International Clinicians Spotlight Techniques and Strategies for Individuals with Complex Communication Needs

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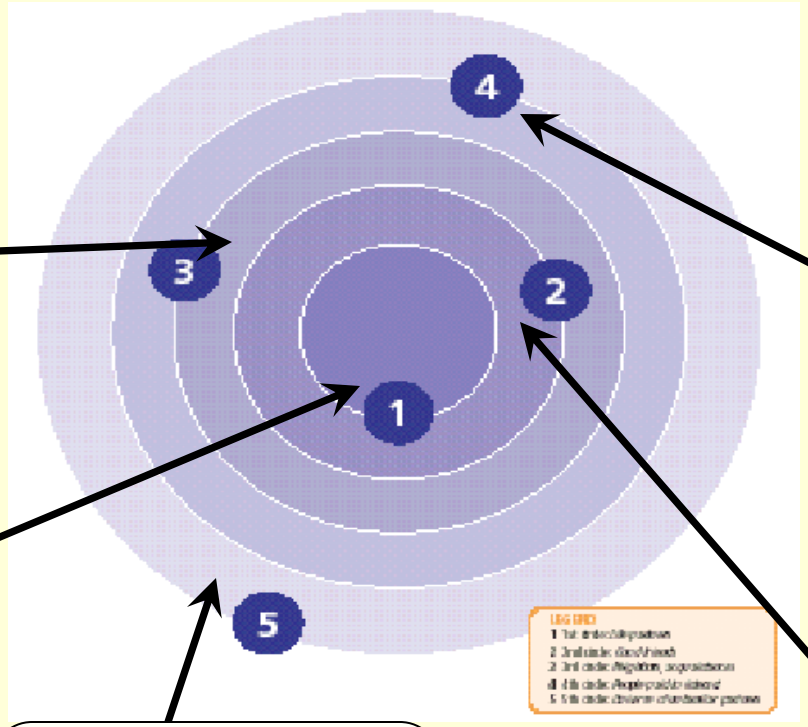
AAC Strategies for a Patient with Locked-In Syndrome for 16 Years

- Greg
- 42 years old
- Sustained brainstem stroke when 26 years old
- Lives with mother
- Has 3 long-time care providers

Present communication strategies

- Partner-dependent alphabet scan
- Eyes up = yes
- Eyes down/eyelids shut = no
- Single vocalization
- Voicing on laughter

Social Networks: Communication partners in all circles



3:Store owners & employees
Musicians
Club patrons

4: Long time care providers (3)

1: Mother
Father
Sister
Nephews

2: Close friends ;facebook; neighbors

5: Many community based individuals (owns a van; goes for walks)

Communication Needs

- Interact verbally with unfamiliar people.
- Write poetry.
- Initiate conversation.
- Independently read and discuss books.
- Independent use of computer for Facebook and surfing Internet.
- Independent purchase power.
- Employment.

Communication Abilities

- Fluent in English and German.
- Completed 4 years of university.
- No cognitive impairment, just motor impairment.
- No volitional movement of body below the neck.
- Limited movement of head from side to side and up/down (10º).
- Eye control.

Evaluation of commercially available speech generating devices

- Wants text generation, mouse functions.
- Does not think he would use functions of phone, camera and mp3 player on devices.
- Is concerned about the productivity rate with an eye gaze system.
- Is concerned with the portability of a system (making it wheelchair tray friendly).
- Questions whether device causes a barrier between him and his listener.

MEGABEE


GHI
JKL
012
345
ABC
DÈF
STU
VẆX
MNO
PQR
678
9YZ
I AM THIRSTY
MegaBee

Dynavox EyeMax

- Dwell and switch mode
- ZYGO CM-9 lever switch placed at right temple

MyTobii P10

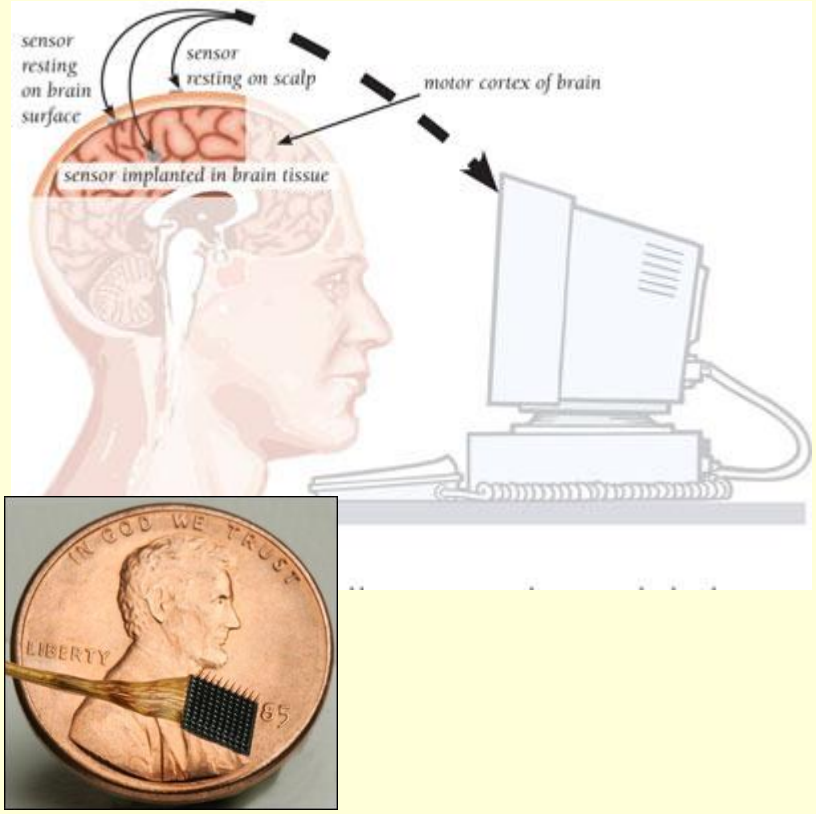

Media Player
You're The Voice
B52's - Love S...
She's a Lazy
mytobii
P10

Brain-Computer Interface

- What is a brain-computer interface (BCI)?
- BCI functions
  - Written/spoken communication
  - Environmental control
  - Prosthesis control
  - Non-medical uses
- Who uses BCI for communication?

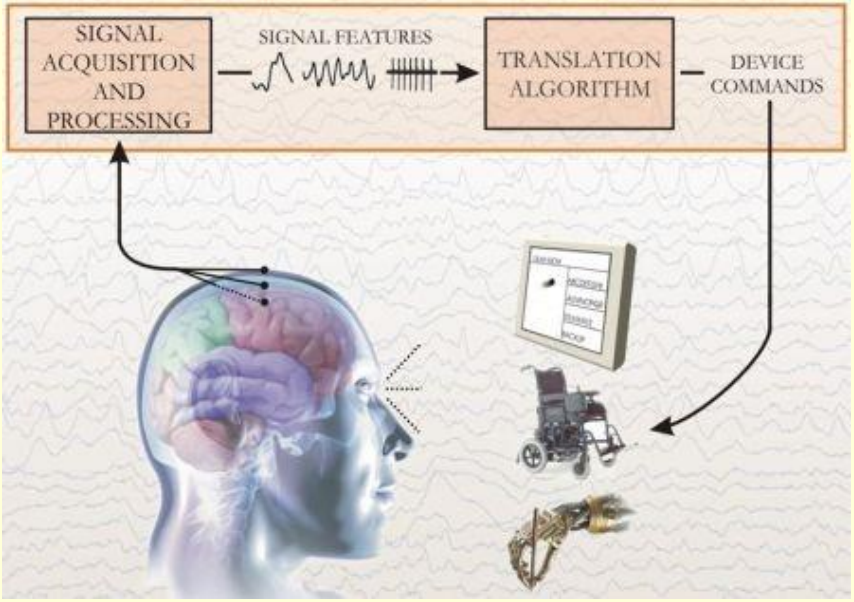
Invasive BCI

BrainGate



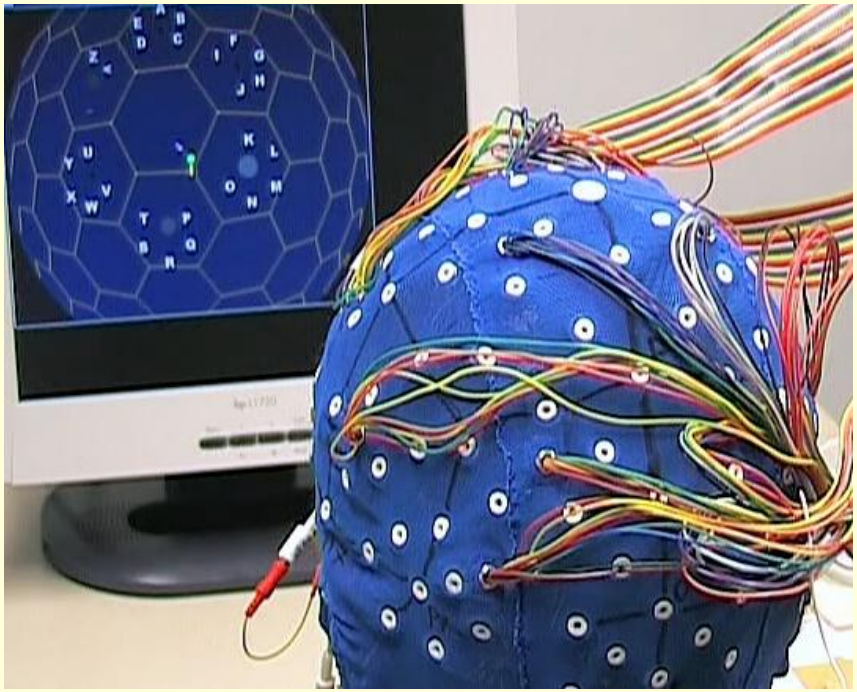
Non-invasive BCI

EEG-cap with 28 electrodes



Currently available spelling interfaces

Berlin BCI speller



P300 speller

The RSVP BCI system
(Rapid Serial Visual Presentation BCI)

Signal processing

- User wears an electrode cap that classifies electricity of brain activity.
- System captures event related potentials for single events that are flashed on the computer screen. (letters presented from 50-200 ms each).

Natural language processing

- Presenting one letter at a time in the center of the screen.
- Using n-gram letter sequence prediction for spelling with large word corpora.
- Will try with word and word-part prediction also.

Greg's first attempt with the RSVP BCI system, July 2010

Many needs…many strategies

- BCI will become another electronic access option for AAC users in the near future.
- AAC offers a full range of electronic and non-electronic options to individuals with severe motor challenges.
- Message to persons with locked-in syndrome: You will always be able to communicate.