Research Methods in Psycholinguistic Investigations of Sign Language Processing

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Why so urgent?

Production

Comprehension (Processing):

modality-specific vs modality-independent aspects

artificial distinction

Acquisition:

e.g. Deaf children acquire SL earlier

Challenge: adapting materials and paradigms to the visual modality

Outline

Standard Methods

Methodological Considerations

Methodological Challenges

In scope:

perception, lexical access, grammatical processing, SL production

Out of scope:

spoken language use, children, reading, neuroimaging methods

Methods: Participants

1. **Deaf (a hearing loss of 70 dB or greater):**

    signed language proficiency

        native signers: exposure from birth

        childhood signers: exposure by age 5

        adolescent signers: exposure by age 9

    education level

    parental hearing status

    socioeconomic status (SES)

Methods: Participants

2. Hearing who use SL:

CODAs (Children of Deaf Adults)

late deafened adults

second-language signers

3. Hearing who do not know SL - control group:

optional, depends on research question, e.g. lexical access

signed language perception vs visual perception

not included in investigation of grammatical processing

Methods: materials

line drawings

still photographic images

video recordings

direct presentation of signed stimuli (no glosses since 1990!):

- recordings of live signers

How to isolate form- and meaning-processing:

- nonce signs (replace one parameter in standard signs)
- foreign signs

Methodological Considerations

Sub-domains of Signed Language Psycholinguistics

Comprehension: perception, lexical access

Production: intact production, production errors

Comprehension (perception)

General RQ: how sensory information is mapped to perceptual categories, modality effects

Tasks:

identification and discrimination tasks

phonological similarity judgment tasks

monitoring tasks

Identification and discrimination tasks

How do participants identify or categorize sensory stimuli into perceptual categories at sublexical or lexical levels?

RQ: the extent to which perception is language-specific vs gestures, facial expressions, or other visual stimuli

Stimuli:

a sequence of signs that vary gradually from using the U handshape to using the V handshape (Best et al., 2010)

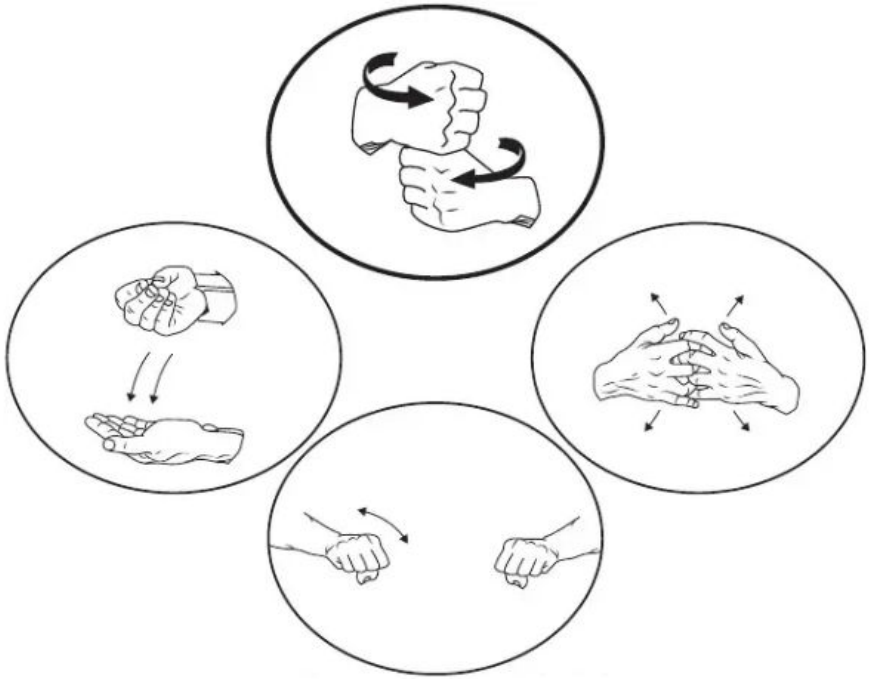
signers can categorize each signed production into two categories: U or V

Phonological similarity judgment task

RQ: how the different phonological parameters contribute to sign perception

Stimuli: multiple signs or nonce signs that differ only in one or two parameters or in certain dimensions of a single parameter

Task: decide which stimuli look most similar



Phoneme monitoring tasks

RQ: reaction time, the efficiency of perceptual processing

Stimuli: a sequence of signs or nonce signs, visual noise

Task: respond when a target is observed, e.g. each time the sign is made with a fist or is located at the chin

Control: use synthetic sign, signing avatars, visual morphing of video recordings

Popular: handshape perception

Rare: movement perception (Poizner, 1981; cf. Tartter and Fischer, 1982)

Lexical access

General RQ: the process that links language form to meaning in the mental lexicon

Tasks:

- sign repetition or translation
- primed lexical decision
- gating

cf. spoken languages: priming and lexical decision

Lexical access (Tweney, Heiman, and Hoemann 1977), (Heiman and Tweney 1981)

Associated with comprehension

RQ: how modifications to the sign signal impacted sign recognition

Stimuli: a sign presented at a faster rate than it was filmed or periodically interrupted

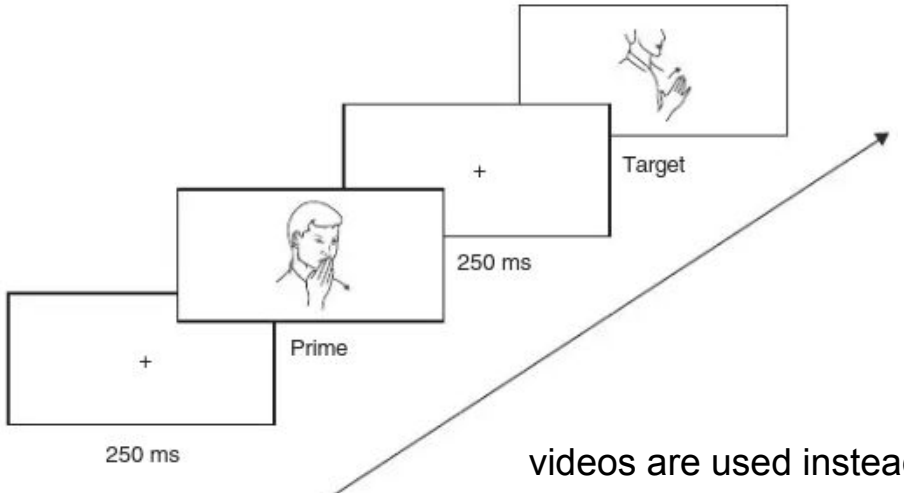
Task: to repeat a sign / translate into English

Lexical decision task

Stimuli: a sequence of individual signs and nonce signs

Task: whether the signed stimulus is a possible sign in their language

Priming: sign recognition response time is compared for a target sign that is preceded by an unrelated sign versus a related sign



videos are used instead of line drawings

Lexical access: Priming

RQs:

effects of semantically (Bosworth and Emmorey, 2010)

phonologically related primes (Carréiras, Gutierrez-Sigut, Baquero, and Corina, 2008; Dye and Shih, 2006)

whether the iconicity of a sign impacts the degree of priming (Bosworth and Emmorey, 2010)

Gating task

RQ: the time course of lexical access

Stimuli: the onset of the target sign

Task: to sign what they saw

Stimuli 2, 3, 4, 5 … : the same target, but are shown a longer onset

signs are recognized prior to their offset

signs are identified more quickly than spoken words (Emmorey and Corina, 1990; Grosjean, 1981; Morford and Carlson, 2011)

the static phonological parameters of location, handshape, and orientation are identified earlier than the dynamic parameter of movement

Lexical access, more tasks:

sign-spotting – that is, identifying a sign embedded in continuous signing

deciding whether a signed stimulus is one or two signs

deciding whether the handshape is straight or curved

deciding whether a sign is made with one or two hands

deciding whether a sign and a picture match

Comprehension: grammatical processing

NB! a less developed area

Tasks:

grammaticality judgment task

probe recognition

sign monitoring

sentence or narrative shadowing

sentence recall

Grammaticality judgment task

Stimuli: signed sentences

Task: to decide whether they are grammatically acceptable or not

Control: disrupting the target grammatical morpheme or construction in the agrammatical sentences

Probe recognition task

Stimuli: a signed sentence

Task: to decide whether a target sign occurred in the sentence or not

Sign monitoring task

Stimuli: a signed sentence

Task: to respond when they see a target sign (= detection)

Both can potentially be affected by the grammatical context, allowing investigators to evaluate **the effects of grammatical manipulations** (see, e.g., Emmorey, Bellugi, et al., 1995).

Sentence shadowing task

Stimuli: a signed sentence

Task: reproduce the target sentence while watching it

Sentence recall

Stimuli: a (complex) signed sentence

Task: wait until a sentence is completed before trying to reproduce it exactly

Output: errors > insights into the comprehension process, modified responses can be evaluated for their grammaticality

Sentence recall task

The age at which signers are first exposed to sign language has lifelong consequences for language comprehension (Mayberry, 1993; Mayberry and Fischer, 1989; Mayberry and Eichen, 1991).

Phonological errors demonstrate surface-level processing of the target signs. Semantic errors demonstrate deeper processing of the target signs.

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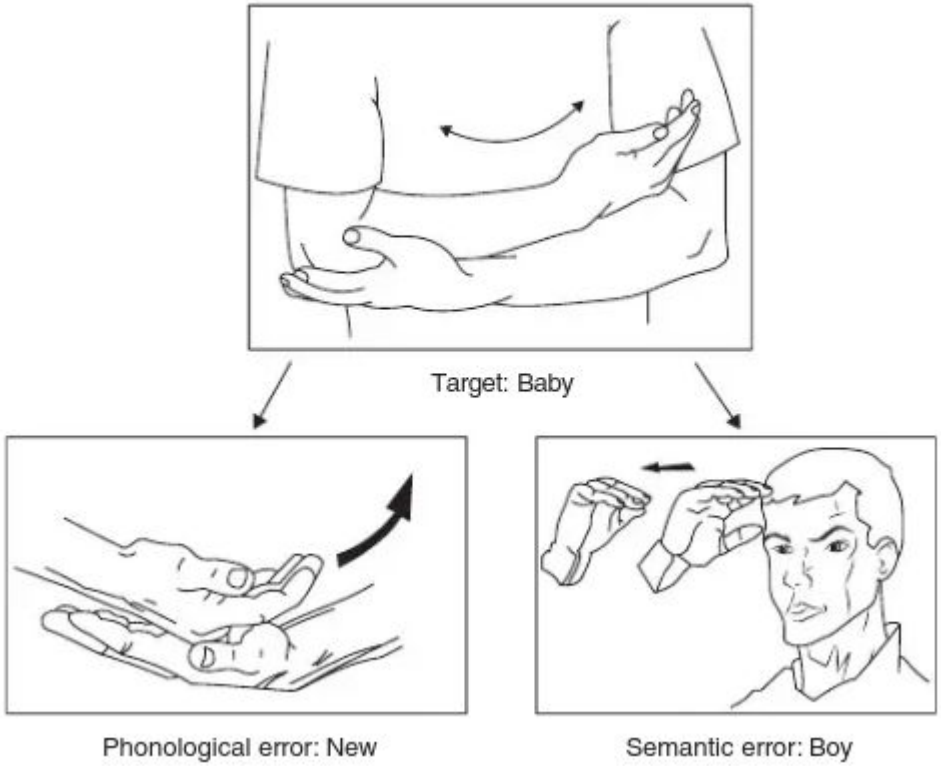


Signed language production

RQ: intact language production and production errors

More consistency in the tasks:

analyze corpora

to elicit language production through picture naming, storytelling, translation

elicited production under cognitively stressful conditions

handshape is the most likely phonological parameter to be substituted in forms >

signs have sublexical structure >

separate processing of form and meaning

Methodological Challenges

Generalizability of findings: small number of SLs studied (European, ASL)

Generalizability of findings: small sample sizes, standardization of signers' description, standardized assessment tools to measure signed language proficiency, creating corpora

Analysis methods: ANOVAs and correlations are used, multilevel (mixed) modeling is required

Stimulus selection: нужно больше корпусов!, collecting familiarity ratings, iconicity ratings, etc.

Measuring reaction times: when does a sign begin and end? how sign length may be contributing to reaction time?

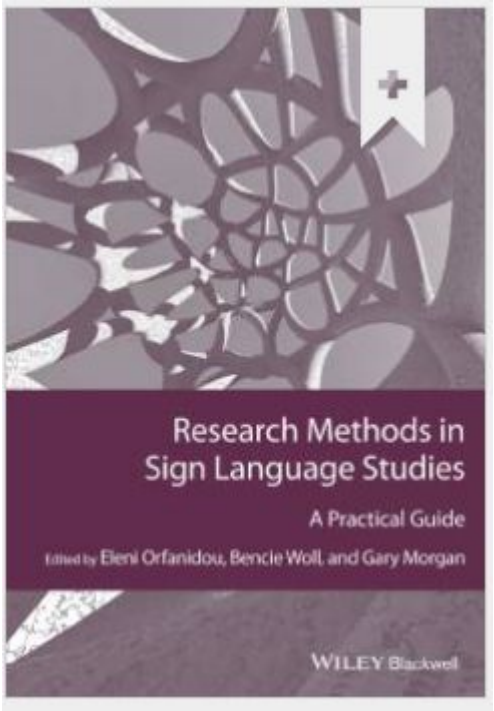
Conclusion

methods from spoken language studies,

adaptation for use with visual languages,

new approaches.

Further reading: Orfanidou, Eleni, et al. Research Methods in Sign Language Studies : A Practical Guide, John Wiley & Sons, Incorporated, 2015.



Thank you!

Almeida, Poeppel & Corina (2015)