

Improving the Understanding of Dysarthric Speech: A Controlled Case Study

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ABSTRACT

Background and aims: In 2017, Jones and Penn presented a study showing that it was possible to teach listeners to understand dysarthric speech. This was achieved by frequently listening to dysarthric patients reading the same passage. As we were working with a severely dysarthric man at the time, our aim was to see if the Jones and Penn method worked for our patient, DJ.

Method: Two passages of equal length and difficulty were selected. One of the co-authors was blinded to one of the passages and it served as a baseline. The second passage was the treatment piece. Following four baselines, treatment began. DJ read the treatment passage three times in weekly sessions for a period of 4 weeks. It was hoped this would enable the listener to become familiar with DJ's speaking. Baselines were then repeated, followed by two further weekly treatment sessions, which were repeated once more and two final baselines completed.

Results: Treatment resulted in better understanding of the unseen passage. Improvement ranged from 3.52% in the first set of baselines to 33.3% to 46.7% to 65.5% in the final baselines.

Conclusion: Although still difficult to understand, there was definitely a better grasp of this man's speech after listening to him read several times.

Keywords

Dysarthric Patients, Nervous system, BAW.

Introduction

Dysarthria is difficult or unclear articulation of speech that is otherwise linguistically normal. It is caused by damage to the nervous system and is a common consequence of brain injury affecting all aspects of the person's life [1]. Training listeners to understand unintelligible speech better is potentially very useful. In this method listeners adapt to degraded speech; and Jones and Penn showed that it was possible to do this. They suggested that a short training programme improved the ability of listeners to decode and understand dysarthric speech.

Case History

DJ was 68 years old when treatment began. He had been self-

employed, and for over 40 years he had worked as a Yoga and Massage Therapist. In 2016 (almost two years prior to the onset of treatment), he sustained a posterior cranial fossa haemorrhage. He underwent an emergency posterior fossa craniotomy. The procedure was repeated due to recurrent cerebral bleeding with brain stem compression. Following a fall in September 2016, a repeat CT scan showed a slight increase in the size of the 4th ventricle and subtle progressive changes in the 3rd ventricle.

He was admitted to the Raphael hospital for rehabilitation. The speech and language therapist found him to have moderate to severe ataxic dysarthria. He was seen for a neuropsychological assessment soon after admission and found to be of previously normal functioning with nonverbal reasoning and recognition memory difficulties. His comprehension appeared to be relatively intact.

Method

Following discussion with the speech and language therapist working with the man, two passages of equal length and difficulty were selected by one of the authors (AR). The other co-author (BAW) was not involved in the process and she was blinded to one of the passages which served as a baseline. The second passage was the treatment piece. Following four baselines, treatment began. During the baseline AR wrote down the words recalled by BAW and counted how many were correct.

DJ read the treatment passage three times in weekly sessions for a period of 4 weeks. Once again AR recorded the words reported by BAW and counted the number of correct words. All words were then converted to percentage correct for the passage. It was hoped that this repeated listening would enable the blinded author to become familiar with DJ's speaking and thus understand more of his speech.

After the first treatment sessions (twelve sessions over four weeks), baselines were repeated. This was followed by two more weekly treatment sessions and a further baseline of the unseen passage. Once again this was repeated and the final baseline completed. Thus, in total there were four baselines and three treatment sessions.

Results

Treatment resulted in better understanding of the unseen passage. Improvement ranged from 3.52 per cent in the first set of baselines to 33.3 per cent in the second; to 46.7 per cent in the third and to 65.5 per cent in the fourth and final baseline. These results can be seen in Figure One. DJ is still not easy to understand but he is certainly better than he was.

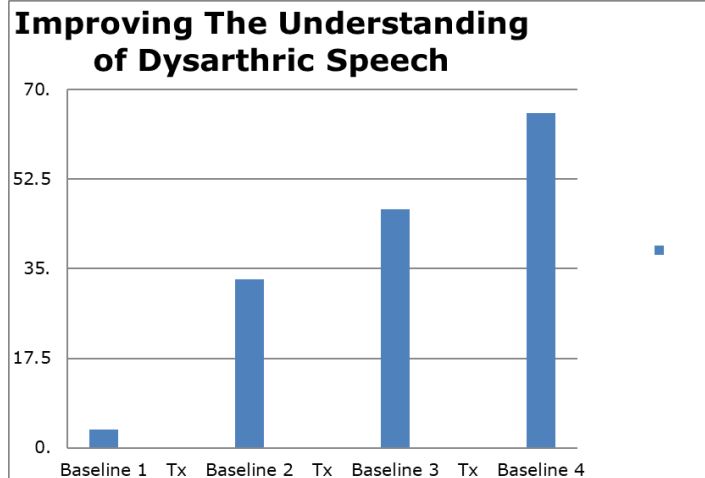


Figure 1: To show the improvement of the understanding of the dysarthric patient (TX + treatment).

Discussion

We know from Jones and Penn that it is possible to teach listeners to adapt to degraded speech signals and that this has been demonstrated under other conditions such as distorted speech [2]. Nevertheless, Jones and Penn believed that explicit training may be required for perceptual learning of dysarthric speech [1].

We found that it was possible to improve understanding of the speech of a severely dysarthric man by specific training. D.J, himself enjoyed the training sessions and seemed to find them amusing. He did not show any irritation or anger with the process. Improvements in an unseen passage increased from less than four per cent initially to closer to 70 per cent after the training. It would, of course, have been even better to get to 100 per cent but 70 per cent was certainly better than four per cent.

This work was a replication of the Jones and Penn study and confirms their view that it is possible to train listeners to improve their understanding of dysarthric speech. This can only enhance communication between the person with dysarthria and others around him or her. One of DJ's goals was to give a speech at his daughter's wedding; he achieved this with one report saying "there was not a dry eye in the house".

Conclusions

There is increasing evidence that training listeners to understand unintelligible speech better is potentially very useful. Although this work needs to be replicated and D. J's speech is still difficult to understand, there was definitely a better grasp of this man's verbal output after listening to him read several times.

References

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