
bRMS Generator - Researcher

Release 1.0

Nadav Weisler

Nov 20, 2021

Contents

1	RMS Overview	3
2	Installation	5
2.1	bRMS Generator - Researcher	5
2.2	bRMS Generator - Runner	5
3	Demo Experiment	7
3.1	Preparations	7
3.2	Main settings	8
3.3	Add Instructions	9
3.4	Add bRMS	10
3.5	Download experiment	12
3.6	Upload experiment JSON file	13
3.7	Upload Stimulus	14
3.8	Upload stimulus	14
3.9	Run experiment	15
3.10	Export	16
4	bRMS Generator - Researcher	19
4.1	Application Forms	19
4.1.1	Main Form	19
4.1.2	bRMS	20
4.1.3	Instructions	22
4.1.4	Survey	22
4.1.5	Questions	23
4.1.6	Image	25
4.1.7	Fullscreen	25
5	bRMS Generator - Runner	27
5.1	Web Pages	27
5.1.1	Upload Experiment	27
5.1.2	Upload Stimulus	28
5.1.3	Dashboard	28
5.1.4	Export Experiment	29
6	Experiment Order	31

7	jsPsych Plugin	33
8	License	35

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

CHAPTER 1

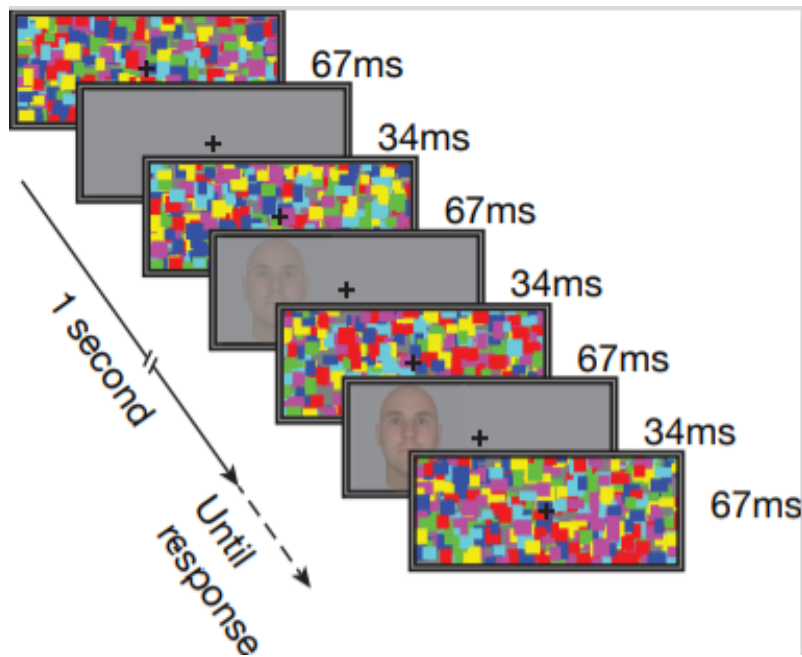
RMS Overview

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).

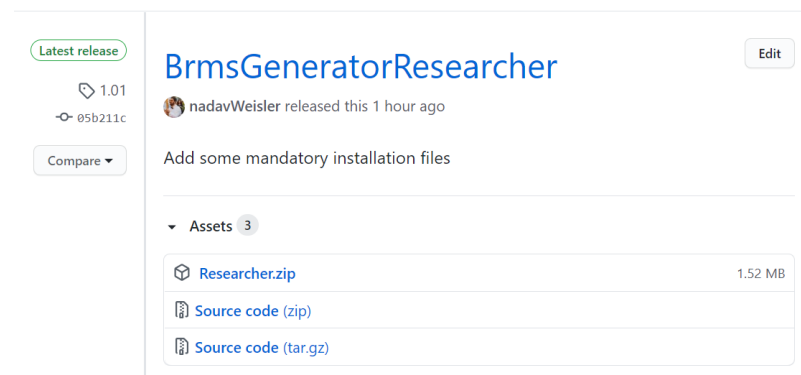
Abir, Y., & Hassin, R. R. (2020). Getting to the heart of it: Multi-method exploration of nonconscious prioritization processes. *Consciousness and Cognition*, 85, 103005.



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

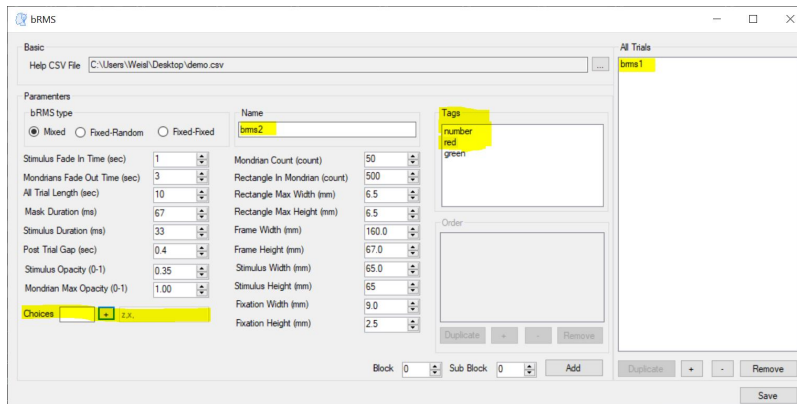
Now add bRMS trial.

Get in bRMS trial form

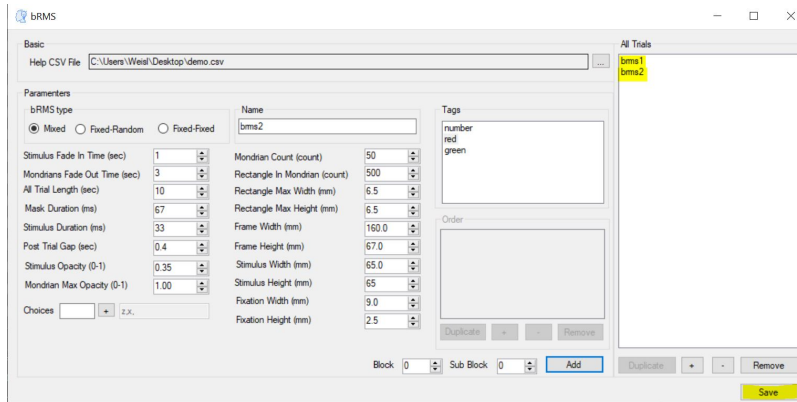
Upload the CSV file we created before to bRMS form.

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.

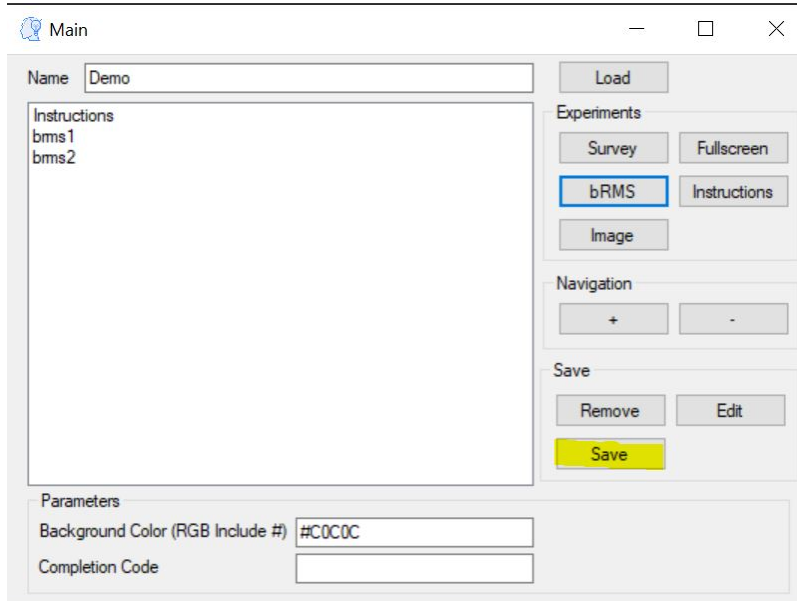


Save both trials.



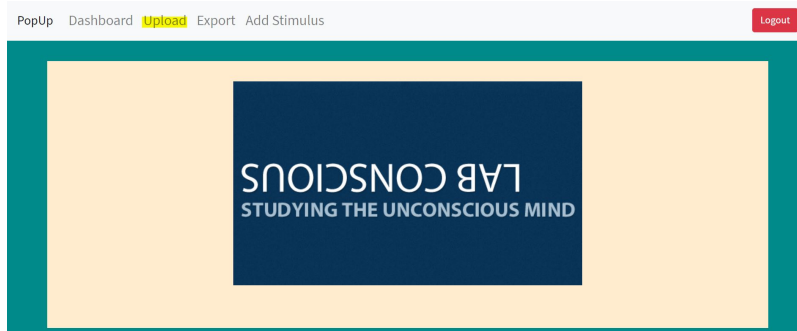
3.5 Download experiment

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

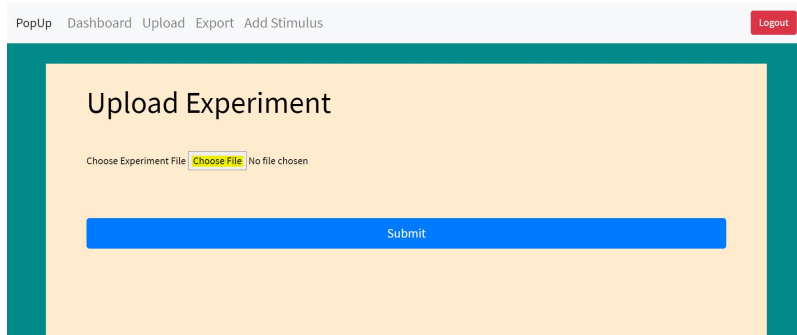


3.6 Upload experiment JSON file

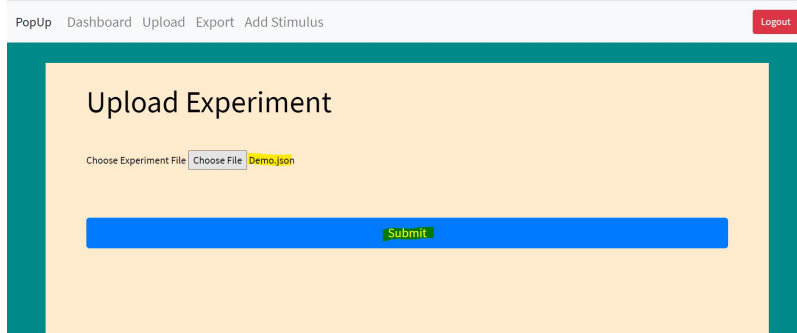
Log in to <http://www.hujilabconscious.com/> and navigate to “Upload” web page.



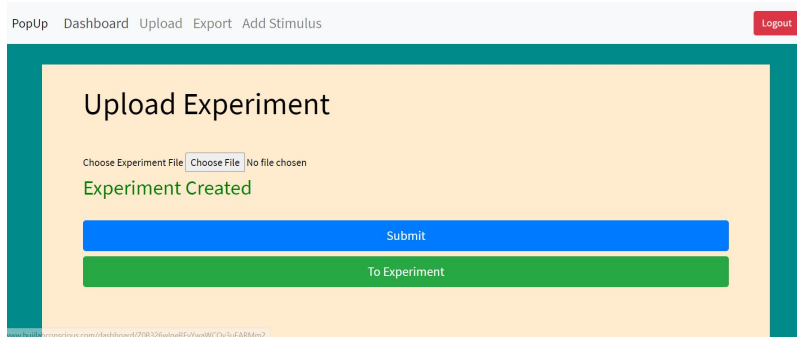
Upload the JSON file downloaded earlier in the section below.



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, and Add Stimulus (highlighted in yellow). A red 'Logout' button is on the right. The form has a title 'Upload Experiment'. Below it, there is a section 'Choose Experiment File' with a 'Choose File' button and the text 'No file chosen'. A green message 'Experiment Created' is displayed. At the bottom, there are two buttons: a blue 'Submit' button and a green 'To Experiment' button. A URL is visible at the bottom left: 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. At the top, there is a navigation bar with links: PopUp, Dashboard, Upload, Export, and Add Stimulus (highlighted in yellow). A red 'Logout' button is on the right. The form has a title 'Upload Stimulus'. Below it, there is a section 'Enter Experiment Name' with a text input field. Below that, there is a section 'Choose Images' with a 'Choose Files' button and the text 'No file chosen'. At the bottom, there is a blue 'Submit' button.

Upload the ZIP file created earlier in the following section.

The screenshot shows the 'Upload Stimulus' form. At the top, there is a navigation bar with links: PopUp, Dashboard, Upload, Export, and Add Stimulus (highlighted in yellow). A red 'Logout' button is on the right. The form has a title 'Upload Stimulus'. Below it, there is a section 'Enter Experiment Name' with a text input field containing the word 'Demo'. Below that, there is a section 'Choose Images' with a 'Choose Files' button and the text 'No file chosen'. At the bottom, there is a blue 'Submit' button.

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	PoSUpzG4mONB8a75ffYr	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	PoSUpzG4mONB8a75ffYr	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	8Rn1dkVLQ5T10V6Wjcb9	Link	24	Details	Delete
Pilot_0_mondrian	9aCaZrT70xwfsb107R6	Link	2	Details	Delete
Pilot_2_4_5	PoSuprZG4mONBs75fYr	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	8Rn1dkVLQ5T10V6Wjcb9	Link	24	Details	Delete
Pilot_0_mondrian	9aCaZrT70xwfsb107R6	Link	2	Details	Delete
Pilot_2_4_5	PoSuprZG4mONBs75fYr	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

YVG29wHS3DFgS2Djzwlg

Delete All Data ☐

Submit

Experiment_Research.com

...

Show all X

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.

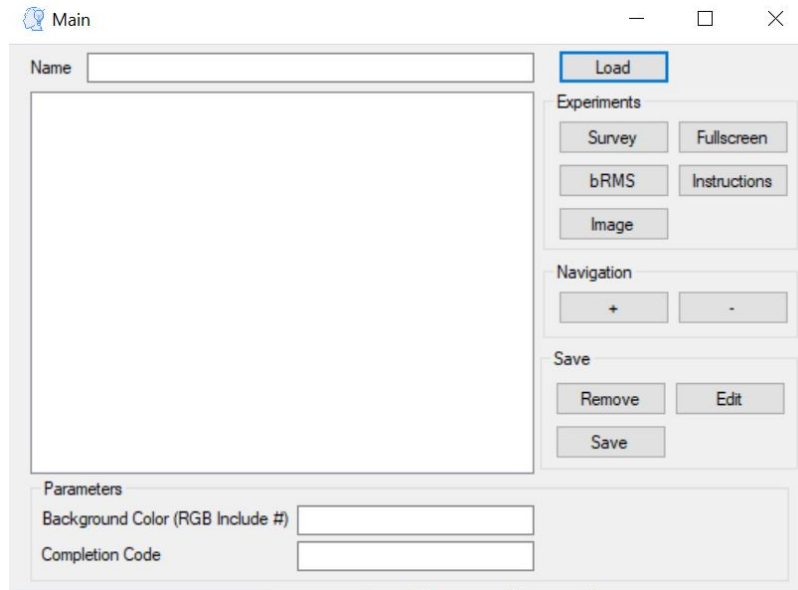
4.1 Application Forms

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

Duplicate + - Remove

Block 0 Sub Block 0 Add

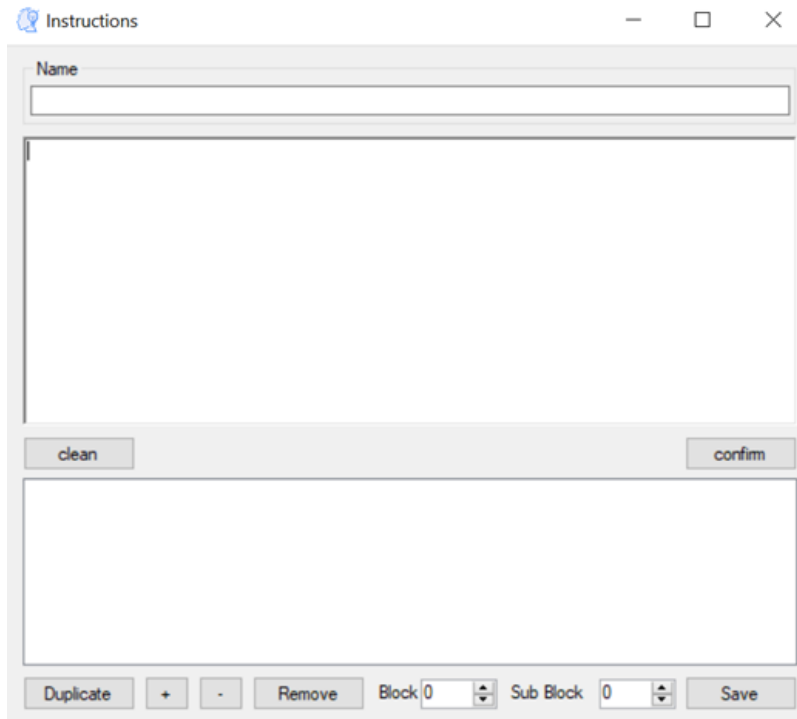
Save

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.

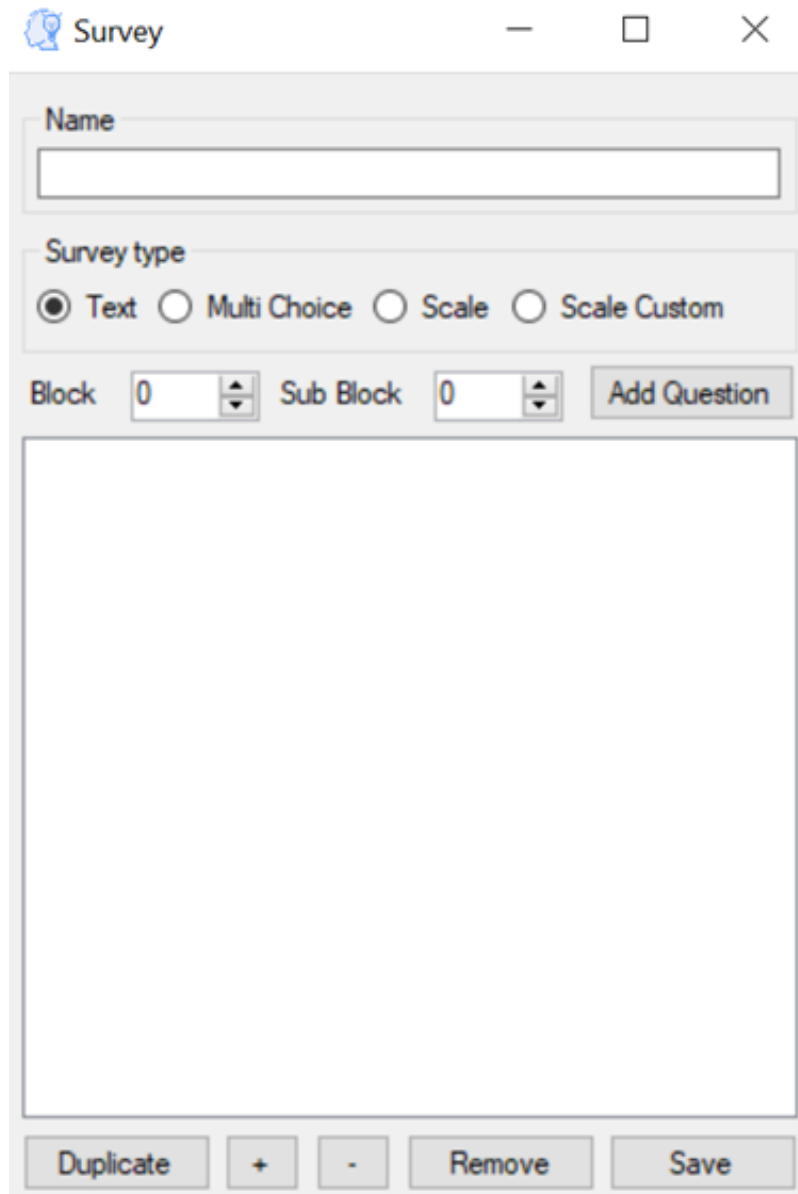


4.1.4 Survey

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, there is a header bar with a blue icon of a person's head, the title "Survey", and standard window controls (minimize, maximize, close). Below the header, the form is organized into sections. The first section is labeled "Name" and contains a single-line text input field. The second section is labeled "Survey type" and contains four radio buttons: "Text" (which is selected), "Multi Choice", "Scale", and "Scale Custom". Below these, there are two spinners: "Block" with a value of 0 and "Sub Block" with a value of 0. To the right of these spinners is a button labeled "Add Question". The main body of the form is a large, empty rectangular area. At the bottom of the window, there is a row of 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 application. The window is divided into several sections. On the left, there is a large 'prompt' text area. Below it, the 'Scale' section contains a 'Scale Count' dropdown set to 3, and three empty text fields for 'Start Label', 'Middle Label', and 'End Label'. To the right of the 'Scale' section is the 'Text' section, which includes 'rows' and 'columns' dropdowns both set to 1, and a 'value' text field. On the far right, the 'options' section features an 'Option' text area and an 'Add' button. Below the 'options' section are 'Duplicate', '+', '-', and 'Remove' buttons. At the bottom right of the window, there is a 'required' checkbox 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 in the bRMS Generator - Researcher application. It displays the 'prompt' text area, the 'Scale' section with 'Scale Count' set to 3, the 'Text' section with 'rows' and 'columns' set to 1, the 'options' section with an 'Option' text area and an 'Add' button, and the 'Duplicate', '+', '-', and 'Remove' buttons at the bottom right. The 'required' checkbox and 'Save' button are also visible.

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.

The 'Questions' dialog box is shown with a 'prompt' text area on the left and an 'options' list on the right. Below the 'prompt' area are fields for 'Scale Count' (set to 3), 'Start Label', 'Middle Label', and 'End Label'. To the right of these are 'Text' fields for 'rows' (set to 1), 'columns' (set to 1), and 'value'. The 'options' list has an 'Option' input field and an 'Add' button. At the bottom of the 'options' list are 'Duplicate', '+', '-', and 'Remove' buttons. A 'required' checkbox is checked, and a 'Save' button is at the bottom right.

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.

The 'Image' dialog box is shown with a 'Name' text field at the top. Below it is a 'Pic' section containing a 'Choose Image' button and an empty text field. At the bottom left are 'Block' and 'Sub Block' dropdown menus, both set to 0. A 'Save' button is at the bottom center. On the right is a large 'Display Image' area.

4.1.7 Fullscreen

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

Fullscreen — □ ×

Name

Fullscreen_Trial

Messeage

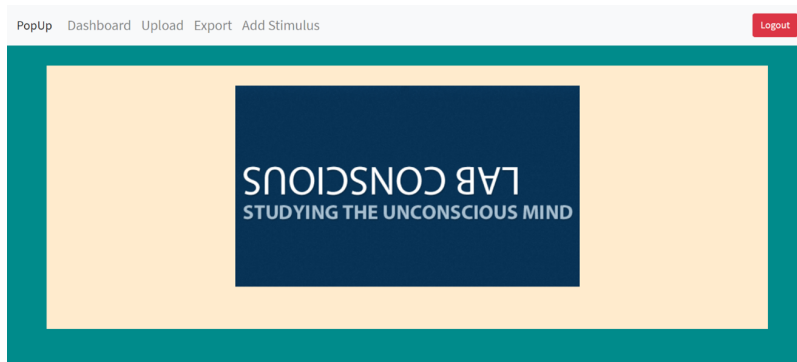
Fullscreen message|

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 text input field labeled 'Choose Experiment File' with a 'Choose File' button and the text 'No file chosen'. At the bottom, there 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. 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 Stimulus' is at the top. Below it, there is a text input field labeled 'Enter Experiment Name'. Below that, there is a text input field labeled 'Choose images' with a 'Choose Files' button and the text 'No file chosen'. At the bottom, there is a large blue 'Submit' button.

5.1.3 Dashboard

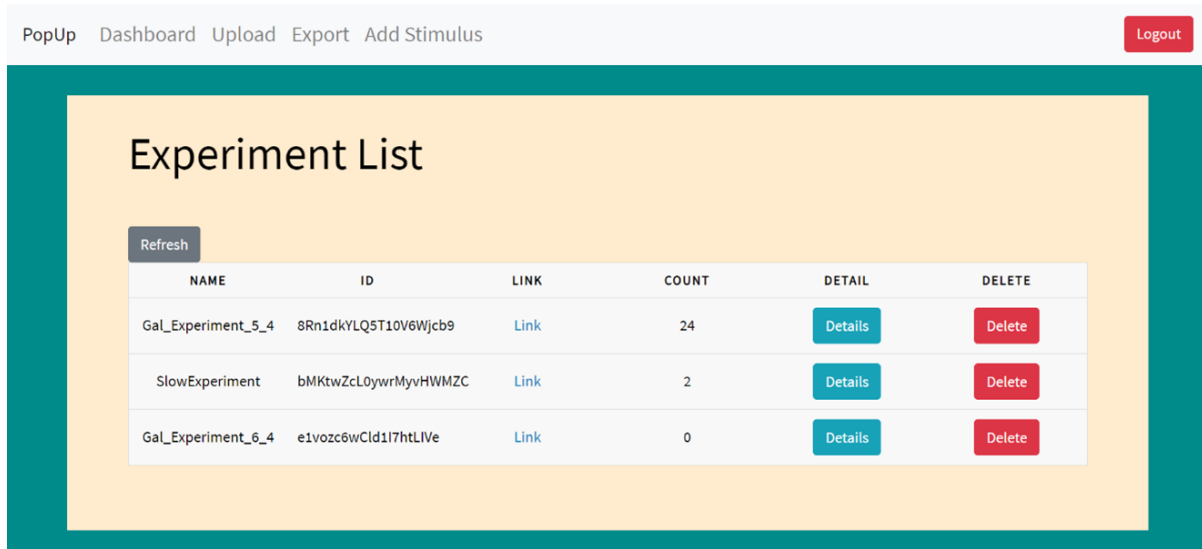
In the dashboard section we can see all the experiment we made.

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.

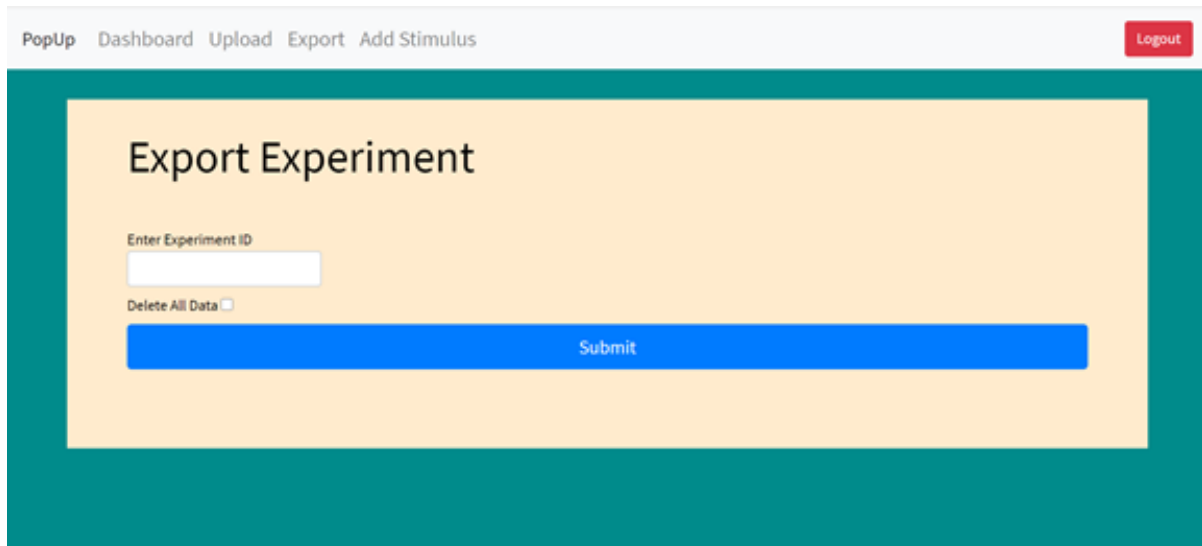


The screenshot shows the 'Experiment List' page. At the top, there is a navigation bar with links: PopUp, Dashboard, Upload, Export, Add Stimulus, and a Logout button. The main content area has a title 'Experiment List' and a 'Refresh' button. Below this is a table with columns: NAME, ID, LINK, COUNT, DETAIL, and DELETE. The table contains three rows of experiment data.

NAME	ID	LINK	COUNT	DETAIL	DELETE
Ga_Experiment_5_4	8Rn1dkYLQ5T10V6Wjcb9	Link	24	Details	Delete
SlowExperiment	bMKtwZcL0ywrMyvHWMZC	Link	2	Details	Delete
Ga_Experiment_6_4	e1voz6wCld17htLlVe	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.



The screenshot shows the 'Export Experiment' page. At the top, there is a navigation bar with links: PopUp, Dashboard, Upload, Export, Add Stimulus, and a Logout button. The main content area has a title 'Export Experiment'. Below the title, there is a form with a label 'Enter Experiment ID' and a text input field. Below the input field, there is a checkbox labeled 'Delete All Data'. At the bottom of the form is a large blue 'Submit' button.

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>

MIT License

Copyright (c) 2019 Nadav Weisler

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the “Software”), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED “AS IS”, WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.