Methods

Replication of Moderation Results

To replicate our main findings that brain dynamic metrics among 9 regions of interest (ROI) comprising three neurocognitive networks (midcingulo-insular network, M-CIN; medial frontoparietal network, M-FPN; and lateral frontoparietal network, L-FPN) moderated Age^2 and cognitive flexibility, we re-ran our moderation analyses using ROIs from the Schaefer parcellation (Schaefer et al. 2018). First we extracted 190 ROIs comprising the M-CIN, M-FPN, and L-FPN (**Supplementary Table 2**), and then extracted 400 ROIs comprising the whole-brain (**Supplementary Table 3**). The same pre- and post-processing procedures were followed as described in the main manuscript.

Statistical Analyses

The same statistical procedures were followed as described in the main manuscript, however, we only conducted statistical analyses for the moderation results. Using the 190 ROIs comprising the M-CIN, M-FPN, and L-FPN, we recomputed analyses on brain dynamic metrics and co-activation patterns equivalent to the ones that survived correction in our original analyses (M-FPN/-L-FPN co-activation pattern (CAP) dwell time and transitions). Using the 400 ROIs comprising the whole-brain, all original moderation analyses were recomputed.

Results

Co-activation pattern analysis

Results from the CAP analysis among the 190 Schaefer ROIs comprising the M-CIN, L-FPN, and M-FPN are presented in **Supplementary Figure 4** and the ROIs are listed in **Supplementary Table 2**. CAP 1 was characterized by co-activation among a few L-FPN and M-FPN nodes. CAP 2 was characterized by co-activation primarily among the L-FPN nodes and a few M-CIN nodes. CAP 3 was characterized by co-activation among the M-FPN nodes. CAP 4 was characterized by co-activation primarily among the M-FPN and nodes of the L-FPN. CAP 5 was characterized by co-activation among the M-CIN.

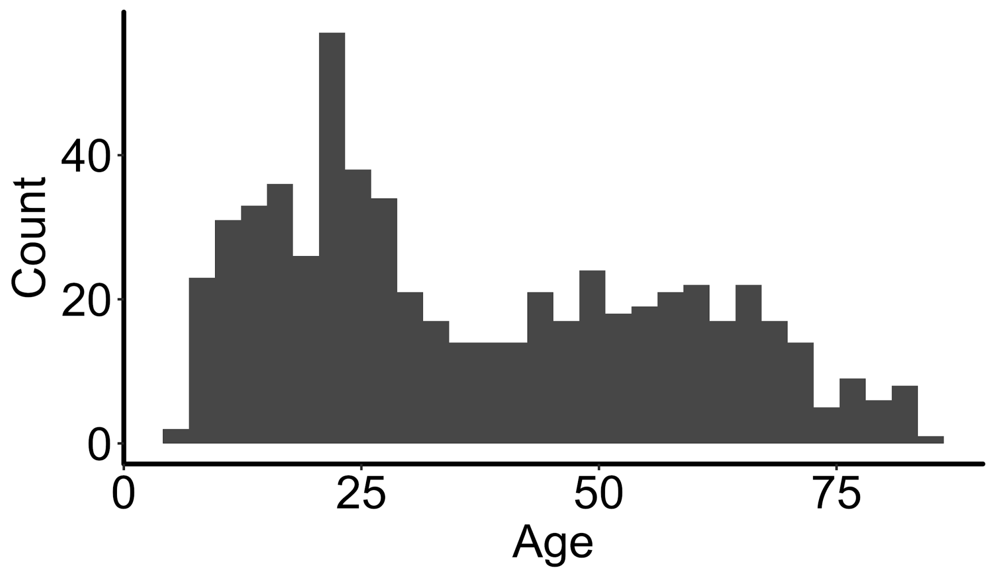
Results from the CAP analysis among the 400 Schaefer ROIs comprising the whole-brain are presented in **Supplementary Figure 5** and the ROIs are listed in **Supplementary Table 3**. CAP 1 was characterized by co-activation among the M-FPN, M-CIN, and somatomotor nodes. CAP 2 was characterized by co-activation primarily among the L-FPN, M-FPN, limbic and somatomotor nodes. CAP 3 was characterized by co-activation among the dorsal attention network (DAN), visual, and a few M-FPN nodes. CAP 4 was characterized by co-activation primarily among the DAN and visual nodes. CAP 5 was characterized by co-activation among the L-FPN, M-FPN, M-CIN, and somatomotor nodes.

Interactions between age and brain dynamics predicting cognitive flexibility

The original results were replicated using the 190 Schaefer ROIs (M-CIN, M-FPN, L-FPN). The dwell time of CAP 4 was chosen in the analysis because in comparison to the other CAPs, it visually had the strongest co-activation pattern among the M-FPN with nodes in the L-FPN as this was similar to the M-FPN/-L-FPN CAP in the original manuscript. We found that the dwell time of CAP 4 moderated the relationship between the quadratic effect of age and cognitive flexibility (trail making test (TMT) switching completion time), $b = < 0.001$, $SE = < 0.001$, $p = .016$. The number of brain state transitions also moderated the relationship between the quadratic effect of age and cognitive flexibility for TMT switching completion time, $b = < 0.001$, $SE = < 0.001$, $p = .048$ (**Supplementary Figure 6**). Overall, our results using more ROIs underlying the M-CIN, M-FPN, and L-FPN replicated our main findings in the original manuscript.

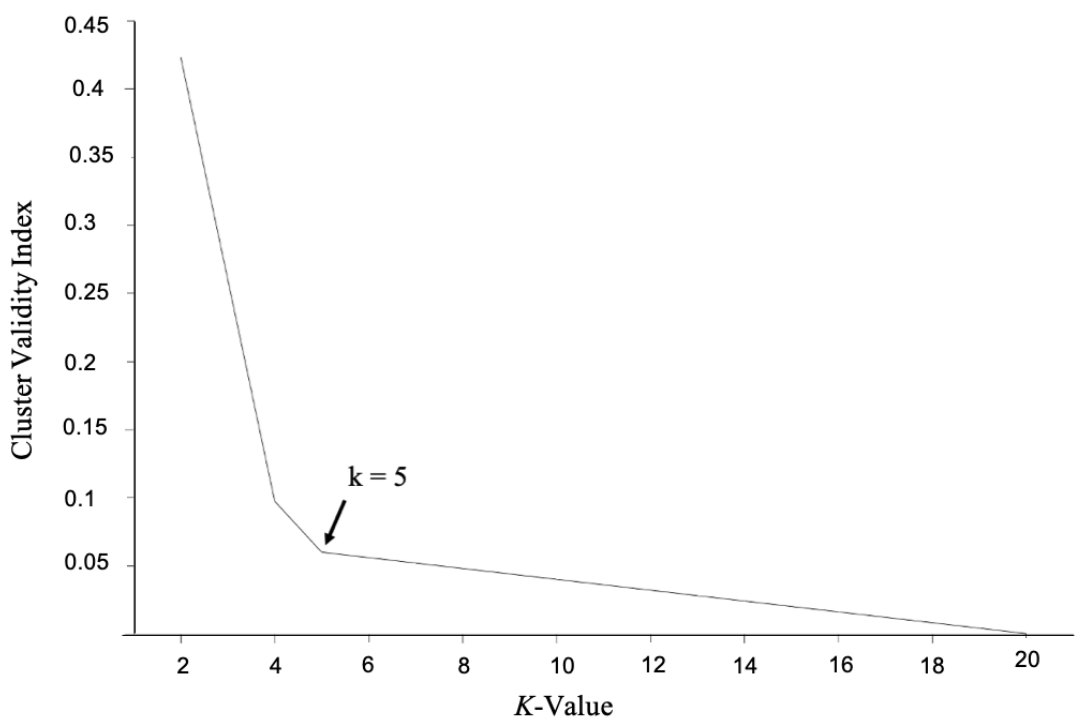
Results from the 400 Schaefer ROIs comprising the whole-brain extended our original results by revealing the same key networks moderate age and cognitive flexibility, however, linear age interactions are seen when more brain regions are involved. After Bonferroni correction ((.05/11 = .005), three significant results remained. The frequency of CAP 2, characterized by co-activation among the L-FPN, M-FPN, limbic and somatomotor nodes, moderated the relationship between the linear effect of age and cognitive flexibility (Verbal Fluency (VF) switching total correct), $b = -0.01$, $SE = 0.01$, $p = .003$. The frequency of CAP 3, characterized by co-activation among the DAN, visual, and a few M-FPN nodes, moderated the relationship between the linear effect of age and cognitive flexibility (Color-Word Interference Test (CWIT) switching completion time), $b = -0.16$, $SE = 0.05$, $p = .002$. Lastly, the frequency of CAP 5, characterized by co-activation among the L-FPN, M-FPN, M-CIN, and somatomotor nodes, moderated the relationship between the linear effect of age and cognitive flexibility (CWIT switching completion time), $b = -0.18$, $SE = 0.05$, $p = < .001$ (**Supplementary Figure 7**). Overall, the results from the whole-brain analysis extend our original findings by revealing dynamic co-activations among the whole-brain, primarily consisting of the M-FPN, L-FPN, and M-CIN, moderate the relationship between age and cognitive flexibility.

Supplementary Figure 1



Supplementary Figure 1. Age histogram of the sample (N = 601)

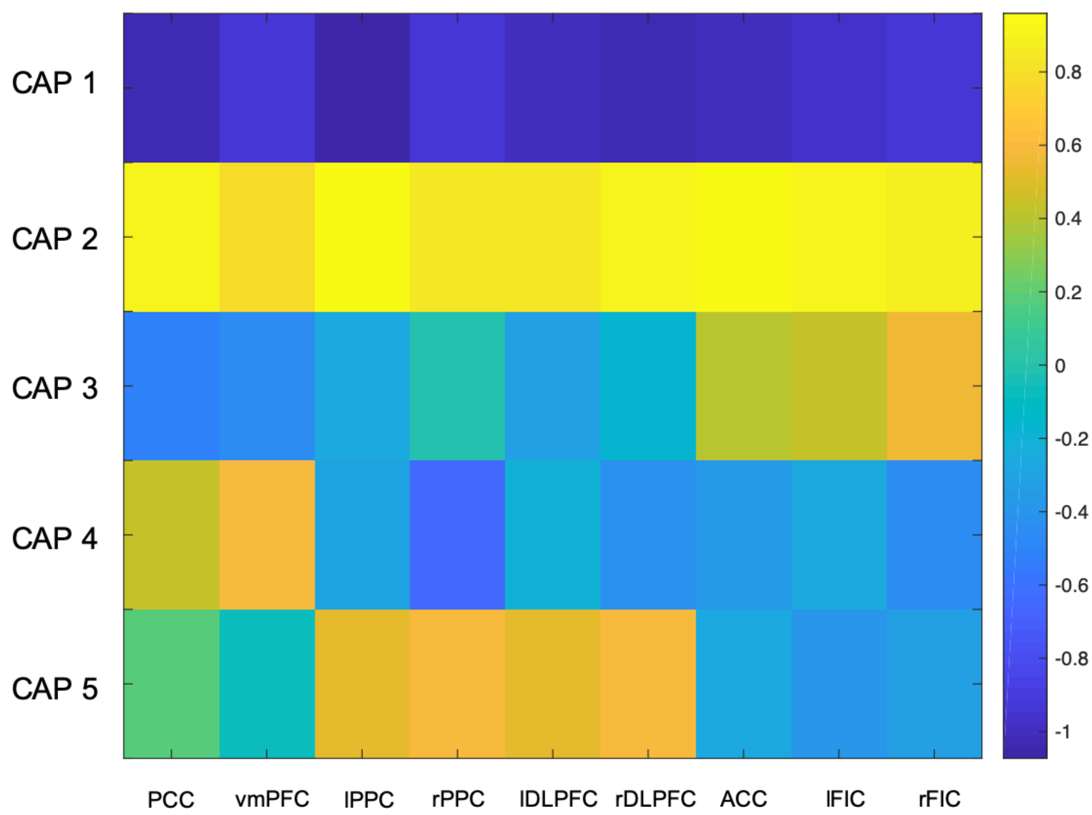
Supplementary Figure 2



Supplementary Figure 2. Elbow Criterion

The elbow criterion identifies $k = 5$ clusters.

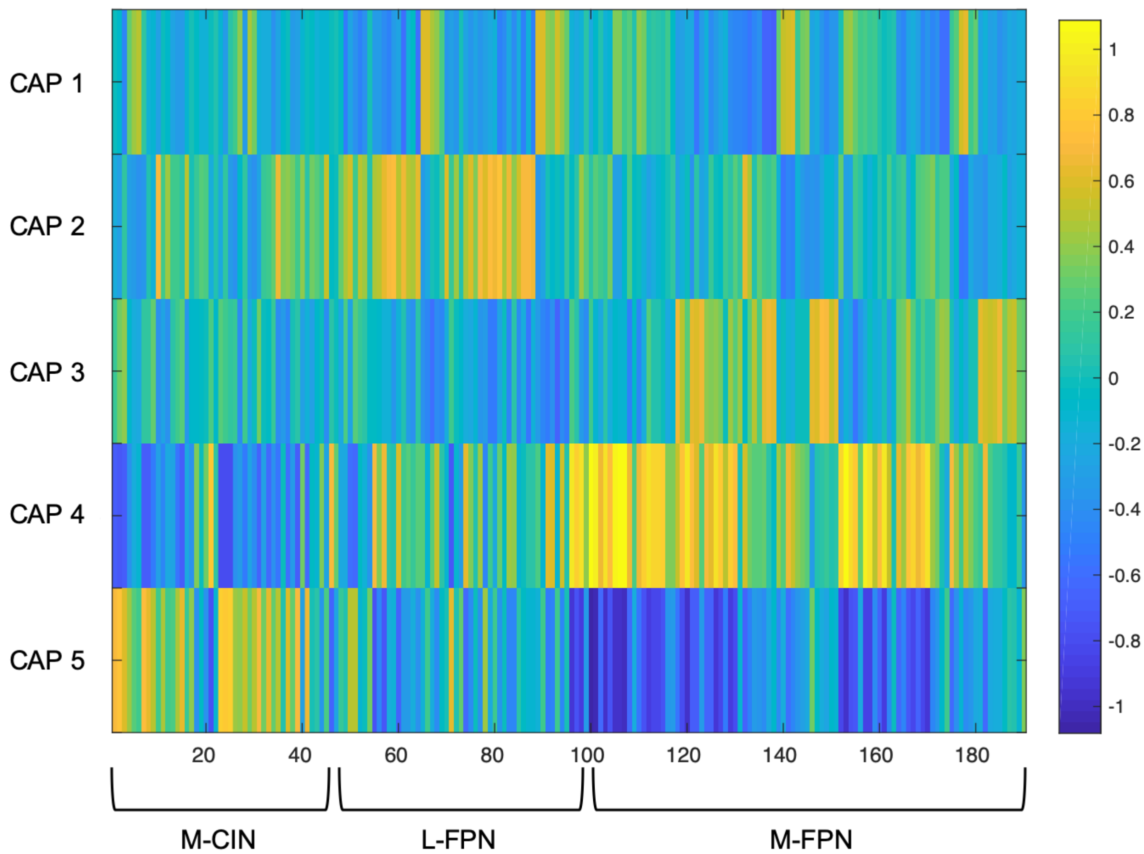
Supplementary Figure 3



Supplementary Figure 3. Analysis without global signal regression

Note: PCC, posterior cingulate cortex; vmPFC, ventromedial prefrontal cortex; lPPC, left posterior parietal cortex; rPPC, right posterior parietal cortex; lDLPFC, left dorsolateral prefrontal cortex; rDLPFC, right dorsolateral prefrontal cortex; ACC, anterior cingulate cortex; lFIC, left fronto-insular cortex; rFIC, right fronto-insular cortex.

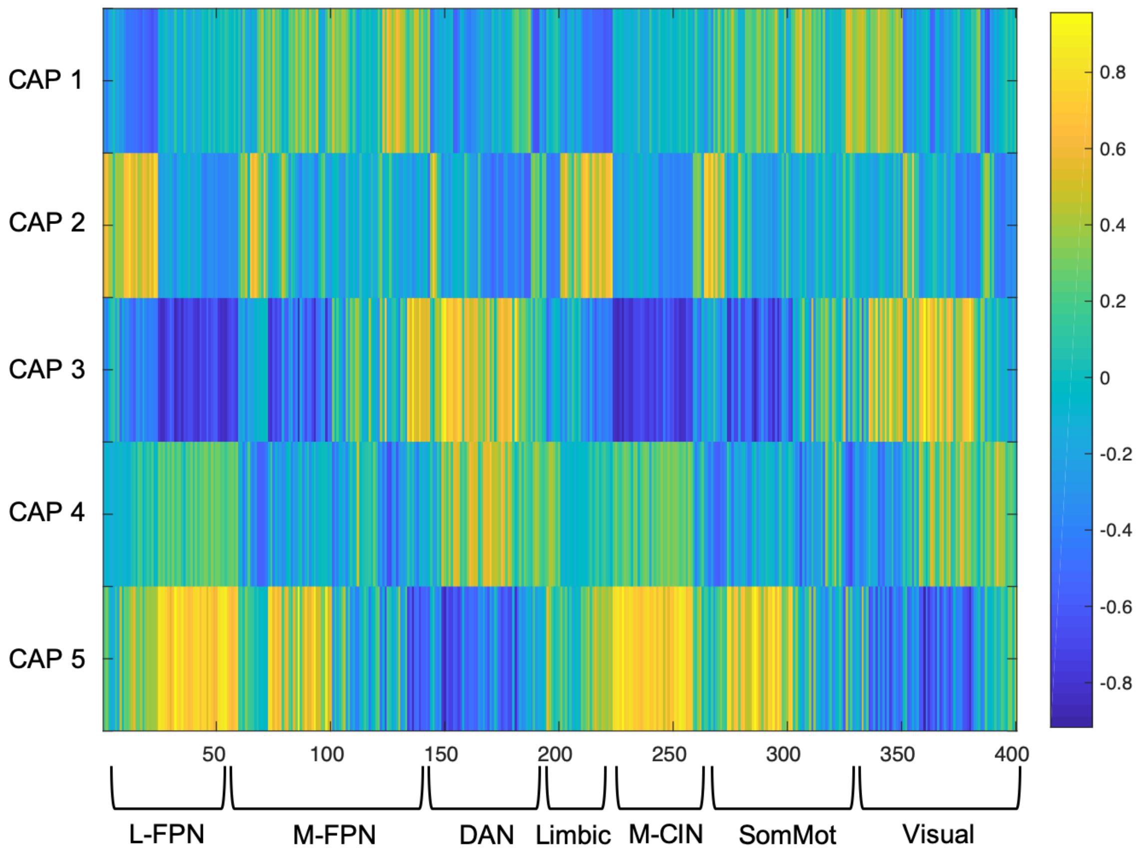
Supplementary Figure 4



Supplementary Figure 4. Co-activation Pattern Analysis (CAP) using Schaefer M-CIN, L-FPN, and M-FPN ROIs

Graphical brain representation of each CAP as demonstrated by the 190 region of interests (ROIs) comprising the M-CIN, L-FPN, and M-FPN. Note: M-CIN, midcingulo-insular network; L-FPN, lateral frontoparietal network; and M-FPN, medial frontoparietal network.

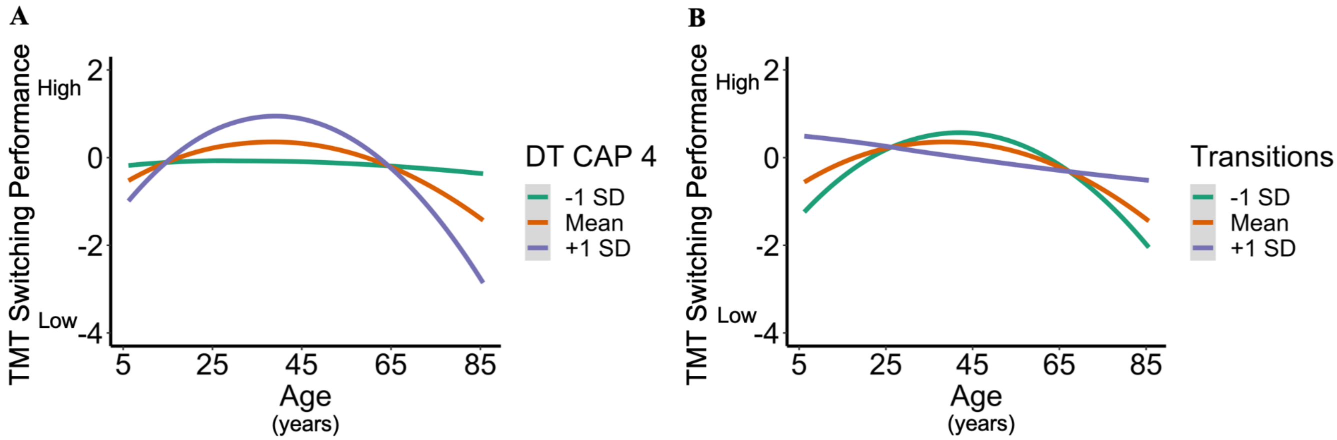
Supplementary Figure 5



Supplementary Figure 5. Co-activation Pattern Analysis (CAP) using Schaefer whole-brain ROIs

Graphical brain representation of each CAP as demonstrated by the 190 region of interests (ROIs) comprising the M-CIN, L-FPN, and M-FPN. Note: L-FPN, lateral frontoparietal network; M-FPN, medial frontoparietal network; DAN, dorsal attention network; M-CIN, midcingulo-insular network; and SomMot, somatomotor.

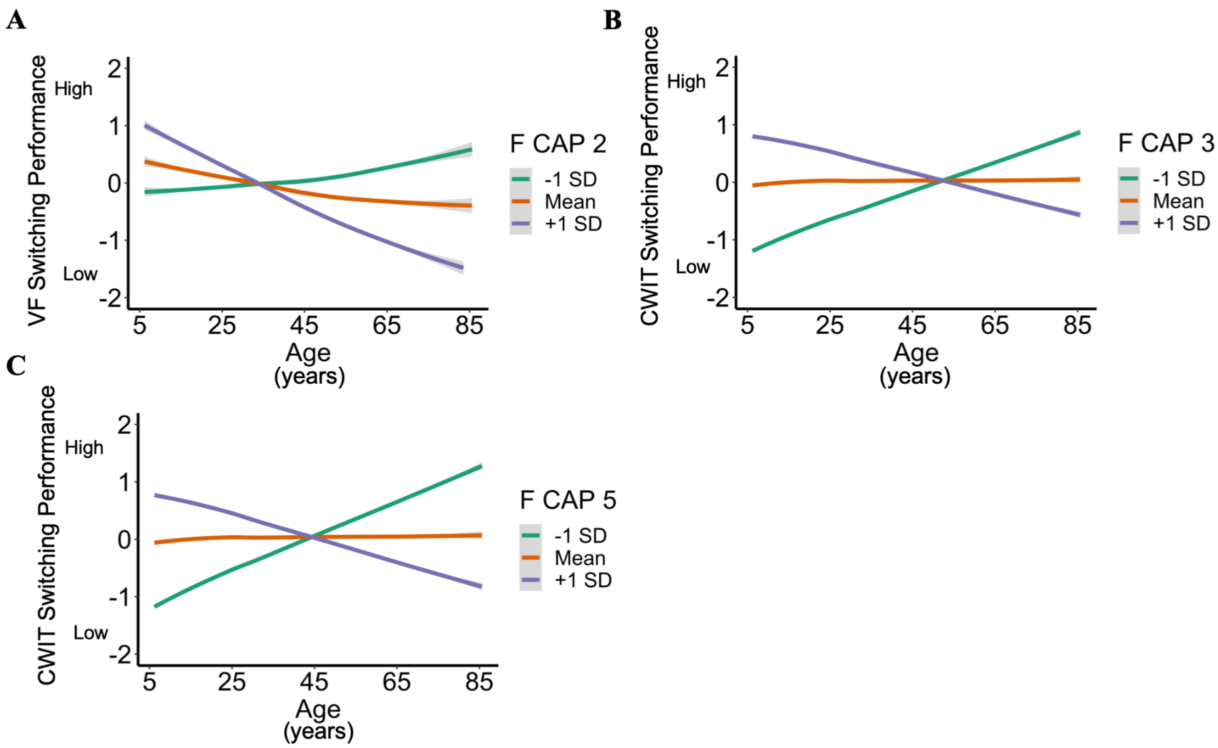
Supplementary Figure 6



Supplementary Figure 6. Schaefer M-FPN, L-FPN, and M-CIN moderation results

The interactions presented in A and B were between Age^2 and the brain dynamic metrics for co-activation pattern (CAP) 4 and brain state transitions, however, they are presented across age for visual purposes. Additionally, the y-axes were reversed and standardized so better cognitive flexibility performance is at higher ends (the top) and poorer cognitive flexibility performance is at lower ends (the bottom) of the y-axes. (**A**) demonstrates the CAP 4 dwell time moderated the relationship between Age^2 and the trail making test (TMT) Switching condition (total time to complete the task) as represented by the simple slopes of CAP 4 dwell time (-1 SD, mean, and +1 *SD*). CAP 4 is characterized by co-activation among the L-FPN (executive control) and M-FPN (default). Children and older adults who spent a longer time in CAP 4 had poorer cognitive flexibility, whereas younger adults had optimal cognitive flexibility regardless of their CAP 5 brain dynamics. (**B**) demonstrates the number of transitions moderated the relationship between Age^2 and the TMT Switching condition (total time to complete the task) as represented by the simple slopes. Children and older adults who had fewer brain state transitions had poorer cognitive flexibility, whereas younger adults had optimal cognitive flexibility regardless of their brain state transitions.

Supplementary Figure 7



Supplementary Figure 7. Schaefer whole-brain moderation results

The interactions presented in A, B, and C were between Age and the brain dynamic metrics for co-activation patterns (CAPs) 2, 3, and 5. Additionally, the y-axes were reversed and standardized so better cognitive flexibility performance is at higher ends (the top) and poorer cognitive flexibility performance is at lower ends (the bottom) of the y-axes. (A) demonstrates the frequency of CAP 2 moderated the relationship between Age and the Verbal Fluency Switching condition (total correct) as represented by the simple slopes of the frequency of CAP 2 (-1 SD, mean, and +1 SD). CAP 2 is characterized by co-activation among the L-FPN (lateral frontoparietal; central executive), M-FPN (medial frontoparietal; default), limbic and somatomotor nodes. (B) demonstrates the frequency of CAP 3 moderated the relationship between Age and the Color-Word Interference Test (completion time) as represented by the simple slopes of the frequency of CAP 3 (-1 SD, mean, and +1 SD). CAP 3 is characterized by co-activation among the dorsal attention network (DAN), visual, and a few M-FPN nodes. (C) demonstrates the frequency of CAP 5 moderated the relationship between Age and the Color-Word Interference Test (completion time) as represented by the simple slopes of the frequency of CAP 5 (-1 SD, mean, and +1 SD). CAP 5 is characterized by co-activation among the L-FPN, M-FPN, M-CIN (midcingulo-insular; salience), and somatomotor node. In A, B, and C, children with more frequently occurring CAP states had greater cognitive flexibility, whereas older adults with less frequently occurring CAP states had greater cognitive flexibility relative to their age groups. Young adults exhibited optimal cognitive flexibility regardless of how frequently the CAP states occurred.

Supplementary Table 1. Summary of the hierarchical regression analysis of age and the brain dynamic metrics predicting cognitive flexibility. To simplify the presentation, we present only the significant variables of interest and not the covariates.

Step	Variable	*β*	*b*	*SE*	*t*	*p*
	Dwell time (DT) CAP 5 and age predict TMT					
1	age	-.07	-0.13	0.09	-1.44	.141
	age^2	.35	0.03	0.004	7.82	< .001***
2	DT CAP 5	.04	2.49	2.31	1.08	.281
3	DT CAP 5 * Age	-.018	-0.05	0.12	-0.40	.690
	DT CAP 5 * Age^2	.20	0.02	0.01	3.13	.002**
	(Constant)	-.003	63.12	7.27	8.69	< .001***
	Transitions and age predict TMT					
1	age	-.07	-0.13	0.09	-1.44	.141

	age^2	.35	0.03	0.004	7.82	< .001***
2	Transitions	.04	0.15	0.16	0.95	.345
3	Transitions* Age	.07	0.1	0.01	1.52	.128
	Transitions * Age^2	-.18	-0.001	0.0004	-2.80	.005**
	(Constant)	-.002	63.30	7.29	8.68	< .001***
	Transitions and age predict CWIT completion time					
1	age	-.28	-0.24	0.04	-5.80	< .001***
	age^2	.43	0.02	0.002	9.47	< .001***
2	Transitions	.01	-0.02	0.07	-0.25	.800
3	Transitions* Age	.08	0.01	0.004	1.84	.067
	Transitions * Age^2	-.17	-0.001	< 0.001	-2.74	.006**
	(Constant)	.01	47.47	3.32	14.28	< .001***
	DT CAP 1 and age predict CWIT total errors					
1	age	-.25	-0.03	0.01	-5.10	< .001***
	age^2	.28	0.002	< 0.001	6.08	< .001***
2	DT CAP 1	.02	0.05	0.13	0.40	.690
3	DT CAP 1* Age	.05	0.01	0.01	1.12	.263
	DT CAP 1 * Age^2	-.17	-0.001	< 0.001	-2.54	.011*
	(Constant)	.002	1.06	0.43	2.47	.014*
	DT CAP 4 and age predict CWIT completion time					
1	age	-.28	-0.24	0.04	-5.80	< .001***
	age^2	.43	0.02	0.002	9.47	< .001***
2	DT CAP 4	-.01	-0.17	0.96	-0.18	0.860
3	DT CAP 4* Age	-.15	-0.17	0.06	-2.97	.003**
	DT CAP 4 * Age^2	.16	0.01	0.003	2.39	.017*
	(Constant)	.01	47.45	3.31	14.34	< .001***

	DT CAP 2 and age predict TMT					
1	age	-.07	-0.13	0.09	-1.44	.141
	age^2	.35	0.03	0.004	7.82	< .001***
2	DT CAP 2	-.04	-2.32	2.32	-1.00	.318
3	DT CAP 2 * Age	-.04	-0.10	0.13	-0.78	.436
	DT CAP 2 * Age^2	.17	0.02	0.01	2.54	.011*
	(Constant)	-.001	62.81	7.31	8.60	< .001***
	DT CAP 3 and age predict TMT					
1	age	-.07	-0.13	0.09	-1.44	.141
	age^2	.35	0.03	0.004	7.82	< .001***
2	DT CAP 3	.03	1.62	2.54	0.64	.525
3	DT CAP 3 * Age	-.03	-0.10	0.14	-0.71	.476
	DT CAP 3 * Age^2	.15	0.02	0.01	2.22	.027*
	(Constant)	-.001	62.60	7.29	8.58	< .001***
	F CAP 5 and age predict TMT					
1	age	-.07	-0.13	0.09	-1.44	.141
	age^2	.35	0.03	0.004	7.82	< .001***
2	F CAP 5	.05	49.64	40.20	1.24	.217
3	F CAP 5 * Age	-.02	-1.00	2.22	-0.45	.652
	F CAP 5 * Age^2	.15	0.26	0.11	2.30	.022*
	(Constant)	-.003	61.79	7.27	8.50	< .001
	DT CAP 2 and age predict VF					
1	age	.39	0.06	0.01	8.70	< .001***
	age^2	-.41	-0.003	< 0.001	-9.68	< .001***
2	DT CAP 2	.15	0.15	0.18	0.83	.408
3	DT CAP 1 * Age	.03	0.01	0.01	0.81	.420

	DT CAP 2 * Age^2	-.16	-0.001	0.001	-2.52	.012*
	(Constant)	-.01	13.47	0.57	23.70	< .001***
	F CAP 3 and age predict VF					
1	age	.39	0.06	0.01	8.70	< .001***
	age^2	-.41	-3.10	1.40	-2.21	.028*
2	F CAP 3	< 0.001	0.03	3.09	0.01	.993
3	F CAP 3 * Age	-.05	-0.20	0.18	-1.14	.253
	F CAP 3 * Age^2	.13	0.02	0.01	1.98	.049
	(Constant)	-.005	13.63	0.57	23.89	< .001***

* $p < .05$
** $p < .01$
*** $p < .001$

Notes: *P*-values are Bonferroni corrected. TMT, trail making test; CWIT, color-word interference test; VF, verbal fluency.

Supplementary Table 2

ROI Number	ROI
1	SalVentAttn_ParOper_1
2	SalVentAttn_ParOper_2
3	SalVentAttn_ParOper_3
4	SalVentAttn_ParOper_4
5	SalVentAttn_TempOcc_1
6	SalVentAttn_FrOperIns_1
7	SalVentAttn_FrOperIns_2
8	SalVentAttn_FrOperIns_3
9	SalVentAttn_FrOperIns_4

10	SalVentAttn_FrOperIns_5
11	SalVentAttn_FrOperIns_6
12	SalVentAttn_FrOperIns_7
13	SalVentAttn_FrOperIns_8
14	SalVentAttn_FrOperIns_9
15	SalVentAttn_PFCl_1
16	SalVentAttn_Med_1
17	SalVentAttn_Med_2
18	SalVentAttn_Med_3
19	SalVentAttn_Med_4
20	SalVentAttn_Med_5
21	SalVentAttn_Med_6
22	SalVentAttn_Med_7
23	SalVentAttn_TempOccPar_1
24	SalVentAttn_TempOccPar_2
25	SalVentAttn_TempOccPar_3
26	SalVentAttn_TempOccPar_4
27	SalVentAttn_TempOccPar_5
28	SalVentAttn_TempOccPar_6
29	SalVentAttn_TempOccPar_7
30	SalVentAttn_PrC_1
31	SalVentAttn_FrOperIns_1
32	SalVentAttn_FrOperIns_2
33	SalVentAttn_FrOperIns_3
34	SalVentAttn_FrOperIns_4
35	SalVentAttn_FrOperIns_5
36	SalVentAttn_FrOperIns_6

37	SalVentAttn_FrOperIns_7
38	SalVentAttn_FrOperIns_8
39	SalVentAttn_PFCl_1
40	SalVentAttn_Med_1
41	SalVentAttn_Med_2
42	SalVentAttn_Med_3
43	SalVentAttn_Med_4
44	SalVentAttn_Med_5
45	SalVentAttn_Med_6
46	SalVentAttn_Med_7
47	SalVentAttn_Med_8
48	Cont_Par_1
49	Cont_Par_2
50	Cont_Par_3
51	Cont_Par_4
52	Cont_Par_5
53	Cont_Par_6
54	Cont_Temp_1
55	Cont_OFC_1
56	Cont_PFCl_1
57	Cont_PFCl_2
58	Cont_PFCl_3
59	Cont_PFCl_4
60	Cont_PFCl_5
61	Cont_PFCl_6
62	Cont_PFCl_7
63	Cont_PFCl_8

64	Cont_PFCv_1
65	Cont_pCun_1
66	Cont_pCun_2
67	Cont_Cing_1
68	Cont_Cing_2
69	Cont_PFCmp_1
70	Cont_Par_1
71	Cont_Par_2
72	Cont_Par_3
73	Cont_Par_4
74	Cont_Par_5
75	Cont_Par_6
76	Cont_Temp_1
77	Cont_Temp_2
78	Cont_PFCv_1
79	Cont_PFCl_1
80	Cont_PFCl_2
81	Cont_PFCl_3
82	Cont_PFCl_4
83	Cont_PFCl_5
84	Cont_PFCl_6
85	Cont_PFCl_7
86	Cont_PFCl_8
87	Cont_PFCl_9
88	Cont_PFCl_10
89	Cont_PFCl_11
90	Cont_PFCl_12

91	Cont_PFCl_13
92	Cont_PFCl_14
93	Cont_PFCl_15
94	Cont_pCun_1
95	Cont_pCun_2
96	Cont_Cing_1
97	Cont_Cing_2
98	Cont_PFCmp_1
99	Cont_PFCmp_2
100	Default_Temp_1
101	Default_Temp_2
102	Default_Temp_3
103	Default_Temp_4
104	Default_Temp_5
105	Default_Temp_6
106	Default_Temp_7
107	Default_Temp_8
108	Default_Temp_9
109	Default_Temp_10
110	Default_Par_1
111	Default_Par_2
112	Default_Par_3
113	Default_Par_4
114	Default_Par_5
115	Default_Par_6
116	Default_Par_7
117	Default_PFC_1

118	Default_PFC_2
119	Default_PFC_3
120	Default_PFC_4
121	Default_PFC_5
122	Default_PFC_6
123	Default_PFC_7
124	Default_PFC_8
125	Default_PFC_9
126	Default_PFC_10
127	Default_PFC_11
128	Default_PFC_12
129	Default_PFC_13
130	Default_PFC_14
131	Default_PFC_15
132	Default_PFC_16
133	Default_PFC_17
134	Default_PFC_18
135	Default_PFC_19
136	Default_PFC_20
137	Default_PFC_21
138	Default_PFC_22
139	Default_PFC_23
140	Default_PFC_24
141	Default_pCunPCC_1
142	Default_pCunPCC_2
143	Default_pCunPCC_3
144	Default_pCunPCC_4

145	Default_pCunPCC_5
146	Default_pCunPCC_6
147	Default_pCunPCC_7
148	Default_pCunPCC_8
149	Default_pCunPCC_9
150	Default_pCunPCC_10
151	Default_pCunPCC_11
152	Default_Par_1
153	Default_Par_2
154	Default_Par_3
155	Default_Par_4
156	Default_Par_5
157	Default_Temp_1
158	Default_Temp_2
159	Default_Temp_3
160	Default_Temp_4
161	Default_Temp_5
162	Default_Temp_6
163	Default_Temp_7
164	Default_Temp_8
165	Default_PFCv_1
166	Default_PFCv_2
167	Default_PFCv_3
168	Default_PFCv_4
169	Default_PFCdPFCm_1
170	Default_PFCdPFCm_2
171	Default_PFCdPFCm_3

172	Default_PFCdPFCm_4
173	Default_PFCdPFCm_5
174	Default_PFCdPFCm_6
175	Default_PFCdPFCm_7
176	Default_PFCdPFCm_8
177	Default_PFCdPFCm_9
178	Default_PFCdPFCm_10
179	Default_PFCdPFCm_11
180	Default_PFCdPFCm_12
181	Default_PFCdPFCm_13
182	Default_pCunPCC_1
183	Default_pCunPCC_2
184	Default_pCunPCC_3
185	Default_pCunPCC_4
186	Default_pCunPCC_5
187	Default_pCunPCC_6
188	Default_pCunPCC_7
189	Default_pCunPCC_8
190	Default_pCunPCC_9

Supplementary Table 3

ROI Number	ROI
1	Cont_Cing_1
2	Cont_Cing_1
3	Cont_Cing_2
4	Cont_Cing_2

5	Cont_OFC_1
6	Cont_Par_1
7	Cont_Par_1
8	Cont_Par_2
9	Cont_Par_2
10	Cont_Par_3
11	Cont_Par_3
12	Cont_Par_4
13	Cont_Par_4
14	Cont_Par_5
15	Cont_Par_5
16	Cont_Par_6
17	Cont_Par_6
18	Cont_pCun_1
19	Cont_pCun_1
20	Cont_pCun_2
21	Cont_pCun_2
22	Cont_PFCl_1
23	Cont_PFCl_1
24	Cont_PFCl_10
25	Cont_PFCl_11
26	Cont_PFCl_12
27	Cont_PFCl_13
28	Cont_PFCl_14
29	Cont_PFCl_15
30	Cont_PFCl_2
31	Cont_PFCl_2

32	Cont_PFCl_3
33	Cont_PFCl_3
34	Cont_PFCl_4
35	Cont_PFCl_4
36	Cont_PFCl_5
37	Cont_PFCl_5
38	Cont_PFCl_6
39	Cont_PFCl_6
40	Cont_PFCl_7
41	Cont_PFCl_7
42	Cont_PFCl_8
43	Cont_PFCl_8
44	Cont_PFCl_9
45	Cont_PFCmp_1
46	Cont_PFCmp_1
47	Cont_PFCmp_2
48	Cont_PFCv_1
49	Cont_PFCv_1
50	Cont_Temp_1
51	Cont_Temp_1
52	Cont_Temp_2
53	Default_Par_1
54	Default_Par_1
55	Default_Par_2
56	Default_Par_2
57	Default_Par_3
58	Default_Par_3

59	Default_Par_4
60	Default_Par_4
61	Default_Par_5
62	Default_Par_5
63	Default_Par_6
64	Default_Par_7
65	Default_pCunPCC_1
66	Default_pCunPCC_1
67	Default_pCunPCC_10
68	Default_pCunPCC_11
69	Default_pCunPCC_2
70	Default_pCunPCC_2
71	Default_pCunPCC_3
72	Default_pCunPCC_3
73	Default_pCunPCC_4
74	Default_pCunPCC_4
75	Default_pCunPCC_5
76	Default_pCunPCC_5
77	Default_pCunPCC_6
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79	Default_pCunPCC_7
80	Default_pCunPCC_7
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82	Default_pCunPCC_8
83	Default_pCunPCC_9
84	Default_pCunPCC_9
85	Default_PFC_1

86	Default_PFC_10
87	Default_PFC_11
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89	Default_PFC_13
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91	Default_PFC_15
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93	Default_PFC_17
94	Default_PFC_18
95	Default_PFC_19
96	Default_PFC_2
97	Default_PFC_20
98	Default_PFC_21
99	Default_PFC_22
100	Default_PFC_23
101	Default_PFC_24
102	Default_PFC_3
103	Default_PFC_4
104	Default_PFC_5
105	Default_PFC_6
106	Default_PFC_7
107	Default_PFC_8
108	Default_PFC_9
109	Default_PFCdPFCm_1
110	Default_PFCdPFCm_10
111	Default_PFCdPFCm_11
112	Default_PFCdPFCm_12

113	Default_PFCdPFCm_13
114	Default_PFCdPFCm_2
115	Default_PFCdPFCm_3
116	Default_PFCdPFCm_4
117	Default_PFCdPFCm_5
118	Default_PFCdPFCm_6
119	Default_PFCdPFCm_7
120	Default_PFCdPFCm_8
121	Default_PFCdPFCm_9
122	Default_PFCv_1
123	Default_PFCv_2
124	Default_PFCv_3
125	Default_PFCv_4
126	Default_Temp_1
127	Default_Temp_1
128	Default_Temp_10
129	Default_Temp_2
130	Default_Temp_2
131	Default_Temp_3
132	Default_Temp_3
133	Default_Temp_4
134	Default_Temp_4
135	Default_Temp_5
136	Default_Temp_5
137	Default_Temp_6
138	Default_Temp_6
139	Default_Temp_7

140	Default_Temp_7
141	Default_Temp_8
142	Default_Temp_8
143	Default_Temp_9
144	DorsAttn_FEF_1
145	DorsAttn_FEF_1
146	DorsAttn_FEF_2
147	DorsAttn_FEF_2
148	DorsAttn_FEF_3
149	DorsAttn_FEF_3
150	DorsAttn_FEF_4
151	DorsAttn_Post_1
152	DorsAttn_Post_1
153	DorsAttn_Post_10
154	DorsAttn_Post_10
155	DorsAttn_Post_11
156	DorsAttn_Post_11
157	DorsAttn_Post_12
158	DorsAttn_Post_12
159	DorsAttn_Post_13
160	DorsAttn_Post_13
161	DorsAttn_Post_14
162	DorsAttn_Post_14
163	DorsAttn_Post_15
164	DorsAttn_Post_15
165	DorsAttn_Post_16
166	DorsAttn_Post_16

167	DorsAttn_Post_17
168	DorsAttn_Post_17
169	DorsAttn_Post_18
170	DorsAttn_Post_19
171	DorsAttn_Post_2
172	DorsAttn_Post_2
173	DorsAttn_Post_3
174	DorsAttn_Post_3
175	DorsAttn_Post_4
176	DorsAttn_Post_4
177	DorsAttn_Post_5
178	DorsAttn_Post_5
179	DorsAttn_Post_6
180	DorsAttn_Post_6
181	DorsAttn_Post_7
182	DorsAttn_Post_7
183	DorsAttn_Post_8
184	DorsAttn_Post_8
185	DorsAttn_Post_9
186	DorsAttn_Post_9
187	DorsAttn_PrCv_1
188	DorsAttn_PrCv_1
189	DorsAttn_PrCv_2
190	Limbic_OFC_1
191	Limbic_OFC_1
192	Limbic_OFC_2
193	Limbic_OFC_2

194	Limbic_OFC_3
195	Limbic_OFC_3
196	Limbic_OFC_4
197	Limbic_OFC_4
198	Limbic_OFC_5
199	Limbic_OFC_5
200	Limbic_OFC_6
201	Limbic_TempPole_1
202	Limbic_TempPole_1
203	Limbic_TempPole_2
204	Limbic_TempPole_2
205	Limbic_TempPole_3
206	Limbic_TempPole_3
207	Limbic_TempPole_4
208	Limbic_TempPole_4
209	Limbic_TempPole_5
210	Limbic_TempPole_5
211	Limbic_TempPole_6
212	Limbic_TempPole_6
213	Limbic_TempPole_7
214	Limbic_TempPole_7
215	Limbic_TempPole_8
216	SalVentAttn_FrOperIns_1
217	SalVentAttn_FrOperIns_1
218	SalVentAttn_FrOperIns_2
219	SalVentAttn_FrOperIns_2
220	SalVentAttn_FrOperIns_3

221	SalVentAttn_FrOperIns_3
222	SalVentAttn_FrOperIns_4
223	SalVentAttn_FrOperIns_4
224	SalVentAttn_FrOperIns_5
225	SalVentAttn_FrOperIns_5
226	SalVentAttn_FrOperIns_6
227	SalVentAttn_FrOperIns_6
228	SalVentAttn_FrOperIns_7
229	SalVentAttn_FrOperIns_7
230	SalVentAttn_FrOperIns_8
231	SalVentAttn_FrOperIns_8
232	SalVentAttn_FrOperIns_9
233	SalVentAttn_Med_1
234	SalVentAttn_Med_1
235	SalVentAttn_Med_2
236	SalVentAttn_Med_2
237	SalVentAttn_Med_3
238	SalVentAttn_Med_3
239	SalVentAttn_Med_4
240	SalVentAttn_Med_4
241	SalVentAttn_Med_5
242	SalVentAttn_Med_5
243	SalVentAttn_Med_6
244	SalVentAttn_Med_6
245	SalVentAttn_Med_7
246	SalVentAttn_Med_7
247	SalVentAttn_Med_8

248	SalVentAttn_ParOper_1
249	SalVentAttn_ParOper_2
250	SalVentAttn_ParOper_3
251	SalVentAttn_ParOper_4
252	SalVentAttn_PFCl_1
253	SalVentAttn_PFCl_1
254	SalVentAttn_PrC_1
255	SalVentAttn_TempOcc_1
256	SalVentAttn_TempOccPar_1
257	SalVentAttn_TempOccPar_2
258	SalVentAttn_TempOccPar_3
259	SalVentAttn_TempOccPar_4
260	SalVentAttn_TempOccPar_5
261	SalVentAttn_TempOccPar_6
262	SalVentAttn_TempOccPar_7
263	SomMot_1
264	SomMot_1
265	SomMot_10
266	SomMot_10
267	SomMot_11
268	SomMot_11
269	SomMot_12
270	SomMot_12
271	SomMot_13
272	SomMot_13
273	SomMot_14
274	SomMot_14

275	SomMot_15
276	SomMot_15
277	SomMot_16
278	SomMot_16
279	SomMot_17
280	SomMot_17
281	SomMot_18
282	SomMot_18
283	SomMot_19
284	SomMot_19
285	SomMot_2
286	SomMot_2
287	SomMot_20
288	SomMot_20
289	SomMot_21
290	SomMot_21
291	SomMot_22
292	SomMot_22
293	SomMot_23
294	SomMot_23
295	SomMot_24
296	SomMot_24
297	SomMot_25
298	SomMot_25
299	SomMot_26
300	SomMot_26
301	SomMot_27

302	SomMot_27
303	SomMot_28
304	SomMot_28
305	SomMot_29
306	SomMot_29
307	SomMot_3
308	SomMot_3
309	SomMot_30
310	SomMot_30
311	SomMot_31
312	SomMot_31
313	SomMot_32
314	SomMot_32
315	SomMot_33
316	SomMot_33
317	SomMot_34
318	SomMot_34
319	SomMot_35
320	SomMot_35
321	SomMot_36
322	SomMot_36
323	SomMot_37
324	SomMot_37
325	SomMot_38
326	SomMot_39
327	SomMot_4
328	SomMot_4

329	SomMot_40
330	SomMot_5
331	SomMot_5
332	SomMot_6
333	SomMot_6
334	SomMot_7
335	SomMot_7
336	SomMot_8
337	SomMot_8
338	SomMot_9
339	SomMot_9
340	Vis_1
341	Vis_1
342	Vis_10
343	Vis_10
344	Vis_11
345	Vis_11
346	Vis_12
347	Vis_12
348	Vis_13
349	Vis_13
350	Vis_14
351	Vis_14
352	Vis_15
353	Vis_15
354	Vis_16
355	Vis_16

356	Vis_17
357	Vis_17
358	Vis_18
359	Vis_18
360	Vis_19
361	Vis_19
362	Vis_2
363	Vis_2
364	Vis_20
365	Vis_20
366	Vis_21
367	Vis_21
368	Vis_22
369	Vis_22
370	Vis_23
371	Vis_23
372	Vis_24
373	Vis_24
374	Vis_25
375	Vis_25
376	Vis_26
377	Vis_26
378	Vis_27
379	Vis_27
380	Vis_28
381	Vis_28
382	Vis_29

383	Vis_29
384	Vis_3
385	Vis_3
386	Vis_30
387	Vis_30
388	Vis_31
389	Vis_4
390	Vis_4
391	Vis_5
392	Vis_5
393	Vis_6
394	Vis_6
395	Vis_7
396	Vis_7
397	Vis_8
398	Vis_8
399	Vis_9
400	Vis_9

Supplementary Table 4. Summary of the whole-brain moderation results. To simplify the presentation, we present only the significant variables of interest and not the covariates. Additionally step 1 of the models are omitted as the results of those steps can be seen in Supplementary Table 1.

Step	Variable	*b*	*SE*	*t*	*p*
	Dwell time (DT) CAP 1 and age predict CWIT completion time				
2	DT CAP 1	0.06	0.05	1.07	.283
3	DT CAP 1 * Age	< 0.001	< 0.001	2.50	.013*
	DT CAP 1 * Age^2	< 0.001	< 0.001		.448

	(Constant)	0.60	0.36		.099
	DT CAP 3 and age predict CWIT completion time				
2	DT CAP 3	0.04	0.05	0.85	.397
3	DT CAP 3 * Age	< 0.001	< 0.001	-2.13	.034*
	DT CAP 3 * Age^2	< 0.001	< 0.001	0.64	.520
	(Constant)	< 0.001	< 0001	1.91	.057
	DT CAP 5 and age predict CWIT completion time				
2	DT CAP 5	0.02	0.05	0.47	.641
3	DT CAP 5 * Age	-0.01	0.003	-2.70	.007**
	DT CAP 5 * Age^2	< 0.001	< 0.001	1.70	.090
	(Constant)	1.19	0.42	2.83	.005**
	Frequency (F) CAP 1 and age predict CWIT completion time				
2	F CAP 1	0.55	1.00	0.55	.586
3	F CAP 1 * Age	0.17	0.05	3.15	.002**
	F CAP 1 * Age^2	-0.01	0.002	-2.29	.022*
	(Constant)	0.29	0.36	0.80	.422
	F CAP 2 and age predict CWIT completion time				
2	F CAP 2	-1.32	0.94	-1.40	.161
3	F CAP 2 * Age	0.11	0.05	2.18	.029*
	F CAP 2 * Age^2	-0.003	0.003	-1.04	.301
	(Constant)	0.95	0.30	3.19	.002**
	F CAP 3 and age predict CWIT completion time				
2	F CAP 3	1.73	0.92	1.87	.062
3	F CAP 3 * Age	-0.16	0.05	-3.14	.002**
	F CAP 3 * Age^2	0.01	0.002	1.97	.050
	(Constant)	0.81	0.32	2.53	.012*
	F CAP 5 and age predict CWIT completion time				
2	F CAP 5	0.29	0.93	0.31	.757

3	F CAP 5 * Age	-0.18	0.05	-3.55	< .001***
	F CAP 5 * Age^2	0.01	0.002	1.89	.059
	(Constant)	1.06	0.33	3.22	.001**
	DT CAP 2 and age predict VF				
2	DT CAP 3	-0.01	0.05	-0.21	.833
3	DT CAP 3 * Age	-0.01	0.002	-2.14	.033*
	DT CAP 3 * Age^2	< 0.001	< 0.001	1.27	.033*
	(Constant)	0.22	0.32	0.69	.491
	DT CAP 3 and age predict VF				
2	DT CAP 5	0.01	0.05	0.132	.895
3	DT CAP 5 * Age	0.01	0.003	2.65	.008**
	DT CAP 5 * Age^2	< 0.001	< 0.001	-2.15	.032*
	(Constant)	-0.45	0.37	-1.24	.216
	DT CAP 5 and age predict VF				
2	F CAP 1	0.03	0.05	0.58	.564
3	F CAP 1 * Age	0.005	0.003	1.94	.053
	F CAP 1 * Age^2	< 0.001	< 0.001	-2.34	.020*
	(Constant)	-0.77	0.40	-1.93	.054
	F CAP 2 and age predict VF				
2	F CAP 2	-0.71	0.90	-0.79	.432
3	F CAP 2 * Age	-0.01	0.01	-2.99	.003**
	F CAP 2 * Age^2	0.005	0.002	1.87	.061
	(Constant)	0.04	0.03	1.21	.187

* $p < .05$
** $p < .01$
*** $p < .001$

Note: *P*-values are Bonferroni corrected. CWIT, color-word interference test; VF, verbal fluency.

References

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