Journal of Speech Pathology & Therapy

Namasivayam A.k, Jspt 2021, 06:06

Commentary Open Access

Evaluation of Speech Motor Skills in Children Using a Probe Word List

Aravind Kumar Namasivayam

Oral Dynamics Lab, Department of Speech-Language Pathology, University of Toronto, Canada

Received date: December 08, 2021; **Accepted date:** November 22, 2021; **Published date:** December 30, 2021

Introduction

Measuring outcomes following treatment in speech language pathology is essential to evidence informed practice. Outcome measurement allows for the assessment of treatment efficacy, evaluation of treatment progress, and planning for future courses of action (American Speech-Language-Hearing Association [ASHA]. However, for children with severe speech sound disorders (SSD), especially those with neuromotor or developmental speech motor control issues, measuring outcomes is challenging due to the complexity of their clinical presentation. These children fall into four subtypes of motor speech disorders (MSD), namely, childhood dysarthria, childhood apraxia of speech (CAS), speech motor delay (SMD), and concurrent childhood dysarthria and CAS. The subtypes are characterized by a range of speech motor issues, such as mandibular sliding, difficulty adjusting mandibular height for different vowels, undifferentiated tongue gestures, limited coordination between speech subsystems (e.g., between phonation and ariculation), limited vocabularies, and unintelligible speech. Probe word (PW) list and scoring systems (SS) are commonly used to measure treatment progress and generalization in this population. A PW list is composed of a customized set of words (i.e., a word list) and a scoring method that permits the measurement of intervention-related behavioral change (e.g., speech approximations) toward specific therapy targets. The PWs are customized carefully while being mindful of underlying constructs (what is being measured), task difficulty, information-processing load, and the client's needs and capabilities.

Rationale for the Current Study

Different PW and SS have been extensively used in both single-subject and group designs. Earlier SS, such as the one presented by Hall, used a point deduction system. In this system, adult productions of items were given a score of 0, and discrepancies between the child's productions and those of adults were scored negatively. For instance, for every mismatched distinctive feature (i.e., voice, place, and manner), a point was deducted with distortions scored as a half point. The final score was then calculated based on the sum of mismatches from the adult form. Recent SS use an auditory–perceptual 3-point scaling procedure that is based on scoring whole-word accuracy rather than individual sound productions (2 = correct production,1= close approximation,0= incorrect production). The scores are converted to a percentage based on the total possible points for a given set of words. This version involves the scoring of not only segmental-level information (place, voice, manner, and distortion errors) but also supra segmental aspects of speech production (e.g., prosodic or stress errors), indices of speech timing (e.g., durational errors such as excessive vowel lengthening), and articulatory effort (e.g., excessive plosive release). Including both segmental and suprasegmental aspects into scoring is assumed to increase sensitivity to speech performance changes with time or intervention. For children with MSD, a combination of visual assessment of the accuracy of speech movements with linguistic transcription–based procedures is preferred. One example is a 3-point scoring procedure, where 2 = accurate movement gestures for correct production, 1= intelligible production with minor errors (mild vowel distortion, one distinctive feature off for consonant production, or close approximation of movement gesture), and 0 = inaccurate production. This allows for the scoring of both segmental (via auditory– perceptual linguistic transcription) and underlying speech motor control issues (via visual examination of speech movements). Such auditory–visual scoring procedures have been used successfully to study changes in speech performance following intervention in children with SSD and speech motor control issues. The PW list discussed in the current study is based on developmental speech motor research and a framework referred to as the Motor Speech Hierarchy. In the next few sections, we will briefly discuss the MSH and developmental evidence in support of this framework.

Statistical Analysis

Statistical Analysis To demonstrate that the MSH-PW list contains words with increasing motoric word complexity (while minimizing the contribution of linguistic variables known to impact speech production), separate one-way analyses of variance (ANOVAs) were carried out with summed mWCM scores and linguistic complexity scores (neighborhood density, mean biphone frequency, and log word frequency) as the dependent variables and MSH stages as the group factor. As words in MSH Stage VI are multisyllabic (e.g., "marshmallow" and "rhinoceros") and arguably more linguistically complex (contains less frequently occurring words, sparse neighborhood density, etc.) than the other three MSH stages (III, IV, and V), we only provide descriptive statistics relating to linguistic complexity for this stage and did not include this in the ANOVA analysis. Tukey's honestly significant difference post hoc tests were performed, as necessary. To assess content validity, we utilized the content validity index (CVI), which is the most widely utilized procedure of quantifying the content validity for a scale or instrument. We report both average-CVI (Ave-CVI) and by item-CVI scores (I-CVI) for relevance of items using standard formulas described in the literature. Since chance agreement between the expert panelists is possible during the rating process, we adjusted each I-CVI for chance agreement using kappa scores.