREEN icon in our diagram. Create a link between the two.
- Click on the EL_BUTTON icon and specify the properties of the icon in the Properties section (Project explorer window):
    - De-select "Release Events" button if it is selected (we want the screen to change by the participants' button press, and not button release)
      In the buttons field specify which button(s) on the button-box will be responsible for this command (e.g., [5]). Each button corresponds to a number ('Y' -> 1; 'X' -> 2; 'B' -> 3; 'A' -> 4; Big D-pad on the left -> 5; left back trigger -> 6; right back trigger -> 7)

3. Create Instructions screen

- Drag another DISPLAY_SCREEN icon in the workspace and link it up with the EL_BUTTON icon
- Click on the DISPLAY_SCREEN icon and
    - in the Project explorer window, specify screen's properties:
        - Label: INSTRUCTIONS_SCREEN
        - Rest properties: default values
    - in the Graph editor window, under the INSTRUCTIONS_SCREEN tab
        - Click on the Insert Multiline Text Resource button (fourth from the left on the toolbar)
        - Click on the editor and type in your instructions text in the pop-up editor window
          e.g. […] *In this experiment you will be presented with stories about people and their actions. You are asked to read through these stories, and answer some questions about them. Throughout this process your eye-movements will be monitored and recorded.* […]
        - Arrange the position of your text on the screen by clicking on the appropriate alignment button at the top of the Multiline Text Resource pop-up window toolbar

Now you need to tell Experiment Builder under what conditions the instructions display should disappear:

- Click on the Experiment tab to navigate back to our experiment diagram.
- From the Triggers tab drag the EyeLinkButton (EL_BUTTON) icon and drop it in the workspace, under the INSTRUCTIONS_SCREEN icon (once you drop it, it will be renamed into EL_BUTTON[1])
- Create a link from INSTRUCTIONS_SCREEN to EL_BUTTON[1].
- Click on EL_BUTTON[1] icon and define its properties as in step 2 above.

4. Block sequence

- From the Actions tab of the toolbar select the SEQUENCE icon, drag and drop it in the workspace below the EL_BUTTON[1] icon. Create a link between the two.
- Click on the new SEQUENCE box to edit its properties
    - Give it a comprehensive name (e.g. BLOCKS)
    - Uncheck "Is Real Time" and "Record" boxes, if they are checked
    - "Iteration Count" (number of blocks within an experimental session) should be set to at least 2 so that participants can have at least one break throughout the experiment
- **Camera set-up**
    - Drag the EL_CAMERA_SETUP icon and drop it on the Workspace (under the START icon)
    - Create a link between the two (EL_CAMERA_SETUP is of course the target)
    - Properties: Default values

4.1. Create main experiment sequence

- From the Actions tab of the toolbar select the SEQUENCE icon, drag and drop it in the workspace below the EL_CAMERA_SETUP icon. Create a link between the two.
- Click on the new SEQUENCE box to edit its properties
    - Give it a comprehensive name (e.g. EXP_SEQUENCE)
    - Uncheck "Is Real Time" and "Record" boxes
    - "Iteration Count" (number of trials in an experimental session) will be automatically updated after you import your datasource file
    - Split by: [18, 18] (divides the 36 items into 2 sets so that participants can have a break in the middle of an experiment)
        - This Property is linked to the "Iteration Count" value of the BLOCKS sequence: if you would like to have two breaks within an experimental session, Split by value should be [12,12,12] and "Iteration Count" of the BLOCKS sequence should be 3.
    - Click in the Value cell of the Data Source field to import your stimuli
        - In the new tab that will open up (EXP_SEQUENCE_DataSource) select "Import Data"
        - In the "Import Data" window that will pop up browse your datasource file (tab delimited *.txt file), select the appropriate encoding ("Default" if ASCII) and click on "OK"
        - **IMPORTANT NOTE: Your Datasource file should be organized as described below (4.1.1).**
        - Check "Enable Run-Time Randomization" box
        - Open "Randomization Setting" dialog window, under "Splitting Column" drop down menu select "list" (this will allow to choose which list you want to run each time you start the experiment), leave everything else the way it is (unless you would like to make a use of the built in randomization procedures)

4.1.1. Create datasource file

- Create tab delimited txt file containing all the stimulus information
    - list
    - trial
    - item
    - $item_name
    - condition
    - $condition_name
    - $story
    - $question
    - correct_answer
    - $noun
    - noun_frequency
    - noun_length
    - postnoun_length

- All variable labels should appear on the first row in lowercase
- $ should be added before the label of string columns
- **The experimental passages should also be annotated for Interest Areas using the asterisks:**
    - E.g., *Context text* critical region* spillover region* end text*
- Use tabs to separate columns (save as tab delimited txt file, if using excel to create the datasource file)

- The "Data Source" field should now tell you how many columns and rows your datasource file has.
- The "Freeze Display Until First Display Screen" box should be checked.
- Uncheck "Prompt for Dataset File" box.
- Other properties: default values

4.2. Edit main experimental sequence

- Double click on the EXP_SEQUENCE box to edit the sequence
- Drag PREPARE_SEQUENCE from the toolbar and drop it in the workspace below the START icon. Draw a link arrow between the two (PREPARE_SEQUENCE is the target icon)
- Click on PREPARE_SEQUENCE to modify its properties
    - "Draw to EyeLink Host" should be set to IMAGE (takes the image from the EXP_STORY display – see below)
- Drag DRIFT_CORRECT icon from the toolbar and drop it in the workspace below the PREPARE_SEQUENCE. Draw a link between the DRIFT_CORRECT and PREPARE_SEQUENCE icons

- Click on the DRIFT_CORRECT icon and edit its properties
    - X Location = coordinates of the calibration dot on X axis in pixels (default center) – set to 85
    - Y Location = coordinates of the calibration dot on Y axis in pixels (default center) – set to 85
        - NOTE: This makes sure that the first fixation on a trial is on the top left corner rather than in the middle of the text.
    - rest properties: default values

4.2.1. Trial sequence

- Drag SEQUENCE icon from the toolbar and drop it in the workspace below the DRIFT_CORRECT icon. Draw a link between the SEQUENCE and DRIFT_CORRECT icons.
- Click on the new SEQUENCE box to edit the sequence properties
    - Label: TRIALS
    - EyeLink Record Status Message: = str(@parent.iteration@) (keeps track of the trial numbers)
    - "Record" and "Is Real Time" need to be checked.
    - Iteration Count: set to 1 (number of times that the single trial/sequence will appear)
    - The "Freeze Display Until First Display Screen" box should be checked
- Double click on the SEQUENCE box to create/edit the trial sequence loop. A new tab will open up with the START icon in the middle of the workspace.
- Drag and drop DISPLAY_SCREEN below the START icon and create a link between them.
- Click on the DISPLAY_SCREEN icon to modify its properties
    - Label: EXP_STORY
    - Message: expstory@selfmessage@
    - The "Clear Input Queues" box should be checked
    - "Auto Update Screen" and "Send EyeLink DV messages" boxes should be checked
    - Check "Use For Host Display" box (this will make sure that you see the story text when looking at the eye-movement data in data analysis software)
        - This property works together with the PREPARE_SEQUENCE "Draw To EyeLink Host" property.

- Select the Triggers tab in the toolbar and drag TIMER and EL_BUTTON icons and drop them below the DISPLAY_SCREEN/EXP_STORY icon one next to the other
- Draw the linking arrows between the display and trigger icons.
    - NOTE: Arrows should be drawn in a dependence order, that is EL_BUTTON first, TIMER second (We want the participant to control the advance to the next trial. If that fails the TIMER trigger will take her to the next trial, after the specified time elapses).

- Right click on the workspace and select "Arrange Layout" for the experiment diagram to be properly arranged and the two trigger icons to be placed in an order (check the numbers next to the arrows). You can repeat this at any point when you want your graph to be properly arranged.
- Click on the TIMER icon to edit its properties
    - Duration: 180000 (=180 seconds)
    - Duration type: msecs
- Click on the EL_BUTTON icon to edit its properties
    - Label: BUTTON1
    - Uncheck "Release Events" box
    - Specify the relevant buttons in the "Buttons" field (e.g., [5])

- Select the Actions tab in the toolbar and drag the DISPLAY_SCREEN icon and drop it in the workspace below the two triggers
- Draw linking arrows from both of the triggers to the DISPLAY_SCREEN icon
- Click on DISPLAY_SCREEN to edit its properties
    - Label: QUESTION
    - Message: expquestion@selfmessage@
    - "Clear Input Queues" box should be checked
    - "Auto Update Screen" box should be checked
    - "Send EyeLink DV Messages" and "Use For Host Display" boxes should **NOT** be checked

- From the Triggers tab in the toolbox drag the EL_BUTTON icon and drop it in the workspace below the two triggers
- Create links from the triggers to the EL_BUTTON icon
- Click on EL_BUTTON to edit its properties
    - Label: BUTTON2
    - Uncheck the "Release Events" box
    - Specify the relevant buttons in the "Buttons" field (e.g., [6,7] = 6 for left back trigger ("yes") and 7 for right back trigger ("no"))

5. Create thank-you screen

- Under the Experiment tab (outmost experimental layer) select DISPLAY_SCREEN from the Action tab of the toolbar, drag and drop it in the workspace after the last sequence (BLOCKS). Create a link between the two.
- Click on the icon and rename it (e.g THANK_YOU_SCREEN).
- Double click on the icon and type in your thank-you message (c.f. section 2 above for creating the welcome screen)
- Drag the KEYBOARD trigger bellow the THANK_YOU_SCREEN and connect the two (this will ensure that THANK_YOU_SCREEN disappears only when you press a key on the keyboard).

6. Variables

Variables help keep track of important information (e.g. the iteration status in a loop). Variables are not connected with any other nodes in the graph. Variables can be used as temporary data storage.

- Outmost layer of our experiment (Experiment tab)
  - From the other tab of the toolbar drag the VARIABLE icon and drop it anywhere in the workspace
  - Click on the icon to specify its properties
    - Label: VAR_SUBJECT
    - Value: @parent.sessionName@

- Inmost experimental layer (experimental loop TRIALS)
  - Create a variable that will let you know when the experimental sentence starts
    - Label: VAR_STORY_START
    - Value: @EXP_SENTENCE.startTime@
  - Create variable for collecting total time participants looked at the experimental stories before advancing to the comprehension question
    - Label: VAR_READING_TIME
    - Value: @BUTTON1.triggeredData.time@
  - Create a variable that will let you know when the comprehension question is presented
    - Label: VAR_QUEST_TIME
    - @QUESTION.startTime@
  - Create a variable for collecting the button press responses
    - Label: VAR_BUTTON
    - Value: @BUTTON2.triggeredData.button@
  - Create a variable for collecting response time data
    - Label: VAR_BUTTON_TIME
    - Value: @BUTTON_2.triggeredData.time@

7. Results files

At this point we should specify that all our data saved to variables up to this point should be collected and saved in a bigger result data file. In order to do this we first need to create a Results file, where we can then ask to have our data sent to.

- Go again to the outmost experimental layer (Experiment tab)
- From the Other tab in the toolbar drag the RESULTS_FILE and drop it anywhere in the workspace
- Click in the Value cell of the "Columns" field. From the pop up dialogue window select everything except:
    - story
    - question

After having specified the properties of RESULTS_FILE we can now tell Experiment Builder when we want our data to be collected and moved to the big result date file.

- Go to the inmost layer of our experiment (experimental loop TRIALS)
- From the Action tab of the toolbar drag the ADD_TO_RESULTS_FILE icon and drop it in the workspace below the BUTTON2 node. Link the two nodes with an arrow.
- Click on the ADD_TO_RESULTS_FILE icon to edit its properties
    - In the "Results File" field select RESULTS_FILE from the drop-down men