

A COMPARISON OF SPEECHREADING ABILITIES USING LIVE AND RECORDED PRESENTATIONS

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ABSTRACT

Nineteen Ss viewed equivalent live and videotaped presentations of speechreading material. Significantly higher scores were obtained in the live condition with mean live minus video differences being 10.19% (word scoring) and 10.87% (meaning scoring). Live-video correlations indicated that prediction of optimal speechreading performance from the recorded score was feasible. Further study using different speakers and test stimuli was recommended. Implications for speechreading therapy were discussed.

An individual's level of speechreading skill is often difficult to establish because many parameters affect the test score obtained. Optimal comprehension of visual information is assured if vertical viewing angle is between -35 and +30 degrees (Berger and Garner, 1971; Erber, 1974), horizontal viewing angle is between 0 and 45 degrees (Neely, 1956; Larr, 1959; Nakano, 1961; Erber, 1974), and viewing distance is approximately five feet (Erber, 1974). However, gestures, environmental setting, cue cards, and related pictures will enhance speechreading performance when added to the original stimulus materials (Sanders, 1971; Smith and Kitchen, 1972; Pelson and Prather, 1974).

The medium of presentation also affects speechreading performance. Loss of three dimensionality and other visual information reduces the visual redundancy of recorded material. The expected result would be higher performance scores when material is presented live. However, the results of previous research in this area are conflicting. Taafe (1957) compared the performance of subjects on a recorded and live version of his test using three different speakers in the live condition. Each of these speakers produced significantly different scores than those from the filmed test, and the live scores were lower than the filmed ones. It was not clear, however, if these differences were a result of speaker variations or live versus film differences. DiCarlo (1963) found no significant performance differences between a live and filmed presentation of material, although live scores were higher for both experienced and inexperienced speechreaders. Goetzinger (1967) and Jeffers (1971) both reported live scores significantly higher than those obtained from film.

Correlations within and among various recorded tests of speechreading are relatively good, (DiCarlo, 1951; Taafe, 1957; Simmons, 1959; O'Neill and Stephens, 1959) suggesting that recorded tests are measuring the same type of performance. This is not true for live-recorded test comparisons. These correlations range from .37 on Part II of the Utley Test to .61 on the Mason Test (Simmons, 1959). Reasons for these low and variable correlations are not entirely clear, but may reflect live-recorded differences in presentation of the material in addition to the difference in medium.

The use of recorded material does ensure standardized consistent viewing for all subjects, thus it has certain inherent advantages over live presentation. Because previous research demonstrated conflicting results when live-recorded comparisons were made, and as reasons for the low live-recorded correlations were not clear, these areas are worthy of further research. Therefore, the purpose of this study was to investigate the following:

1. Does live presentation of speechreading material result in significantly better scores than recorded presentation, and
2. Can "optimal" or live speechreading scores be predicted from recorded scores.

METHOD

Subjects

Nineteen second year students from the Communicative Disorders Program at the University of Western Ontario served as subjects. All had normal hearing (20 dB or better, 250-6000 Hz., ANSI 53.6, 1969) and visual acuity (Snellen Test). None had prior experience with a task of this nature. Participation was voluntary and the subjects were not paid.

Speaker

Five senior students who were Project assistants, were considered as possible speakers. Each of the five spoke a prelearned passage using their normal manner of speaking. They were viewed through a one way glass by four judges who ranked them as being "easy" to "difficult" to speechread, based on visibility of the speaker's normal articulatory movements. The speaker selected was ranked best by all four judges. She had normal articulation and used normal articulatory patterns, facial expression, rhythm and stress while producing the test sentences. Her rate and manner of presentation were essentially constant as indicated by sample viewing judgements made during the live presentation and comparing these to the videotape one.

Speechreading Material

The Utley Sentence Test of Speechreading Ability was selected because Parts A and B are equivalent and the material is in sentence format.

Equipment

A Sony AVC Camera with a 1:1.8 lens and a Sony AV 3600 Videotape Recorder were used for recording on a 1" B/W videotape. Playback was through a Sony B/W 12" monitor adjusted for optimal contrast-brightness.

Preparation of Materials

All video recording was done in a Rayshield Single Wall Sound Booth with overhead florescent lighting. The speaker sat 5 feet from the camera and looked directly at it while producing the sentences. Live and video presentations were performed with the same illumination and blank wall background.

Normal voice levels were used to ensure a natural delivery. In the live condition, the speaker sat in the sound isolated booth and was viewed through the floor to ceiling non-glare glass panel door of the room. This speaker isolation eliminated all auditory information. In the video condition, there was no audio playback.

Viewing Condition

Ss viewed the stimuli on a level plane. Face size of the speaker was equalized for both conditions by adjusting the subject-speaker distance in the live condition to conform to face size on the video monitor. This approximated viewing a face at 5 feet.

To ensure consistent viewing angle, two **Ss** viewed the test stimuli each time. Each **S** was randomly assigned to Group I or Group II in which order of viewing (live or video) was also randomized. Group I **Ss** (N=8) viewed the Utley Part A live and Utley Part B video. Group II **Ss** (N=11) viewed the Utley Part B live and the Utley Part A video.

Procedure

Each **S** was instructed to watch the speaker carefully and write down everything he/she thought the speaker said, even if they understood only part of the sentence. Five practice sentences preceded the 31 test sentences. Prior to each sentence, the **Ss** were alerted by a verbal "are you ready" signal and each sentence was presented only once. Fifteen seconds were provided between each sentence to permit sufficient time to record answers on the scoring sheet provided.

Scoring

Two scorers independently analyzed **S** responses. Scoring was done two ways: Number of words correctly identified (Maximum possible = 125); and "meaning" of the sentence correctly identified (maximum possible = 31). These results were then converted to percentage values. If the correct "meaning" of the sentence was obtained, even though all words were not correctly identified, **Ss** received full credit for "meaning" scoring. Interscorer reliability was .99 for word scoring and .98 for meaning scoring.

RESULTS

Speechreading performance scores (in %) are seen in Table 1. Mean live scores were 52.65% (word scoring) and 47.54% (meaning scoring). Mean video scores were 42.45% (word scoring) and 36.67% (meaning scoring). The live scores were 10.19% higher than video scores using word scoring and 10.87% higher using meaning scoring. These results were significant at the .01 level for both scoring procedures (Word Scoring: $F=17.002$; Meaning Scoring: $F=28.22$). Individual **S** data indicated that 35 of the 38 scores were higher in the live condition.

The effect of the two different scoring procedures was also evident. T-tests indicated word scores were significantly higher than meaning scores at the .01 level (Live condition: $t=4.97$, $df=18$; Video condition: $t=6.31$, $df=18$). Word-meaning correlations obtained for this same data were .97 (live condition) and .97 (video condition), indicating that if a **S** scored high by word scoring, he also scored high when meaning scoring was used. Correlations between the live and video scores were .77 (word scoring) and .75 (meaning scoring).

DISCUSSION

The results of this study indicated that speechreading ability measured by live presentation was significantly better than that measured by videotape presentation of equivalent material. This agrees with some of the previous research (Goetzinger, 1967; Jeffers, 1971) and occurred apparently because the two-dimensionality and lack of color of

videotape decreased the visual information available. The viewing task thus became less redundant and scores were reduced.

While both word and meaning scoring indicated that live performance was significantly better than video, word scoring resulted in higher estimates of performance 35 of 38 times. The mean differences (Table 1) were small, but statistically significant, and may partially reflect the nature of the material used in this study. They do indicate, however, that method of scoring is yet another variable to be considered when analyzing speechreading performance.

The low live-recorded correlations obtained in previous research may have led to the suggestion by Oyer (1961) and Berger (1972) that live and recorded materials are measuring different aspects of receiving speech by vision. The live-video correlations obtained in this study (Word Scoring: .75; Meaning scoring: .77) do not necessarily disprove the preceding statement. They indicate, nevertheless, that prediction of 'optimal' or live speechreading performance from recorded scores is feasible and this approach should be given serious consideration. As recorded material has the inherent advantage of consistent presentation of stimulus items, it should permit clinicians to obtain more reliable measurements of speechreading skill in both the diagnostic and rehabilitative setting.

Further investigation of live-video performance with varying stimulus items and speakers should be accomplished. Also, research with hearing impaired subjects, to determine if speechreading skills learned from "training" videotapes generalize to improved live performance would be very beneficial. The results of the present study imply that this skill generalization might indeed occur. Should this be proven true, the development of effective programmed training tapes for speechreading would become a very real possibility, welcomed by all wanting to improve remedial speechreading techniques for the hearing impaired.

Table 1. Mean speechreading scores (in %) for the Live and Videotape conditions, using Word and meaning scoring procedures.

SCORING	LIVE	VIDEOTAPE	DIFFERENCE [L-V]
Word	52.65	42.45	10.19
Meaning	47.54	36.67	10.87
Difference (Word-Meaning)	5.11	5.78	

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ACKNOWLEDGMENT

The authors wish to express appreciation to C. Bauer, B. Benham, J. LeBlanc and K. Virtue (University of Western Ontario) for their assistance in collecting and compiling the experimental data, and to R. Kretchmer (University of Kansas Medical Center) for his assistance in statistical analysis of the data. This study was supported in part by the Faculty of Medicine, University of Western Ontario.

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