
bRMS Generator - Researcher

Release 1.0

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bRMS generator is two part application for creation and running of bRMS experiments.

CHAPTER 1

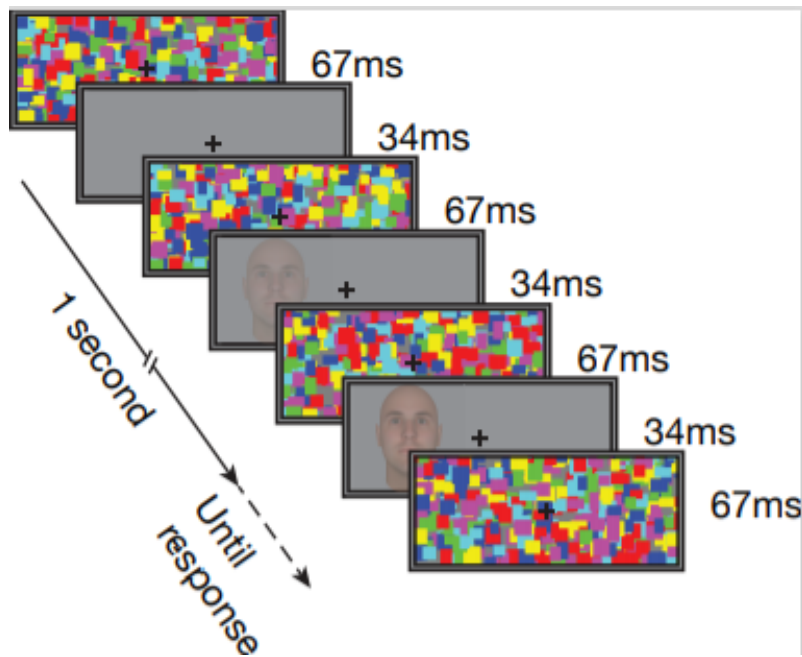
RMS Overview

Repeated masking suppression (RMS) is a technique for presenting stimuli below the threshold of consciousness for long durations. RMS is closely related to Continuous Flash Suppression (CFS; Tsuchiya & Koch, 2005), but relies on different visual principles that enable its use without any apparatus additional to a computer screen and a modern computer. It is based on forward- and backward-masking, separating the target stimuli and mask in time. In RMS participants are presented with masks interleaved with a target stimulus appearing at a lower contrast level. The masking stimulus is presented for a duration of 67 ms each time, while the target is presented for a duration of only 34 ms (See figure below).

Tsuchiya, N., & Koch, C. (2005). Continuous flash suppression reduces negative afterimages. *Nature neuroscience*, 8(8), 1096-1101.

In breaking RMS (bRMS) - the paradigm enabled by this software package - stimuli are presented long enough for the target stimulus to break through RMS and become visible. Participants' task is to indicate the location of the target stimulus relative to midscreen as soon as it becomes visible. Participants' reaction times thus serve as a measure of the time they needed to become conscious of the target stimulus - or its breaking time (BT). bRMS BTs have been demonstrated to be a valid measure of prioritization for consciousness, and show convergent validity with bCFS BTs (Abir & Hassin, 2020).

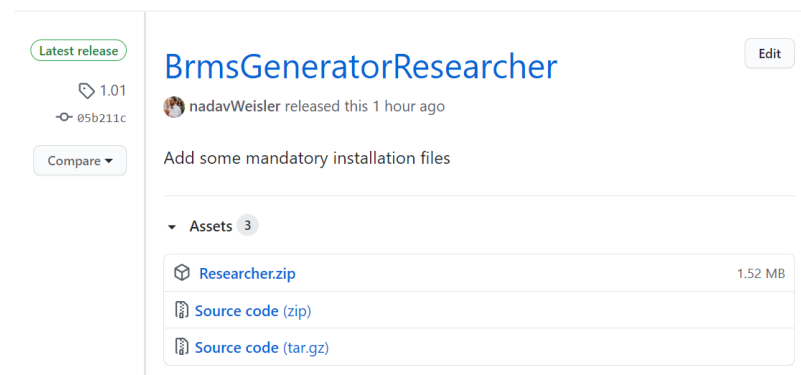
Abir, Y., & Hassin, R. R. (2020). Getting to the heart of it: Multi-method exploration of nonconscious prioritization processes. *Consciousness and Cognition*, 85, 103005.



2.1 bRMS Generator - Researcher

Start by downloading the bRMS Generator - Researcher application. The most recent version can always be found on the GitHub releases page.

The image below shows version 1.01, but the process is the same for the most recent version.



Release link: <https://github.com/nadavWeisler/BrmsGeneratorResearcher/releases/tag/1.01>

Download the zip file and start the setup process.

2.2 bRMS Generator - Runner

Link: <http://www.hujilabconscious.com/>

3.1 Preparations

Download this two images and call them 2.jpg and 4.jpg





Create CSV file called “BrmsDemo.csv” struct as follow

	A	B	C	D
1	2.jpg	number	red	
2	4.jpg	number	green	
3				
4				
5				

You can see that we set two tags for each picture, their color and the fact that they are numbers.

3.2 Main settings

Now I open BrmsGenerator - Researcher and set “Name” to “Demo” and “Background Color” to “#C0C0C0” (Grey).

Main

Name: Demo

Load

Experiments

Survey Fullscreen

bRMS Instructions

Image

Navigation

+ -

Save

Remove Edit

Save

Parameters

Background Color (RGB Include #): #C0C0C0

Completion Code:

3.3 Add Instructions

Now add instructions trial.

Get in instructions form.

Main

Name: Demo

Load

Experiments

Survey Fullscreen

bRMS Instructions

Image

Navigation

+ -

Save

Remove Edit

Save

Parameters

Background Color (RGB Include #): #C0C0C0

Completion Code:

Create new page with the text “Here is a demo experiment!” and call this trial “Instructions”.

Instructions

Name

Instructions

Here is a demo experiment!

clean confirm

Duplicate + - Remove Block 0 Sub Block 0 Save

Enter confirm and save the trial.

Instructions

Name

Instructions

clean confirm

Here is a ...

Duplicate + - Remove Block 0 Sub Block 0 Save

3.4 Add bRMS

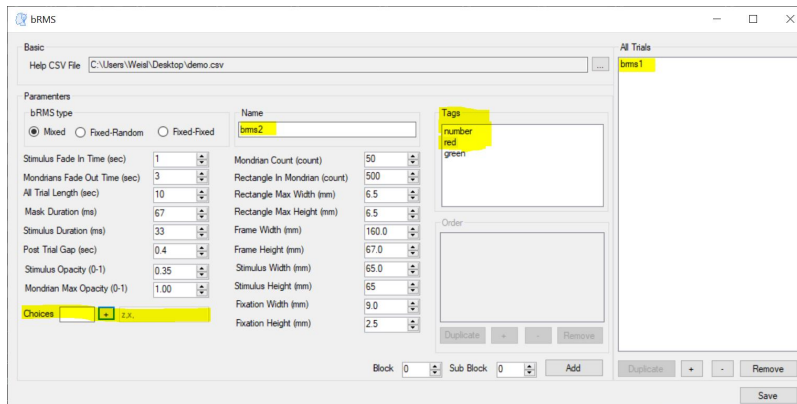
Now add bRMS trial.

Get in bRMS trial form

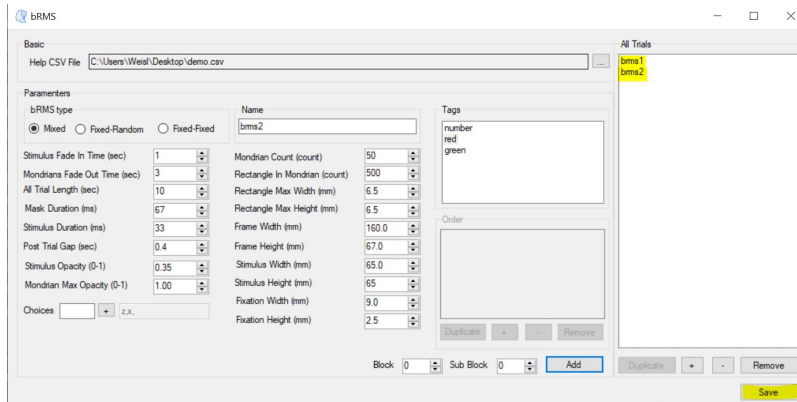
Upload the CSV file we created before to bRMS form.

Create bRMS trial called “brms1” with all the default values and the letter ‘z’ as a choice and press the “Add” button.

Create bRMS trial called “brms2” and add the ‘x’ letter to the choices section.

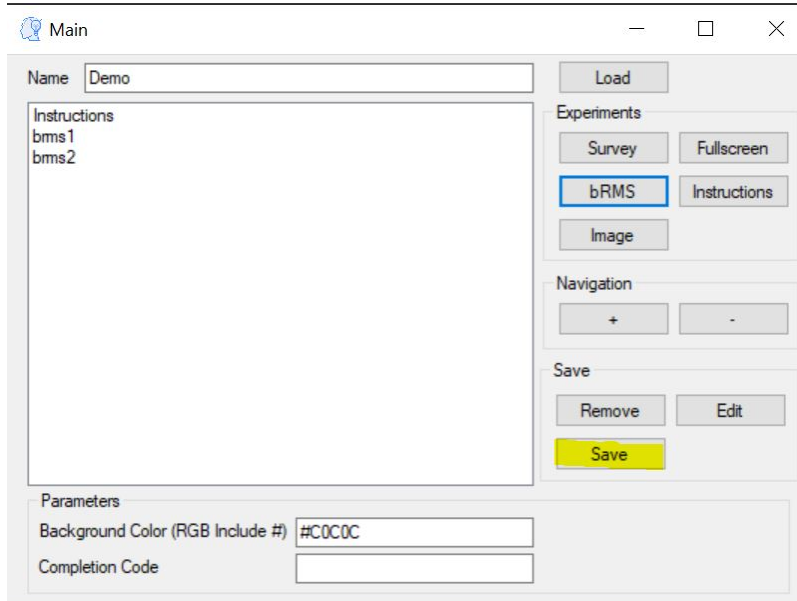


Save both trials.



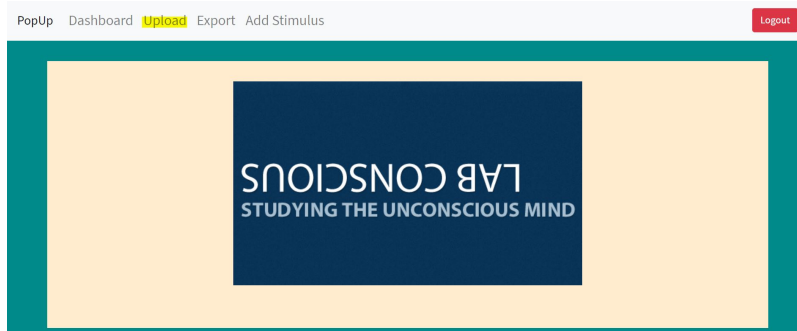
3.5 Download experiment

Download the experiment to your computer by press the “Save” button, Dont change its name.

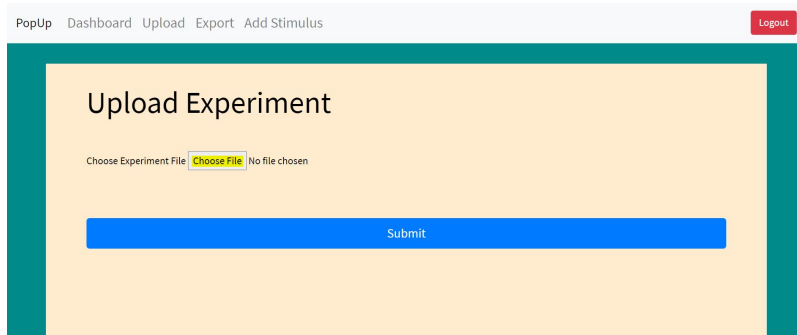


3.6 Upload experiment JSON file

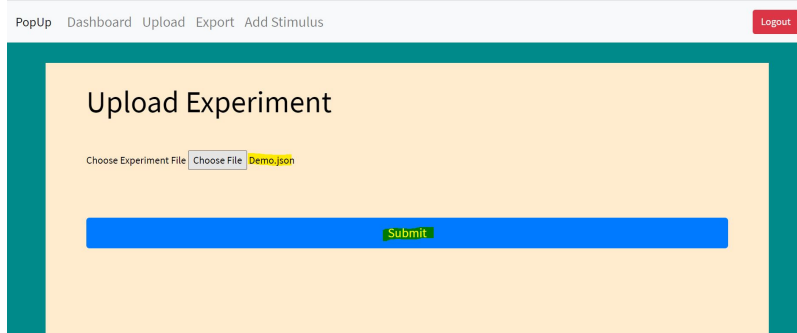
Log in to <http://www.hujilabconscious.com/> and navigate to “Upload” web page.



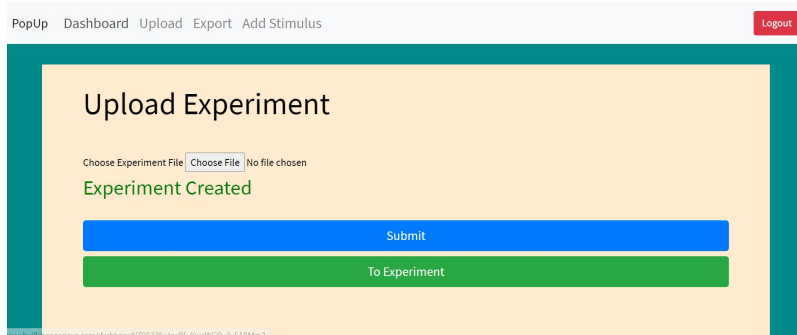
Upload the JSON file downloaded earlier in the section below.



Press the “Submit” button.



Wait for success message.



3.7 Upload Stimulus

Compress 2.jpg and 4.jpg to Stimulus.zip and navigate to “Add stimulus” web page.

PopUp Dashboard Upload Export **Add Stimulus** Logout

Upload Experiment

Choose Experiment File Choose File No file chosen

Experiment Created

Submit

To Experiment

www.hullit.com/stimulus.com/dashboard/208326wqgRTYwaWCQy3uLARMm2

Enter experiment name, in this case - “Demo” into the following section.

PopUp Dashboard Upload Export Add Stimulus Logout

Upload Stimulus

Enter Experiment Name

Choose Images Choose Files No file chosen

Submit

Upload the ZIP file created earlier in the following section.

PopUp Dashboard Upload Export Add Stimulus Logout

Upload Stimulus

Enter Experiment Name

Demo

Choose Images Choose Files No file chosen

Submit

Wait until the page reloads.

3.8 Upload stimulus

Compress 2.jpg and 4.jpg to Stimulus.zip and navigate to “Add stimulus” web page.

The screenshot shows the 'Upload Experiment' form. At the top, there is a navigation bar with links: PopUp, Dashboard, Upload, Export, Add Stimulus (highlighted in yellow), and a Logout button. The form itself has a title 'Upload Experiment'. Below the title, there is a section for file selection with a 'Choose Experiment File' button and a 'No file chosen' status. A green message 'Experiment Created' is displayed. At the bottom of the form, there are two buttons: a blue 'Submit' button and a green 'To Experiment' button. A URL is visible at the bottom of the page: www.bjui8.com/scous.com/dashboard/208326wlgRfYwaWCOy3uEARMm2.

Enter experiment name, in this case - “Demo” int the following section.

The screenshot shows the 'Upload Stimulus' form. The navigation bar is the same as the previous screenshot. The form has a title 'Upload Stimulus'. Below the title, there is a text input field labeled 'Enter Experiment Name'. Below the input field, there is a 'Choose Images' button and a 'No file chosen' status. A blue 'Submit' button is at the bottom of the form.

Upload the ZIP file created earlier in the following section.

This screenshot is similar to the previous one, but the 'Enter Experiment Name' input field now contains the text 'Demo'. The 'Choose Images' button is still present, and the 'Submit' button is at the bottom.

Wait until the age reload.

3.9 Run experiment

Navigate to “Dashboard” web page.

PopUp **Dashboard** Upload Export Add Stimulus Logout

Upload Stimulus

Enter Experiment Name

Choose images Choose Files No file chosen

Submit

Look at the table and find Demo experiment

PopUp Dashboard Upload Export Add Stimulus Logout

Experiment List

Refresh

NAME	ID	LINK	COUNT	DETAIL	DELETE
GaL_Experiment_5_4	8Rn1dkYLQST10V6Wjcb9	Link	24	Details	Delete
Pilot_0_mondrian	9aCazR70xwfsyb107R6	Link	2	Details	Delete
Pilot_2_4_5	PoSUpzG4mONB875ffYr	Link	3	Details	Delete
Exp_28_6_json	VuGWB8qeGHYk5xstqlek	Link	23	Details	Delete
demo	YYG25wHS3DFg62DjzwIq	Link	0	Details	Delete

Press on the link tab

PopUp Dashboard Upload Export Add Stimulus Logout

Experiment List

Refresh

NAME	ID	LINK	COUNT	DETAIL	DELETE
GaL_Experiment_5_4	8Rn1dkYLQST10V6Wjcb9	Link	24	Details	Delete
Pilot_0_mondrian	9aCazR70xwfsyb107R6	Link	2	Details	Delete
Pilot_2_4_5	PoSUpzG4mONB875ffYr	Link	3	Details	Delete
Exp_28_6_json	VuGWB8qeGHYk5xstqlek	Link	23	Details	Delete
demo	YYG25wHS3DFg62DjzwIq	Link	0	Details	Delete

3.10 Export

Get the experiment ID from “Dashboard” web page

PopUp Dashboard Upload Export Add Stimulus Logout

Experiment List

Refresh

NAME	ID	LINK	COUNT	DETAIL	DELETE
Gal_Experiment_5_4	8Rn1dkVLQST10V6Wjcb9	Link	24	Details	Delete
Pilot_0_mondrian	9aCaZrT70xwfsb107R6	Link	2	Details	Delete
Pilot_2_4_5	PoSuprZG4mONBs75ffYr	Link	3	Details	Delete
Exp_28_6_json	VuGWB8qeGHyk5xztqlek	Link	23	Details	Delete
Demo	YYG25wHS3DFg62Djzwliq	Link	0	Details	Delete

Navigate to “Export” web page.

PopUp Dashboard Upload **Export** Add Stimulus Logout

Experiment List

Refresh

NAME	ID	LINK	COUNT	DETAIL	DELETE
Gal_Experiment_5_4	8Rn1dkVLQST10V6Wjcb9	Link	24	Details	Delete
Pilot_0_mondrian	9aCaZrT70xwfsb107R6	Link	2	Details	Delete
Pilot_2_4_5	PoSuprZG4mONBs75ffYr	Link	3	Details	Delete
Exp_28_6_json	VuGWB8qeGHyk5xztqlek	Link	23	Details	Delete
Demo	YYG25wHS3DFg62Djzwliq	Link	0	Details	Delete

Enter our experiment ID in the following section.

PopUp Dashboard Upload Export Add Stimulus Logout

Export Experiment

Enter Experiment ID

Delete All Data: ☐

[Submit](#)

Press on “Submit” button

PopUp Dashboard Upload Export Add Stimulus Logout

Export Experiment

Enter Experiment ID

Delete All Data: ☐

[Submit](#)

Watch how the experiment result downloaded to your computer

[PopUp](#) [Dashboard](#) [Upload](#) [Export](#) [Add Stimulus](#) [Logout](#)

Export Experiment

Enter Experiment ID

YVG29wHS3DFgS2Djzwlq

Delete All Data ☐

Submit

Experiment_Research.com

...

Show all

×

bRMS Generator - Researcher

PopUpResearcher is a desktop application which generates bRMS experiments. PopUpResearcher responsible for JSON experiment file creation, which intended to be upload to PopUpWeb.

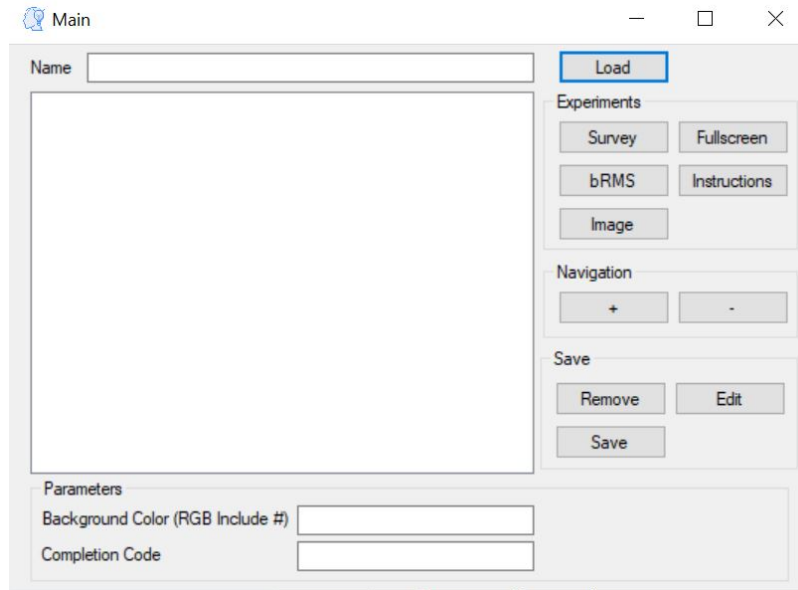
4.1 Application Forms

4.1.1 Main Form

In bRMS generator - Researcher we generate new bRMS experiment JSON file. Experiment must include:

- Name
- At least one Trial
- Background color (RGB code)

Each trial can be edited (edit button) remove (remove button) and reorder (+ and – buttons). Each trial also includes a name, block, and sub block. To save the experiment file press on the “Save” button and a file save dialog will open.



4.1.2 bRMS

bRMS experiment contains stimulus and mask parts. On the stimulus part one of your stimulus picture will appear after a fade in time.

The mask part contains several modrians in different colors, switching places and colors between each other.

The mask part is not mandatory, if you want to disable it, just set the Mask Duration to be 0.

Each component size can be change, but be aware that change one size can harm the harmony of the experiment, and please be cautious with it. First of all we need to import data CSV file, contains all stimuli names on the first column and stimulus tags on each columns, tags order are irrelevant.

CSV file example

	A	B	C	D
1	file1.jpg	tag1	tag2	
2	file2.jpg	tag1	tag2	tag3
3	file3.jpg	tag3	tag4	
4	file4.jpg	tag2	tag1	
5	file5.jpg	tag3		

After uploading the CSV file we could can create our bRMS trials.

We have 3 bRMS types

- Mixed: Shuffle all stimulus together.
- Fixed-Random: Each tag runs in a separate block.
- Fixed-Fixed: Fixed order .

After choosing the bRMS type we could continue edit our bRMS trial. Mandatory (with no default):

- Trial name: unique trial name, should be indicative.

- Tags: list view of all stimulus tags.
- Choices: buttons for experiment response. Should be numeric or alphabetic.

Extras:

- Stimulus fade in time (sec)
- Mondrian fade out time (sec)
- All Total trial length (sec)
- Mask duration (ms)
- Stimulus duration (ms)
- Post trial gap (ms)
- Stimulus opacity (0-1)
- Mondrian max opacity (0-1)
- Mondrian count (count)
- Rectangle count in mondrian (count)
- Rectangle max width (mm)
- Rectangle max height (mm)
- Frame width (mm)
- Frame height (mm)
- Stimulus width (mm)
- Stimulus height (mm)
- Fixation width (mm)
- Fixation height (mm)

The screenshot shows the bRMS Generator software interface. The 'Basic' tab is active, displaying a 'Help CSV File' button and a file path: 'C:\Weisler\Work\GreenLab\Experiments\galTest\data.csv'. Below this, the 'Parameters' section is divided into two columns. The left column contains 'bRMS type' (Mixed, Fixed-Random, Fixed-Fixed) and a list of time and duration parameters with spinners. The right column contains a 'Name' field (Trial2) and a list of spatial and count parameters with spinners. A 'Tags' section on the right shows a list of tags (1, high, face, 1face, 2, 2face, low, ch, word, 1word, 2word, heb) and an 'Order' section with a list box and buttons. At the bottom, there are 'Block' and 'Sub Block' spinners, an 'Add' button, and a 'Save' button.

Basic

Help CSV File C:\Weisler\Work\GreenLab\Experiments\galTest\data.csv

Parameters

bRMS type

☒ Mixed ☐ Fixed-Random ☐ Fixed-Fixed

Name Trial2

Tags

1	low
high	ch
face	word
1face	1word
2	2word
2face	heb

Order

Block 0 Sub Block 0 Add

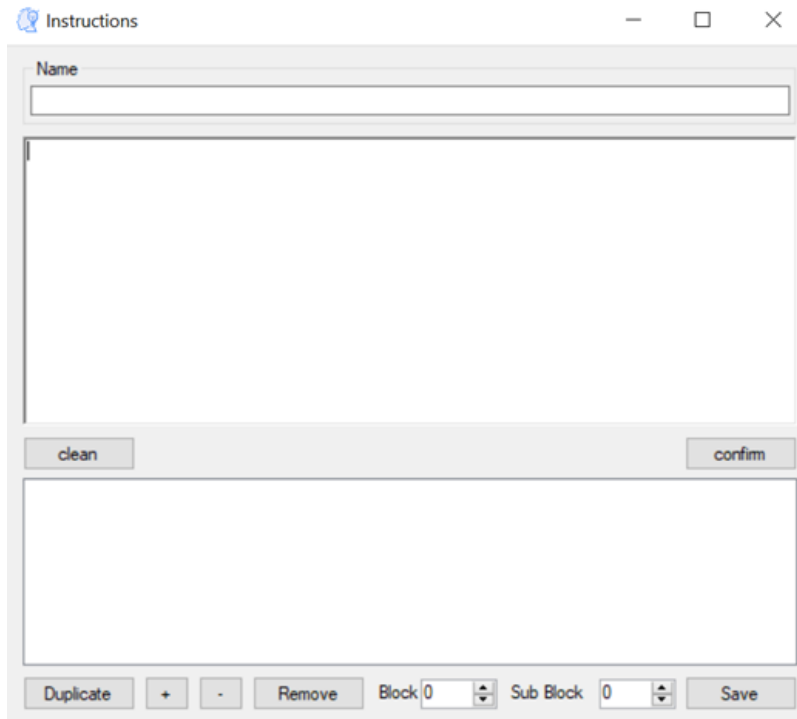
Save

4.1.3 Instructions

On the rich textbox , we write the content of one page and press confirm for adding.

All pages listed on the list view at the bottom of the page. We could change the pages order, duplicate or remove from the list view.

For save press the button Save.

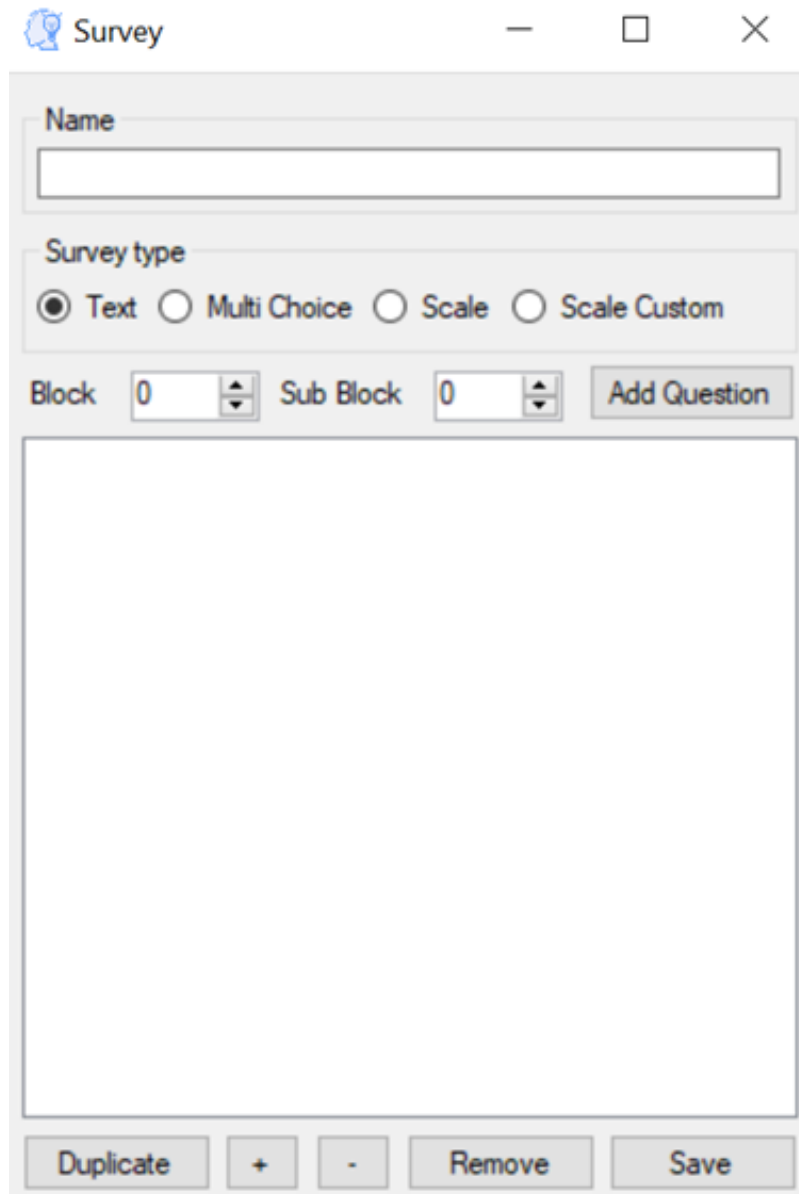


4.1.4 Survey

There are 4 survey types

- Text
- Multi choice
- Scale
- Scale custom

After we choose a survey type we should add at least one question, the questions form will be according to the survey type, as explain in the next chapter.



The image shows a window titled "Survey" with a light gray background. At the top left is a blue icon of a person's head with a gear inside. To the right of the icon are three window control buttons: a minus sign, a square, and an X. Below the title bar, there is a section labeled "Name" with a text input field. Underneath is a section labeled "Survey type" with four radio buttons: "Text" (selected), "Multi Choice", "Scale", and "Scale Custom". Below the radio buttons are two spinners labeled "Block" and "Sub Block", both set to "0". To the right of the spinners is a button labeled "Add Question". The main area of the window is a large, empty rectangular box. At the bottom of the window, there are five buttons: "Duplicate", "+", "-", "Remove", and "Save".

4.1.5 Questions

Text Question:

Text question contain a textbox for the question text and row and columns for textbox size, row is height and columns in width.

The screenshot shows the 'Questions' window in the bRMS Generator - Researcher. It features a 'prompt' text area on the left, a 'Scale' section with 'Scale Count' set to 3 and empty fields for 'Start Label', 'Middle Label', and 'End Label', and a 'Text' section with 'rows' and 'columns' set to 1 and an empty 'value' field. On the right, there is an 'options' grid with an 'Add' button. Below the grid are 'Duplicate', '+', '-', and 'Remove' buttons. At the bottom right, there is a 'required' checkbox (checked) and a 'Save' button.

Multi Custom Scale Question:

Multi choice and custom scale questions contains grid of options, added by write on the textbox and press Add. We can duplicate, remove and reorder the options by pressing the relevant buttons.

Also we have the prompt textbox, which contains the question itself.

This screenshot is identical to the one above, showing the 'Questions' window. The 'Scale' section is configured with 'Scale Count' set to 3. The 'Text' section has 'rows' and 'columns' set to 1. The 'options' grid is empty, and the 'required' checkbox is checked.

Scale Question:

Scale question contains “start”, “middle” and “end” labels and “scale count”. The first, middle and last scale points will be the relevant label, the rest will be numbers.

4.1.6 Image

On Image trial we upload an image by press Choose Image button, then file dialog will open and you will be able to choose image from your computer. After choosing the image will display in the Display Image section, for save press the Save button.

4.1.7 Fullscreen

Simple trial that represent a message after which the browser will enter fullscreen mode.

Fullscreen — □ ×

Name
Fullscreen_Trial

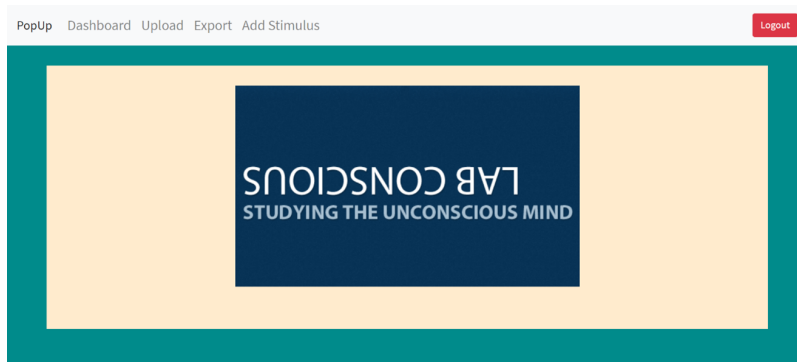
Messeage
Fullscreen message|

Clear Block 0 Sub Block 0 Save

CHAPTER 5

bRMS Generator - Runner

bRMS Generator - Runner is a website that upload, run, organize and export bRMS experiments.



5.1 Web Pages

5.1.1 Upload Experiment

First thing we should upload our experiment. Press Choose File button and then file dialog.

Choose your experiment Json file representation (deeply suggest generating it on bRMS Generator - Researcher) and press submit.

If the submission failed, you probably have format error on your JSON file. If you familiar with json format you can try and edit the file yourself, otherwise we suggest you create new JSON file.

After the experiment submission we still need to upload the relevant stimulus, as explained in the next section.

The screenshot shows the 'Upload Experiment' form. At the top, there is a navigation bar with links: 'PopUp', 'Dashboard', 'Upload', 'Export', 'Add Stimulus', and a red 'Logout' button. The main content area has a teal border and a light orange background. The title 'Upload Experiment' is at the top. Below it, there is a label 'Choose Experiment File' followed by a 'Choose File' button and the text 'No file chosen'. At the bottom of the form is a large blue 'Submit' button.

5.1.2 Upload Stimulus

After experiment JSON file upload, we should upload our stimuli.

In bRMS generator - Web stimuli is a JPG image. You should combine all your stimuli to zip files (Its better to combine for group of 100 stimulus just to be bullet proof).

Then, upload the stimulus zip files with the relevant experiment name (which you can see in the dashboard).

The screenshot shows the 'Upload Stimulus' form. It has the same navigation bar as the previous form. The main content area has a teal border and a light orange background. The title 'Upload Stimulus' is at the top. Below it, there is a label 'Enter Experiment Name' followed by a text input field. Below that, there is a label 'Choose images' followed by a 'Choose Files' button and the text 'No file chosen'. At the bottom of the form is a large blue 'Submit' button.

5.1.3 Dashboard

In the dashboard section we can see all the experiment we made.

For each experiment we can see

- Name
- Id

- Participants count.
- Details.

We are also having a link to the experiment and able to delete it.

NAME	ID	LINK	COUNT	DETAIL	DELETE
Gal_Experiment_5_4	8Rn1dkYLQ5T10V6Wjcb9	Link	24	Details	Delete
SlowExperiment	bMKtwZcL0ywrMyvHWMZC	Link	2	Details	Delete
Gal_Experiment_6_4	e1vozc6wCld17htLlVe	Link	0	Details	Delete

5.1.4 Export Experiment

In this window we can export experiment, we only need to enter experiment Id. We also can delete all the saved data (**very dangerous and not recommended!**). After press submit results csv file will be downloaded to your computer.

CHAPTER 6

Experiment Order

Each note has block and sub block.

blocks and sub blocks are the way for us to order and randomize trials in our experiment.

If trial is with block number 0, its means that the trials stay fixed in his defined place.

Else, each block number trial groups switch with other block number trial group. Same rules applied on sub blocks.

For example: lets look at an random experiment.

Name	Block	Sub Block
Instructions0	0	0
bRMS1	1	1
Instructions1	1	0
Survey1	1	1
bRMS2	2	1
Instructions2	2	0
Survey2	2	1

Than the experiment will be:

Instructions0
bRMS1/2
Instructions1/2
Survey1/2
bRMS1/2 (other than the first one)
Instructions1/2 (other than the first one)
Survey1/2 (other than the first one)

CHAPTER 7

jsPsych Plugin

For the people that feel safe with programming or have the intention to create more complicated experiment than the one we provide we extract jsPsych plugin of RMS.

You can find it here: <https://github.com/nadavWeisler/jsPsychRmsPlugin>

CHAPTER 8

License

MIT License

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