The role of speechreadability in the intelligibility of visual speech signals produced by Cued Speech transliterators

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Background

Cued Speech is a visual-motor language system taught to deaf individuals by Cued Speech transliterators, who use hand and face gestures to accompany speech simultaneously.

Method

Twelve (12) Cued Speech transliterators (CSTs) used an 8th grade reading level stimulus (verbatim audio recording) of a high-school level educational film, "Life Cycle of Plants" (Films Media Group, 1989), to transliterate. Four stimulus blocks drawn from videos, such that each transliterator was equally represented. Each transliterator was presented one phrase at a time (no repetitions). Research was consented for with minor children by a legal guardian.

Results

2.6% of the variance in intelligibility was attributed to speechreadability (P<0.001). Together, speechreadability and accuracy accounted for 37% of the variance in intelligibility of individual stimulus items (p<0.001). The relationship between speechreadability and accuracy was stronger than the relationship between accuracy and intelligibility. Overall, speechreadability is a significant factor in determining the intelligibility of visual speech signals produced by Cued Speech transliterators.

Conclusions

• Accounting for 26% of the variance, accuracy has a greater contribution to intelligibility than speechreadability

• However, speechreadability also plays a considerable role

• Accuracy may account for more if measurements can be refined

• Other errors may reflect correct visemes (e.g. trauma)

• Full speechreadability was not evaluated

• Moreover, the relative contributions of speechreadability and accuracy are largely independent

• CSTs with higher speechreadability are more intelligible than those with lower speechreadability

• CSTs with lower speechreadability are less intelligible than would be predicted from accuracy alone

• More than half of variance still unexplained, which suggests still other sources of variance

• Sources of transliterator variability are of primary interest (could be improved by improved training and evaluation methods)

• Transliterator factors that are likely to affect intelligibility include:
  - "Speaking" rate
  - Visual prosody
  - Facial expressions and non-manual behaviors
  - Crossing, clear, in conversation, and lightly co-edited

Future Work

- Assess speechreadability data at phoneme-level (and sentence-level)
- Compare results across communication options to determine effective visual communication style
- Gather feedback from deaf participants to determine effectiveness of visual communication style
- Gain insight into modality-independent aspects of perception

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Reviews

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