THE EFFECT OF INPUT VARIABILITY ON PHONETIC VOWEL TRAINING FOR CHILDREN

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Background

High variability phonetic training (HVPT) is well-established in training L2 speech contrasts following seminal studies by Logan, Lively, & Pisoni (1991; 1993). Key to their success was high variability (HV) input with multiple talkers and contexts, rather than low variability (LV) input. HVPT has since been used effectively in many adult studies (e.g. Nishi & Kewley-Port, 2007), and more recently with children (e.g. Giannakopoulou, Uther, & Ylinen, 2013). However, so far only Giannakopoulou, Brown, Clayards, & Wonnacott (2017) directly investigated the effect of input variability for training children, and they did not find an HV benefit.

Aim: to further investigate the effect of variability on phonetic training for children.

Research Questions
1. Do child participants improve after phonetic training?
2. Does input variability affect their improvement?

Hypothesis: we expect improvement across the board, but expect a possible LV benefit in training, and an HV benefit at post-test.

Methodology

Participants
Tested 109 Dutch children learning English as a second language.

Final sample: 89 children spread over 2 age groups
– 50 7/8 year-olds   27 HV   23 LV
– 39 11/12 year-olds   20 HV   19 LV

Some additional task-specific drop-out due to absence/data loss.

Stimuli
Monosyllabic CVC minimal pairs recorded by 6 SSBE speakers.

Corresponding clip art pictures for each item.

/e/-/æ/	/uː/-/ʊ/	/ʌ/-/ɒ/	/iː/-/ɔː/
bed-bad	fool-full	bus-boss	heel-hall
gem-jam	Luke-look	cut-cot	sheet-short
pen-pan	pool-pull	luck-lock	week-walk
vet-vat	suit-soot	shut-shot	wheel-wall

Pre/post-tests included additional novel items not used in training.

Procedure and design

Training
Participants receive either HV (4 talkers) or LV (1 talkers) training across 4 blocks. Training is a minimal pair 2 alternative forced-choice (AFC) task with trial-by-trial feedback. Participants complete 8 sessions of 30-minute training with 256 trials each.

Pre/post-tests: used 3 novel talkers not used in training.
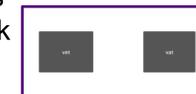
Discrimination
3AFC - 64 trials
Oddity task

Picture identification
2AFC - 128 trials
Identification task

Orthography identification
2AFC - 128 trials
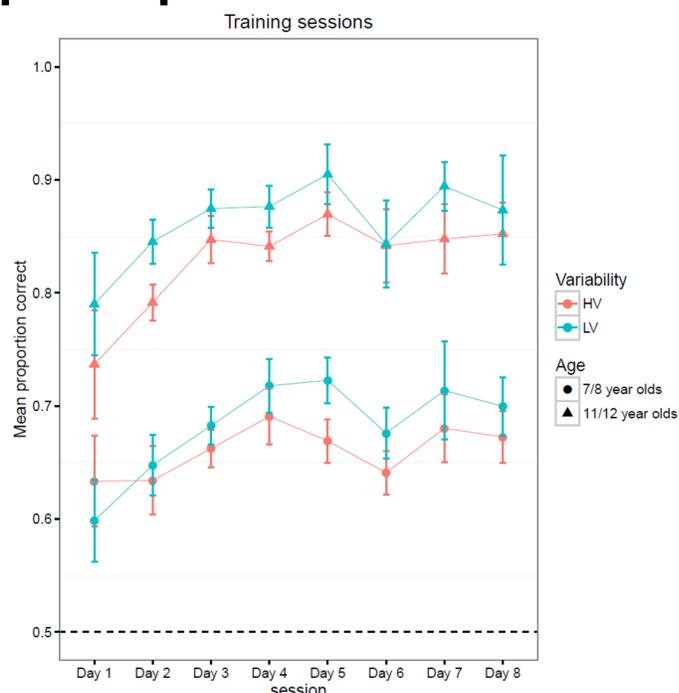Identification task

Vocabulary introduction
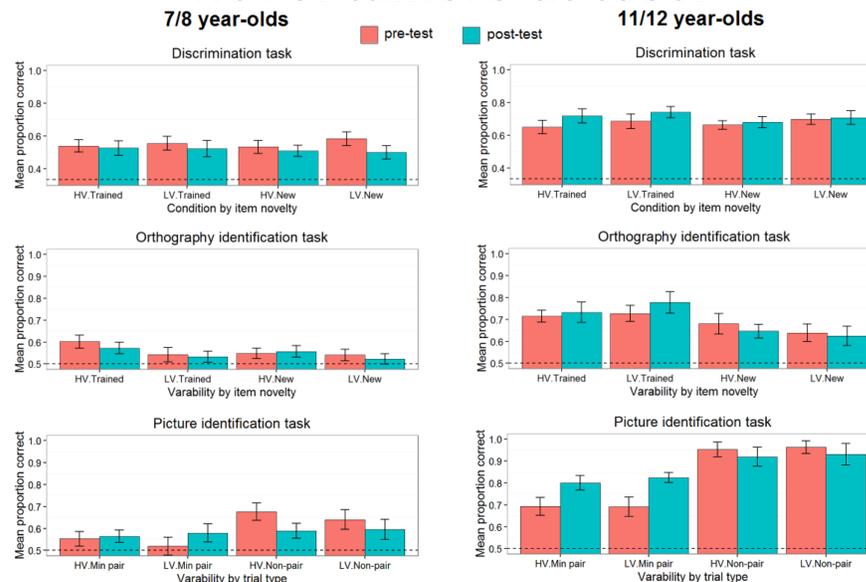Familiarity (y/n) and stimulus translation

Production
Real-word repetition - 64 trials

Do participants learn over time?

While older children start off higher, both younger and older children improve over sessions.

Does improvement transfer to novel talkers at test?

Older children: improve on discrimination but only on trained items. In orthography ID, only the LV condition improve, and only on trained items. In the picture ID task, significant improvement only for minimal pairs.
Younger children: no pre- to post-test improvement in any task.

Summary and discussion

Do child participants improve after phonetic training?
As expected, children improve over time during phonetic training. Only older children improved on the pre- to post-test tasks. This indicates transfer across talkers; however, across tasks they only showed improvement with items used in training (no transfer across words). Younger children did not improve in any of the tasks, suggesting no transfer from training.

Does input variability affect participants' improvement?
For older children, the orthography task shows a benefit of LV training for trained items. No other variability effect was found from pre- to post-test.

This goes against some of the literature finding an HV training benefit on post-test results in adults (e.g. Lively et al. 1993, Sadakata & McQueen 2013), but is in line with Giannakopoulou et al. (2017) who found no such benefit either, and some evidence of a LV benefit at test.

Implications
HVPT might not be as beneficial for children as might be assumed based on adult literature. This could have practical implications for the development of second and foreign language teaching methods.

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