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Short-Term Test-Retest Reliability of Informal Phonological Analysis for 2-year-old Late Talkers

Jordan Gearheart, B.S., Ann Walker, B.S., and Shari DeVeney, Ph.D., CCC-SLP

Background and Significance

Late Talkers
• 2-year-old children identified with expressive language delay without a causal factor (e.g., autism spectrum disorder, intellectual deficits)
• Few words; limited to no two-word utterances (“Mommy eat”)
• Approximately 10-15% of all 2-year-old children

Phonological Skills
• Correlation between the size of a child’s phonological repertoire and expressive vocabulary
• Late talkers may exhibit deficits in phonological skills (e.g., fewer complex syllable structures in words, limited speech sound repertoires)

Speech-language pathologists (SLPs) in Practice
• Planning appropriate intervention begins with comprehensive evaluation of both speech and language skills
• Often collect and analyze conversational speech samples using informal measures (i.e., those not compared to normative group; used for descriptive purposes)

Two Types of Informal Phonological Measures

Independent
• Allow for speech sound analysis that is descriptive rather than comparative (e.g., what the child DOES produce instead of what child DOES NOT produce)
• Includes Phonetic inventory (PI) and Word shape analysis (WS)

Relational
• Used to evaluate ability to produce sounds in a word compared to the adult form (e.g., comparing a child’s production of “fat” to the adult form, “cat”)
• Includes Place-manner-voice analysis (PMV) and Percent consonants correct-revised (PCC-R)

Test-Retest Reliability
• Measurement stability over time; short-term (i.e., one-week) reliability important for accurate baseline performance indicators and tracking treatment progress

Significance
• Need for evidence-based practices in assessment (ASHA 2004, 2005)
• SLPS may assume informal measures are reliable, but lack of evidence

Aim of current study
• Extension of Morris’ (2009) procedures for determining test-retest reliability of phonological analyses with a clinically-relevant population (e.g., late talkers); inclusion of relational analyses

Research Question
• What is the short-term test-retest reliability (over a one-week time period) of independent and relational informal phonological analyses calculated using intelligible words produced during a 20-minute speech sample for young children identified as late talkers?

Method

Participants
• (n = 3); Ages 24 months to 31 months (M = 26.67, SD = 3.79)
• Identified as a late talker: (1) <10th percentile on the MacArthur Bates Communicative Development Inventory: Words and Sentences (CDI) test. (2) one standard deviation below the mean on the Preschool Language Scale-5th edition (PLS-5) Expressive Communication subtest.

Procedures
• Modeled after Morris (2009) study procedures
• Two 20-minute conversational speech samples were obtained from each child while interacting with his/her parent and playing with age-appropriate, researcher-supplied toys
• Each speech sample was transcribed by the first two authors using the International Phonetic Alphabet (IPA); Inter-rater reliability was 81.83% (range = 72-91%)
• The first author calculated PIs and WS analyses for each participant session based on final agreed-upon transcriptions. Inter-rater reliability for independent analyses was established with the faculty advisor on 20% of the data. PI Inter-Rater Reliability was an average of 96% (range = 89-100%); WS Inter-Rater Reliability was 100%.
• The second author calculated all PMV and PCC-R analyses. Inter-rater reliability was established with faculty on 20% of the data. PMV Inter-Rater Reliability ranged from 84-93%; PCC-R Inter-Rater Reliability ranged from 89-95%.

Results

Phonetic Inventory
• Initial consonants: P1 and P2 were reliably consistent for productive initial consonants (6 in S1; 7 in S2; 6 in S1; 6 in S2); however P3 was not (2 in S1; 7 in S2)
• Final consonants: P1 was reliably consistent with productive final consonant sounds, but not for emerging (0 in S1, 3 in S2), P2 was consistent in that he did not produce any in either session; P3 was not consistent for productive final consonants (2 in S1; 4 in S2)

Word Shape Analyses
• Findings indicated substantive unreliability for two of three participants. P1 (33% consistency; 2/6 word shapes produced consistently across the two data collection sessions), P2 (50% consistency; 2/4), P3 (80% consistency; 4/5)

Place Manner Voice Analysis
• Findings indicate a discrepancy between session one and two for all three participants: at least 2 phonemes differed for each session

Differences noted across all sessions for each participant; resulted in change of severity rating for two of three participants:
• P1S1: 47% (severe disorder) and P1S2: 34% (severe)
• P2S1: 53% (moderate/severe) and P2S2: 65% (moderate/mild)
• P3S1: 71% (mild/moderate) and P3S2: 50% (mod/severe)

Implications and Limitations
• Findings indicate that each informal phonological analysis outcome was inconsistent for at least one-third of participants across samples
• Small sample size; replication with larger sample size is warranted.

Selected References

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