

# PsPM: Options documentation

December 14, 2024

Version 7.0

by the PsPM team<sup>1</sup>:

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<sup>1</sup>If you have comments on or error corrections to this documentation, please send them to the PsPM team or post them on: [bachlab.org/pspm](https://bachlab.org/pspm)

# Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
<b>2</b>	<b>Index</b>	<b>4</b>
2.1	Field name . . . . .	4
2.2	Data type . . . . .	4
2.3	Unit . . . . .	4
2.4	Default value . . . . .	4
2.5	Acceptable values . . . . .	5
<b>3</b>	<b>References for Values</b>	<b>5</b>
3.1	Abbreviations . . . . .	5
3.2	Action Descriptors . . . . .	5
3.3	Miscellaneous . . . . .	6
<b>4</b>	<b>Function-specific Default Values</b>	<b>7</b>
4.1	Blink Saccade Filter . . . . .	7
4.2	Contrasts on the 1st Level . . . . .	7
4.3	Contrasts on the 2nd Level . . . . .	7
4.4	Convert Area To Diameter . . . . .	7
4.5	Convert Arbitrary Unit To Unit . . . . .	7
4.6	Convert Electrocardiogram To Heart Beat . . . . .	8
4.7	Convert Electrocardiogram To Heart Beat, Advanced MRI . . . . .	8
4.8	Convert Gaze Distance . . . . .	8
4.9	Convert Heart Beat To Heart Period . . . . .	9
4.10	Convert Pixel To Unit . . . . .	9
4.11	Convert Photoplethysmogram To Heart Beat . . . . .	9
4.12	Convert Visual Angle To Scanpath Speed . . . . .	9
4.13	Data Editor . . . . .	10
4.14	Dynamic Causal Modelling . . . . .	10
4.15	Down . . . . .	10
4.16	Electrocardiogram Editor . . . . .	11
4.17	Electromyogram Preprocessing . . . . .	11
4.18	Export . . . . .	11
4.19	Extract Segments . . . . .	11
4.20	Find Sounds . . . . .	12
4.21	Find Valid Fixations . . . . .	12
4.22	Gaze Preprocessing . . . . .	13
4.23	Get Marker Information . . . . .	13
4.24	Get Response Function . . . . .	13
4.25	General Linear Model . . . . .	14
4.26	Import . . . . .	14
4.27	Interpolate . . . . .	15
4.28	Load – First Level Model . . . . .	15

4.29	Merge . . . . .	15
4.30	Trial Average Model . . . . .	16
4.31	Preprocessing . . . . .	16
4.32	Process Illuminance . . . . .	16
4.33	Pupil Correct Eyelink . . . . .	16
4.34	Pupil Preprocessing . . . . .	17
4.35	Remove Epochs . . . . .	17
4.36	Respiratory Preprocessing . . . . .	17
4.37	Skin Conductance Response Preprocessing . . . . .	18
4.38	Segment Mean . . . . .	18
4.39	Spontaneous Fluctuations . . . . .	19
4.40	Spontaneous Fluctuations — Dynamic Causal Modelling . . . . .	19
4.41	Spontaneous Fluctuations — Matching Pursuit . . . . .	19
4.42	Split Sessions . . . . .	20
4.43	Trim . . . . .	20
4.44	Write Channel . . . . .	20

# 1 Introduction

Since version 6.1, PsPM has started using `pspm_options` to control field values in most functions. The default values for option fields have been set in `pspm_options` and described in this document with their explanations wherever available. The values of option fields have their own specification requirements and should be set carefully if non-standard values are used. Please check this document carefully about how to set values for the option fields. The errors which may appear when such variables have been set according to this guideline should be sent to PsPM developer team for getting further support.

## 2 Index

### 2.1 Field name

- A word written in bold means the name of a variable.
  - Example: **channel**

### 2.2 Data type

There are five basic kinds of data types used for the values of the fields in PsPM, which are namely *cell*, *character* (abbreviated as *char*), *double*, *logical*, and *struct*. Among *double*, there are some values required to be *integers* for their actual meanings. There are also some values required to be more than  $1 \times 1$  size, and there are therefore denoted as *double (vector)* or *double (matrix)*. If unspecified, *double (vector)* denotes a matrix of size  $1 \times n$ . If such vectors / matrixes are additionally required to be *integers*, they will be specified as *integer (vector)* or *integer (matrix)*.

### 2.3 Unit

Content in this column demonstrates the unit of default and acceptable values of this field. This column will not be available for the tables when there are no variables with physical meaning and units.

### 2.4 Default value

Default values are used if users have not customised the fields.

- A word written in typewriter format means a string that is used in the code, typically the value of a variable.
  - Example: `add`
- A number written in typewriter denotes a number used in the code, typically the value of a variable.
  - Example: `1`

## 2.5 Acceptable values

Apart from the notations described above for the default values, two additional terms, Any and Subset, are also used:

Any            Any means any value that meets the requirement of data type can be used here.

Subset        *Subset* means any value that is a subset of the default value can be used here.

## 3 References for Values

### 3.1 Abbreviations

amri	Advanced Magnetic Resonance Imaging
au	Arbitrary Unit
dcm	Dynamic Causal Modelling
ecg	Electrocardiogram
emg	Electromyography
hb	Heart Beat
hp	Heart Period
tam	Trial Average Model
pp	PreProcessing
resp	Respiration
rf	Response Function
scr	Skin Conductance Response
sf	Spontaneous Fluctuations
sps	ScanPath Speed
teo	Teager Energy Operator

### 3.2 Action Descriptors

channel\_action

none	No channel action will be performed.
add	The results will be added as a new channel.

replace	The results will replace the old data in the corresponding channel. If no corresponding channel is available, the results will be added as a new channel.
channel_output	
all	All markers are to be added.
corrected	Only markers which have been assigned are to be added.
eyes	
combined	Combined bilateral eyes that are computed based on the left and right eyes.
left	Left eye.
right	Right eye.
nan_output	
none	Values not to be displayed on the screen or written into files.
screen	Values to be displayed on MATLAB's screen.
file_output	Values to be written into a created file.
statstype	
param	Export all parameter estimates.
cond	Contrasts formulated in terms of conditions.
recon	Export all conditions.
timeunit	
seconds	<i>Second</i> as the unit.
samples	<i>Sample</i> as the unit.
markers	<i>Marker</i> as the unit.
overwrite	
1	The results will be overwrite.
0	The results will be dropped out.

### 3.3 Miscellaneous

NS	The parameter does not have a default value.
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## 4 Function-specific Default Values

### 4.1 Blink Saccade Filter

**Table 1** Default values for `pspm_blink_saccade_filt`

Field name	Data type	Default value	Acceptable values
<code>channel</code>	cell / char / integer	0	Any
<code>channel_action</code>	char	add	replace

### 4.2 Contrasts on the 1st Level

**Table 3** Default values for `pspm_con1`

Field name	Data type	Default value	Acceptable values
<code>zscored</code>	logical	0	1

### 4.3 Contrasts on the 2nd Level

**Table 4** Default values for `pspm_con2`

Field name	Data type	Default value	Acceptable values
<code>overwrite</code>	double	0	1

### 4.4 Convert Area To Diameter

**Table 5** Default values for `pspm_convert_area2diameter`

Field name	Data type	Default value	Acceptable values
<code>channel_action</code>	char	add	replace

### 4.5 Convert Arbitrary Unit To Unit

**Table 6** Default values for `pspm_convert_au2unit`

Field name	Data type	Default value	Acceptable values
<code>channel_action</code>	char	add	replace

## 4.6 Convert Electrocardiogram To Heart Beat

**Table 7** Default values for pspm\_convert\_ecg2hb

Field name	Data type	Unit	Default value	Acceptable values
channel_action	char	/	replace	add
debugmode	logical	/	0	1
maxHR	double	bpm	200	> 20
minHR	double	bpm	20	< 200
outfact	double	/	2	Any
semi	logical	/	0	1
twthresh	double	second	0.36	Any

## 4.7 Convert Electrocardiogram To Heart Beat, Advanced MRI

**Table 8** Default values for pspm\_convert\_ecg2hb\_amri

Field name	Data type	Unit	Default value	Acceptable values
channel	cell / char / integer	/	ecg	Any
channel_action	char	/	add	replace
ecg_bandpass	double (vector)	bpm	[0.5, 40]	[m, n]: m>0, n>0, n>m
hrrange	double (vector)	bpm	[20, 200]	[m, n]: m>0, n>0, n>m
min_cross_corr	double	/	0.5	Any
min_relative_amplitude	double	/	0.4	Any
signal_to_use	char	/	auto	ecg, teo
teo_bandpass	double (vector)	Hz	[8, 40]	> 0
teo_order	integer	/	1	Any

## 4.8 Convert Gaze Distance

**Table 9** Default values for pspm\_convert\_gaze

Field name	Data type	Default value	Acceptable values
channel_action	char	add	replace



## 4.9 Convert Heart Beat To Heart Period

**Table 10** Default values for pspm\_convert\_hb2hp

Field name	Data type	Default value	Acceptable values
channel_action	char	replace	add
limit.lower	double	0.2	> 0
limit.upper	double	2	> 0

## 4.10 Convert Pixel To Unit

**Table 11** Default values for pspm\_convert\_pixel2unit\_core

Field name	Data type	Default value	Acceptable values
channel_action	char	add	replace

## 4.11 Convert Photoplethysmogram To Heart Beat

**Table 12** Default values for pspm\_convert\_ppg2hb

Field name	Data type	Default value	Acceptable values
channel_action	char	replace	add
diagnostics	logical	0	1

## 4.12 Convert Visual Angle To Scanpath Speed

**Table 13** Default values for pspm\_convert\_visangle2sps

Field name	Data type	Default value	Acceptable values
channel	cell / char / integer	1	Any
channel_action	char	add	replace
eye	char	settings.lateral.char.b	settings.lateral.char.l, settings.lateral.char.r

### 4.13 Data Editor

**Table 14** Default values for pspm\_data\_editor

Field name	Data type	Default value	Acceptable values
epoch_file	char	NS	file must be a struct with an epoch field
output_file	char	NS	a file the changed data is saved to
overwrite	double	0	1

### 4.14 Dynamic Causal Modelling

**Table 15** Default values for pspm\_dcm and pspm\_dcm\_inv

Field name	Data type	Default value	Acceptable values
aSCR_sigma_offset	double	0.1	> 0
sclpost	double	5	> 0
sclpre	double	2	> 0
sffreq	double	0.5	> 0
sfpost	double	5	> 0
sfpre	double	2	> 0
crfupdate	logical	0	1
depth	integer	2	Any
dispsmallwin	logical	0	1
dispwin	logical	1	0
eventnames	cell	{}	Any
getrf	logical	0	1
indrfr	logical	0	1
nosave	logical	0	1
overwrite	double	1	0
rf	logical	0	1
trlnames	cell / char	{}	Any

### 4.15 Down

**Table 16** Default values for pspm\_down

Field name	Data type	Default value	Acceptable values
<b>overwrite</b>	double	0	1

## 4.16 Electrocardiogram Editor

**Table 17** Default values for `pspm_ecg_editor`

Field name	Data type	Default value	Acceptable values
<b>artefact</b>	char	[]	Any
<b>channel</b>	cell / char / integer	1	Any
<b>factor</b>	double	1	> 0
<b>semi</b>	logical	0	1

## 4.17 Electromyogram Preprocessing

**Table 18** Default values for `pspm_emg_pp`

Field name	Data type	Default value	Acceptable values
<b>channel</b>	cell / char / integer	emg	Any
<b>channel_action</b>	char	replace	add
<b>mains_freq</b>	double	50	> 0

## 4.18 Export

**Table 19** Default values for `pspm_exp`

Field name	Data type	Default value	Acceptable values
<b>delim</b>	char	\t	Any
<b>exclude_missing</b>	logical	0	1
<b>statstype</b>	char	param	cond, recon
<b>target</b>	char	screen	Any

## 4.19 Extract Segments

**Table 20** Default values for `pspm_extract_segments`

Field name	Data type	Default value	Acceptable values
<b>marker_chan</b>	cell / char / integer	marker	Any
<b>length</b>	double	10	$\geq 0$
<b>nan_output</b>	char	none	screen, file output
<b>norm</b>	logical	0	1
<b>outputfile</b>	char	''	Any
<b>overwrite</b>	double	0	1
<b>plot</b>	logical	0	1
<b>timeunit</b>	char	seconds	samples, markers

## 4.20 Find Sounds

**Table 21** Default values for pspm\_find\_sounds

Field name	Data type	Default value	Acceptable values
<b>channel_action</b>	char	none	add, replace
<b>channel_output</b>	char	all	corrected
<b>diagnostics</b>	logical	1	0
<b>expectedSoundCount</b>	integer	0	$\geq 0$
<b>maxdelay</b>	double	3	$\geq 0$
<b>mindelay</b>	double	0	$\geq 0$
<b>plot</b>	logical	0	1
<b>resample</b>	integer	1	$\geq 1$
<b>roi</b>	double (vector)	[]	[a, b]; a,b $\in\mathbb{R}$
<b>sndchannel</b>	integer	0	$\geq 0$
<b>threshold</b>	double	0.1	$\geq 0$
<b>trigchannel</b>	integer	0	$\geq 0$

## 4.21 Find Valid Fixations

**Table 22** Default values for pspm\_find\_valid\_fixations

Field name	Data type	Default value	Acceptable values
channel	cell / char / integer	1	Any
eyes	char	combined	left, right
fixation_point	double (vector)	[0.5, 0.5]	Any
missing	logical	0	1
newfile	char	''	Any
overwrite	double	0	1
plot_gaze_coords	logical	0	1
resolution	double (vector)	[1, 1]	[a, b]; a,b∈R

## 4.22 Gaze Preprocessing

**Table 23** Default values for pspm\_gaze\_pp

Field name	Data type	Default value	Acceptable values
channel	char	gaze_x_l	gaze_x_r, gaze_y_l, gaze_y_r
channel_action	char	add	replace
channel_combine	char	none	gaze_x_l, gaze_x_r, gaze_y_l, gaze_y_r
valid_sample	logical	0	1

## 4.23 Get Marker Information

**Table 24** Default values for pspm\_get\_markerinfo

Field name	Data type	Default value	Acceptable values
filename	char	''	Any
marker_chan	double	-1	Any
overwrite	double	0	1

## 4.24 Get Response Function

**Table 25** Default values for pspm\_get\_rf

Field name	Data type	Default value	Acceptable values
<b>aSCR_sigma_offset</b>	double	0.1	> 0
<b>eventnames</b>	cell	{}	Any
<b>nosave</b>	logical	0	1
<b>sclpost</b>	double	5	> 0
<b>sclpre</b>	double	2	> 0
<b>sffreq</b>	double	0.5	> 0
<b>sfpost</b>	double	5	> 0
<b>sfpre</b>	double	2	> 0
<b>crfupdate</b>	logical	0	1
<b>depth</b>	double	2	Any
<b>dispsmallwin</b>	logical	0	1
<b>dispwin</b>	logical	1	0
<b>getrf</b>	logical	0	1
<b>indrfr</b>	logical	0	1
<b>overwrite</b>	double	1	0
<b>rf</b>	logical	0	1
<b>trlnames</b>	char / cell	{}	Any

## 4.25 General Linear Model

**Table 26** Default values for `pspm_glm`

Field name	Data type	Default value	Acceptable values
<b>marker_chan_num</b>	cell / char / integer	marker	Any
<b>bf</b>	logical	0	1
<b>exclude_missing</b>	struct	NS	struct('segment_length', m, 'cutoff', n), m, n > 0
<b>centering</b>	logical	1	0
<b>norm</b>	logical	0	1
<b>overwrite</b>	double	0	1

## 4.26 Import

**Table 27** Default values for pspm\_import

Field name	Data type	Default value	Acceptable values
overwrite	double	0	1

## 4.27 Interpolate

**Table 28** Default values for pspm\_interpolate

Field name	Data type	Default value	Acceptable values
channel	cell / char / integer	1	Any
channel_action	char	add	replace
extrapolate	logical	0	1
method	char	linear	pchip, nearest, spline, previous, next
newfile	logical	0	1
overwrite	double	0	1

## 4.28 Load – First Level Model

**Table 29** Default values for pspm\_load1

Field name	Data type	Default value	Acceptable values
overwrite	integer	0	1
zscored	logical	0	1

## 4.29 Merge

**Table 30** Default values for pspm\_merge

Field name	Data type	Default value	Acceptable values
marker_chan_num	integer (vector)	[0, 0]	Any
overwrite	integer	0	1

### 4.30 Trial Average Model

**Table 31** Default values for pspm\_tam

Field name	Data type	Default value	Acceptable values
overwrite	integer	0	1

### 4.31 Preprocessing

**Table 32** Default values for pspm\_pp

Field name	Data type	Default value	Acceptable values
overwrite	integer	0	1

### 4.32 Process Illuminance

**Table 33** Default values for pspm\_process\_illuminance

Field name	Data type	Default value	Acceptable values
bf	struct	struct()	Any
fn	char	<i>empty</i>	Any
overwrite	integer	0	1
transfer	double (vector)	[49.79, -1.05, -0.50]	[a, b, c]: a, b, c>0
bf.constriction	struct	struct()	Any
bf.dilation	struct	struct()	Any
bf.duration	double	20	$\geq 0$
bf.offset	double	0.2	$\geq 0$

### 4.33 Pupil Correct Eyelink

**Table 34** Default values for pspm\_pupil\_correct\_eyelink



Field name	Data type	Default value	Acceptable values
C_x	double	0	Any
C_y	double	0	Any
C_z	double	0	Any
channel	char	pupil	Any
channel_action	char	add	replace
mode	char	auto	manual
S_x	double	0	Any
S_y	double	0	Any
S_z	double	0	Any
screen_size_mm	double (vector)	[43.5, 29.9]	[a, b]: a, b>0
screen_size_px	double (vector)	[1920, 1080]	[a, b]: a, b>0

#### 4.34 Pupil Preprocessing

**Table 35** Default values for pspm\_pupil\_pp

Field name	Data type	Default value	Acceptable values
channel	char	pupil	pupil_l, pupil_r
channel_combine	char	none	pupil_l, pupil_r
plot_data	logical	0	1
segments	cell	{}	Any

#### 4.35 Remove Epochs

**Table 36** Default values for pspm\_remove\_epochs

Field name	Data type	Default value	Acceptable values
channel_action	char	add	replace

#### 4.36 Respiratory Preprocessing

**Table 37** Default values for pspm\_resp\_pp

Field name	Data type	Default value	Acceptable values
<b>channel_action</b>	char	add	replace
<b>datatype</b>	cell	{rp, ra, rfr, rs, all}	Subset
<b>diagnostics</b>	logical	0	1
<b>plot</b>	logical	0	1
<b>systemtype</b>	char	bellows	cushion

### 4.37 Skin Conductance Response Preprocessing

**Table 38** Default values for pspm\_scr\_pp

Field name	Data type	Default value	Acceptable values
<b>change_data</b>	logical	1	0
<b>channel_action</b>	char	add	replace, withdraw
<b>clipping_n_window</b>	integer	10000	Any
<b>clipping_step_size</b>	integer	2	Any
<b>clipping_threshold</b>	double	0.1	Any
<b>data_island_threshold</b>	double	0	$\geq 0$
<b>deflection_threshold</b>	double	0.1	Any
<b>expand_epochs</b>	double	0.5	$\geq 0$
<b>max</b>	double	60	$> 0$
<b>min</b>	double	0.05	$> 0$
<b>missing_epochs_filename</b>	char	missing_epochs_filename	Any
<b>slope</b>	double	10	Any

### 4.38 Segment Mean

**Table 39** Default values for pspm\_segment\_mean

Field name	Data type	Default value	Acceptable values
<b>adjust_method</b>	char	none	downsample, interpolate
<b>newfile</b>	char	<i>empty</i>	Any
<b>overwrite</b>	integer	0	1
<b>plot</b>	logical	0	1

### 4.39 Spontaneous Fluctuations

**Table 40** Default values for pspm\_sf

Field name	Data type	Default value	Acceptable values
dispsmallwin	logical	0	1
dispwin	logical	1	0
fresp	double	0.5	$\geq 0$
marker_chan_num	char / integer	marker	Any
overwrite	integer	1	0
theta	double (vector)	[0.92, 3.92, 2.16, 1.53, 1.64]	Any
threshold	double	0.1	$> 0$

### 4.40 Spontaneous Fluctuations — Dynamic Causal Modelling

**Table 41** Default values for pspm\_sf\_dcm

Field name	Data type	Default value	Acceptable values
dispwin	logical	1	0
dispsmallwin	logical	0	1
fresp	double	0.5	$> 0$
theta	double (vector)	[0.92, 3.92, 2.16, 1.53, 1.64]	Any
threshold	double	0.1	$> 0$

### 4.41 Spontaneous Fluctuations — Matching Pursuit

**Table 42** Default values for pspm\_sf\_mp

Field name	Data type	Default value	Acceptable values
diagnostics	logical	0	1
dispwin	logical	0	1
fresp	double	0.5	$> 0$
theta	double (vector)	[0.92, 3.92, 2.16, 1.53, 1.64]	Any
threshold	double	0.1	$> 0$

## 4.42 Split Sessions

**Table 43** Default values for `pspm_split_sessions`

Field name	Data type	Default value	Acceptable values
<code>max_sn</code>	double	<code>settings.split.max_sn</code>	$> 0$
<code>min_break_ratio</code>	double	<code>settings.split.min_break_ratio</code>	$> 0$
<code>missing</code>	char	<i>empty</i>	Any
<code>overwrite</code>	integer	0	1
<code>prefix</code>	double	0	$\leq 0$
<code>randomITI</code>	logical	0	1
<code>splitpoints</code>	double (vector)	[ ]	Any
<code>suffix</code>	double	0	$\geq 0$
<code>verbose</code>	logical	1	0

## 4.43 Trim

**Table 44** Default values for `pspm_trim`

Field name	Data type	Default value	Acceptable values
<code>drop_offset_markers</code>	integer	0	Any
<code>marker_chan_num</code>	integer	0	Any
<code>overwrite</code>	integer	0	1

## 4.44 Write Channel

**Table 45** Default values for `pspm_write_channel`

Field name	Data type	Default value	Acceptable values
<code>channel</code>	integer / char / cell	0	Any
<code>delete</code>	char	last	first, all
<code>msg</code>	char / struct	<i>empty</i>	Any
<code>prefix</code>	char	<i>empty</i>	Any