

## PROTOCOL MANUAL

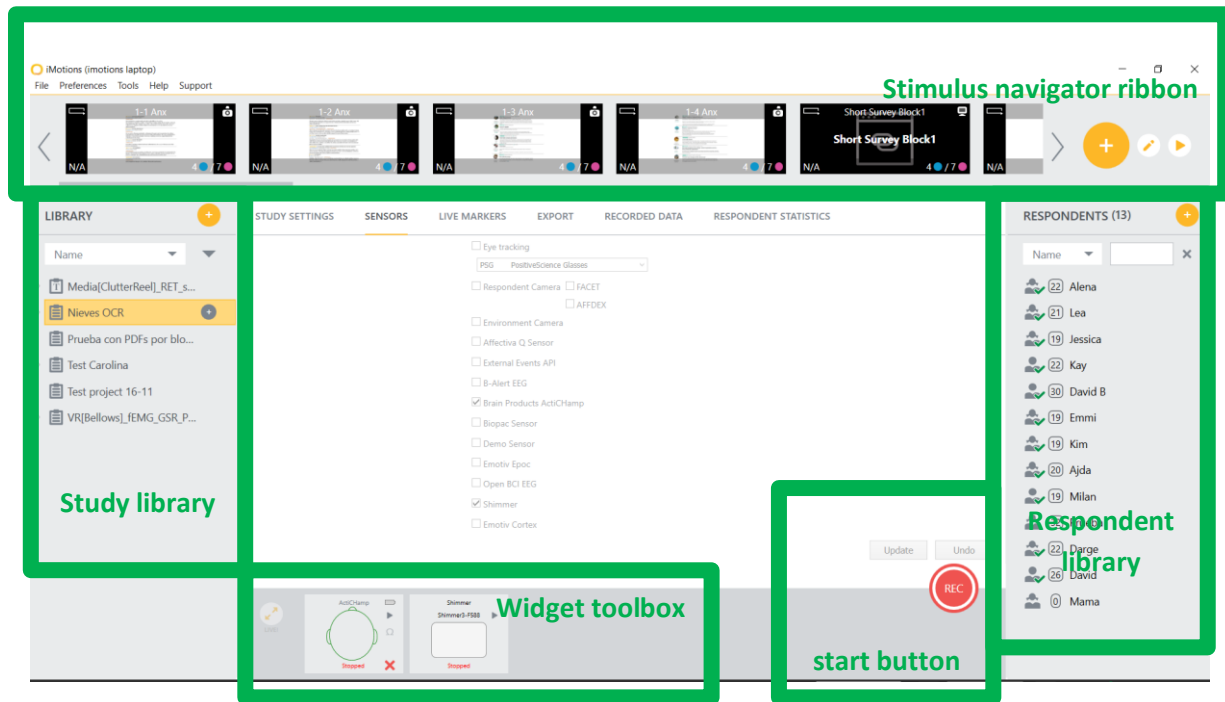
### HOW TO USE iMOTIONS + EEG + SHIMMERS (HR + GSR)

#### BEFORE STARTING

Before starting to create your experiment in iMotions and synchronize it with EEG and shimmers, you have to pay a lot of attention to the design of your experiment, taking into account how the stimuli are going to be shown, how long the stimuli are going to be exposed, etc.

iMotions is mainly a presentation software that allows synchronizing the experiment stimuli with different neurophysiological devices (i.e. Brain Products ActiChamp, eye tracking glasses, facial expression, shimmers for measuring heart rate or galvanic skin response). Although iMotions also allows analyzing some basic data, the purpose of this protocol manual is to guide researchers in the design of the experiment with iMotions synchronized with EEG headset (Brain products ActiChamp) and several shimmers (HR and GSR).

#### WHAT YOU ARE GOING TO FIND IN iMOTIONS:



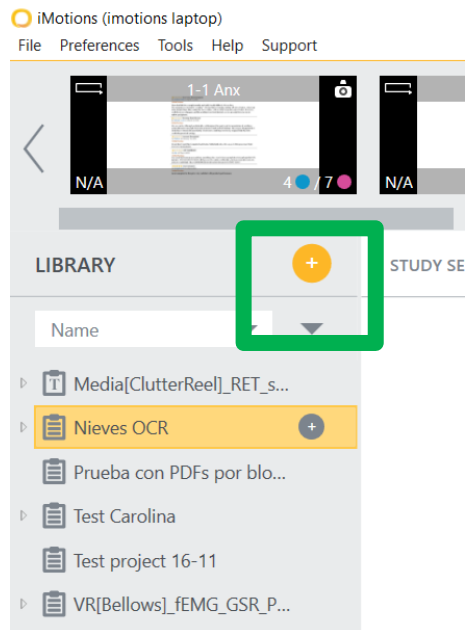
The main screen of iMotions is divided into 4 parts: (1) study library, (2) widget toolbox, (3) respondent library and (4) stimulus navigator ribbon.

- 1- Study library shows the list of projects, that is, each experiment that has been created in iMotions.
- 2- Widget box shows all the sensors programmed in a specific experiment and their alive data. When conducting your experiment, you are able to check through the widget box if all sensors are well connected during the whole process.

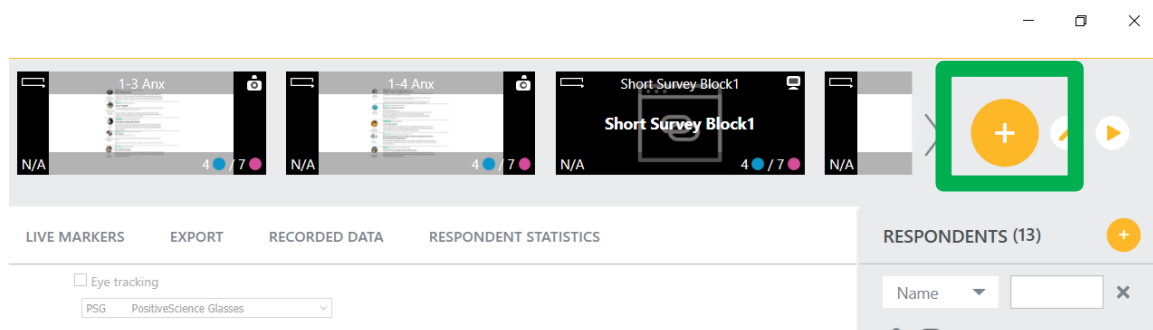
- 3- Respondent library collects the data of each of your participant registered in your experiment.
- 4- Stimuli navigator ribbon shows each screen/stimulus that compound the experiment (the full project). These stimuli can be images, videos, websites, survey slides, qualtrics survey, etc.)

### HOW TO CREATE A NEW EXPERIMENT WITH IMOTIONS:

- 1- The first step to create a new experiment is clicking the “+” button in study library and add the name of your experiment/project.



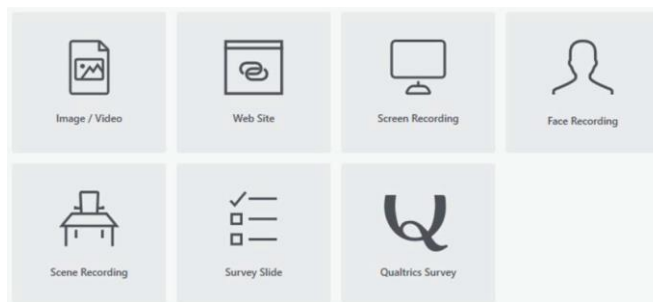
- 2- Once the name of your experiment/project appears on the study library list, the next step is to start adding the stimuli in the stimuli navigator ribbon: clicking the “+” button.



Then, you are able to choose the kind of stimulus you want to add. Before this step, be sure that:

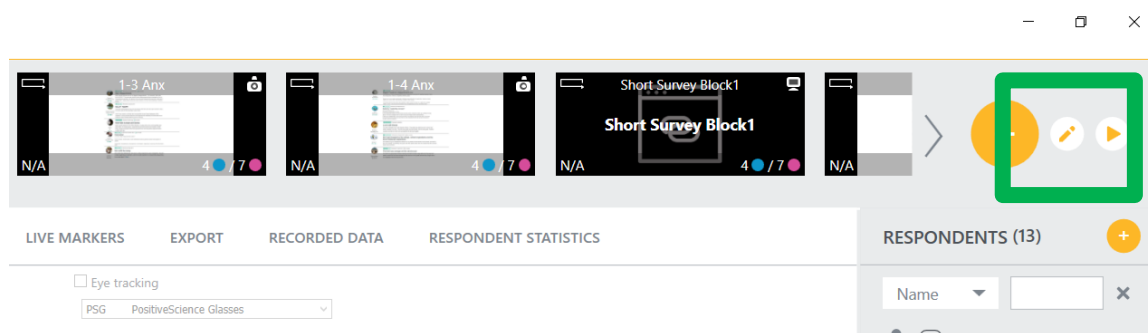
- if you want to show an image or picture the format is in JPG or PNG,
- if you want to upload a video the format of the file has to be MPG or WMV,

- if you want to add a website, you have to paste the link to the website that you want to be redirected,
- screen recording will record all the movement on the participant screen,
- if you want to use face recording, you do need to add the recording camera,
- if you want to add scene recording, you need a camera recording the scene,
- you can also create your own survey slide,
- or even also link to qualtrics survey.



Of course, you can combine different kind of stimuli. All the stimuli together will compound your experiment and will be shown as presentation slides.

You can edit each stimuli when you are adding them (time of exposure or duration, background color, automatic versus manual presentation advance, etc.) or by clicking in each of them in the stimulus navigation ribbon and then clicking “update”. Automatically iMotions always set the stimuli 30 seconds non manual advance. If you want to edit all stimuli together, you can also click on the “pencil” editing button. Moreover, you can also clone a stimulus.

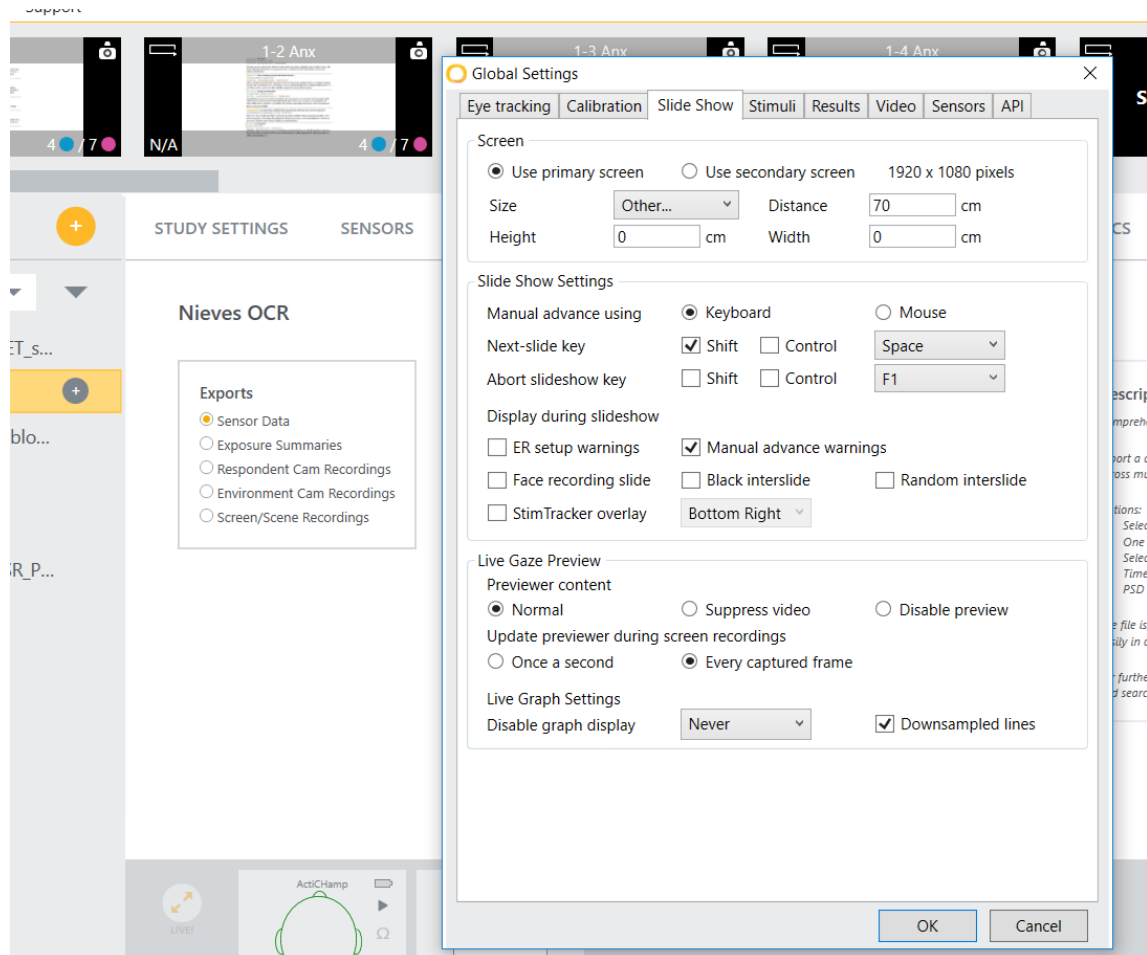


- 3- The next step is to create a block. This will help you to select what block or scenario you want to show to each participant. Even though your experiment is designed as a group of several blocks or scenarios, that is, that all participants are going to see only the same block, it is advisable to group your different scenarios in blocks. In this way, your data will be also recorded as a full file or as different blocks. This can be very helpful not to deal

with heavy files. Blocks can be created also clicking the “pencil” button for editing the stimuli.

- 4- The final step when designing your experiment is to check the slide show properties:  
Global setting >> Slide show

Here you can chose the button command settings, the screens you are going to use, among other things.



#### **BEFORE SYNCHRONIZING THE EXPERIMENT AND THE SENSORS:**

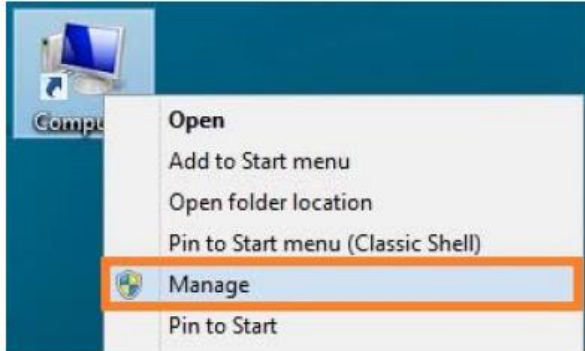
Important!! Before synchronizing the experiment and the sensors, you have to install the ActiChamp driver in your computer:

##### **Install the ActiChamp driver:**

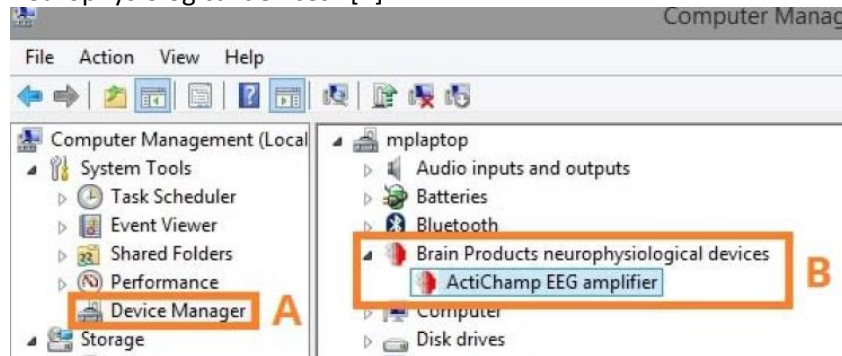
1. Download the driver from [http://actichamp.com/materials/actiCHampDriver\\_1-0-9.zip](http://actichamp.com/materials/actiCHampDriver_1-0-9.zip) or [https://www.dropbox.com/s/6614hljggzicroy/actiCHampDriver\\_1-0-9.zip?dl=0](https://www.dropbox.com/s/6614hljggzicroy/actiCHampDriver_1-0-9.zip?dl=0)
2. Extract the contents of the ZIP file.
3. Install the driver (dpinst.exe for 32-bit systems; dpinst64.exe for 64-bit systems).

##### **Connect the ActiChamp with the computer:**

1. Follow the document “actiCHamp Operating Instructions” available in the actiCHamp user forum ([http://actichamp.com/materials/actiCHamp\\_OI.pdf](http://actichamp.com/materials/actiCHamp_OI.pdf))
2. Connect the actiPOWER (battery) with the actiCHamp (amplifier).
3. Connect the actiCHamp to a free USB port. The PC automatically detects the amplifier.
4. You can find the actiCHamp in the list of devices:
  - Right-click the “Computer” icon on your desktop and select “Manage”.



- In the list, click “Device Manager” [A] and expand the entry “Brain Products neurophysiological devices” [B].

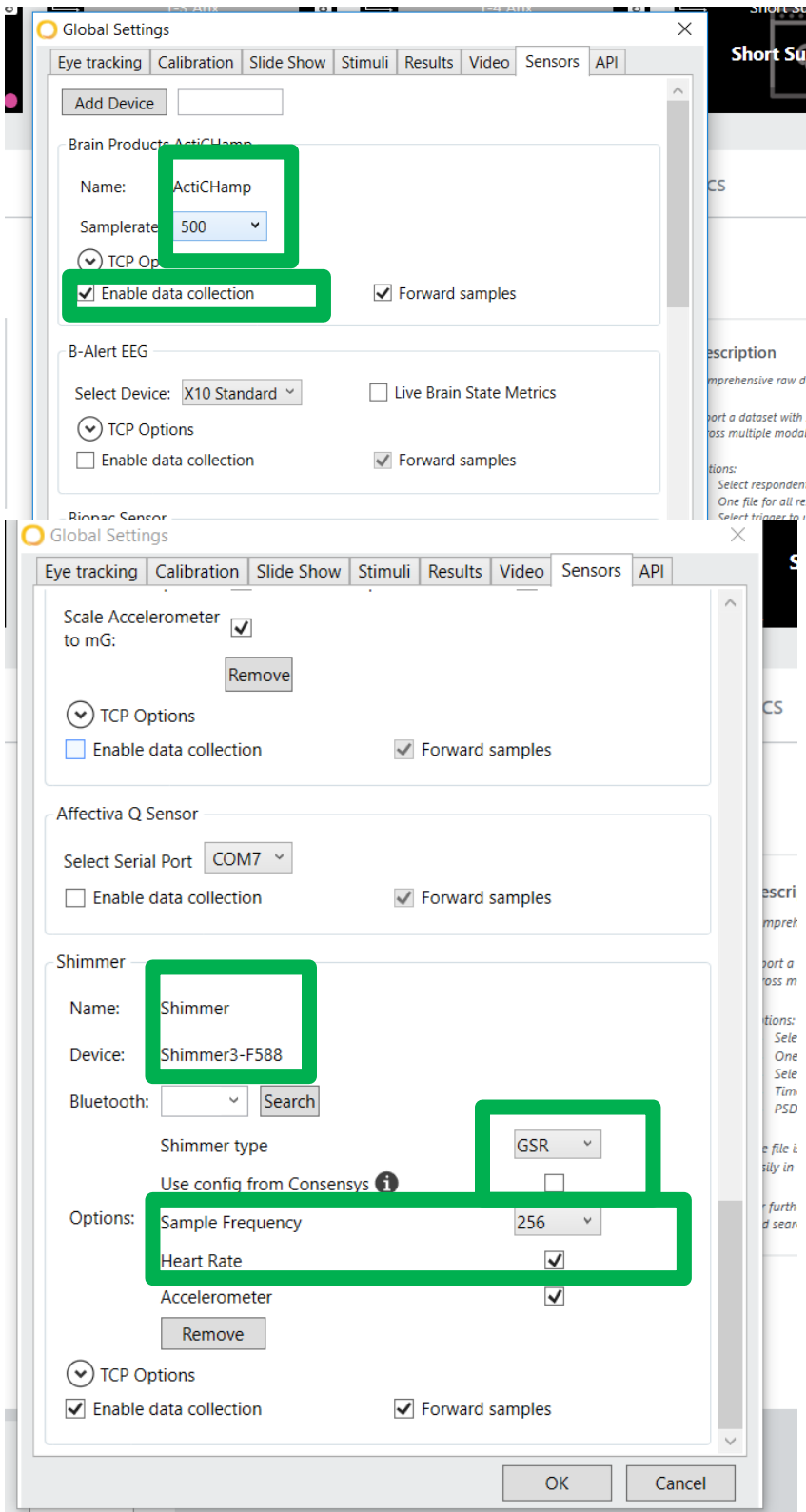


## HOW TO SYNCHRONIZE YOUR EXPERIMENT WITH THE SENSORS:

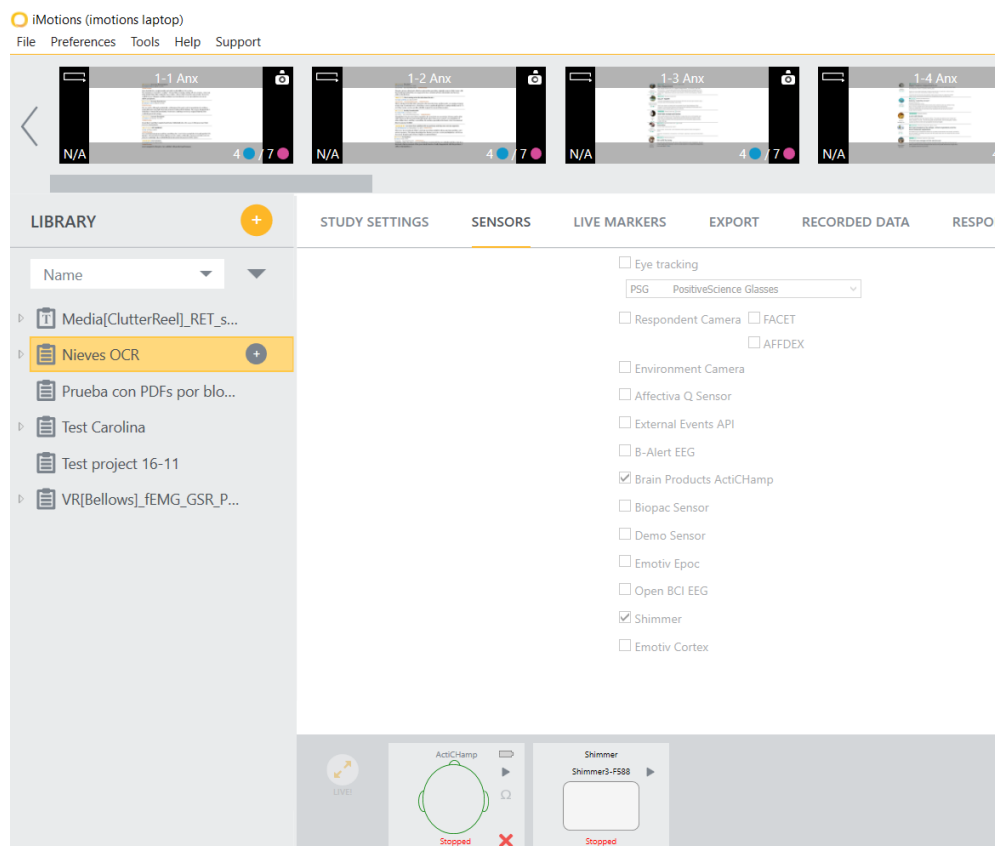
Once the experiment is created, the next step is to synchronize the experiment presentation with the sensors that you are going to use.

On the top left corner of the screen you can find the Global settings >> Sensors: there you can add the devices you want to use (all the available devices will appear on the list).

We are going to select Brain Products ActiChamp in order to set the electroencephalogram sensors and the Shimmer to connect via Bluetooth the sensors for collecting Heart Rate and Galvanic Skin Response (GSR). Each shimmer has a number that allow you to find it via Bluetooth (e.g. Shimmer3-F588). Therefore, you have to be sure that the computer you are using has Bluetooth system.



After setting all the sensors, they will appear recorded in your experiment/project:

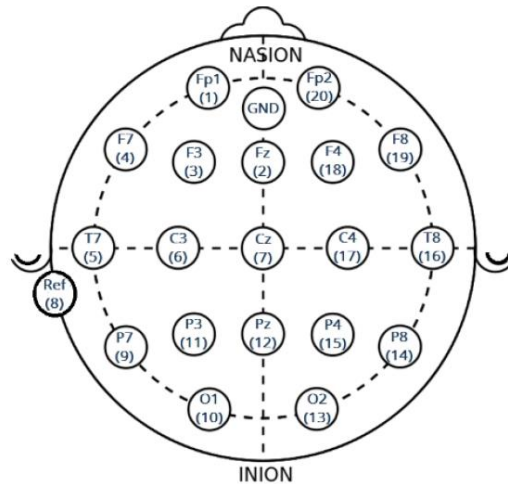


### WHAT YOU DO NEED FOR THE EEG EXPERIMENT:

Before participants come to your experiment, you must have ready the following:

- Syringe
- Needle for the syringe
- Conductance gel
- Meter for measuring the head
- Ground electrode
- Stickers for the extra electrodes
- Pencil for marking the middle of the head
- Cotton pads
- Alcohol
- Paper towels
- Electrodes round plastic adaptors
- Distil water
- Towels
- Shampoo
- Blow dryer

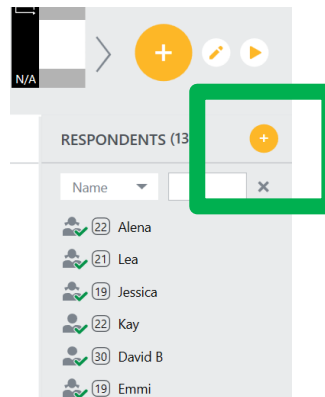
## LET ALWAYS CLOSE THE SENSORS DISTRIBUTION PLAN!



iMotions only recognizes 20 channels, so in case you are going to use 32 channels, you will have to use the extra electrodes.

### ADD RESPONDENTS:

Each time you carry out the experiment you have to add a new respondent clicking the “+” button in the respondent library. You can add some basic details as gender and age. Each time you add a new respondent it will appear in the column.



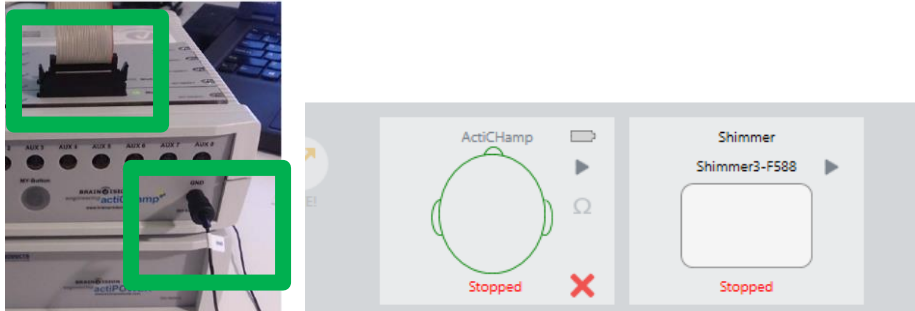
### CONNECT THE SENSORS

Once you have added the participant, connect the GSR and Heart Rate sensors with the bluetooth shimmer and the EEG headcap following the protocols.

- Measure the circumference of the head of the participant: normally you have to choose the size of the cap one centimeter less than the circumference of the head (e.g. if the circumference of the head is 57cm, you should take the cap 56).
- Measure and mark with a red dot the middle point from nasion to inion, and the middle point from right to left ear. Electrode number 7 (Cz) will be placed right in the middle of the head.
- Set the electrodes in the correct position.



- Remember to place the ground electrode (advisable in the middle of the forehead with a sticker for electrodes), two references electrodes (normally behind the ears, you can use for example electrodes 8 and 23 for collecting the average brain activity, otherwise you can use the AUX exits from the ActiChamp box), and another extra electrode under the eye in order to collect eye movement (VEOG and HEOG).
- Connect the power to the ActiChamp, connect the GND electrode and connect the full set of sensors to switch on. You will see a green light close to the full set of sensors switcher when is working properly.



- Press “play” and “omega” to do the impedance check and starting injecting gel to create the conductivity between the sensors and the brain activity from the scapt. Remember, electrodes will be ready when they are green (below 30 shows excellent impedance but try always to have them as slow as possible). It is very important to start always putting the gel in the ground electrode.



During the experiment you will be able to check that all of the electrodes are showing impedance rightly:



After finishing the experiment, **VERY IMPORTANT DO NOT FORGET TO CONNECT THE BRAIN ACTICHAMP BOX again to the power.**

## HOW TO CLEAN EVERYTHING

- Clean the electrodes with distil water for protecting them from the lime (calcium oxide) of the water, using an electrical teeth brush.
- Clean the EEG cap with water and shampoo.
- Clean the needle with water and alcohol and save it in a small box with alcohol to avoid oxidation. If the needles are not cleaned well, they get obstructed. Therefore, it is advisable to use a paperclip to be sure all the gel is out of the needle.
- Clean all the room and let everything ready for the next participant or for the next researcher.
- If you have used towels, put them in the laundry bag and let them in the reception desk to be sent to the laundry service.
- Leave the room and the tools as you would like to find them ; )

## HOW TO SAVE YOUR DATA

Last but not least, be sure you save your data well > Go to export sensor data and select the sensors you want to save (Brain Products ActiChamp and Shimmer), the respondent and the stimuli. If you have created block previously, you will be able to save the data also by blocks. Moreover, you can export data individually or also all the respondents in one file, but be aware that the data are very heavy. It is useful to save data also in “Milliseconds timestamp” to open later with MATLAB for example. The data are always saved in a text format file.

