

Zed Sevcikova Sehyr, Karen Emmorey

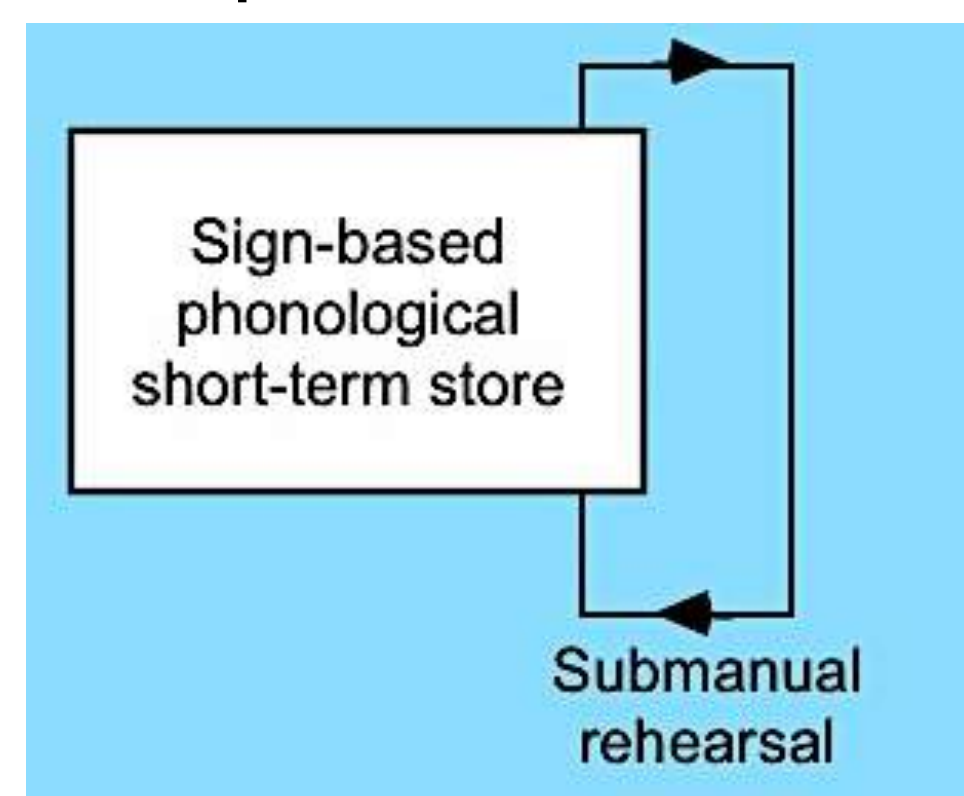
Laboratory for Language and Cognitive Neuroscience, San Diego State University

Introduction

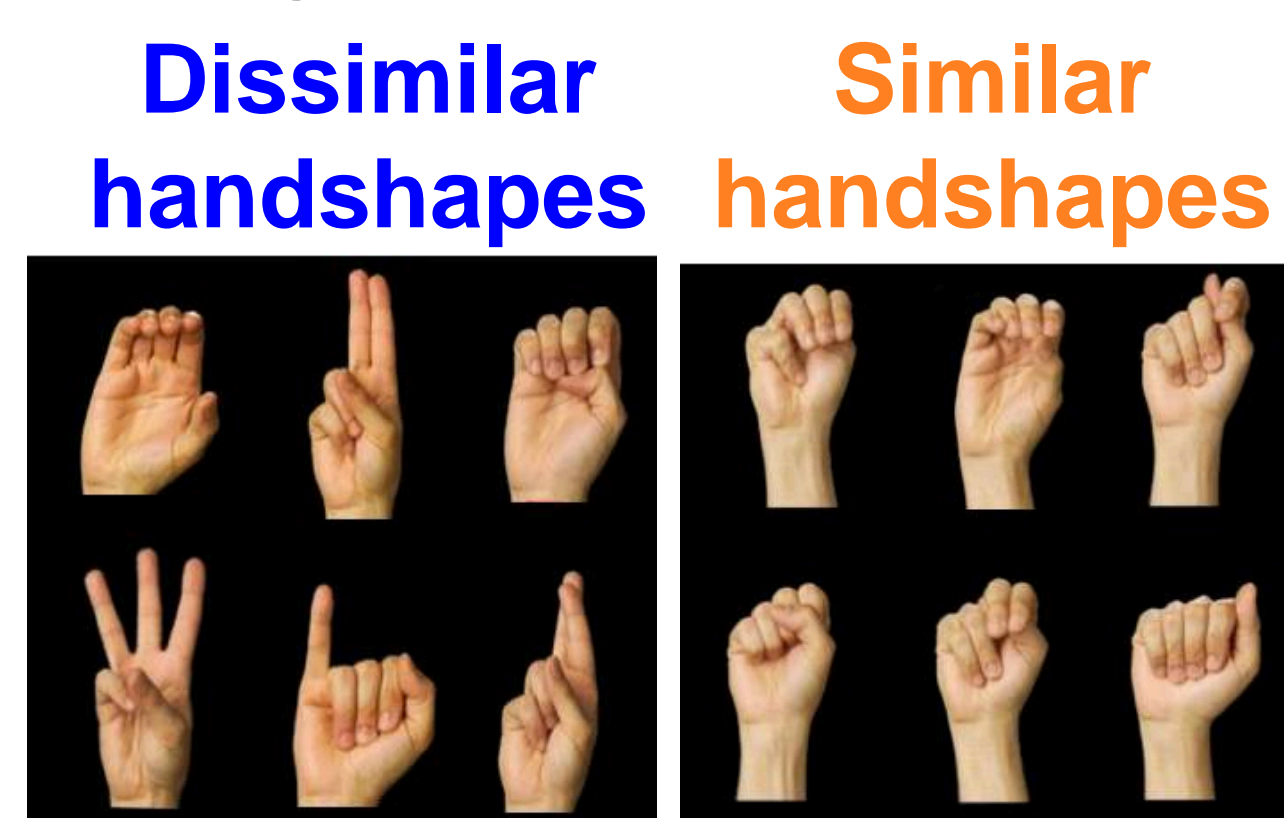
- Phonological similarity effects in immediate serial recall tasks suggest that short-term memory (STM) uses a phonological (speech-based) code for printed words (Baddeley 1986)
- Mixed evidence for phonological coding in deaf readers (Conrad 1979, Chincotta & Chincotta 1996)

Fingerspelling (FS) provides an alternative coding for English orthography for deaf users of American Sign Language (ASL)

- Is there a manual similarity effect for FS words?
- Are printed words recoded into FS?



Wilson & Emmorey (1997)
(based on Baddeley 1986)



Hanson et al. (1984)

Study 1: STM for printed words

- If deaf ASL signers recode printed words into a phonological and/or manual code, phonological/manual similarity should reduce accuracy in serial recall of print.

Participants

21 deaf signers ($M_{age} = 31.1$, $SD = 10.6$; 11F)

21 hearing non-signers ($M_{age} = 22.7$, $SD = 5.2$; 18F)

Phonological awareness: Hearing > Deaf: $p = .007$; Groups matched on reading comprehension (PIAT), reading fluency, print exposure & non-verbal KBIT ($p > .3$)

Stimuli & Task

Printed words: 8 similar, 8 dissimilar words per condition:

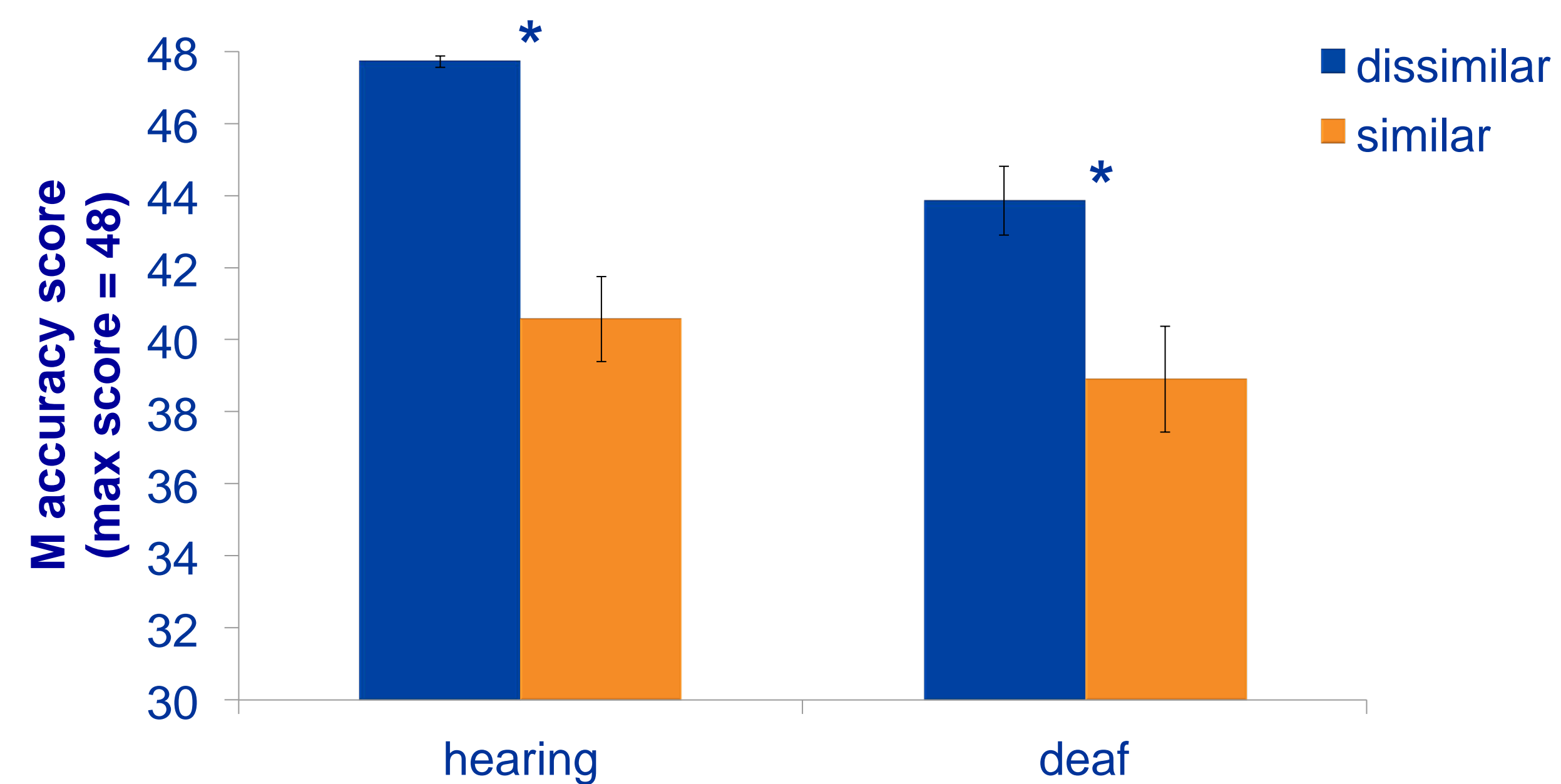
Phonological similarity		Manual similarity	
dissimilar	similar	dissimilar	similar
king, some, farm, with, tax, that, bug, cry	blue, shoe, chew, who, due, two, jew, you	box, race, cap, love, desk, new, lie, sick	east, son, nose, ten, mat, same, not, meat

Procedure

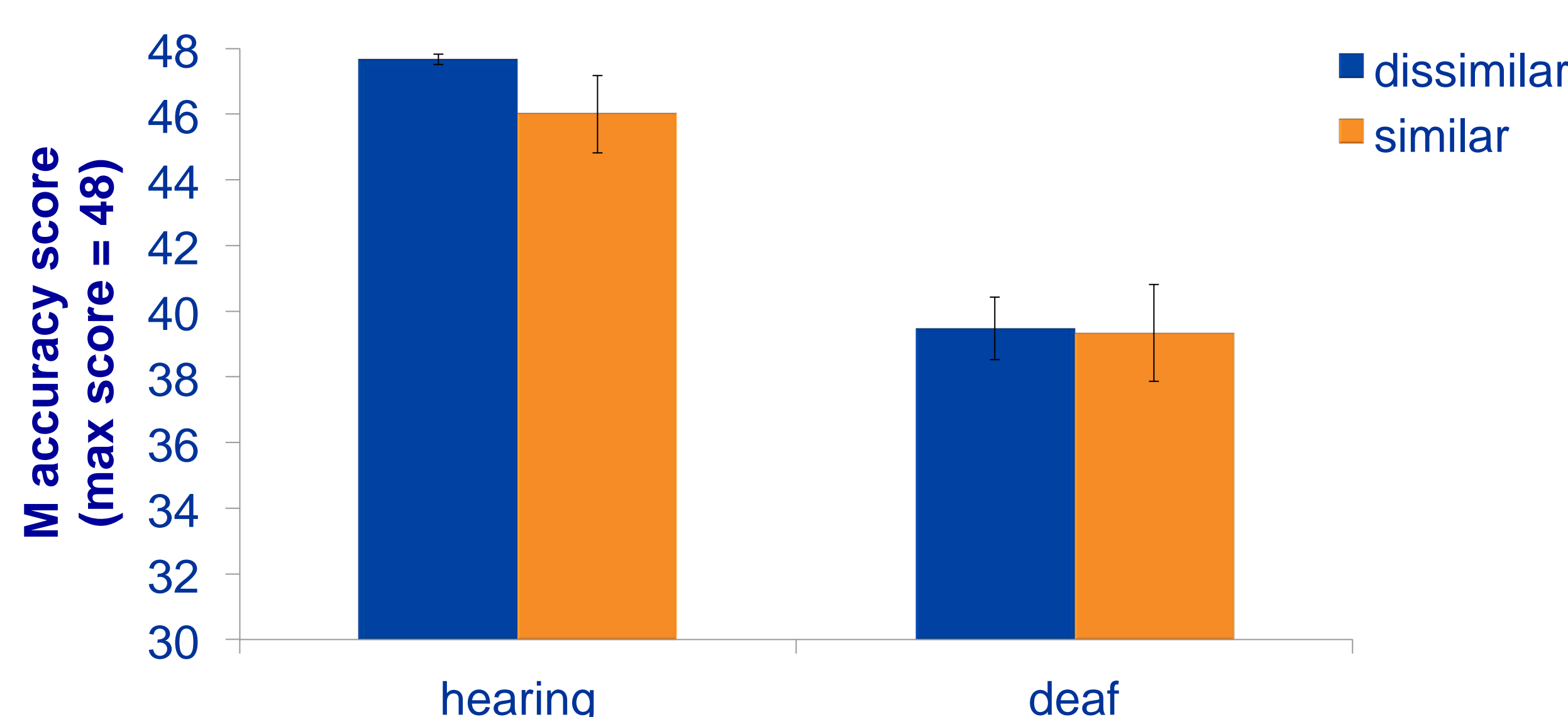
- lists: 12 similar, 12 dissimilar four-word lists per condition presented in pseudorandom order (+8 practice lists)
- order of conditions (phonological, manual) counterbalanced across subjects
- immediate serial word recall using written response

Results: serial recall of printed words

- Phonological similarity effects in hearing & deaf groups:



- No manual similarity effects in hearing & deaf groups:



Main effects: Group H > D: $p = .001$; List Type: Dissimilar > Similar: $p < .001$; Group X Condition: $p = .001$; List type X Condition: $p < .001$

Study 2: STM for fingerspelled words

- If deaf ASL signers recode fingerspelled words into a phonological and/or manual code, phonological/manual similarity should impact serial recall of FS.

Participants

22 deaf signers ($M_{age} = 31.6$, $SD = 9.6$, 10F; 19 from Study 1)

Stimuli & Task

FS words: 8 similar, 8 dissimilar words per condition:

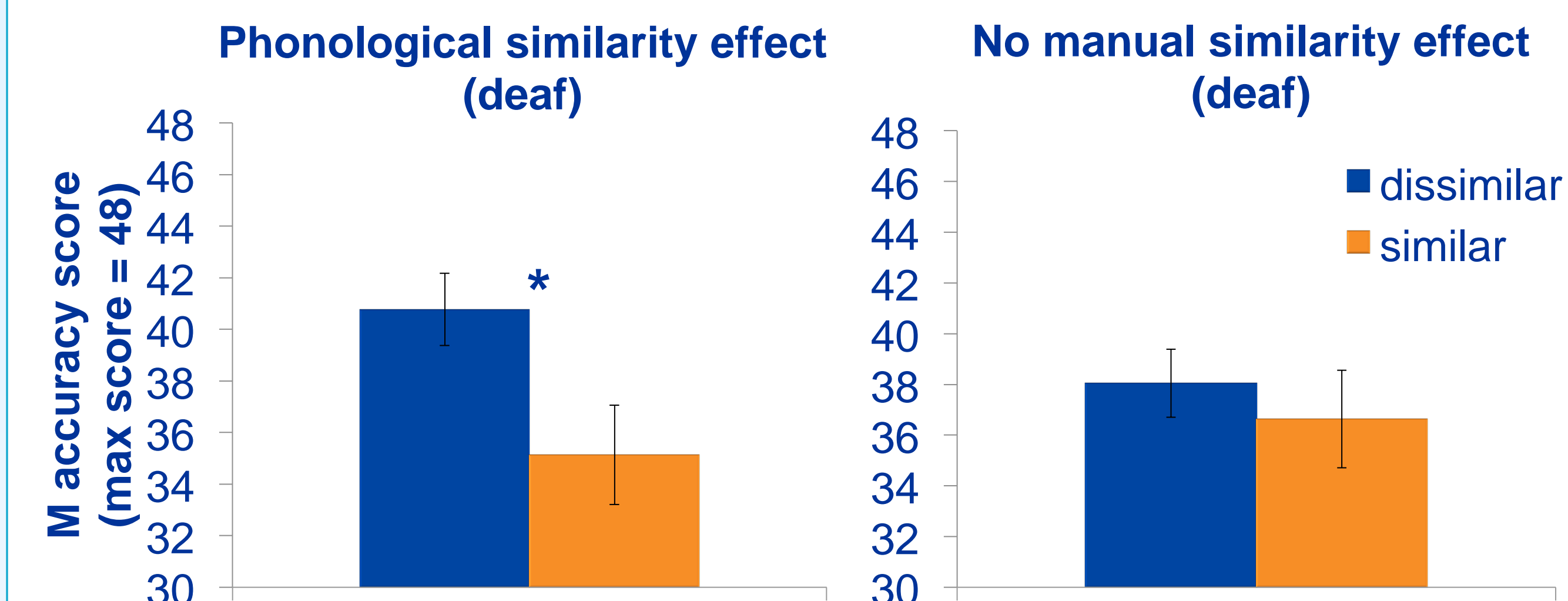
Phonological similarity		Manual similarity	
dissimilar	similar	dissimilar	similar
k-i-n-g, s-o-m-e, f-a-r-m, w-i-t-h ...	b-l-u-e, s-h-o-e, c-h-e-w, w-h-o ...	b-o-x, r-a-c-e, c-a-p, l-o-v-e ...	e-a-s-t, s-o-n, n-o-s-e, t-e-n ...

Procedure

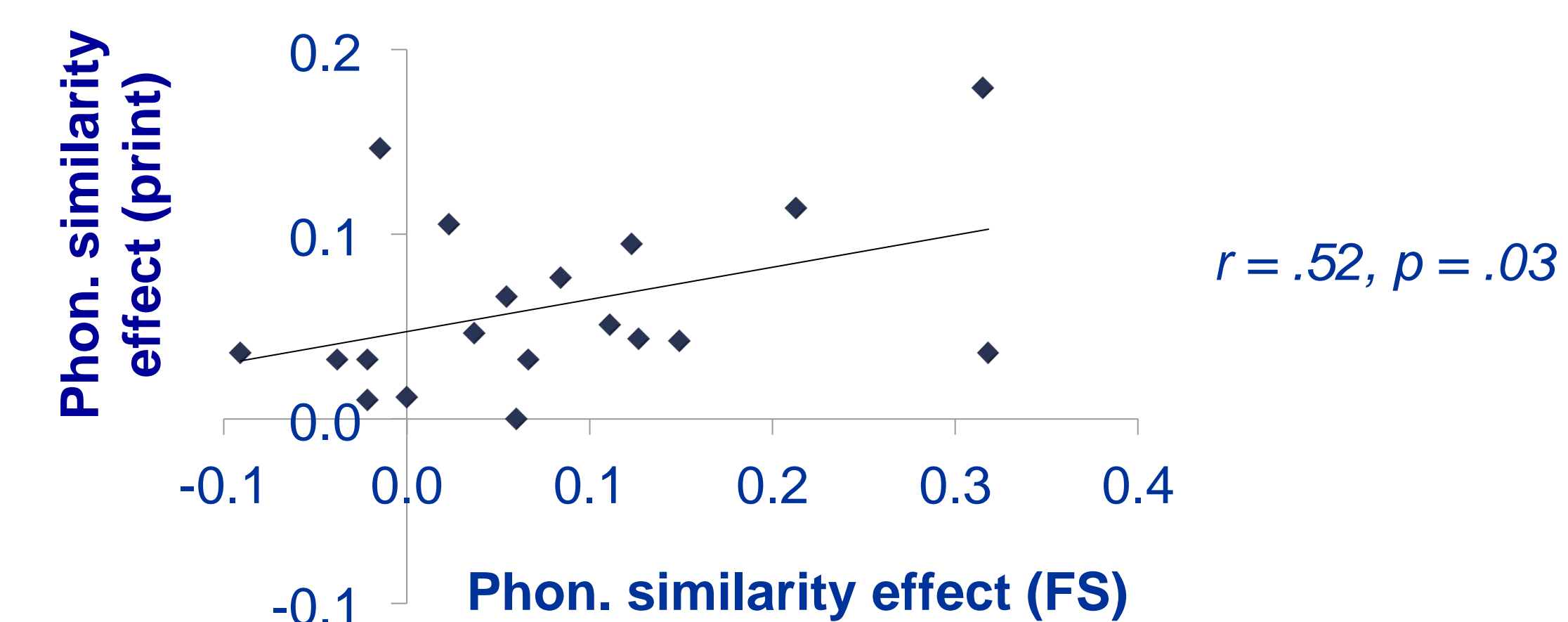
- same as Study 1 with words and lists re-ordered
- immediate serial word recall using FS response

Results: serial recall of fingerspelling

- Deaf signers recoded fingerspelling into a phonological code, but no evidence for use of a manual code:



- Phonological coding was systematic for deaf signers across both print and FS modalities ($n = 19$):



- Phonological recoding in print did not correlate with phonological awareness scores (deaf $p = .50$; hearing $p = .92$) or reading skill (deaf: $p = .13$; hearing: $p = .78$)
- In the deaf group, recall accuracy for print correlated with reading skill ($p = .009$) and ASL skill ($p = .002$)

Discussion

- Phonological similarity led to poorer recall in both deaf and hearing groups (groups matched on reading skill)
- Deaf readers recoded printed and FS words using a phonological (speech-based) code in STM
- A tight relationship between English mouthings and FS may promote phonological recoding of FS
- Follow-up: examine effects of manual similarity using a different metric to select stimuli based on a theoretical model of handshape features (Brentari 1998)

References

- Baddeley, A. (1986) Short-term memory for word sequences as a function of acoustic, semantic & formal similarity. *Q.J. Exp. Psy.* 18
- Brentari, D. (1998) *A Prosodic Model of Sign Language Phonology*. Cambridge, MA: MIT Press
- Chincotta, M. & Chincotta, D. (1996) Digit Span, Articulatory Suppression and the Deaf: A Study of the Hong Kong Chinese. *American Annals of the Deaf*, 141 (3)
- Conrad, R. (1979). *The deaf schoolchild*. London: Harper Row
- Hanson, V. et al. (1984) Linguistic coding by deaf children in relation to beginning reading success. *JECSP* 37
- Wilson, M. & Emmorey, K. (1997) A visuospatial "phonological loop" in working memory: Evidence from American Sign Language. *Mem.&Cog.* 25(3)