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Introduction to E-Prime

http://softdev.ppls.ed.ac.uk/eprime/

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What is E-Prime?

Experimental Design Software that lets you:

- Present a stimulus
  - Visual
  - Auditory
- Collect a response and the data about it
  - Keyboard
  - Mouse
  - Voice
  - Response Times
- These can be repeated, combined and randomised

Why use E-Prime?

How else could we do the same thing?

- PowerPoint presentation
- Custom computer program (e.g. jsPsych)
- Other experimental development software
  - (e.g. Testable, OpenSesame, PsychoPy, Experiment Builder)

E-Prime is a compromise between PowerPoint and computer programming

A Little Background

Developed by Psychology Software Tools

- http://pstnet.com/

Availability:

- Windows only
- Mac and Linux are not supported

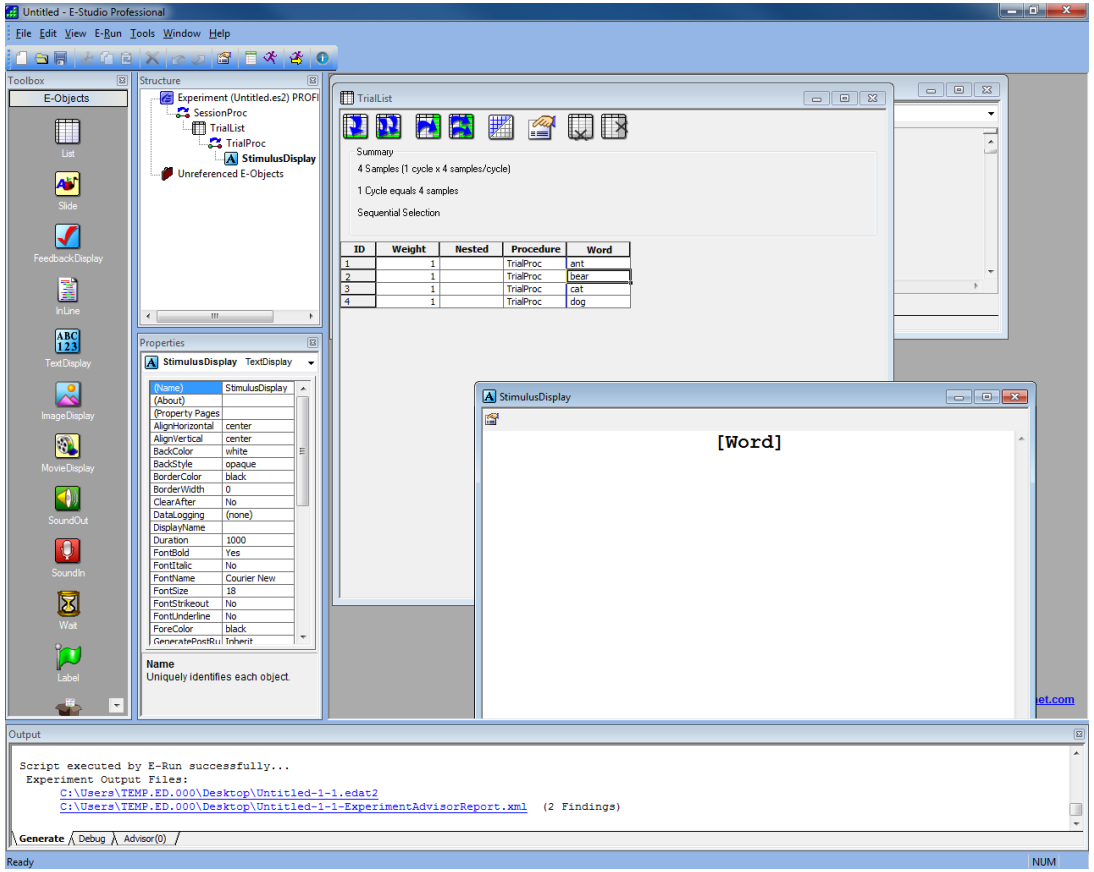
Getting Started

E-Prime is available
on selected PPLS PCs

Start Menu

- E-Prime 2.0
- E-Studio

On starting, E-Prime will ask if you want to start a new experiment based on a template. Just click Cancel for now



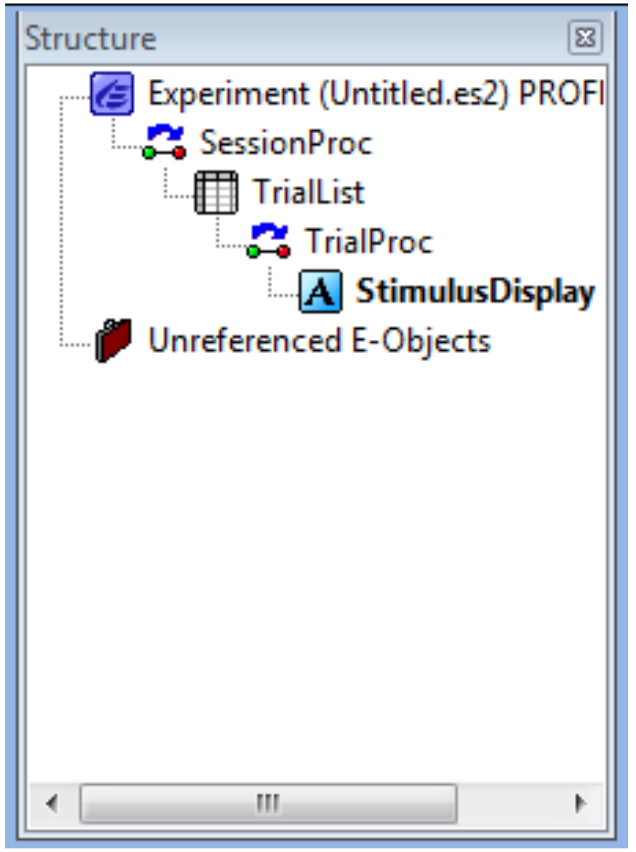
E-Prime 3 vs E-Prime 2

- Most PCs that have E-Prime will have both
- We keep E-Prime 2 for those running legacy experiments
- For new experiments we recommend using E-Prime 3
- E-Prime 2 files can generally be opened in E-Prime 3
- Files saved in E-Prime 3 can’t be opened in E-Prime 2

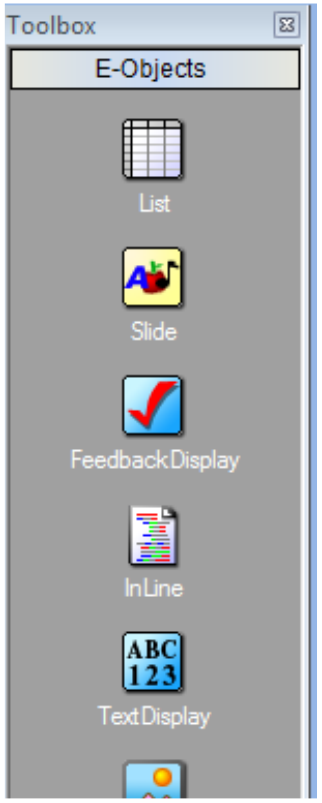
Structure

The Structure is a list of things to do

- It runs in order from top to bottom
- Each item has a name and a type, indicated by its icon



Tools



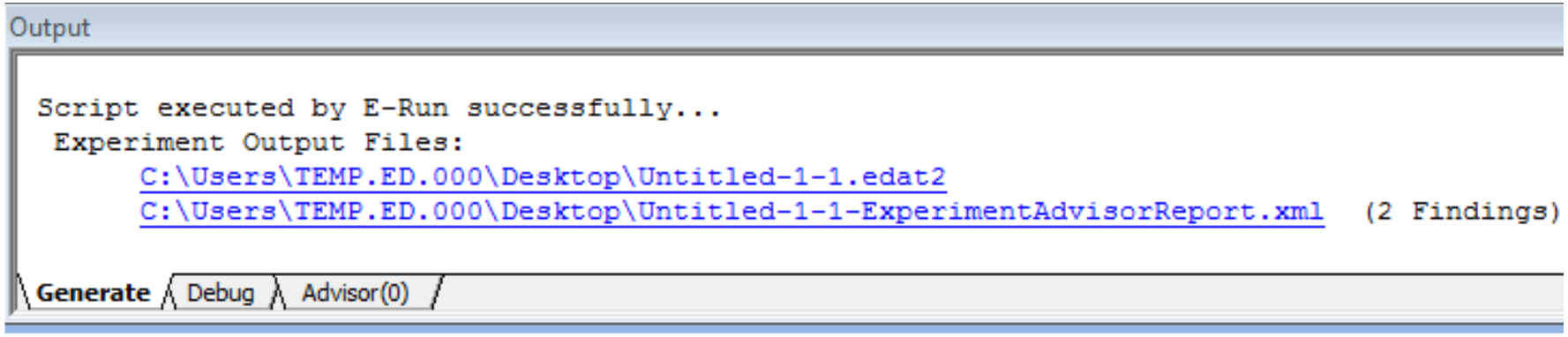
The Toolbox is a list of items (E-Objects) that you can add to your experiment

- Each one is a different possible kind of step
- For example:
  - TextDisplay shows text stimuli
  - ImageDisplay shows image stimuli
- These can be combined together to make up your experiment

Output

This shows you the output from your experiment

- If there are errors they'll display here to help you fix problems
- It also includes a link to the output file.

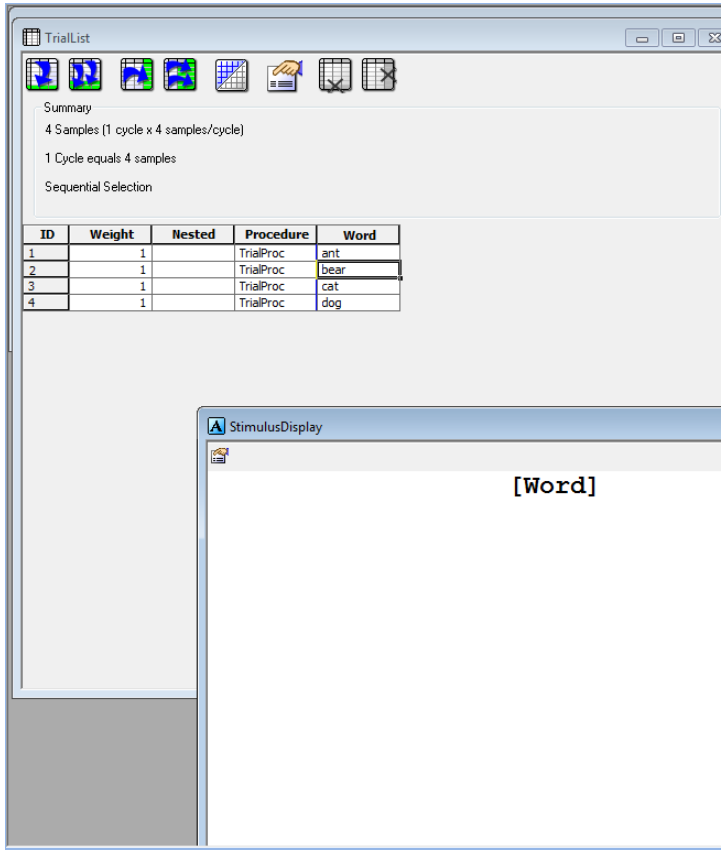


Window Area

This area shows various windows relating to the experiment.

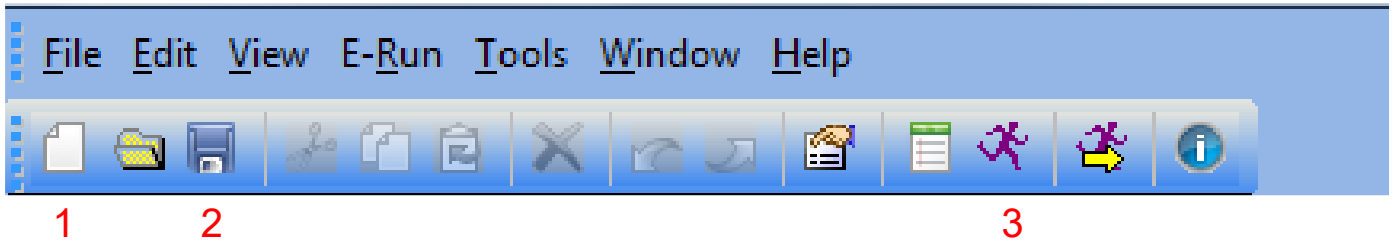
Here you can:

- Change the properties of experiment items by double-clicking on an item in the Structure to open its window
- Modify the main experiment properties
- View the underlying experiment script.



Create your First Experiment

- Open E-Prime with a new, blank experiment (1)
- In the Structure, double-click on the SessionProc to open an empty Timeline
- Drag a TextDisplay object from the Toolbox and drop it on this Timeline
- Double-click the TextDisplay to edit it, and change the text
- Save your experiment (2)
- Click the “Run” button in the menu bar (3)
- The experiment will show your text for a brief moment and then exit.
- This is the default for a TextDisplay but we can change this later



Time To Save

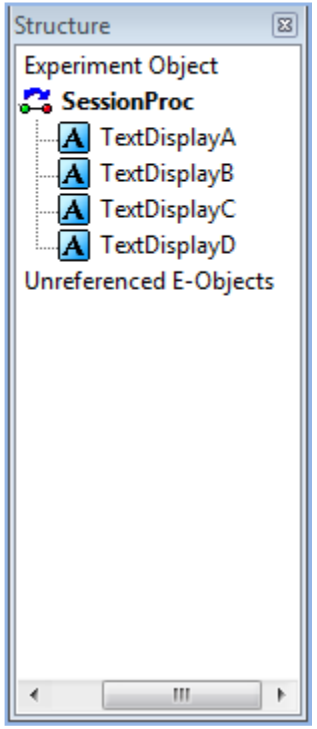
- E-Prime can be a little unpredictable and does sometimes crash
- Save often!

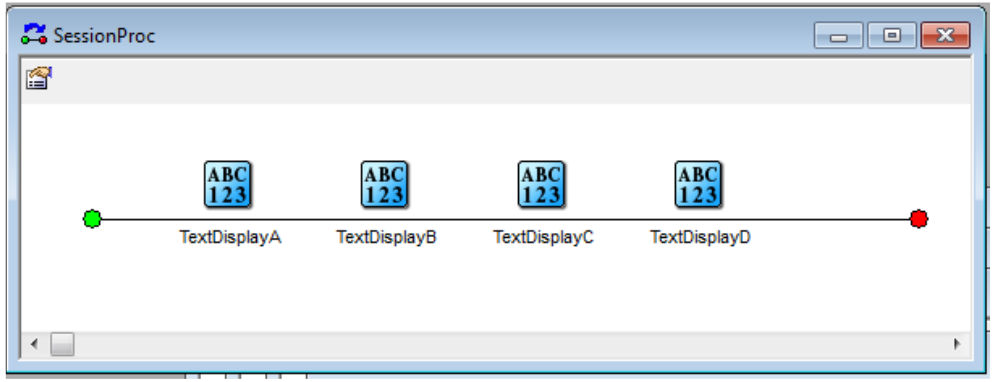
- When you get to the exercises, for each exercise, please start a new E-Prime experiment
- You can start from a copy of one of your previous experiments if that's useful

Expanding The Stimuli List

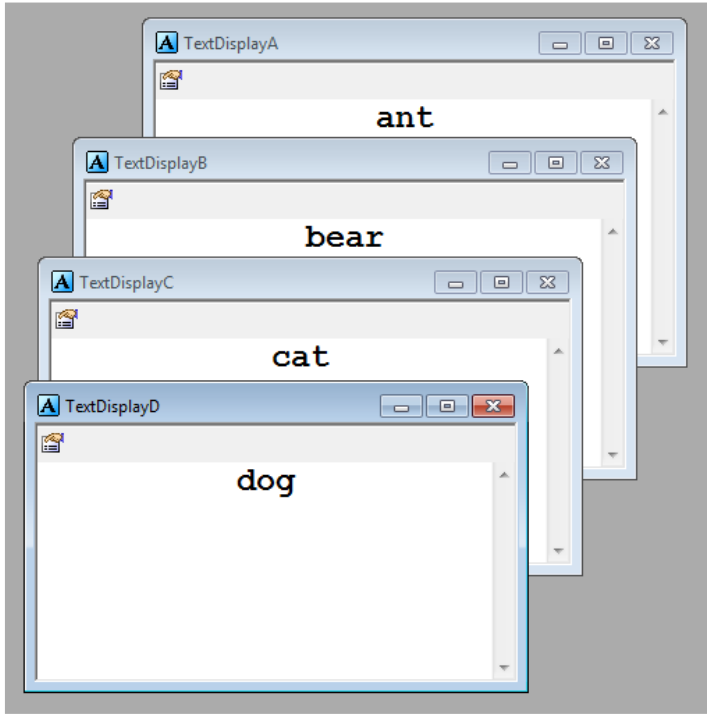
How would we show four words in sequence?

- We could do it with four TextDisplay objects, each showing one word of text





The SessionProc shows the order in which items are processed or displayed



Expanding The Stimuli List

We now have four stimuli and we know the order in which they'll be shown. But…

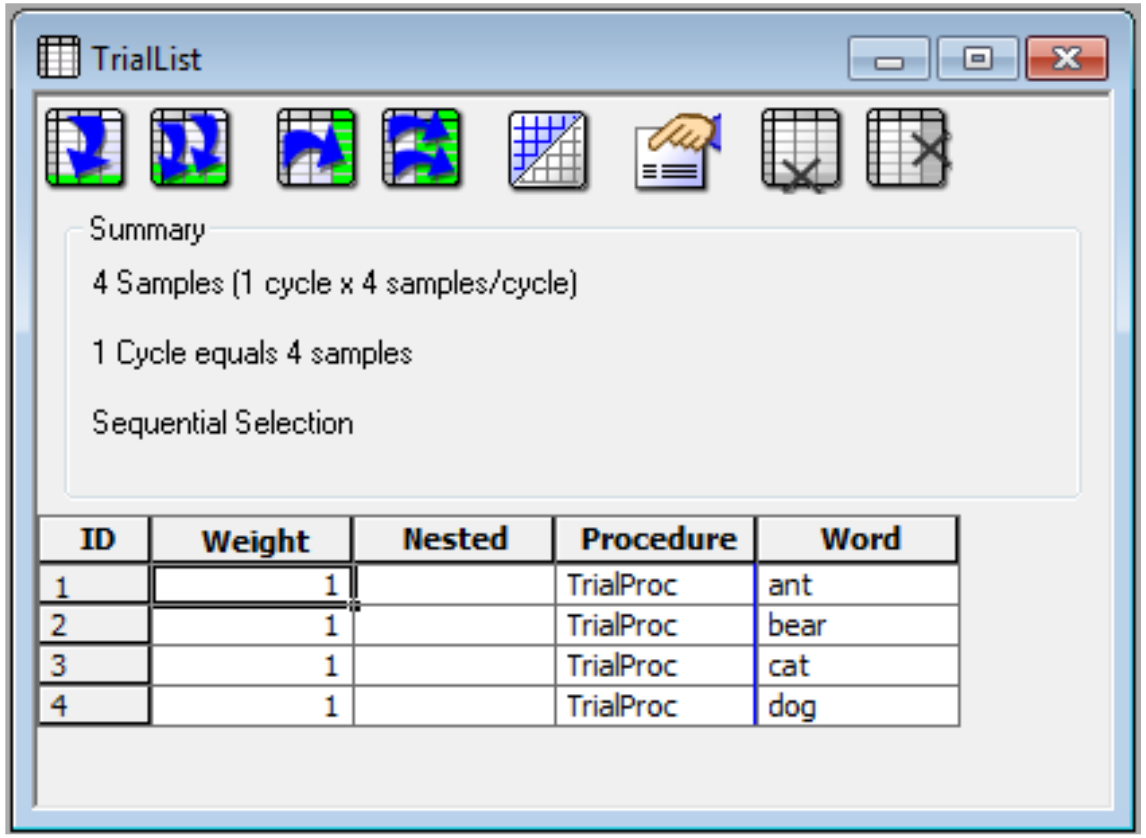
- What if we have hundreds?
- What if we want to repeat some?
- What about randomisation?

Instead, we can use a List object

List Objects

A List Object is just a table of values that can be shown sequentially or randomly

- In this example, the words in the “word” column should be shown in order
- How will that happen, when there's only one TextDisplay object?

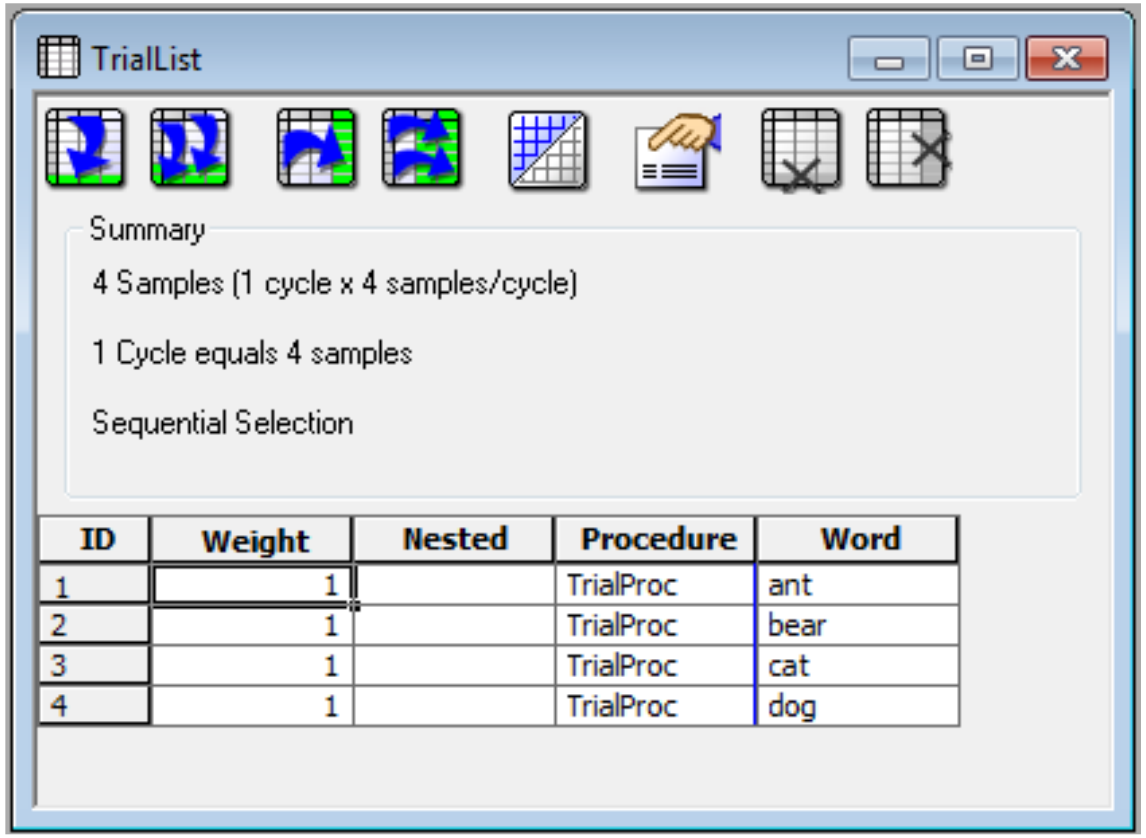


ID	Weight	Nested	Procedure	Word
1	1		TrialProc	ant
2	1		TrialProc	bear
3	1		TrialProc	cat
4	1		TrialProc	dog

List Objects

A List allows you to run a procedure a number of times

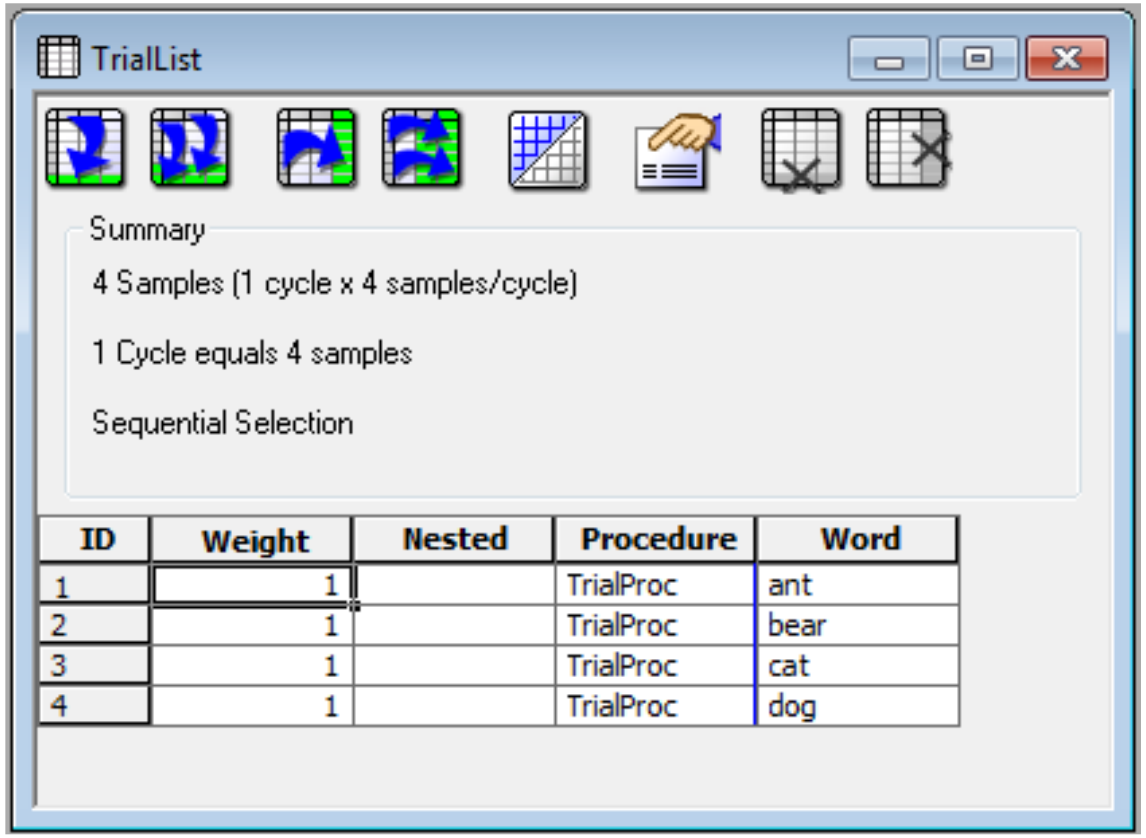
- In this case we run the procedure TrialProc four times, once for each row in the table



ID	Weight	Nested	Procedure	Word
1	1		TrialProc	ant
2	1		TrialProc	bear
3	1		TrialProc	cat
4	1		TrialProc	dog

List Objects (an aside)

- You can add rows and columns with the first four buttons
- There are four special columns in a List:
  - ID is just a label for the row
  - Weight is the number of times something will be repeated
  - Nested is for advanced randomisation
  - Procedure is the procedure to run for that row
  - The rest of the columns are created by you.



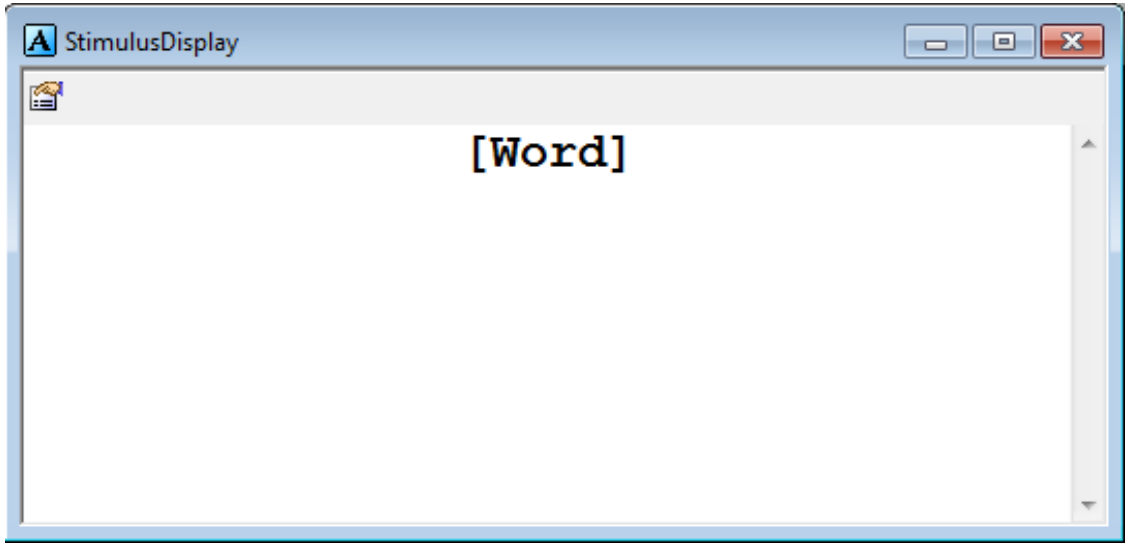
ID	Weight	Nested	Procedure	Word
1	1		TrialProc	ant
2	1		TrialProc	bear
3	1		TrialProc	cat
4	1		TrialProc	dog

List Objects

How does E-Prime know what to show?

- In our TextDisplay, we can put the name of the column in square brackets […]
- This tells E-Prime to use that column from the List
- If you type "[" then E-Prime will automatically offer to auto-complete the variable name for you

- Note, that we use variable, column and attribute interchangeably. They all basically mean the same thing at this stage.



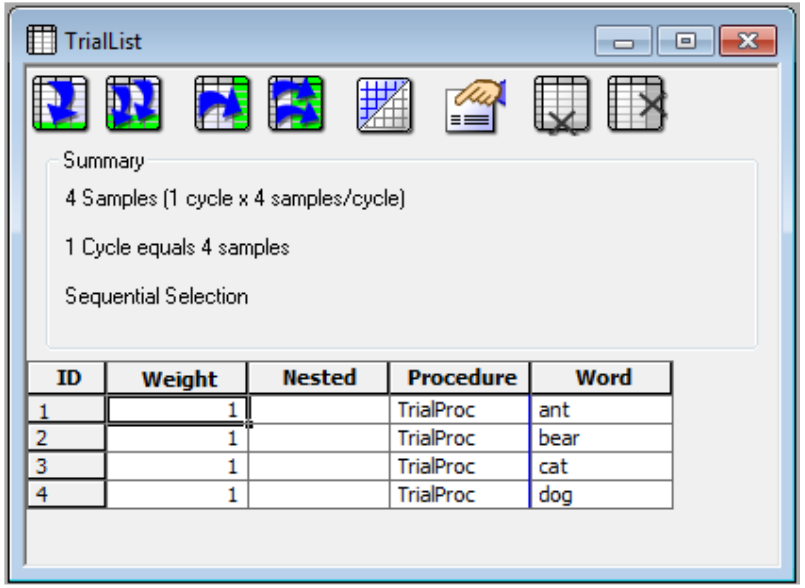
Create Your Second Experiment

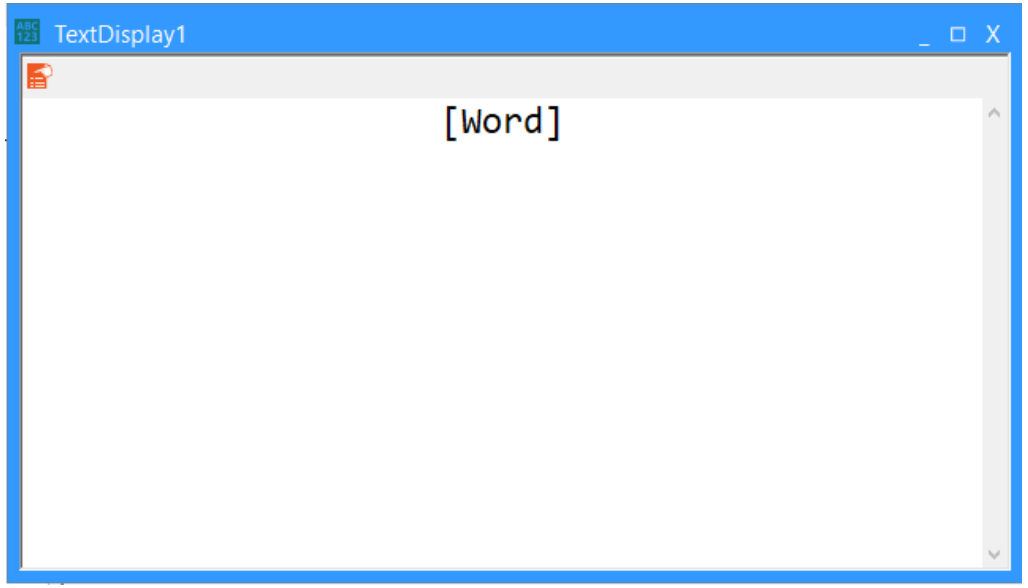
Now let's try using a List to create the this experiment

- Add a new List to the SessionProc in the same way you added the TextDisplay
  - Drag and Drop it onto the Timeline
- Double-click on the List to open its window.
- In the first row of the table, select the Procedure column and type in a new Procedure name.
  - Make is something meaningful. You can't just call it Procedure.
- E-Prime will offer to create the new Procedure for you. Click Yes
- Add a new Attribute (column)  and call it ***Word***
- Add some new levels  (rows)
- Fill the ***Word*** column with different words
- Make sure the Procedure for each row is set to your new Procedure. Once it's been created you can select it from the drop-down list.
- Inside your new procedure add a TextDisplay and set its content to ***[Word]***

Create Your Second Experiment

You should see something like this





Click Save and then Run

Quitting An Experiment

- When running an Experiment you can stop it by pressing

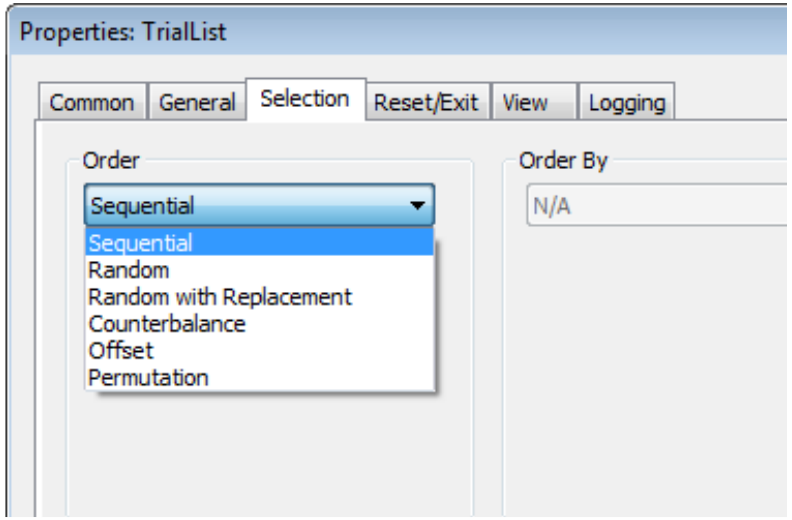
  CTRL + ALT + SHIFT

Undo

- You can undo almost any change in E-Prime with Undo
- Click on the Undo button  to roll back changes
- Click on the Redo button  to reverse the Undo.

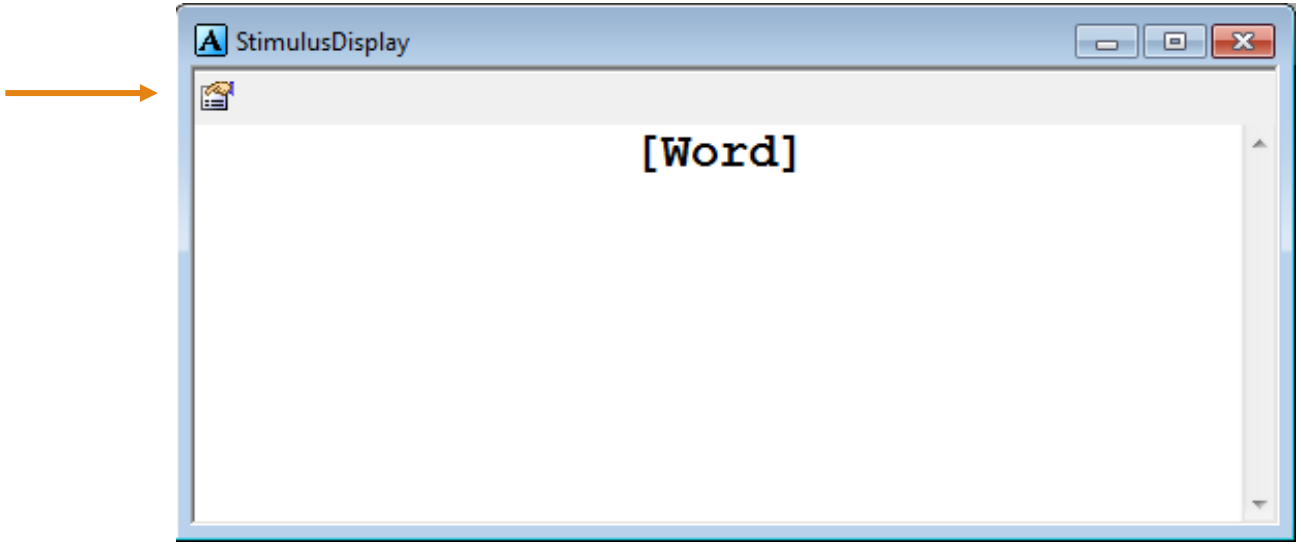
Randomisation

- By default E-Prime goes through the items in the list in the order shown
- Lots of other options are available
- Open the List properties using the Properties Icon in the List window
- The order is controlled by the drop down list in the Selection tab



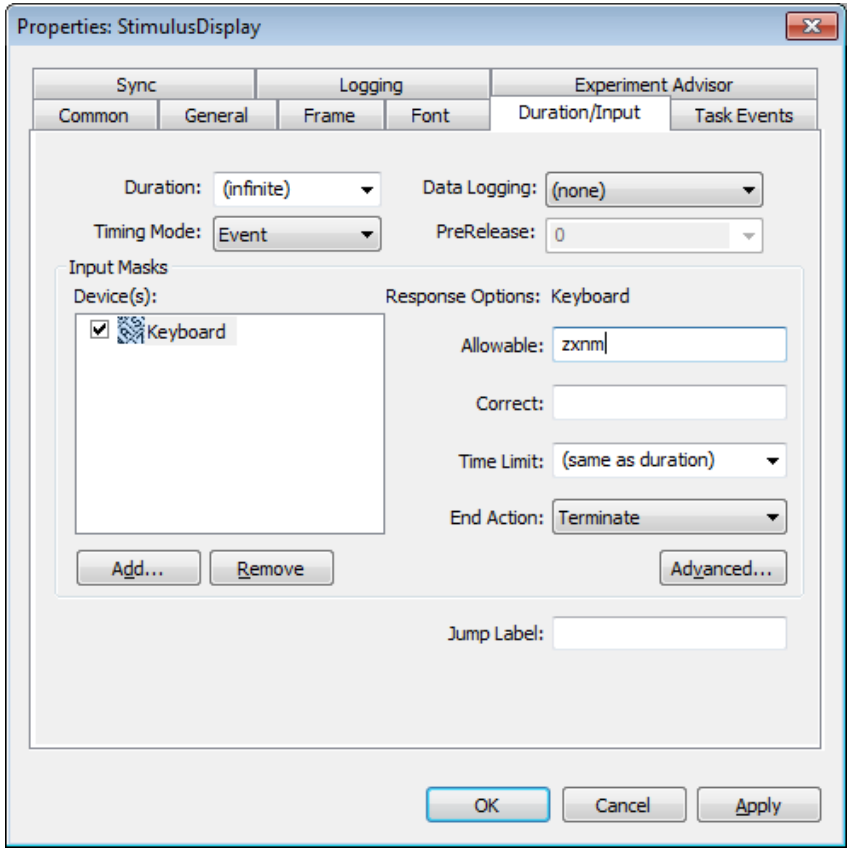
Getting Responses

- All stimulus objects can take responses
- These are TextDisplay, ImageDisplay, MovieDisplay and Slide
- To get to the object settings click on the icon in the top left corner that looks like a hand holding a piece of paper.



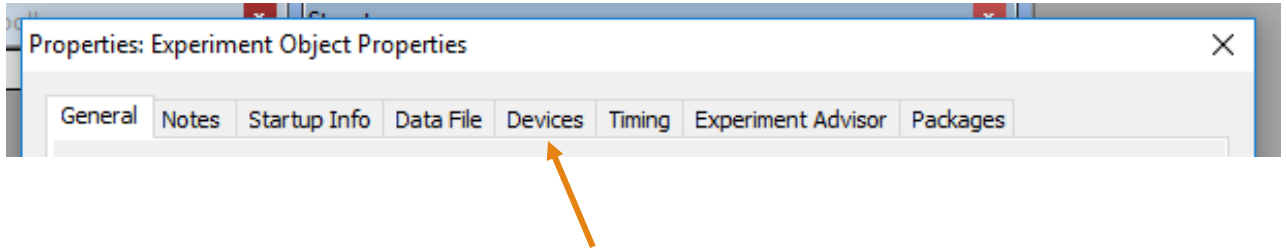
Getting Responses

- Switch to the Duration/Input Tab
- Click ***Add*** to add a new response type
- Choose your device (e.g. Keyboard)
- Enter your allowable responses
  - Letters
  - Numbers
  - Special values such as {ANY} or {SPACE}
    - Note the curly brackets {…}



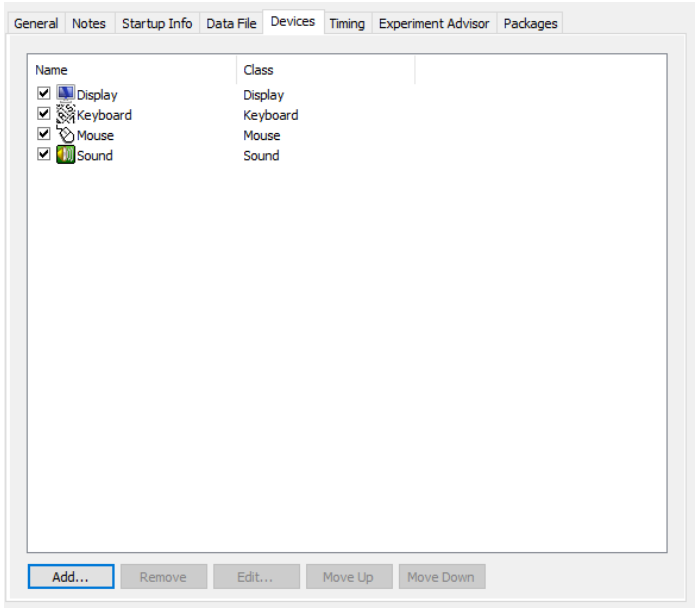
Getting Responses – Button Boxes

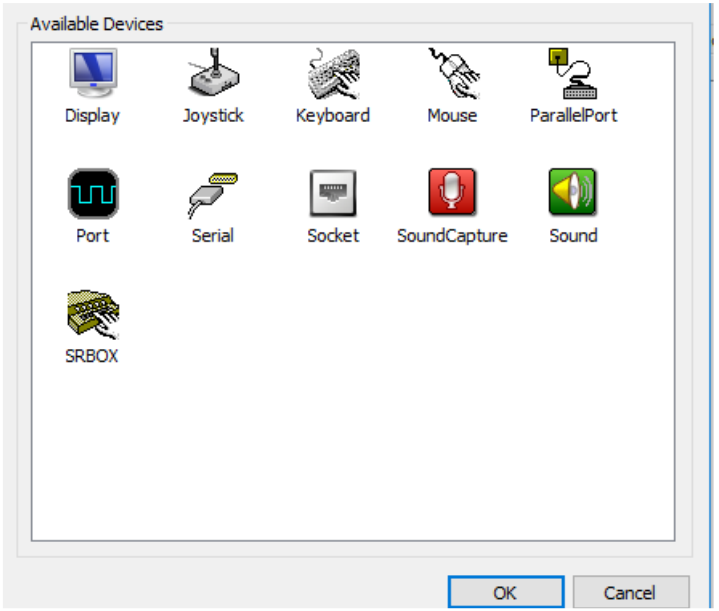
- It's sometimes preferable to use a Button Box rathe than the keyboard to collect responses.
- To add a Button Box, double-click on the Experiment in the Structure panel or select Edit -> Experiment from the menu.
- In the Experiment Properties, switch to the Devices Tab



Getting Responses – Button Boxes

- Click on Add at the bottom of the window and then select the SRBOX and click OK





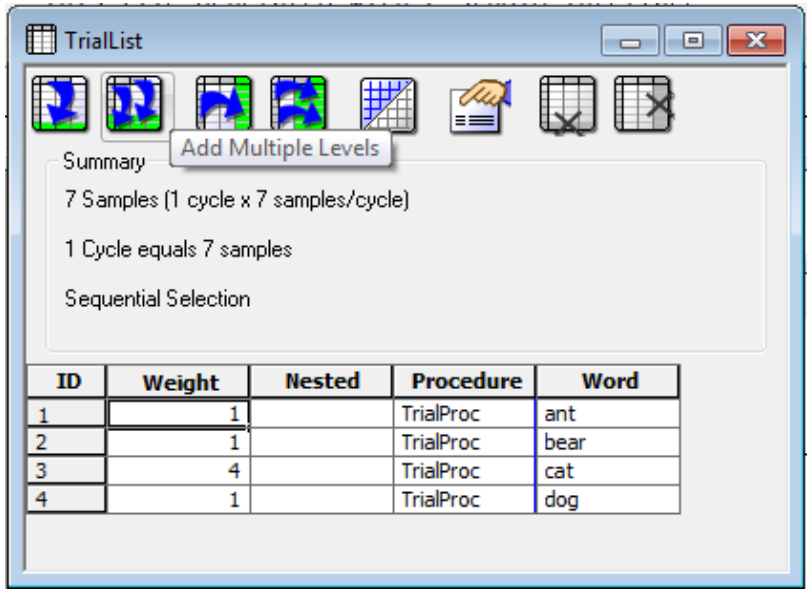
- The SRBOX will now be available in the same way as you added a Keyboard

Try It

- In your current experiment (list of words):
  - Make the words appear in random order
  - Make the experiment wait for a response before showing the next word

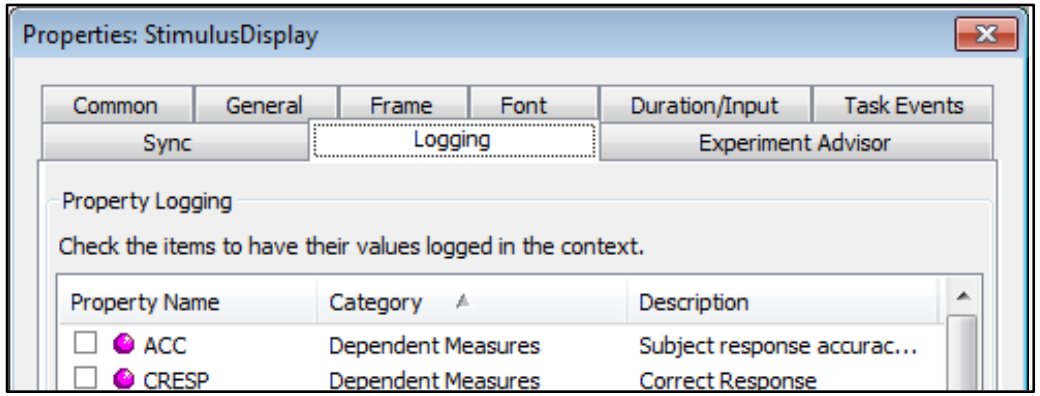
Weight

- If your list object has lots of repetition of samples you can use weights to save time
- Weight tells E-Prime to display more or less of any particular row in a List table



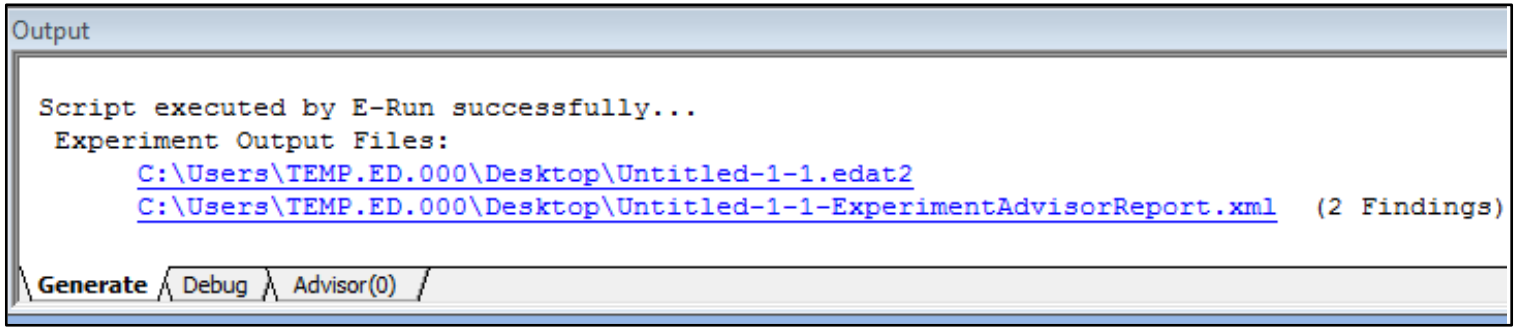
Logging Results

- Responses from participants are logged (saved) to the output by individual E-Prime objects
- For example, a TextDisplay taking a keyboard response can save the key pressed and the Response Time.
- Double-click on a TextDisplay object and go to the Logging tab
- E-Prime will usually enable logging for objects that take responses but it's worth checking



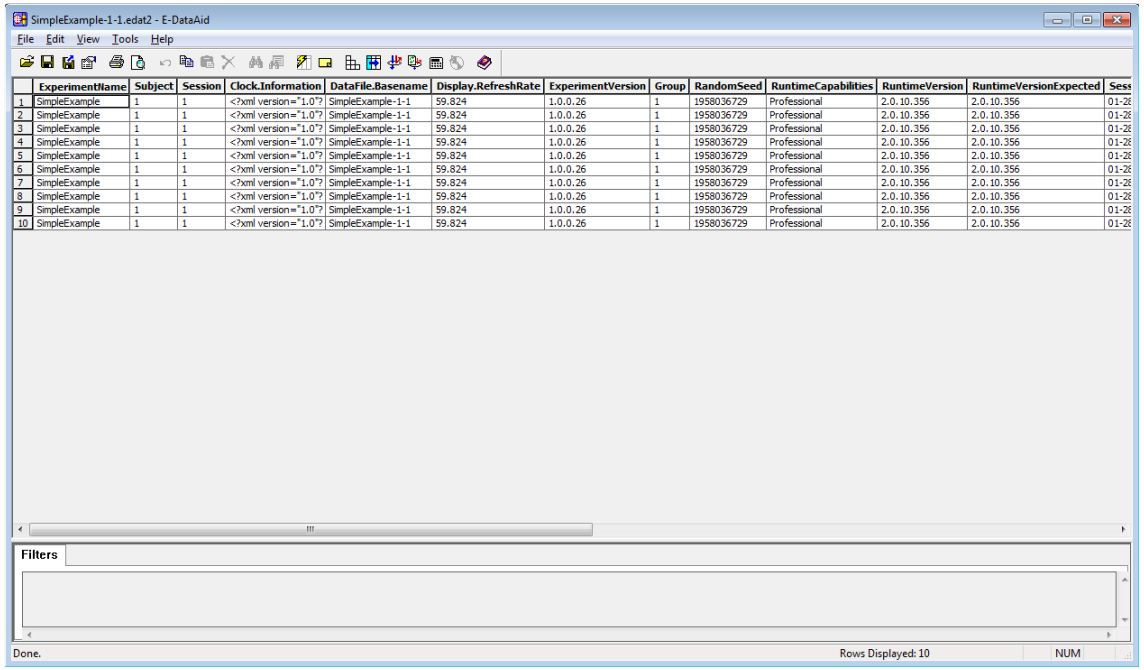
The Results File

- The results will be in the same directory as your experiment file and the filename will consist of the experiment name followed by the participant ID and the Session Number
- E-Prime uses its own format for results, edat3
- There will be a link to it in the Output window



The Results File

- Edat3 files open in a separate program called E-DataAid
- From there you can export to other formats (Excel, SPSS)



	ExperimentName	Subject	Session	Clock.Information	DataFile.Basename	Display.RefreshRate	ExperimentVersion	Group	RandomSeed	RuntimeCapabilities	RuntimeVersion	RuntimeVersionExpected	Sess
1	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
2	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
3	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
4	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
5	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
6	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
7	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
8	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
9	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28
10	SimpleExample	1	1	<?xml version="1.0"?	SimpleExample-1-1	59.824	1.0.0.26	1	1958036729	Professional	2.0.10.356	2.0.10.356	01-28

Break - Any Questions

Exercise 1 – Reaction Timer

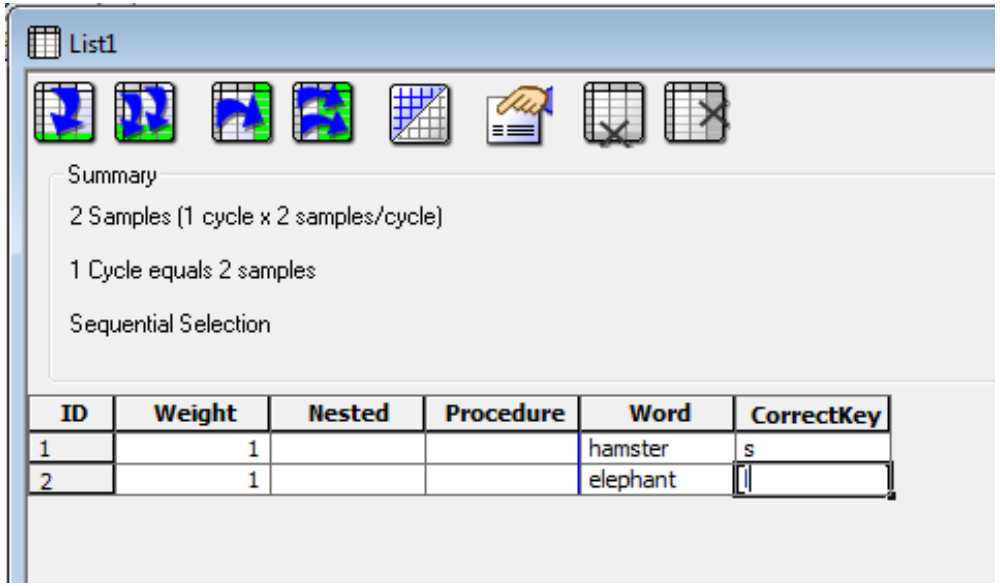
- In a new E-Prime Experiment
  - Create a List Item with an single Row – you don't need to add any columns
  - Type in a new Procedure name in the *Procedure* box for that Row
  - E-Prime will offer to create the Procedure. Let it go ahead and create it.
  - Inside the Procedure, create a TextDisplay that shows the word "NOW"
  - Change the properties of the TextDisplay so that it:
    - Waits for keyboard input
    - Accepts SPACE as the only valid response
    - Is displayed in a large font
    - Reaction Time is logged.
  - Add another TextDisplay that is blank and has a duration of 2s and no response required
  - Edit the List item to run the experiment many times (e.g. 20)
  - Run the experiment and open the results in E-DataAid – Export them to Excel

Correct Answers

It's possible to tell OpenSesame what the correct answer is for a given stimulus

- Not applicable to all tasks
- Can save a lot of time in Analysis

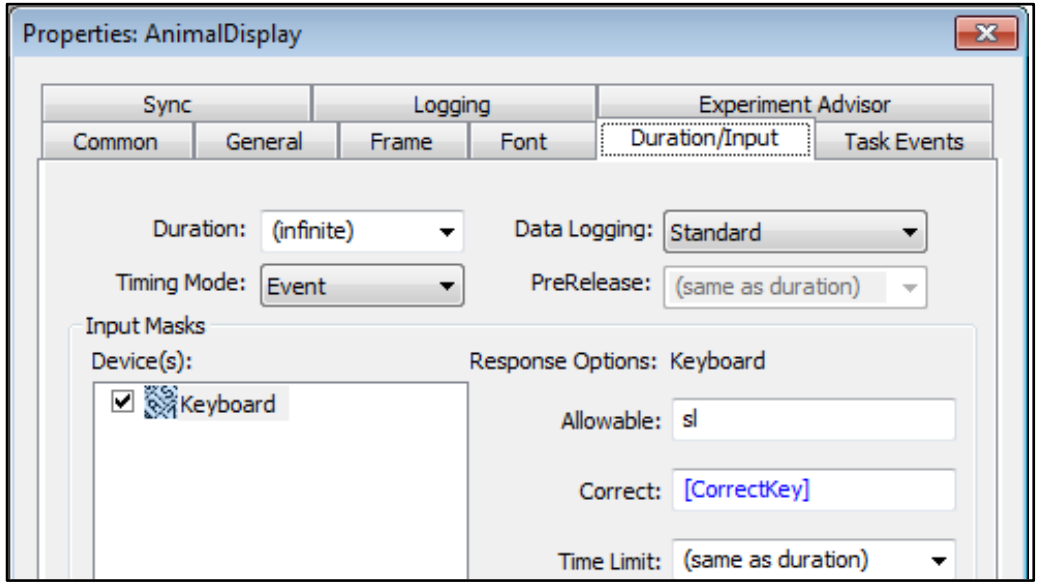
- To specify the correct answer, add a new attribute (column) in your List table
- Variable names cannot contain spaces



Correct Answers

This column can then be used in the Properties of your stimulus object

As before, when referring to variables or columns, enclose the name in […]



Exercise 2 – Word Length

- In this experiment, participants see single words one at a time
- For each word, the participant should press a key corresponding to the number of letters in the word
- The question is whether it takes longer to respond to longer words

- Start a New Experiment
- To begin, create an experiment that shows a list of 20 words between 2 and 5 letters long and set it to show in random order.
- You will need a List, a new Procedure inside it and a TextDisplay

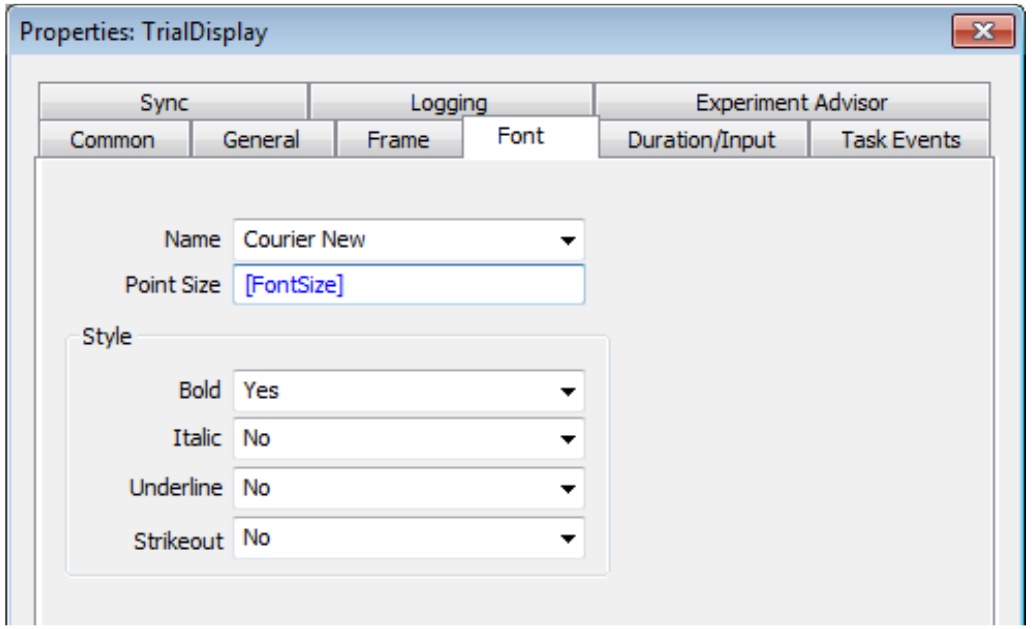
Exercise 2 – Word Length

- Now change your TextDisplay to wait for a Keyboard Response
- Set the allowable responses to 2, 3, 4 and 5
- Make sure logging is enabled for:
  - Reaction Time (RT)
  - Response (RESP)
  - Correct Response (CRESP)
  - Accuracy (ACC)
- Add a blank TextDisplay after the first one and set its duration to 2s
- Now add an extra Attribute to your List table for the correct answer.
- The values for this will be 2, 3, 4 or 5 depending on the length of the corresponding word.
- Set this variable in the *Correct Response* section of your first TextDisplay
  - Don't forget the […]
- Save and Run and take a look at the results

Other Way to Use Variables

Variables can be used almost anywhere that you have a fixed value

- Go back to the example experiment from the start that displays a list of words
- Open the List object
- Add a new Attribute called ***fontsize***
- Fill in the numbers for this attribute. Make them sensible font sizes – e.g. 12, 16, 20.
- Now in the Properties of the TextDisplay, specify this Attribute as the Point Size.
  - Again, don't forget the […]
- Run the experiment and see if you get the results you expect

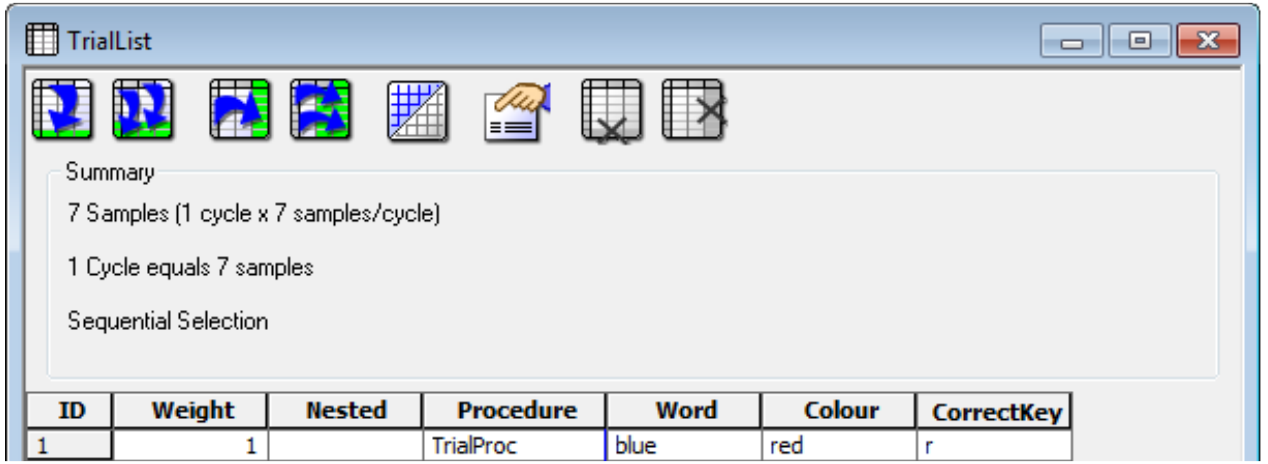


Exercise 3 – Stroop Task

- Start a new Experiment
- To begin create an experiment that just shows the words “blue”, “green”, “red” and “yellow”
- As before, add a blank TextDisplay after the stimulus
- You’ll need a List, a new Procedure and a couple of TextDisplays
- Now add another Attribute to your List table for the text colour
- Change your TextDisplay to use this new Attribute to set the text colour (it’s in the G*eneral* tab of the Properties)
- Set the response of the TextDisplay to allow the first letters of any of the colours (b, g, r, y)

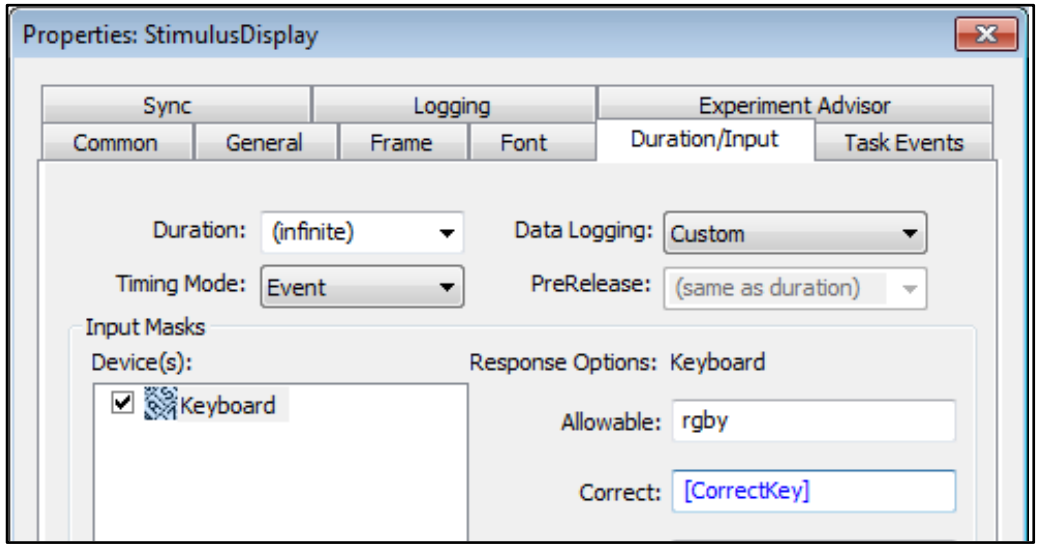
Exercise 3 – Stroop Task

- Now add another Attribute to your List table for the correct response
- The values for this should be the first letter of the ***Colour*** of the word



Exercise 3 – Stroop Task

- Change your TextDisplay to use this Attribute as the correct Response
- Make sure Logging is enabled and log Accuracy and Reaction Time are logged
- You might also find it useful to log RESP and CRESP

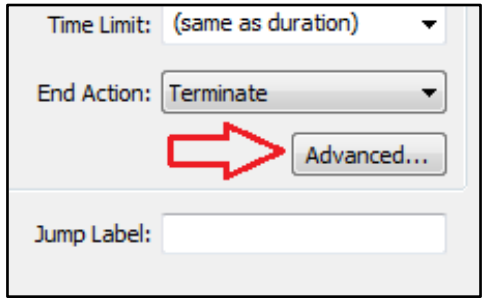


- Finally, edit the Loop table to make sure that:
  - There are four different congruent trials (i.e. four rows where the word and colour are the same)
  - There are four different incongruent trials (i.e. four rows where the word and colour are different)
- Remember, you can also use the weight column to increase the total number of trials

Entering and Seeing Text Onscreen

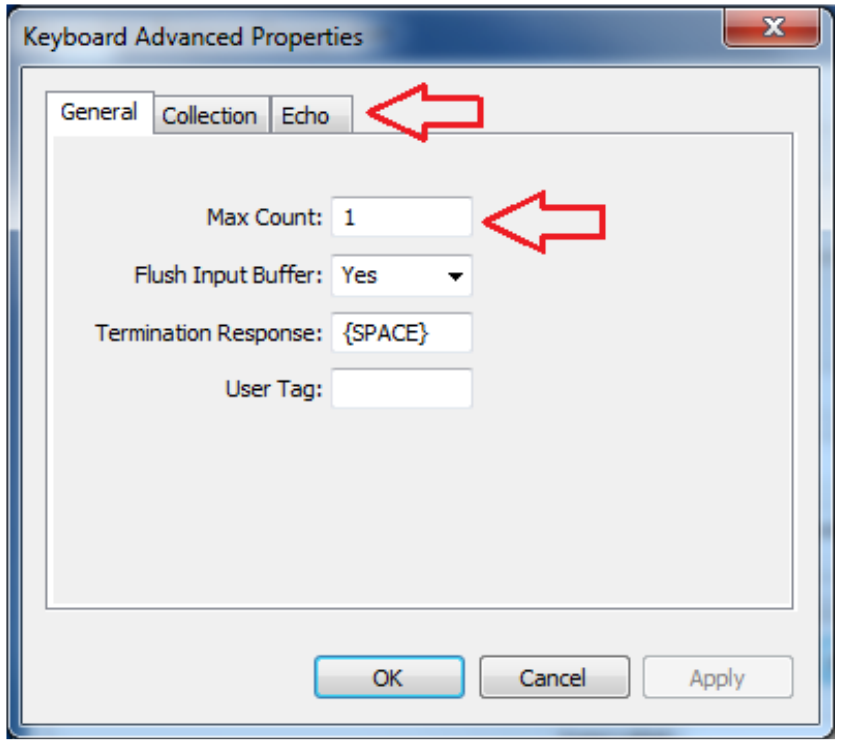
- In qualitative research you may want to collect a participant's recollection, interpretation or emotional response to a stimuli
- For instance, a participant listens to a song and is asked to recall lyrics.

- In E-Prime you can create TextDisplay items which allow a participant to enter text.
- Go into the Duration/Input Tab of the Properties of a TextDisplay, then click *Advanced*



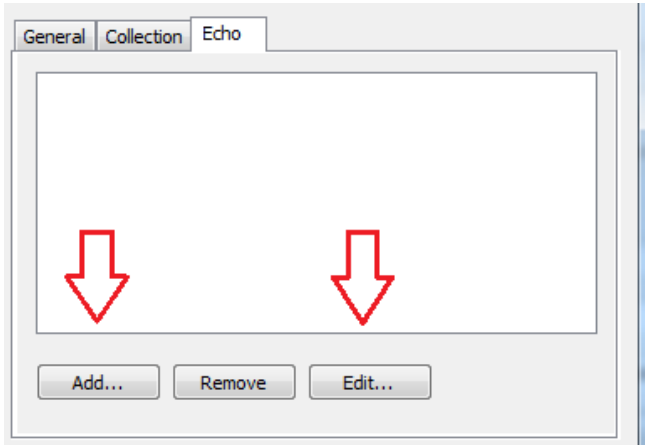
Entering and Seeing Text Onscreen

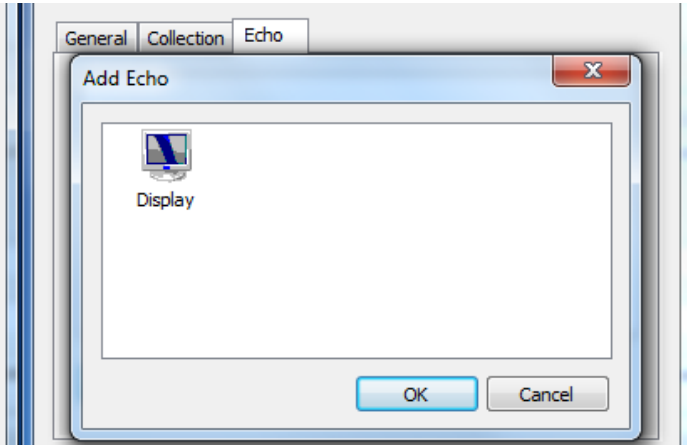
- In the General Tab, the Max Count lets you specify the maximum number of characters that the participant can enter
- The Termination Response tells E-Prime which key will end input from the participant

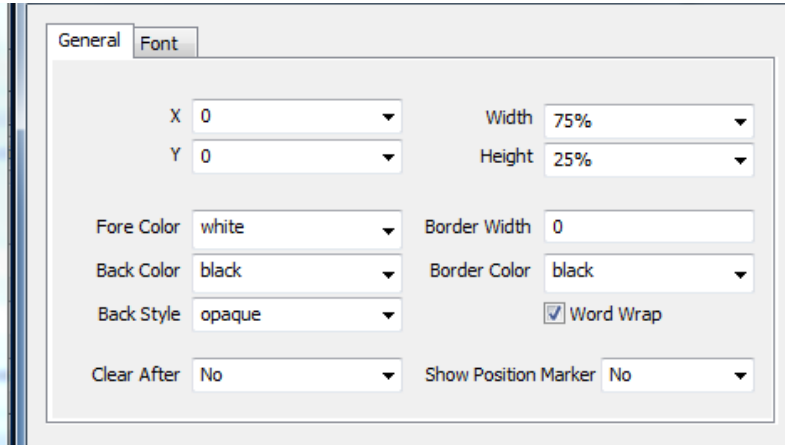


Entering and Seeing Text Onscreen

- Next switch to the Echo Tab
- Here you can *Add…* the *Display* where the text will be shown as the Participant types
- You can also *Edit* its properties once you've created it such as its size, on-screen position, colours and borders.







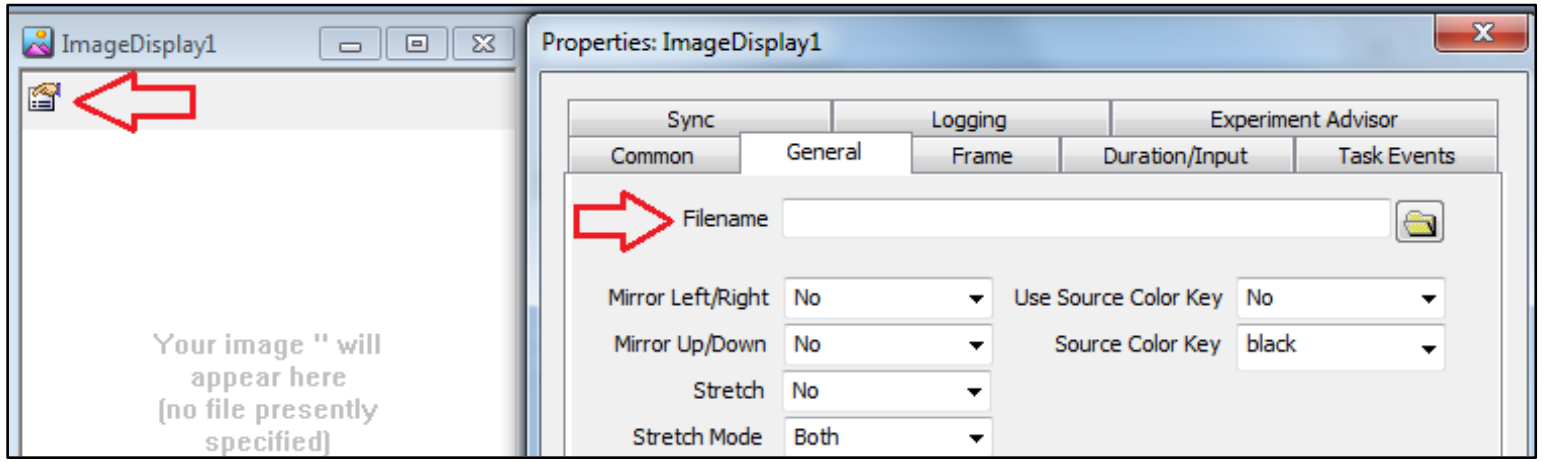
Presenting Visual and Audio Stimuli

- E-Prime can present various types of Stimuli besides text
- Audio, images, movie clips, or combination can all be presented

- In this section we will look at Image Display

Presenting Visual and Audio Stimuli

- Open a new Experiment and add an ImageDisplay
- Open it's Properties by clicking the icon in the top-left corner
- You can either enter the filename manually or use the Folder icon to search for files.
- Just like a TextDisplay, you can have the ImageDisplay show multiple different images by using a List object. You can specify a filename per Row by having an Attribute such as *ImageName* and then using [ImageName].jpg as the Filename
- Note, your files should be in the same folder as your experiment



Exercise 4 – Recall Experiment

- Use what you've learnt to create an experiment in which a participant sees a scene and then writes down what they recall from the experiment

- Present three scenes two times.
- Display each of the scenes and ask for a response in two blocks, one block with a duration of 1000ms and one with a duration of 2000ms
- For a response, ask the participant to describe the scene in a Display Box.