Classification proposal of phonological disorder severity using Fuzzy Methodology, according to the implicational model of feature complexity

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This study aimed at proposing a quantitative classification for phonological disorder severity based on the Implicational Model of Feature Complexity – IMFC (Mota, 1996), considering Rangel's adequacies (1998). Quantification of such proposal was based on the Fuzzy modeling; to do so, a *Linguistic Fuzzy Model* was created, developed from a system of fuzzy rules, processed in parallel, using Mamdani's minimum inference method and the center of area defuzzification method. The *Model* comprehended three input variables: *Path Course*, *Level of Complexity* and *Acquisition of Phonemes*, described in linguistic terms to which fuzzy subsets were added (three subsets for each variable). Determination of borders followed criteria and inference based on the IMFC and on the researcher's experience. The model output variable was the *Severity Phonological Disorder Index* based on four fuzzy subsets: *Severe, Moderate-Severe, Moderate-Mild, and Mild.* The *Severity Phonological Disorder Index* was calculated for all 204 deviating phonological systems included in the sample using the *Fuzzy Linguistic Model*, run in MATLAB fuzzy toolbox (2009). Validation of modeling was performed by evaluating severity of a representative number of phonological systems by two groups of speech and language therapists. The first, GT-I (Group of Speech and Language Therapists I), was comprised of three speech and language therapists with a doctorate in applied linguistics and experienced in disordered speech. The second, GT-II (Group of Speech and Language Therapists II), was comprised of three speech and language therapists with a master's degree in human communication disorders and experienced in disordered speech at a research laboratory. Classification of disorder severity based on the proposal was similar to that assessed by the speech and language therapists in most phonological systems under evaluation. In addition, the criteria used in the proposal were used by Group I speech and language therapists and were considered adequate by Group II. Finally, the proposal has shown to be able to quantitatively differentiate degrees as to input variables (path course, level of complexity, acquisition of phonemes), sound classes, and distinctive features. Such findings allowed the conclusion that the proposal is able to adequately classify phonological disorder severity and presents validity for the speech and language therapists; therefore, it is an important reference for clinical practice.

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