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KNOW THYSELF.

HOME TRUTHS FOR HOME CONSUMPTION.

1848.

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PHRENOLOGY, PHYSIOLOGY, PHYSIOGNOMY, MAGNETISM.

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FOWLERS & WELLS,
PHERNOLOGICAL CABINET, 318 NASSAU-STREET.

Terms $1 a Year, invariably in advance. Ten cts. a Number.
Tactile abilities in the blind suggest brain plasticity

Van Boven, Hamilton, Kauffman, Keenan, & Pascual-Leone, 2000
Visual cortex activation predicts tactile acuity

Hamilton, Kiriakopoulis, Van Boven, Kauffman, Keenan, & Pascual-Leone, 1999
Cortical plasticity in blindness

Can we manipulate this relationship experimentally?
Transcranial Magnetic Stimulation (TMS)

- Faraday Principle
- Noninvasive
- Permits focal manipulation of cortical activity
TMS dissociates sensation from perception

- Somatosensory cortex: Braille detection early
- Striate cortex: Braille perception later

Interstimulus Interval (ISI)

Peripheral Stimulus (PS)

Cortical Stimulus (CS)
- Somatosensory Cortex
- Striatal Cortex

Response

Nº Stimuli Detected or Perceived

TMS to Sensorimotor Cortex

TMS to Striatal Cortex

Hamilton & Pascual-Leone, 1998
Blindfold study: new connections vs unmasking

Merabet, Hamilton, Schlaug et al., 2008
Compensatory vs noncompensatory language reorganization after stroke

ALE Map: All Aphasic Patients & Controls
(FDR = .01)

ALE Map: Effect of Lesion Location- IF+ & IF- Groups
(FDR = .01)

Turkeltaub et al. Neurology, 2011
Topographic Specificity of Stimulation

Garcia et al., 2013
Naming

Object Naming

Percent Change from Baseline

<table>
<thead>
<tr>
<th>Category</th>
<th>2mo Change</th>
<th>6mo Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animals</td>
<td></td>
<td></td>
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<tr>
<td>Tool/Impl.</td>
<td></td>
<td></td>
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</tbody>
</table>

Legend:
- Percent change 2mo
- Percent change 6mo
Fluency

Number of Items

- Unique Nouns
- Total Nouns
- Total Verbs
- Unique Words
- Unique Verbs

Narrative length (seconds)

- Pre TMS
- Post TMS

Medina et al., 2013
Transcranial Direct Current Stimulation (tDCS): An easier way?

- Subthreshold stimulation
- Neurons alter firing rates
- Differential anodal & cathodal effects.
- Safe, inexpensive, easy to use
tDCS in Aphasia

WAB Aphasia Quotient Scoring
- 0-25 = very severe
- 26-50 = severe
- 51-75 = moderate
- 76 and above = mild

Shah et al., under review
Enhancing normal cognition
Cognitive Control & Mental Flexibility

Novel Uses

“Use it to hammer nails?”

Chrysikou et al., Cognition, 2013
DIY Brain stimulation?

http://www.foc.us/
Conclusions

• Brain reorganization drives neural repair
• Brain stimulation can facilitate plasticity
• Coming soon: Cosmetic stimulation?
• “Build a better mousetrap…”

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