

Table S1: Baseline value of CANTAB variables

CANTAB Variable	Healthy				Patients			
	Mean	SD	Min	Max	Mean	SD	Min	Max
IED Total Errors Adjusted	26.90	46.37	5.00	175.00	35.10	28.88	8.00	155.00
IED Stages completed	8.38	1.96	2.00	9.00	8.18	1.24	3.00	9.00
MOT Mean Latency	819.18	228.45	487.90	1287.00	916.11	172.76	623.30	1312.40
MOT Median Latency	773.57	197.15	438.00	1136.50	871.69	173.40	549.00	1264.50
MOT Mean error	7.20	2.55	3.00	13.16	7.14	2.56	4.05	14.93
OTS Problems solved on first choice	10.19	3.08	4.00	15.00	8.98	2.97	2.00	15.00
OTS choices to correct	1.55	0.45	1.00	2.87	1.80	0.54	1.00	3.33
OTS mean latency to correct	25280	11919	11513	60373	28562	14470	8437	92264
OTS median latency to correct	14117	6232	6994	32452	22064	15738	7985	91481
PAL total errors adjusted	14.67	15.71	0.00	68.00	31.83	29.05	2.00	101.00
PAL total errors 6 shapes adjusted	3.90	5.57	0.00	24.00	8.55	9.65	0.00	30.00
RTI simple accuracy score	29.05	1.56	24.00	30.00	28.95	1.20	25.00	30.00
RTI mean simple reaction time	304.06	51.04	242.24	473.38	324.23	83.28	236.36	657.43
RTI median simple reaction time	279.55	25.28	231.00	340.00	307.56	79.75	229.00	638.00
RTI SD simple reaction time	87.32	135.29	18.87	647.96	69.78	43.48	17.35	270.80
RTI mean simple movement time	212.00	57.91	106.10	338.50	292.25	90.37	141.82	540.38
RTI median simple movement time	206.93	56.73	101.00	336.50	289.69	91.60	136.50	532.00
RTI SD simple movement time	39.76	40.60	15.71	187.08	37.00	22.79	16.04	127.79
RTI five choice accuracy score	29.24	0.83	27.00	30.00	29.25	1.21	25.00	30.00
RTI five choice reaction time	310.86	35.47	244.00	387.00	329.54	79.35	241.08	646.00
RTI SD five choice reaction time	40.47	18.85	17.00	100.05	53.82	33.67	21.91	216.94
RTI mean five choice reaction time	213.55	57.82	116.86	324.83	296.58	87.67	131.50	503.45
RTI median five choice reaction time	212.07	58.65	112.00	328.00	292.90	86.72	136.50	503.00
RTI SD five choice reaction time	34.59	18.22	15.05	92.98	46.16	38.90	17.96	243.54
RVP A'	0.90	0.05	0.82	0.99	0.87	0.05	0.75	0.99
RVP: Probability of hit	0.62	0.20	0.35	0.96	0.51	0.18	0.17	0.94
RVP: total false alarms	3.76	6.79	0.00	30.00	3.68	6.62	0.00	39.00
RVP: mean latency	444	68	323	536	517	119	357	907
RVP: median latency	394	55	308	501	453	107	341	892
SWM between errors	9.19	10.45	0.00	30.00	11.70	9.03	0.00	29.00
SWM Strategy	14.19	3.46	9.00	20.00	15.50	4.02	9.00	25.00
VRM Free recall correct immediate	8.33	1.53	6.00	11.00	6.78	2.20	3.00	12.00
VRM Free recall novel words immediate	0.14	0.36	0.00	1.00	0.10	0.30	0.00	1.00
VRM Recognition correct immediate	23.43	1.16	19.00	24.00	22.53	2.12	12.00	24.00
VRM Recognition false positives immediate	0.38	1.12	0.00	5.00	0.65	1.94	0.00	12.00
VRM Recognition correct delayed	23.14	1.62	17.00	24.00	22.45	2.42	12.00	24.00
VRM Recognition false positives delayed	0.48	1.54	0.00	7.00	0.85	2.41	0.00	12.00

IED – Intra-Extra Dimensional Set Shift, MOT – Motor Screening Task, OTS – One Touch Stockings of Cambridge, PAL – Paired Associates Learning, RTI – Reaction Time, RVP – Rapid Visual Information Processing, SWM – Spatial Working Memory, VRM – Verbal Recognition Memory

Table S2: Baseline value of MCCB domains

MCCB Domain	Healthy				Patients			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Speed of processing	51.57	9.46	38	70	33.63	14.067	-8	65
Attention/Vigilance	43.76	10.98	23	65	34.55	9.403	16	57
Working memory	47.00	10.26	29	66	37.70	9.706	20	63
Verbal learning	44.05	7.63	32	60	38.40	10.322	26	66
Visual learning	46.19	9.86	28	61	35.58	11.910	4	57
Reasoning and problem solving	49.24	9.47	30	64	38.80	10.780	22	61
Social cognition	47.43	7.12	31	57	40.48	10.527	11	60
MCCB Composite	45.19	10.47	23	61	28.83	12.947	-2	56

Table S3: Summary statistics and treatment effects for MCCB in volunteers with schizophrenia

MCCB Domain	Sequence MDF-PLC or PLC-MDF	Modafinil		Placebo		Treatment effect		
		Mean	SD	Mean	SD	Effect (SE)	P- value	95% CI
Speed of processing	MDF-PLC	40.57	12.21	42.30	14.81	0.34 (1.33)	0.801	-2.27, 2.95
	PLC-MDF	40.53	16.90	38.12	15.81			
Attention/Vigilance	MDF-PLC	38.65	11.50	37.57	11.68	1.43 (1.05)	0.174	-0.63, 3.48
	PLC-MDF	34.82	10.04	33.06	8.45			
Working memory	MDF-PLC	42.52	8.31	41.39	8.18	1.80 (0.96)	0.062	-0.09, 3.69
	PLC-MDF	40.41	11.38	37.94	11.59			
Verbal learning	MDF-PLC	42.83	8.85	41.09	6.90	0.75 (1.76)	0.670	-2.70, 4.21
	PLC-MDF	39.24	14.10	39.47	14.11			
Visual learning	MDF-PLC	42.91	10.70	45.87	10.04	-2.54 (1.62)	0.117	-5.71, 0.64
	PLC-MDF	36.59	14.19	38.71	13.71			
Reasoning and problem solving	MDF-PLC	43.83	11.31	45.83	11.61	0.65 (1.20)	0.590	-1.70, 3.00
	PLC-MDF	44.76	11.21	41.47	9.25			
Social cognition	MDF-PLC	45.13	10.98	43.39	8.59	1.43 (1.16)	0.220	-0.85, 3.71
	PLC-MDF	35.24	9.90	34.12	7.86			
MCCB Composite	MDF-PLC	37.57	11.54	37.70	11.75	0.99 (1.13)	0.378	-1.21, 3.20
	PLC-MDF	31.88	16.13	29.76	14.77			

Table S4: Summary statistics and treatment effects for CANTAB in volunteers with schizophrenia

CANTAB Domain	Sequence MDF-PLC or PLC-MDF	Modafinil		Placebo		Treatment effect		
		Mean	SD	Mean	SD	Effect (SE)	P- value	95% CI
IED Errors Adjusted	MDF-PLC	26.09	19.14	21.52	20.71	4.16 (4.11)	0.311	-3.90, 12.23
	PLC-MDF	38.41	38.45	34.65	20.84			
IED Stages completed	MDF-PLC	8.57	0.79	8.61	0.78	-0.20 (0.18)	0.284	-0.56, 0.16
	PLC-MDF	7.94	1.60	8.29	0.92			
MOT Mean Latency	MDF-PLC	786.98	134.04	786.41	147.43	-34.8 (32.4)	0.282	-99.3, 28.7
	PLC-MDF	830.25	174.79	900.41	192.57			
MOT Median Latency	MDF-PLC	745.54	130.05	731.63	112.62	-35.4 (27.1)	0.190	-88.4, 17.6
	PLC-MDF	784.41	152.13	869.15	169.27			
MOT Mean error	MDF-PLC	7.55	2.54	8.00	2.41	-0.43 (0.31)	0.168	-1.04, 0.18
	PLC-MDF	7.02	1.83	7.42	1.79			
OTS Problems solved on first choice	MDF-PLC	9.78	2.32	9.87	2.85	0.46 (0.36)	0.202	-0.24, 1.16
	PLC-MDF	9.82	2.90	8.82	2.92			
OTS choices to correct	MDF-PLC	1.57	0.35	1.61	0.55	-0.08 (0.05)	0.105	-0.18, 0.02
	PLC-MDF	1.65	0.51	1.77	0.47			
OTS mean latency to correct	MDF-PLC	20093	10292	16855	7586	2656 (1074)	0.013	552, 4760
	PLC-MDF	22162	8690	20087	4818			
OTS median latency to correct	MDF-PLC	14402	8781	12013	6423	3297 (1295)	0.011	758, 5835
	PLC-MDF	20157	11015	15953	5456			
PAL total errors adjusted	MDF-PLC	11.17	10.44	9.70	11.37	-2.88 (1.71)	0.093	-6.24, 0.48
	PLC-MDF	21.06	23.07	28.29	29.97			
PAL total errors 6 shapes adjusted	MDF-PLC	1.78	2.73	2.00	3.00	-1.40 (0.58)	0.015	-2.54, -0.27
	PLC-MDF	4.53	7.39	7.12	8.44			
RTI simple accuracy score	MDF-PLC	28.65	1.07	29.35	1.07	-0.14 (0.24)	0.553	-0.61, 0.33
	PLC-MDF	28.88	1.32	28.47	1.62			
RTI mean simple reaction time	MDF-PLC	294.52	29.37	293.77	36.89	8.60 (7.90)	0.276	-6.88, 24.09
	PLC-MDF	360.25	112.73	343.79	83.66			
RTI median simple reaction time	MDF-PLC	282.17	27.47	283.00	34.74	2.44 (4.97)	0.623	-7.30, 12.18
	PLC-MDF	332.65	84.18	326.94	80.62			
RTI SD simple reaction time	MDF-PLC	57.9	34.0	50.5	19.8	25.5 (17.0)	0.134	-7.8, 58.8
	PLC-MDF	121.0	171.9	77.3	35.02			

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Table S5: Summary statistics and treatment effects for MCCB in healthy volunteers

MCCB Domain	Sequence MDF-PLC or PLC-MDF	Modafinil		Placebo		Treatment effect		
		Mean	SD	Mean	SD	Effect (SE)	P-value	95% CI
MCCB Composite	MDF-PLC	49.44	12.57	49.78	12.74	1.63 (0.94)	0.085	-0.23, 3.48
	PLC-MDF	51.75	10.92	48.17	12.19			
Speed of processing	MDF-PLC	59.11	16.10	58.56	15.53	1.99 (1.41)	0.159	-0.78, 4.75
	PLC-MDF	65.00	9.41	61.58	10.17			
Attention/Vigilance	MDF-PLC	40.44	16.94	42.44	13.39	-0.63 (2.29)	0.785	-5.12, 3.87
	PLC-MDF	43.42	13.41	42.67	13.31			
Working memory	MDF-PLC	49.22	9.20	49.33	9.07	0.86 (1.19)	0.469	-1.47, 3.19
	PLC-MDF	50.50	11.24	48.67	11.41			
Verbal learning	MDF-PLC	42.89	9.41	45.33	10.93	-1.56 (1.60)	0.331	-4.69, 1.58
	PLC-MDF	42.92	9.69	43.58	11.36			
Visual learning	MDF-PLC	45.67	10.27	47.33	8.03	2.21 (1.32)	0.095	-0.39, 4.80
	PLC-MDF	53.17	6.75	47.08	8.50			
Reasoning and problem solving	MDF-PLC	53.56	6.82	55.44	5.73	-0.74 (2.03)	0.716	-4.71, 3.24
	PLC-MDF	52.92	9.62	52.50	10.41			
Social cognition	MDF-PLC	57.89	10.02	51.56	8.16	5.04 (1.44)	<0.001	2.23, 7.86
	PLC-MDF	50.33	4.72	46.58	4.21			

Table S6: Summary statistics and treatment effects for CANTAB in healthy volunteers

CANTAB Domain	Sequence MDF-PLC, PLC-MDF	Modafinil		Placebo		Treatment effect		
		Mean	SD	Mean	SD	Effect (SE)	P-value	95% CI
IED Total Errors Adjusted	MDF-PLC	17.89	22.31	22.78	26.56	-4.44 (1.68)	0.008	-7.74, -1.15
	PLC-MDF	18.33	17.14	22.33	19.15			
IED Stages completed	MDF-PLC	8.89	0.33	8.67	1.00	0.24 (0.14)	0.095	-0.04, 0.51
	PLC-MDF	8.83	0.58	8.58	0.79			
MOT Mean Latency	MDF-PLC	736.22	224.02	816.32	259.84	-46.91 (30.51)	0.124	-106.71, 12.90
	PLC-MDF	657.02	117.15	670.73	117.06			
MOT Median Latency	MDF-PLC	683.22	190.18	760.78	262.34	-40.72 (27.78)	0.143	-95.17, 13.74
	PLC-MDF	644.54	127.37	648.42	114.91			
MOT Mean error	MDF-PLC	7.90	2.52	8.27	3.22	-0.89 (0.59)	0.136	-2.05, 0.28
	PLC-MDF	7.44	1.90	8.84	3.14			
OTS solved on first choice	MDF-PLC	11.00	2.24	11.33	2.65	-0.08 (0.37)	0.822	-0.81, 0.64
	PLC-MDF	10.92	2.43	10.75	2.14			
OTS choices to correct	MDF-PLC	1.41	0.35	1.36	0.31	-0.00 (0.04)	0.965	-0.08, 0.08
	PLC-MDF	1.41	0.30	1.46	0.32			
OTS mean latency to correct	MDF-PLC	20046	6248	19007	7364	317	0.777	-1880, 2513
	PLC-MDF	16434	7855	16839	4422	(1121)		
OTS median latency to correct	MDF-PLC	12870	2879	10268	2041	-210 (675)	0.756	-1533, 1114
	PLC-MDF	7595	2172	10617	3661			
PAL total errors adjusted	MDF-PLC	10.78	8.24	8.33	8.05	-2.36 (2.12)	0.265	-6.51, 1.79
	PLC-MDF	4.42	5.33	11.58	16.25			
PAL total errors 6 shapes adjusted	MDF-PLC	1.00	1.66	1.56	1.74	-0.03 (0.48)	0.954	-0.97, 0.92
	PLC-MDF	1.58	2.35	1.08	1.98			
RTI simple accuracy score	MDF-PLC	28.22	1.39	29.00	1.12	-0.43 (0.37)	0.249	-1.16, 0.30
	PLC-MDF	29.25	1.48	29.33	0.65			
RTI mean simple reaction time	MDF-PLC	293.82	36.75	299.45	55.17	-1.44 (9.57)	0.880	-20.20, 17.32
	PLC-MDF	299.96	52.79	297.21	36.10			
RTI median simple reaction time	MDF-PLC	278.06	30.61	285.33	47.08	-6.91 (6.87)	0.315	-20.38, 6.56
	PLC-MDF	281.46	36.57	288.00	32.45			
RTI SD simple reaction time	MDF-PLC	60.46	30.62	55.48	33.86	13.84 (9.13)	0.129	-4.04, 31.73
	PLC-MDF	69.16	54.68	46.45	20.90			
RTI mean simple movement time	MDF-PLC	197.94	69.66	193.60	53.88	0.76 (7.89)	0.923	-14.69, 16.22
	PLC-MDF	235.35	47.41	238.16	56.21			
RTI median simple movement time	MDF-PLC	196.00	70.60	192.39	50.96	1.49 (8.11)	0.854	-14.40, 17.39
	PLC-MDF	234.04	48.36	234.67	57.84			
RTI SD simple movement time	MDF-PLC	27.38	13.77	26.84	11.99	-2.33 (4.43)	0.598	-11.01, 6.34
	PLC-MDF	25.09	7.86	30.29	20.27			
RTI 5 choice accuracy score	MDF-PLC	29.44	0.53	29.44	1.01	0.04 (0.20)	0.831	-0.34, 0.42
	PLC-MDF	29.67	0.65	29.58	0.51			
RTI 5 choice reaction time (RT)	MDF-PLC	305.36	47.25	303.91	47.16	5.30 (7.62)	0.487	-9.64, 20.24
	PLC-MDF	322.63	64.28	313.49	35.17			
RTI SD 5 choice RT	MDF-PLC	36.20	11.02	50.58	22.69	-6.21 (4.65)	0.182	-15.33, 2.91
	PLC-MDF	49.41	23.92	47.45	24.38			
RTI mean 5choice RT	MDF-PLC	196.46	61.20	209.87	65.70	-10.07 (9.89)	0.309	-29.45, 9.31
	PLC-MDF	235.05	34.52	241.78	42.09			
RTI median 5 choice RT	MDF-PLC	194.17	59.84	204.06	63.77	-8.51 (10.44)	0.415	-28.98, 11.96
	PLC-MDF	234.08	33.73	241.21	42.15			
RTI SD 5 choice RT	MDF-PLC	34.42	20.28	40.92	30.15	-5.11 (6.93)	0.461	-18.68, 8.47
	PLC-MDF	35.91	18.64	39.62	21.00			
RVP A'	MDF-PLC	0.93	0.04	0.92	0.05	0.02 (0.01)	0.004	0.01, 0.03
	PLC-MDF	0.96	0.03	0.92	0.05			
RVP Probability of hit	MDF-PLC	0.72	0.15	0.71	0.18	0.07 (0.02)	0.001	0.03, 0.11
	PLC-MDF	0.84	0.11	0.72	0.17			
RVP total false alarms	MDF-PLC	4.11	5.23	3.44	3.32	0.42 (0.83)	0.616	-1.21, 2.04
	PLC-MDF	3.67	4.74	3.50	5.44			
RVP mean latency	MDF-PLC	445.14	39.35	445.67	62.22	-9.54 (8.98)	0.288	-27.13, 8.05
	PLC-MDF	395.13	49.16	413.69	48.94			
RVP median latency	MDF-PLC	391.50	31.11	408.72	62.39	-9.36 (7.83)	0.232	-24.70, 5.98
	PLC-MDF	365.42	39.54	366.92	27.08			
SWM_Strategy	MDF-PLC	13.33	3.74	12.89	3.18	-0.61 (0.63)	0.335	-1.85, 0.63
	PLC-MDF	13.17	4.59	14.83	4.61			
VRM_Free_recall_total_correct_immediate	MDF-PLC	8.67	2.06	8.11	2.57	0.36 (0.42)	0.393	-0.47, 1.19
	PLC-MDF	8.25	1.66	8.08	2.19			
VRM Free recall novel words immediate	MDF-PLC	0.00	0.00	0.56	0.73	-0.27 (0.13)	0.028	-0.53, -0.03
	PLC-MDF	0.17	0.39	0.17	0.39			

VRM Recognition correct immediate	MDF-PLC	23.22	1.09	22.33	1.73	0.19 (0.27)	0.467	-0.33, 0.72
	PLC-MDF	22.92	1.24	23.42	0.90			
VRM Recognition false positives immediate	MDF-PLC	0.33	1.00	0.56	1.33	0.01 (0.14)	0.922	-0.26, 0.29
	PLC-MDF	0.42	0.67	0.17	0.39			
VRM Recognition correct delayed	MDF-PLC	22.89	1.54	21.89	2.42	0.58 (0.33)	0.081	-0.07, 1.24
	PLC-MDF	23.00	1.48	22.83	1.53			
VRM Recognition false positives delayed	MDF-PLC	0.56	1.33	0.89	1.96	-0.17 (0.12)	0.179	-0.41, 0.08
	PLC-MDF	0.17	0.39	0.17	0.39			

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Table S7: comparison of modafinil effects between healthy volunteers and patients on CANTAB

CANTAB Variable	Interaction effect		
	Effect (SE)	P-value	95% CI
IED Total Errors Adjusted	-8.57 (5.79)	0.139	-19.92, 2.77
IED Stages completed	0.44 (0.27)	0.108	-0.10, 0.98
MOT Mean Latency	-9.24 (50.34)	0.854	-107.91, 89.43
MOT Median Latency	-1.69 (43.60)	0.969	-87.14, 83.75
MOT Mean error	-0.48 (0.60)	0.425	-1.66, 0.70
OTS Problems solved on first choice	-0.55 (0.56)	0.323	-1.65, 0.54
OTS choices to correct	0.08 (0.07)	0.293	-0.07, 0.23
OTS mean latency to correct, ms	-2345 (1677)	0.162	-5633, 942
OTS median latency to correct, ms	-3662 (1910)	0.055	-7406, 81
PAL total errors adjusted	0.50 (2.80)	0.868	-4.98, 5.98
PAL total errors 6 shapes adjusted	1.45 (0.89)	0.106	-0.31, 3.20
RTI simple accuracy score	-0.30 (0.42)	0.482	-1.13, 0.53
RTI mean simple reaction time	-10.20 (12.82)	0.426	-35.33, 14.93
RTI median simple reaction time	-9.47 (8.40)	0.259	-25.93, 6.99
RTI SD simple reaction time	-12.03 (24.31)	0.621	-59.68, 35.62
RTI mean simple movement time	4.91 (11.58)	0.671	-17.77, 27.60
RTI median simple movement time	6.77 (11.71)	0.563	-16.18, 29.72
RTI SD simple movement time	-2.65 (6.64)	0.689	-15.67, 10.36
RTI five choice accuracy score	-0.05 (0.29)	0.865	-0.62, 0.52
RTI five choice reaction time	7.22 (8.90)	0.417	-10.22, 24.66
RTI SD five choice reaction time	-5.41 (5.05)	0.284	-15.31, 4.49
RTI mean five choice reaction time	-4.02 (11.79)	0.733	-27.13, 19.10
RTI median five choice reaction time	-4.95 (11.85)	0.676	-28.17, 18.27
RTI SD five choice reaction time	1.96 (8.29)	0.813	-14.29, 18.21
RVP_A	0.01 (0.01)	0.123	-0.00, 0.03
RVP_Probability of hit	0.05 (0.03)	0.097	-0.01, 0.11
RVP total false alarms	0.41 (1.19)	0.730	-1.92, 2.74
RVP mean latency	0.83 (18.61)	0.964	-35.65, 37.31
RVP median latency	1.88 (14.33)	0.896	-26.20, 29.96
SWM between errors	-1.98 (1.95)	0.310	-5.80, 1.84
SWM_Strategy	-0.83 (0.71)	0.241	-2.22, 0.56
VRM_Free_recall_total_correct_immediate	0.29 (0.55)	0.605	-0.80, 1.37
VRM_Free_recall_total_novel_words_immediate	-0.16 (0.18)	0.372	-0.53, 0.20
VRM_Recognition_total_correct_immediate	0.32 (0.45)	0.469	-0.55, 1.20
VRM_Recognition_total_false_positives_immediate	0.06 (0.20)	0.781	-0.34, 0.46
VRM_Recognition_total_correct_delayed	0.66 (0.41)	0.113	-0.16, 1.47
VRM_Recognition_total_false_positives_delayed	-0.16 (0.19)	0.402	-0.53, 0.21

IED – Intra-Extra Dimensional Set Shift, MOT – Motor Screening Task, OTS – One Touch Stockings of Cambridge, PAL – Paired Associates Learning, RTI – Reaction Time, RVP – Rapid Visual Information Processing, SWM – Spatial Working Memory, VRM – Verbal Recognition Memory