

## SUPPLEMENTARY MATERIAL

**Table S1:** Lesion locations of the Frontal Lobe (FL), Basal Ganglia (BG) and Parietal-temporal (PTL) clinical groups. Lesion site was determined by (T1 and T2 weighted) anatomical MRI datasets from a 3.0T system (Brucker 30/100 Medspec) and evaluated by the chief neurologist and an experienced neuroanatomist.

Abbreviations: ant – anterior, CA – cerebral angiopathy, CG – cingulate gyrus, e – externa, EI – embolic infarction, FL-LAT – frontolateral group, FL-POL – frontopolar, GP – Globus pallidus, ICB – Intracerebral bleeding, IFG – inferior frontal gyrus, ITG – inferior temporal gyrus, i – interna, II – Ischemic Infarction, IPS – intraparietal sulcus, MTG – middle temporal gyrus, OM – olfactory meningioma, Other – other regions containing small lesions or lacuna, pos – posterior, SFG – superior frontal gyrus, SFS – superior frontal sulcus, SR – surgically removed, T – tumor, TBI – Traumatic brain injury

Patient	Group	Hem.	Lesion Description	Etiology
<i>FRONTAL LOBE GROUP</i>				
1	FL-LAT	right	SFG (pos), SFS, Central sulcus Other: none	II
2	FL-LAT	right	IFG, MFG Other: insula (ant), left cerebellum	II
3	FL-LAT	right	MFG (ant) Other: none	II
4	FL-LAT	left	IFG (pars triangularis) Other: insula (ant)	II
5	FL-LAT	left	IFG, MFG (pos) Other: insula (ant), temporal pole	II
6	FL-LAT	left	Precentral sulcus Other: IPS (ant)	II
7	FL-LAT	left	IFG (pars orbitalis) Other: insula (ant)	ICB
8	FL-LAT	left	IFG (pos), MFG (pos) Other: insula (ant), putamen, right thalamus	II
9	FL-LAT	left	MFG (pos), Precentral gyrus, Other: thalamus	II
10	FL-POL	left	Frontal pole Other: none	T-SR
11	FL-POL	left	Frontal pole, Orbital gyri Other: striatum, corpus callosum	II
12	FL-POL	bilateral (R >> L)	Orbital Gyri Other: none	TBI
13	FL-POL	bilateral	Frontal pole, Orbital gyri Other: temporal pole, ITG (ant)	TBI
14	FL-POL	bilateral (R >> L)	Frontal pole, Orbital gyri Other: none	TBI
15	FL-POL	bilateral (R >> L)	Frontal pole, Orbital gyri Other: temporal pole, ITG (ant)	TBI
16	FL-POL	bilateral	Frontal pole, Orbital gyri Other: temporal pole	TBI
17	FL-POL	bilateral	Frontal pole, Orbital gyri Other: none	OM-SR
18	FL-POL	bilateral (L > R)	Frontal pole, Orbital gyri Other: none	TBI

19	FL-POL	right	Frontal pole, Orbital gyri Other: none	OM-SR
20	FL-POL	bilateral (L > R)	Frontal pole, Orbital gyri Other: ITG, MTG, fusiform gyrus	TBI
21	FL-EXT	right	IFG, Orbital Gyrus Other: insula (ant)	TBI
22	FL-EXT	bilateral	Frontal pole, Orbital Gyrus, Frontomedian wall Other: striatum, temporal pole	ICB
23	FL-EXT	left	Frontal pole, Orbital Gyrus, Frontomedian wall Other: corpus callosum	II
24	FL-EXT	left	Frontal pole, Orbital Gyrus Other: corpus callosum, striatum	OM-SR
25	FL-EXT	right	IFG, MFG, SFG Other: insula, postcentral gyrus , temporal pole, STG	II
26	FL-EXT	left	CG, Frontal pole, Orbital Gyrus, Frontomedian wall Other: corpus callosum, striatum, temporal pole, parietomedian wall	II
27	FL-EXT	bilateral (R >> L)	Frontal pole, Orbital gyri, Frontomedian wall Other: none	TBI
28	FL-EXT	bilateral	Frontal pole, Frontomedian wall Other: corpus callosum	CA, T-SR
29	FL-EXT	bilateral	SFG, SFS, MFG Other: none	T-SR
<i>BASAL GANGLIA GROUP</i>				
1	BG	bilateral (R >> L)	Putamen (pos), Internal Capsule Other: none	ICB, CA
2	BG	left	GPe, Internal Capsule, Caudate Nucleus (body) Other : thalamus (ant)	EI
3	BG	left	Putamen (pos), GP, Internal Capsule Other: thalamus (pos), claustrum	ICB, CA
4	BG	left	Caudate Nucleus, Putamen, GP, Internal Capsule Other: claustrum	EI
5	BG	left	Caudate Nucleus, Putamen Other: none	II
6	BG	left	Putamen (pos) Other: none	II
7	BG	left	Putamen (pos), GP, Internal capsule Other: none	II
8	BG	left	Putamen (pos), Caudate Nucleus, Internal capsule Other: none	II
9	BG	right	Putamen (pos), GPe, Internal capsule Other: none	II
10	BG	right	Putamen (pos), Caudate Nucleus Other: none	II
11	BG	right	Putamen, Caudate Nucleus (head) Other: none	II
12	BG	right	Caudate Nucleus (head) Other: none	II
13	BG	right	Putamen, Caudate Nucleus, Internal & External Capsule. Other: thalamus, postcentral gyrus	II
14	BG	right	Caudate Nucleus (head), Putamen (ant), GP, Substantia	II

			Nigra	
15	BG	right	Caudate Nucleus (body), Putamen (ant), Internal Capsule. Other: none	II
16	BG	right	Putamen (pos), Caudate Nucleus (body), Other: claustrum, insula	ICB
<i>PARIETAL-TEMPORAL GROUP</i>				
1	PTL	bilateral (R > L)	STG, ITG, Angular Gyrus Other: fusiform gyrus, lingual gyrus	ICB, CA
2	PTL	bilateral	STG, MTG, Angular Gyrus, Supramarginal Gyrus Other: temporal pole, orbital gyrus	II
3	PTL	bilateral (R > L)	STG, MTG, Supramarginal Gyrus Other: temporal pole, frontal pole	ICB
4	PTL	left	STG, ITS, Supramarginal Gyrus, Postcentral Gyrus Other: insula, striatum, IFG	II
5	PTL	left	STG, STS Other: insula	II
6	PTL	left	STG, STS Other: none	ICB
7	PTL	left	STG, MTG, Temporal pole Other: striatum	II
8	PTL	left	STG, ITG, Angular gyrus Other: striatum	ICB
9	PTL	left	STG, Supramarginal Gyrus, Angular gyrus, IPS Other: posterior insula	II
10	PTL	left	STG, MTG, Supramarginal Gyrus, Angular gyrus, IPS Other: posterior insula	II
11	PTL	right	STG, Supramarginal Gyrus Other: none	ICB

**Table S2:** Results of the FL versus FL-CT hierarchical regression analyses. The two values of especial interest are the Effect size (Cohen's  $f^2$ ) attributable to the addition of Group variable to the Model as well as the associated Significance Level.

		R <sup>2</sup>	Effect size ( $f^2$ )	Beta	Significance
Alternate Uses Originality	Model 1: IQ	.106	0.22	.326	P = .013
	Model 2: IQ	.264		.150	P = .239
	Model 2: Group			.435	<b>P &lt; .001</b>
Alternate Uses Fluency	Model 1: IQ	.104	0.25	.323	P = .014
	Model 2: IQ	.284		.135	P = .282
	Model 2: Group			.464	<b>P &lt; .001</b>
Conceptual Expansion	Model 1: IQ	.107	0.00	.327	P = .012
	Model 2: IQ	.107		.330	P = .021
	Model 2: Group			-.008	<b>P = .954</b>
Constraints of Examples	Model 1: IQ	.004	0.00	.063	P = .637
	Model 2: IQ	.004		.059	P = .690
	Model 2: Group			.011	<b>P = .941</b>
Creative Imagery: ORIG	Model 1: IQ	.019	0.04	.136	P = .308
	Model 2: IQ	.060		.046	P = .749
	Model 2: Group			.223	<b>P = .124</b>
Creative Imagery: RELE	Model 1: IQ	.005	0.22	.067	P = .615
	Model 2: IQ	.183		-.119	P = .376
	Model 2: Group			.462	<b>P = .001</b>
RAT: Total	Model 1: IQ	.004	0.02	.067	P = .620
	Model 2: IQ	.019		.041	P = .927
	Model 2: Group			.131	<b>P = .372</b>
RAT: Nonstandard	Model 1: IQ	.003	0.06	.055	P = .679
	Model 2: IQ	.056		.157	P = .279
	Model 2: Group			-.251	<b>P = .086</b>
Insight PS: Candle Task	Model 1: IQ	.004	0.03	.065	P = .627
	Model 2: IQ	.033		-.010	P = .944
	Model 2: Group			.187	<b>P = .203</b>
Incremental PS: Hanoi Task	Model 1: IQ	.012	0.01	.112	P = .403
	Model 2: IQ	.024		.064	P = .664
	Model 2: Group			.119	<b>P = .416</b>

**Table S3:** Results of the BG versus BG-CT hierarchical regression analyses. The two values of especial interest are the Effect size (Cohen's  $f^2$ ) attributable to the addition of Group variable to the Model as well as the associated Significance Level.

		R <sup>2</sup>	Effect size ( $f^2$ )	Beta	Significance
Alternate Uses Originality	Model 1: IQ	.279	0.14	.528	P = .002
	Model 2: IQ	.365		.309	P = .106
	Model 2: Group			.366	<b>P = .057</b>
Alternate Uses Fluency	Model 1: IQ	.331	0.09	.575	P = .001
	Model 2: IQ	.386		.400	P = .036
	Model 2: Group			.292	<b>P = .119</b>
Conceptual Expansion	Model 1: IQ	.109	0.00	.331	P = .064
	Model 2: IQ	.111		.364	P = .107
	Model 2: Group			-.056	<b>P = .801</b>
Constraints of Examples	Model 1: IQ	.023	0.13	.153	P = .404
	Model 2: IQ	.133		-.095	P = .663
	Model 2: Group			.413	<b>P = .066</b>
Creative Imagery: ORIG	Model 1: IQ	.205	0.02	.452	P = .009
	Model 2: IQ	.221		.356	P = .093
	Model 2: Group			.160	<b>P = .440</b>
Creative Imagery: RELE	Model 1: IQ	.145	0.10	.381	P = .032
	Model 2: IQ	.222		.173	P = .406
	Model 2: Group			.347	<b>P = .101</b>
RAT: Total	Model 1: IQ	.163	0.02	.403	P = .022
	Model 2: IQ	.178		.311	P = .150
	Model 2: Group			.153	<b>P = .472</b>
RAT: Nonstandard	Model 1: IQ	.003	0.02	-.315	P = .755
	Model 2: IQ	.022		-.693	P = .494
	Model 2: Group			.739	<b>P = .466</b>
Insight PS: Candle Task	Model 1: IQ	.004	0.00	.066	P = .721
	Model 2: IQ	.007		.443	P = .661
	Model 2: Group			-.265	<b>P = .793</b>
Incremental PS: Hanoi Task	Model 1: IQ	.001	0.16	-.026	P = .889
	Model 2: IQ	.142		-.308	P = .163
	Model 2: Group			.470	<b>P = .037</b>

**Table S4:** Results of the PTL versus PTL-CT hierarchical regression analyses. The two values of especial interest are the Effect size (Cohen's  $f^2$ ) attributable to the addition of Group variable to the Model as well as the associated Significance Level.

		R <sup>2</sup>	Effect size ( $f^2$ )	Beta	Significance
Alternate Uses Originality	Model 1: IQ	.166	0.03	.407	P = .060
	Model 2: IQ	.193		.365	P = .102
	Model 2: Group			.171	<b>P = .431</b>
Alternate Uses Fluency	Model 1: IQ	.119	0.20	.345	P = .116
	Model 2: IQ	.267		.247	P = .239
	Model 2: Group			.397	<b>P = .065</b>
Conceptual Expansion	Model 1: IQ	.000	0.02	.013	P = .954
	Model 2: IQ	.024		-.026	P = .911
	Model 2: Group			.160	<b>P = .502</b>
Constraints of Examples	Model 1: IQ	.003	0.25	.053	P = .815
	Model 2: IQ	.204		.167	P = .438
	Model 2: Group				-.463
Creative Imagery: ORIG	Model 1: IQ	.012	0.01	.109	P = .629
	Model 2: IQ	.017		.091	P = .701
	Model 2: Group				.072
Creative Imagery: RELE	Model 1: IQ	.212	0.37	.460	P = .031
	Model 2: IQ	.426		.342	P = .072
	Model 2: Group				.477
RAT: Total	Model 1: IQ	.193	0.15	.439	P = .041
	Model 2: IQ	.301		.355	P = .088
	Model 2: Group				.339
RAT: Nonstandard	Model 1: IQ	.009	0.03	.415	P = .682
	Model 2: IQ	.035		.218	P = .830
	Model 2: Group				.728
Insight PS: Candle Task	Model 1: IQ	.035	0.10	-.187	P = .405
	Model 2: IQ	.120		-.261	P = .254
	Model 2: Group				.300
Incremental PS: Hanoi Task	Model 1: IQ	.037	0.06	.191	P = .394
	Model 2: IQ	.093		.131	P = .569
	Model 2: Group				.245

**Table S5:** Results of the FL-EXT versus FL-EXT-CT hierarchical regression analyses. The two values of especial interest are the Effect size (Cohen's  $f^2$ ) attributable to the addition of Group variable to the Model as well as the associated Significance Level.

		R <sup>2</sup>	Effect size ( $f^2$ )	Beta	Significance
Alternate Uses Originality	Model 1: IQ	.188	0.12	.433	P = .073
	Model 2: IQ	.275		.284	P = .268
	Model 2: Group			.331	<b>P = .199</b>
Alternate Uses Fluency	Model 1: IQ	.197	0.78	.444	P = .065
	Model 2: IQ	.550		.143	P = .473
	Model 2: Group			.666	<b>P = .004</b>
Conceptual Expansion	Model 1: IQ	.215	0.04	.463	P = .053
	Model 2: IQ	.242		.547	P = .046
	Model 2: Group			-.185	<b>P = .473</b>
Constraints of Examples	Model 1: IQ	.012	0.01	-.109	P = .665
	Model 2: IQ	.022		-.059	P = .838
	Model 2: Group			-.111	<b>P = .705</b>
Creative Imagery: ORIG	Model 1: IQ	.208	0.02	.456	P = .057
	Model 2: IQ	.221		.400	P = .139
	Model 2: Group			.126	<b>P = .630</b>
Creative Imagery: RELE	Model 1: IQ	.101	0.30	.318	P = .198
	Model 2: IQ	.310		.087	P = .722
	Model 2: Group			.512	<b>P = .050</b>
RAT: Total	Model 1: IQ	.025	0.00	-.159	P = .529
	Model 2: IQ	.029		-.128	P = .659
	Model 2: Group			-.068	<b>P = .816</b>
RAT: Nonstandard	Model 1: IQ	.160	0.15	.400	P = .100
	Model 2: IQ	.271		.569	P = .036
	Model 2: Group			-.374	<b>P = .151</b>
Insight PS: Candle Task	Model 1: IQ	.102	0.02	.319	P = .551
	Model 2: IQ	.121		.249	P = .374
	Model 2: Group			.155	<b>P = .577</b>
Incremental PS: Hanoi Task	Model 1: IQ	.136	0.00	.363	P = .133
	Model 2: IQ	.138		.392	P = .165
	Model 2: Group			-.053	<b>P = .846</b>

**Table S6:** Results of the FL-LAT versus FL-LAT-CT hierarchical regression analyses. The two values of especial interest are the Effect size (Cohen's  $f^2$ ) attributable to the addition of Group variable to the Model as well as the associated Significance Level.

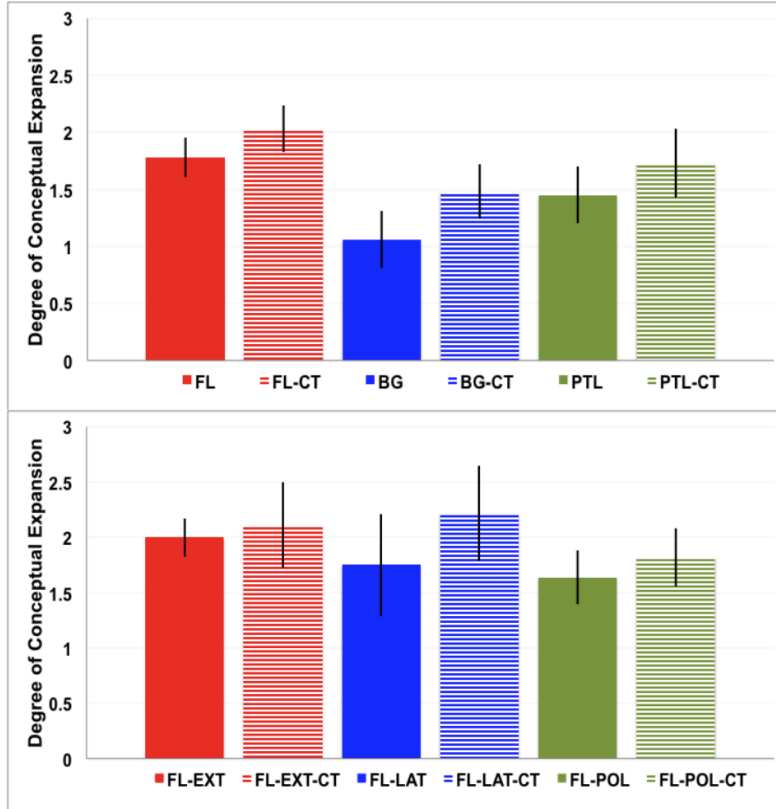
		R <sup>2</sup>	Effect size ( $f^2$ )	Beta	Significance
Alternate Uses Originality	Model 1: IQ	.002	0.44	.05	P = .845
	Model 2: IQ	.305		-.05	P = .824
	Model 2: Group			.559	<b>P = .022</b>
Alternate Uses Fluency	Model 1: IQ	.053	1.01	.230	P = .359
	Model 2: IQ	.528		.106	P = .566
	Model 2: Group			.701	<b>P = .001</b>
Conceptual Expansion	Model 1: IQ	.114	0.02	.338	P = .170
	Model 2: IQ	.129		.317	P = .216
	Model 2: Group			.122	<b>P = .625</b>
Constraints of Examples	Model 1: IQ	.108	0.09	.328	P = .184
	Model 2: IQ	.178		.376	P = .135
	Model 2: Group			-.269	<b>P = .276</b>
Creative Imagery: ORIG	Model 1: IQ	.068	0.22	-.261	P = .295
	Model 2: IQ	.234		-.335	P = .166
	Model 2: Group			.414	<b>P = .092</b>
Creative Imagery: RELE	Model 1: IQ	.023	0.33	-.152	P = .546
	Model 2: IQ	.265		-.241	P = .301
	Model 2: Group			.500	<b>P = .042</b>
RAT: Total	Model 1: IQ	.001	0.07	-.034	P = .893
	Model 2: IQ	.070		-.082	P = .751
	Model 2: Group			.268	<b>P = .307</b>
RAT: Nonstandard	Model 1: IQ	.023	0.06	.151	P = .550
	Model 2: IQ	.075		.192	P = .459
	Model 2: Group			-.232	<b>P = .373</b>
Insight PS: Candle Task	Model 1: IQ	.027	0.04	-.165	P = .513
	Model 2: IQ	.060		-.198	P = .449
	Model 2: Group			.184	<b>P = .480</b>
Incremental PS: Hanoi Task	Model 1: IQ	.099	0.00	-.314	P = .204
	Model 2: IQ	.102		-.325	P = .211
	Model 2: Group			.058	<b>P = .820</b>



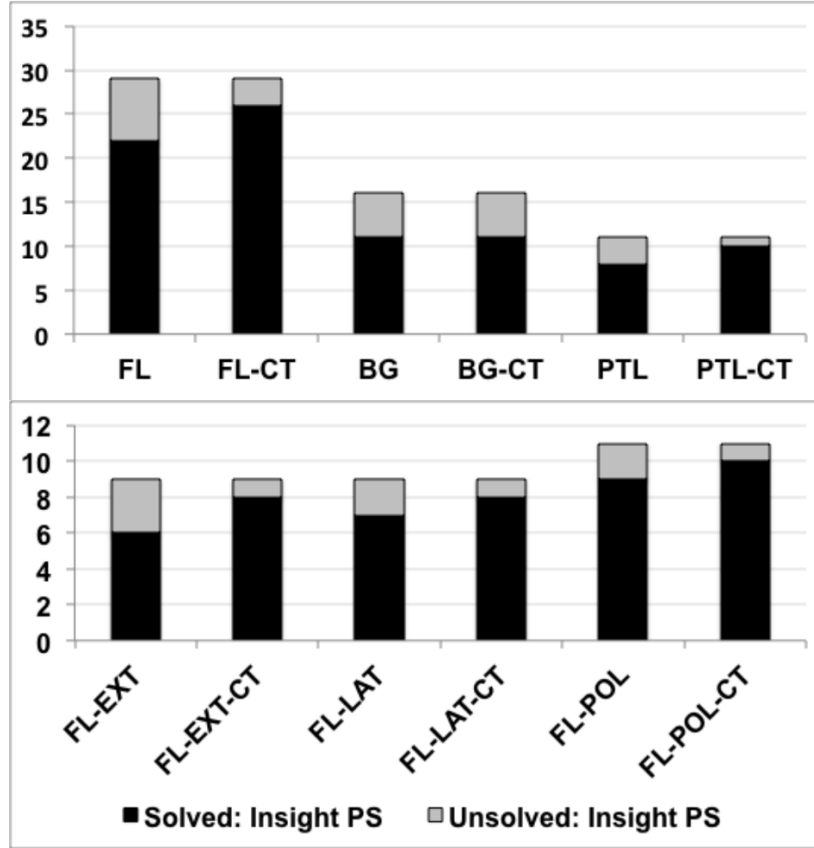
**Table S7:** Results of the FL-POL versus FL-POL-CT hierarchical regression analyses. The two values of especial interest are the Effect size (Cohen's  $f^2$ ) attributable to the addition of Group variable to the Model as well as the associated Significance Level.

		R <sup>2</sup>	Effect size ( $f^2$ )	Beta	Significance
Alternate Uses Originality	Model 1: IQ	.263	0.10	.513	P = .015
	Model 2: IQ	.327		.355	P = .125
	Model 2: Group			.298	<b>P = .194</b>
Alternate Uses Fluency	Model 1: IQ	.116	0.01	.340	P = .121
	Model 2: IQ	.124		.286	P = .272
	Model 2: Group			.103	<b>P = .687</b>
Conceptual Expansion	Model 1: IQ	.048	0.00	.219	P = .329
	Model 2: IQ	.048		.221	P = .413
	Model 2: Group			-.004	<b>P = .988</b>
Constraints of Examples	Model 1: IQ	.000	0.18	.000	P = .221
	Model 2: IQ	.151		-.242	P = .344
	Model 2: Group			.458	<b>P = .081</b>
Creative Imagery: ORIG	Model 1: IQ	.113	0.01	.336	P = .126
	Model 2: IQ	.119		.383	P = .147
	Model 2: Group			-.089	<b>P = .729</b>
Creative Imagery: RELE	Model 1: IQ	.005	0.06	.072	P = .749
	Model 2: IQ	.062		-.072	P = .773
	Model 2: Group			.282	<b>P = .295</b>
RAT: Total	Model 1: IQ	.108	0.01	.328	P = .136
	Model 2: IQ	.116		.270	P = .300
	Model 2: Group			.109	<b>P = .671</b>
RAT: Nonstandard	Model 1: IQ	.066	0.02	-.257	P = .249
	Model 2: IQ	.083		-.175	P = .506
	Model 2: Group			-.155	<b>P = .557</b>
Insight PS: Candle Task	Model 1: IQ	.007	0.01	.086	P = .705
	Model 2: IQ	.018		.022	P = .936
	Model 2: Group			.121	<b>P = .656</b>
Incremental PS: Hanoi Task	Model 1: IQ	.056	0.04	.237	P = .288
	Model 2: IQ	.088		.126	P = .631
	Model 2: Group			.211	<b>P = .424</b>

**Figure S1:** Degree of conceptual expansion (Mean and Standard Error) across all clinical and healthy control groups. The significance level is indicated by the number of arrows (\*\*\*:  $p < .01$ , \*\*:  $p \leq .05$ , \*:  $p \leq .1$ ). Significant results were also accompanied by medium to large effect sizes.



**Figure S2:** Number of solved/unsolved performances during insight problem solving (candle task) across all clinical and healthy control groups. The significance level is indicate by the number of arrows (\*\*\*:  $p < .01$ , \*\*:  $p \leq .05$ , \*:  $p \leq .1$ ). Significant results were also accompanied by medium to large effect sizes.



**Figure S3:** Number of solved/unsolved performances during incremental problem solving (tower of Hanoi task) across all clinical and healthy control groups. The significance level is indicate by the number of arrows (\*\*\*:  $p < .01$ , \*\*:  $p \leq .05$ , \*:  $p \leq .1$ ). Significant results were also accompanied by medium to large effect sizes.

