Supplementary Methods

fMRI Task & Procedure

Previously acquired high-resolution T2-weighted magnetic resonance imaging (MRI) scans and functional MRI (fMRI) results associated with an overt picture naming task were utilized to determine placement of the anode electrode on a patient-by-patient basis. MRI data collection relied on a 3 Tesla Siemens Trio scanner (Erlangen, Germany) and consisted of overt naming of high-frequency common nouns.[1] For specific details on the naming task as well as the scanning parameters and data analyses, see Fridriksson et al.[2] The location of voxels with the highest Z-scores in the left posterior cortex associated with correct naming for each patient is listed in Table S2. These coordinates were targeted for the placement of the anode electrode.

Electrode Positioning

In order to locate the cortical region to be stimulated by the anode electrode, coordinates of the area of the left posterior cortex (i.e., temporal, parietal, and/or occipital) with the highest level of activation during correct naming on the previously completed fMRI naming task were entered into *MRIreg*, a computer program that registers a high-resolution MRI scan of the head with scalp locations (www.cabiatl.com/mricro/mricro/mrireg/index.html). Utilizing *MRIreg* and a magnetic positioning tracker system (*Flock of Birds*; Ascension Technology, Burlington, VT), the desired cortical region was located and demarcated on a latex cap worn by the patient. The latex cap was carefully fitted on the patient prior to the start of each tDCS administration in order to accurately position the active anode electrode and reference cathode electrode in the same area from one day to the next. Following positioning, the cap was removed and the electrodes were held in place with self-adhesive bandages. This was accomplished on a patient-by-patient basis and was therefore tailored for each individual.

Supplementary References

1. Snodgrass JG, Vanderwart M. Standardized set of 260 pictures - Norms for name agreement, image agreement, familiarity, and visual complexity. J Exp Psychol [Hum Learn]. 1980;6:174-215.

2. Fridriksson J, Bonilha L, Baker JM, Moser D, Rorden C. Activity in preserved left hemisphere regions predicts anomia severity in aphasia. Cereb Cortex. 2009;20: 1013-1019.

Supplementary Tables

Table S1. Patient demographics including biographical information, diagnostic testing results, and lesion description.

Biographical information					Diagnostic testing results			Lesion description	
P	*Sex*	*Age*[*]	*Education*[*]	*Post-Onset*[†]	*Aphasia Type*	*WAB-R AQ*[‡]	*BNT-2*[§]	*Size*[‖]	*Lesion location*[#]
1	F	76	12	25	Anomic	94.1	53	8.45	Damage to portions of BA 22, BA 41, BA 42, and the inferior portion of BA 40
2	M	59	16	44	Anomic	91.7	44	33.60	Damage to white matter involving the pyramidal tract extending to the posterior horn of the lateral ventricle
3	M	77	12	52	Anomic	84.4	46	29.13	Damage to the posterior portion of BA 21, as well as BA 22, BA 37, and BA 39
4	F	73	12	38	Anomic	89.8	40	18.40	Damage to BA 21 and 22, as well as white matter damage deep in the middle and superior parietal lobe.
5	M	53	12	77	Anomic	91.6	49	23.57	Damage to BA 22, BA 39, BA 40, BA 42, and the posterior portion of BA 38
6	F	72	18	58	Anomic	92.7	47	40.49	Damage to BA 37 and inferior portion of the left precuneus
7	F	56	12	150	Anomic	91.8	49	31.04	Damage to the medial portions of BA 37, BA 18, and BA 19
8	F	79	12	10	Conduction	68.0	14	64.73	Damage to portions of BA 21, BA 22, and BA 40

[*] Measured in years
[†] Measured in months
[‡] Aphasia Quotient from the *Western Aphasia Battery-Revised; Maximum score of 100*
[§] Number of spontaneous correctly named items on the *Boston Naming Test-Second Edition*; Maximum score of 60
[‖] Measured in cc
[#] BA: Brodmann's area

Table S2. Coordinates and location of voxels with the highest Z-scores associated with correct picture naming during overt naming fMRI. The placement of the center of the 5 cm x 5 cm sponge (anode electrode placement) was based on the location of these coordinates for each patient.

P	x*	Y*	z*	Location†	BA‡
1	-56	-40	6	Posterior middle temporal gyrus	22
2	-46	-66	2	Posterior middle temporal gyrus	37
3	-62	-36	26	Supra-marginal gyrus	40
4	-56	-52	-16	Inferior temporal lobe	37
5	-48	-66	-2	Inferior occipital – posterior middle temporal gyrus	37
6	-64	-32	-4	Middle temporal gyrus	21
7	-64	-28	6	Middle temporal gyrus	22
8	-52	-52	44	Inferior parietal lobe	40

*x, y, & z: Montreal Neurological Institute coordinates
†Anatomical locations were determined using the Talairach Daemon (www.talairach.org)
‡BA: Brodmann's area

Figure S1. The experimental design: Each patient was tested before, immediately after, and three weeks following both anodal and sham tDCS conditions. A cross-over design was utilized, so that half of the patients received the S-tDCS (placebo) condition followed by A-tDCS, and the other half received the opposite treatment order.

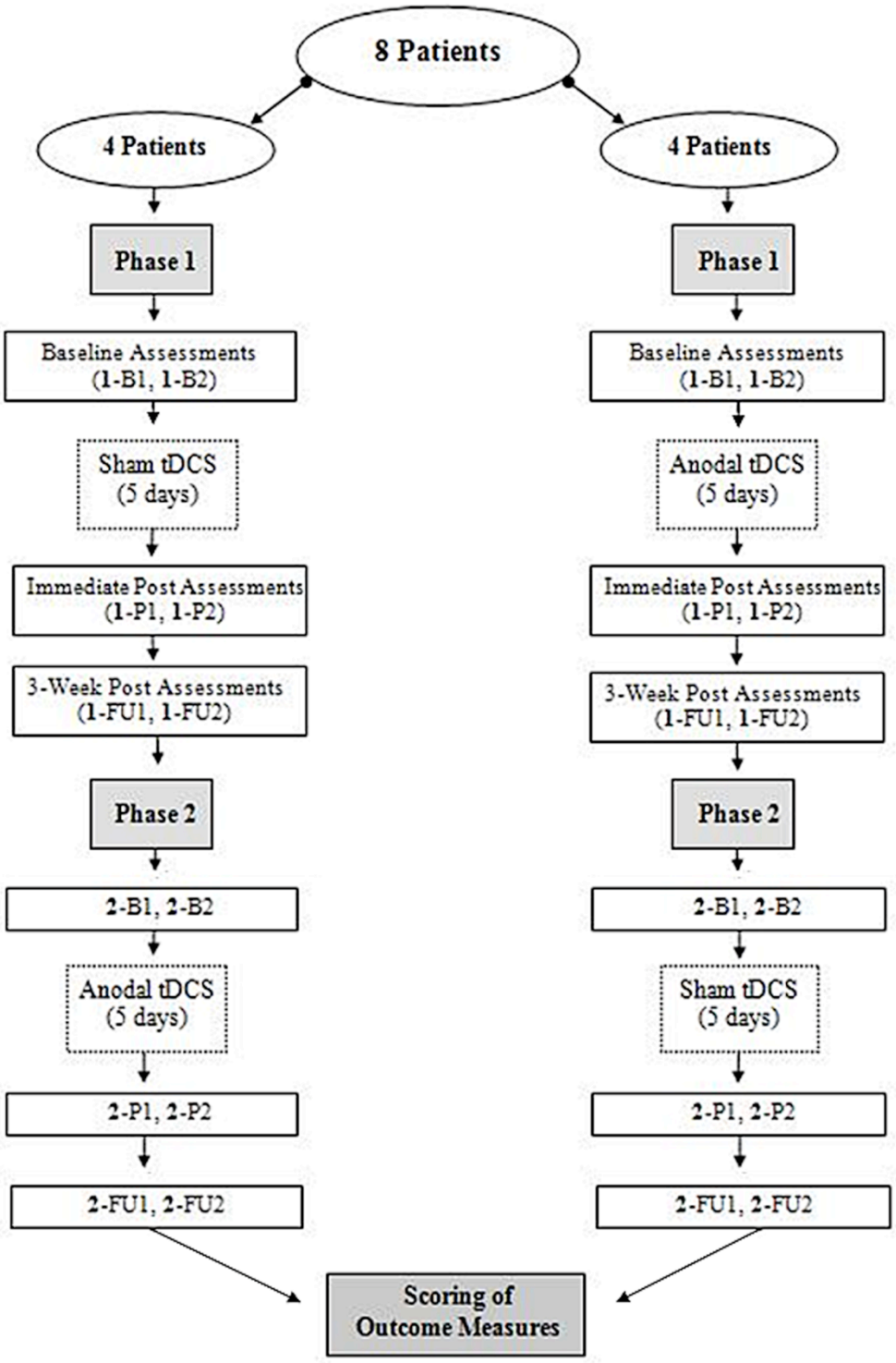

Figure S2. Each trial for the computerized anomia treatment included the following structure: a) fixation point, b) audio stimulus, c) picture stimulus, d) blank response screen, and e) feedback.