# User-centered design influences the integration of multimodal access in an AAC-BCI system

Deirdre McLaughlin, Betts Peters, Tab Memmott, Michelle Kinsella, & Melanie Fried-Oken

Background on AAC-BCI

- The target users of brain computer interfaces for AAC (AAC-BCI) are people who experience severe speech and physical impairment (SSPI)

- People who experience SSPI are often not included in the design or testing of AAC-BCI as team members or research participants (Eddy et al., 2019)

- For 12 years, our research team has partnered with people with SSPI to guide AAC-BCI system development (Peters et al, 2016; Oken et al, 2014).

Example inquiry with RSVP Keyboard

0 s

+
B
C
D
E
Y
A
G
H
I
J

target

2.5 s

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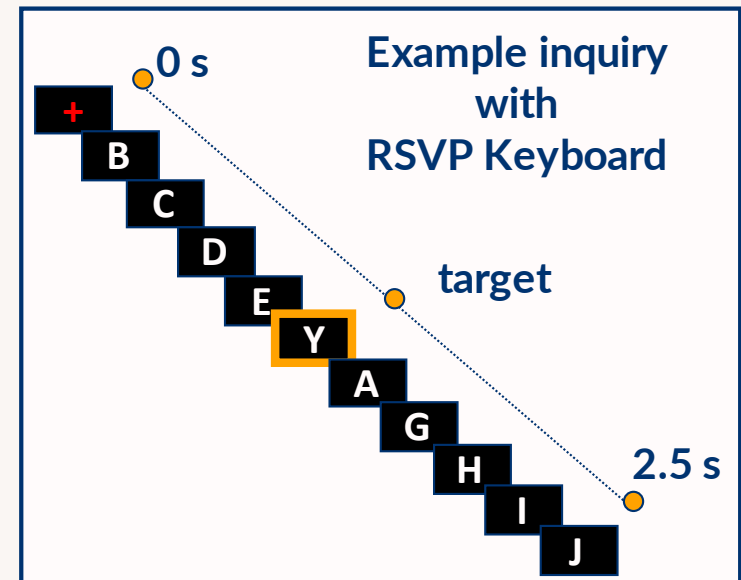
Consultants for Switch Integration

- A recent team goal was to **integrate switch activation** as an additional control signal in our EEG-based non-invasive AAC-BCI spelling system.

- Four individuals with SSPI who had participated in previous AAC-BCI studies and had experience using assistive technology acted as consultants
  - **sharing their opinions** about seven potential features that could be controlled using switch activation
  - **participating in co-design of the user interface** for selected features.

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Opinions on Switch Integration

- All consultants identified the following features as potentially useful:
    - Backspace

    - Pausing stimuli presentation

    - Switching to stored phrases

    - Activating text-to-speech

- All consultants emphasized the importance of ease of use, flexibility, and customizability to meet the needs of individual users.

Co-Designs of Selected Features
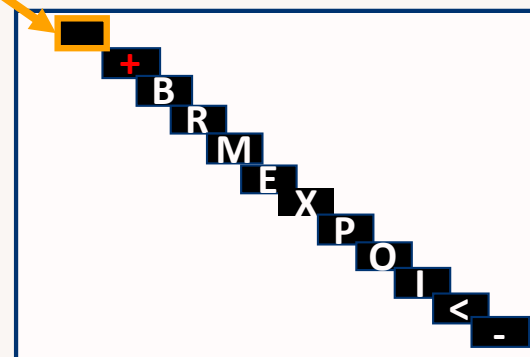
Session 1: Stored Phrases
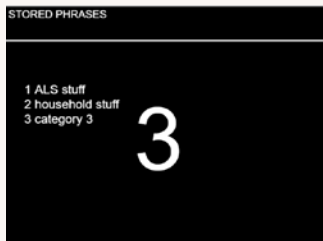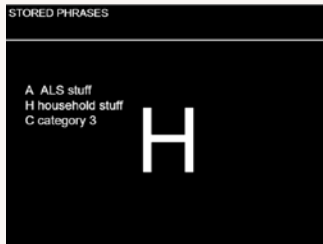
Session 2: Advanced Editing
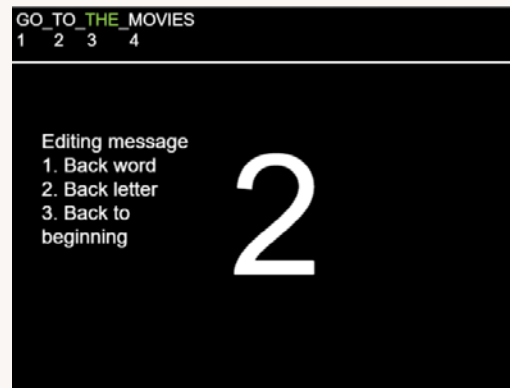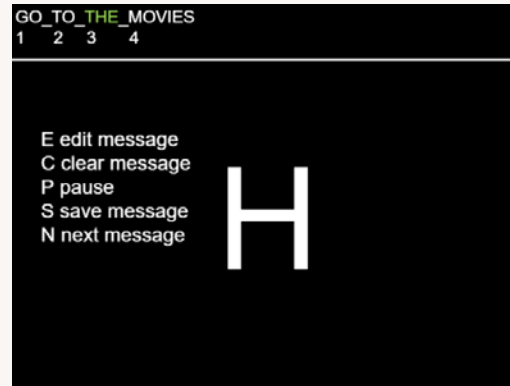
Co-Designs of Selected Features (continued)

Session 3:

Delete & Pause Mode

Session 4: Inquiry Preview

Deirdre McLaughlin M.S. CCC-SLP
deirdre@ohsu.edu

www.cambi.tech   **@cambi_tech**   **cambi research**

References

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Oken, B., Orhan, U., Roark, B., Erdogmus, D., Fowler, A., Mooney, A, Peters, B., Miller, M., & Fried-Oken, M. (2014). Brain-computer interface with language model EEG fusion for locked-in syndrome. Neurorehabilitation and Neural Repair, 28(4), 387-394.

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