Computational Cognitive Neuroscience – CH8

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Question 8.1
AB Err:Mean:0.8545
AB Err:Min:0.6

The AC learning generally exhibits significant increase before the AB performance exceedingly diminishes, it suggests that the network experiences interference during the transition from AB to AC training.

Question 8.2
AB Err:Mean:0.79
AB Err:Min:0.5

This reduced the amount of AB interference.

Question 8.3
AB Err:Mean:0.66
AB Err:Min:0.3

Index	Params	AB Err:Co	AB Err:Me	AB Err:Std	AB Err:Sem	AB Err:Mir	AB Err:Q1	AB Err:Me	AB Err:Q3	AI
00000	hid_gi: 2.2, wt_var: 0.25, fm_ctxt: 1, lrate: 0. ×	10	0.79	0.119722	0.0378594	0.5	0.8	0.8	0.875	0
00001	hid_gi: 2.2, wt_var: 0.25, fm_ctxt: 1.5, lrate: ×	10	0.66	0.17127	0.0541603	0.3	0.55	0.7	0.8	0

This reduced the amount of AB interference.

This is a good model compared to humans in terms of results data, but these simulations may still not accurately replicate human-level performance.
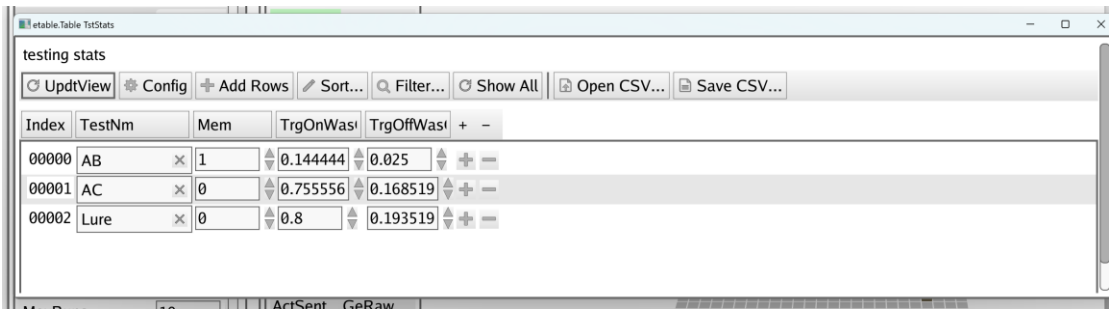
Question 8.4
The patterns with the largest overlap are those of ECin. Because external impulses directly enter this layer. DG shows relatively lower overlap compared to ECin. The DG layer's ability to separate patterns is aided by its high level of inhibition. CA3 shows a moderate level of overlap. DG provides inputs to CA3, however CA3 also exhibits some inhibition. CA1 exhibits less overlap compared to CA3. After receiving data from CA3, CA1 has significantly less pattern overlap. Inhibition occurs in this layer, however not as much as in CA3.

Question 8.5
AB Test: Mem = 1
AC Test: Mem = 0
Lure Test: Mem = 0

Index	TestNm	Mem	TrgOnWas	TrgOffWas	+	−
00000	AB ×	1	0.144444	0.025		
00001	AC ×	0	0.755556	0.168519		
00002	Lure ×	0	0.8	0.193519		

Question 8.6
Mem:Mean (average) level for the AB = 0.62, AC = 1, and Lure tests = 0
Almost identical compared to human results.
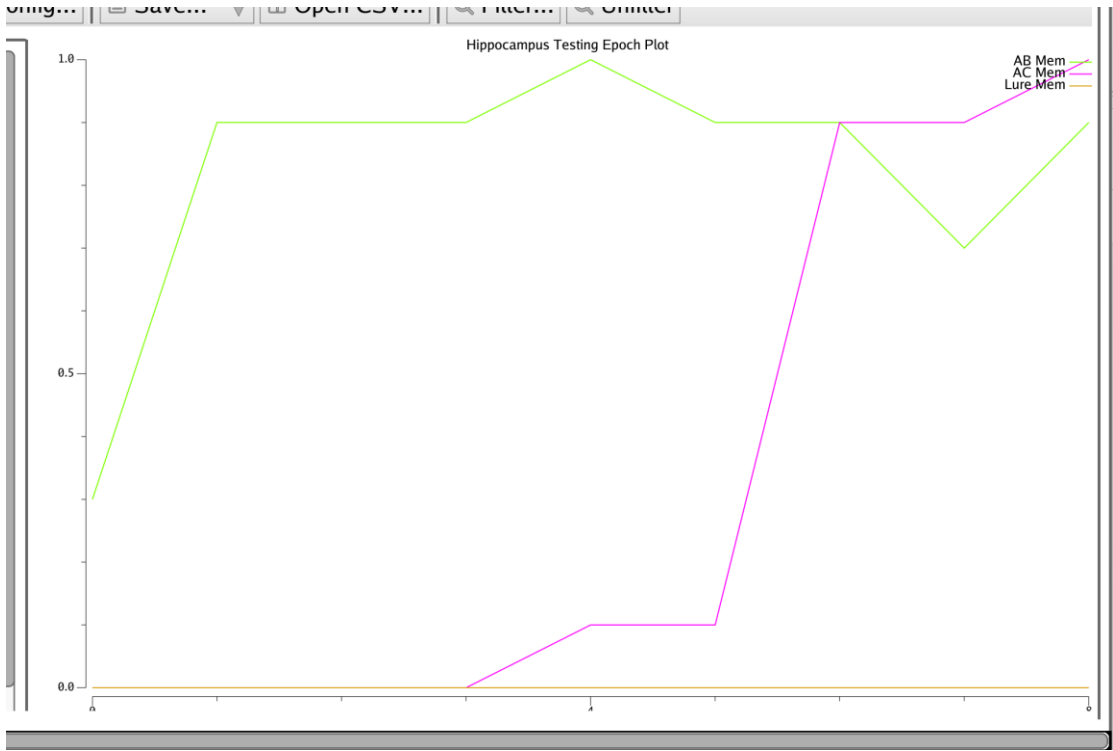
aggregate stats on all runs

UpdtView | Config | Add Rows | Sort... | Filter... | Show All | Open CSV... | Save CSV...

Index	Params	AB Mem:C	AB Mem:N	AB Mem:S	AB Mem:S	AB Mem:N	AB Mem:C	AB Mem:N	AB Mem:C	AB Mem:N	AC Mem:C	AC Mem:N	A
00000	Base ✕	10	0.62	0.198886	0.0628932	0.2	0.525	0.6	0.775	0.9	10	1	

Show All | Open CSV... | Save CSV...

AB Mem:N | AC Mem:C | AC Mem:N | AC Mem:S | AC Mem:S

0.9 | 10 | 1 | 0 | 0

| Config | Add Rows | Sort... | Filter... | Show All | Open CSV... | Save CSV... |

n:N	Lure Mem	Lure Mem	Lure Mem	Lure Mem	Lure Mem	Lure Mem	Lure Mem	Lure Mem	Lure
	10	0	0	0	0	0	0	0	0

Question 8.7
Epoch=99 IsA=0.5385
Epoch=0 IsA=0

etable.Table TstEpcLog

Summary stats for testing trials testing epoch–level log data

UpdtView | Config | Add Rows | Sort... | Filter... | Show All | Open CSV... | Save CSV...

Index	Run	Epoch	SSE	AvgSSE	PctErr	PctCor	IsA	IsB	Correl	CosDiff
00000	0	−1	50.1847	0.154415	0.0769231	0.923077	0.538462	0.461538	0.914527	0.476585
00001	0	0	103.789	0.319352	0	1	0	1	0.950137	−0.0821743
00002	0	0	5.37923	0.0165515	0	1	1	0	0.921118	0.921119
00003	0	0	103.809	0.319412	0	1	0	1	0.934795	−0.0894475
00004	0	0	4.81931	0.0148286	0	1	1	0	0.924722	0.924722

Question 8.8
10 times.

etable.Table TstTrlLog

Record of testing per input pattern testing trial–level log data

UpdtView | Config | Add Rows | Sort... | Filter... | Show All | Open CSV... | Save CSV...

Index	Run	Epoch	Trial	TrialName	Closest	IsA	IsB	Err	Correl	SSE	AvgSSE	CosDiff	Hidden A	I
00023	0	−1	23	11_b	11_a	1	0	0	0.986955	8.27509	0.331004	−0.106342	0.196596	
00024	0	−1	24	12_a	12_b	0	1	0	0.982839	6.45194	0.258078	0.110955	0.187795	
00025	0	−1	25	12_b	12_a	1	0	0	0.966794	5.74312	0.229725	0.166846	0.189905	