UNIVERSIDADE FEDERAL DE MINAS GERAIS
Departamento de Fonoaudiologia

Índices Acústico Multiparamétricos AVQI e ABI: análise do efeito do tamanho da tarefa de fala encadeada

Trabalho apresentado para obtenção do
título de graduação em Fonoaudiologia pela
Universidade Federal de Minas Gerais

Sofia Romagnoli Borges Lima
Orientadora: Ana Cristina Côrtes Gama
Coorientadora: Fabiana Andrade Penido

Belo Horizonte
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Sofia Romagnoli Borges Lima

ÍNDICES ACÚSTICO MULTIPARAMÉTRICOS AVQI E ABI: ANÁLISE DO EFEITO DO TAMANHO DA TAREFA DE FALA ENCADEADA

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ABSTRACT

Objective: This study aims to compare the outcomes of the multiparametric acoustic indices, namely the Acoustic Voice Quality Index (AVQI) and the Acoustic Breathiness Index (ABI), across various lengths of connected speech tasks.

Methods: An observational, analytical, cross-sectional study was conducted with a convenience sample of 86 teachers (48 females and 38 males, aged between 27 and 55 years) who had no laryngeal alterations and exhibited neutral or mild vocal deviation (G0 or G1 on the GRBASI scale). Participants underwent otorhinolaryngological and perceptual-auditory voice assessments performed by experienced professionals. The laryngeal examination was considered normal if it showed complete glottic closure and no lesions on the vocal folds (VFs). The speech-language pathology evaluation involved a perceptual-auditory assessment conducted by three speech-language pathologists, each with over 10 years of experience. Samples of sustained vowel [a] and connected speech through counting from 1 to 20 at habitual frequency and intensity were collected. The connected speech samples were edited and segmented into different task lengths (15 to 42 syllables) allowing the comparison of progressively longer speech segments. AVQI and ABI values were extracted using a validated *Praat* script, based on the central three seconds of the sustained vowel and the corresponding connected speech segments. Statistical analysis was performed at a 5% significance level, employing Friedman and Tukey Pairwise tests to compare the different task lengths. To assess the intra-rater agreement of the three speech-language pathologists, 20% of the sample was replicated. The perceptual-auditory agreement analysis was conducted using the Second-Order Agreement Coefficient (AC2), calculated with R software, version 3.2.

Results: The sample comprised 86 teachers, including both genders, all native speakers of Brazilian Portuguese. Among the 48 female participants, 24 teachers exhibited a mild overall degree of vocal quality deviation (G1) in the perceptual-auditory evaluation, whereas the other 24 were classified with a neutral voice (G0). In the male group of 38 participants, 11 teachers were identified as G1, and 27 as G0. The results demonstrated that AVQI values progressively increased as the number of syllables in the connected speech task increased, indicating that this index is sensitive to speech sample length. In males, statistically significant differences were observed starting at 33 syllables, corresponding to counting from 1 to 17. In females, differences were noted beginning at 29 syllables, corresponding to counting from 1 to 16. Conversely, ABI values did not show statistically significant differences across the various speech task lengths for either males or females, indicating

stability of this index regardless of the duration of the connected speech sample and supporting its robustness across different speech conditions and evaluation situations.

Conclusion: The length of the connected speech task significantly influences AVQI results, highlighting the importance of standardizing speech material in vocal assessment protocols to ensure consistency, reliability, and comparability across clinical and research contexts. ABI remained stable across different task lengths and effective for analyzing vocal breathiness in various contexts. These findings support maintaining standardized speech tasks to ensure consistent and reliable acoustic assessments.

Keywords: Voice, Speech Therapy, Speech Acoustics, Index.

RESUMO

Objetivo: Comparar os resultados dos índices acústicos multiparamétricos Acoustic Voice Quality Index (AVQI) e Acoustic Breathiness Index (ABI) em diferentes tamanhos de tarefas de fala encadeada.

Métodos: Trata-se de um estudo observacional, analítico e transversal, realizado com uma amostra de conveniência composta por 86 professores (48 mulheres e 38 homens, com idades entre 27 e 55 anos), sem alterações laríngeas e com qualidade vocal classificada como neutra ou com desvio leve (G0 ou G1 na escala GRBASI). Os participantes foram submetidos à avaliação otorrinolaringológica e à avaliação perceptivo-auditiva da voz, realizadas por profissionais experientes. O exame laríngeo foi considerado normal quando apresentava fechamento glótico completo e ausência de lesões nas pregas vocais (PPV). A avaliação fonoaudiológica envolveu análise perceptivo-auditiva realizada por três fonoaudiólogas, cada uma com mais de 10 anos de experiência. Foram coletadas amostras da vogal sustentada [a] e de fala encadeada por meio da contagem de 1 a 20, em frequência e intensidade habituais. As amostras de fala encadeada foram editadas e segmentadas em diferentes extensões de tarefa (15 a 42 sílabas), permitindo a comparação entre segmentos progressivamente mais longos. Os valores de AVQI e ABI foram extraídos por meio de um script validado no software *Praat*, usando os três segundos centrais da vogal sustentada e as tarefas fala encadeada. A análise estatística foi realizada com nível de significância de 5%, utilizando os testes de Friedman e comparações múltiplas de Tukey para comparar os diferentes comprimentos de tarefa. Para avaliar a concordância intra-examinadora entre as três fonoaudiólogas, 20% da amostra foi replicada. A análise de concordância perceptivo-auditiva (AC2) foi realizada por meio do Coeficiente de Concordância de Segunda Ordem, calculado no software R, versão 3.2.

Resultados: A amostra foi composta por 86 professores, de ambos os sexos, todos falantes nativos do português brasileiro. Entre as 48 participantes do sexo feminino, 24 professoras apresentaram grau leve de desvio na qualidade vocal (G1) na avaliação perceptivo-auditiva, enquanto as outras 24 foram classificadas com voz neutra (G0). No grupo masculino, composto por 38 participantes, 11 professores foram classificados como G1 e 27 como G0. Os resultados demonstraram que os valores de AVQI aumentaram progressivamente à medida que o número de sílabas na tarefa de fala encadeada aumentou, indicando que esse índice é sensível ao comprimento da amostra de fala. No grupo dos homens, diferenças estatisticamente significativas foram observadas a partir de 33 sílabas (contagem de 1 a 17). Já no grupo das mulheres, a diferença surgiu a partir de 29 sílabas (contagem de 1 a 16). Em

contrapartida, o ABI, não houve variações estatisticamente significativas nos diferentes tamanhos da tarefa de fala, em ambos os sexos.

Conclusão: O tamanho da tarefa de fala influencia os resultados do AVQI, sugerindo a necessidade de padronização na avaliação vocal para garantir consistência. Contudo, o ABI mostrou-se estável, sendo adequado para a análise da soprosidade vocal em diferentes contextos. Os achados apresentados reforçam a necessidade de manter tarefas de fala padronizadas, garantindo avaliações acústicas consistentes e confiáveis.

Palavras-chave: Voz, Fonoaudiologia, Acústica da Fala, Índices.

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