

# 1. Correlation Between Acoustic Measurements and Self-Reported Voice Disorders Among Female Teachers

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## Objective

Many studies focused on teachers' voice problems and most of them were conducted using questionnaires, whereas little research has investigated the relationship between self-reported voice disorders and objective quantification of voice. This study intends to explore the relationship of acoustic measurements according to self-reported symptoms and its predictive value of future dysphonia.

## Study Design

This is a case-control study.

## Methods

Voice samples of 80 female teachers were analyzed, including 40 self-reported voice disorders (VD) and 40 self-reported normal voice (NVD) subjects. The acoustic measurements included jitter, shimmer, and noise-to-harmonics ratio (NHR). Levene's t test and logistic regression were used to analyze the differences between VD and NVD and the relationship between self-reported voice conditions and the acoustic measurements. To examine whether acoustic measurements can be used to predict further voice disorders, we applied a receiver operating characteristic (ROC) curve to determine the cutoff values and the associated sensitivity and specificity.

## Results

The results showed that jitter, shimmer, and the NHR of VD were significantly higher than those of NVD. Among the parameters, the NHR and shimmer demonstrated the highest correlation with self-reported voice disorders. By using the  $\text{NHR} \geq 0.138$  and shimmer  $\geq 0.470$  dB as the cutoff values, the ROC curve displayed 72.5% of sensitivity and 75% of specificity, and the overall positive predictive value for subsequent dysphonia achieved 60%.

## 2. Hoarseness in School-Aged Children and Effectiveness of Voice Therapy in International Classification of Functioning Framework

Ozgul Akın .enkal, Cem Ozer

### Objectives

The hoarseness in school-aged children disrupts the educational process because it affects the social progress, communication skills, and self-esteem of children. Besides otorhinolaryngological examination, the first treatment option is voice therapy when hoarseness occurs. The aim of the study was to determine the factors increasing the hoarseness in school-aged children by parental interview and to know preferable voice therapy on school-aged children within the frame of International Classification of Functioning (ICF).

### Study Design

Retrospective analysis of data gathered from patient files.

### Method

A total of 75 children (56 boys and 19 girls) were examined retrospectively. The age range of school-aged children is 7.14 years and average is  $10.86 \pm 2.51$ . A detailed history was taken from parents of children involved in this study. Information about vocal habits of children was gathered within the frame of ICF and then the voice therapies of children were started by scheduling appointments by an experienced speech-language pathologist.

### Results

The differences between before and after voice therapy according to applied voice therapy methods, statistically significant differences were determined between maximum phonation time values and s/z rate. The relationship between voice therapy sessions and s/z rate with middle degree significance was found with physiological voice therapy sessions. According to ICF labels, most of voice complaints are matching with “body functions” and “activity and limitations.”

### Conclusions

The appropriate voice therapy methods for hoarseness in school-aged children must be chosen and applied by speech-language therapists. The detailed history, which is received from family during the examination, within the frame of ICF affects the processes of choosing the voice therapy method and application of them positively. Child's family is very important for a successful management.

### 3. The relationship of aphasia type and gesture production in people with aphasia.

Sekine K1, Rose ML.

#### Purpose

For many individuals with aphasia, gestures form a vital component of message transfer and are the target of speech-language pathology intervention. What remains unclear are the participant variables that predict successful outcomes from gesture treatments. The authors examined the gesture production of a large number of individuals with aphasia—in a consistent discourse sampling condition and with a detailed gesture coding system—to determine patterns of gesture production associated with specific types of aphasia.

#### Method

The authors analyzed story retell samples from AphasiaBank (TalkBank, n.d.), gathered from 98 individuals with aphasia resulting from stroke and 64 typical controls. Twelve gesture types were coded. Descriptive statistics were used to describe the patterns of gesture production. Possible significant differences in production patterns according to aphasia type were examined using a series of chi-square, Fisher exact, and logistic regression statistics.

#### Results

A significantly higher proportion of individuals with aphasia gestured as compared to typical controls, and for many individuals with aphasia, this gesture was iconic and was capable of communicative load. Aphasia type impacted significantly on gesture type in specific identified patterns, detailed here.

#### Conclusions

These type-specific patterns suggest the opportunity for gestures as targets of aphasia therapy.

#### **4. An acoustic study of the relationships among neurologic disease, dysarthria type, and severity of dysarthria.**

Kim, Y., Kent, R. D., & Weismer, G.

##### Purpose

This study examined acoustic predictors of speech intelligibility in speakers with several types of dysarthria secondary to different diseases and conducted classification analysis solely by acoustic measures according to 3 variables (disease, speech severity, and dysarthria type).

##### Method

Speech recordings from 107 speakers with dysarthria due to Parkinson's disease, stroke, traumatic brain injury, and multiple system atrophy were used for acoustic analysis and for perceptual judgment of speech intelligibility. Acoustic analysis included 8 segmental/suprasegmental features: 2nd formant frequency slope, articulation rate, voiceless interval duration, 1st moment analysis for fricatives, vowel space, F0, intensity range, and Pairwise Variability Index.

##### Results

The results showed that (a) acoustic predictors of speech intelligibility differed slightly across diseases and (b) classification accuracy by dysarthria type was typically worse than by disease type or severity.

##### Conclusions

These findings were discussed with respect to (a) the relationship between acoustic characteristics and speech intelligibility and (b) dysarthria classification.

## **5. Intensive voice treatment (LSVT LOUD) for children with spastic cerebral palsy and dysarthria.**

Fox, C. M., & Boliek, C. A.

### Purpose

The purpose of this study was to examine the effects of an intensive voice treatment (Lee Silverman Voice Treatment, commonly known as LSVT LOUD) for children with spastic cerebral palsy (CP) and dysarthria.

### Method

A nonconcurrent multiple baseline single-subject design with replication across 5 children with spastic CP was used. Auditory-perceptual analysis of speech, acoustic measures of vocal functioning, and perceptual ratings by parents of participants were obtained at baseline, posttreatment, and 6-week follow-up recording sessions.

### Results

Listeners consistently preferred the speech samples taken immediately posttreatment over those taken during the baseline phase for most perceptual characteristics rated in this study. Changes in acoustic measures of vocal functioning were not consistent across participants and occurred more frequently for maximum performance tasks as opposed to speech. Although parents of the treated participants reported an improved perception of vocal loudness immediately following treatment, maintenance of changes at 6-week follow-up varied across the participants. No changes were observed in the 5th participant, who did not receive treatment.

### Conclusions

These findings provide some preliminary observations that the children with spastic CP in this study not only tolerated intensive voice treatment but also showed improvement on select aspects of vocal functioning. These outcomes warrant further research through Phase 2 treatment studies.

## **6. Quantitative acoustic measurements for characterization of speech and voice disorders in early untreated Parkinson's disease.**

Rusz, J., Cmejla, R., Ruzickova, H., & Ruzicka, E.

An assessment of vocal impairment is presented for separating healthy people from persons with early untreated Parkinson's disease (PD). This study's main purpose was to (a) determine whether voice and speech disorder are present from early stages of PD before starting dopaminergic pharmacotherapy, (b) ascertain the specific characteristics of the PD-related vocal impairment, (c) identify PD-related acoustic signatures for the major part of traditional clinically used measurement methods with respect to their automatic assessment, and (d) design new automatic measurement methods of articulation. The varied speech data were collected from 46 Czech native speakers, 23 with PD. Subsequently, 19 representative measurements were pre-selected, and Wald sequential analysis was then applied to assess the efficiency of each measure and the extent of vocal impairment of each subject. It was found that measurement of the fundamental frequency variations applied to two selected tasks was the best method for separating healthy from PD subjects. On the basis of objective acoustic measures, statistical decision-making theory, and validation from practicing speech therapists, it has been demonstrated that 78% of early untreated PD subjects indicate some form of vocal impairment. The speech defects thus uncovered differ individually in various characteristics including phonation, articulation, and prosody.

## **7. Speech-language pathologists' assessment and intervention practices with multilingual children.**

Williams, C. J., & McLeod, S.

Within predominantly English-speaking countries such as the US, UK, Canada, New Zealand, and Australia, there are a significant number of people who speak languages other than English. This study aimed to examine Australian speech-language pathologists' (SLPs) perspectives and experiences of multilingualism, including their assessment and intervention practices, and service delivery methods when working with children who speak languages other than English. A questionnaire was completed by 128 SLPs who attended an SLP seminar about cultural and linguistic diversity. Approximately one half of the SLPs (48.4%) reported that they had at least minimal competence in a language(s) other than English; but only 12 (9.4%) reported that they were proficient in another language. The SLPs spoke a total of 28 languages other than English, the most common being French, Italian, German, Spanish, Mandarin, and Auslan (Australian sign language). Participants reported that they had, in the past 12 months, worked with a mean of 59.2 (range 1-100) children from multilingual backgrounds. These children were reported to speak between two and five languages each; the most common being: Vietnamese, Arabic, Cantonese, Mandarin, Australian Indigenous languages, Tagalog, Greek, and other Chinese languages. There was limited overlap between the languages spoken by the SLPs and the children on the SLPs' caseloads. Many of the SLPs assessed children's speech (50.5%) and/or language (34.2%) without assistance from others (including interpreters). English was the primary language used during assessments and intervention. The majority of SLPs always used informal speech (76.7%) and language (78.2%) assessments and, if standardized tests were used, typically they were in English. The SLPs sought additional information about the children's languages and cultural backgrounds, but indicated that they had limited resources to discriminate between speech and language difference vs disorder.

## **8. How should children with speech sound disorders be classified? A review and critical evaluation of current classification systems.**

Waring, R., & Knight, R.

### Background

Children with speech sound disorders (SSD) form a heterogeneous group who differ in terms of the severity of their condition, underlying cause, speech errors, involvement of other aspects of the linguistic system and treatment response. To date there is no universal and agreed-upon classification system. Instead, a number of theoretically differing classification systems have been proposed based on either an aetiological (medical) approach, a descriptive linguistic approach or a processing approach.

### Aims

To describe and review the supporting evidence, and to provide a critical evaluation of the current childhood SSD classification systems.

### Methods & Procedures

Descriptions of the major specific approaches to classification are reviewed and research papers supporting the reliability and validity of the systems are evaluated.

### Main Contribution

Three specific paediatric SSD classification systems; the aetiologic-based Speech Disorders Classification System, the descriptive linguistic Differential Diagnosis system, and the processing-based Psycholinguistic Framework are identified as potentially useful in classifying children with SSD into homogeneous subgroups. The Differential Diagnosis system has a growing body of empirical support from clinical population studies, across language error pattern studies and treatment efficacy studies. The Speech Disorders Classification System is currently a research tool with eight proposed subgroups. The Psycholinguistic Framework is a potential bridge to linking cause and surface level speech errors.

### Conclusions & Implications

There is a need for a universally agreed-upon classification system that is useful to clinicians and researchers. The resulting classification system needs to be robust, reliable and valid. A universal classification system would allow for improved tailoring of treatments to subgroups of SSD which may, in turn, lead to improved treatment efficacy.

## **9. Phonological and articulation treatment approaches in Portuguese children with speech and language impairments: a randomized controlled intervention study.**

Lousada, M., Jesus, L. M., Capelas, S., Margaca, C., Simoes, D., Valente A, Hall A, Joffe VL.

### Background

In Portugal, the routine clinical practice of speech and language therapists (SLTs) in treating children with all types of speech sound disorder (SSD) continues to be articulation therapy (AT). There is limited use of phonological therapy (PT) or phonological awareness training in Portugal. Additionally, at an international level there is a focus on collecting information on and differentiating between the effectiveness of PT and AT for children with different types of phonologically based SD, as well as on the role of phonological awareness in remediating SSD. It is important to collect more evidence for the most effective and efficient type of intervention approach for different SSDs and for these data to be collected from diverse linguistic and cultural perspectives.

### Aims

To evaluate the effectiveness of a PT and AT approach for treatment of 14 Portuguese children, aged 4;0-6;7 years, with a phonologically based SSD.

### Methods & Procedures

The children were randomly assigned to one of the two treatment approaches (seven children in each group). All children were treated by the same SLT, blind to the aims of the study, over three blocks of a total of 25 weekly sessions of intervention. Outcome measures of phonological ability (percentage of consonants correct (PCC), percentage occurrence of different phonological processes and phonetic inventory) were taken before and after intervention. A qualitative assessment of intervention effectiveness from the perspective of the parents of participants was included.

### Outcomes & Results

Both treatments were effective in improving the participants' speech, with the children receiving PT showing a more significant improvement in PCC score than those receiving the AT. Children in the PT group also showed greater generalization to untreated words than

those receiving AT. Parents reported both intervention approaches to be as effective in improving their children's speech.

### Conclusions & Implications

The PT (combination of expressive phonological tasks, phonological awareness, listening and discrimination activities) proved to be an effective integrated method of improving phonological SSD in children. These findings provide some evidence for Portuguese SLTs to employ PT with children with phonologically based SSD.

## 10. Contributions of morphological awareness skills to word-level reading and spelling in first-grade children with and without speech sound disorder.

Apel, K., & Lawrence, J.

### Purpose

In this study, the authors compared the morphological awareness abilities of children with speech sound disorder (SSD) and children with typical speech skills and examined how morphological awareness ability predicted word-level reading and spelling performance above other known contributors to literacy development.

### Method

Eighty-eight first-grade students. 44 students with SSD and no known history of language deficiencies, and 44 students with typical speech and language skills. completed an assessment battery designed to measure speech sound production, morphological awareness, phonemic awareness, letter-name knowledge, receptive vocabulary, word-level reading, and spelling abilities.

### Results

The children with SSD scored significantly lower than did their counterparts on the morphological awareness measures as well as on phonemic awareness, word-level reading, and spelling tasks. Regression analyses suggested that morphological awareness predicted significant unique variance on the spelling measure for both groups and on the word-level reading measure for the children with typical skills.

### Conclusion

These results suggest that children with SSD may present with a general linguistic awareness insufficiency, which puts them at risk for difficulties with literacy and literacy-related tasks.

# **11. Articulation rate and its relationship to disfluency type, duration, and temperament in preschool children who stutter.**

Tumanova, V., Zebrowski, P. M., Throneburg, R. N., & Kayikci, M. E. K.

The purpose of this study was to examine the relationship between articulation rate, frequency and duration of disfluencies of different types, and temperament in preschool children who stutter (CWS). In spontaneous speech samples from 19 CWS (mean age = 3;9; years:months), we measured articulation rate, the frequency and duration of (a) sound prolongations; (b) sound-syllable repetitions; (c) single syllable whole word repetitions; and (d) clusters. Temperament was assessed with the Children's Behavior Questionnaire (Rothbart et al., 2001). There was a significant negative correlation between articulation rate and average duration of sound prolongations ( $p < 0.01$ ), and between articulation rate and frequency of stuttering-like disfluencies (SLDs) ( $p < 0.05$ ). No other relationships proved statistically significant. Results do not support models of stuttering development that implicate particular characteristics of temperament as proximal contributors to stuttering; however, this is likely due to the fact that current methods, including the ones used in the present study, do not allow for the identification of a functional relationship between temperament and speech production. Findings do indicate that for some CWS, relatively longer sound prolongations co-occur with relatively slower speech rate, which suggests that sound prolongations, across a range of durations, may represent a distinct type of SLD, not just in their obvious perceptual characteristics, but in their potential influence on overall speech production at multiple levels.

## **12. Overview of the diagnosis and treatment of stuttering.**

Maguire, G. A., Yeh, C. Y., & Ito, B. S.

Stuttering is a speech disorder defined by frequent prolongations, repetitions, or blocks of spoken sounds and/or syllables, as well as anxiety and cognitive avoidance. Stuttering is a very common disorder, and research now indicates that it is likely a multifactorial process with a physiologic etiology. Recent advances in the field of stuttering now provide insight into novel treatment strategies to help guide the practicing clinician. In addition to considering the upcoming revision to the Diagnostic and Statistical Manual of Mental Disorders criteria, comprehensive treatment should address all aspects of this disorder, as the optimal treatment of stuttering involves a multidisciplinary approach.

### **13. Mindfulness training in stuttering therapy**

#### **: A tutorial for speech-language pathologists.**

Boyle, M. P.

The use of mindfulness training for increasing psychological well-being in a variety of clinical and nonclinical populations has exploded over the last decade. In the area of stuttering, it has been widely recognized that effective long-term management often necessitates treatment of cognitive and affective dimensions of the disorder in addition to behavioral components. Yet, mindfulness based strategies and their possible usefulness in stuttering management have not been described in detail in the literature. This article seeks to engage professionals who treat stuttering in a conversation about the possible usefulness of incorporating mindfulness training into stuttering management. A review of the literature reveals that there is a substantial overlap between what is required for effective stuttering management and the benefits provided by mindfulness practices. Mindfulness practice results in decreased avoidance, increased emotional regulation, and acceptance in addition to improved sensory-perceptual processing and attentional regulation skills. These skills are important for successful long-term stuttering management on both psychosocial and sensory-motor levels. It is concluded that the integration of mindfulness training and stuttering treatment appears practical and worthy of exploration. Mindfulness strategies adapted for people who stutter may help in the management of cognitive, affective, and behavioral challenges associated with stuttering.

Educational objectives: Readers should be able to: (1) describe what mindfulness is and how it is cultivated; (2) identify the benefits that can be produced from mindfulness practice; (3) summarize how the benefits of mindfulness practice parallel what is often required for effective long-term stuttering management; and (4) identify specific mindfulness techniques that can be taught in stuttering therapy and explain their rationale.

#### **14. Language development and assessment in the preschool period.**

Conti-Ramsden, G., & Durkin, K.

Most young children make significant progress in learning language during the first 4 years of life. Delays or differences in patterns of language acquisition are sensitive indicators of developmental problems. The dynamic, complex nature of language and the variability in the timing of its acquisition poses a number of challenges for the assessment of young children. This paper summarises the key developmental milestones of language development in the preschool years, providing a backdrop for understanding difficulties with language learning. Children with specific language impairment (SLI) are characterised illustrating the types of language difficulties they exhibit. Genetic evidence for language impairment suggests complex interactions among multiple genes of small effect. There are few consistent neurobiological abnormalities and currently there is no identified neurobiological signature for language difficulties. The assessment of young children's language skills thus focuses on the evaluation of their performances in comparison to typically developing peers. Assessment of language abilities in preschool children should involve an evaluation of both expressive and receptive skills and should include an evaluation of more than one dimension of language. The use of a single measure of a language component, such as vocabulary, is considered inadequate for determining whether preschool children have typical language or language impairment. Available evidence supports the inclusion of measures of phonological short-term memory in the assessment of the language abilities of preschool children. Further study of genetic, neurobiological and early behavioural correlates of language impairments in preschool children is needed.

## 15. Speech and language delay in children.

McLaughlin, M. R.

Speech and language delay in children is associated with increased difficulty with reading, writing, attention, and socialization. Although physicians should be alert to parental concerns and to whether children are meeting expected developmental milestones, there currently is insufficient evidence to recommend for or against routine use of formal screening instruments in primary care to detect speech and language delay. In children not meeting the expected milestones for speech and language, a comprehensive developmental evaluation is essential, because atypical language development can be a secondary characteristic of other physical and developmental problems that may first manifest as language problems. Types of primary speech and language delay include developmental speech and language delay, expressive language disorder, and receptive language disorder. Secondary speech and language delays are attributable to another condition such as hearing loss, intellectual disability, autism spectrum disorder, physical speech problems, or selective mutism. When speech and language delay is suspected, the primary care physician should discuss this concern with the parents and recommend referral to a speech-language pathologist and an audiologist. There is good evidence that speech-language therapy is helpful, particularly for children with expressive language disorder.