Introduction

Printed letter recognition plays an important role in reading and follows different phases of processing, from early visual feature processing through to the processing of abstract letter representations. Masked priming ERP studies revealed repetition priming effects for single letter targets. In Petit et al. [1] related pairs elicit less positive-going waveforms than unrelated pairs. Amplitude was modulated as a function of case consistency between prime and target (starting at ~120ms) or as a function of exact letter identity (~180-220ms) or as a function of abstract letter identity (220-300ms). Behavioral studies show facilitatory priming for same-case or same-letter pairs [2].

ASL Fingerspelling. Deaf signers can represent orthography indirectly using a non-written symbol system in which each letter of an alphabetic script is represented by a distinct handshape. Fingerspelling is relatively frequent and forms an integral component of the American Sign Language (ASL) lexicon.

Methods

20 deaf ASL signers (Mage= 34, SD=9, range 23-58), 9 native & 11 early signers

Stimuli

23 English letters presented as Batang font
23 ASL handshapes presented as Handtext font

Design – Unmasked repetition priming

- 2 lists blocked by target type: 276 English letter targets & 276 Fingerspelling targets
  - 2 Prime Types: English letter primes (EL) & Fingerspelling primes (FS)
  - Primes and targets represented either the same or different letters
  - Task: Probe detection (12% of trials)
  - Participants were familiarized with fingerspelling font prior to the experiment
  - Target type: Fingerspelling (FS)
    - A priming effect emerges at ~180ms: FS targets preceded by related FS primes elicited more positive amplitude than unrelated primes (180-500ms)
    - Effects may be related to accessing lexical letter names
  - Target type: English letter (EL)
    - A case-dependent, abstract letter identity priming ~100ms: EL targets elicited less positivity than unrelated primes (120-180ms)
    - In a later epoch (~300ms), reverse polarity (N400-like) priming may reflect access to lexical names of letters (task effect?)

EEG recording

EEG data recorded from 29 channels & averaged offline. ERPs measured to repeated vs. non-repeated pairs, time-locked to target onset (100ms baseline). Mean amplitude analyzed using 2 Relatedness x 3 Laterality x 5 Anteriority ANOVA. Hits: 98%, false alarms: 4%.

Conclusions

- Both EL and FS primed letter targets ➔ both prime types pre-activated EL letter representations.
- Only letter primes to letter targets showed a priming pattern similar to [1] (120-180ms) ➔ abstract EL and FS representations differ
- FS targets ‘benefited’ less from pre-activation by EL primes; Inefficient to recode English letters into fingerspelling for reading, consistent with a lack of letter to FS recoding in short-term memory [3].
- A follow-up (19 hearing / 14 deaf): for EL-EL trials only, N400-like priming effect is sustained ➔ may be due to probe detection task demands and/or supraliminal priming (“naming” strategy not induced by FS presence for deaf signers).