

Age of acquisition effects on verbal fluency in Turkish Sign Language

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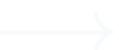
Introduction (cont.)

Deaf Children of Deaf Parents



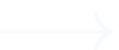
Acquire a Sign Language Effortlessly

Hearing Children of Hearing Parents



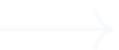
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Acquire both Spoken and Sign Language

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Experience Language Deprivation

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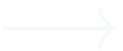
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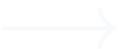
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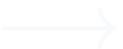
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Introduction (cont.)

Delayed sign language acquisition has long-lasting effects among DCHP and leads to:

- ▶ poorer linguistic abilities in the domains of morphology, morphosyntax and sentential processing [1]–[4].
- ▶ reduced lexicon with a slower pace of vocabulary acquisition [5]–[7].
- ▶ more impoverished phonological processing and awareness [8].
- ▶ and Executive Functioning (EF) [7], [9].

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The Present Study

It is still unclear whether effects of deprivation among DCHP persist or disappear with maturation. In this study, we aimed to:

- ▶ explore the AoA effects among deaf adult signers of Turkish Sign Language (TİD) on verbal fluency.
- ▶ test lexical and phonemic frequency effects on task difficulty

by examining the number of correct responses through a time-course analysis.

1.2. Verbal Fluency Tests

VFTs are the measures of *verbal ability*, consisting of both *vocabulary knowledge* and *lexical access*, and *executive functions* that help update and store information in the working memory.

- ▶ In fluency tasks participants are given a prompt, for which they produce as many words as possible in a given amount of time.
- ▶ The mean number of correct responses is argued to be explained by previous vocabulary knowledge and the decline rate of responses through time mostly indicates updating abilities [10].

Introduction (cont.)

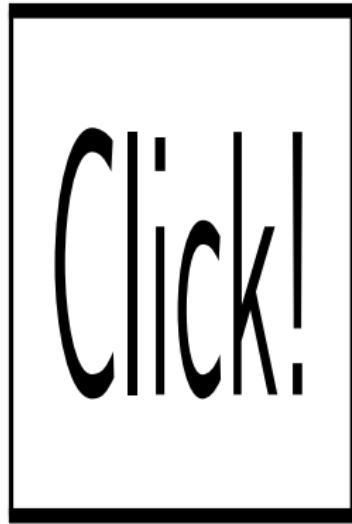
Phonological Fluency Task

Excerpt from the "Flat Handshape" category



Semantic Fluency Task

Excerpt from the "Vegetables & Fruit" category



Method

2.1. Test Format

- ▶ In our test we included 6 handshape (HS) and 6 location (LOC) items for the phonological module, and 6 semantic (SEM) items with E(asym), M(edium), and H(igh) difficulty settings.
- ▶ The signers were asked to produce as many signs as possible within 60 seconds for each item.
- ▶ We calculated the difficulty of the phonemes in their TID dictionary [11] frequencies, and semantic difficulty is adapted from [12].

Method (cont.)

Task	Parameter	Easy-1	Easy-2	Medium-1	Medium-2	Difficult-1	Difficult-2
Phonology	Handshape	 - Flat-B	 - 1	 - 2	 - T	 - L	 - 8
	Location	Above-shoulders	Hands	Chest	Arms	Stomach	Shoulders
Semantics		Relatives	Fruits and Vegetables	Professions	Something made of wood	Diseases	Sciences

Figure 2: Test Categories

Method (cont.)

2.2. Participants

- ▶ 31 deaf adult signers of Turkish Sign Language (TİD)
 - 15 with early (before 3 y.o)
 - 16 with late acquisition (after 3 y.o)

participated in the study.

2.3. Coding and Analysis

- ▶ We annotated responses in MPI ELAN annotation program, and coded unique and meaningful signs as correct.
- ▶ We then measured the total number of correct responses and analysed the time course.

Results (cont.)

Figure 3 shows that native acquisition of TID led to a higher number of correct responses. Increasing difficulty reduced mean responses overall, more prominently in the semantic task category.

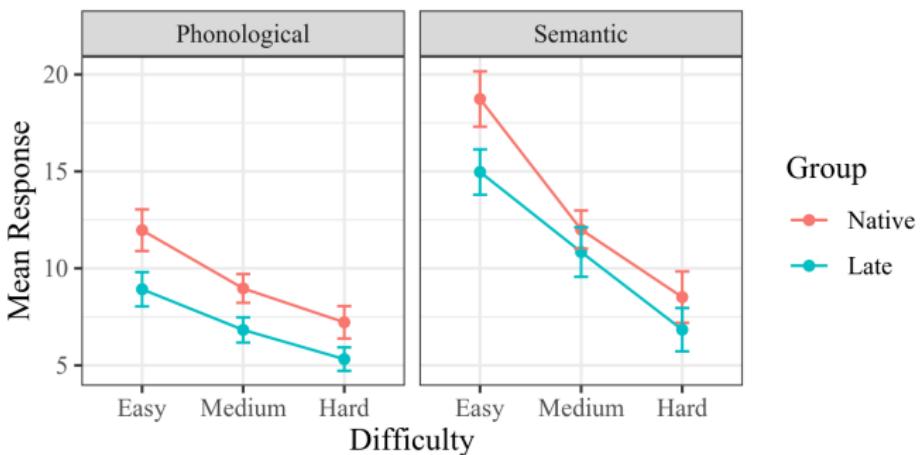


Figure 3: Mean correct responses by category, group, and difficulty.

Results (cont.)

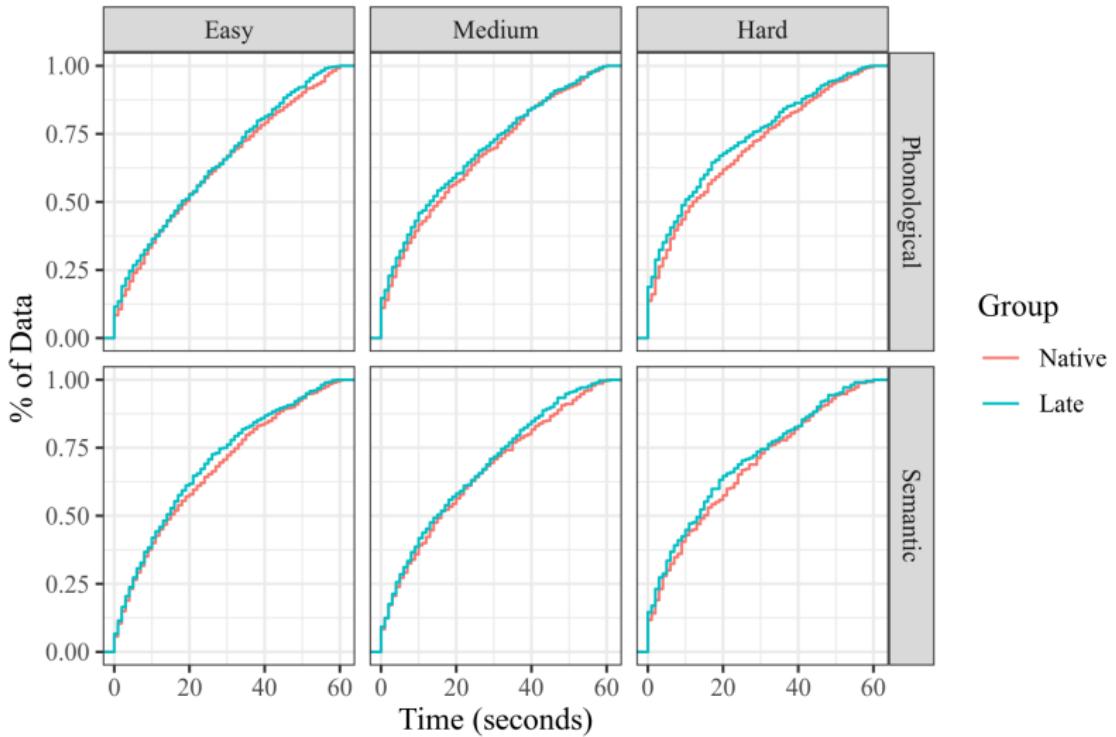


Figure 4: Results for Word Production by Time

Results (cont.)

For a statistical analysis of how word production has proceeded through time, we fit a linear mixed model using the `brms` package [13] in R with predictors for Time and Acquisition. We present the results in Figure 5 and 6.

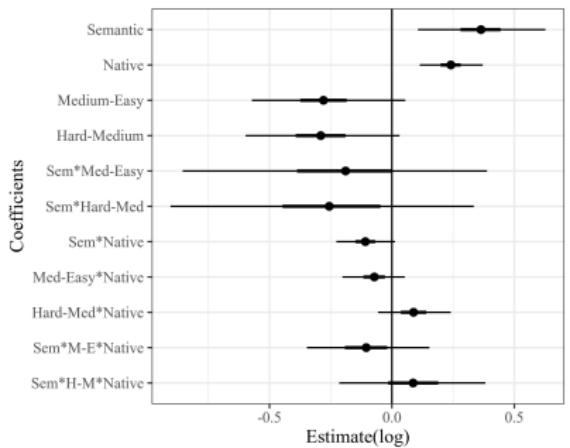


Figure 5: Results for Overall Word Production

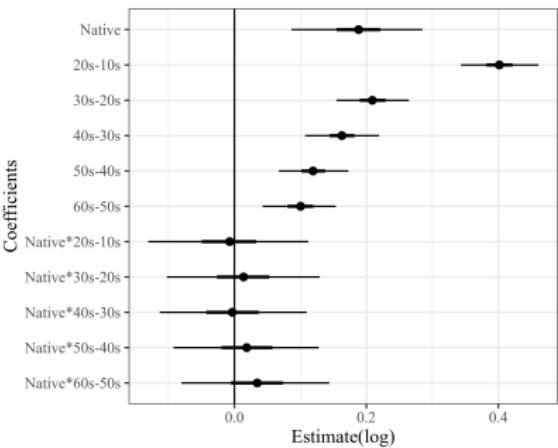


Figure 6: Results for Overall Word Production

The results indicate that:

- ▶ Participants with native acquisition produced more correct responses.
- ▶ Difficulty settings across task categories and acquisition groups were relatively consistent.
- ▶ There was no interaction of time intervals and native acquisition.

We interpret this as no difference between acquisition groups in terms of access to the vocabulary inventory or namely the updating ability of the participants.

Discussion (cont.)

We argue that the observed mean difference in the number of the correct responses results from the size of initially available search set in line with [10] possibly because of:

- ▶ smaller vocabulary [14].
- ▶ poorer phonemic awareness [8].

Discussion (cont.)

The results in the present study supports the notion that *not all cognitive discrepancy* observed among late-signing deaf children extends to adults, but *the linguistic effects* of language deprivation *do remain* and persist into adulthood.

- ▶ Preliminary support for [3], [15].

Possible explanations for poorer linguistic skills

- ▶ little joint attention during DCHP's early development
- ▶ weaker attention span abilities to learn new words and identify phonemes

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Thank you!



Hoping to see you on November 5,
12:30 PM (EST)!