

## Supplementary Material

**Table S1.** Mattis Dementia Rating Scale-2 (MDRS-2). Statistics (non-parametric Wilcoxon or Mann-Whitney tests) show within-group and between-group comparisons. Statistics done with normalized z-transformed values. Standard deviations are given in brackets.

	Right subthalamotomy			Left subthalamotomy			Statistics
	Pre	Post	Within-group	Pre	Post	Within-group	Between-groups
<b>DRS total</b>	141.20 (1.4)	143.00 (0.7)	$p > .05$	141.00 (2.5)	142.67 (1.5)	$p > .05$	pre > .05 post > .05
<b>Attention</b>	37.00 (0.0)	37.00 (0.0)	$p > .05$	36.11 (0.9)	36.67 (0.7)	$p > .05$	pre > .05 post > .05
<b>Initiation/ perseveration</b>	36.00 (0.7)	36.60 (0.8)	$p > .05$	36.11 (0.7)	36.56 (0.7)	$p > .05$	pre > .05 post > .05
<b>Construction</b>	6.00 (0.0)	6.00 (0.0)	$p > .05$	6.00 (0.0)	6.00 (0.0)	$p > .05$	pre > .05 post > .05
<b>Conceptualization</b>	38.40 (0.8)	39.00 (0.0)	$p > .05$	38.44 (0.7)	38.78 (0.4)	$p > .05$	pre > .05 post > .05
<b>Memory</b>	23.40 (0.8)	23.80 (1.1)	$p > .05$	24.22 (0.8)	24.33 (0.8)	$p > .05$	pre > .05 post > .05

**Table S2.** Paired Associate Learning. Statistics (non-parametric Wilcoxon or Mann-Whitney tests) show within-group and between-group comparisons. Standard deviations are given in brackets.

	Right subthalamotomy			Left subthalamotomy			Statistics
	Pre	Post	Within-group	Pre	Post	Within-group	Between-groups
<b>Easy pairs</b>	20.20 (3.5)	17.40 (5.2)	$p > .05$	16.22 (5.3)	16.77 (5.4)	$p > .05$	pre > .05 post > .05
<b>Hard pairs</b>	9.40 (3.2)	9.80 (3.1)	$p > .05$	9.11 (3.2)	8.55 (2.4)	$p > .05$	pre > .05 post > .05
<b>Errors</b>	6.40 (6.9)	5.40 (1.3)	$p > .05$	7.44 (5.2)	6.88 (4.2)	$p > .05$	pre > .05 post > .05
<b>Omissions</b>	7.20 (1.0)	2.80 (3.1)	$p > .05$	5.11 (3.9)	2.55 (1.7)	$p > .05$	pre > .05 post > .05
<b>Blocks to Criterion</b>	5.00 (.7)	5.00 (2.0)	$p > .05$	5.00 (2.0)	4.00 (1.8)	$p > .05$	pre > .05 post > .05

**Table S3.** Frontal Assessment Battery (FAB). Statistics (non-parametric Wilcoxon or Mann-Whitney tests) show within-group and between-group comparisons. Statistics done with normalized z-transformed values. Standard deviations are given in brackets.

	Right subthalamotomy			Left subthalamotomy			Statistics
	Pre	Post	Within- group	Pre	Post	Within- group	
<b>FAB total</b>	15.40 (1.1)	16.60 (0.8)	$p > .05$	14.56 (2.1)	15.67 (1.7)	$p > .05$	pre > .05 post > .05
<b>Conceptualization</b>	3.00 (0.0)	2.80 (0.4)	$p > .05$	2.44 (0.7)	2.67 (0.7)	$p > .05$	pre > .05 post > .05
<b>Mental Flexibility</b>	2.40 (0.5)	2.60 (0.5)	$p > .05$	2.33 (0.8)	2.78 (0.6)	$p > .05$	pre > .05 post > .05
<b>Programming</b>	1.60 (1.1)	2.80 (0.4)	$p > .05$	1.78 (0.8)	2.44 (0.7)	$p > .05$	pre > .05 post > .05
<b>Inhibitory control</b>	2.60 (0.5)	2.60 (0.5)	$p > .05$	2.44 (0.5)	2.22 (0.4)	$p > .05$	pre > .05 post > .05
<b>Sensitivity to interference</b>	2.80 (0.4)	2.80 (0.4)	$p > .05$	2.56 (0.5)	2.56 (0.3)	$p > .05$	pre > .05 post > .05
<b>Prehension behavior</b>	3.00 (0.0)	3.00 (0.0)	$p > .05$	3.00 (0.0)	3.00 (0.0)	$p > .05$	pre > .05 post > .05

**Table S4.** The Stroop colour word interference test. Statistics (non-parametric Wilcoxon or Mann-Whitney tests) show within-group and between-group comparisons. Statistics done with normalized z-transformed values. Standard deviations are given in brackets.

	Right subthalamotomy		Within-group	Left subthalamotomy		Within-group	Statistics Between-groups
	Pre	Post		Pre	Post		
<b>1. Colour Naming completion time</b>	28.35 (7.7)	25.23 (4.4)	$p > .05$	24.76 (6.8)	25.52 (8.0)	$p > .05$	pre > .05 post > .05
<b>Colour Naming errors</b>	.00 (.0)	.00 (.0)	$p > .05$	.11 (.3)	.00 (.0)	$p > .05$	pre > .05 post > .05
<b>2. Reading words completion time</b>	34.27 (7.2)	33.52 (8.1)	$p > .05$	34.57 (8.1)	35.58 (9.4)	$p > .05$	pre > .05 post > .05
<b>Reading words errors</b>	.20 (.4)	0.40 (.45)	$p > .05$	.11 (.3)	0.22 (.6)	$p > .05$	pre > .05 post > .05
<b>3. Inhibition completion time</b>	91.39 (36.7)	91.68 (40.9)	$p > .05$	86.23 (52.1)	104.18 (38.8)	$p > .05$	pre > .05 post > .05
<b>Inhibition errors</b>	1.00 (1.2)	2.80 (5.7)	$p > .05$	3.89 (3.8)	1.89 (2.0)	$p > .05$	pre > .05 post > .05
<b>4. Inhibition/switching completion time</b>	94.11 (41.9)	105.44 (38.7)	$p > .05$	119.95 (64.1)	123.97 (52.5)	$p > .05$	pre > .05 post > .05
<b>Inhibition/switching errors</b>	2.60 (2.8)	4.00 (6.2)	$p > .05$	5.67 (5.8)	6.22 (7.2)	$p > .05$	pre > .05 post > .05

**Table S6.** The Hayling sentence completion test. Statistics (non-parametric Wilcoxon or Mann-Whitney tests) show within-group and between-group comparisons. Results shown are raw values converted to standardized values. Standard deviations are given in brackets.

	Right subthalamotomy			Left subthalamotomy			Statistics
	Pre	Post	Within-group	Pre	Post	Within-group	
<b>Part A score</b>	5.60 (.8)	5.60 (1.14)	$p > .05$	6.00 (.0)	5.89 (.3)	$p > .05$	pre $> .05$ post $> .05$
<b>Part B score</b>	5.40 (1.3)	5.00 (1.41)	$p > .05$	5.56 (.8)	5.22 (.9)	$p > .05$	pre $> .05$ post $> .05$
<b>Type A errors</b>	1.12 (1.6)	6.80 (7.5)	$p > .05$	12.44 (18.3)	5.00 (9.6)	$p > .05$	pre $> .05$ post $> .05$
<b>Type B errors</b>	8.80 (10.0)	5.40 (5.8)	$p > .05$	19.33 (18.7)	8.63 (8.6)	$p = .01$	pre = .04 post $> .05$
<b>Total score</b>	5.00 (2.3)	4.40 (2.3)	$p > .05$	4.33 (1.1)	4.89 (1.2)	$p > .05$	pre $> .05$ post $> .05$

**Table S7.** The working memory index (WMI). Statistics (non-parametric Wilcoxon or Mann-Whitney tests) show within-group and between-group comparisons. Standard deviations are given in brackets.

	Right subthalamotomy			Left subthalamotomy			Statistics
	Pre	Post	Within- group	Pre	Post	Within- group	Between- groups
<b>Arithmetic</b>	9.00 (2.8)	7.20 (2.9)	$p > .05$	5.44 (2.3)	5.44 (2.4)	$p > .05$	pre > .05 post > .05
<b>Digit Span</b>	13.40 (1.9)	14.20 (1.3)	$p > .05$	12.22 (1.7)	13.44 (1.9)	$p > .05$	pre > .05 post > .05
<b>Letter-number Sequencing</b>	7.20 (2.6)	7.80 (2.9)	$p > .05$	7.11 (2.1)	7.11 (2.3)	$p > .05$	pre > .05 post > .05
<b>WMI</b>	29.60 (6.6)	29.20 (5.8)	$p > .05$	24.78 (4.0)	26.00 (2.7)	$p > .05$	pre > .05 post > .05

**Table S8.** Right and left subthalamotomy volume differences. Statistics (non-parametric Wilcoxon or Mann-Whitney tests) show between-group comparisons. Standard deviations are given in brackets.

	Right subthalamotomy	Left subthalamotomy	Between-groups
$V_{lesion}$	38.47 (8.90)	34.44 (10.54)	$p = .57$
$V_{stn}$	.64 (0.10)	.69 (0.08)	$p = .32$

$V_{lesion}$  - Volume of lesions (in mm<sup>3</sup>);

$V_{stn}$  - The fraction of the ablative lesion targeting the STN (in normalized units).