Cued Speech training

Rachel Rees asks if explicit training in Cued Speech helps school-aged deaf children and reports on the first of a series of studies to address this question

Background

Typically developing hearing children are able to distinguish all phonological contrasts in their spoken language through hearing and vision (e.g. /p/, /b/ and /m/). This usually leads to the formation of complete and accurate phonological representations of words that support spoken language and literacy development. Deaf children rely more heavily on speechreading to distinguish these contrasts and, for many, speechreading is the main source of information. The term speechreading refers to the extraction of meaning from facial expression, body language and linguistic and situational cues as well as lipreading cues, provided by movements of the lips, jaw and tongue. Because many groups of phonemes are virtually indistinguishable by sight (e.g. /p/, /b/ and /m/), deaf people are only able to identify about 30% of phonemes when lipreading nonwords. Cued Speech (CS) is a system of handshapes and hand positions used alongside speech to disambiguate similarities in lip-patterns. For example, three different consonant handshapes help to distinguish these phonemes that look the same: /p/, /b/ and /m/. CS is designed to be used by parents and others speaking to the deaf child, can be used at the speed of speech and takes adults about 20 hours to learn. For further details, see www.cuedspeech.co.uk/

Early exposure to CS used by parents or carers leads to age-appropriate language and literacy skills in their deaf children. Deaf children exposed to CS at a later age at school do not attain these age-equivalent achievements but they do show improvements in speech perception. No studies to date have evaluated the advantages of explicit CS training with older deaf children. An improved ability to speechread should lead to improved language and literacy outcomes.

Aim of the Study

This study is the first part of a University College London project to develop a training programme for the explicit teaching of CS perception to school-aged deaf children. This study evaluated a newly designed training programme delivered via computer with hearing adults denied access to sound, by testing their ability to identify phonemes (e.g./n/ and /f/) in cued nonwords (e.g."nim", "fup") before and after the 45–minute training.

Method

Sixty-two adult hearing participants were randomly allocated to a single training session in one of three training conditions:

- Cued Speech Training (CST)
- Lipreading Training (LT) and
- Auditory Training in Noise (AT).

The last two conditions acted as control groups. To ensure that any improvements in the CST were not solely due to lipreading practice, we were expecting these to be greater than improvements in the LT. As the training programmes were short, we only included eight consonants and five vowels. The inclusion of the AT (where we expected no changes in phoneme identification) would ensure that any improvements in the other programmes were not due to familiarity with a closed set of phonemes.

All participants were tested before and after training on their ability to identify the eight consonants and five vowels in 32 nonwords (eg "bim") when denied access to sound.

Only half of the 32 nonwords were used in the training. The nonwords were presented as spoken video clips and the participants were told to use the eight consonants and five vowels to write down written versions of the nonwords. They were told that each had a Consonant Vowel Consonant format and all the nonwords had predictable spellings.

In the CST and LT programmes the video clips of spoken stimuli were presented without sound. In the CST all the stimuli were produced with cues. In the AT the video clips were replaced by speech bubbles appearing on the computer screen, and the spoken stimuli were presented with white noise added, where the signal to noise ratio was -10dB. In other ways, the three training programmes were designed to be as similar as possible. They all began with

the introduction of the single consonants and moved on to the treated nonwords.

All programmes involved the following techniques:

- provision of exemplars (e.g. video clips presented with corresponding orthography)
- production practice (opportunities to produce the sounds/cues and check guesses)
- perception practice (opportunities to perceive the sounds/cues and check guesses).

Results

Two one-way ANOVAs were performed in order to establish whether the performance of the groups undergoing the three training conditions differed before and after training in response to the cued nonwords. There was no significant difference in performance between groups before training, indicating that all groups performed equally accurately prior to training. The results for the post-test showed a main effect of group, indicating that there were differences in accuracy between groups after training. Post hoc tests revealed that the scores of the group who received CST were significantly higher than those of the LT group, although the LT group did make improvements. This indicated that improvements made in the CST group were not solely due to lipreading practice. The AT group made no improvement, indicating that the other improvements could not be due to familiarisation with a closed set of phonemes. To establish whether the increase in identification accuracy in the group who had received CST could be generalised to cued nonwords not included in the training programme, we conducted an additional paired comparison on just the untreated cued nonwords for the CST group, comparing before and after training. This found a significant increase in identification accuracy.

Educational Implications

Findings suggest that it is possible to train those with no or limited hearing to benefit from the addition of CS when identifying phonemes in nonwords. Nonwords are comparable with new words that are being learnt, as the learner has no stored lexical representation of the word to aid recognition. The combination of phonemes in nonwords is unfamiliar and, due to the ambiguities of lipreading, it is often difficult for a deaf child to identify each of the phonemes. Therefore, the late learning of CS could potentially help deaf children to identify phonemes in new words and store them accurately in their lexicon. In addition, they could update any representations that were previously stored inaccurately. This could potentially improve their language and literacy skills. Children whose parents have opted for Cued Speech are usually assigned teaching assistants who use Cued Speech to support language and literacy learning at their child's school. Therefore, there would be the possibility for this support to be provided to other deaf children, if it could be shown that CS benefited their speech perception.

The next stage of our study will adapt the programme for children and evaluate it with deaf children aged 8-15 years. If you are interested in being involved in this study, please contact the author – rachel.rees@ucl.ac.uk

For further information see:
Rees R, Fitzpatrick C, Foulkes J, Peterson H & Newton C (2017). *Can explicit training in Cued Speech improve phoneme identification?* Deafness & Education International, 19 (1), 13-21.

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BATOD Magazine

This article was published in the November 2017 issue.