Orientation Discrimination: Lesson 2

In this lesson, you will learn how to:

- duplicate an experiment,
- set experimental conditions through the **Conditions** method,
- move the events using drag and drop.

This lesson assumes you have been through Lesson 1 of this tutorial and became familiar with adding and inspecting the various types of events.

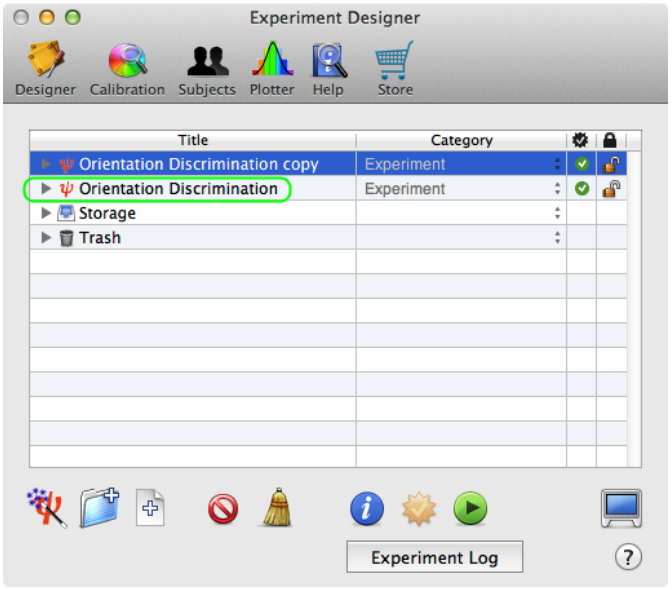
Difficulty: 1/5
Duration: 20 mn

EFFECT OF SIZE AND SPATIAL FREQUENCY

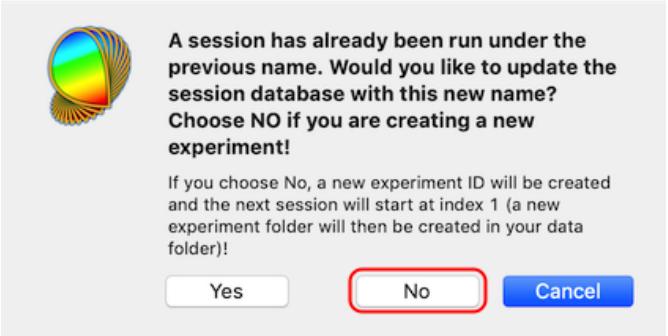
This lesson makes the basic orientation discrimination task more elaborate by measuring the effect of the Gabor stimuli's size and spatial frequency. The measurements will be made through interleaved staircase methods, each of them specifying one experimental condition.

Step 1: Duplicating the Experiment

From the **Designer** panel, select the ***Orientation Discrimination*** experiment designed in Lesson 1, and press the ⌘**-D** keystroke (or select **Duplicate** from the **Edit** menu). The duplicate appears at the top level of the table with the 'copy' suffix added to the name of the original event. Rename the copy as ***Orientation Discrimination 2***.



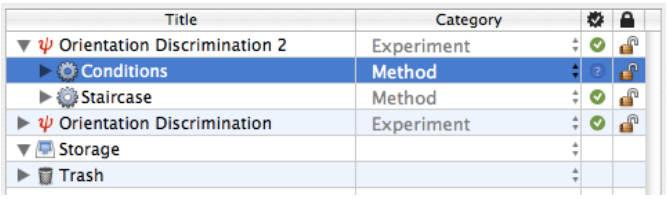
The above message appears when changing the name of an experiment which ID already exists in the session database. Since we are working on a copy, click the **No** button to automatically create a new ID for this new experiment.



***Tip**: There are alternative ways to duplicate an event:*
*- Using the regular Copy/Paste with the ⌘**--C** & ⌘**--V** keystrokes; events copied this way are always pasted in the **Storage** area of the table.*
*- Use ⌘**--D** to duplicate the selected event at the top of the **Designer** table.*
- Option-drag an event to make a copy at the dragged position.

Step 2: Adding and Customizing a "Conditions" Event

Select the ***Orientation Discrimination 2*** experiment, reveal its hierarchy, and insert a new group event using the '**+**' folder icon. Select the ***Conditions*** sub-category **Method** and simply rename the new event ***Conditions***.

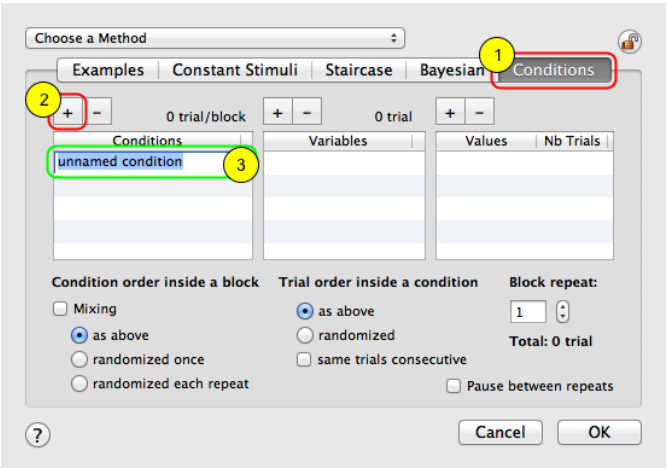


Select the new event named ***Conditions***, and click on the **Inspector** button to inspect and modify its properties:

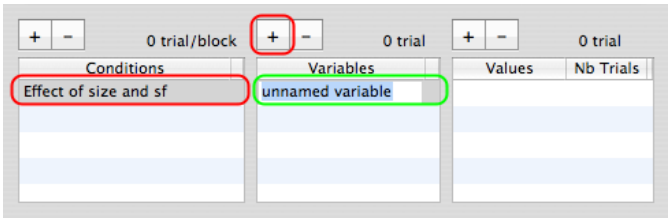
1) Click on the **Conditions** tab to select this **Method** sub-category if not yet specified.

2) Click on the '**+**' button above the ***Conditions*** table to add a new condition (called ***unnamed condition*** by default).

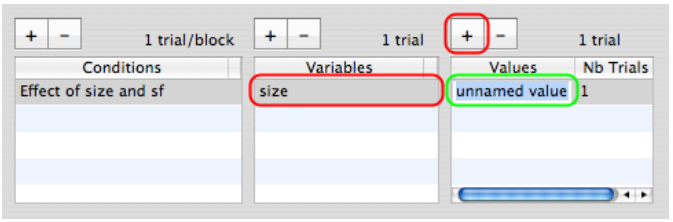
3) Rename it as ***Effect of size and sf***.



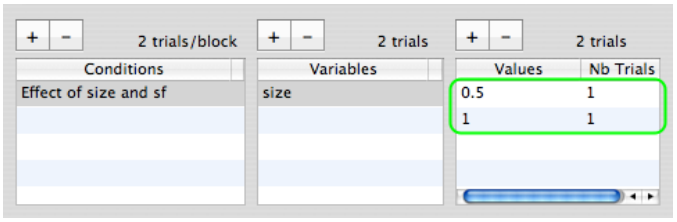
Make sure to select this new condition, and click on the '**+**' button above the ***Variables*** table to add a new variable (called ***unnamed variable*** by default). Rename this variable as ***size***.



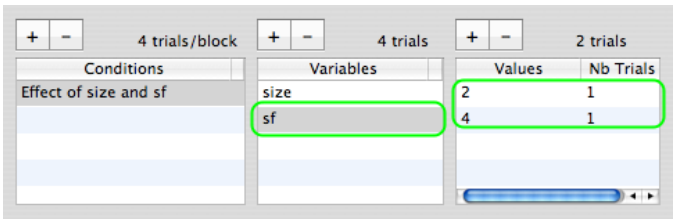
Make sure to select this new variable, and click on the '**+**' button above the ***Values*** table to add a new value (called ***unnamed value*** by default). Set this value to ***0.5***. Leave the number of trials as ***1***.



Add another value for the ***size*** variable and set it to ***1***.

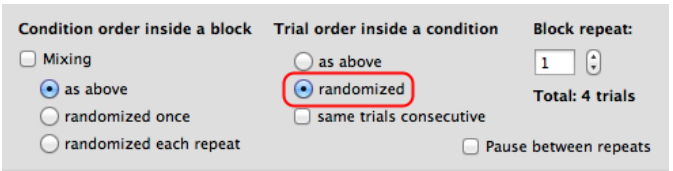


Add another variable named ***sf*** and set two values: ***2*** and ***4***.



Here we have defined four experimental conditions: two variables (***size***, ***sf***) which are the **independent variables** of this experimental design, each taking two values. The number of trials for each value was left as 1 because the actual number of trials will depend on how fast the adaptive method (staircase) can estimate the threshold.

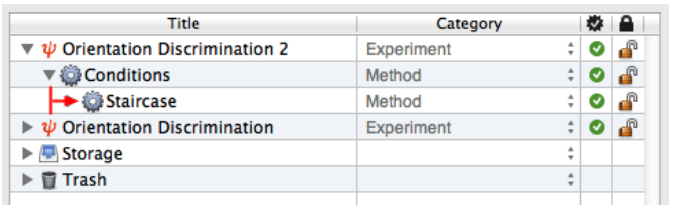
Finally make sure to select the ***randomized*** option for **Trial order inside a condition** to ensure the different variable combinations (***size*** x ***sf***) will be presented in a random order rather than in the specified order.



Click on the **OK** button to validate the changes and return to the **Designer** panel.

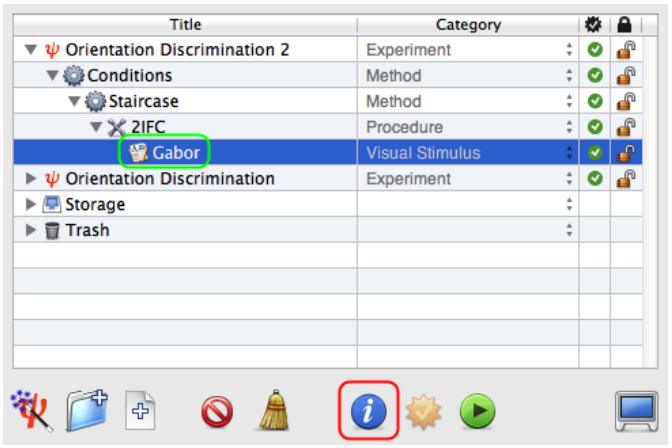
Step 3: Updating the Hierarchy and the Stimulus Properties

Click on and drag the ***Staircase*** event **INTO** the ***Conditions*** event so it gets indented to the right as illustrated. This way a staircase will run for each experimental condition defined above (i.e. one staircase for each spatial frequency and size combination), and the 4 different staircases will be presented randomly interleaved.

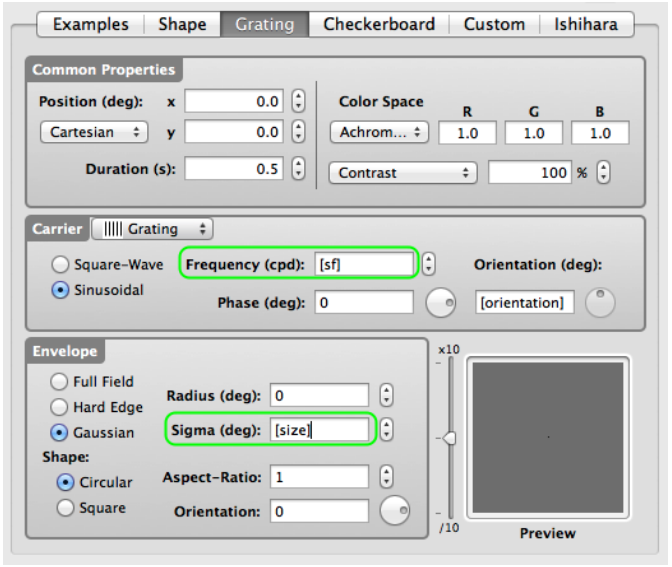


Option-click on the arrow in front of the ***Staircase*** event to reveal the entire hierarchy down to the ***Gabor*** event.

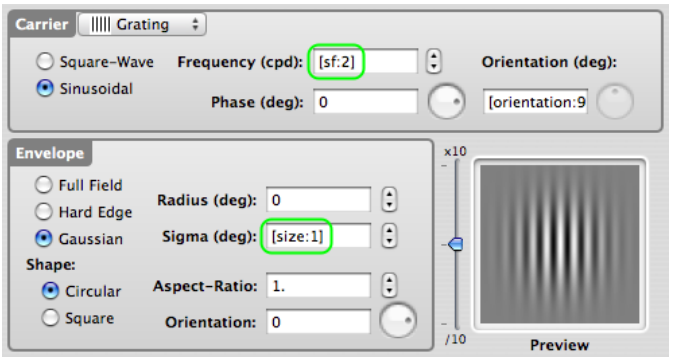
Select the ***Gabor*** event and edit its properties by clicking on the **Inspect** button (or press ⌘**--i**).



Finally, connect the ***sf*** and ***size*** variables, defined in the ***Conditions*** event, to the spatial frequency and sigma parameters of the stimulus (select and control-click on the text fields content and choose the appropriate variable in the contextual menu). Note that the ***orientation*** variable has been already connected to the stimulus orientation in Lesson 1.



If you wish to preview the stimulus with realistic values for its parameters, just add a colon (:) after the variable name followed by a value, all between brackets as illustrated. As already noted in the previous tutorial, these values are used only for preview purposes and have no effect on the experimental design or during its execution.



Click on the **OK** button to validate the changes and return to the **Designer** panel.

Check & run the Experiment! It may take 8 to 10 minutes to collect the data and derive estimates of the orientation threshold for the 4 experimental conditions.

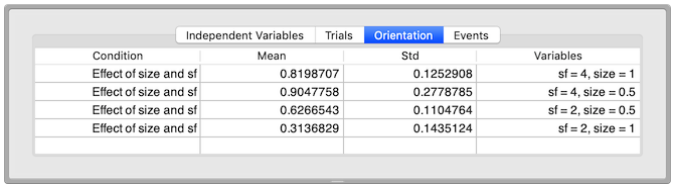
Remember: *To save the session results in the results database for future retrieval, always make sure to:*

- run the experiment in full-screen mode by toggling the display icon in the ***Designer*** *bottom toolbar,*
- select the subject and group in the ***Session Information*** *panel,*
- click on the ***Run Session*** *button in the* ***Session Information*** *panel.*

Step 4: Inspecting & Visualizing the Results

This is an example of the results presented in the **Plotter** panel after selecting an entry in the results table for one of the experimental conditions.

This is an example of the results summary presented in the **Data Table** of the **Plotter** panel after selecting the **root object** of the session entry: under the ***Orientation*** tab, the Mean and Std for the measured thresholds are presented as function of the experimental conditions (variables ***sf*** and ***size***).



Condition	Mean	Std	Variables
Effect of size and sf	0.8198707	0.1252908	sf = 4, size = 1
Effect of size and sf	0.9047758	0.2778785	sf = 4, size = 0.5
Effect of size and sf	0.6266543	0.1104764	sf = 2, size = 0.5
Effect of size and sf	0.3136829	0.1435124	sf = 2, size = 1

See the ***Importing, Plotting, Fitting, and Exporting Data*** tutorial to learn more about the Plotter panel.

Conclusion

In this lesson, you learned how to duplicate an experiment, specify experimental conditions through a **Conditions** method, and move the events using drag and drop.

In the next lessons, you will learn how to:

- implement a sandwich paradigm with forward and feedback masking noise (**Lesson 3**),
- add a spatial and temporal context (**Lesson 4**),
- add motion & dynamics through the use of a 1st-order drifting Gabor (**Lesson 5**).