TAS: A NEW TEST OF ADULT SPEECHREADING: THE DEAF REALLY CAN BE BETTER SPEECHREADERS

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ABSTRACT

A new Test of Adult Speechreading (TAS) is described. The TAS was designed so that it does not disadvantage the born-deaf speechreader. It uses picture choice responses, and vocabulary and syntax appropriate to such users.

Over 100 deaf and hearing people have so far been tested using the TAS. The pattern of performance of subsets of users is described. The effects of factors including age (18-68), gender, nonverbal IQ, education, regional speech community, language preference, and the hearing status of participants and their parents is summarised.

Among the notable findings to date: in the deaf, but not the hearing, visible regional accent and level of education affected performance markedly. (The tested group included 32 deaf people with a tertiary-level education). In the hearing, hearing status of parents predicted performance (people with deaf parents were better speechreaders).

Most strikingly, after close matching of deaf and hearing individuals for all psychometric and background variables, deaf participants out-performed hearing peers by a significant margin.

1. TESTING SPEECHREADING WITH TAS

Tests of adult speechreading typically assume that the testee has acquired spoken language normally, although s/he may have subsequently lost hearing. Studies of language acquisition in people born deaf suggest that both syntax and lexical development may be idiosyncratic with respect to hearing norms [1], and may be further affected by non-optimal language experience for deaf children of hearing parents (DoH) and by sign in deaf children of deaf parents (DoD).

Response measures in most speechreading tests also assume a level of speech, sign or literacy that may not fairly reflect the abilities of deaf people. Furthermore, speechreading tests with written responses have sometimes been used to predict literacy itself [2], which casts doubt on the independence of these measures.

Under these circumstances, it is not too surprising that the general claim that hearing people out-speechread deaf people has been advanced and widely supported (see Gailey, 1987; Mogford, 1987).

The TAS was designed to measure speechreading ability in British adults, avoiding the pitfalls mentioned earlier. In the TAS, two young adult speakers of British (Southern) English are seen. The items to be speechread include single words, sentences and short stories, all of which use concrete vocabulary items familiar to the deaf, in simple, colloquial syntactic structures. Words and sentences were pre-screened for familiarity and acceptability by a group of deaf judges. Accuracy was measured through picture multiple-choice responses.

2. DETAILED DESCRIPTION OF TAS

The TAS is administered as a video-test without sound, lasting about 20 minutes, using a skilled administrator to present response sheets and score responses. In addition, when administered to deaf participants, the test instructions and ongoing communication used the preferred languages of the participant (sign, signed English, speech).

The speakers were recorded using natural speech. A full-face, naturally lit view was used, showing the head and upper trunk of the speaker. Speakers alternated for each item.

Figure

The test starts with the identification of words. Following demonstration and practice trials, during
which feedback was given, 24 monosyllabic or spondaic items were shown. For each item, the speechread target was selected from a response sheet (figure 1).

Figure 1: A picture response set for the TAS - single word subtest. Speechread targets were “thumb”, “sandwich”, “rings”, “cat”, “peacock” and “ear”.

The second subtest comprised 15 sentence items, presented and scored in a similar way. They were pictured with distracters so that subjects would need to understand more than a key word in each; and arranged into groups with a common theme, so that a glance at the picture set would give the context. Sentences are rarely perceived without context in conversation. The final, story subtest was of 5 short texts, with a choice of pictured descriptors following similar guidelines.

The total number of accurate responses for each subtest was recorded.

2.2. Influences of Background and Psychometric Variables

**NVIQ:** As expected [5], there was no association of measured nonverbal IQ with speechreading performance.

**Gender:** In the deaf group there were 28 females and 21 males. In the hearing group there were 33 females and 27 males. Mean speechreading accuracy was slightly higher for females, but not significantly so, and there was no interaction with hearing status.

**Age:** There was no association between the age of participants and their speechreading skill:

Figure 3: There was no significant correlation between age and speechreading ability on the TAS.

**Regional variation:** A subset of deaf (N=9) and hearing (N=16) participants from the North of England viewed the Southern English speakers. Matched to similar South of England viewers, the northern viewers were significantly poorer at speechreading, especially when they were deaf.

**Schooling of deaf:** 30 of the deaf participants gave information regarding their schooling: 5 participants had been in mainstream schools, 22 had attended oral institutions and just 3 had attended Total Communication schools. The speechreading scores showed no advantage for oral education.

**Preferred language:** The language choice of the deaf adult did not have a significant bearing on speechreading performance. In particular, affiliation to BSL did not lower speechreading scores.
Level of Education: A tertiary level education was associated with better speechreading. This was particularly striking for the deaf participants.

Figure 4: Participants who had been educated to a tertiary level outperformed their peers. This difference is significant for the deaf participants (t=3.64, p<.002).

Parental Hearing Status: The 11 deaf and 11 hearing participants with deaf parents were matched (by all available background variables) to similar participants with hearing parents. There was no difference between the speechreading ability of the deaf participants with deaf parents (DoD) and those with hearing parents (DoH). However, the hearing subjects with deaf parents (HoD) significantly outperformed their peers with hearing parents (HoH) (figure 5). The HoD group have developed a high awareness of communicating with deaf people, and this seems to include the majority have chosen careers as communicators or interpreters.

Figure 5: Parental hearing status did not affect speechreading ability in the deaf. In the hearing, the HoD group speechread significantly better than the HoH group (t=5.95, p<.001).

Hearing Status: 20 pairs of deaf and hearing subjects were matched closely for all other recorded variables. The deaf participants in this group significantly outperformed the hearing on the TAS:

Figure 6: Deaf participants speechread significantly better than matched hearing participants (t=2.53, p<.02).

Reading: The Group Reading Test, 2nd edition, (GTR II) form C (NFER Nelson) was used to establish the reading level of 40 of the deaf participants. There was a strong correlation between their performances on the TAS and on the GTR II (r=.42, p<.01). The relationship between speechreading and reading exists, therefore, even when there is no element of literacy in the speechreading assessment used (figure 7).

Figure 7: There is a strong correlation between reading and speechreading performance in this group of deaf participants.
3. CONCLUSIONS AND DIRECTIONS

These results concur with some recent studies which suggest that, when tested appropriately, deaf people can speechread more efficiently than hearing people (Roninberg, Bernstein). The TAS has face validity, for it uses direct measures of speechreading comprehension, and has been shown to be reliable (Ellis 1999). Moreover, the TAS is sensitive to a number of factors which may be important in the assessment of speechreading in both hearing and deaf populations.

It is an appropriate measure for assessing the factors that relate speechreading to literacy in deaf adults, and may provide a reliable measure of speechreading in relation to a number of other functions, including cortical activation (see MacSweeney et al, 2001 for one example of its use).

Planned refinements of TAS include (1) a test of discrimination at the phonological level (and see Bernstein et al.), (2) further selection of discriminating items, especially in the ‘stories’ task, (3) digitisation.

4. REFERENCES

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