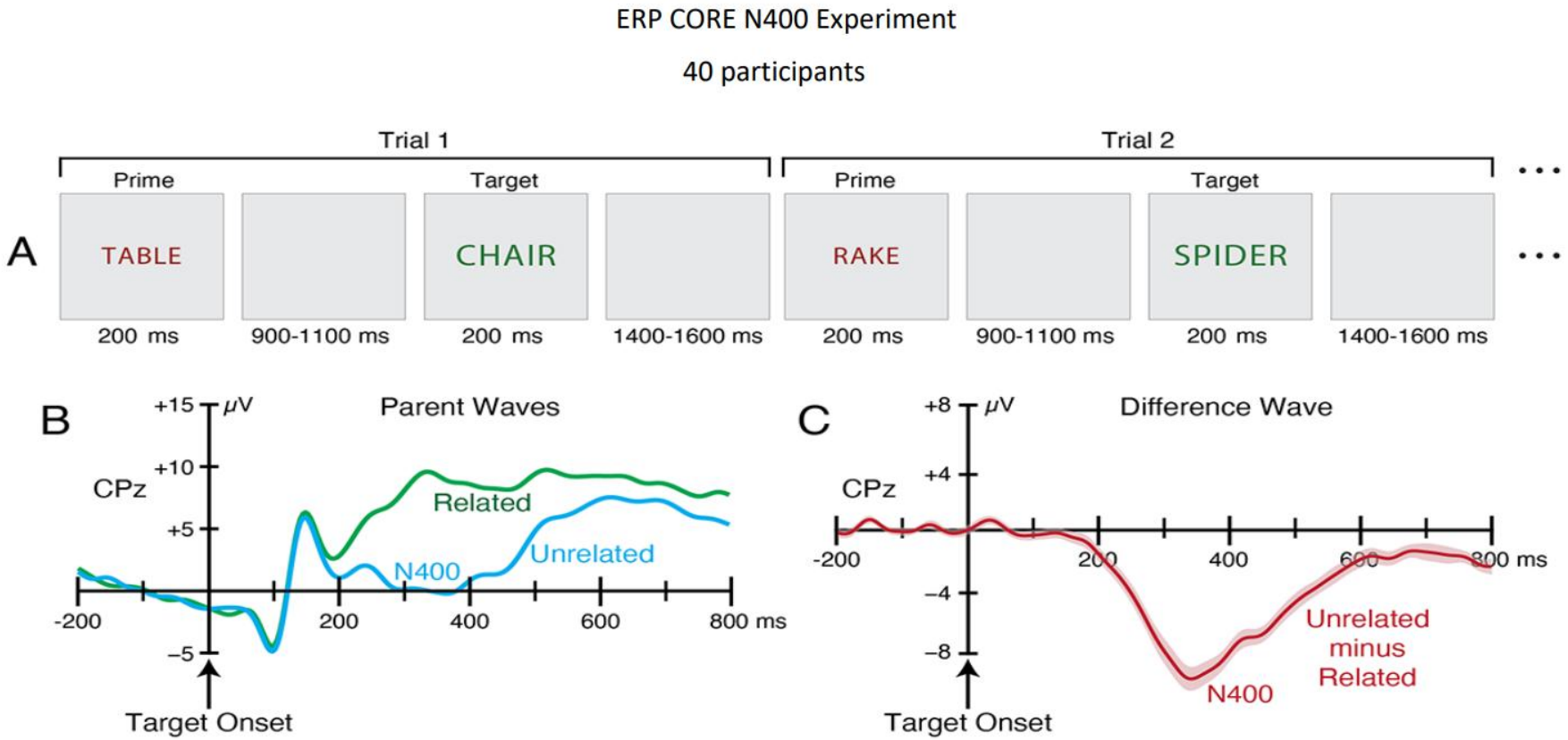
EEGLAB and ERPLAB

Interdisciplinary Schools

Signal Processing Department

Parisa Khoorahe

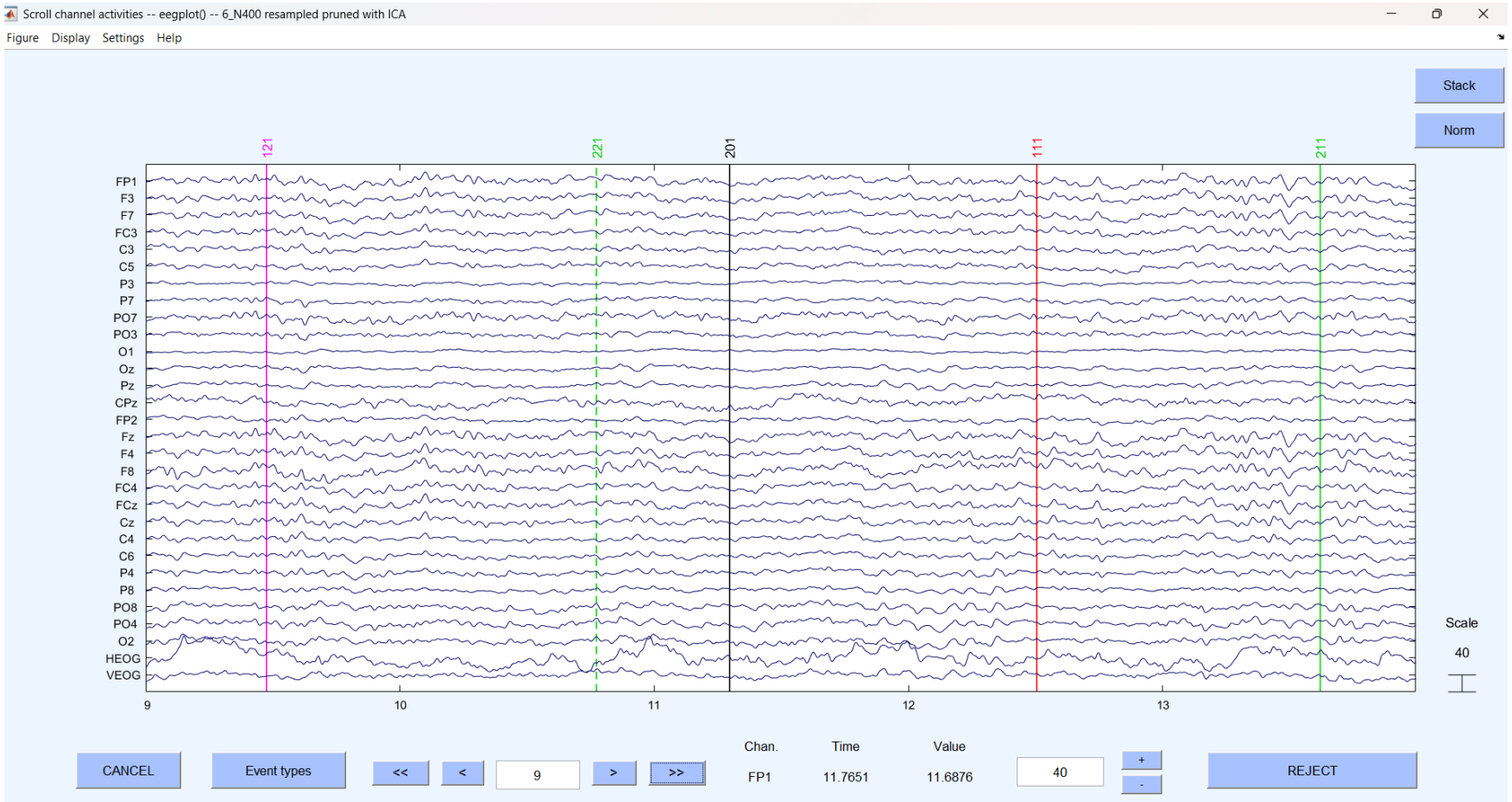
ERPLAB


ERP CORE N400 Experiment
40 participants
Trial 1
Trial 2
Prime
Target
Prime
Target
A
TABLE
CHAIR
RAKE
SPIDER
200 ms
900-1100 ms
200 ms
1400-1600 ms
200 ms
900-1100 ms
200 ms
1400-1600 ms
B
Parent Waves
+15 μV
+10
+5
−5
CPz
Related
Unrelated
N400
-200
200
400
600
800 ms
Target Onset
C
Difference Wave
+8 μV
+4
−4
−8
CPz
-200
200
400
600
800 ms
Unrelated
minus
Related
N400
Target Onset

ERPLAB

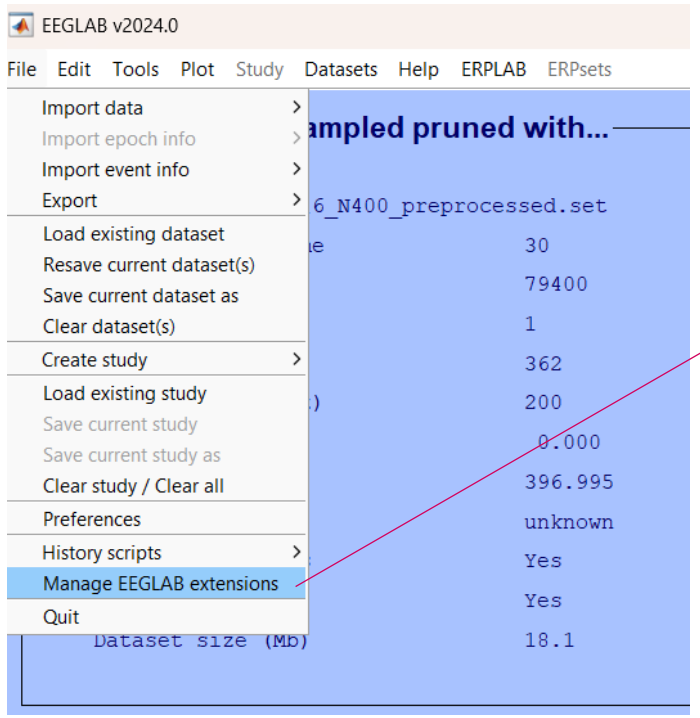
	Word Type	Relatedness	Word List	Event Code	Occurrences
Stimuli	Prime	Related	List 1	111	30
	Prime	Related	List 2	112	30
	Prime	Unrelated	List 1	121	30
	Prime	Unrelated	List 2	122	30
	Target	Related	List 1	211	30
	Target	Related	List 2	212	30
	Target	Unrelated	List 1	221	30
	Target	Unrelated	List 2	222	30
Responses	Correct			201	Variable
	Incorrect			202	Variable

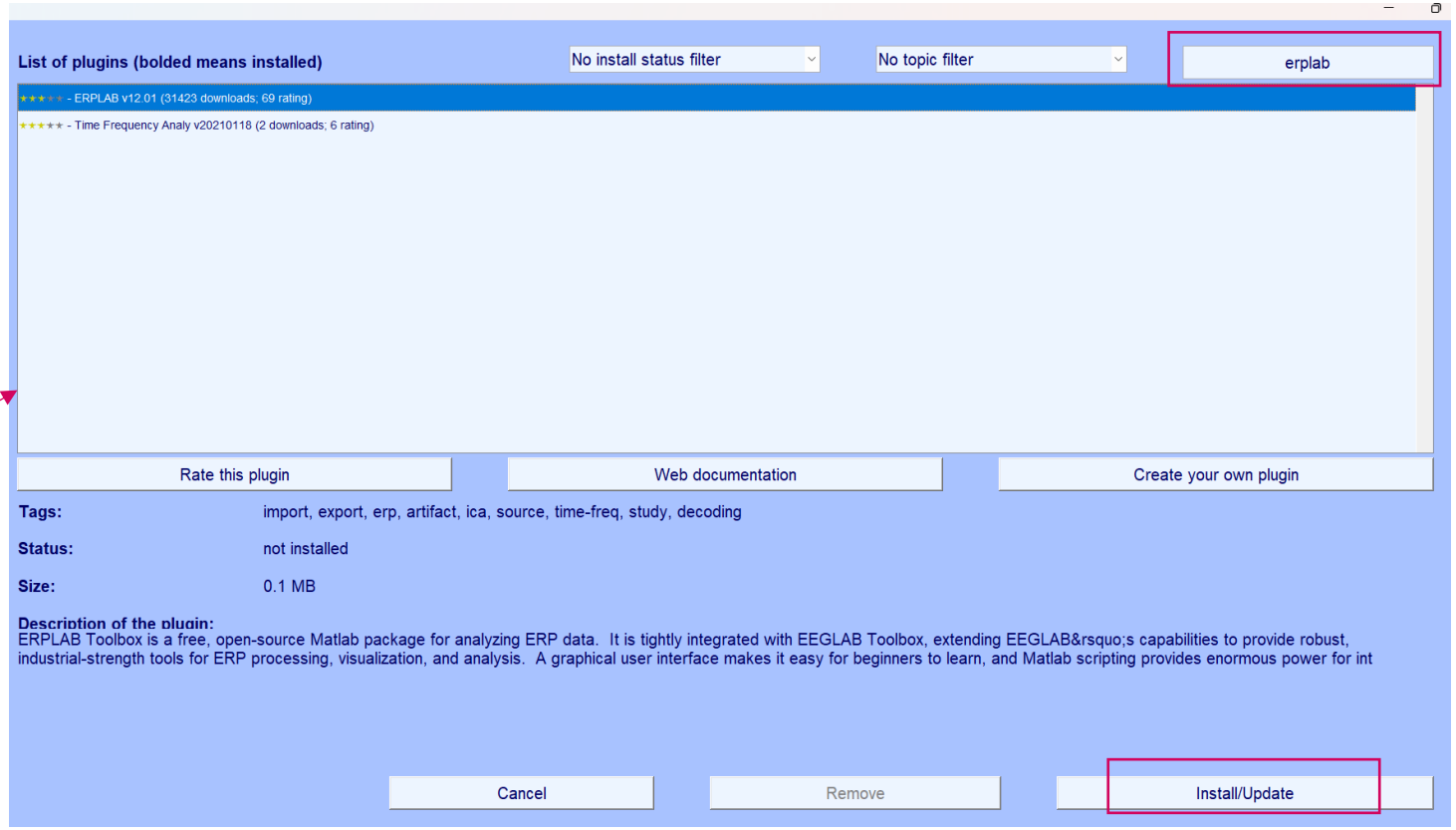
ERPLAB


Scroll channel activities -- eegplot() -- 6_N400 resampled pruned with ICA
Figure Display Settings Help
Stack
Norm
121
221
201
111
211
FP1
F3
F7
FC3
C3
C5
P3
P7
PO7
PO3
O1
Oz
Pz
CPz
FP2
Fz
F4
F8
FC4
FCz
Cz
C4
C6
P4
P8
PO8
PO4
O2
HEOG
VEOG
9
10
11
12
13
Scale
40
CANCEL
Event types
<<
<
9
>
>>
Chan.
Time
Value
FP1
11.7651
11.6876
40
+
-
REJECT

ERPLAB

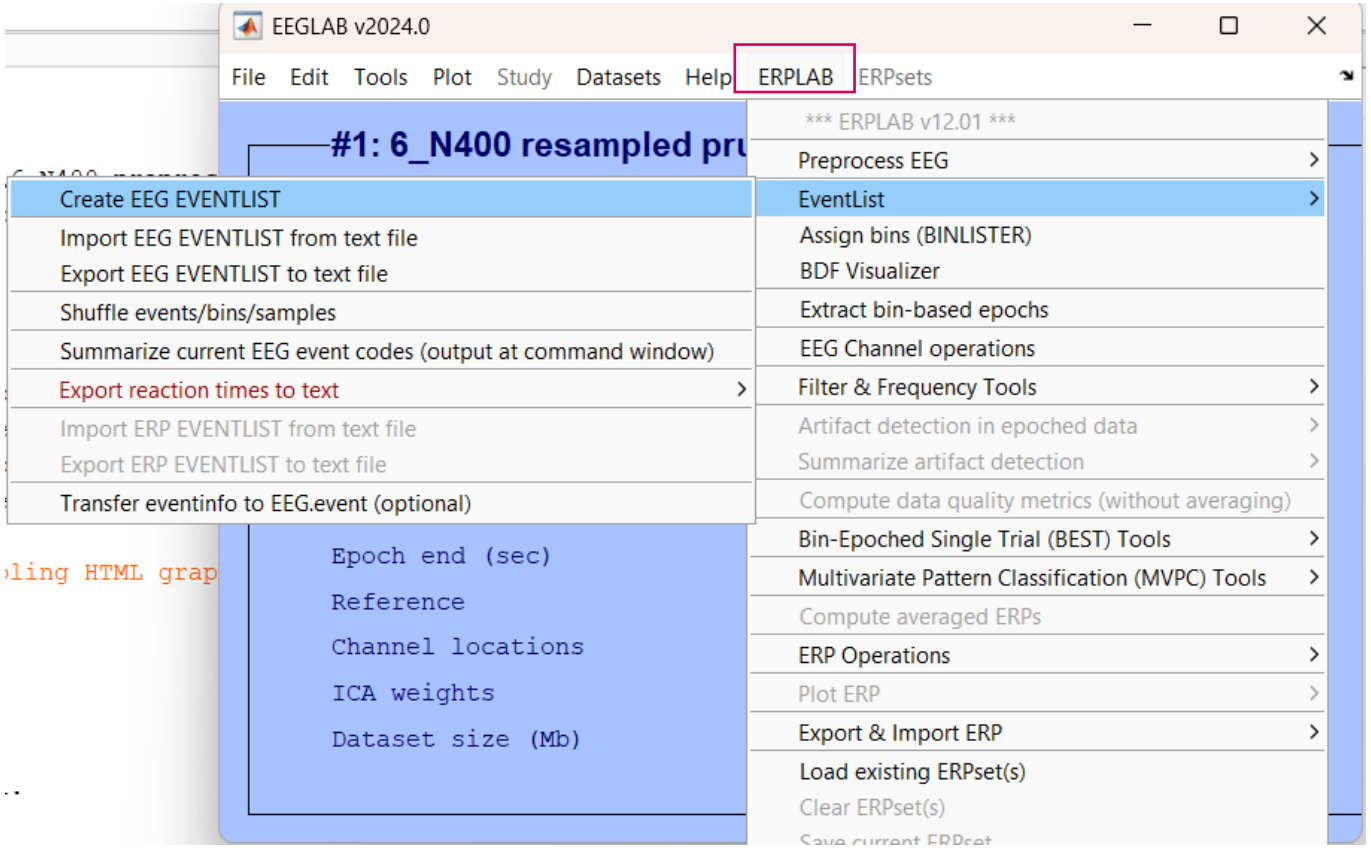
Installing ERPLAB





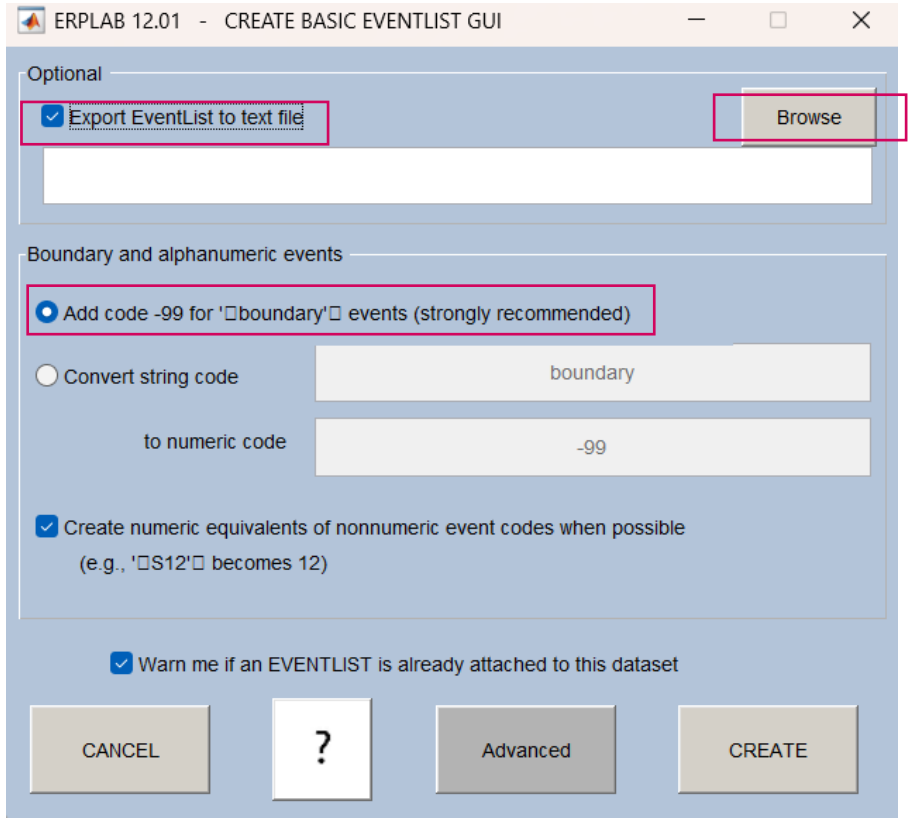
ERPLAB

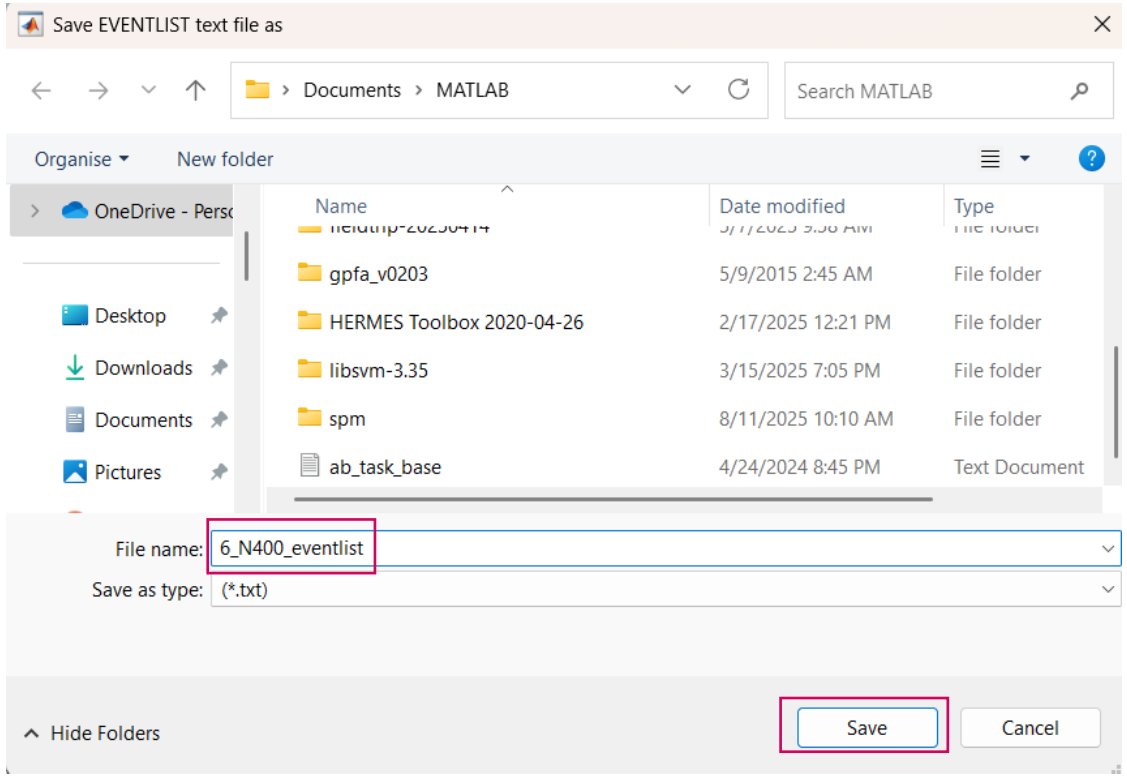
Eventlist



ERPLAB

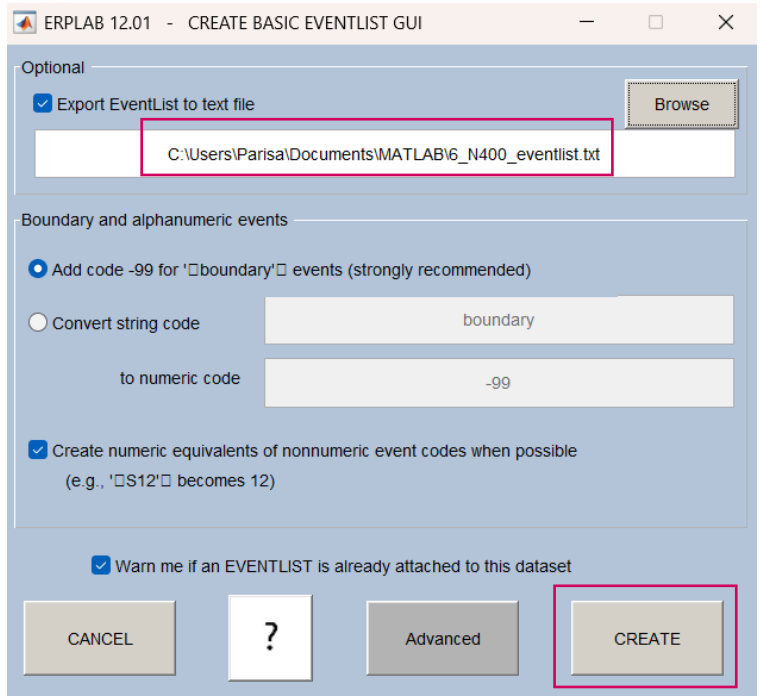
Eventlist

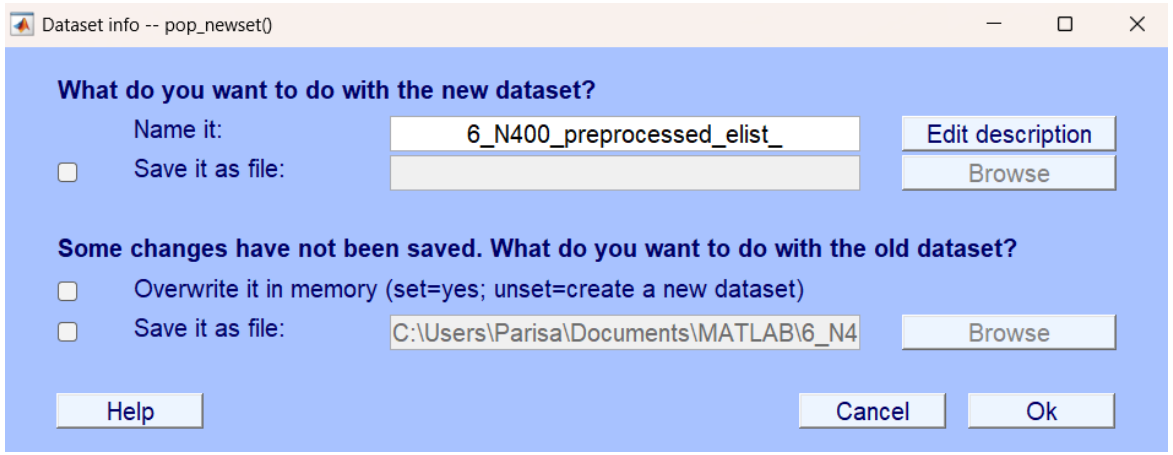




ERPLAB

Eventlist





ERPLAB

Eventlist

6_N400_eventlist.txt

File Edit View

```
#  Non-editable header begin ------------------------------------------------------------------------------
#
#  data format..............: continuous
#  setname..................: 6_N400 resampled pruned with ICA_elist
#  filename.................: 6_N400_preprocessed.set
#  filepath.................: C:\Users\Parisa\Documents\MATLAB\
#  nchan....................: 30
#  pnts.....................: 79400
#  srate....................: 200
#  nevents..................: 362
#  generated by (bdf).......:
#  generated by (set).......: 6_N400 resampled pruned with ICA_elist
#  reported in .............:
#  prog Version.............: 12.01
#  creation date............: 20-Aug-2025 11:36:21
#  user Account.............:
#
#  Non-editable header end --------------------------------------------------------------------------------



# item   bepoch   ecode            label           onset             diff       dura       b_flags    a_flags        enable           bin
#                                                  (sec)           (msec)     (msec)    (binary)   (binary)

1       0          202              ""             1.6426          0.00          0.0     00000000     00000000         1    [       ]
2       0          202              ""             2.6504       1007.81          0.0     00000000     00000000         1    [       ]
3       0          121              ""             6.6094       3958.98          0.0     00000000     00000000         1    [       ]
4       0          221              ""             7.7256       1116.21          0.0     00000000     00000000         1    [       ]
5       0          201              ""             8.3145        588.87          0.0     00000000     00000000         1    [       ]
6       0          121              ""             9.4756       1161.13          0.0     00000000     00000000         1    [       ]
7       0          221              ""            10.7744       1298.83          0.0     00000000     00000000         1    [       ]
8       0          201              ""            11.2988        524.41          0.0     00000000     00000000         1    [       ]
9       0          111              ""            12.5078       1208.98          0.0     00000000     00000000         1    [       ]
10      0          211              ""            13.6240       1116.21          0.0     00000000     00000000         1    [       ]
11      0          201              ""            14.2500        625.98          0.0     00000000     00000000         1    [       ]
12      0          111              ""            15.3398       1089.84          0.0     00000000     00000000         1    [       ]
13      0          211              ""            16.5557       1215.82          0.0     00000000     00000000         1    [       ]
14      0          201              ""            17.4102        854.49          0.0     00000000     00000000         1    [       ]
```

Ln 1, Col 1 | 41,623 characters | Plain text | 100% | Unix (LF) | UTF-8

ERPLAB

Assign Bins (BINLISTER)

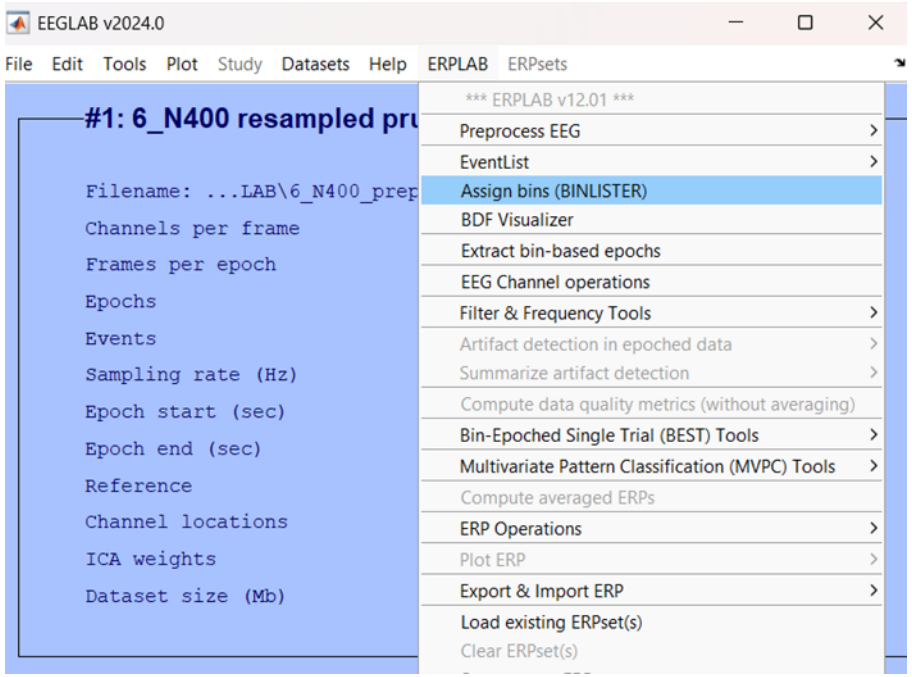
ERPset Header Information
ERPset Name ('S6_ERP')
Number of Channels (30) and Channel Locations
Number of Bins (4) and Bin Labels
Etc.

Bin 1: Prime word, related to subsequent target word
Channel 1 ERP Waveform
Channel 2 ERP Waveform
…
Channel 30 ERP Waveform

Bin 2: Prime word, unrelated to subsequent target word
Channel 1 ERP Waveform
Channel 2 ERP Waveform
…
Channel 30 ERP Waveform

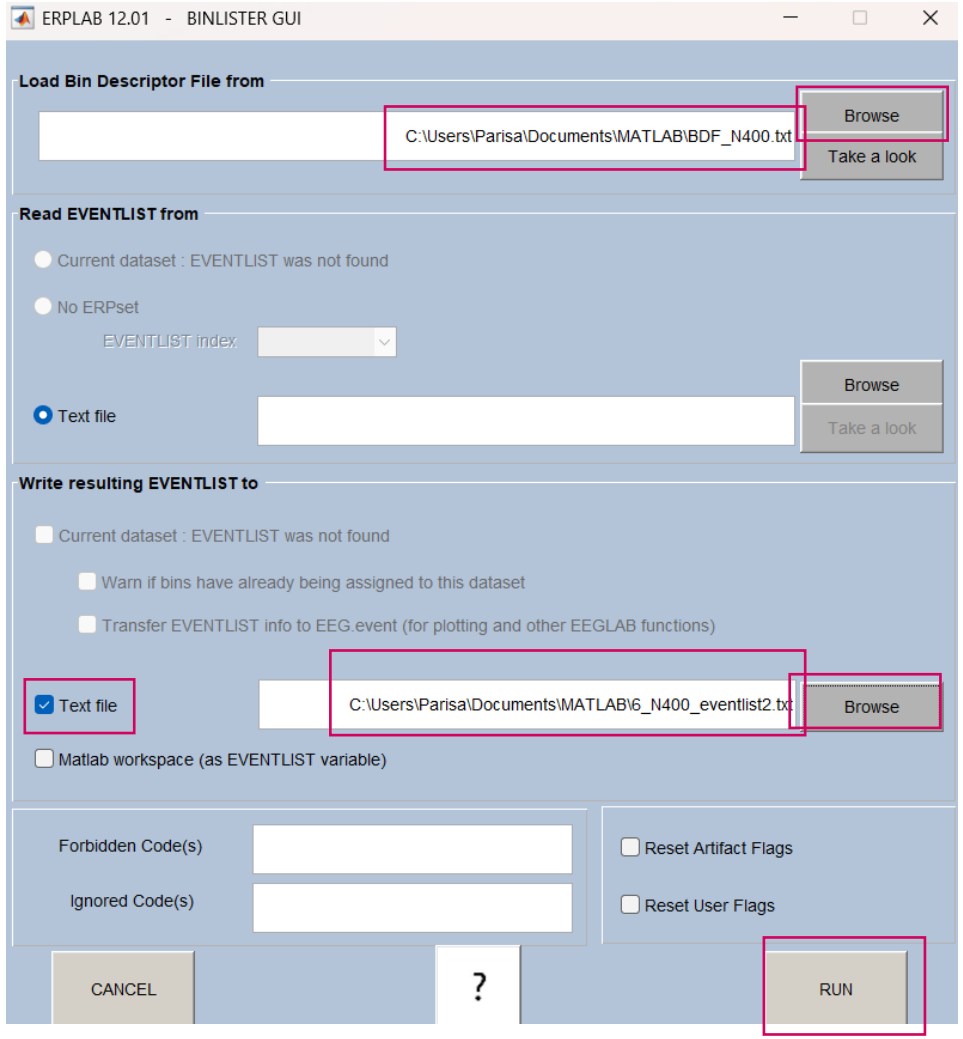
Bin 3: Target word, related to **previous prime word**
Channel 1 ERP Waveform
Channel 2 ERP Waveform
…
Channel 30 ERP Waveform

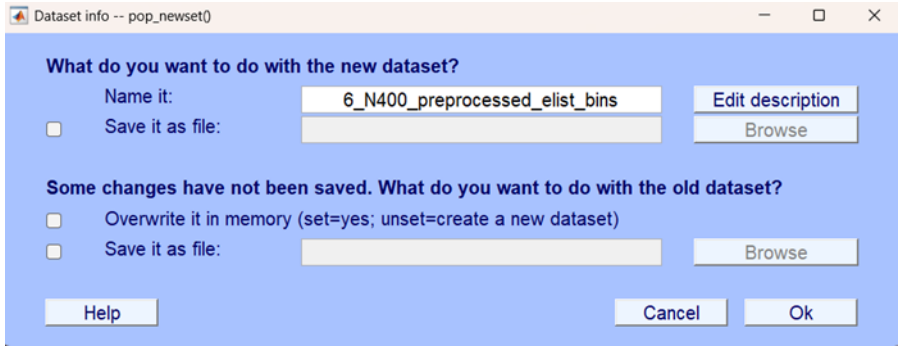
Bin 4: Target word, unrelated to **previous prime word**
Channel 1 ERP Waveform
Channel 2 ERP Waveform
…
Channel 30 ERP Waveform



ERPLAB

Assign Bins (BINLISTER)





ERPLAB

Assign Bins (BINLISTER)

6_N400_eventlist2.txt

File Edit View

```
#  Non-editable header begin ---------------------------------------------------------------------------
#
#  data format...............: continuous
#  setname...................: 6_N400_preprocessed_elist_bins
#  filename..................: none_specified
#  filepath..................: none_specified
#  nchan.....................: 30
#  pnts......................: 79400
#  srate.....................: 200
#  nevents...................: 362
#  generated by (bdf)........: C:\Users\Parisa\Documents\MATLAB\BDF_N400.txt
#  generated by (set)........: 6_N400_preprocessed_elist_bins
#  reported in ..............:
#  prog Version..............: 12.01
#  creation date.............: 21-Aug-2025 10:10:08
#  user Account..............: Documents
#
#  Non-editable header end -----------------------------------------------------------------------------

        bin 1,  # 60,   Prime word, related to subsequent target word
        bin 2,  # 60,   Prime word, unrelated to subsequent target word
        bin 3,  # 54,   Target word, related to previous prime, followed by correct response
        bin 4,  # 57,   Target word, unrelated to previous prime, followed by correct response


# item   bepoch   ecode            label            onset              diff       dura       b_flags    a_flags        enable            bin
#                                                (sec)          (msec)     (msec)    (binary)   (binary)


1       0          202              ""             1.6426          0.00          0.0     00000000     00000000          1    [       ]
2       0          202              ""             2.6504       1007.81          0.0     00000000     00000000          1    [       ]
3       0          121              ""             6.6094       3958.98          0.0     00000000     00000000          1    [      2]
4       0          221              ""             7.7256       1116.21          0.0     00000000     00000000          1    [      4]
5       0          201              ""             8.3145        588.87          0.0     00000000     00000000          1    [       ]
6       0          121              ""             9.4756       1161.13          0.0     00000000     00000000          1    [      2]
7       0          221              ""            10.7744       1298.83          0.0     00000000     00000000          1    [      4]
8       0          201              ""            11.2988        524.41          0.0     00000000     00000000          1    [       ]
9       0          111              ""            12.5078       1208.98          0.0     00000000     00000000          1    [      1]
10      0          211              ""            13.6240       1116.21          0.0     00000000     00000000          1    [      3]
```

Ln 12, Col 62 | 42,093 characters | Plain text | 100%

ERPLAB

Assign Bins (BINLISTER)

	Word Type	Relatedness	Word List	Event Code	Occurrences
Stimuli	Prime	Related	List 1	111	30
	Prime	Related	List 2	112	30
	Prime	Unrelated	List 1	121	30
	Prime	Unrelated	List 2	122	30
	Target	Related	List 1	211	30
	Target	Related	List 2	212	30
	Target	Unrelated	List 1	221	30
	Target	Unrelated	List 2	222	30
Responses	Correct			201	Variable
	Incorrect			202	Variable

ERPLAB

Assign Bins (BINLISTER)

Bin number

Bin label

Bin descriptor

BDF_N400.txt

File Edit View

```
Bin 1
Prime word, related to subsequent target word
.{111;112}

Bin 2
Prime word, unrelated to subsequent target word
.{121;122}

Bin 3
Target word, related to previous prime, followed by correct response
.{211;212}{t<200-1500>201}

Bin 4
Target word, unrelated to previous prime, followed by correct response
.{221;222}{t<200-1500>201}
```

Stimulus-locked

ERPLAB

Assign Bins (BINLISTER)

Bin number

Bin label

Bin descriptor

BDF_N400_R.txt

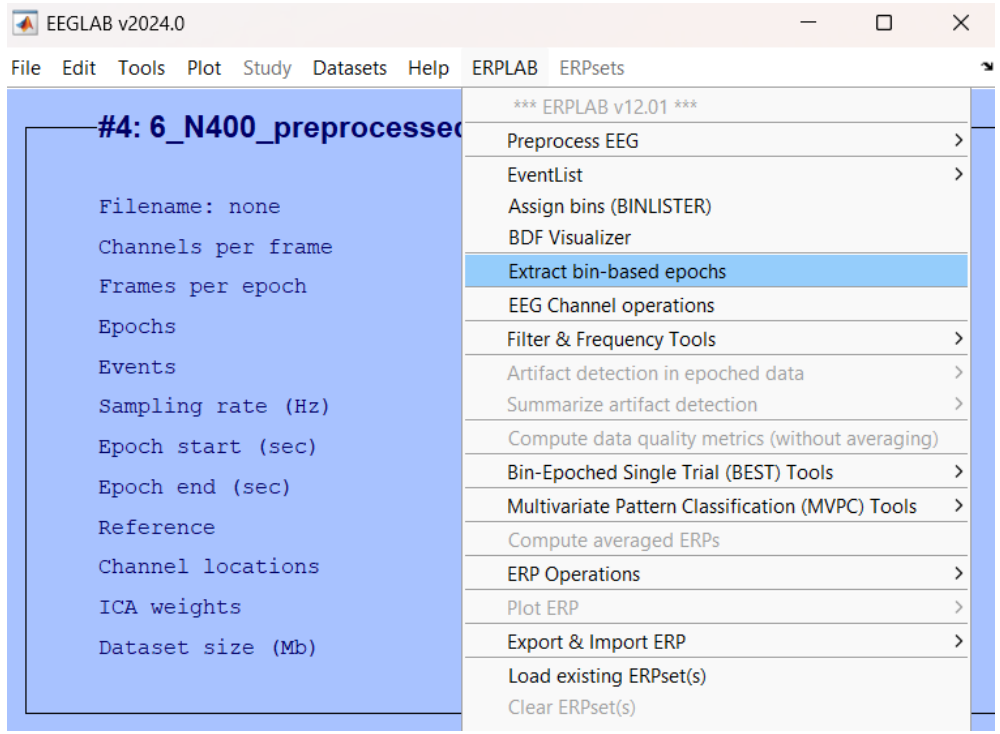
File Edit View H1

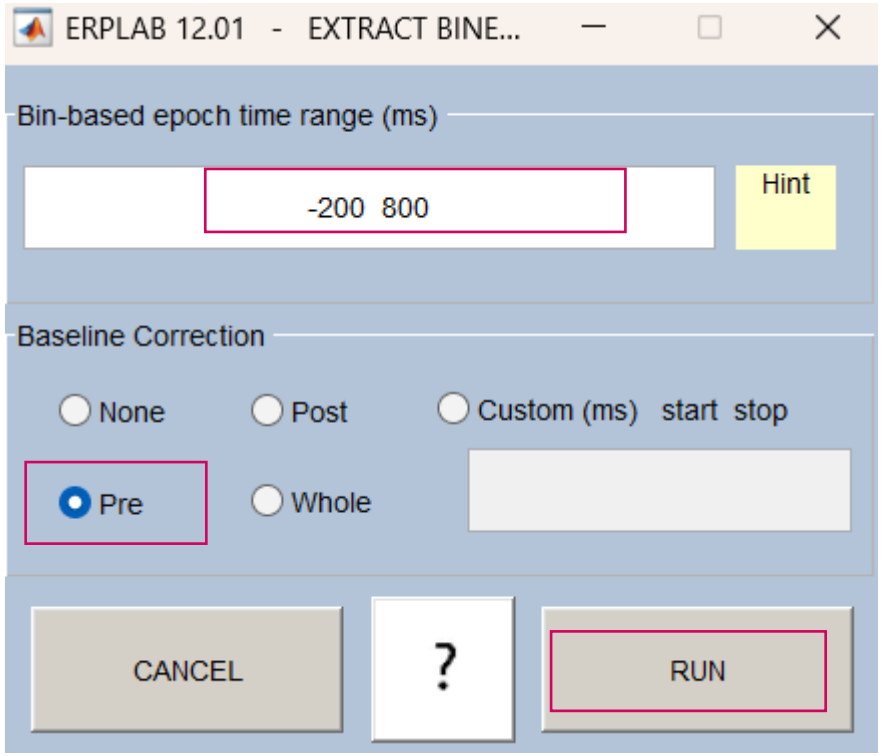
```
Bin 1
Response to related target, correct
{t<200-1500>211;212}.{201}

Bin 2
Response to unrelated target, correct
{t<200-1500>221;222}.{201}

Bin 3
Response to related target, incorrect
{t<200-1500>211;212}.{202}

Bin 4
Response to unrelated target, incorrect
{t<200-1500>221;222}.{202}
```

Response-locked

ERPLAB

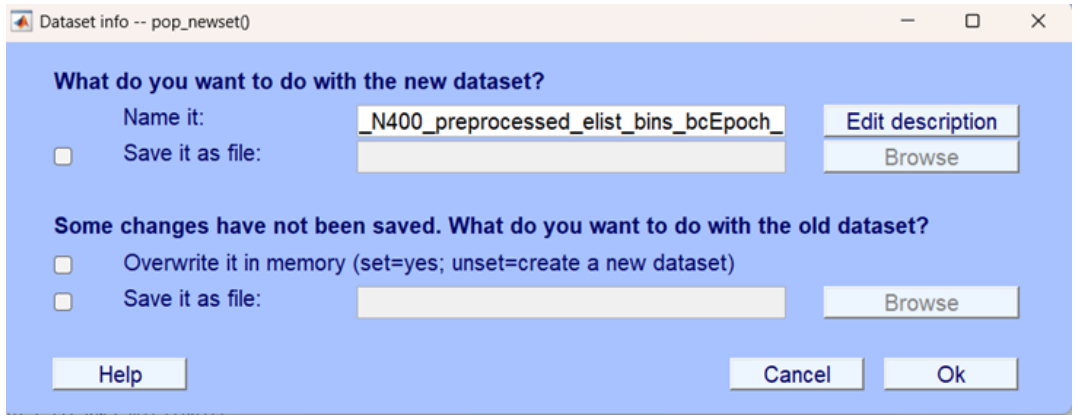
Extract bin-based epochs

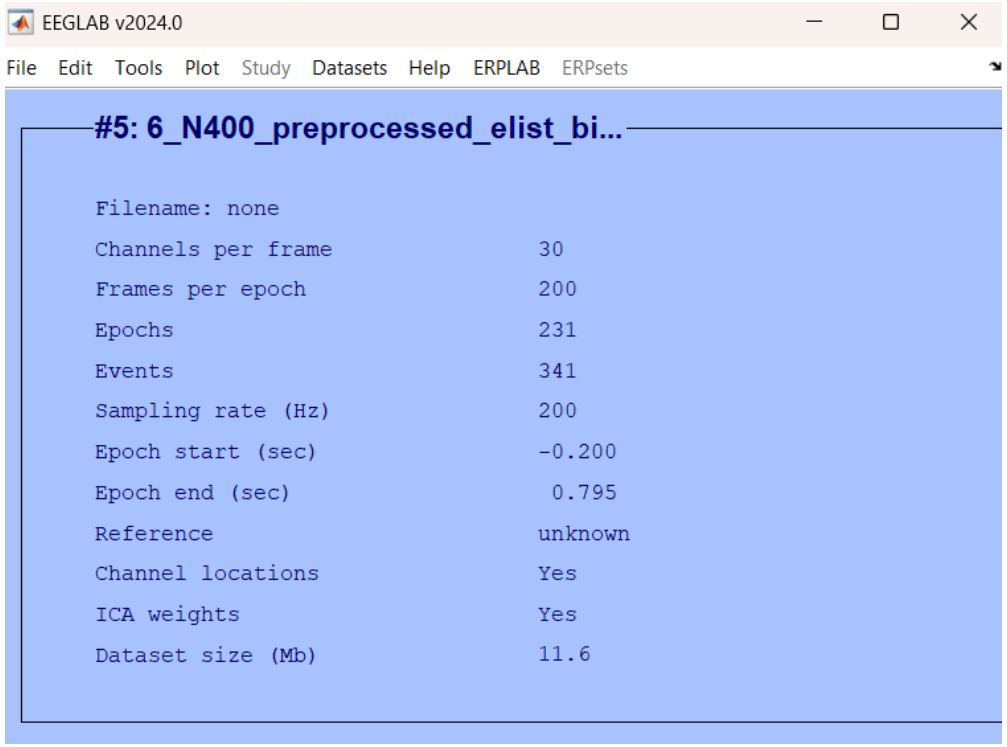




ERPLAB

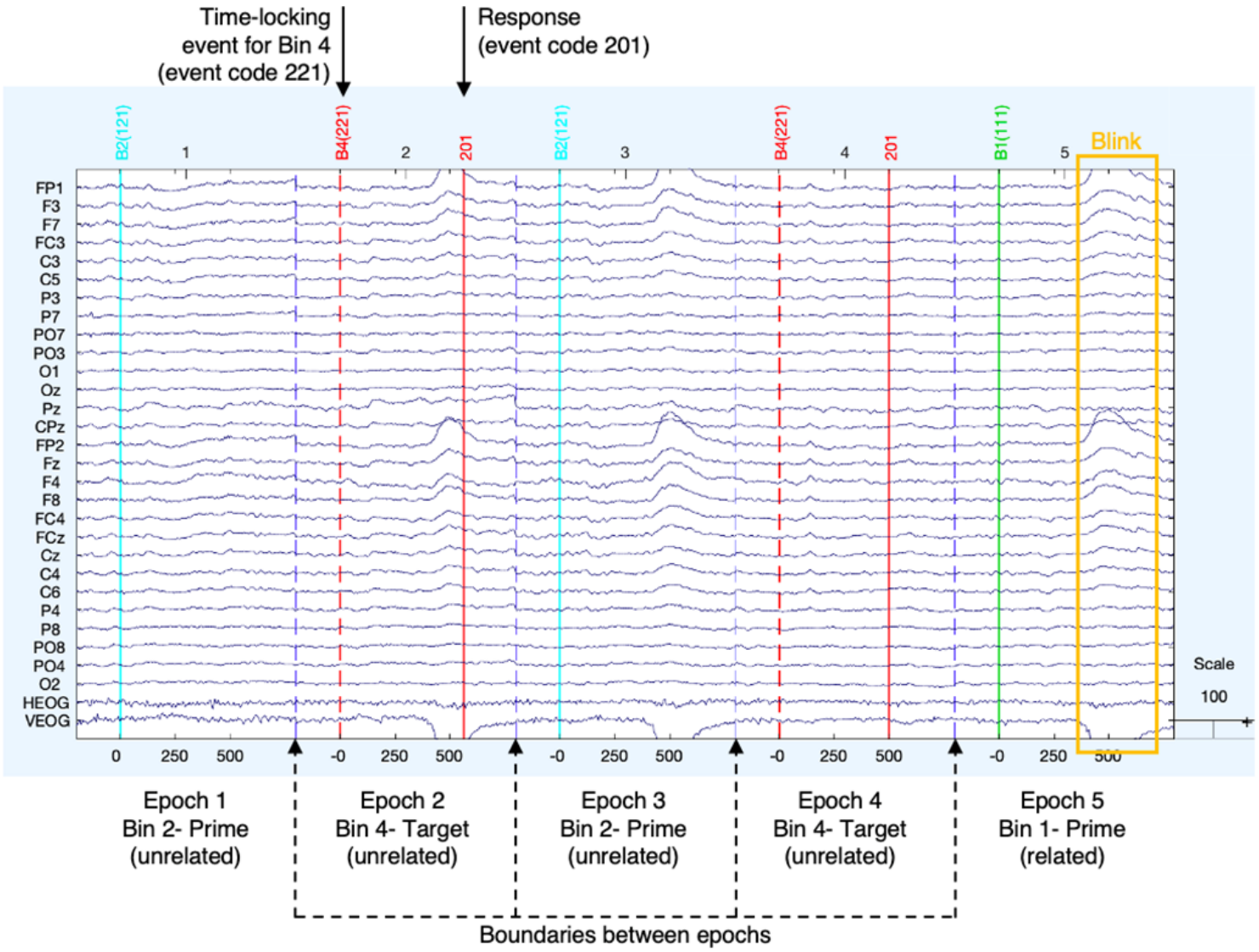
Extract bin-based epochs





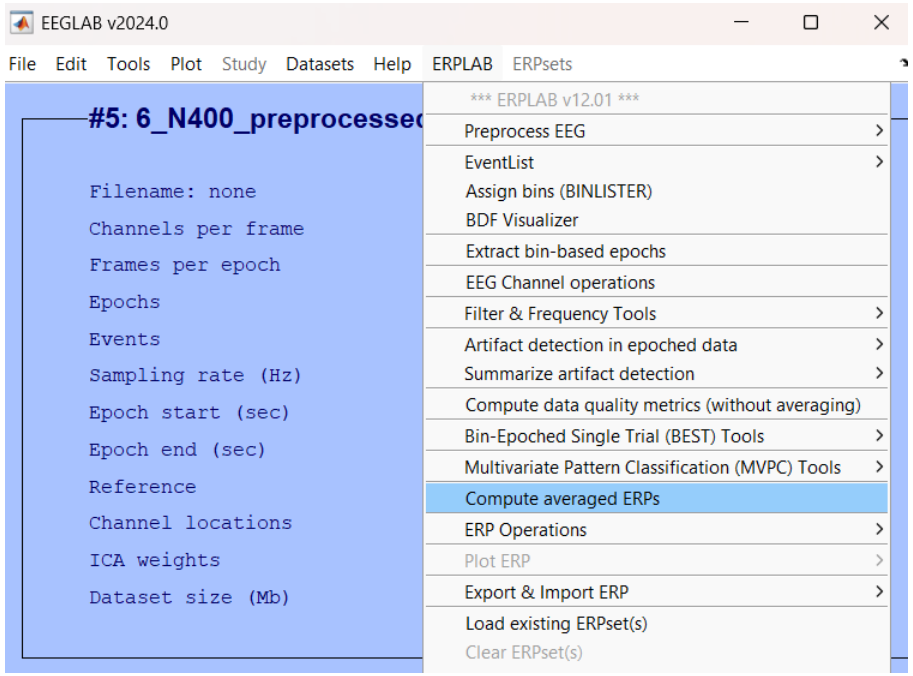
ERPLAB

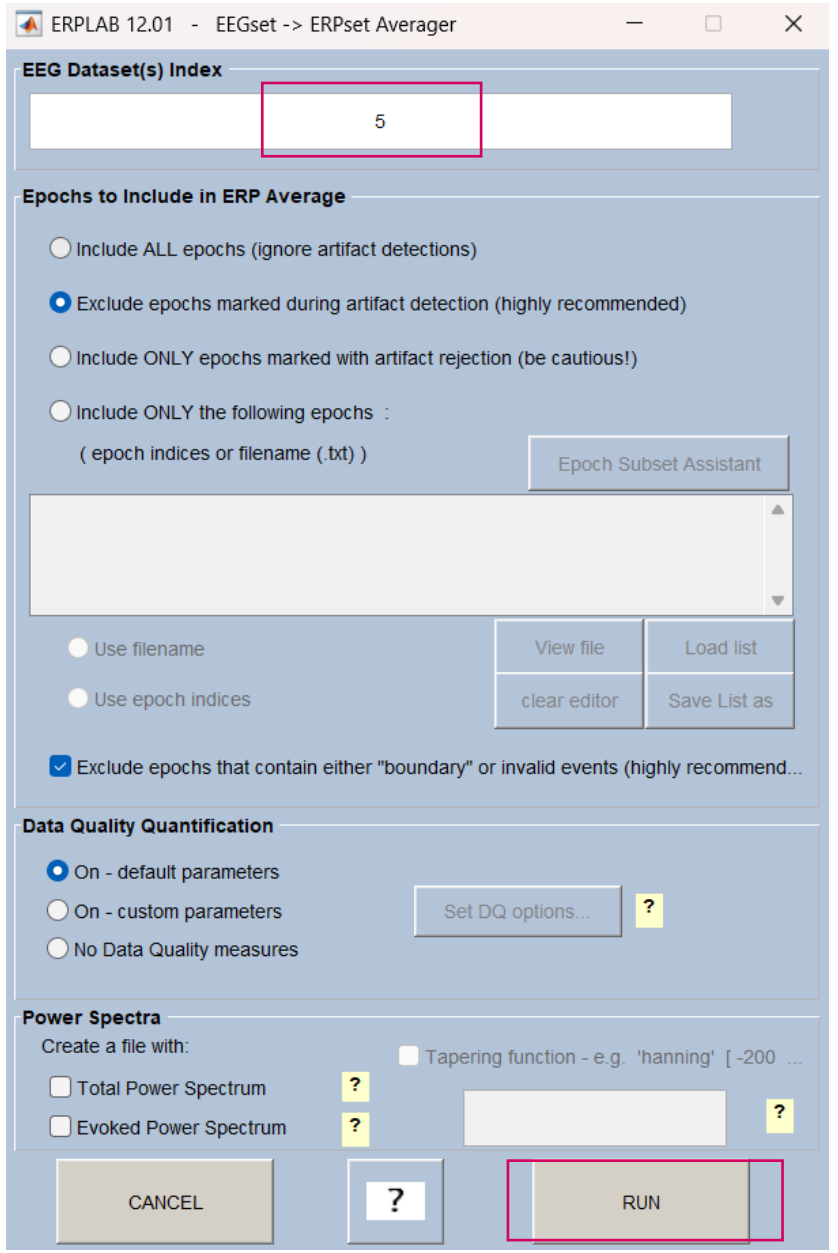
Extract bin-based epochs



ERPLAB

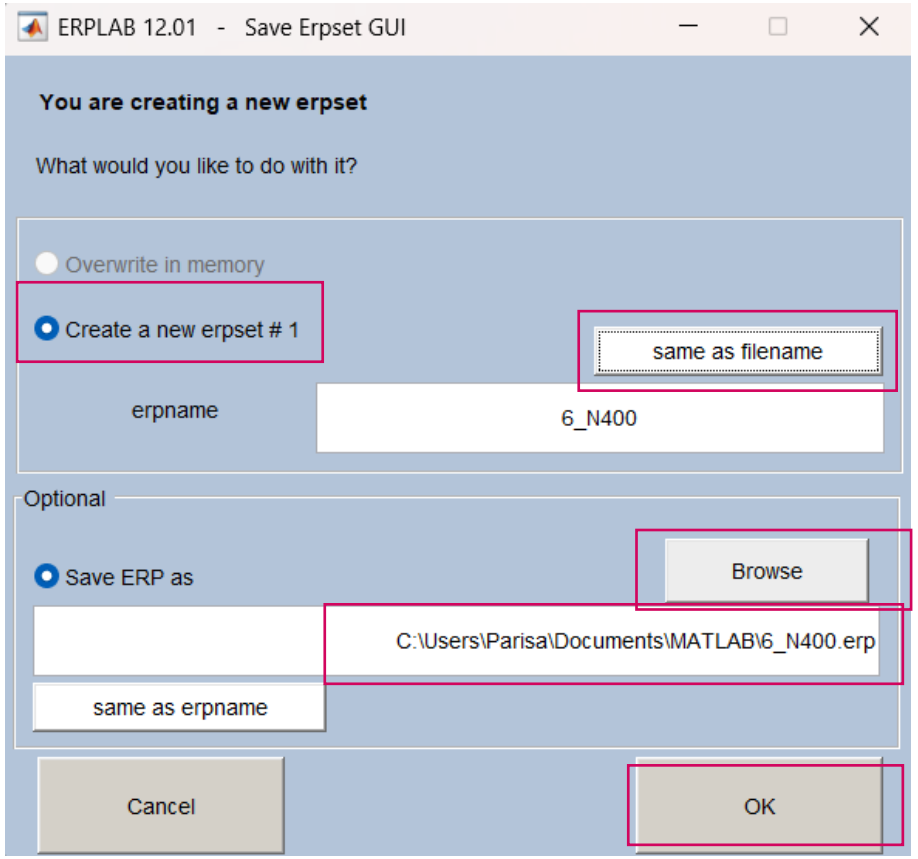
Extract bin-based epochs

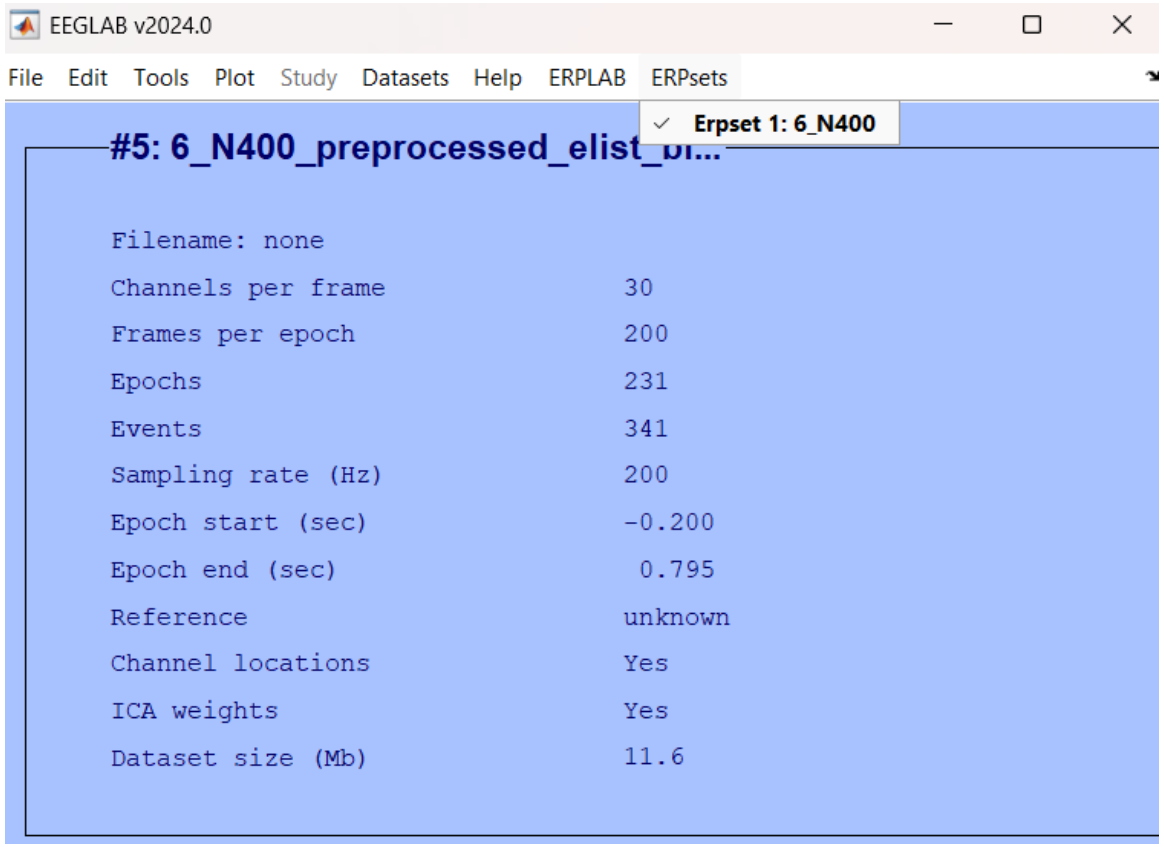




ERPLAB

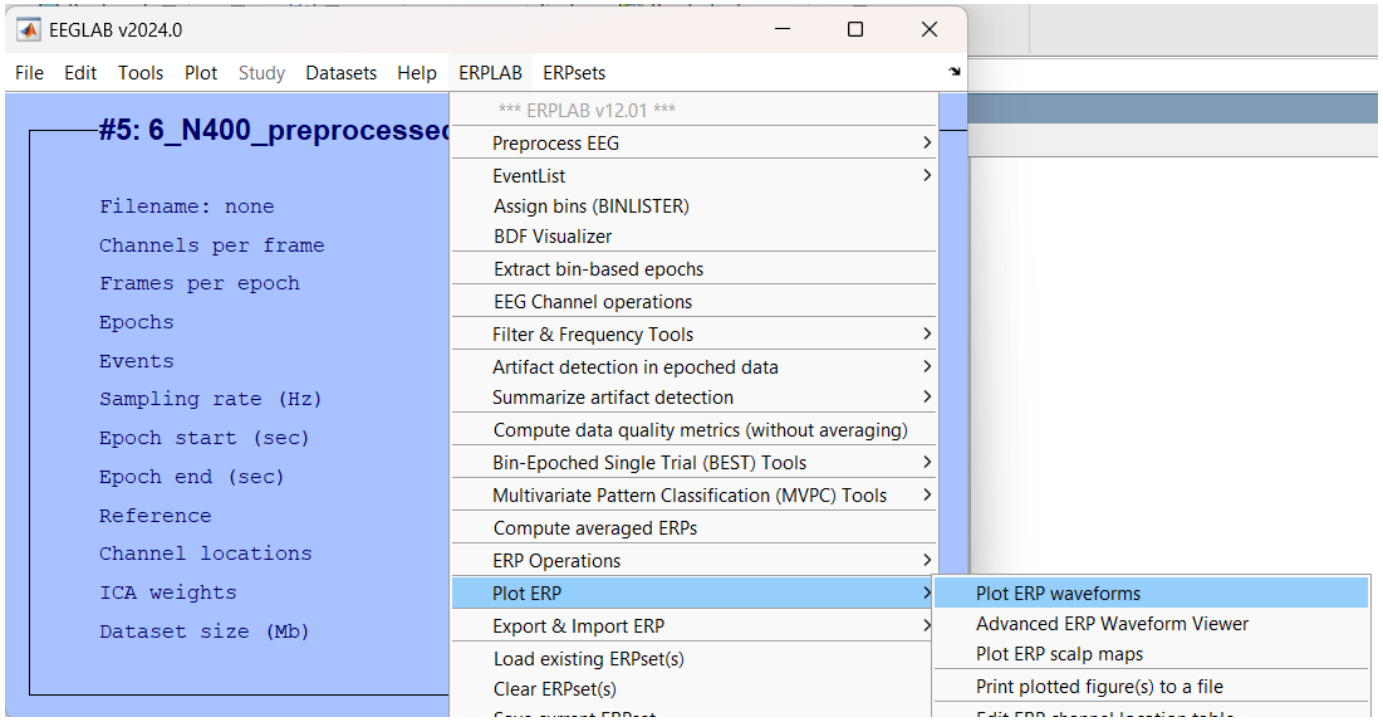
Extract bin-based epochs





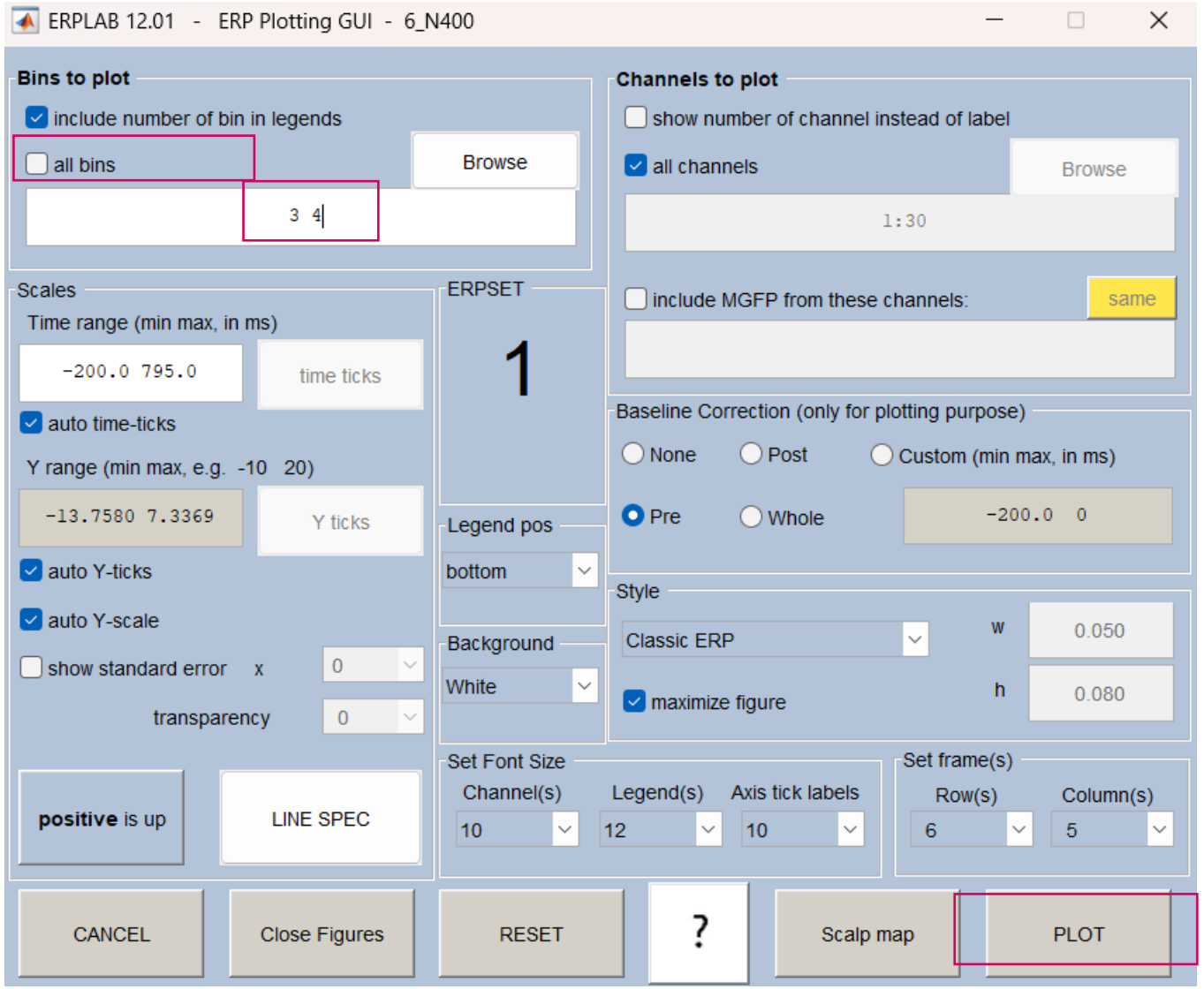
ERPLAB

Plot ERP



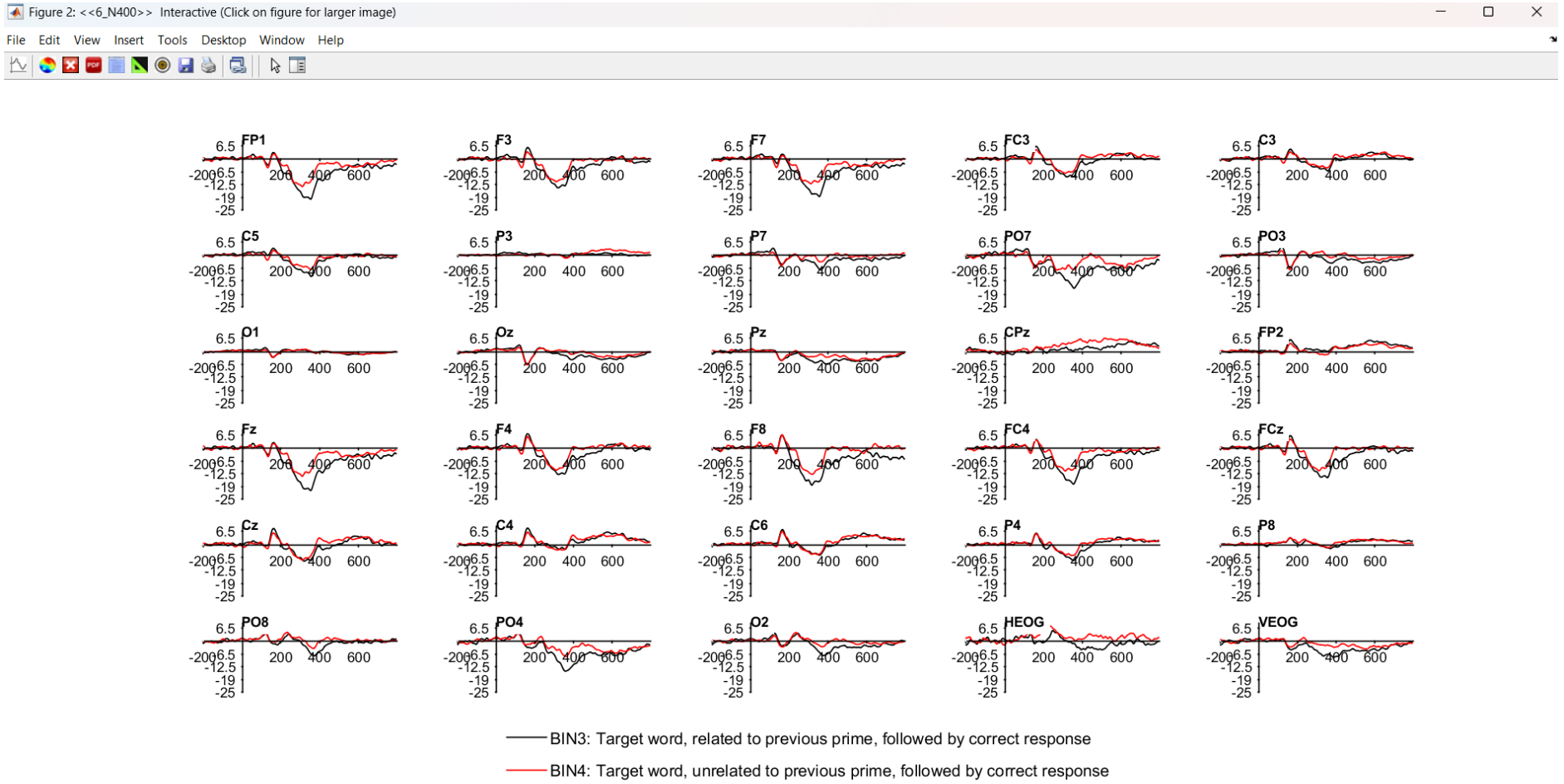
ERPLAB

Plot ERP



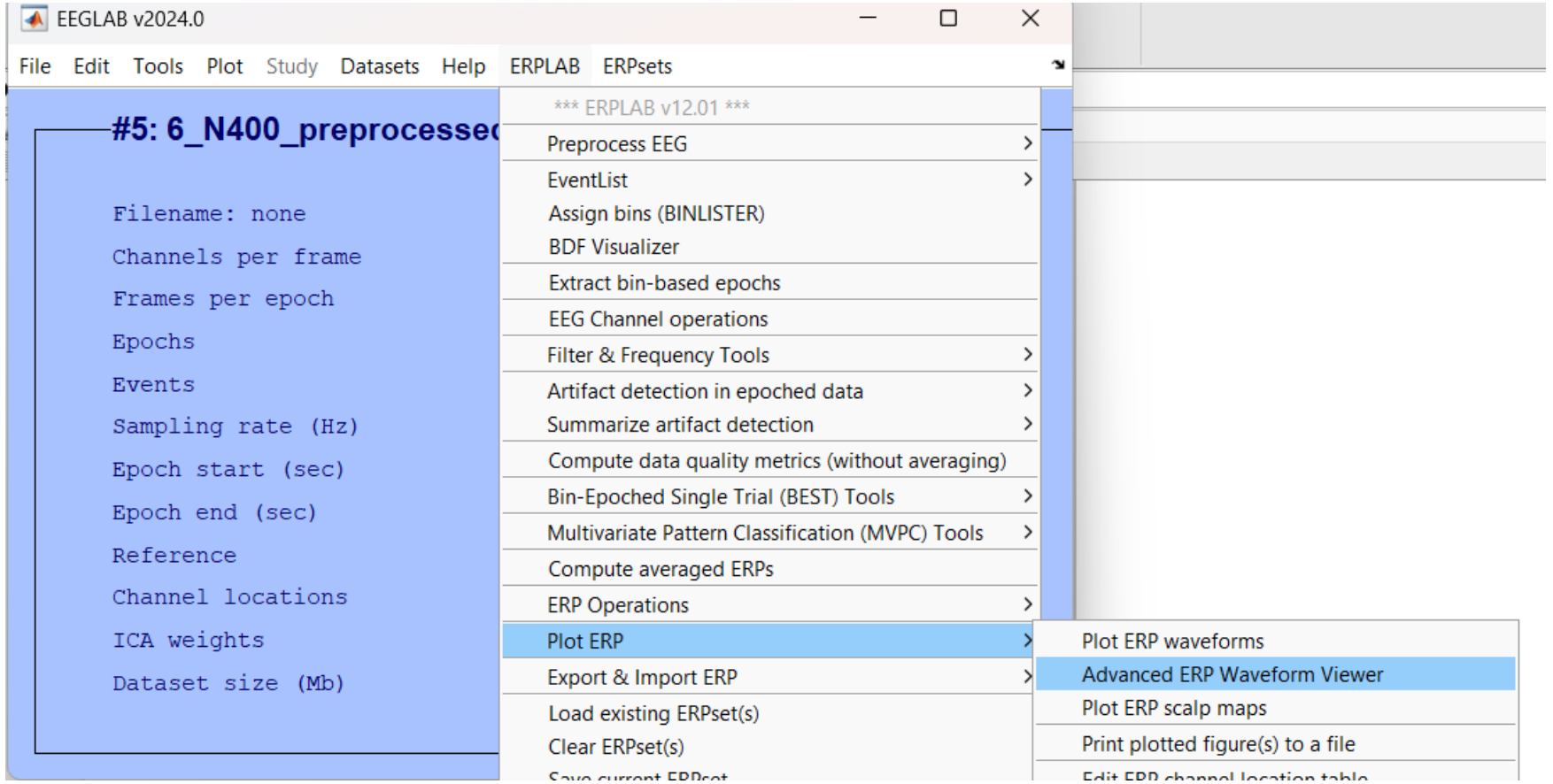
ERPLAB

Plot ERP



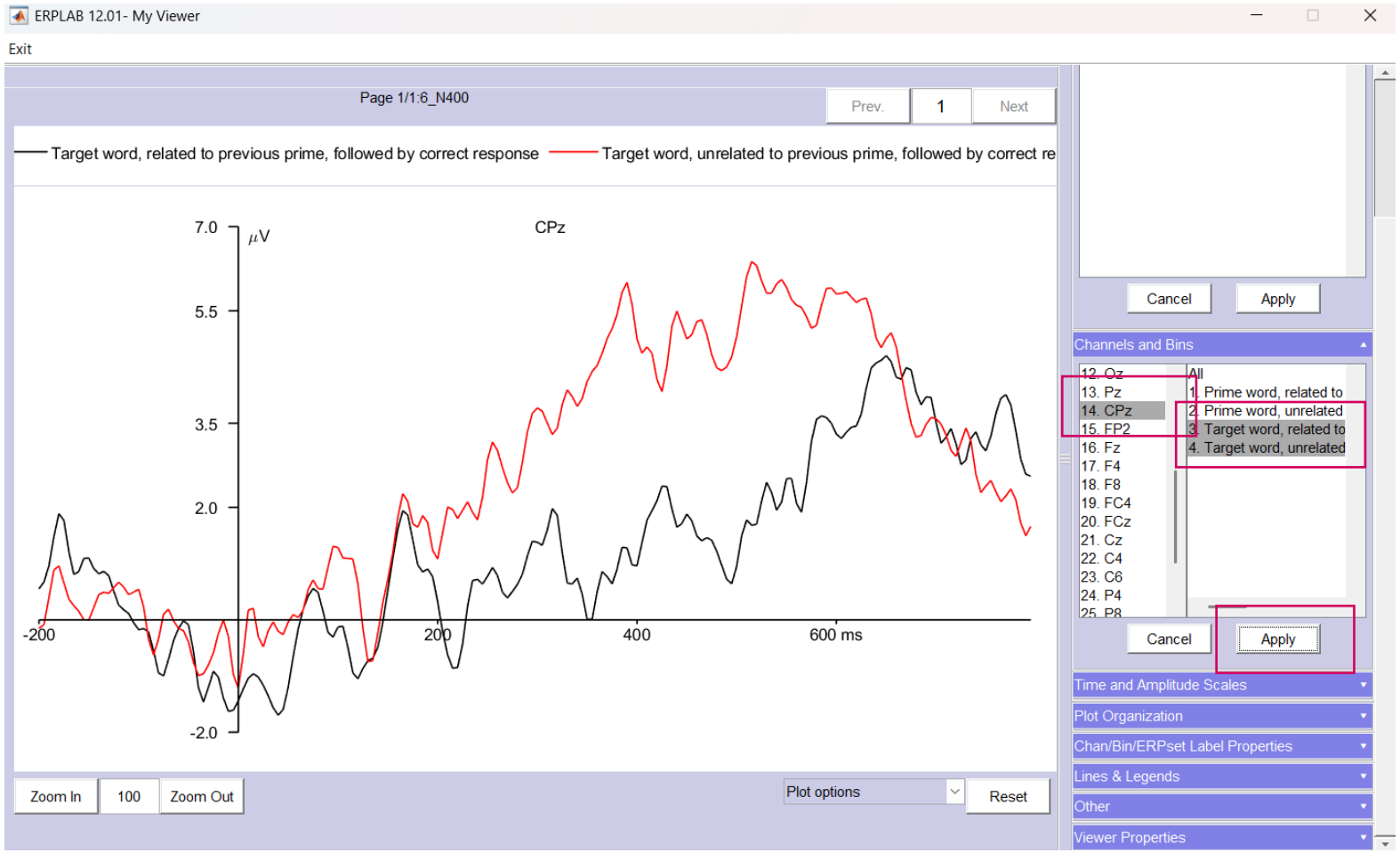
ERPLAB

Plot ERP



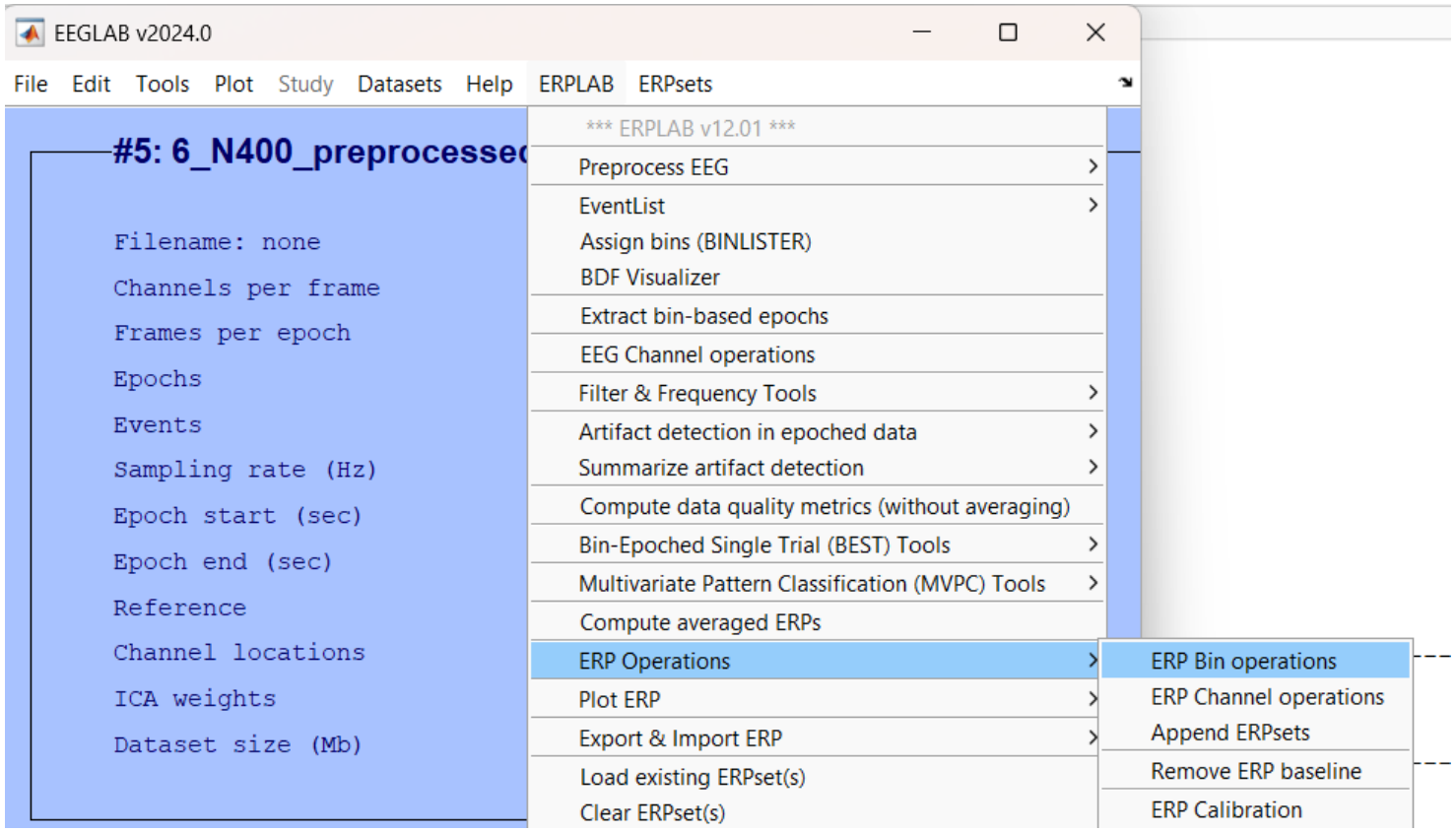
ERPLAB

Plot ERP



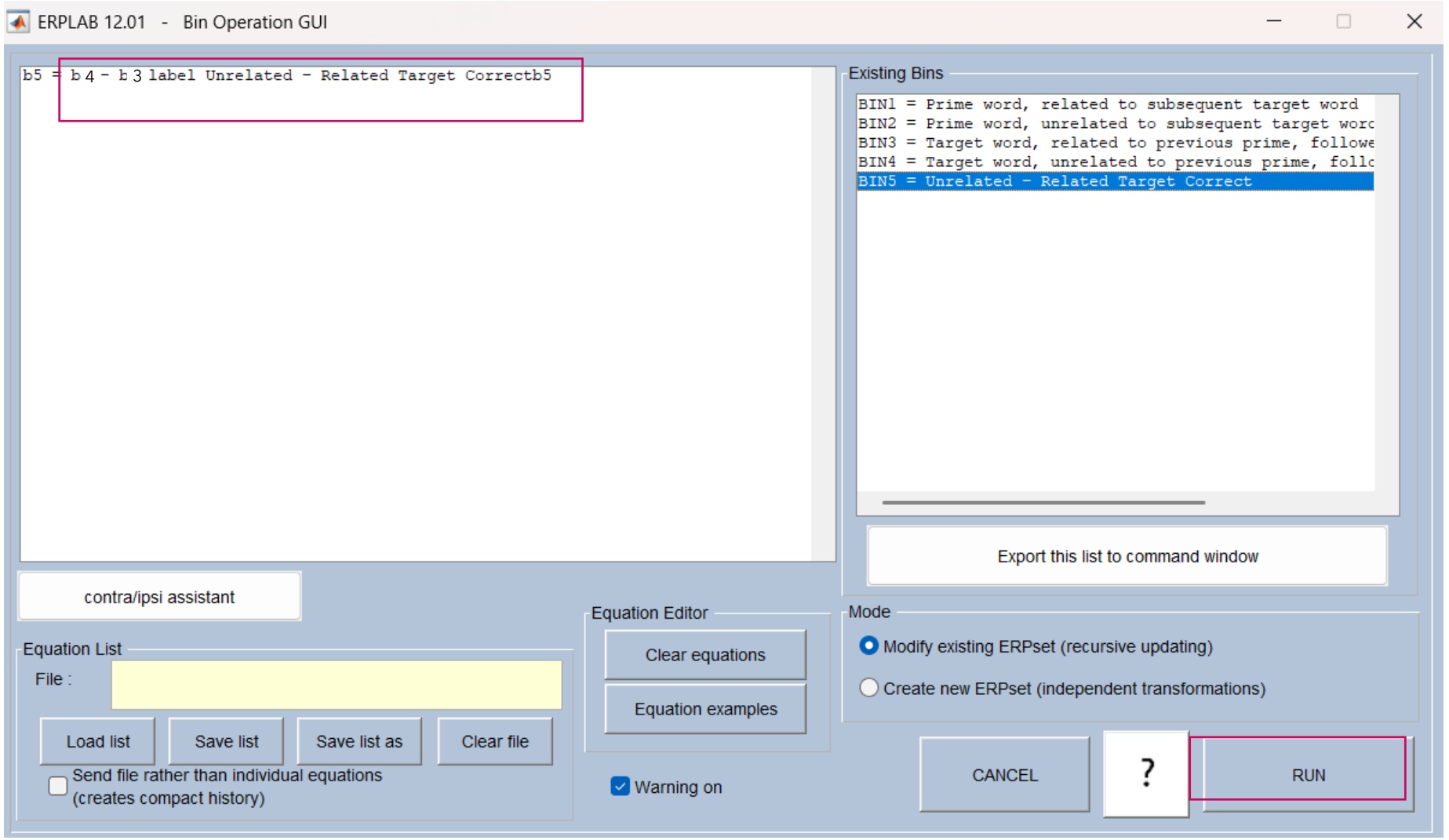
ERPLAB

ERP operations



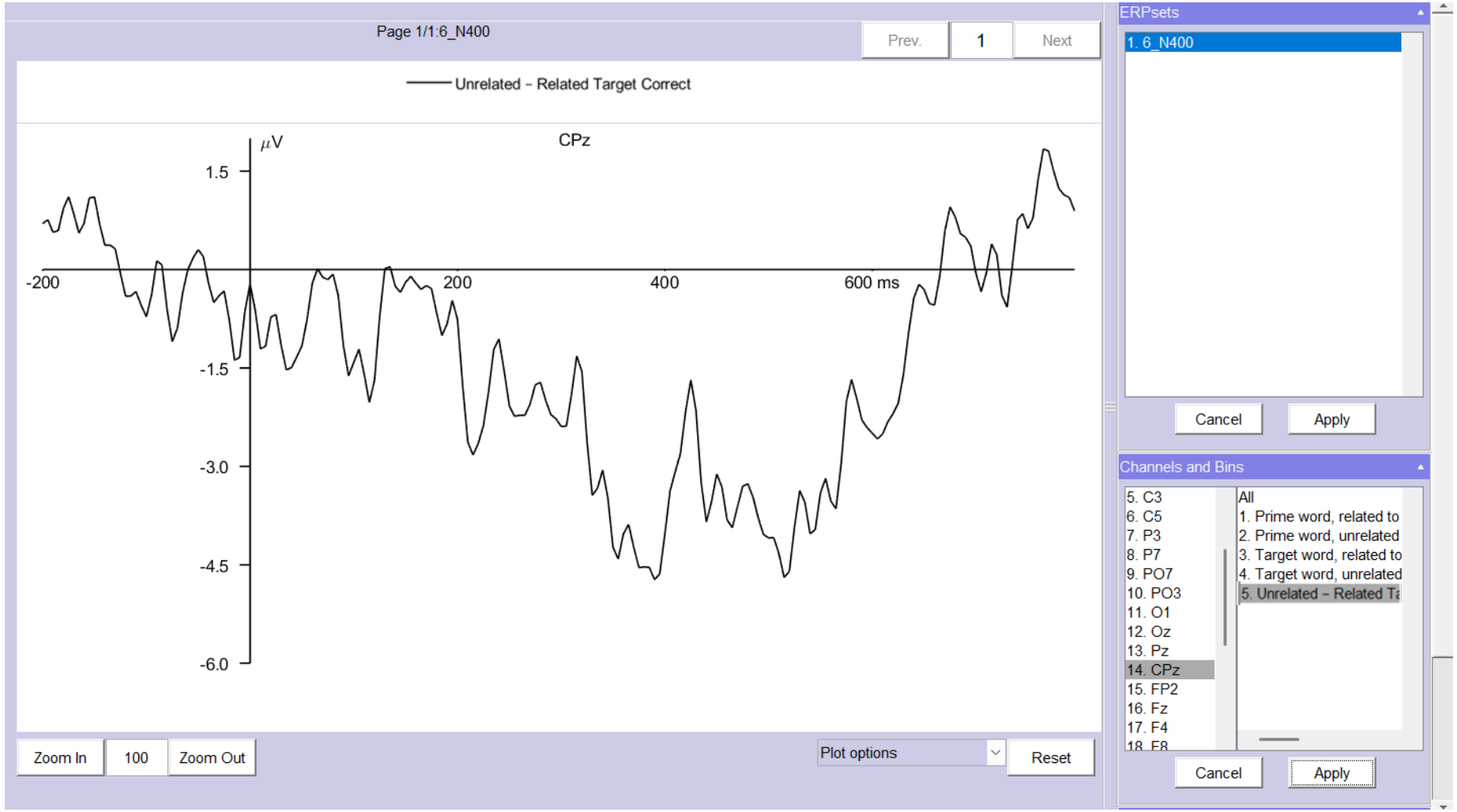
ERPLAB

ERP operations



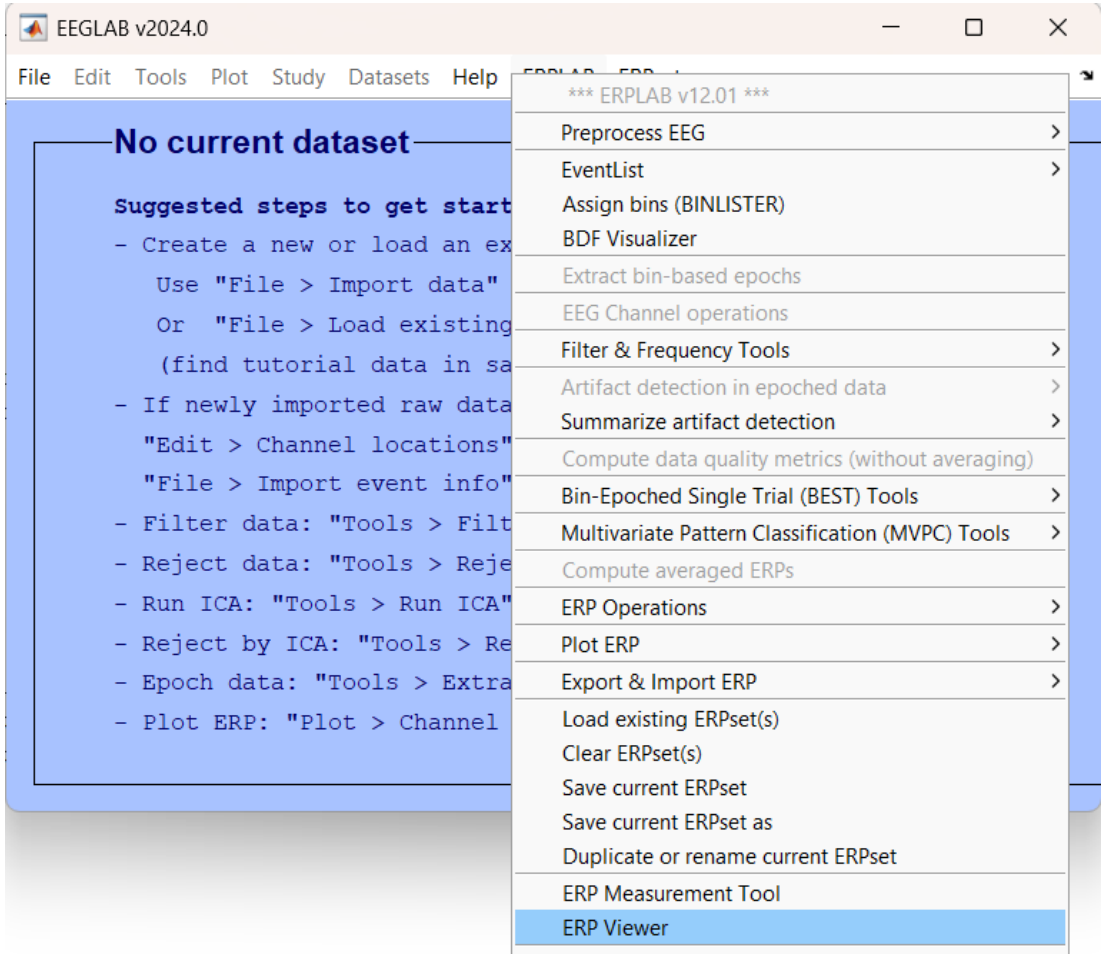
ERPLAB

Plot ERP



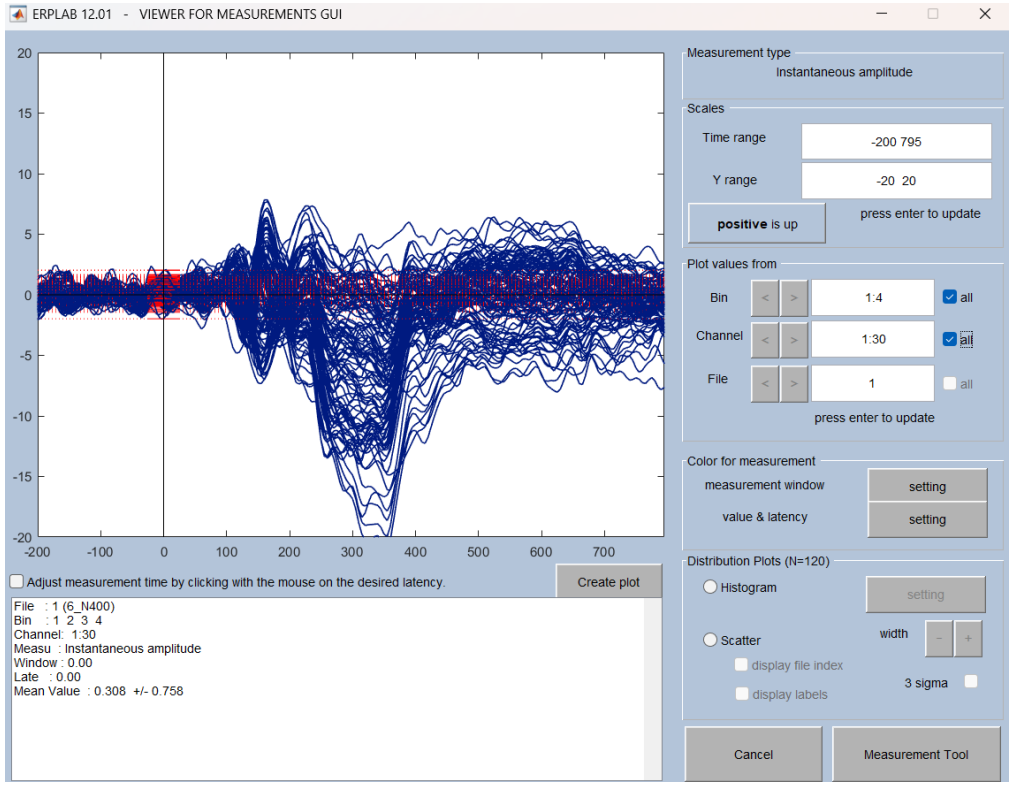
ERPLAB

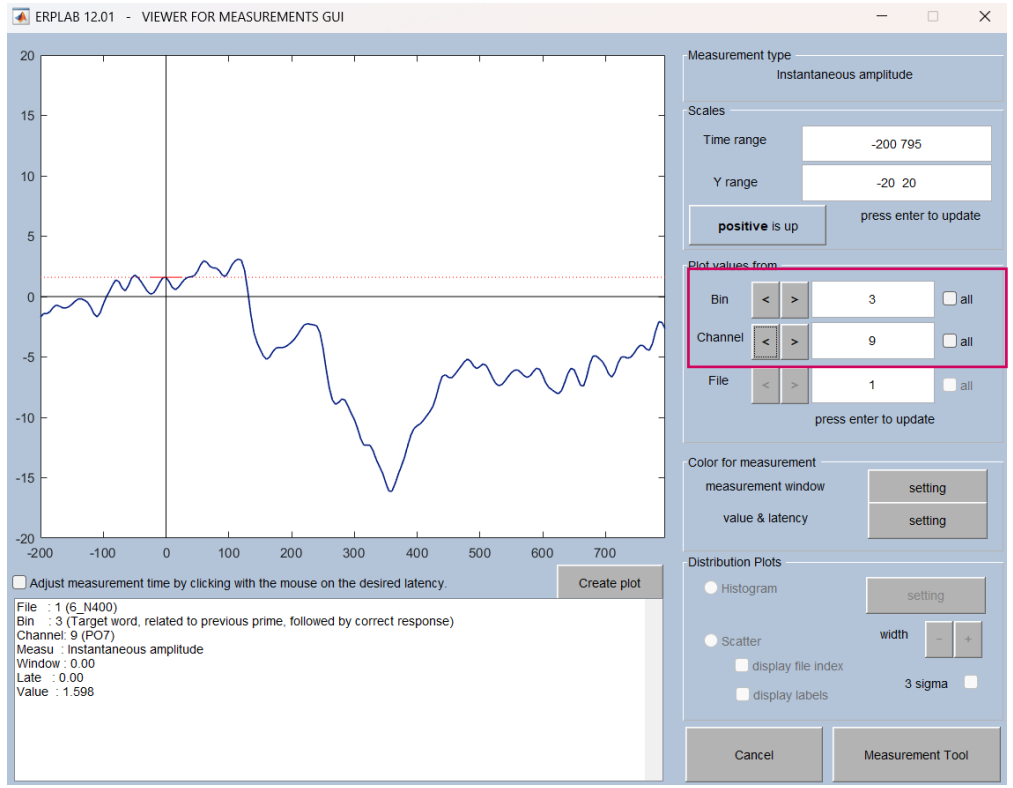
ERP viewer



ERPLAB

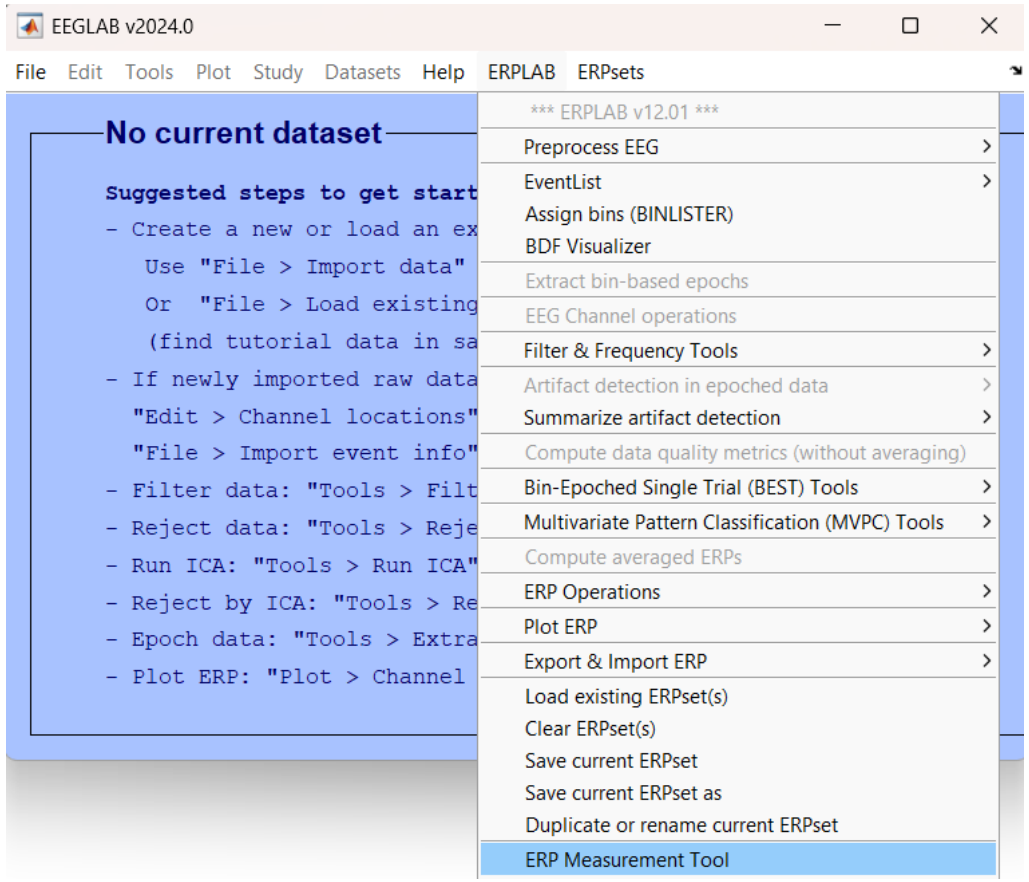
ERP viewer





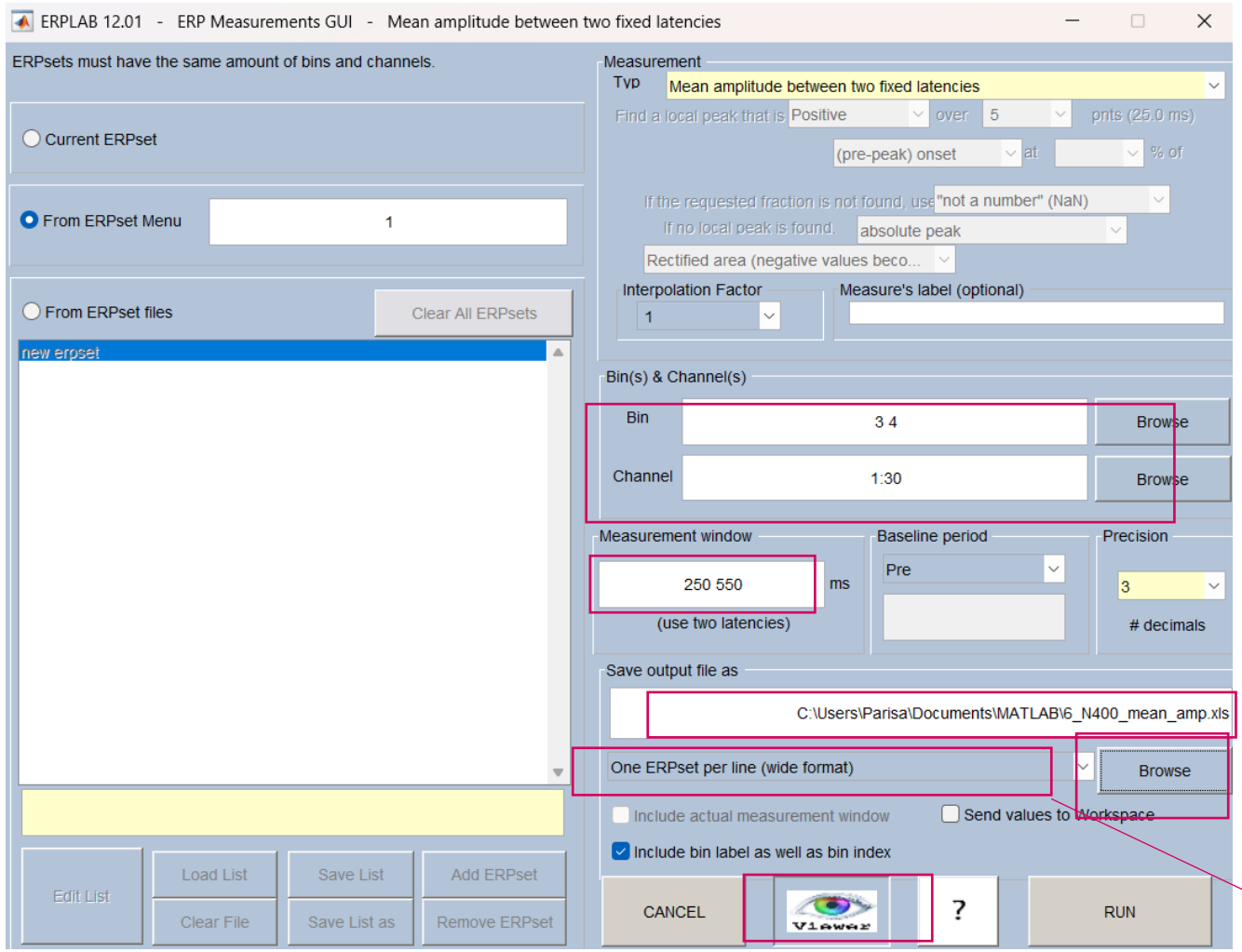
ERPLAB

ERP measurement tool



ERPLAB

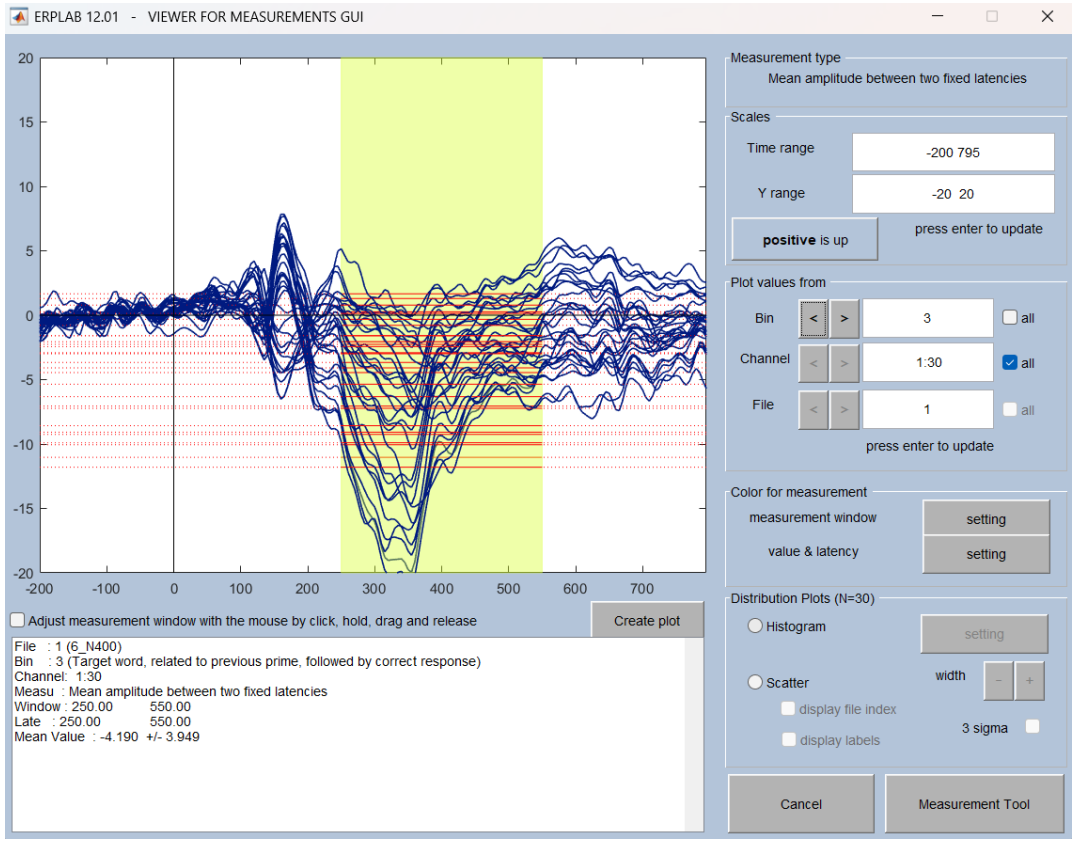
ERP measurement tool

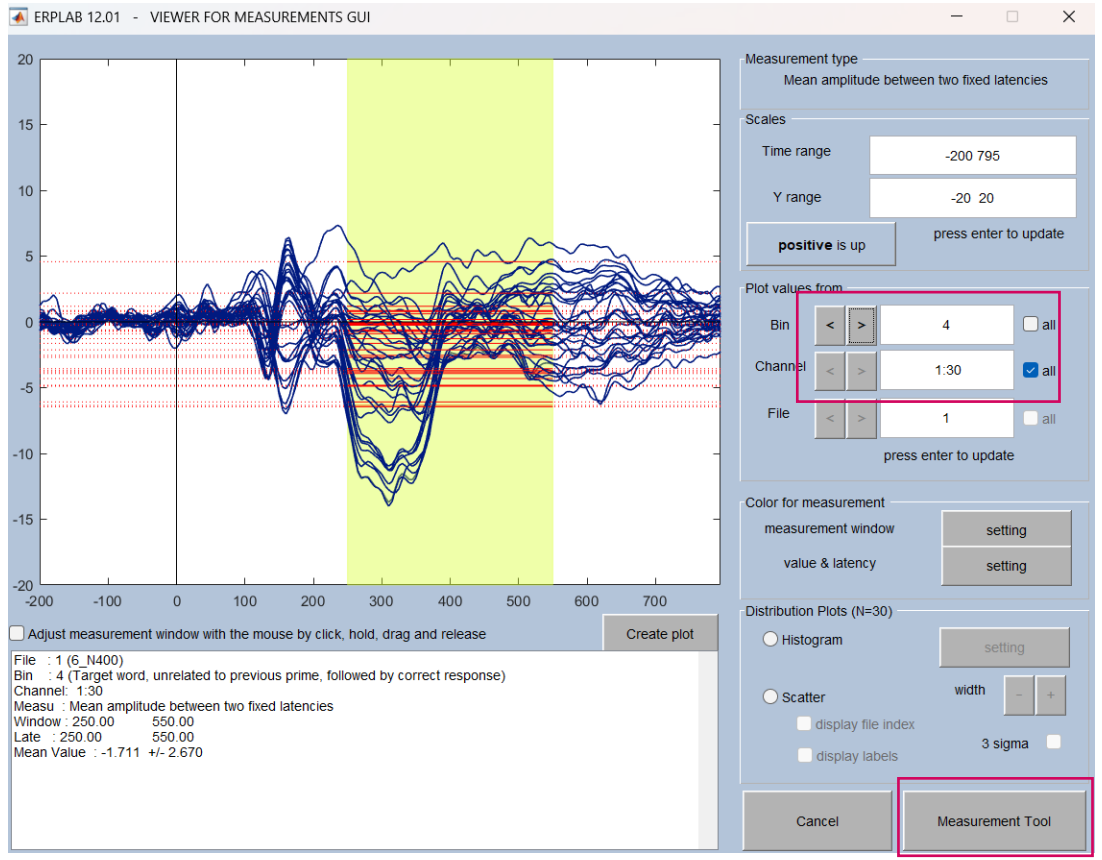


Long format

ERPLAB

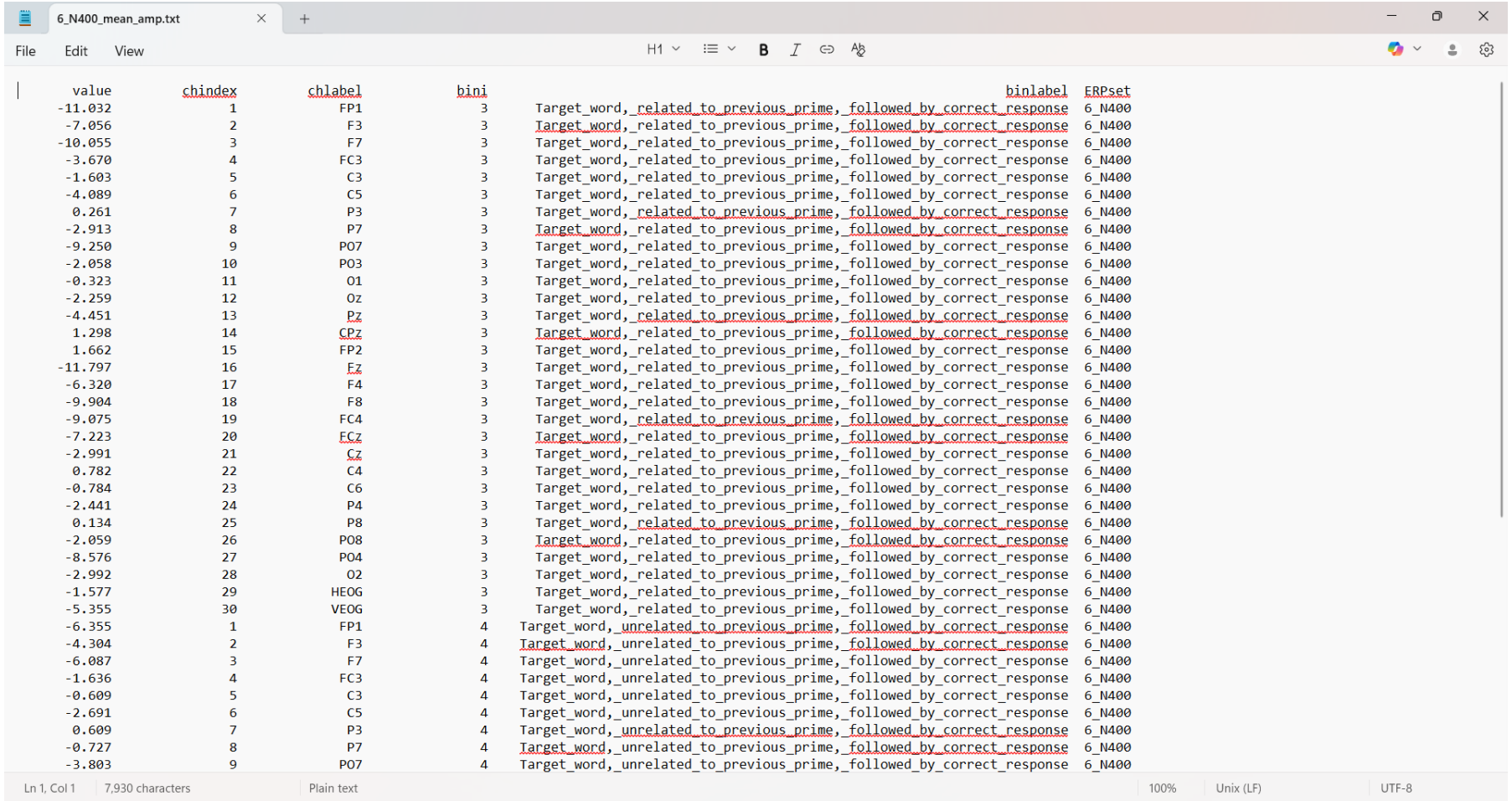
ERP measurement tool





ERPLAB

ERP measurement tool



6_N400_mean_amp.txt

File Edit View

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-11.032	1	FP1	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-7.056	2	F3	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-10.055	3	F7	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-3.670	4	FC3	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-1.603	5	C3	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-4.089	6	C5	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
0.261	7	P3	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-2.913	8	P7	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-9.250	9	PO7	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-2.058	10	PO3	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-0.323	11	O1	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-2.259	12	Oz	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-4.451	13	Pz	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
1.298	14	CPz	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
1.662	15	FP2	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-11.797	16	Fz	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-6.320	17	F4	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
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-9.075	19	FC4	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-7.223	20	FCz	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-2.991	21	Cz	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
0.782	22	C4	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-0.784	23	C6	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
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0.134	25	P8	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-2.059	26	PO8	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-8.576	27	PO4	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-2.992	28	O2	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-1.577	29	HEOG	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-5.355	30	VEOG	3	Target_word,_related_to_previous_prime,_followed_by_correct_response	6_N400
-6.355	1	FP1	4	Target_word,_unrelated_to_previous_prime,_followed_by_correct_response	6_N400
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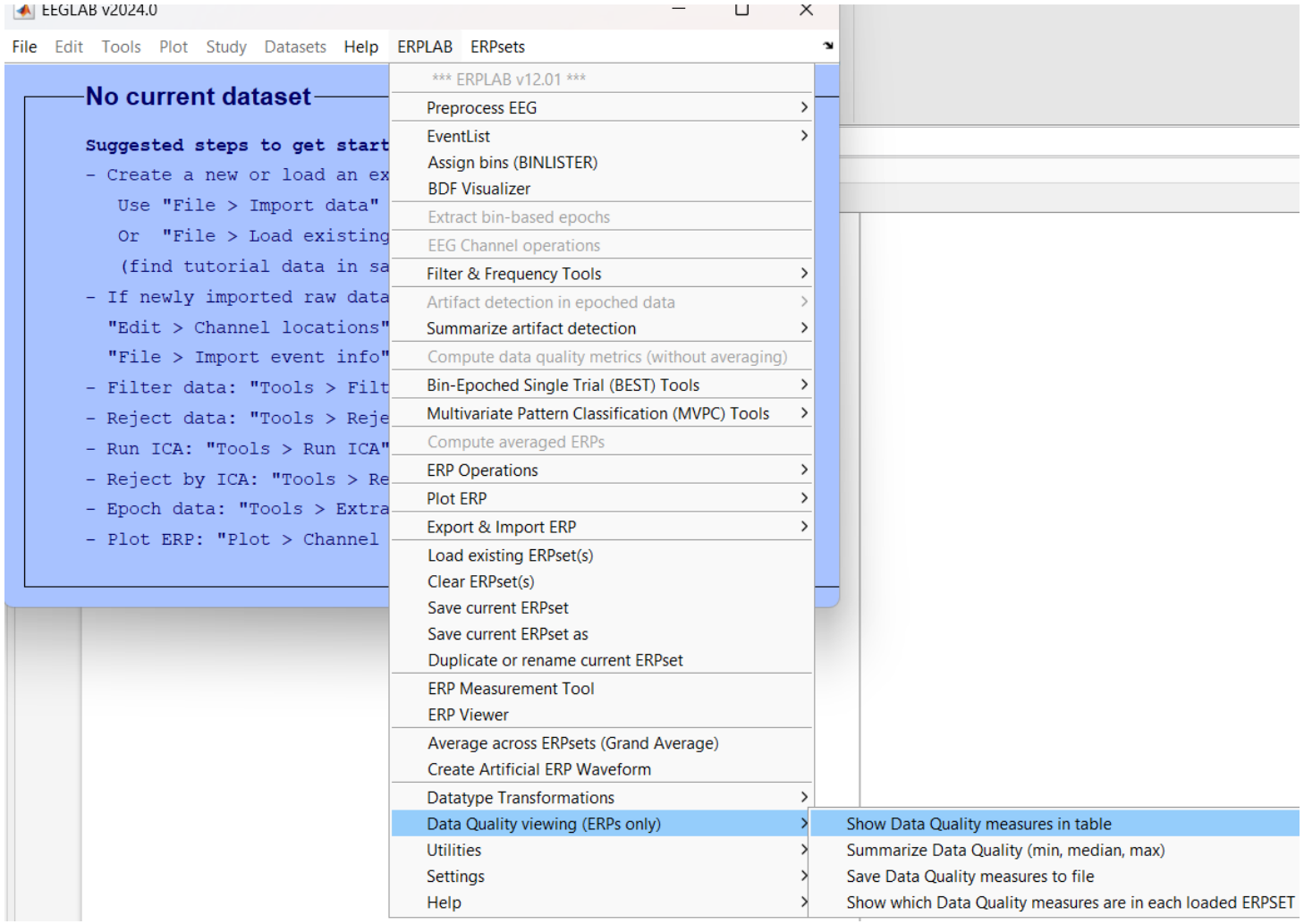
-3.803	9	PO7	4	Target_word,_unrelated_to_previous_prime,_followed_by_correct_response	6_N400

Ln 1, Col 1 | 7,930 characters | Plain text | 100% | Unix (LF) | UTF-8

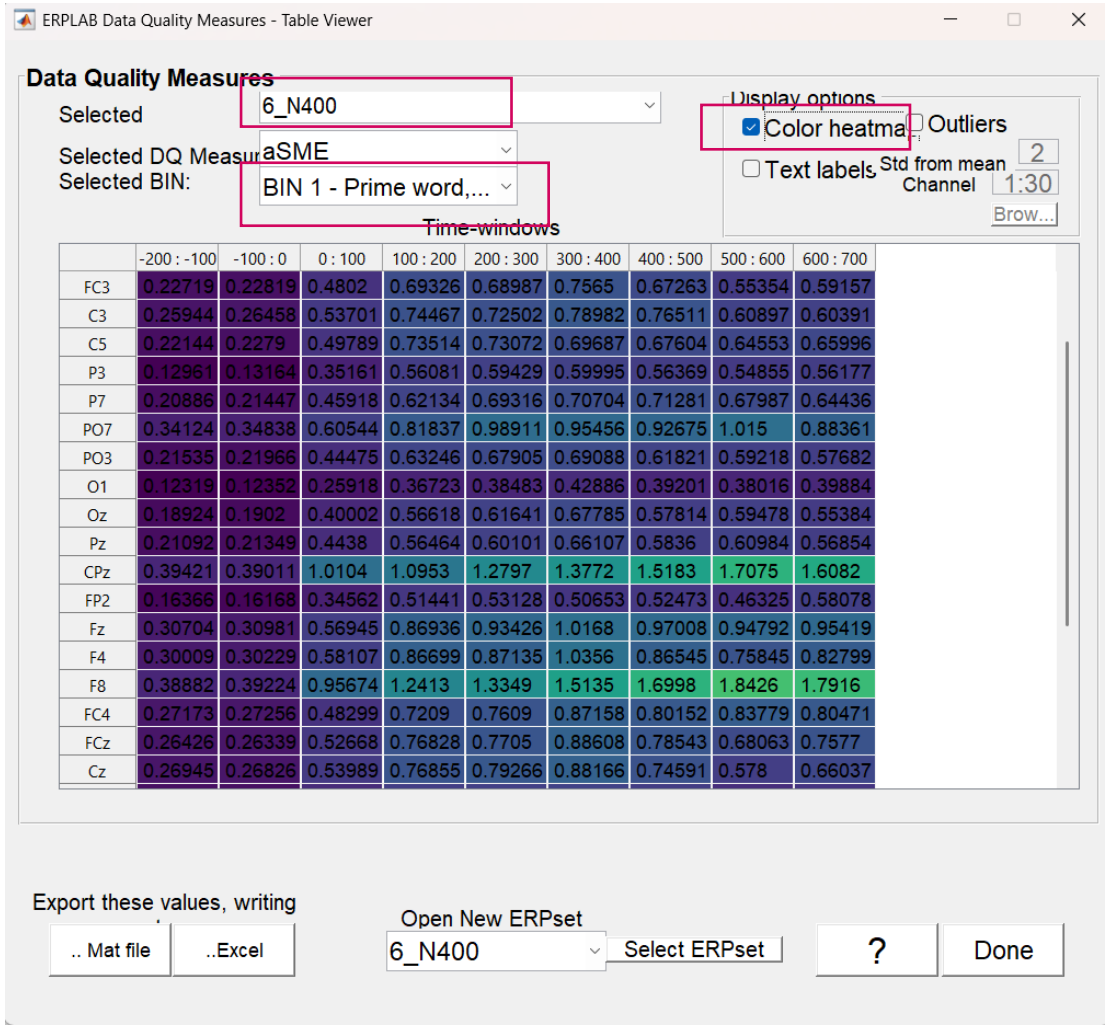
ERPLAB

Data quality viewing



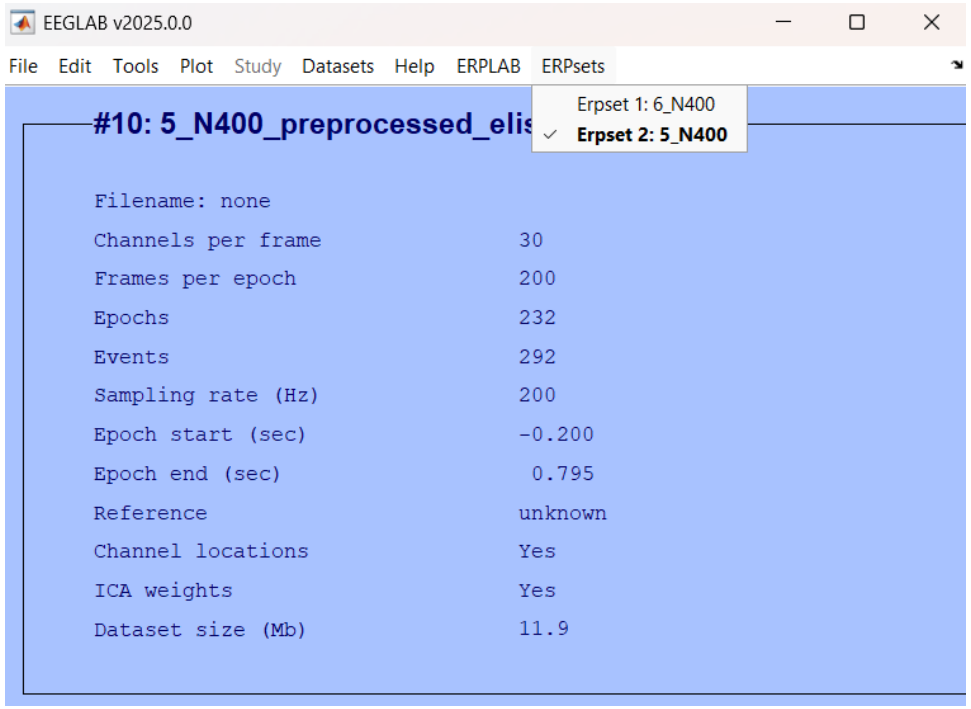
ERPLAB

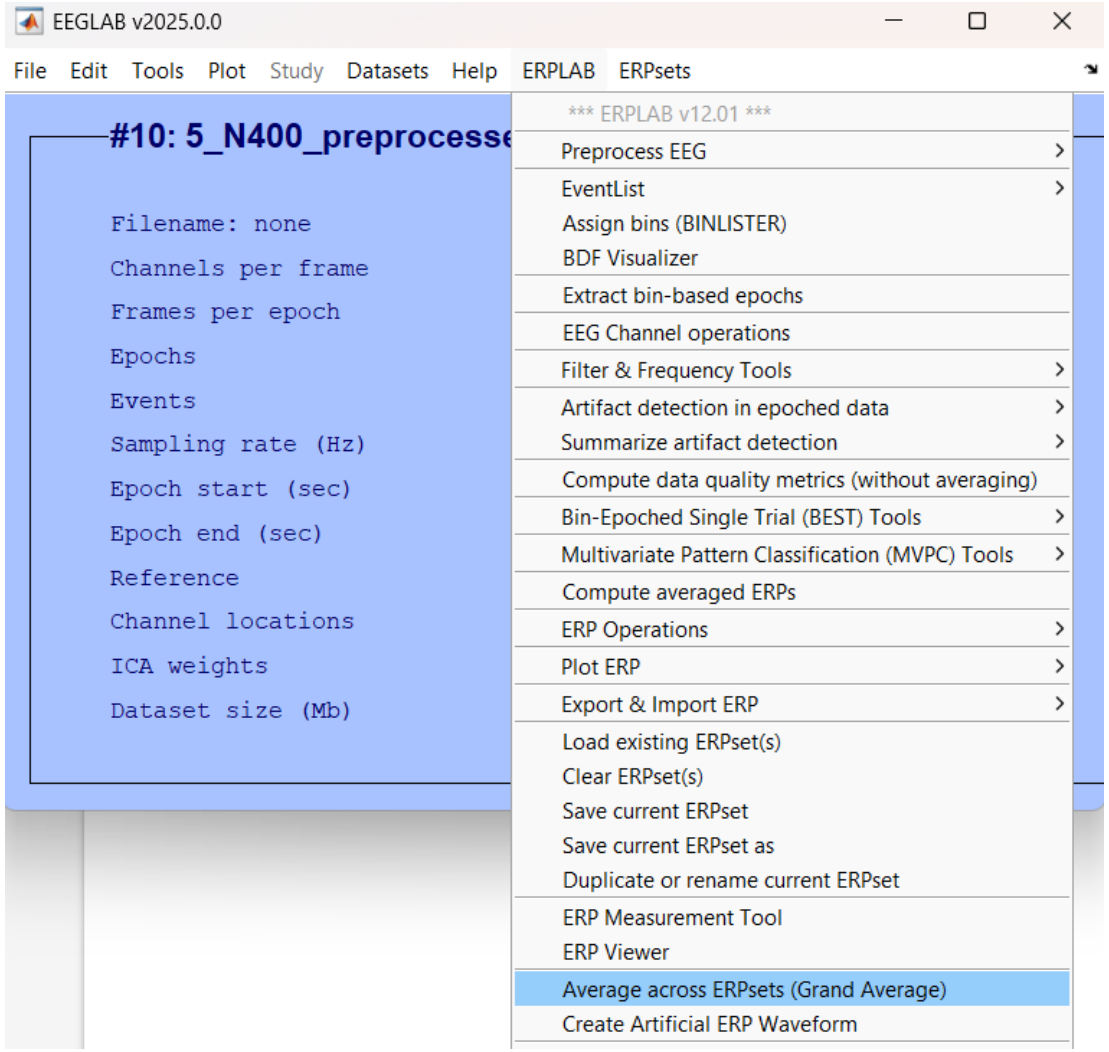
Data quality viewing



ERPLAB

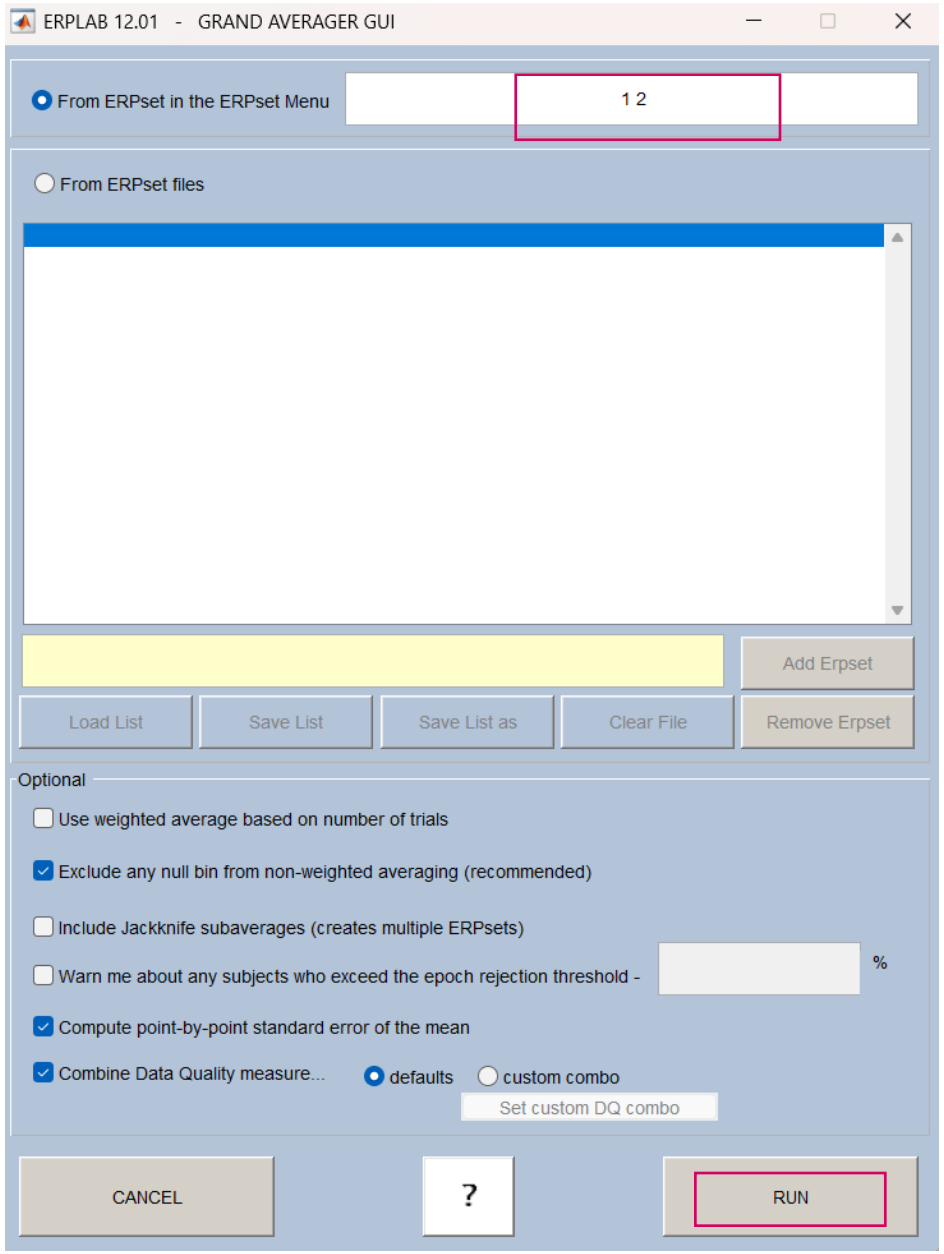
Average across ERPsets (Grand Average)





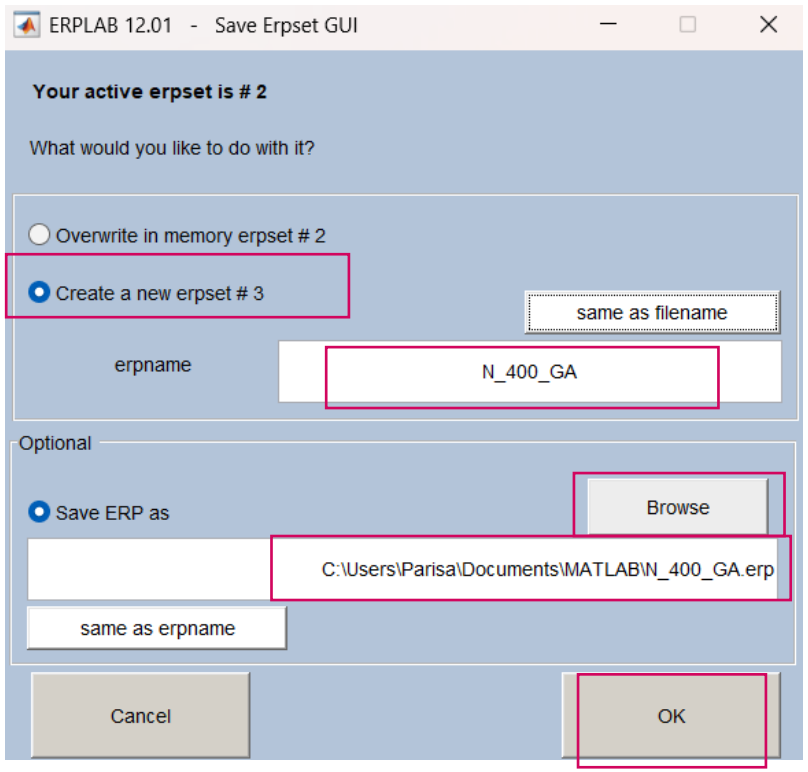
ERPLAB

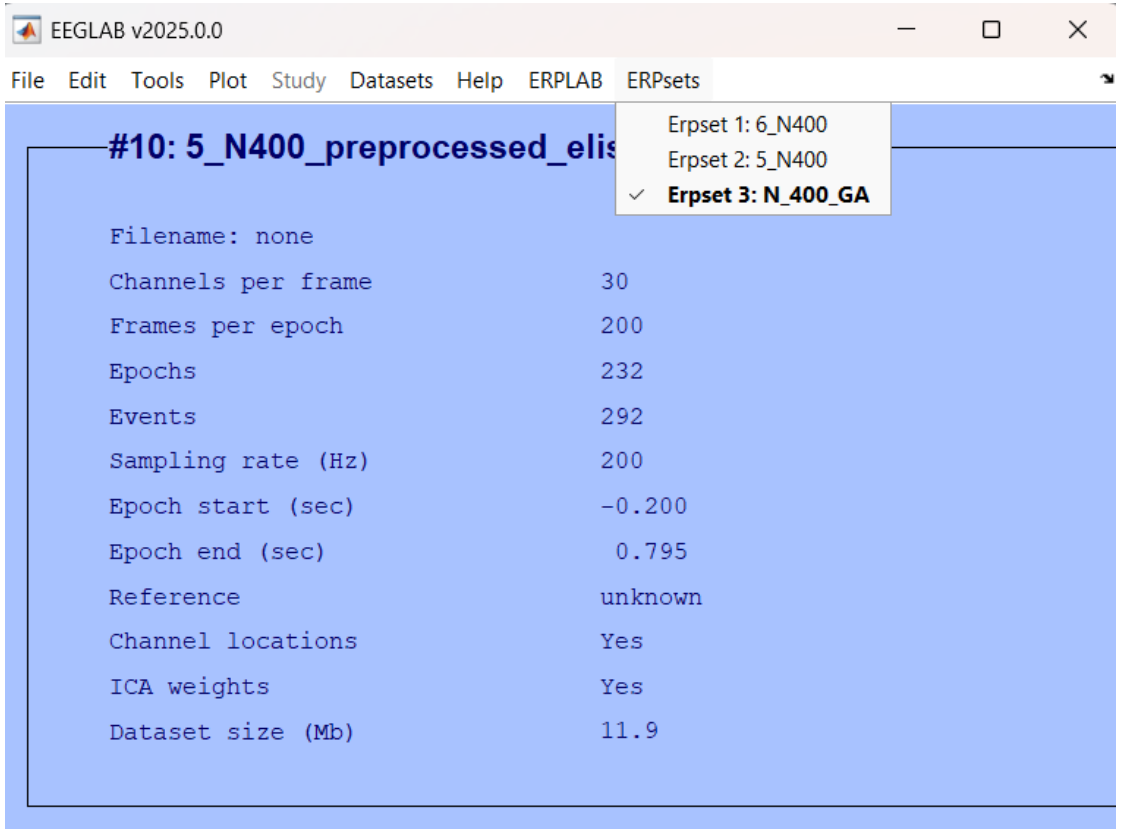
Average across ERPsets
(Grand Average)



ERPLAB

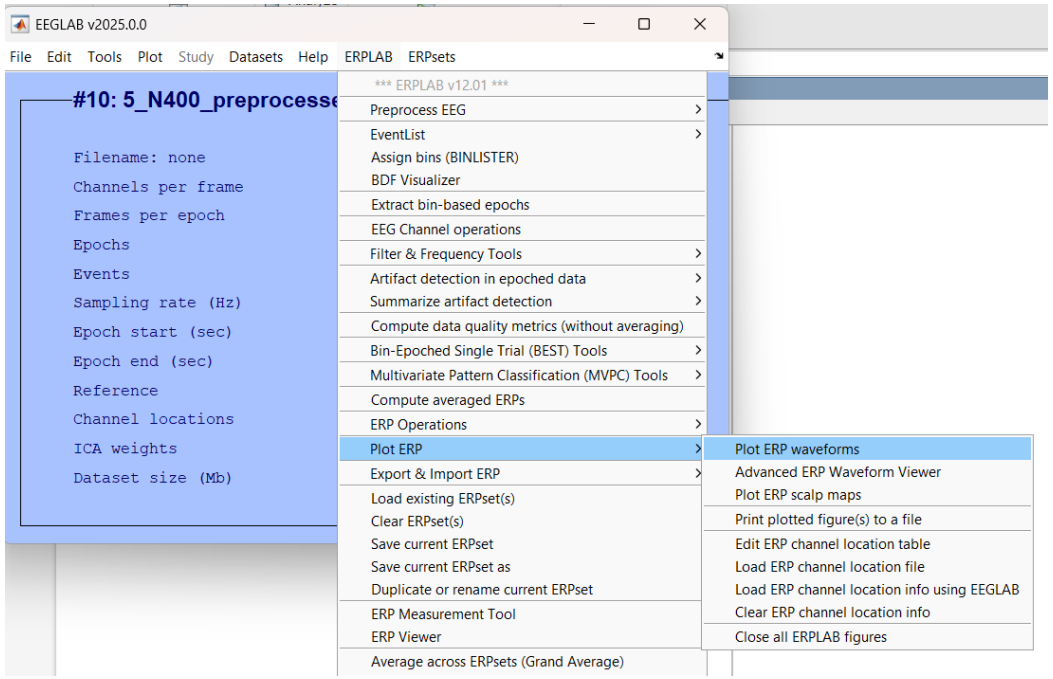
Average across ERPsets (Grand Average)

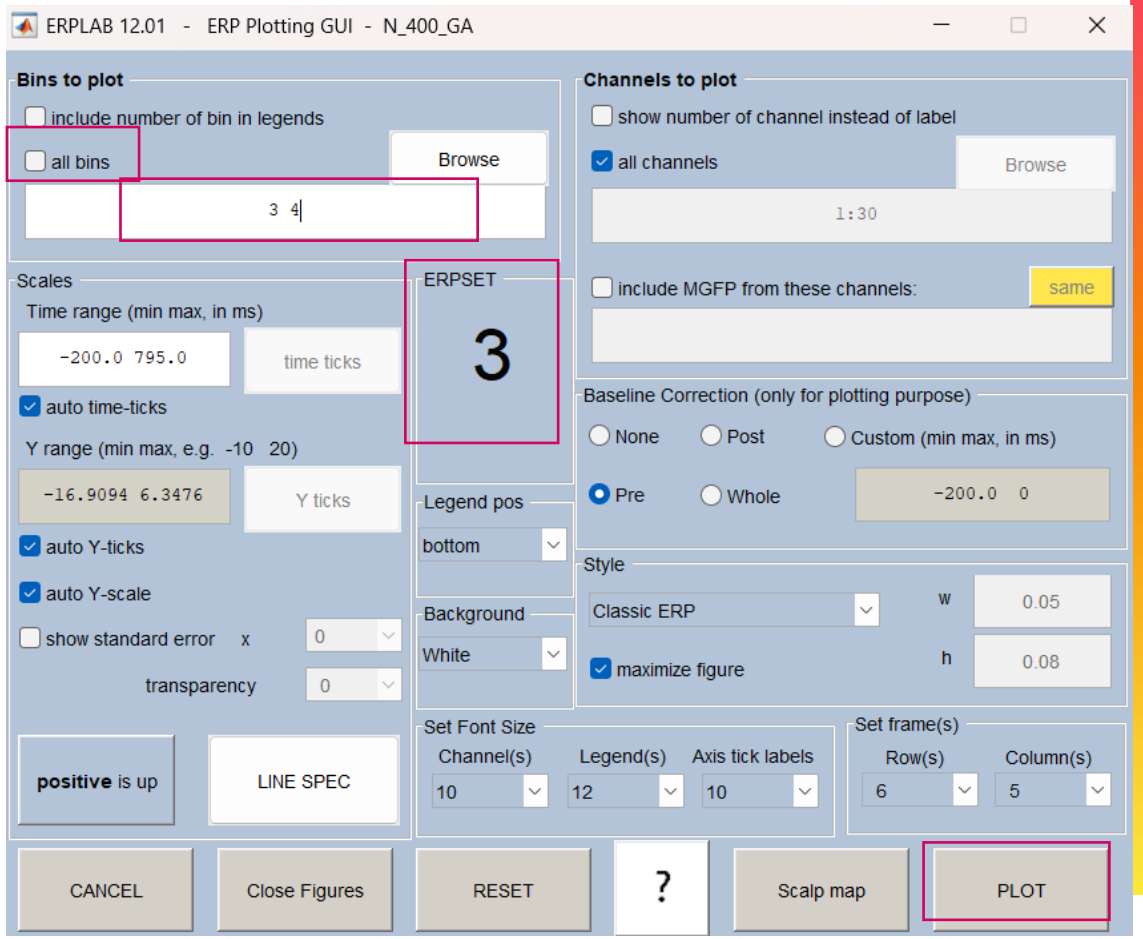




ERPLAB

Average across ERPsets (Grand Average)





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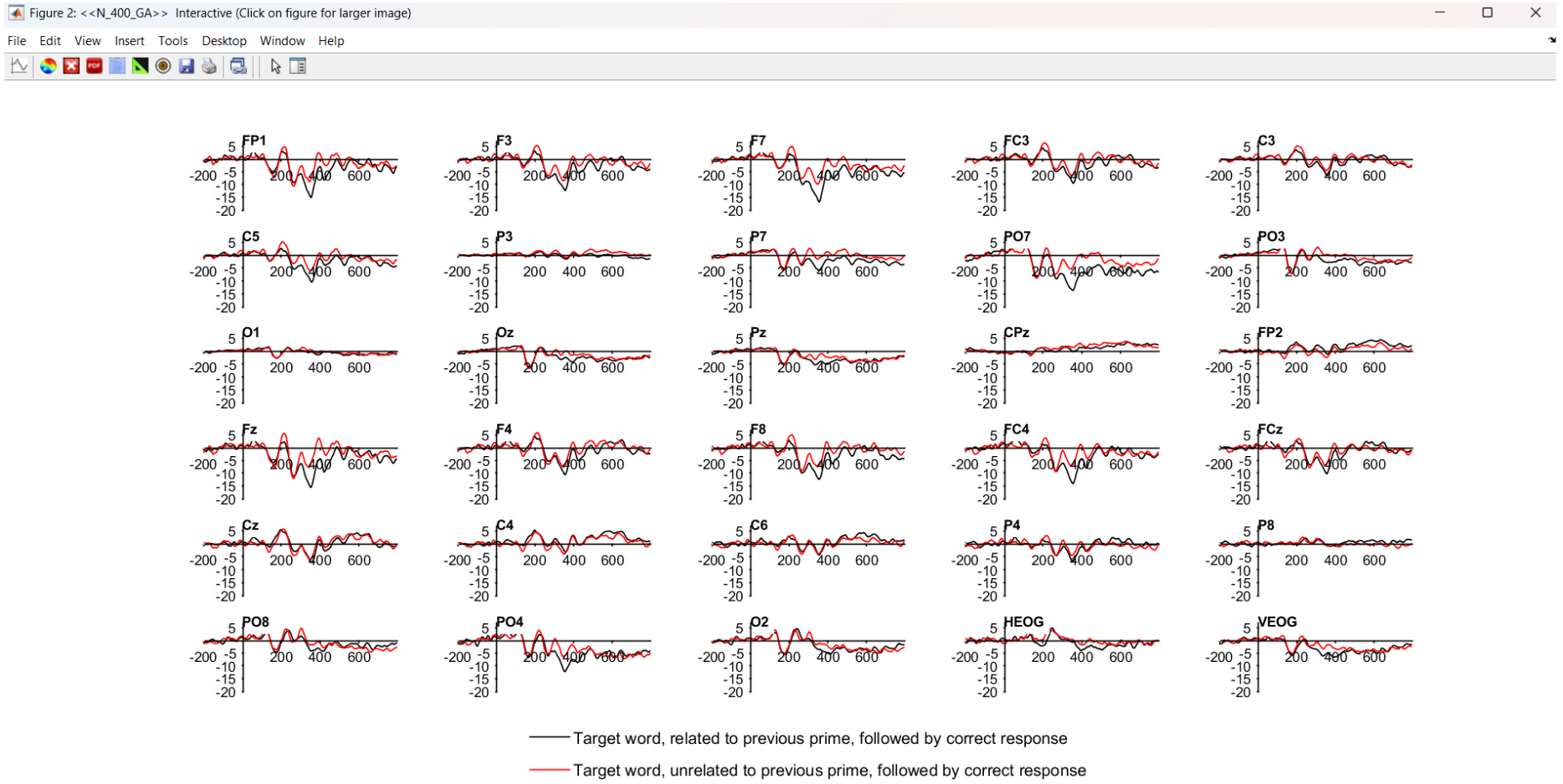
Average across ERPsets (Grand Average)



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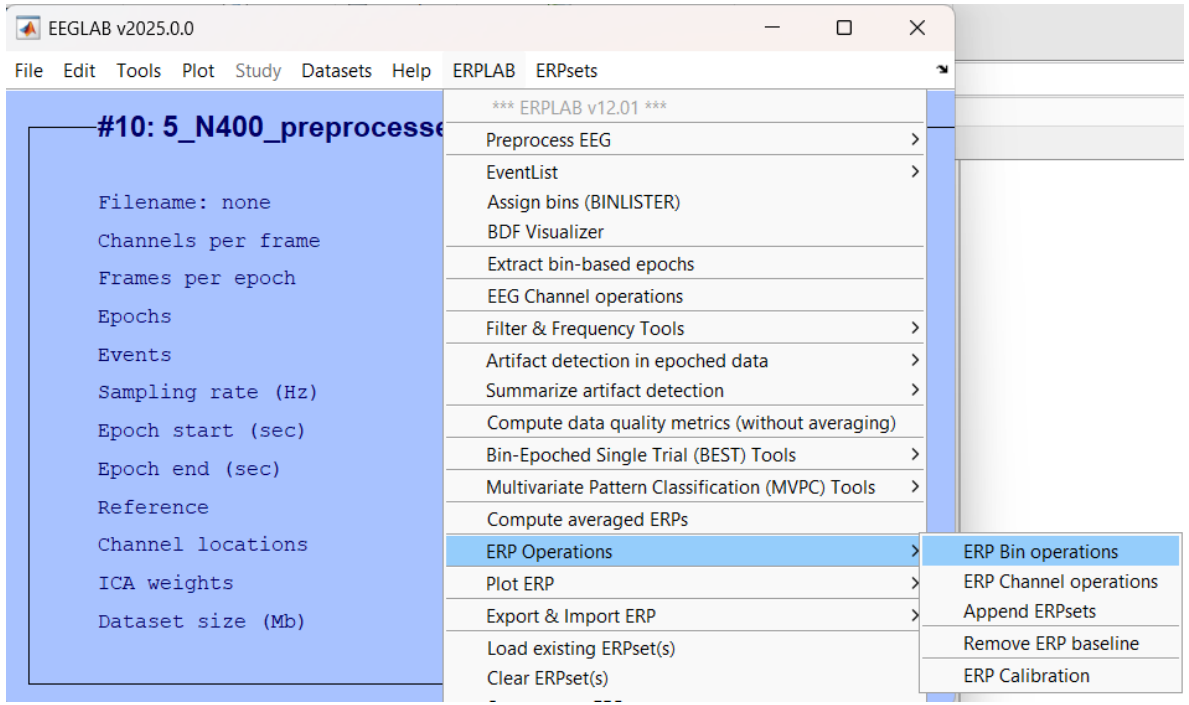
Average across ERPsets (Grand Average)



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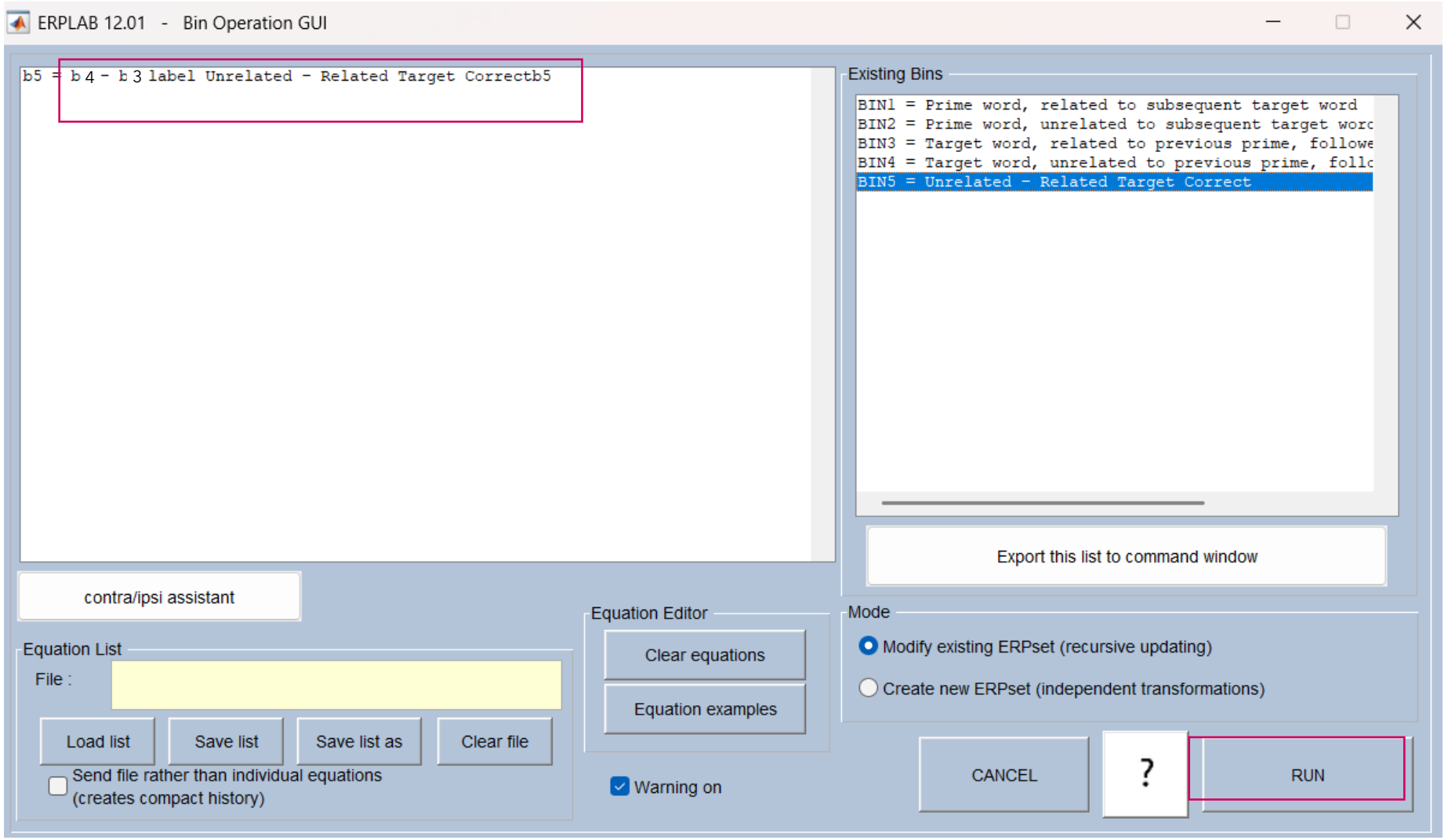
Average across ERPsets (Grand Average)



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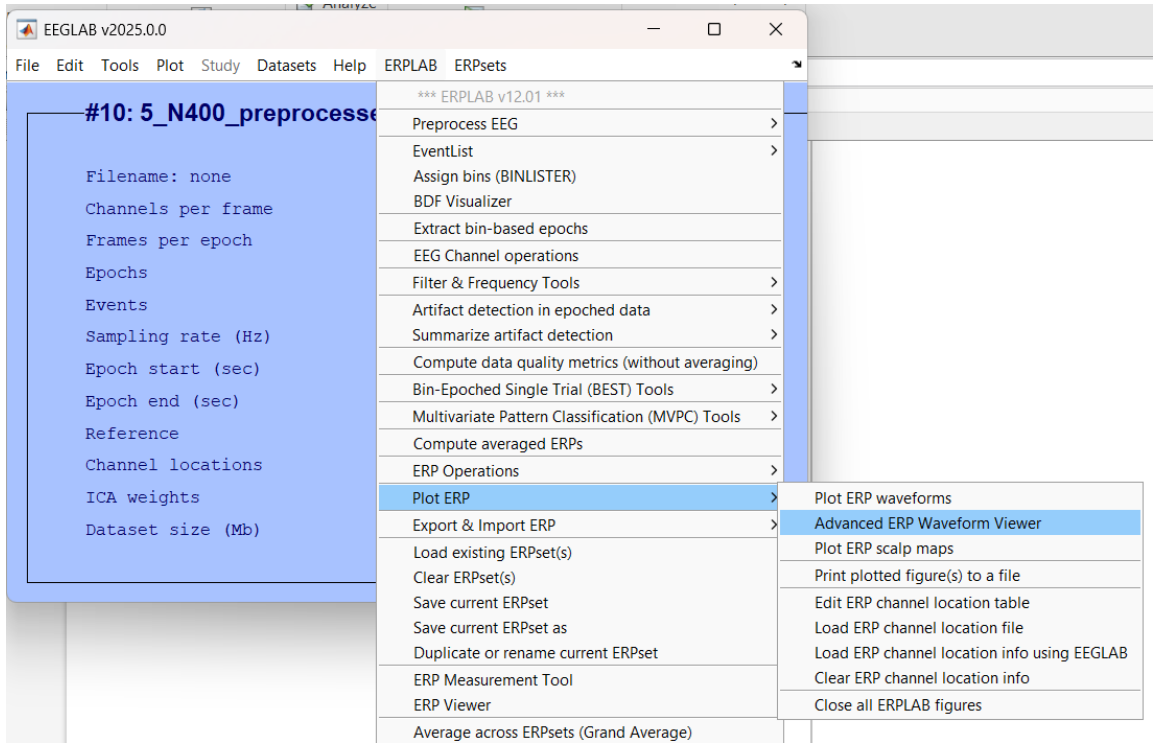
Average across ERPsets (Grand Average)



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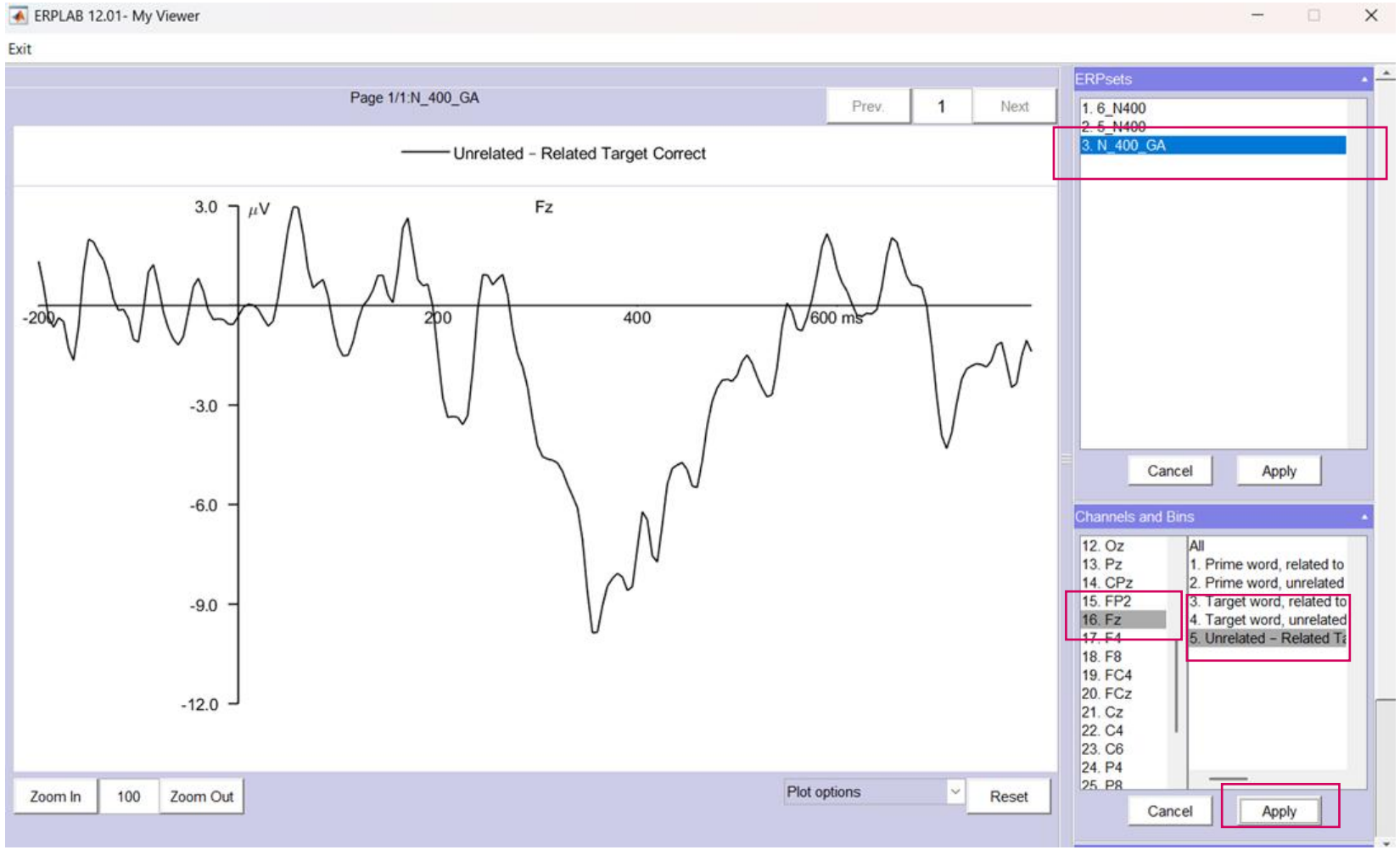

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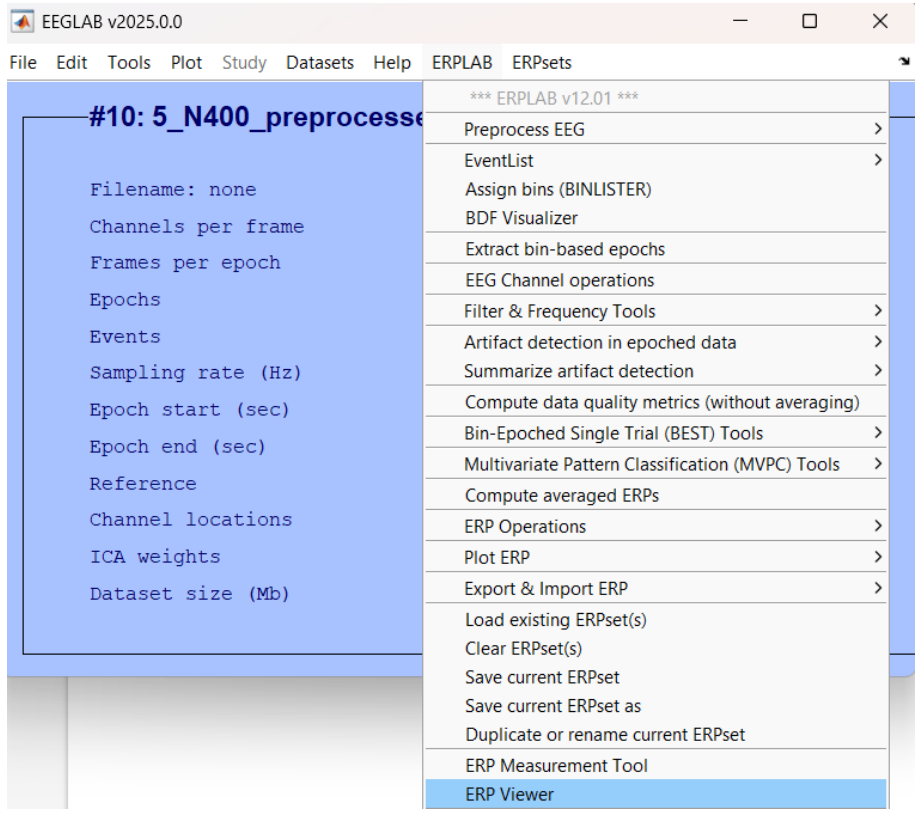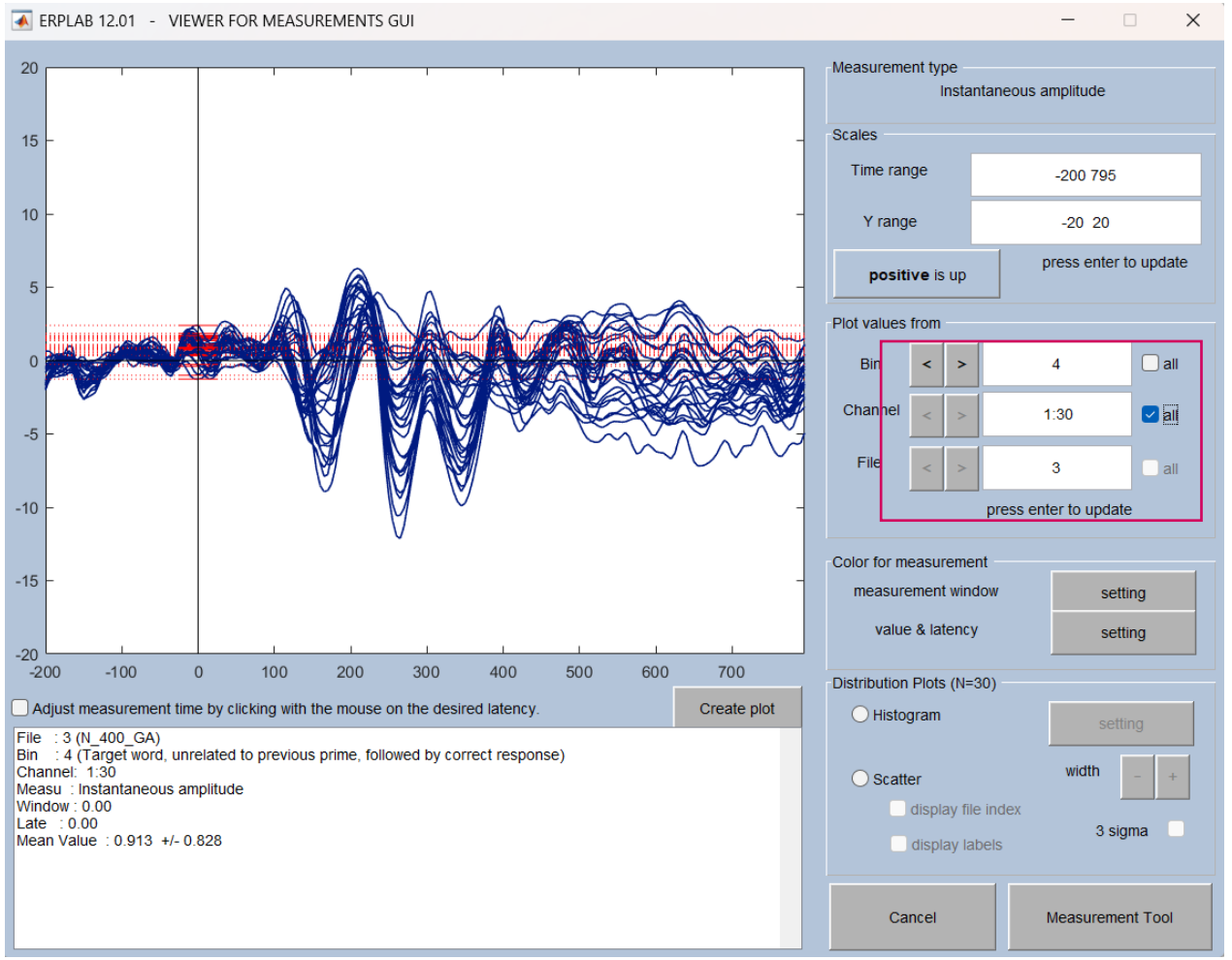
Average across ERPsets (Grand Average)