Phonological-Orthographic Substitution Evaluation©

P·O·S·E

www.p-o-s-e.com ©

PRESENTATION TO THE PLAINVIEW-OLD BETHPAGE CENTRAL SCHOOL DISTRICT BOARD OF EDUCATION.

November, 2012

We, the authors and developers of the Phonological Orthographic Substitution Evaluation, P-O-S-E©, express our deepest appreciation to administrators, professional and clerical staff, past and present, of the Plainview-Old Bethpage Central School District for the ability to share our vision in the development of a basic criterion-referenced test instrument targeting a fundamental skill, i.e. short vowel competence at the third grade level. Since 2006, iterations of the P-O-S-E© have been administered to thousands of children in district.

We can now celebrate effective completion of the Phonological Orthographic Substitution Evaluation, P-O-S-E© project. For the past 7½ years we have been developing a criterion-referenced test targeting the third grade in Plainview Old Bethpage School District. The project has involved team work among staff, administration and the test developers. In this process, POB students in the 3rd grade and upper grade levels have been identified and received remediation based on test results.

The test is now in its final format. Manuals have been written. Forms have been printed and packaged. Remediation materials and techniques are designed for the general education classroom teachers as well as the SLP and special education teachers. ALL test items, as well as the fundamental thrust of the P-O-S-E©, are consistent with Common Core State Standards. Students with reading difficulties in upper grades can be administered the P-O-S-E© to elicit fundamental knowledge critical to the automaticity of reading and spelling.

A computer application has been developed to summarize and categorize P-O-S-E© outcomes for individual students with both tabular and graphically represented baselines and RTI. Additionally, an optional service is available for entry and processing of individual data which compiles into a full class report detailing results in a manner leading to differentiated training and teaching.

Plainview Old Bethpage Central School District will be cited in Power Point presentations as well as journal articles which will be circulated to a nationwide professional audience. It is with gratitude to the district and with a pride of accomplishment that we are donating a license for use of the P-O-S-E© to each elementary school in the Plainview-Old Bethpage Central School District.

Carol A. Sullivan, M.S. Roy F. Sullivan, Ph.D. Rebecca F. Kooper, Au.D.

The following is a summary of the research and test data underlying the P-O-S-E©.

Overview:

The development and automaticity of literacy in young children is contingent upon the successfully sequenced acquisition, integration and layering of basic skills in the receptive and expressive surface structural modalities as well as in deep structural systems. Hearing is the sensory avenue of ingress for speech sounds as the phonological or phonic elements of auditory language. Vision provides receptive access to letters as the lexical elements of visual language. Decoding is the cognitive reification of these symbols. The expressive cognate of hearing is oral-motor speech production while that of vision is grapho-motor, written output. The complementary associative process is encoding.

There is a synergistic developmental relationship among hearing and seeing, reading and writing. Hearing is the only teloreceptive sense that is active in utero. It has been demonstrated that a fetus can hear sounds, though muffled, as early as twenty weeks. By the third trimester of pregnancy, hearing is essentially intact. Among all speech elements, maternally-produced vowels sounds and prosodic features are the earliest speech elements experienced through pre-partum hearing. Post-partum, speech sound exposure is supplemented by consonant sounds.

Infancy and early childhood provide a rich immersion in auditory-verbal stimulation leading to the concomitant development of both auditory receptive and oral expressive language. In this period, sound-symbol-language relationships tend to evolve more as a gestalt than elementally associative in construction.

In the early childhood educational context, there has developed a formal system of phonics to facilitate learning the relationship between letters and sounds, subsequently sounding-out or decoding and spelling words. Initially, children are taught to associate letter consonants to phonemes, followed sequentially by short vowels, digraphs, blends and long vowels. Consonants and short vowels are taught first because of the general regularity of the sound-symbol relationship. Significant, empirically based theory has been applied to stress the importance of sequencing and layering these skills for effective decoding and recoding of language (Frith, Ehre, et al).

There is general consensus that the third grade represents a nexus between "learning to read" and "reading to learn". Consistent with the construct of sequentially obtained, integrated and layered linguistic structures, the Phonological-Orthographic Substitution Evaluation© (P-O-S-E©) was developed as a criterion-referenced test instrument to provide a valid, elemental assessment of short-vowel proficiency in reading and spelling at the critical third grade level.

Our Research:

Short Vowel Substitution in Third Grade Reading and Spelling.

Carol A. Sullivan, M.S.
Roy F. Sullivan, Ph.D.
Rebecca F. Kooper, Au.D.

Abstract:

A criterion-referenced instrument of monosyllabic real- and non-words was developed to probe internalized phonological/orthographic rules for spelling and reading of short vowels and silent /e/ vowel monosyllables. Subjects were of 275 third grade students in the Plainview-Old Bethpage School district of Long Island, New York. Statistically significant external correlations with test findings include: Benchmark (r=.60), ELA (r=.41), IQ (r=.29). Consistent vowel substitution patterns provide remedial direction (2012).

Rationale:

Children acquire spoken language with little awareness (Catts & Kamhi, 2005), whereas, they must consciously think about individual phonemes used in sound/symbol relationships and apply them to orthographic patterns (Apel & Apel, 2011). This research uniquely examines in depth, short vowel patterns applied in the automaticity of reading and spelling. These errors can be detected randomly in current standardized reading tests without consideration to phonological neighborhoods and regularity of use. Persistent short vowel errors inhibit accurate, fluent reading and writing. Targeted identification of these errors leads to focused short term intervention across disciplines.

This study arose from the expressed need of a suburban school district for timely and efficient identification of phonological and orthographic deficiencies in short vowel proficiency as a potential impediment to future efficiencies in learning. To that end, in 2005, a sampling of 2nd, 3rd, and 4th grade students was evaluated to determine the feasibility of concurrently assessing orthographic and phonological acquisition of short vowel skills in reading and spelling. Based on performance, 3rd grade was selected as the target population for this detailed study.

Materials:

A short vowel assessment instrument was constructed using monosyllabic real and non-words in CVC (short vowel) and CCVCC (short vowel and silent /e/) formats, balancing target vowel occurrences, consonants and blends while avoiding homonyms. Given the inverse relationship between word-frequency and time required for perception (Hall, 1953), thirty low probability monosyllabic words were selected from catalogued vocabularies. (Thorndike, 1968; British National Corpus, via Webster's Online Dictionary, Rosetta Edition). Monophonic and biphonic phonotactic probabilities (Vitevitch, 2004) did not differ for real and non-word items (P>.10). Subsequent validation of real word frequency counts (=4.4/10^6;SE=0.8) was obtained using the Corpus of Contemporary English (Davies, 2008)

Based on an analysis of potential real- and non-word monosyllabic test items in 2005-2006, 60 items were selected for use both in reading and spelling assessment. Thirty items were real words and 30 items were non-words. The basic instrument design includes 2 groups of 20 words each incorporating two instances of each short vowel {I/E/A/O/U} 10 CVC (real words, tab,rut),(non-words: vip,tob) and 10 CCVCC (real words: hack,clot; non-words,: shug,glesh). A third group of 10 silent /e/ long vowel {aI/EI/o-oU/u-ju} monosyllables (real words, mute,cone), (non-words: nide,bave) served as a cross-check on the integrity of discrimination between short and long vowels. This format was presented in the following task sequence: spelling non-words(Sn), spelling real words(Sr); one-to-four weeks later, the same 60 items were applied to reading non-words(Rn), and reading real words(Rr). Spelling was tested in a class-sized group context, average duration 20 minutes. Reading was evaluated individually, typically 3 minutes per child. A vowel-matched, split-half analysis of 120 test items for all 275 students indicates a high degree of internal reliability (Cronbach a= .98).

Procedure:

The target population was 275 third grade students in the Plainview-Old Bethpage School district of Long Island, New York. Test administration was performed in two stages. Spelling non-word and real, was tested by SLPs using a classroom FM sound field system to assure consistent acoustic access. The child's task was to hand-write the spelling words dictated twice in isolation, following

the prompt; “Write the word you hear”. Timing of test administration was systematic and rapid in order to capture the automaticity of the phonological-orthographic response. After 1-4 weeks, the reading portion was administered individually by SLPs.

Scoring and Analysis:

Spelling results were scored by SLPs on-site, facilitating in situ categorization of student responses. A computer application was developed by the authors, converting both reading and spelling responses to a keyboard-compatible SAMPA (Wells, 1997) phonetic code. This enabled a direct comparison of virtual phonology, generated by the spelling response, with actual phonology, generated by the reading response. Results of the four subtest segments (Sn, Sr, Rn, Rr) , processed by short vowel error type, were presented in tabular and graphic formats. In addition to scoring subtest outcomes, a summary page displays all responses, highlighting errors, including initial and final consonants. A weighted total % score is calculated: 2/3 short vowel and 1/3 silent /e/. Intervention priority levels are designated: High=5-8 errors/vowel; Mid-=3-4 errors per vowel; Low=2 errors per vowel ; N/A=0-1 error per vowel.

Summary findings follow, based on 33,000 vowel data points, N=275:

• Mean total items correct (N=275) was 87.68% , ranging from 38% to 100%; median 91.7%; mode 98.3%.

• Short vowel substitution errors display consistent cluster patterns both in phonological neighborhoods and on long-vowel cognates.

• Long vowel, silent /e/ substitution errors cluster in phonological neighborhoods and on short vowel cognates.

• Short vowel errors (N items=2329): [O]:29.5%; [U]:25,5%; [E]:21.7%; [I]:13.0%; [A]:10.2%.

• Silent /e/ long vowel errors (N items=1735): [o/oU]:30.8%; [aI]:29.0%; [u/ju]:22.7% ; [e/eI]:17.5%.

• CSE-designated performance: SLI:80.2% (N=22); LD:75.0% (N=19); Other Health:88.1% (N=10); Autism:91.3%(N=7); HI:91.3%. (N=2).

• Correlation spelling with reading: r= .79, P <.0001

• Correlation total score w/ F&P Benchmark (*N=78): r= .60, P<.0001

• Correlation total score w/ contemporary NYS ELA: r=.41; P=.0001

• Correlation total w/ forward ELA scores +1 year r=.39; +2 years r=.19; +3 years r=.28; + 4years r=.26.

• Correlation total w/ Otis IQ: r=.29; P < .0001

Clinical Intervention:

Diagnostic categorical information derived from these data provides a documented, prescriptive basis for targeted remediation strategies to correct the identified short vowel errors. These strategies tap the phonological loop for auditory and verbal processing. (Fuchs, et al., 2011) Remediation techniques include: auditory training, association of sound/symbol relationships, auditory differentiation between target vowel and error vowel, and application of skills to real- and non-words.

References:

Apel, K., Apel L., “Identifying Intraindividual Differences in Students Written Language Abilities”, Topics in Language Disorders,Vol. 31. No.1. pp. 54-72. 2011.

ASHA: Ad Hoc Committee on Reading and Written Language Disorders, Roles and Responsibilities of Speech-Language Pathologists With Respect to Reading and Writing in Children and Adolescents. 2011.

Berninger, V. Defining and differentiating dyslexia, dysgraphia, and language learning disability within a working memory model. In Silliman, E. & Mody, M. (Editors), Brain, Behavior, and Learning in Language and Reading Disorders (pp. 103-134). New York: Guilford Press, 2008.

Bernstein, S. E. Phonology, decoding, and lexical compensation in vowel spelling errors made by children with dyslexia, Reading and Writing, 22: 307-331. January, 2009.

Catts, H. W., Kamhi, A. G., Language and Reading Disabilities. Boston: Allyn & Bacon, 1999.

Davies, M. The Corpus of Contemporary American English: 425 million words, 1990-present. Available online at http://corpus.byu.edu/coca/. 2008-

Fountas, I. C., & Pinnell, G. S. Fountas and Pinnell Benchmark Assessment System 1: Grades K-2, levels A-N. Portsmouth, NH: Heinemann. 2007.

Fuchs, D., Hale, J.B., Kearns, D. M., "On the Importance of a Cognitive Processing Perspective: An Introduction", Journal of Learning Disabilities, Volume 44, Number 2, March/April, 2011.

Hall, J.F.,"Learning as a Function of Word-Frequency", The American Journal of Psychology, Vol. 67, No.1, March,1954, pp 138-140.

Hillenbrand, J, Getty, L., Clark, M. & Wheeler , K., "Acoustic characteristics of American English vowels." Journal of the Acoustical Society of America, 97, 3099-3111. 1995

Catts, H., & Kamhi,A. (Eds.) The connections between language and reading disabilities. Mahwah, NJ:Erlbaum, 2005.

Mody, M., Silliman, E. R., Brain, Behavior, and Learning in Language and Reading Disorders, New York: Guilford Press, 2008.

Parker, P., Webster's Online Dictionary, Rosetta Edition Webster's Online Dictionary, Rosetta Edition Publisher: Philip M. Parker, INSEAD URL:

http://www.websters-online-dictionary.org/ (no longer includes word frequency data) 2005

Peterson, G & Barney, H. "Control methods used in a study of the vowels." Journal of the Acoustical Society of America 24: 175–184, 1952

Thorndike,E.L., Lorge, I., The Teachers Word Book of 30,000 Words, Teachers College Press, Teachers College, Columbia University, New York. 1968

Traunmüller, H. Analytical expressions for the tonotopic sensory scale J. Acoust. Soc. Am. Volume 88, Issue 1, pp. 97-100 ,1990

Vellutino, F.R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M., Specific reading disability (dyslexia). What have we learned in the past four decades? Journal of Child Psychology and Psychiatry, 45:1 p. 2-40, 2004.

Wells, J. C. “SAMPA computer readable phonetic alphabet”. In Gibbon, D., Moore, R. and Winski, R. (eds.), 1997. Handbook of Standards and Resources for Spoken

Winski, R. (eds.), 1997. Handbook of Standards and Resources for Spoken Language Systems. Part IV, section B, Berlin and New York: Mouton de Gruyter, 1997.