# Lexical factors that influence sign retrieval: A large-scale ASL picture naming study

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## Introduction

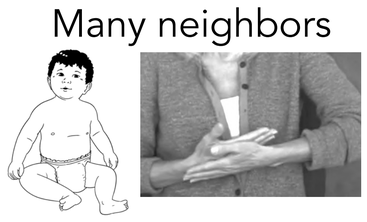
- Picture naming tasks are a popular way to study influences on lexical retrieval
- Large-scale picture naming databases or normative datasets are available for spoken languages, but lacking for sign languages!

- Factors influencing lexical retrieval include:
  - Lexical frequency (FREQ) [1, 2]
  - Iconicity (ICON) [3,4,5,6]
  - Phonological neighborhood density (ND) [7,8]; Parameter-based ND [11]: Signs must share Handshape, Location & Mov.
  - Lexical class: **Nouns vs. verbs** [9]

Type of mapping: Neighborhood density:

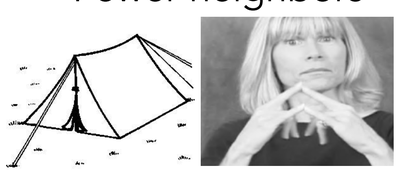
More iconic

Many neighbors



Less iconic

Fewer neighbors



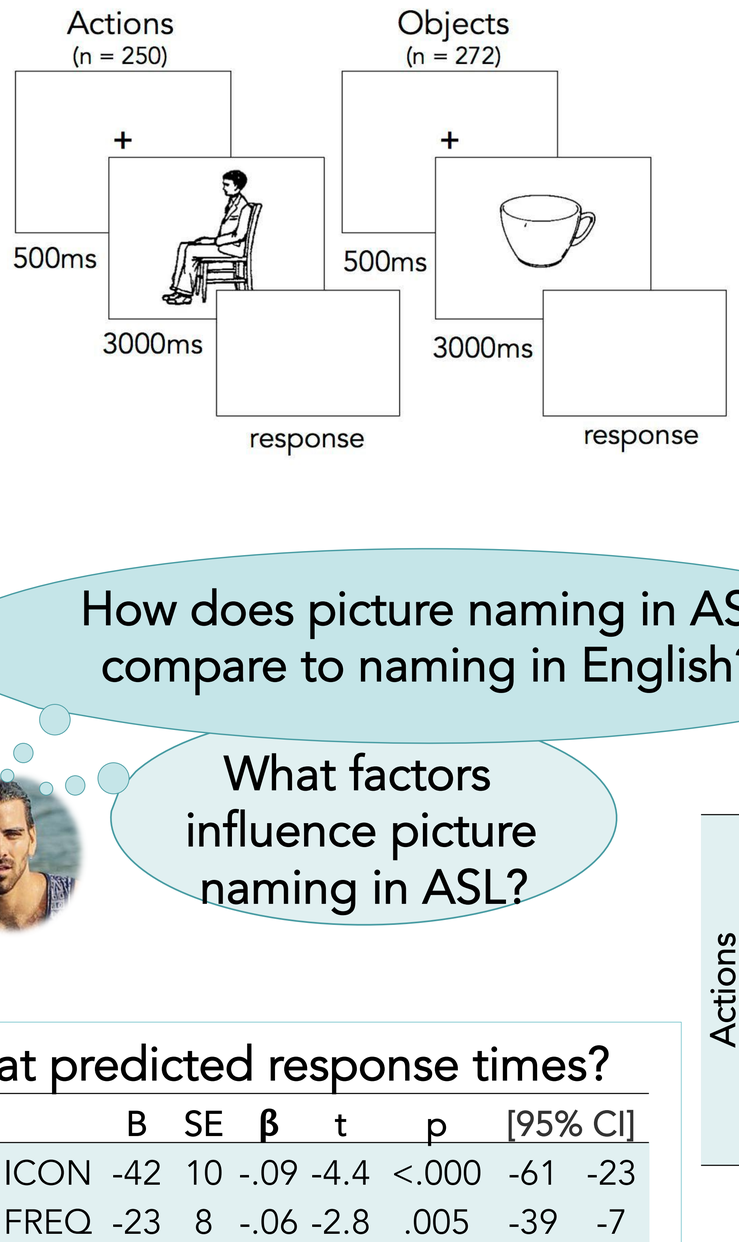
## Method

### Participants

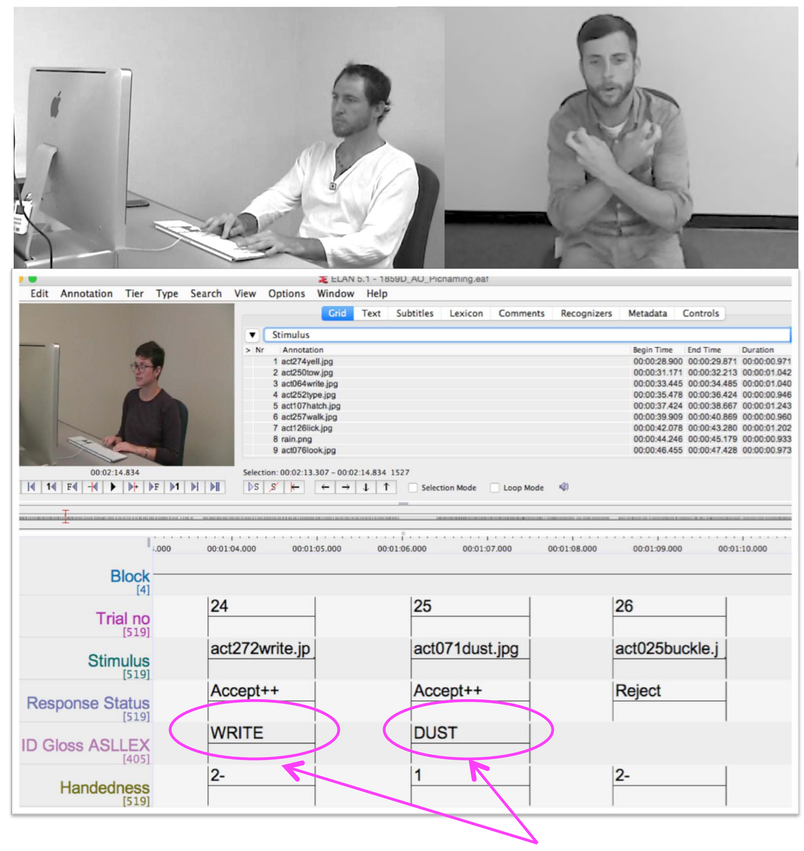
- 21 deaf native ASL signers

(M age = 31, SD = 6, 12 F, 13 native)

### Stimuli (from CRL-IPNP) [10]




Response recoding set-up & coding




ELAN response glosses were compatible with ASL-LEX (asl-lex.org) [11]

How does picture naming in ASL compare to naming in English?

What factors influence picture naming in ASL?

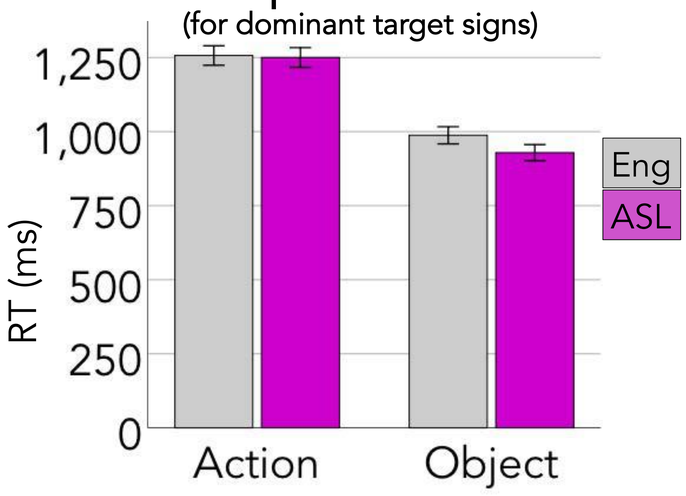


### Relationships among variables

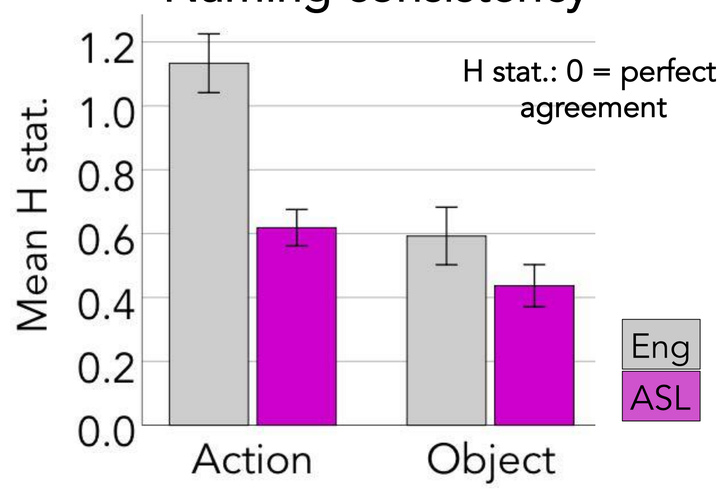
| | | RT tar. | Acc.Tar | H | FREQ | ICON | ND | |
|---|---|---|---|---|---|---|---|---|
| Actions | RT Tar. | | –.34** | .10* | –.09** | –.07** | - | Objects |
| | Acc.Tar | –.53** | | –.75** | .20** | - | - | |
| | H | .24** | –.92** | | –.15* | - | - | |
| | FREQ | –.06** | - | - | | –.17** | .09** | |
| | ICON | –.07** | .16* | - | –.09** | | .03* | |
| | ND | .05** | - | - | –.06** | .08* | | |

## Results

### Response times
(for dominant target signs)




### Naming consistency




- Valid responses (trials):

  $M_{OBJ}$ = 88%; $M_{ACT}$ = 76%

- Object names were retrieved faster, more accurately & consistently than action names, similarly to English [9, 10]

### What predicted response times?

| | | B | SE | β | t | p | [95% CI] | |
|---|---|---|---|---|---|---|---|---|
| Actions | ICON | -42 | 10 | -.09 | -4.4 | <.000 | -61 | -23 |
| | FREQ | -23 | 8 | -.06 | -2.8 | .005 | -39 | -7 |
| | ND | 2 | 0.9 | .05 | 2.5 | .011 | .52 | 4 |
| Objects | ICON | -27 | 4.9 | -.09 | -5.5 | <.000 | -37 | -17 |
| | FREQ | -31 | 4.9 | -.1 | -6.3 | <.000 | -41 | -22 |

### What predicted sign agreement (%)

| | | B | SE | β | t | p | [95% CI] | |
|---|---|---|---|---|---|---|---|---|
| Actions | ICON | .03 | .01 | .18 | 2.1 | .037 | 0 | .06 |
| Objects | ICON | .02 | .01 | .14 | 2.0 | .044 | 0 | .03 |
| | FREQ | .04 | .01 | .23 | 3.3 | .001 | .02 | .06 |

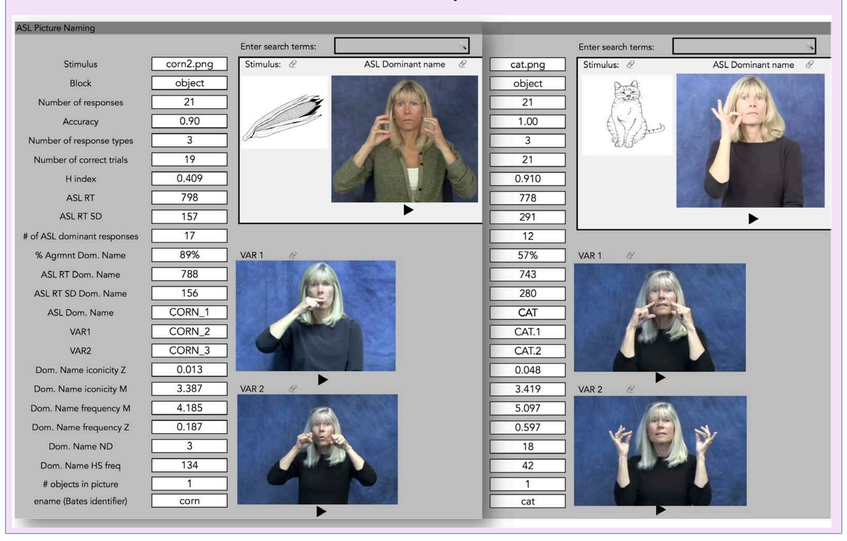
- Sign iconicity sped up RTs, improved name agreement, and was the strongest predictor of naming, in line with existing studies [3,4,5,6]
- Frequent names were retrieved faster than less frequent names [e.g. 1,2,3]
- Frequency also predicted better naming agreement for objects [10]
- Denser neighborhoods may slow down action naming
- ASL nouns and verbs might be processed differently, as found for spoken languages [9, 10]

## Conclusions

- Frequency effect replicated for ASL – lexical selection favors more frequent signs (i.e., principle of least effort, [12])
- Structured iconic mapping between picture and sign may play a key role in picture naming
- Phonological neighbors compete for retrieval during ASL picture naming

### ASL Picture Naming Database

- Build a normative database of pictures suitable for ASL; create a standardized test of vocabulary or ASL sign processing
- Will include lexical & phonological variants




References: [1] Oldfield & Wingfield (1964); [2] Emmorey, Gollan et al. (2013); [3] Vinson, D., Thompson, R. L., Skinner, R. & Vigliocco, G. (2015); [4] Baus, C. & Costa, A. (2015); [5] Navarrete, E., Peressotti, F., Lerose, L., & Miozzo, M. (2017); [6] Pretato, E., Peressotti, F., Bertone, C., & Navarrete, E. (2018); [7] Luce & Pisoni (1998); [8] Pierrehubert (2001); [9] Szekely et al. (2003, 2005); [10] Bates et al. (2003); [11] Caselli, Sevcikova Sehyr, Cohen-Goldberg, & Emmorey (2017); [12] Zipf, G. (1949)

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