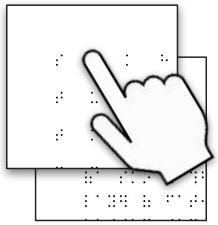
1. The basic idea: Braille reading and EEG

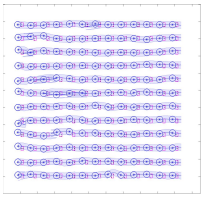
We track readers' **moving hands and brain waves simultaneously**



Read single letters or a page of prose text

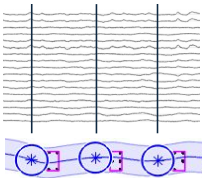
Finger position tracking

Electroencephalogram



Track over one page

Synchronize finger positions with EEG signal



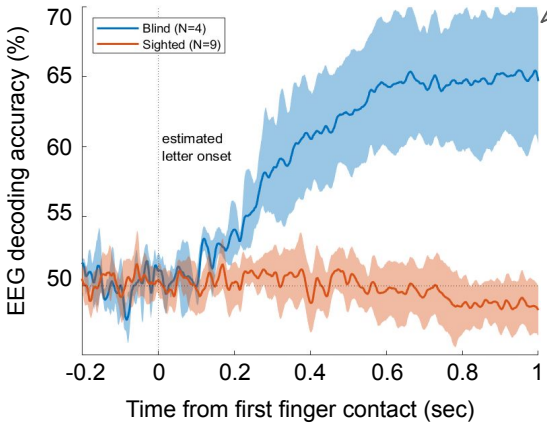
Closeup on 3 letters

This lets us pinpoint the brain response to each bit of text on the page, synced to the first moment of contact with the finger.

2. What we've already been doing

We can distinguish **letters and words from the brain signal alone**

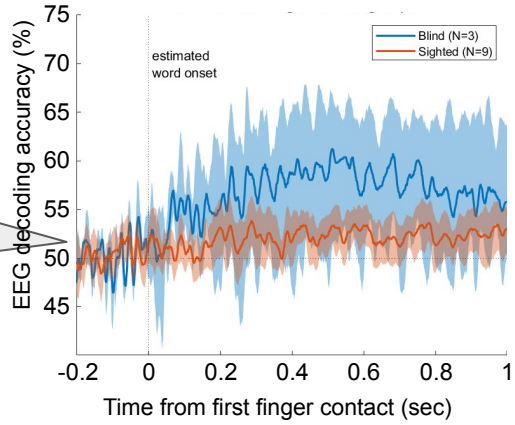
Single alphabetic letters in isolation



Blind readers' brains (blue) distinguished braille letters, while sighted participants (orange) did not.

Also true for word parts of speech — a signal only arising from reading comprehension.

Word parts of speech in text passage

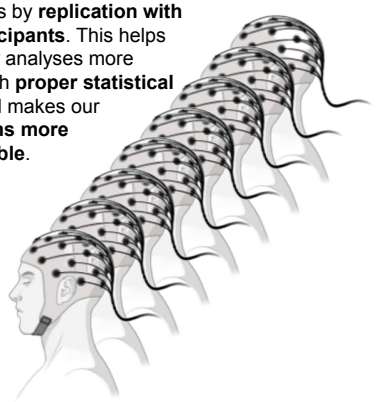


Bhattacharyya, P., Tam, R., Orsmond, P., Hicks, S., & Teng, S. Time-resolved EEG decoding of neural text representations during naturalistic braille reading. *CNS* (2025).

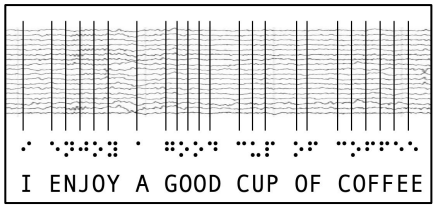
3. Where we hope to go from here

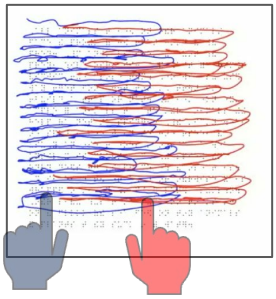
Strengthen the **proof of concept**, analyze **more complex signals**

We can strengthen our promising early results by **replication with more participants**. This helps support our analyses more robustly with **proper statistical power**, and makes our **conclusions more generalizable**.



We will analyze how the brain **processes the whole passage**, not just single letters or words.



This gives us an **end-to-end picture** of braille evolving **from dots on the fingertip to meaningful language** in the reader's brain.

Eventually we can examine **two-handed braille reading**. How does the brain combine signals from the left and right hands into a single narrative?