

# Brain functional correlates of episodic memory using an ecological free-recall task

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## Methods

Each passage was registered in Italian language. As an example, we report a passage that was listened by participants (n.1 of 8 possible prose passages). Each “concept” is shown between two vertical bars:

| Una malattia misteriosa | acceca | i daini | che vivono nei boschi | dell’Appennino Toscano. | Un virus o un veleno | non ancora identificato | provoca la distruzione del nervo ottico di questi timidi animali, | che in breve divengono incapaci di provvedere a se stessi, | precipitano nei dirupi | o vengono investiti dalle auto. | In un anno | nelle province di Pistoia | e Firenze | sono stati raccolti dieci esemplari ciechi. | Cinque nel solo mese di maggio. | Gli specialisti parlano di epidemia dilagante. | La causa della malattia è ancora sconosciuta. | I sintomi fanno pensare ad un grave avvelenamento | da metalli pesanti. | Forse questi animali hanno bevuto acqua inquinata | da discariche abusive di pile e batterie | che contengono piombo e cadmio. | La procura circondariale di Firenze ha aperto un’inchiesta | per fare luce sulle cause dell’epidemia. | Si teme che anche altri animali possano ammalarsi, | ma comunque la situazione appare abbastanza circoscritta | e sembra che non ci sia pericolo di avvelenamento | per gli abitanti della zona, | i quali comunque sono molto preoccupati. |

Total concepts: 30

| A mysterious disease | blinds | the fallow deer | living in the woods | of the Tuscan Apennines. | A virus or poison | not yet identified | causes destruction of the optic nerve of these shy animals, | who soon become unable to provide for themselves, | fall into the cliffs | or are hit by cars. | In one year | in the provinces of Pistoia | and Florence | ten blind fallow deer were collected. | Five in the month of May alone. | Specialists speak of a rampant epidemic. | The cause of the disease is still unknown. | Symptoms suggest severe poisoning | from heavy metals. | Perhaps these animals drank polluted water | from illegal dumps of cells and batteries | which contain lead and cadmium. | The district attorney of Florence has opened an investigation | to shed light on the causes of the epidemic. | There are fears that other animals may also get sick, | but the situation appears quite limited | and it seems that there is no danger of poisoning | for the inhabitants of the area, | who are still very worried. |

Total concepts: 30

## Results

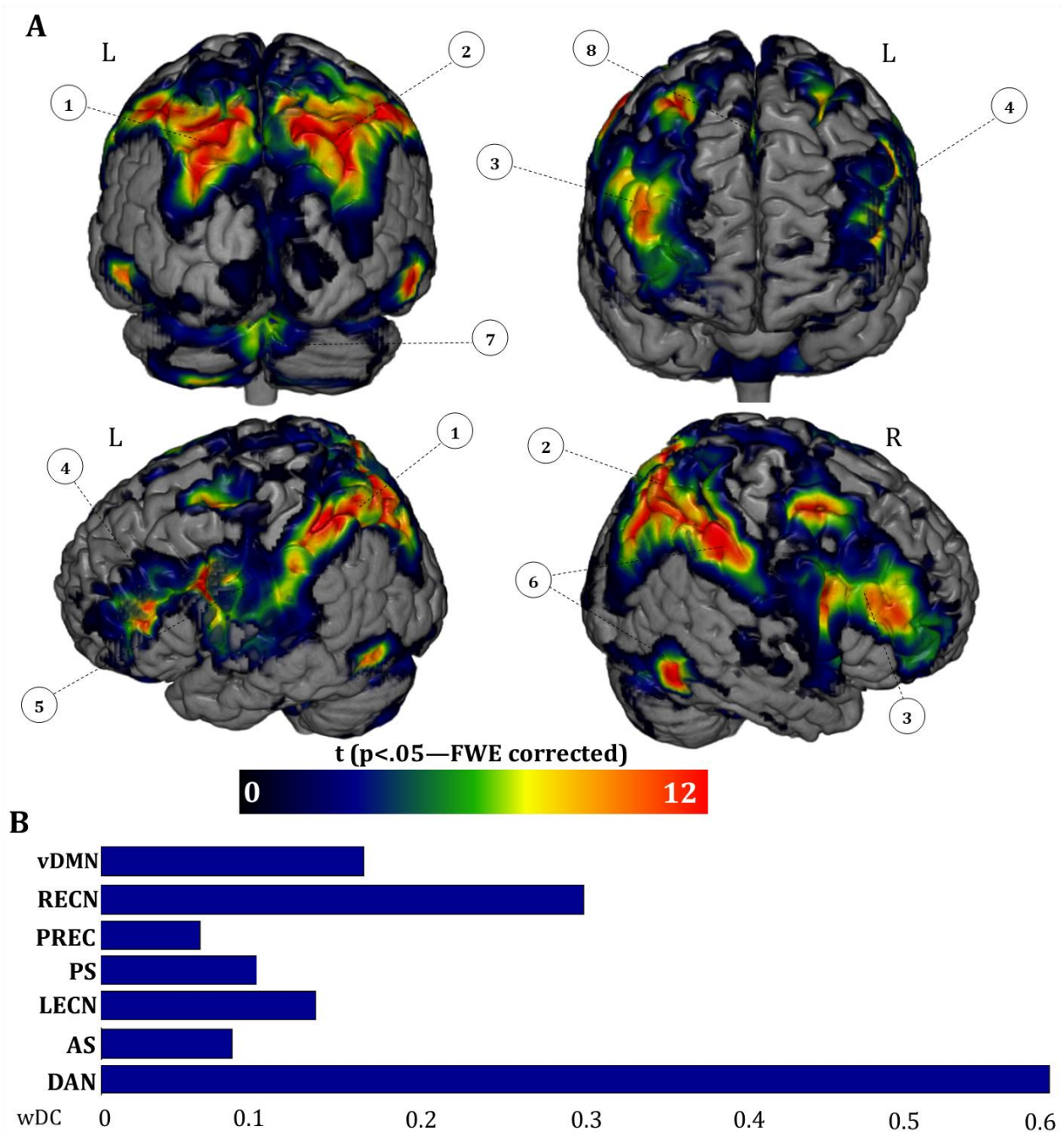
**Table S1.** Questionnaire results.

	<i>FR/IR similarity</i>	<i>FR/DR similarity</i>	<i>FR Ability</i>	<i>Thinking Interference</i>	<i>fMRI Noise Interference</i>	<i>BC Ability</i>	<i>Tasks Interference</i>	<i>Shifting Ability</i>	<i>Visual Imagination</i>
<i>Mean</i>	5,43	5,79	5,79	1,79	4,00	4,64	1,00	5,43	5,64
<i>SD</i>	0,76	0,97	0,58	1,19	2,04	1,78	0,00	1,28	1,01
<i>Median</i>	5	6	6	1	5	5	1	5,5	6
<i>Freq. 1</i>	0	0	0	8	2	0	14	0	0
<i>Freq. 2</i>	0	0	0	3	3	3	0	0	0
<i>Freq. 3</i>	0	0	0	2	1	1	0	2	0
<i>Freq. 4</i>	1	1	4	0	0	1	0	0	2
<i>Freq. 5</i>	7	5	9	1	3	4	0	5	4
<i>Freq. 6</i>	5	4	1	0	5	3	0	4	5
<i>Freq. 7</i>	1	4	0	0	0	0	0	3	3
<i>Total</i>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>

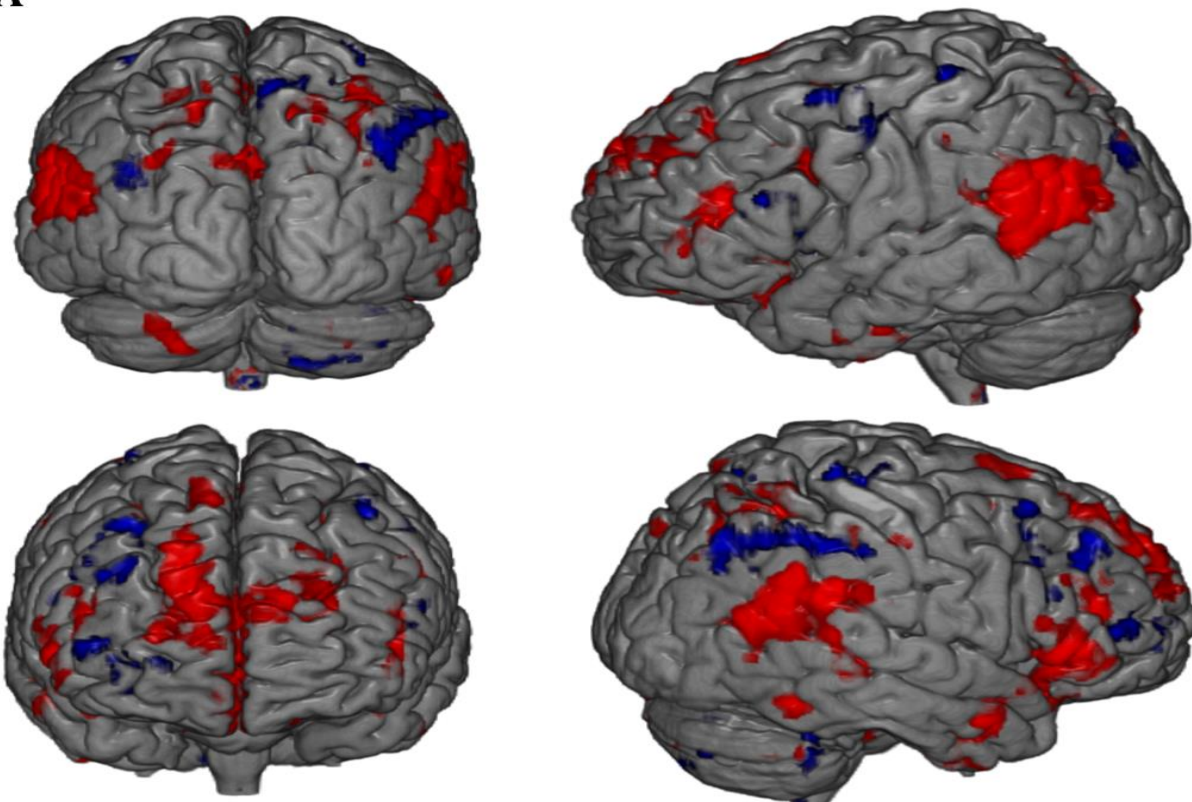
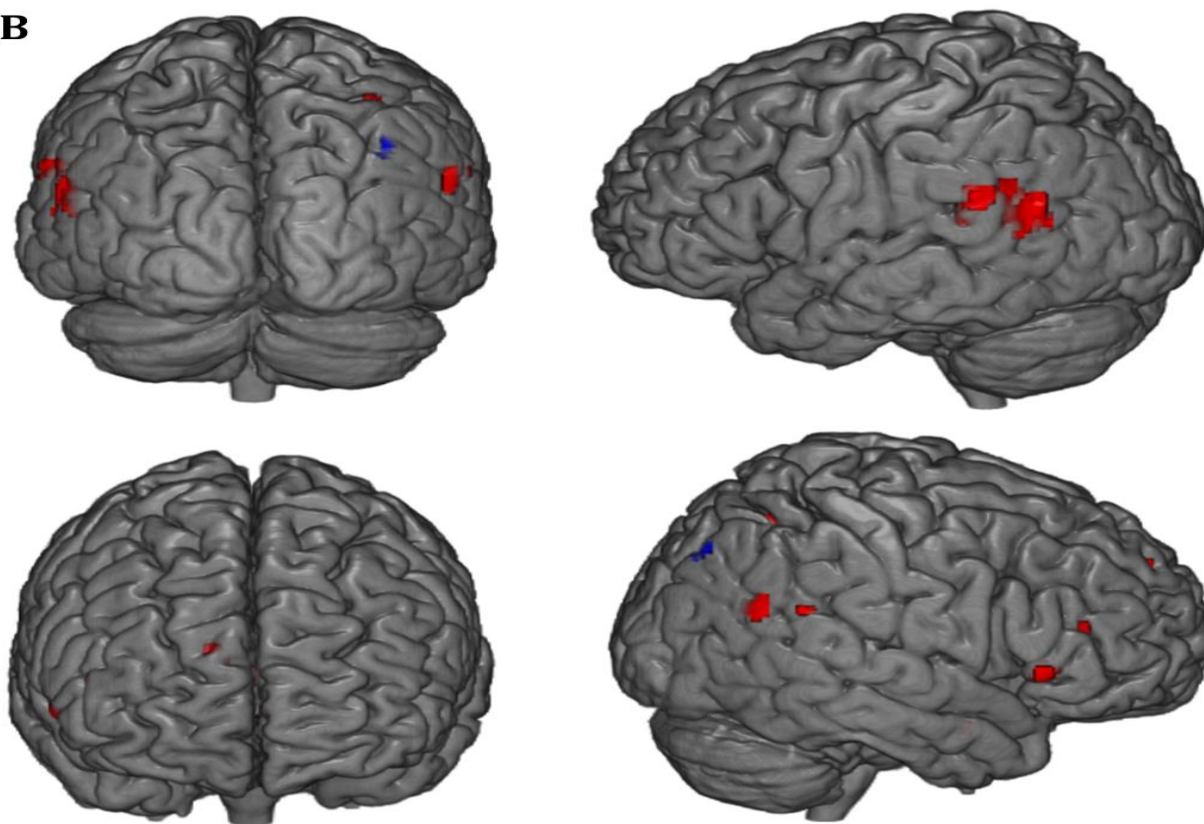
**Table S2.** MNI coordinates for each region showing increased BOLD signal in the BC>FR contrast.

<b>Activation Loci (BC&gt;FR Contrast)</b>	<b>Cluster size (voxels)</b>	<b>T</b>	<b>Coordinates (MNI)</b>		
			<b>x</b>	<b>y</b>	<b>z</b>
<i>Right &amp; Left Parietal Cortex</i>	17011				
L Inferior Parietal Lobule		18,04	-44	-40	44
R Superior Parietal Lobule		17,46	18	-70	58
R Inferior Parietal Lobule		18,46	50	-38	52
<i>Right Frontal Cortex</i>	3590				
R IFG (p. Triangularis)		13,15	50	12	26
R Middle Frontal Gyrus		12,04	46	42	18
R IFG (pars opercularis)		6,53	42	60	-4
<i>Right Frontal Cortex</i>	1472				
R Middle Frontal Gyrus		14,50	30	6	58
<i>Left Cerebellum</i>	1001				
L Cerebellum (Crus 1)		8,30	-8	-80	-20
L Cerebellum (Crus 1)		7,48	-30	-70	-26
<i>Left Temporal Cortex</i>	915				
L Inferior Temporal Gyrus		14,50	-52	-58	-16
<i>Cingulate Cortex</i>	700				
R Medial Cingulate Cortex		9,03	6	14	50
<i>Right Temporal Cortex</i>	699				
R Inferior Temporal Gyrus		14,70	58	-54	-14
<i>Right Cerebellum</i>	277				
R Cerebellum (Crus 1)		7,64	30	-66	-30
<i>Right Frontal Cortex</i>	274				
R IFG (p. Orbitalis)		8,11	34	20	-4
<i>Right Cerebellum</i>	199				
R Cerebellum (VIII)		10,30	18	-76	-50
<i>Left Cerebellum</i>	195				

L Cerebellum		11,23	-28	-74	-52
Right & Left Cerebellum	71				
Cerebellum		6,45	0	-50	-22
Right Thalamus	69				
R Thalamus		6,14	8	-18	8



**Figure S1. Threshold activation maps of the BC>FR contrast.** Whole brain activation is displayed on the 3D rendered MNI reference brain (statistical threshold of  $p < .05$  FWE-corrected; cluster size:  $> 50$ ) **1**: Left Parietal Cortex; **2**: Right Parietal Cortex; **3**: Right Frontal Cortex **4**: Left Frontal Cortex; **5**: Left Temporal Cortex; **6**: Right Temporal Cortex; **7**: Bilateral Cerebellum; **8**: Cingulate Cortex. (A). Activation overlap with the RSNs is shown (B).

**A****B**

**Figure S2. Threshold activation maps of the BC>FR contrast, two sided of the MVPA analysis.** Height threshold =  $p < .05$ ; uncorrected; cluster-size FDR corrected  $p < .05$  (A). Height threshold =  $p < .05$ ; FDR corrected; cluster-size FDR corrected  $p < .05$  (B).

**Table S3.** Results Table of MVPA analysis. Height threshold =  $p < .05$ ; uncorrected; cluster-size FDR corrected  $p < .05$

X	Y	Z	size	size p-FWE	size p-FDR	size p-unc	peak p-FWE	peak p-unc
-46	-58	16	10757	0.000000	0.000000	0.000000	0.005171	0.000000
10	54	-6	8416	0.000000	0.000000	0.000000	0.023910	0.000000
56	26	2	7764	0.000000	0.000000	0.000000	0.164791	0.000001
-54	10	36	1310	0.000000	0.000000	0.000000	0.999999	0.000020
-32	-88	36	884	0.000000	0.000000	0.000000	1	0.000040
48	38	18	585	0.000023	0.000001	0.000000	1	0.000022
-46	-38	38	435	0.000568	0.000030	0.000000	1	0.000112
-22	-84	-38	347	0.004402	0.000205	0.000003	1	0.000070
16	-36	-38	321	0.008315	0.000345	0.000006	1	0.000573
32	-46	-6	285	0.020583	0.000774	0.000016	1	0.000400
60	-52	-16	274	0.027314	0.000929	0.000021	1	0.000075
36	-22	58	271	0.029520	0.000929	0.000023	1	0.000116
24	26	2	251	0.049767	0.001461	0.000039	1	0.001137
-26	10	54	208	0.155371	0.004489	0.000128	1	0.000071
-4	-48	-66	195	0.218310	0.006111	0.000187	1	0.000538
28	-76	-42	191	0.242017	0.006446	0.000210	1	0.000086
22	-82	-28	179	0.327382	0.008682	0.000301	1	0.000018
24	50	-8	176	0.352283	0.008980	0.000329	1	0.000884
38	34	32	173	0.378649	0.009321	0.000361	1	0.000029
-36	-30	66	169	0.416064	0.010011	0.000408	1	0.001867
-38	-24	0	148	0.647117	0.018461	0.000790	1	0.000938
-36	-30	66	169	0.416064	0.010011	0.000408	1	0.001867
-38	-24	0	148	0.647117	0.018461	0.000790	1	0.000938

**Table S4.** Results Table of MVPA analysis. Height threshold =  $p < .05$ ; FDR corrected; cluster-size FDR corrected  $p < .05$

X	Y	Z	size	size p-FWE	size p-FDR	size p-unc	peak p-FWE	peak p-unc
-46	-58	16	343	0.000000	0.000000	0.000000	0.005171	0.000000
0	-18	36	56	0.000000	0.000000	0.000000	0.147889	0.000001
60	-58	26	34	0.000000	0.000000	0.000000	0.357044	0.000001
10	54	-6	28	0.000000	0.000000	0.000000	0.023910	0.000000
56	26	2	24	0.000002	0.000000	0.000000	0.164791	0.000001
10	52	34	20	0.000011	0.000003	0.000000	0.624534	0.000003
-12	-68	34	13	0.000443	0.000093	0.000015	0.996944	0.000006
50	-40	2	11	0.001429	0.000262	0.000048	0.630946	0.000003
36	-52	56	8	0.009552	0.001406	0.000319	0.994514	0.000005
40	-78	44	8	0.009552	0.001406	0.000319	0.999962	0.000013
8	-58	38	5	0.080245	0.009424	0.002784	0.999994	0.000016
0	40	22	5	0.080245	0.009424	0.002784	1	0.000037
0	32	0	5	0.080245	0.009424	0.002784	0.999997	0.000017
-2	-48	38	4	0.171926	0.014542	0.006279	0.999988	0.000015
-4	-44	30	4	0.171926	0.014542	0.006279	0.999956	0.000012
48	38	18	4	0.171926	0.014542	0.006279	1	0.000022
-48	-30	-2	4	0.171926	0.014542	0.006279	0.999957	0.000012
56	4	-22	4	0.171926	0.014542	0.006279	1	0.000026
22	-82	-28	4	0.171926	0.014542	0.006279	0.999998	0.000018
36	-50	38	3	0.366853	0.029104	0.015213	1	0.000021
-42	-2	30	3	0.366853	0.029104	0.015213	1	0.000021
62	-44	26	3	0.366853	0.029104	0.015213	1	0.000036
52	2	-28	3	0.366853	0.029104	0.015213	1	0.000037