PsPM: Option References

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[1] 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

Contents

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 1×1 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 typewritter format means a string that is used in the code, typically the value of a variable.
  - Example: `add`
- A number written in typewritter 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` *Second* as the unit.

`samples` *Sample* as the unit.

`markers` *Marker* 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.

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
`channel`	cell / char / integer	`0`	Any
`channel_action`	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
`zscored`	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
`overwrite`	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
`channel_action`	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
`channel_action`	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
indrf	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
overwrite	double	0	1

4.16 Electrocardiogram Editor

Table 17 Default values for pspm_ecg_editor

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

4.17 Electromyogram Preprocessing

Table 18 Default values for pspm_emg_pp

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

4.18 Export

Table 19 Default values for pspm_exp

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

4.19 Extract Segments

Table 20 Default values for pspm_extract_segments

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

4.20 Find Sounds

Table 21 Default values for pspm_find_sounds

Field name	Data type	Default value	Acceptable values
channel_action	char	none	add, replace
channel_output	char	all	corrected
diagnostics	logical	1	0
expectedSoundCount	integer	0	$\geq$ 0
maxdelay	double	3	$\geq$ 0
mindelay	double	0	$\geq$ 0
plot	logical	0	1
resample	integer	1	$\geq$ 1
roi	double (vector)	[]	[a, b]; a,b$\in$R
sndchannel	integer	0	$\geq$ 0
threshold	double	0.1	$\geq$ 0
trigchannel	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
aSCR_sigma_offset	double	0.1	> 0
eventnames	cell	{}	Any
nosave	logical	0	1
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	double	2	Any
dispsmallwin	logical	0	1
dispwin	logical	1	0
getrf	logical	0	1
indrf	logical	0	1
overwrite	double	1	0
rf	logical	0	1
trlnames	char / cell	{}	Any

4.25 General Linear Model

Table 26 Default values for pspm_glm

Field name	Data type	Default value	Acceptable values
marker_chan_num	cell / char / integer	marker	Any
bf	logical	0	1
exclude_missing	struct	NS	struct('segment_length', m, 'cutoff', n), m, n > 0
centering	logical	1	0
norm	logical	0	1
overwrite	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	*empty*	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
channel_action	char	add	replace
datatype	cell	{rp, ra, rfr, rs, all}	Subset
diagnostics	logical	0	1
plot	logical	0	1
systemtype	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
change_data	logical	1	0
channel_action	char	add	replace, withdraw
clipping_n_window	integer	10000	Any
clipping_step_size	integer	2	Any
clipping_threshold	double	0.1	Any
data_island_threshold	double	0	$\geq$ 0
deflection_threshold	double	0.1	Any
expand_epochs	double	0.5	$\geq$ 0
max	double	60	> 0
min	double	0.05	> 0
missing_epochs_filename	char	missing_epochs_filename	Any
slope	double	10	Any

4.38 Segment Mean

Table 39 Default values for pspm_segment_mean

Field name	Data type	Default value	Acceptable values
adjust_method	char	none	downsample, interpolate
newfile	char	*empty*	Any
overwrite	integer	0	1
plot	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
max_sn	double	settings.split.max_sn	> 0
min_break_ratio	double	settings.split.min_break_ratio	> 0
missing	char	*empty*	Any
overwrite	integer	0	1
prefix	double	0	≤ 0
randomITI	logical	0	1
splitpoints	double (vector)	[]	Any
suffix	double	0	≥ 0
verbose	logical	1	0

4.43 Trim

Table 44 Default values for `pspm_trim`

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

4.44 Write Channel

Table 45 Default values for `pspm_write_channel`

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