

## **An investigation into the relationship between rhythm and intonation in ataxic dysarthria**

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### **Scientific abstract**

This project aims to perform detailed analyses of the most prominent prosodic impairments in the dysarthria associated with Friedreich's ataxia, namely stress, rhythm and intonation. Although many research studies have been published on these speech parameters, most investigated only one of these in isolation rather than their relationship to the other prosodic parameters. The lack of knowledge about this inter-relationship makes it difficult to assess to what degree observed speech deviations are due to the cerebellar pathology or to compensatory behaviours arising from this pathology. In addition, previous studies do not provide sufficient information on which parameters would lend themselves to be used as compensatory strategies to alleviate the observed speech impairments.

In the proposed study, newly developed analysis techniques will be applied to data from speakers with ataxic dysarthria as well as healthy control participants which can provide detailed information on each individual parameter as well as how they relate to each other. It is hoped that the results of this investigation will contribute to a greater understanding of the complex symptomatology of ataxic dysarthria and possibly identify parameters that would warrant further investigations as compensatory tools in its treatment.

### **Lay summary**

Ataxic dysarthria is the speech disorder associated with cerebellar problems. Research studies have identified that speakers with this disorder have problems coordinating their speech muscles and timing their speech movements correctly. This can result in monotonous speech. Alternatively, they may have sudden, uncontrolled excursion of pitch or loudness. The duration of speech is also altered, speakers tend to have a slower speech rate, and the rhythm of the language can be disturbed. These factors tend to have a negative effect on the intelligibility and the communicative effectiveness of the speakers, and ultimately affect quality of life.

Many of the observed impairments are due to the cerebellar damage. However, research has also shown that some of the observed speech impairments could be a result of compensatory behaviour. For example, if the speed and range of articulatory movements are affected a person might slow down their speech tempo, but by doing so their rhythm or intonation will become unnatural. In ataxic dysarthria, the disturbance in speech rhythm due to cerebellar damage could thus be exacerbated by other speech behaviours such as slowing down tempo.

There is currently insufficient information about the degree to which different speech components influence each other, as studies have mainly concentrated on individual aspects. New techniques have recently been developed in the field of normal speech production that allow a more detailed look at individual parameters as well as an investigation of how they might influence each other.

This study aims to apply these techniques to the study of ataxic dysarthria in order to understand its symptoms and their causes better. It is hoped that the results of this study can ultimately lead to improved ways of treating ataxic dysarthria by identifying compensatory strategies to reduce impairment and improve intelligibility.

**For more support or information please contact:**

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