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Speech disorders following brain injury: Effects of speaking rate on nasal resonance

Brain injuries can result in a variety of impairments including speech disorders. One such disorder is dysarthria, which results in impaired control of the muscles used for speech. A common characteristic of dysarthria is hypernasality (i.e., excessive nasality), where a person's speech resonates through the nasal passage instead of the oral cavity. This creates a distinct sound quality that interferes with how well the speaker is understood by the listener. Several studies have suggested that the amount of nasality may be influenced by a person's speaking rate. The relationship between speaking rate and nasality is important because brain-injured subjects typically speak much slower following their injury. Therefore, their speech may sound more nasal at those slower rates. This study investigated the effects of speaking rate on the amount of nasality produced in sentences. Seventy-five experimental sentences were developed with specific consonant-vowel combinations to manipulate the amount of nasality for each sentence. Although this initial study investigated the effects of speaking rate on nasality in a group of non brain-injured individuals, future studies will focus on individuals who have suffered some type of brain injury. Five non brain-injured subjects were asked to produce the experimental sentences at five speaking rates (i.e., normal, slow, very slow, fast, very fast). The speaking rates were controlled by presenting a previously-recorded sample of each sentence at the designated rate. Subjects were required to produce the sentences at that same rate. Each subjects' speech was digitally recorded using the Computerized Speech Lab (CSL) and nasality was computed using an acoustic instrument called the Nasometer. Average nasality scores and standard deviations were computed for each subject for each speaking rate. Analysis of results demonstrated that the speaking rate had no effect on the amount of nasality for these non brain-injured subjects. Subsequent investigations will re-evaluate this effect on brain-injured subjects with dysarthria.