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**Assessment**

**In this issue:**

Assessing toddlers' productions  
of polysyllables

Language sample analysis

Assessing speech and language  
in children with cerebral palsy

Clinical assessment of  
progressive aphasia

Subtypes of developmental  
reading disorders



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Level 2 / 11-19 Bank Place,  
Melbourne, Victoria 3000  
T: 03 9642 4899 F: 03 9642 4922  
Email:  
[office@speechpathologyaustralia.org.au](mailto:office@speechpathologyaustralia.org.au)  
Website:  
[www.speechpathologyaustralia.org.au](http://www.speechpathologyaustralia.org.au)  
ABN 17 008 393 440 ACN 008 393 440

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# From the editors

Kerry Ttofari Eecen and Marleen Westerveld

## THIS EDITION OF *ACQUIRING KNOWLEDGE IN SPEECH,*

*Language and Hearing* focuses on assessment issues in speech pathology practice. Assessment of communication disorders can inform many aspects of speech pathology practice, including differential diagnosis, prognosis, treatment selection, treatment effectiveness, and service delivery. Claessen and Cartwright (in the “What’s the evidence?” column) discuss the importance of balancing “craft-based knowledge” (gained through clinical practice) with “science-based knowledge” in order to assess clients’ communication needs in an evidence based manner. However, they point out that it is currently difficult to achieve this balance because of the lack of research on evidence based assessment. Furthermore, Claessen and Cartwright report that although evidence based resources specific to speech pathology practice are available, most of these focus on treatment, not assessment. In this issue we hope to add to the assessment literature with a selection of peer-reviewed papers of clinical relevance, in addition to our regular columns.

Baker and Munro review experimental and commercially available tools to assess children’s production of polysyllabic words. Although assessment of polysyllables is an emerging area of research, it is important to consider it within the context of a comprehensive assessment because of recent research indicating a link between the ability to produce polysyllables, speech and language processing, and later literacy skills.

Westerveld presents a tutorial on spontaneous language sampling relevant for speech pathologists working with preschool and school-aged children. The author states that although clinicians routinely use standardised assessments in their everyday practice, naturalistic assessment of communication abilities is used less frequently. She argues the benefits of incorporating language sampling in routine assessment of speech and language skills, which include determining the impact of the communication problem on everyday communication function, setting relevant treatment goals, and determining whether treatment gains generalise to everyday communication. A box at the end of the tutorial includes the contexts, conditions, and examples of further reading for paediatric speech pathologists interested in finding out more about spontaneous language sampling.

The third peer-reviewed paper by Mei, Morgan, and Reilly focuses on assessment of the communication skills of children with cerebral palsy. The authors discuss the importance of holistic assessment in relation to this population, and provide an overview of how the *International Classification of Functioning, Disability and Health for Children and Youth* can be used to guide assessment of the communication skills of these children. They highlight that further research is needed to develop tools that will allow the holistic assessment of the communication skills of children with cerebral palsy.

Nickels, Taylor, and Croot provide an overview of the assessment requirements of people with acquired language impairment, and more specifically, progressive aphasia. They argue that there are some similarities in the assessment requirements of people with progressive and non-progressive language impairment, but that people with progressive language impairment have some additional considerations that need to be taken into account. The final peer-reviewed paper by Jones, Castles, and Kohnen summarises six subtypes of developmental reading disorders. A list of suggested assessments is provided at the end of the paper.

Most of our regular columns focus on assessment, including “What’s the evidence?”, “Ethical conversations”, “Webwords”, and “Top 10 resources”. Hesketh updates us on her research-in-progress on the assessment of children’s speech intelligibility, currently underway at the University of Manchester. This issue concludes with a summary of a select number of papers recently published in peer-reviewed journals focusing on assessment, and a list of resource reviews.

We hope that this issue of *ACQ* inspires us as clinicians to reflect on our assessment practices, and to consider assessment in an evidence based manner.



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# An overview of resources for assessing toddlers' productions of polysyllables

Elise Baker and Natalie Munro

KEYWORDS

ASSESSMENT

CHILDREN

NONWORD

REPETITION

POLYSYLLABLES

THIS ARTICLE HAS BEEN PEER-REVIEWED



Elise Baker (top) and Natalie Munro

**Historically, routine assessment of children's speech has focused on consonant accuracy (e.g., ability to pronounce /k/ in *car*, *bucket*, and *bike*). The discovery of a link between the ability to produce polysyllables and speech, language, phonological processing, and later literacy abilities suggests that speech pathologists (SPs) need to extend their focus from consonant accuracy to children's ability to produce polysyllables, considering syllable number, shape, and stress pattern accuracy. This paper reviews a range of experimental tasks and clinical tools that SPs could use to examine toddlers' productions of polysyllabic real- and nonwords. Given that assessment of toddlers' productions of polysyllables is a relatively new area of research, SPs are encouraged to assess toddlers' polysyllable productions within the context of a comprehensive communication assessment.**

As children learn to speak, they not only learn how to articulate the individual consonants and vowels in their ambient language, but also to pronounce words of varying syllable shapes, word lengths, and stress patterns. Historically, routine assessment of children's speech has focused on their ability to accurately articulate consonants in initial, medial, and final word positions, typically in mono- and/or disyllabic words (e.g., pronunciation of /k/ in *car*, *bucket*, and *bike*). The discovery of a link between the ability to produce polysyllables (words of three or more syllables) and speech, language, phonological processing, and later literacy abilities (e.g., Dollaghan & Campbell, 1998; Sutherland & Gillon, 2005), suggests that speech pathologists (SPs) need to extend their focus from consonant accuracy to one that considers children's abilities to produce polysyllables, including their ability to match syllable number, syllable shape, and stress pattern in real words such as *helicopter* and *spaghetti*, and in nonwords such as /pɜːduləmeɪp/ and /dɒʊpəlʊt/ (from Stokes & Klee, 2009b). The impetus for this recommended

change to assessment practice is based on an assumption that polysyllables have the potential to (a) provide insight into the underlying processing difficulties that children with speech sound disorders (SSD) or specific language impairment (SLI) might have with the encoding, storage, and/or retrieval of spoken words (e.g., Contour & McCauley, 2000; Sutherland & Gillon, 2005); (b) help with the differential diagnosis of late talkers who are at risk of future speech, language, or literacy difficulties (e.g., Richardson, Kulju, Neiminen, & Torvelainen, 2009); and (c) improve the identification of children at risk of future literacy difficulties who otherwise might be deemed to have typically developing speech or a mild speech difficulty when assessed on a measure of consonant accuracy (e.g., Nathan & Simpson, 2001). Clinically, the application of this recommendation to everyday SP practice raises some fundamental questions with respect to age of assessment. Specifically, at what age should and/or could children's pronunciation of polysyllables be reliably assessed? Should SPs wait until children are of preschool or school age to assess production of polysyllables? Is it better or indeed possible to evaluate children's productions of polysyllables during the toddler years (between the age of approximately 1;0 to 3;0 years)?

According to James, van Doorn, and McLeod (2008), children's acquisition of polysyllabic words is gradual and protracted, with refinement of syllable timing continuing into adolescence. This does not mean, however, that young children do not produce polysyllabic words. Children with typical development have been observed to produce polysyllables in their first 50 words (e.g., Savinainen-Makkonen, 2000). Although children's initial attempts may be truncated (e.g., *helicopter* /hɛlɪkɒptə/ as [kɒtə]) (Kehoe & Stoel-Gammon, 1997), the number of polysyllables in which all syllables are represented (rather than deleted) changes from 0% to about 50% by 2;3 years (James, 2006). Clearly, if routine assessment of children's pronunciations of polysyllables is to be conducted, it would seem appropriate to begin that evaluation with children from the time they start to talk – during the toddler years. The purpose of this paper is to explore the literature on the potential clinical value of assessing toddlers' productions of polysyllables (both real words and imitated nonwords), and to review currently available experimental tasks and clinical resources for assessing Australian-English-speaking toddlers' productions of polysyllabic real- and nonwords.

## Assessing toddlers' productions of polysyllables

### *The potential clinical value*

If a school-age child said [kɔtə] for helicopter, and [wændi] for the nonword /bɪkəwændi/, research findings (e.g., Dollaghan & Campbell, 1998; Sutherland & Gillon, 2005) would support speculation that this child could have or would be at risk for having speech, language, phonological processing, and/or literacy difficulties. What if a toddler was to say [kɔtə] for helicopter, and [wændi] for /bɪkəwændi/? Findings from a small body of research addressing this question would seem to support a similar speculation, as toddlers' abilities to repeat polysyllabic real and nonwords have been linked with their emerging language (e.g., Chiat & Roy, 2004, 2007, 2008; Stokes & Klee, 2009a, 2009b) and later literacy skills (Richardson et al., 2009). Research in this area has not focused on examining links between toddlers' production of polysyllables and their later speech production skills. To help readers understand the state of the evidence regarding the potential clinical value of examining toddlers' productions of polysyllables, a review of the findings from this relatively small body of research focusing on toddlers' language and literacy outcomes now follows.

In a study of 66 typically developing British-English-speaking children between 24 and 47 months, Chiat and Roy (2004) reported that the children's abilities to repeat both real and nonwords of up to 3-syllables in length (on a task referred to as the Preschool Repetition Test or PSRep) was significantly correlated with their performance on a test of receptive vocabulary. Using a larger sample of typically developing children ( $n = 315$ ) and a clinical sample of children ( $n = 168$ ) referred because of concerns about language development (rather than speech), Chiat and Roy (2007) reported that the PSRep reliably differentiated the typical and clinical samples. In a longitudinal study following a clinical sample of 163 children, performance on the PSRep at the first point of assessment (2;6 – 3;6 yrs) was helpful in predicting expressive language skills (particularly morphosyntax) 18 months later (Chiat & Roy, 2008). Stokes and Klee (2009a) examined factors that influenced vocabulary development in 232 typically developing British-English-speaking toddlers aged 24 to 30 months. Based on results from regression analyses, they found that while age and gender uniquely predicted the toddlers' scores on the British-English version of the MacArthur-Bates Communicative Development Inventory: Word and Sentences (CDI:WS-UK; Klee & Harrison, 2001), the toddlers' abilities to repeat nonwords (up to 3 syllables in length) was in fact the strongest predictor of the toddlers' CDI scores. In neither of these two studies were 4-syllable real or nonwords included.

In an interesting application of a nonword repetition task, Stokes and Klee (2009b) examined the diagnostic accuracy of two different versions of their Test of Early Nonword Repetition (TENR) – one version containing words of 1–3 syllables, and a second containing words of 1–4 syllables, with a sample of 232 British-English-speaking children aged 24–30 months with no severe medical history or reported hearing loss. They reported that the TENR containing words of 1–4 syllables showed greater promise than the 1–3 syllable version for differentially diagnosing the typically developing children from late talkers in their original sample, based on the toddlers' performances on the British-English

version of the CDI (Klee & Harrison, 2001). Stokes and Klee (2009b) acknowledged that further research is needed to establish the clinical value of their TENR using 1–4 syllables, given the small sample of children ( $n = 8$ ) in their late talker group.

As part of the Jyväskylä Longitudinal Study of Dyslexia project examining early signs of dyslexia in Finnish-speaking children from birth to 10 years, Richardson et al. (2009, p. 374) discovered an interesting trend. Richardson et al. found that from a sample of 196 children, the “children with dyslexia were not as advanced at the age of 30 months as those children with no reading/writing problems in the production of some prosodic aspects of a word structure, such as in producing four syllable words”. Real words (in Finnish) were used rather than nonwords. Collectively, the studies by Chiat and Roy (2004, 2007, 2008), Stokes and Klee (2009a, 2009b) and Richardson et al. (2009) suggest that toddlers' abilities to spontaneously produce polysyllabic real words and repeat polysyllabic nonwords may be associated with emerging language and later literacy skills, and that evaluation of toddlers' abilities to produce polysyllables of 4-syllables in length may be particularly informative. Why might this be the case?

Children's productions of polysyllables are thought to yield important information not only about their overt speech production skills but also about their underlying phonological processing abilities and the nature of their underlying phonological representations of words (James et al., 2008; Sutherland & Gillon, 2005). Phonological representations are referred to in the literature as “the storage of phonological information about words in long term memory” (Sutherland & Gillon, 2005, p. 295). For speakers with normal hearing, phonological representations are believed to be created through a process of encoding, then storing the segmental and suprasegmental information about words in a speech signal. Initially, the information in a speech signal is presumed to be analysed and encoded into a temporary representation. Phonological working memory (also referred to as phonological short-term memory or verbal short-term memory) is described as the component of memory that holds this temporary store of phonological information (Graf Estes, Evans, & Else-Quest, 2007). The information in the temporary store is then used to create an abstract underlying phonological representation of a word in the lexicon in long-term memory. Adequate phonological working memory is believed to be necessary for creating stable or well-specified abstract phonological representations of words (Graf Estes et al., 2007). See Gathercole (2006) for a helpful review of this topic.

Children with speech, language, or literacy difficulties are believed to have (or at least be at risk for having) underspecified phonological representations, otherwise described in the literature as incomplete, imprecise, faulty, impoverished, or indistinct representations of words (Elbro, Borström, & Peterson, 1998). The presence of underspecified phonological representations means that children with speech and/or language difficulties are subsequently less able to judge or manipulate phonological information in words as required in phoneme awareness tasks, which are important for literacy (Mann & Foy, 2007). What does this have to do with polysyllables, and in particular the production of polysyllabic real-and nonwords?

Polysyllables, by their very nature, contain more phonological information to be encoded and stored relative to mono- and disyllables. As such, polysyllables stress the

speech processing system to expose potential difficulties. These difficulties may include one or more of the following processes: (a) the temporary storage of information in phonological working memory, (b) the interaction between short-term memory processes and aspects of phonological knowledge in long-term memory, and, (c) the creation of well-specified phonological representations in long-term memory (Contour & McCauley, 2007; Sutherland & Gillon, 2005). Real word production presumably provides insight into the quality of children's underlying phonological representations in long-term memory, while the imitation of nonwords provides unique insight into children's phonological short-term working memory abilities – the important part of memory thought to be involved in the creation of well-specified underlying phonological representations (Gathercole, 2006). Thus, if SP assessments are to provide insight into children's abilities to encode, store, and retrieve phonological information about words, polysyllabic real- and nonword speech sampling would seem most appropriate.

One of the challenges for SPs when assessing polysyllabic production, particularly in young children, is the ease with which the skill can be assessed. What follows is a review of both experimental tasks in published research and commercial clinical assessment tools suitable for sampling toddlers' productions of polysyllabic real- and nonwords.

### **Suitable experimental tasks**

Across the research literature examining toddlers' abilities to produce polysyllabic real- and nonwords, four experimental tasks were identified. This section provides a brief overview of each of these four tasks and comments on their suitability for Australian-English-speaking toddlers.

- The Preschool Repetition Test (PSRep) was developed by Chiat and Roy (2004) for children 2;0–3;11 years and consists of 18 real words and 18 matched nonwords (comprising of six 1-syllable, six 2-syllable and six 3-syllable items for both real- and nonwords) that are systematically manipulated for prosodic structure and syllable length (up to three syllables). The word list and further details regarding administration and scoring are available in the Appendix of Chiat and Roy (2004). For Australian-English-speaking toddlers, some of the real word vocabulary items may be unknown (e.g., *magazine*, *cigarette*). Seeff-Gabriel, Chiat, and Roy (2008) have since published the PSRep with normative data, as part of the Early Repetition Battery (ERB) (see the section below on commercially available tests).
- The Test of Early Nonword Repetition (TENR) was developed by Stokes and Klee (2009b) for 2-year-olds and consists of 16 nonwords of increasing syllable length, including: four 1-syllable, four 2-syllable, four 3-syllable and four 4-syllable nonwords. Although Stokes and Klee (2009b, p. 876) state that the nonwords in the TENR contain “early developing consonants and tense vowels”, it is unclear how the early developing status of the consonants was established, given that some of the consonants (e.g., /l, ɹ, s, ʃ/) in some items (e.g., /fɛnɹaɪsɛk/ /lɒdʒnætɪʃ/) are considered later developing (Bleile, 2006). The word list and further details regarding administration and scoring are available in the Appendix of Stokes and Klee (2009b). The TENR is suitable for Australian-English-speaking toddlers as the test is limited to the imitation of nonwords containing consonants and vowels in Australian-English.

- The Syllable Repetition Task (SRT) was developed by Shriberg and Lohmeier (2008) as a nonword repetition task for children age of 3;0 and up. It was designed to circumvent the potential problem of speakers' articulation errors negatively influencing his or her performance on nonword repetition tasks (Shriberg et al., 2009). The SRT consists of eight 2-syllable (CVCV) nonwords, six 3-syllable (CVCVCV) nonwords, and four 4-syllable (CVCVCVCV) nonwords, each containing four early developing phonemes /b, d, m, n/ and the stressed vowel /a/ (e.g., /bamadana/). Given the simplicity of the nonwords, the SRT may be suitable for Australian-English-speaking toddlers; however, clinical utility of the SRT with this age group has yet to be reported. The SRT, including a technical report by Shriberg and Lohmeier (2008), as well as a PowerPoint™ presentation of the task is freely available from the Technical Reports section of the Phonology Project Website <http://www.wais.wisc.edu/phonology> (Shriberg et al., 2009). The technical report provides further details about administration and scoring.
- The Toddler Polysyllable Test (T-POT) was developed by Baker (2010) for Australian-English-speaking toddlers (age 2;0–3;11 years) to overcome the limitation of unfamiliar lexical items in real word polysyllable tests (e.g., PSRep). The T-POT is a single-word picture naming task comprising 20 real polysyllabic words (eight 3-syllable words with weak onset stress and seven 3-syllable words, four 4-syllable words and one 5-syllable word each with strong-onset stress). Fifteen of the 20 words were selected from the Australian-English Developmental Vocabulary Inventory – OZI (MARCS Auditory Laboratories, 2004) – which was adapted from Fensen et al. (1993) to ensure that many of the items would be known by typically developing Australian-English-speaking toddlers. In a preliminary evaluation of the T-POT, 40 typically developing Australian-English speaking toddlers, aged 30–36 months, were able to complete the test within approximately 5 minutes (Baker, Munro, McGregor, Docking, & Arciuli, 2010). Experimental evaluation of the T-POT with Australian-English-speaking toddlers is ongoing. Until normative data are available, SPs could use the T-POT informally to supplement a comprehensive assessment of toddlers' communication skills, specifically to provide insight into toddlers' abilities to produce polysyllabic real words with respect to syllable number, shape, and stress pattern accuracy. Readers can contact the first author to obtain a copy of the test and administration guidelines.

### **Suitable commercial single-word tests**

Commercially available assessment tools designed to assess children's productions of single words tend to focus on singleton consonant articulation in real words (Eisenberg & Hitchcock, 2010). These tests also tend not to include many polysyllabic words. For example, in a review of 23 published commercial picture naming tests designed to assess children's speech production skills, polysyllables comprised approximately 6% of all test words, with two tests containing no 3-, 4- or 5-syllable words (James, 2006). An exception to this trend is the Hodson Assessment of Phonological Patterns (HAPP): Multisyllabic Word Screening Test, by Hodson (2004) which samples 12 different polysyllabic real words (e.g., aluminium foil, refrigerator, stethoscope). However, this test is only suitable

for children 8 years and older. Comprehensive sampling of toddlers' productions of polysyllabic real-and nonwords using commercial tools would thus require SPs to consider alternatives to their mainstream picture-naming tests. One option could be the Toddler Phonology Test (TPT) developed by McIntosh and Dodd (2011). While the TPT was designed to assess toddlers' speech production skills using real words, it only samples two 3-syllable words and one 4-syllable word (McIntosh & Dodd, 2008). Another more comprehensive option is the Early Repetition Battery (ERB), developed by Seeff-Gabriel et al. (2008). The ERB is a UK standardised assessment tool designed to assess the expressive language of young children aged 2;0–6;0 years via repetition tasks. The ERB contains the PSRep (described earlier) in addition to a sentence imitation task (SIT) comprising 27 sentences controlled for syntactic complexity and length (ranging from three to nine words). See Chiat and Roy (2008) and Seeff-Gabriel, Chiat, and Roy (2010) for further information. Normative data for Australian-English-speaking toddlers are currently not available.

## Conclusion

Typically developing 2-year-olds are capable of producing polysyllables in both picture-naming and nonword repetition tasks. There is an emerging body of evidence identifying the clinical and research value of examining toddlers' productions of polysyllables, with respect to accurate differential diagnosis of language impairment in the early years and the prediction of later literacy difficulties. Research examining the relationship between toddlers' abilities to produce polysyllables and their later speech production skills is needed. Understandably, late talking or unintelligible toddlers referred to SPs have immediate issues that require attention, such as developing or expanding their lexicon, increasing their utterance length or expanding their singleton consonant inventory. However, given the current state of the research on children's productions of polysyllabic real-and nonwords, it may be diagnostically valuable for SPs to examine clinically referred toddlers' abilities to produce such words. How SPs might best do this remains to be determined. In this paper we have reviewed a range of experimental tasks and commercial assessment tools that are suitable for sampling toddlers' productions of polysyllables. Further research investigating the reliability, validity, and diagnostic value of some of these tools is required. While this work continues, it is important for SPs to remember that one single measure cannot be used to identify or exclude current or later risk of speech, language, or literacy difficulties (Seeff-Gabriel et al., 2010). The evidence to date suggests that assessment of toddlers' production of polysyllabic real-and nonwords would be best done in conjunction with other suitable measures of toddlers' speech, receptive, and expressive language skills.

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**Elise Baker, PhD, and Natalie Munro, PhD**, are co-directors of the Kids Talk Lab at The University of Sydney and have complementary clinical and research interests in paediatric communication disorders. Elise's interests focus on speech sound disorders (SSD) while Natalie's focus is on specific language impairment (SLI). Together, they are exploring the difficulties that underlie SSD and SLI in children.

*Correspondence to:*

**Elise Baker, PhD**

*Discipline of Speech Pathology*

*Faculty of Health Sciences*

*The University of Sydney*

*PO Box 170*

*Lidcombe 1825, Australia*

*phone: 61 2 9351 9121*

*email: elise.baker@sydney.edu.au*





# Sampling and analysis of children's spontaneous language

## From research to practice

Marleen Westerveld

**In clinical practice, most paediatric speech pathologists (SPs) deal with young clients with communication difficulties on a daily basis. Routine assessments generally include standardised tests of children's speech and/or language skills to determine the severity of the speech/language disorder, the eligibility for service, and the possible direction for intervention. Detailed assessment of children's language skills in more natural situations is used less frequently, however, as it may seem a relatively difficult and time-consuming task. This paper provides a brief overview of current empirical knowledge about spontaneous oral language sampling in preschool and school-aged children across a range of discourse genres, with particular emphasis on clinical applications in an Australian context. It urges practitioners to adopt language sample analysis on a routine basis to determine a child's baseline level of performance and to monitor the child's response to intervention in an ecologically valid way.**

Spontaneous oral language sampling and analysis (LSA) should be central to the paediatric SP's assessment process (see Miller, 1996). Without addressing a client's spontaneous communication ability, it will be difficult, if not impossible to (a) determine the impact of a child's language impairment on his or her ability to execute communicative tasks in everyday situations, (b) set relevant detailed goals for intervention, or (c) evaluate whether newly learned skills have generalised to everyday communication following intervention. Results from overseas studies into LSA practices of SPs revealed that although most SPs gathered some information about the child's spontaneous language skills, few SPs fully transcribed these samples for detailed in-depth analysis (e.g., Hux, Morris-Friehe, & Sanger, 1993). Possible reasons for this limited analysis include the lack of training in (computerised) analysis, lack of (standardised) local norms for comparison, and time constraints (Gillon & Schwarz, 1998).

In recent years, there have been a significant number of research studies into the spontaneous language skills of children with differing communication profiles, including

typically developing children (e.g., Nippold, Hesketh, Duthie, & Mansfield, 2005; Westerveld & Gillon, 2010b; Westerveld, Gillon, & Miller, 2004), children with traumatic brain injury (e.g., Thal, Reilly, Seibert, Jeffries, & Fenson, 2004), children with specific language impairment (e.g., Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; Heilmann, Miller, & Nockerts, 2010), children with reading disabilities (e.g., Westerveld & Gillon, 2010a), children with known chromosomal disorders such as Down syndrome (e.g., Kay-Raining Bird, Cleave, White, Pike, & Helmkey, 2008), and bilingual populations (e.g., Miller, Heilmann, & Nockerts, 2006). The prevailing message is that LSA can successfully differentiate between children with (spoken and/or written) communication difficulties and their typically developing peers (see also Dunn, Flax, Sliwinski, & Aram, 1996). However, a wide range of methods have been reported in the research literature to elicit spontaneous language. This makes it more difficult for the busy clinician to decide which elicitation context or condition to use as it is well known that the choice of context influences the length, the syntactic complexity, as well as the overall structure of the child's oral language sample. Finally, without norms of typical performance, it will be difficult to determine clinically if an individual client's spoken language skills are significantly impaired. The current tutorial addresses these issues by summarising the most recent research into LSA in relation to the following four areas:

1. Elicitation: guidelines for eliciting spontaneous language in preschool and school-aged clinical populations.
2. Analysis: an overview of the clinically most relevant measures of language performance.
3. Reference databases: using normative data of typical language performance.
4. Progress monitoring: using LSA to determine response to intervention.

### Eliciting spontaneous language samples: contexts and conditions

When eliciting a sample of a child's spontaneous language, the child's age and general speech-language ability need to be taken into consideration. When the child's mean length of utterance (MLU) is less than 3, typically below the age of 2;6 – 3;0 years, analysis of spontaneous language may focus on semantic relations, and real-time transcription of children's language productions may be sufficient. Once a child's MLU is greater than 3, analysis may concentrate on morphological and syntactic markers, and real-time transcription may become too difficult (see Klee, Mebrino, & May, 1991). Furthermore, the length of the sample is

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important. Recent research suggests that eliciting relatively short samples may be appropriate when analysed as part of a comprehensive assessment battery of spoken language skills, or when used as a progress monitoring tool (Heilmann, Nockerts, & Miller, 2010). However, samples containing at least 50 complete and intelligible utterances are recommended for detailed analysis of a child's language production skills (Heilmann, Nockerts, et al., 2010; Miller, 1996). Next, the SP will need to decide in which context/s to elicit the child's spontaneous language to ensure the child's language production skills are sufficiently challenged to reveal strengths and weaknesses across the domains of semantics, morphology, and syntax.

There are three main contexts for eliciting spontaneous language in children: conversation, narrative, and expository discourse. Conversation can be described as an 'unplanned' interactional exchange between two or more conversational partners. In contrast, narratives are accounts of experiences or events by just one speaker, and are temporally sequenced. Different narrative genres exist, including personal narratives and fictional narratives or stories. Expository discourse, like narrative language, requires planning at text level and can be described as a monologue providing factual descriptions or explanations of events. Within these broad elicitation contexts, spontaneous language samples can be elicited in different conditions (e.g., generation, retelling), utilising a variety of methods (e.g., with/without visual support such as pictures or video, a picture sequence or a single picture, with/without a model, naïve versus familiar listener). Although it goes beyond the scope of this paper to provide an extensive review, Box 1 presents an overview of the main elicitation contexts and conditions, including an approximate age range (see also Hughes, McGillivray, & Schmidek, 1997) and suggestions for further reading. The elicitation contexts in Box 1 are more or less in order of development/difficulty.

When choosing the context for LSA, several factors may influence the SP's decision. Although it is recommended to sample children's spontaneous language across different contexts (e.g., Price, Hendricks, & Cook, 2010), in clinical practice eliciting one formal language sample is better than

none. Depending on the purpose of the LSA (screen versus full linguistic analysis), the child's age and the main measures the SP is interested in (see Box 1), a sample can be elicited either in conversation, narration, or exposition. As can be seen in Box 1, narrative samples (story retelling in particular) generally yield less than the 50 utterances needed for full linguistic analysis. In those situations, collecting a second language sample in a different context is suggested. Another consideration is whether the SP wishes to compare the language sample to age- or grade-matched peers. Finally the methods used in eliciting spontaneous language can have significant effects on the child's language production (e.g., Masterson & Kamhi, 1991; Schneider & Dubé, 2005). This highlights the importance of closely adhering to the language sampling protocol used for collecting normative data when comparing a language sample collected in the clinic to these norms of typical performance.

## Transcription and analysis

Once a language sample has been elicited and transcribed, the most efficient way of analysing a language sample is to use a computer program. Examples of available programs are CLAN (available from <http://chldes.psy.cmu.edu/clan/>), developed by Brian MacWhinney, Computerized Profiling (CP; <http://www.computerizedprofiling.org/>), developed by Steven Long, and Systematic Analysis of Language Transcripts (SALT; <http://www.saltsoftware.com/>) by Jon Miller and Ann Nockerts. Although the first two programs are available for free, one of the SALT program's main features is its ability to readily compare a child's transcript to a reference database (i.e., a database containing transcripts from typically developing children). The importance of this aspect will be discussed in more detail in the next section. First, let's consider which language production measures are known to be sensitive to age and/or language ability.

## Morphology and syntax

Utterance length (MLU in morphemes or words) and clausal density are two known indicators of later language development (e.g., Nippold, 2007). Clausal density can be calculated by dividing the total number of clauses (independent

**Box 1. An overview of elicitation contexts and conditions in approximate order of difficulty**

Elicitation context	Conditions	Approximate minimal age in years	Main measures and expected length of sample	Examples of further reading
Conversation	Free play	3;0 (MLU > 3.0)	Semantics, syntax, morphology, pragmatics > 50 utterances	(Evans & Craig, 1992)
	Interview	4;6		
Narration	Personal narratives	3;6 (embedded in conversation)	Semantics, syntax, morphology, narrative quality > 50 utterances	(McCabe & Rollins, 1994)
		4;6 (using picture prompts)		(Westerveld et al., 2004)
	Fictional story retelling	4;4		(Westerveld & Gillon, 2010b) <a href="http://www.saltsoftware.com/training/elicitation/protocol/#">http://www.saltsoftware.com/training/elicitation/protocol/#</a>
	Fictional story generation	3;11	Semantics, syntax, morphology, narrative quality 20–96 utterances	(Schneider et al., 2009) <a href="http://www.rehabmed.ualberta.ca/spa/enni">http://www.rehabmed.ualberta.ca/spa/enni</a>
Expository	Expository generation – favourite game or sport task	6;0	Semantics, syntax, morphology, expository structure 4–140 utterances	(Nippold, Hesketh, et al., 2005; Westerveld & Moran, 2011) <a href="http://www.saltsoftware.com/training/elicitation/protocol/#">http://www.saltsoftware.com/training/elicitation/protocol/#</a>

and dependent) by the number of independent clauses. For example “I went to McDonalds **because it was my brother's birthday**” contains one independent clause (underlined) and one dependent clause (bold). MLU is sensitive to language ability (Scott & Windsor, 2000), with children with language disorder demonstrating lower MLU in narrative and expository discourse than their peers with typical language development. Grammatical accuracy can be assessed by considering the percentage of grammatically correct utterances (Fey et al., 2004) and may be particularly sensitive to language ability (Scott & Windsor, 2000).

### Verbal productivity

The length of the overall sample may be an important indicator of verbal productivity that changes with age (e.g., Nippold, Hesketh, et al., 2005). Another verbal productivity measure is rate (words per minute, WPM). Research into WPM in conversation, narrative, and expository contexts has shown sensitivity of this measure to age (Heilmann, Miller, & Nockerts, 2010) and language ability (Scott & Windsor, 2000).

### Semantic diversity

The number of different words (NDW) that are used in spoken discourse is a well-known indicator of lexical diversity that is sensitive to age as well as language ability (e.g., Fey et al., 2004). Unfortunately, NDW is sensitive to sample length (the longer the sample, the higher the NDW), which makes it less useful in contexts in which the transcripts are not cut after a certain number of utterances, such as story retellings or generations. A mathematical solution to this problem was put forward (see Richards & Malvern, 2004) and referred to as the *vocd lexical diversity measure*. This measure can be calculated with software included with CLAN, but it is beyond the scope of this tutorial to discuss this measure in more detail.

### Verbal fluency

Another measure of linguistic performance is mazing behaviour (i.e., filled pauses, repetitions, reformulations) (Loban, 1976). Mazing behaviour has been linked to sentence length and grammatical complexity in studies involving morpho-syntactic development in preschool children (Rispoli & Hadley, 2001). In other words, a child's mazing behaviour may increase as he or she tries to produce longer and/or more complex sentences. Moreover, excessive use of mazing behaviour may indicate linguistic vulnerability, especially when the cognitive demands of a task increase (MacLachlan & Chapman, 1988).

### Narrative quality

Narrative language samples can also be analysed at a more global level to determine the overall quality of the narrative. This is referred to as macrostructure analysis (see Hughes et al., 1997) and typically focuses on the structure of the narrative. For example, personal narratives can be analysed using high point analysis (McCabe & Rollins, 1994), which evaluates the narrative for inclusion of past tense events, a “high point” (‘the meaning the narrative had for the narrator’ [p. 50]), and a resolution. Fictional narratives can be analysed at macrostructure level by scoring the inclusion of story grammar elements (e.g., setting, characters, problem; see Stein & Glenn, 1979), the overall cohesion of the narrative or story, and the theme of the story. Several scoring systems have been devised, including the Narrative Scoring Scheme (Heilmann, Miller, Nockerts, & Dunaway, 2010), and the Oral Narrative Quality rubric (Westerveld & Gillon, 2010b).

Difficulties producing good quality oral narratives have been observed in children with language impairment (e.g., Fey et al., 2004; Miranda, McCabe, & Bliss, 1998) and in children with reading disability (e.g., Westerveld, Gillon, & Moran, 2008).

## Reference databases

To determine if a child functions significantly below his or her age level, language production measures derived through LSA should be compared to normative data. One potential obstacle to LSA in Australian children is the very limited availability of normative data based on Australian populations. Although it would be preferable to create databases containing spontaneous language samples of Australian children in a variety of contexts, this process is time consuming and expensive. Until such time, evidence from existing cross-cultural research examining spontaneous language produced by English-speaking children may provide some guidance as to whether Australian SPs can safely adopt overseas norms when analysing spontaneous language samples. At present, most readily available databases containing English language samples are from the US and New Zealand (Miller & Nockerts, 2010; <http://www.saltsoftware.com/salt/downloads/referencedatabases.cfm>) and Canada (Schneider, Dubé, & Hayward, 2009; <http://www.rehabmed.ualberta.ca/spa/enni>). All these databases are integrated into the SALT software, but norms for the Canadian samples can also be obtained from their website. In addition, the CHILDES database contains a wealth of transcripts from around the world (visit <http://childes.psy.cmu.edu/>).

### Cross-cultural comparisons of language performance

Westerveld and Claessen (2009) compared spoken language samples produced by 5- and 6-year-old children from New Zealand (NZ) and Western Australia (WA). Conversational ( $n = 24$ ) and story retelling transcripts ( $n = 39$ ) from WA children were compared to the samples of all 5;0 to 6;0 year-old NZ children contained in the SALT-NZ reference database ( $n = 67$  and  $n = 47$  respectively) (Miller, Gillon, & Westerveld, 2008). In the conversational context, exactly the same protocol was used, in which the child was first asked to talk about an object, before being asked to talk about his or her family, school, and after-school activities (see Westerveld et al., 2004). In the story retelling condition, children were asked to listen twice to a novel story (NZ: *Ana Gets Lost*; Swan, 1992; WA: *A Day at the Zoo*; Strang & Leitão, 1992), before being asked to retell the story into a tape recorder so that “other children can listen to *your* story next time”. The two model stories were comparable in length, semantic diversity, and grammatical complexity. Results indicated significant differences between the performance of the children in the two countries on a measure of grammatical accuracy (GA), with the NZ children performing better than the WA children both in conversation and in story retelling. In contrast there were no significant group differences on measures of story length, semantic diversity (NDW), or syntax (MLU). The authors hypothesised that several factors might have contributed to these differences in GA, including socioeconomic background and year of schooling of the participants. Further research is clearly needed to check these assumptions. In the meantime, clinicians should take caution when comparing the grammatical performance of Australian children against the NZ database.

A number of studies have compared spoken language samples from NZ children to samples produced by children from the US (Nippold, Moran, Mansfield, & Gillon, 2005; Westerveld et al., 2004; Westerveld & Heilmann, 2010). Westerveld et al. found differences in conversational samples between speakers from the two countries dependent on the age group. At age 5, the NZ children ( $n = 56$ ) spoke at a faster rate compared to their US peers ( $n = 60$ ). There were no differences on measures of MLU, GA, or

semantic diversity (NDW). At age 6, however, the NZ children ( $n = 93$ ) outperformed the US children ( $n = 53$ ) on measures of MLU and NDW. By age 7, these differences on MLU and NDW had disappeared and the only measure that differentiated the two groups was speaking rate. The authors postulated that the different schooling systems of the two countries might explain the group differences at age 6. In NZ, children typically start school around their fifth birthday, which might explain the generally stronger language production skills at the age of 6. In a more recent study, Westerveld and Heilmann (2010) compared story retelling samples of 6- and 7-year-old children from NZ and the US. Results showed that the only measure that differentiated the two groups was a verbal fluency measure (percent maze words), accounting for just over 5% of the variability, with the US children using more maze words than the NZ children. There were no differences on measures of MLU, total number of utterances, and narrative quality. Finally, Nippold, Moran, et al. (2005) found no statistically significant differences between older groups of speakers ( $n = 40$ ; aged 11 and 17) from the two different countries on measures of syntactic complexity (MLU and dependent clause use) derived in conversation and expository generation.

In summary, until further research is conducted in Australia, the results from existing cross-cultural research indicate that we may have some confidence when comparing a language sample from an Australian child to a database of language samples produced by NZ or US children. However, utmost care should be taken to adhere to the specific language sampling protocols. To illustrate, Westerveld and Heilmann (2010) found significant differences in children's ability to retell a story when provided with pictures (as opposed to no pictures) during the retelling component of the task. Children told longer stories, containing a higher number of different words and a lower percentage of maze words when provided with pictures during the retell. These results are consistent with numerous other studies investigating the effects of elicitation conditions on children's productive language (e.g., Schneider & Dubé, 2005).

### **Evaluating language performance in children from linguistically diverse backgrounds**

When evaluating the spontaneous language performance of children from linguistically diverse backgrounds, comparisons to a reference database containing samples from monolingual English speakers may not be appropriate. To help distinguish between a language difference and a language disorder, the SP may decide to use an alternative approach, such as Parent-Child Comparative Analysis (CPAA), in which the child's performance is compared to the parent's responses rather than the responses contained in the reference database (see Paul, 2007, for more information). For more information regarding personal narratives in children from culturally and linguistically diverse populations, the reader is advised to read Bliss and McCabe (2008).

### **Monitoring progress**

Consistent with best practice guidelines, results from LSA should be used to confirm standardised test results, and to provide detailed information about a child's performance in the areas of syntax, morphology, verbal productivity, and fluency. Based on this information, very detailed goals may be set for intervention, which not only incorporate specific language production features (syntax, semantics, narrative quality, etc.), but also include the communicative context. A child's response to intervention can then be measured by

collecting an additional language sample and comparing the child's performance to his or her previous one. Spontaneous language sampling thus provides an ecologically valid way of measuring progress following language intervention. In addition, language samples are more readily interpretable for teachers and can be used as part of school portfolios across listening and talking curriculum outcomes. For a detailed case study see Westerveld (2003), or contact the author for a copy.

In contrast, the use of standardised tests should be avoided to monitor progress. Although results from these tests may inform the clinician whether a child's performance still differs significantly from a normal population, they will not provide detail about the child's communicative performance in a more contextualised situation. Moreover, care should be taken when re-administering standardised tests, as learning effects may occur, which could inflate a child's performance.

### **Conclusion**

Although there are few norms available of typical spoken language development for Australian children, this should not preclude the use of routine LSA for assessment and progress monitoring practices for children with (suspected) spoken language impairment. As SPs we strive to improve our clients' communication skills in everyday situations. LSA is the most sensitive, ecologically valid way of determining a child's spoken language performance in communicative situations and for monitoring progress following intervention.

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**Marleen Westerveld** is a senior lecturer and researcher at Massey University in Auckland. She also works as a research fellow at the University of Canterbury, Christchurch, New Zealand. Her research focuses on investigating the relationship between spoken and written language development and disorders. Particular interests include spontaneous language sampling and oral narrative development. Marleen has been the co-editor of *ACQuiring Knowledge in Speech, Language and Hearing* since 2009.

Correspondence to:

**Marleen Westerveld, PhD**

Senior Lecturer

Speech and Language Therapy Programme

Massey University, Auckland, New Zealand

email: [m.westerveld@gmail.com](mailto:m.westerveld@gmail.com)

# Assessing speech and language in children with cerebral palsy

## A holistic approach

Cristina Mei, Angela T. Morgan, and Sheena Reilly

### KEYWORDS

ASSESSMENT

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Cristina Mei

**Assessing the communicative abilities of children with cerebral palsy (CP) can be challenging. In addition to the physical impairments, children can present with a range of co-morbid conditions (e.g., cognitive, hearing, and visual impairments) that impact on speech and language development. A holistic approach to assessment is necessary to identify and reduce functional communication impairments. An overview is provided of how the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY) framework can be used to guide the assessment of speech and language in children with CP. Issues that may arise during the assessment of each ICF-CY component are discussed.**

It is widely acknowledged that communication impairments (i.e., those affecting speech and/or language) are common in children with cerebral palsy (CP) (Achilles, 1955; Parkes, Hill, Platt, & Donnelly, 2010). Much of the research available concerning the speech and language abilities of children with CP has focused at the impairment level. In comparison, relatively few studies have investigated the functional communicative abilities of children with CP (e.g., how children are able to use speech and language within their natural environments).

The lack of available assessments measuring the functional impact of speech and language impairments (McLeod & Threats, 2008) may in part explain the paucity of research in this area. Given the dearth of assessments presently available, speech pathologists may turn to the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY; WHO, 2007) to classify speech and language deficits both at an impairment and at a functional level.

### The ICF-CY

The ICF-CY provides health professionals with a holistic view of a child. This is often not provided by commonly used speech and language assessments which are typically directed towards the impairment level. The ICF-CY is made

up of two parts: Part 1: Functioning and Disability consists of sections on Body Functions, Body Structures, and Activities and Participation; Part 2: Contextual Factors covers Environmental and Personal Factors. Each component is relevant to the field of speech pathology and to children with CP. Qualifiers are used at each level of the ICF-CY to classify the severity of the impairment or problem (i.e., no problem, mild, moderate, severe, or complete problem).

While the application and importance of the ICF in the field of speech pathology has been well highlighted (e.g., Howe, 2008; McLeod & Bleile, 2004; Raghavendra, Bornman, Granlund, & Bjorck-Akesson, 2007), a survey conducted by McLeod (2004) involving 199 speech pathologists found that over 80% of those surveyed based their diagnosis of a speech impairment at the Body Functions level, with less than 10% of participants considering the child's more functional abilities at an Activities and Participation level (McLeod & Threats, 2008). This reliance on the impairment level by speech pathologists is also noted by Thomas-Stonell, Oddson, Robertson, and Rosenbaum (2009) who found that parents were more likely to report Participation Restrictions and negative Personal Factors than speech pathologists.

The following section provides an overview of how the components of the ICF-CY can be applied to the clinical assessment of speech and language in children with CP, enabling a holistic approach to management.

## Components

### Body functions

Body Functions refers to the "physiological functions of body systems" (WHO, 2007, p. 45), and is largely considered to focus on the impairment level of speech and language function, which is traditionally used to identify speech and language deficits. The ICF-CY chapters *Voice and speech functions* (e.g., vocal quality and articulation) and *Mental functions* (e.g., comprehension and production of spoken, sign, and gestural language) are arguably most pertinent to speech pathologists for documenting the presence or absence of speech and language impairments, although other chapters should also be taken into consideration to document co-morbid conditions. Further relevant chapters include *Sensory functions and pain* (for hearing and vision impairments); *Functions of the cardiovascular, haematological, immunological and*

*respiratory systems* (to document deficits in respiration for speech); *Functions of the digestive, metabolic and endocrine systems* (for recording feeding/swallowing impairments and excessive drooling); and *Neuromusculoskeletal and movement related functions* (for classifying the physical abilities of children).

The following qualifiers are used to classify the severity of an impairment at the Body Functions level: 0: no impairment; 1: mild impairment; 2: moderate impairment; 3: severe impairment; and 4: complete impairment (WHO, 2007).

When determining the most appropriate speech and/or language assessment to administer to a child, speech pathologists must take into consideration the child's motor, cognitive, visual, hearing, and communicative abilities. Commonly used articulation assessments may be administered (where appropriate) with no motor modifications, although visual modifications (e.g., positioning test stimuli close to the child's face) may be necessary in some cases.

Formally assessing the language abilities of children with impaired upper limb function may prove to be more difficult considering the high reliance on fine motor movements (e.g., object manipulation, pointing) to indicate responses. Hustad, Gorton, and Lee (2010) reported that only 32% (11/34) of their sample involving children aged four years with varying types and severity of CP were able to complete a standardised comprehension assessment. Yet Love, Hagerman, and Taimi (1980) found that most children and adults (i.e., 78%, 47/60) aged 3 to 26 years, who varied in gross motor abilities, were able to complete the Peabody Picture Vocabulary Test (Dunn, 1965). Even if a child is capable of completing standardised assessments, establishing the reliability of a child's score may be complicated by difficulties in determining whether a child's inability to respond to a task represents a true receptive language deficit or reflects a child's inability to execute the physical component of the task (Hustad et al., 2010).

Unfortunately, commonly used language assessments are not specifically designed to be used with children with physical impairments. Modifications to assessment procedures are often necessary for children with severe speech and physical impairments. Results obtained using adapted procedures need to be interpreted with caution, however, as they may alter the psychometric properties of the assessment, reduce the child's motivation (Geytenbeek et al., 2010), and increase the cognitive load of the task (Pennington, 2008).

Recently, Geytenbeek et al. (2010) conducted a systematic review to determine the most appropriate comprehension test to use with children with CP who demonstrate severe dysarthria (defined as unintelligible speech) or anarthria (i.e., the absence of speech). The authors reviewed 12 standardised tests and found that no test was sufficiently suitable to use with this population. Of the tests reviewed, the Peabody Picture Vocabulary Test – Revised (Dunn & Dunn, 1981) was the most commonly used instrument and most feasible to administer to children over 9 years of age, although it may be used with younger children provided that modifications are made for those with reduced upper limb mobility. The authors concluded that there was a need for the development of an assessment measuring comprehension specifically designed for children with severe CP and dysarthria or anarthria (Geytenbeek et al., 2010).

## Body structures

The Body Structures component of the ICF-CY is closely related to the Body Functions level as it identifies structural deficits underlying the physiological impairments. Body Structures is defined as the "anatomical parts of the body such as organs, limbs, and their components" (WHO, 2007, p. 107). An example of this relating to children with CP includes large ranges of jaw movement and impaired velopharyngeal closure (Kent & Netsell, 1978). Chapters within this component relevant to children with CP include *Structures involved in voice and speech* (e.g., hard/soft palate, tongue, lips); *Structures of the nervous system* (e.g., basal ganglia, cerebellum); *The eye, ear and related structures* (e.g., middle/inner ear); *Structures of the cardiovascular, immunological and respiratory systems* (e.g., muscles of respiration); *Structures related to the digestive, metabolic and endocrine systems* (e.g., salivary glands, oesophagus); and *Structures related to movement* (e.g., muscles of the head and neck region, structure of the trunk).

The qualifiers used at the Body Functions level also apply to the Body Structures component to indicate the severity of the impairment. Two additional qualifiers may also be used at this level: one uses a 10-point scale to indicate the nature of the change in the body structure (e.g., no change in structure, partial absence, deviating position), while the remaining qualifier can be used to indicate the location of the impairment (e.g., right, left, or bilateral).

Considering that up to 90% of children with CP demonstrate oral motor impairments (Reilly, Skuse, & Poblete, 1996), assessment of the oral structures at rest and during movement is an important component of the clinical assessment of children. Children with sufficient cognitive abilities may be able to complete commonly used standardised oral motor assessments such as the Verbal Motor Production Assessment for Children (Hayden & Square, 1999). Formally assessing the oral motor abilities of children with severe intellectual disabilities may be difficult and speech pathologists may need to rely on informal observations of the child at rest and during feeding.

## Activities and participation

While Body Functions and Structures address the impairment level, the Activities and Participation component aims to identify possible limitations or restrictions in the child's ability to function. The ICF-CY defines Activities as the "execution of a task or action by an individual" (WHO, 2007, p. 9), while Participation relates to a child's "involvement in a life situation" (WHO, 2007, p. 9).

All of the Activity and Participation domains are important to consider for children with CP with a speech and/or language impairment. These include *Learning and applying knowledge* (e.g., thinking and problem-solving skills); *General tasks and demands* (e.g., performing single/multiple tasks, following routines); *Communication* (e.g., receiving and producing spoken and nonverbal messages); *Mobility* (e.g., gross and fine motor skills); *Self-care* (e.g., eating and drinking); *Domestic life* (e.g., maintaining assistive devices); *Interpersonal interactions and relationships* (e.g., interacting with family members and peers); *Major life areas* (e.g., engagement in play and school activities); and *Community, social and civic life* (e.g., engagement in community activities).

Due to poor consensus in differentiating between domains relating to Activities versus Participation (WHO,

2007), the ICF-CY presents items relating to both of these constructs in a single list. As a result, users may find it difficult to distinguish between Activities and Participation. The ICF-CY does, however, offer users four options for how to utilise the single list, e.g., treat Activities and Participation as distinct components, or as domains with partial or total overlap, or assign all domains as Activities and categories as Participation (see WHO, 2007, pp. 248–251 for further information).

O'Halloran and Larkins (2008) summarised various perspectives on how to differentiate between Activities and Participation. These include that Activities focuses at the level of the individual, is related to the impairment and can be assessed by clinicians. Participation focuses at the societal level, is related to quality of life, and is measured via the individual or a proxy.

In terms of measuring the extent of Activity Limitations and Participation Restrictions, two qualifiers are recommended: performance and capacity (WHO, 2007). The performance qualifier is defined as “what an individual does in his or her current environment” (WHO, 2007, p. 13), while capacity refers to an “individual's ability to execute a task or an action” (WHO, 2007, p. 13). These two qualifiers are important for speech pathologists to consider, as a child's level of functioning demonstrated during a clinical assessment may not be representative of their overall abilities.

In addition to the ambiguity surrounding domains relating to Activities versus Participation, assessment of a child's functional communicative abilities is further complicated by the lack of available tools addressing this area. A variety of assessments have been used to assess the Activities and Participation of children with CP (see McConachie, Colver, Forsyth, Jarvis, & Parkinson, 2006); however, these assessments contain very few items relating to communication and are not designed to specifically measure the Activities and Participation of children with a communication impairment. Thus, they do not provide a comprehensive assessment of a child's functional communicative abilities.

There is currently no standardised assessment tool designed specifically to measure the Activities and Participation of children with speech and/or language impairments, although the Participation Model (Beukelman & Mirenda, 2005) provides a useful framework for assessment in AAC. This is in stark contrast to the adult population where a number of standardised assessments have been developed (Eadie et al., 2006). The Focus on the Outcomes of Communication Under Six (FOCUS) (Thomas-Stonell, Oddson, Robertson, & Rosenbaum, 2010) is a promising tool addressing this issue. Although the tool is still under development, a recently published report demonstrates its high internal consistency and construct validity (Thomas-Stonell et al., 2010). In addition, there are functional communication classification systems currently being developed specifically for use with individuals with CP (Barty & Caynes, 2009; Hidecker et al., 2009).

The Speech Participation and Activity Assessment of Children (SPAA-C) (McLeod, 2004) and the AusTOMs (Perry & Skeat, 2004) are the only available measures concerning the Activities and Participation of children with speech and/or language impairments. The SPAA-C aims to elicit information regarding the functional impact of a child's speech impairment. This information can be obtained from a variety of viewpoints including directly from the child

or from the child's friends, siblings, parents or teachers, thereby enabling speech pathologists to determine a child's ability to participate across a variety of settings.

### **Contextual factors**

As stated by Morris, Kurinczuk, Fitzpatrick, and Rosenbaum (2006) the abilities of children with CP “only partially explain their Activities and Participation” (p. 954). Other factors that are not within the child's control also play an important role in enabling (facilitator) or hindering (barrier) a child's ability to participate and perform activities. The Contextual Factors component of the ICF-CY seeks to determine these factors and is divided into two parts: Environmental Factors and Personal Factors. These factors closely interact with all components of the ICF-CY (WHO, 2007). Environmental Factors refer to the “physical, social and attitudinal environment in which people live and conduct their lives” (i.e., external influences) (WHO, 2007, p. 189), while Personal Factors relate to the “particular background of an individual's life and living” (i.e., internal influences) (WHO, 2007, p. 15).

All five domains listed under Environmental Factors are important to consider when working with children with CP. These factors include *Products and technology* (e.g., augmentative and alternative communication (AAC) devices, Botulinum Toxin A); *Natural environment and human made changes to environment* (e.g., background noise, lighting, familiar environments); *Support and relationships* (e.g., support from family members, peers, teachers), which is considered one of the most important factors for children with a speech impairment (McLeod & Bleile, 2004); *Attitudes* (e.g., negative and positive attitudes of family members and society); and *Services, systems and policies* (e.g., access to speech pathology services, support groups) (see Howe, 2008, for a discussion on Contextual Factors relevant to speech pathology).

Due to the “large social and cultural variance” (WHO, 2007, p. 8), Personal Factors are not classified in the ICF-CY. Relevant Personal Factors include gender, age, temperament, race (WHO, 2007), as well as motivation, self-confidence, attention, and the child's learning style (McLeod & Bleile, 2004).

A thorough case history and observation of a child within their natural environments can assist in identifying positive and negative Environmental and Personal Factors that facilitate or hinder communication. Knowledge of these factors can lead to the development of therapy goals that maximise opportunities for communication and reduce environmental barriers.

Although limited research has been conducted to determine specific Contextual Factors that facilitate or hinder communication in children with CP, some potential barriers/facilitators that speech pathologists may consider during assessment and treatment have been highlighted in the literature. Identified barriers of communication and social functioning in children with CP aged 9 to 16 years include externalising behaviours (e.g., aggression, delinquency), having no siblings, low parental level of education, and parental stress (Voorman, Dallmeijer, Van Eck, Schuengel, & Becher, 2010). In contrast, Voorman et al. (2010) found that having two or more siblings acted as a facilitator to communication.

In regard to children with CP who use AAC, qualitative research has highlighted specific communication barriers and facilitators. Goldbart and Marshall (2004) and Marshall



and Goldbart (2008) explored the experiences of parents who have a child that uses or needs AAC. Both studies involved individual semi-structured interviews of 11 parents or carers of children aged 3 to 10 years (9 children were diagnosed with CP). Several facilitators were identified, including positive attitudes of others (Goldbart & Marshall, 2004), personality of the child (e.g., persistence in repairing communication breakdowns) (Marshall & Goldbart, 2008) and communicating with familiar adults (Marshall & Goldbart, 2008). Reported barriers included personality of the child (e.g., easily frustrated) (Goldbart & Marshall, 2004; Marshall & Goldbart, 2008), communicating with unfamiliar adults (Marshall & Goldbart, 2008), and insufficient professional training of service providers (Goldbart & Marshall, 2004).

A lack of professional training was also identified by McNaughton, Rackensperger, Benedek-Wood, Krezman, Williams, and Light (2008) as a barrier to using AAC devices. McNaughton and colleagues conducted an on-line focus group involving seven parents with a child or adult with CP who had used an AAC device. In addition to inadequate training, parents also reported that communication was hindered by difficulties in obtaining services and funding, and by the negative attitudes of others (McNaughton et al., 2008).

## Summary

The ICF-CY provides a useful framework for speech pathologists to consider when assessing the speech and language abilities of children with CP. Assessment should involve consideration of all components of the ICF-CY to determine deficits at both an impairment and functional level in order to establish functional therapy goals. Commonly used impairment-based assessments may be administered to children where appropriate. Formally assessing the functional communicative abilities of children with CP remains difficult given the lack of standardised assessments available (although clinicians may use measures such as the SPAA-C [McLeod, 2004] or AusTOMs [Perry & Skeat, 2004]). Future research is required to develop tools that measure the communicative abilities of children with CP at both an impairment and functional level to provide a more holistic approach to the management of children with CP.

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**Cristina Mei** is completing her PhD at the Murdoch Childrens Research Institute through the University of Melbourne. **Angela Morgan**, PhD, is a senior research fellow at the Murdoch Childrens Research Institute and a senior speech pathologist at the Royal Children's Hospital. She is also an adjunct lecturer at the University of Melbourne. **Sheena Reilly**, PhD, is a professor and director of speech pathology at the Royal Children's Hospital, and professor of paediatric speech pathology, Department of Paediatrics, University of Melbourne. She is also the director of the Healthy Development Theme at the Murdoch Childrens Research Institute.

*Correspondence to:*

**Cristina Mei, PhD scholar**

Murdoch Childrens Research Institute

50 Flemington Road, Parkville 3052

Melbourne, Australia

phone: (03) 9345 5521

email: [cristina.mei@mcri.edu.au](mailto:cristina.mei@mcri.edu.au)



# Clinical assessment of progressive aphasia

Lyndsey Nickels, Cathleen Taylor, and Karen Croot

**There is an increasing awareness that language impairments can be the most prominent initial symptom of people with a number of neurodegenerative disorders. Consequently, speech pathologists are increasingly required to apply their skills to the communication needs of this group. While the literature addressing the nature and treatment of the language impairments of individuals with progressive aphasia is growing, little guidance is available regarding assessment. In this paper we review the assessment requirements of this population, arguing that assessment needs to a) identify the current status of the person's language impairment and the impact it has on their communication activities, participation, and quality of life to enable goal-planning for treatment, and b) establish the nature, extent, and rate of change in language skills over time. We argue that, while many factors influencing choice of assessment are similar to those for people with non-progressive aphasia, important factors that are particular to people with progressive aphasia need to be considered.**

In the past, the primary role for speech pathologists in the area of acquired neurogenic language impairments was restricted to the assessment and treatment of language impairments resulting from stroke, traumatic brain injury and, less often, from tumour, infection, and surgery. Occasionally the speech pathologist might have been called on to perform a differential diagnosis between aphasia and dementia, or to facilitate communication in people with dementia using techniques such as reality orientation or reminiscence therapy (e.g., Baines, Saxby, & Ehlert, 1987; Spector, Davies, Woods, & Orrell, 2000). However, more recently there has been a realisation that deterioration in language processing can be the most prominent initial symptom in a number of neurodegenerative diseases. The resulting syndrome is *primary progressive aphasia*,

which typically occurs in one of three behaviourally defined variants (Gorno-Tempini et al., 2011): *semantic dementia* (Snowden, Goulding, & Neary, 1989), *nonfluent progressive aphasia* (Gorno-Tempini et al., 2004), and *logopenic progressive aphasia* (Gorno-Tempini et al., 2004, 2008; Mesulam et al., 2009). Over the last 30 years or so, a wide range of other syndrome labels have also been applied to individuals with progressive language impairments, including pure progressive anomia, primary progressive conduction aphasia, primary progressive apraxia of speech, and language- or temporal-variant frontotemporal dementia (see Croot, 2009, for more details). Many people with these syndromes are found on post-mortem investigation to have frontotemporal lobar degeneration neuropathology, but others have Alzheimer disease pathology (Gorno-Tempini et al., 2011).

There is currently a growing recognition of, and evidence for, the role of the speech pathologist in the treatment of individuals with communication disorders associated with dementia (e.g., Royal College of Speech and Language Therapists (RCSLT), 2005a, 2005b). In the Australian context, Taylor, Miles-Kingma, Croot, and Nickels (2009) surveyed speech pathology service provision for people with primary progressive aphasia in New South Wales. The survey gave a clear picture that speech pathologists viewed progressive aphasia as an emerging field of practice and revealed that when clients were referred, all centres provided assessment services. However, the survey responses also indicated that speech pathologists lacked confidence in the appropriate service provision for this population. While literature is emerging on treatment for progressive language impairments (e.g., Croot, Taylor, & Nickels, 2011; Nickels & Croot, 2009), little guidance is available for the speech pathologist regarding assessment of progressive language impairments. This article aims to address this issue.

As McNeil and Duffy (2001, p. 475) note, the speech and language symptoms in people with progressive language impairments "can be strikingly similar to those of people with stroke-induced aphasia". They argue that decisions about treatment in progressive language impairments can thus be based on the same philosophical, clinical, theoretical and practical considerations that apply in stroke-related aphasia. Thus, the approach to assessment of progressive language impairments should also be similar to the assessment of non-progressive language impairment. However, because of the different long-term prognosis

## KEYWORDS

ASSESSMENT

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APHASIA

PROGRESSIVE  
APHASIA

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DEMENCIA

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Lyndsey Nickels (top), Cathleen Taylor (centre), and Karen Croot

(decline rather than stability or improvement), there are additional considerations in the assessment of progressive language impairments that we will discuss below.

Nickels (2005) suggested that in the context of non-progressive aphasia, assessment should allow the speech pathologist to develop a hypothesis about areas of strength and weakness in functioning. Furthermore, assessment should identify factors that are barriers to and facilitators of successful communication, and the impact of these factors on quality of life, to enable appropriate goal-setting for therapy in collaboration with the client and significant communication partners (see also, for example, Byng, Kay, Edmundson, & Scott, 1990; Howard & Hatfield, 1987), and to track change over time, which includes evaluating the outcome of the therapy process. We suggest the same is true for progressive language disorders. This article will therefore outline principles of assessment of clients with primary progressive aphasia (which will be referred to as progressive aphasia for the remainder of this paper). The two primary aims of assessment that we will discuss are:

1. to identify the current status of the person's language impairment, and the impact on communication activities, participation, and quality of life to enable goal planning for treatment, and
2. to establish the nature, extent, and rate of change in language skills over time.

We will conclude with discussion of some further considerations for assessment that are encountered in this population.

## Assessment aims

### *To identify the current status*

When working with an individual with progressive aphasia (as with every individual with language impairment), the speech pathologist aims to optimise the person's current communication. In other words, given a certain language impairment with a particular impact on that individual's life participation and quality of life, the speech pathologist may ask: what can be done to lessen the impact of impairment, facilitate participation, and improve quality of life? When considered in light of the client's own goals, assessment allows the speech pathologist to determine the best course of action.

Traditionally the first step in assessment would have been to use a standard aphasia battery, such as the *Western Aphasia Battery – Revised* (WAB-R; Kertesz, 2006) or the *Boston Diagnostic Aphasia Assessment* (BDAE; Goodglass, Kaplan & Barresi, 2001). These batteries will give a broad overview of how well the individual is performing across a range of language tasks such as picture naming, understanding spoken words, repeating words, reading, writing, and so on. However, some clinicians and researchers now believe this is not the most efficient way of learning what is wrong and deciding how best to treat the problem. For example, Byng et al. (1990) question whether “the clinician's time is well spent in carrying out any of these assessments if they neither clarify what is wrong nor specify what treatment should be provided” (p. 67). Instead they argue for a more targeted approach to assessment driven by (a) hypotheses that are generated based on observation, and (b) joint discussion/decision-making with the individual with aphasia and their primary communication partners (e.g., Byng et al., 1990; Nickels, 2005, 2008). This hypothesis-driven assessment allows the

speech pathologist to prioritise the order in which skills and processes are assessed.

For example, the clinician may suspect a problem in semantic processing, on the basis of difficulties in understanding conversation and/or with word finding in conversation. However, whether further investigation of this hypothesised impairment (and its functional consequences) initially focuses on spoken production, written production, or written comprehension (for example) will depend on the relative priority of the skill as perceived by the individual with progressive aphasia and their communication partners. For an individual for whom reading and understanding the newspaper each day is a high priority, investigation may emphasise written comprehension. In contrast, for the individual who feels the ability to exchange social greetings with neighbours is critical to their quality of life, initial assessment may focus on spoken language.

Which assessments can be used to test our clinical hypotheses? Appropriate measures could include selected subtests of standardised batteries, specialised assessments such as subtests of the *Psycholinguistic Assessments of Language Processing in Aphasia* (PALPA; Kay, Lesser, & Coltheart, 1992), and informal assessments devised for that individual. Whitworth, Webster, and Howard (2005) present a clear, clinically oriented guide to which assessments are best suited to assess particular aspects of the language processing system. Importantly, the choice of assessment should be influenced by the fact that it will be required both to determine the current status of the language system, and also to track change over time, including change which is the result of treatment.

A comprehensive assessment should not only focus on targeted, hypothesis-driven testing at the level of the impairment. It is also vital to understand the impact of that impairment on functional language (i.e., to address the level of activity/participation), personal relationships, and psycho-social well-being. Here too, we agree with clinical researchers who propose that hypothesis-driven assessment is preferable (e.g., Sacchetti & Marshall, 1992). Moreover, Worrall (1992, 2000; Worrall, McCooey, Davidson, Larkins, & Hickson, 2002) suggests that it is naïve to expect that a single assessment will be appropriate to assess all individuals with aphasia from all cultures, all impairments, and all settings, and consequently clinicians should not rely on a single assessment of functional communication. In an attempt to address this problem, the *Everyday Communication Needs Assessment* (Worrall, 1992) and the *Functional Communication Therapy Planner* (Worrall, 1999) include an interview to evaluate an individual's communicative needs, a questionnaire to assess social support, and observations and ratings of interactions in the individual's natural environment. This assessment goes some way towards the goal of functional communication assessment that reflects what really happens (in the aphasic and non-aphasic population), what is really important (to the individual with aphasia and their communication partners), and what can be acted upon for rehabilitation. It is therefore highly suitable for use with clients with progressive aphasia. More recently, it has been suggested that assessment beyond the impairment level should focus on detailed ethnographic interviews with the person with aphasia and their communication partners (e.g., Simmons-Mackie & Damico, 2001; Worrall, 2006; Worrall et al., 2011). Such interviews are vital not only to

allow for in-depth discussion of concerns, priorities, and goals, but also to gain an understanding of the nature of the functional impact of language impairments (e.g., not just that there is a problem with using the telephone, but just how this problem manifests itself). As Simmons-Mackie and Damico (2001) point out, clinicians routinely do obtain information from clients and families regarding activities, social relationships, and feelings. However, critically, this information is rarely documented systematically, rendering it a far less potent source of information.

In sum, we advocate hypothesis-driven assessment and systematically documented in-depth interviews as the most efficient way of identifying the current status of language impairment and function and of enabling truly collaborative treatment planning for people with progressive aphasia.

### *To investigate change over time*

Unfortunately, it is central to the nature of the disorder that people with progressive language impairments will show a decline in their language functions over time. An important role for the speech pathologist is therefore to track this decline in order that the rate and nature of change can be used to plan for future communication strategies and adjust the focus of treatment. For example, if one skill (e.g., writing) is declining at a more rapid rate than another (e.g., spoken output), a communication strategy that relies on a rapidly declining skill would seem to be ill advised, but an impairment-directed treatment aimed at maintaining this skill may be important (depending on the personal priorities of the individual). The speech pathologist might also provide education about the need for strategies that proactively address the potential consequences of further decline in that ability (e.g., how will the client handle future management of personal, health, legal, and financial matters which currently rely on writing?). In addition, as with any client group, it is vital to evaluate the nature of the change brought about through treatment.

### **Choosing assessments for tracking change**

In order that assessments can accurately document change (both spontaneous change and change brought about through treatment), they must be reliable (i.e., if there is no change they will show the same level of performance on retest) and sensitive (i.e., if there is change this will be reflected in the scores) (Howard & Hatfield, 1987). Both of these criteria require a relatively large sample of behaviour (e.g., many items to name aloud, many observations of attempted conversational repair; multiple ratings of similar communicative behaviours – ordering a pizza, ordering a taxi, ordering a curry). The adequacy of the sample is another factor to consider when evaluating the suitability of a general language battery for use in assessment of progressive aphasia. While over the battery as a whole there are usually large numbers of stimuli, within each subtest the numbers of items are generally (and necessarily) small. Thus change in a specific skill as a result of a greater rate of decline, or as a result of improvement, if therapy has been targeted at that area, may neither be represented in the overall score nor be significant on its own because of the small number of stimuli. Hence, our recommendation would be, wherever possible, to use specialised assessments that are aimed at each level of processing of interest and that contain enough stimuli to enable sensitivity and reliability in the measurement of change as and when it occurs.

In addition, there are some common pitfalls that need to be avoided when measuring change over time. Of course, one can only truly evaluate whether a change has occurred if one measures performance on the same test, because of differences in test difficulty. Hence, at each assessment the same test (and the same items within a test) should be used to measure, for example, semantics, naming, repetition, reading. Moreover, should different items be completed on each occasion (e.g., a smaller number of items tested on the second assessment than the first), then the true extent of change can only be evaluated through comparing performance on those items that were assessed on *both* testing occasions. It is therefore important to choose, wherever possible, assessment tasks that are sensitive to a range of severities. Alternatively, if it is not possible to use the same test and the same items on each occasion, at least one testing session should use both a harder and an easier test, prior to no longer using the harder test. One final point to note is that some relatively easy tests (e.g., PALPA word-picture matching, subtest 47) may appear to give a picture of no change in performance when an individual is scoring close to ceiling (i.e., close to the maximum possible on the test). However, despite the lack of change in the score, a decline in the underlying skill may have occurred (e.g., semantic processing in PALPA 47). This is because on some assessments, even if language skills are impaired, it is still possible to score perfectly.

It is important to also consider issues of reliability and sensitivity in relation to assessment beyond the impairment level. For example, it is only when sufficient detail has been documented regarding the nature of participation and communicative activities undertaken, that change can accurately be tracked in that participation. To return to our example of using the telephone: that an individual has difficulty in using the telephone may be too general a measure to be able to detect any change. However, if more detailed questioning had provided greater detail as to the extent and nature of the difficulty, then it may have been possible to determine whether there had indeed been a change over time in the degree of difficulty in telephone use. Incorporating client ratings into the extent of difficulty or depth of feelings can also add sensitivity.

### **Tracking change as a result of treatment**

In the treatment of non-progressive aphasia, it is important that any assessment of treatment outcomes must show (a) whether the ability being treated is changing over the course of treatment, and (b) whether the change is actually due to the treatment as opposed to some other factor that happens to influence the outcome (Nickels, 2002; Wilson, 1987). While these are clearly also relevant to treatment of progressive aphasia, the situation is complicated because of the expectation of decline without treatment. Although improvement above the level seen at initial assessment is one possible outcome if therapy is effective, it is not the only one. One might also see an outcome of no change (i.e., the client maintains his or her current level of ability), or a slowing of deterioration that allows the individual to continue in desired activities for a longer period of time than would have been possible without the intervention (Rapp & Glucroft, 2009). To know whether a treatment is effective, the ability being treated must also be compared with a “control” condition (perhaps items of similar difficulty that are not being treated, or another ability that is not expected

to benefit from treatment) and the critical comparison is whether the decline on the treated items/ability is slower than the decline in untreated “control” items/ability.

As well, as with all people with language impairments, the person’s scores on language tests can vary from session to session for a variety of reasons (e.g., the person’s health, motivation or feelings, other life events, the therapist’s encouragement, the particular items being tested that day and many more), so it is necessary to take “baseline” measures over a number of sessions before therapy, and to again measure that ability on repeated sessions after a phase of therapy, rather than relying on a single “before” or “after” score. An alternative way to establish whether a treatment effect is reliable over time is to “probe” the treated and control ability/items regularly over the period of treatment to see whether the pattern of scores over time is better for the treated ability/items. Further information and discussion about designing treatment protocols that can demonstrate therapy effects can be obtained from, for example, Howard, Best, and Nickels (2011), Nickels (2002), Perdices and Tate (2009), and Wilson (1987).

## Further considerations

### *Assessment comprehensiveness*

Another contrast in comparing the assessment of non-progressive and progressive aphasia is in the comprehensiveness of assessment. In non-progressive aphasia, it is usually inappropriate to attempt a comprehensive assessment of language processing because of its large scope and complexity (Nickels, 2005). Instead, assessment should be restricted to those areas required in order to establish current level of functioning in relationship to priorities for treatment. However, for progressive aphasia, the need to plan for the future necessitates a more comprehensive approach. Hence, it is insufficient to focus on the impairments that are the current barriers to communication, because in order to identify current strengths and track how well they are maintained, a complete and comprehensive assessment of every aspect of language processing is required. The fact that the neurological damage in progressive aphasia spreads from one region to another also suggests a need for comprehensive assessment, possibly including impairments of wider aspects of cognition.

The Progressive Aphasia Severity Scale (PASS; Sapolsky et al, 2010) aims to provide a clinically grounded rating scale that grades the severity of impairment within the domains of language that are typically affected in progressive aphasia, namely syntax and grammar, fluency, word retrieval, repetition, articulation, single word comprehension, reading, writing, and functional communication. The PASS allows the speech pathologist to rate the severity of impairment of each speech and language domain from performance on tests or spontaneous speech samples. While still under development, the current version may be downloaded from <http://www.nmr.mgh.harvard.edu/~bradd/PASS.html>. While clearly a useful tool to provide a comprehensive overview of language impairments, PASS should not be seen as a substitute for more detailed testing. With only 10 rated factors and a scale ranging from 0–3, clearly only relatively large changes in performance will be captured by this scale. Similarly, the scale cannot, nor is designed to, capture

subtle differences in the nature (rather than the severity) of the impairment within each of the domains.

### *Assessment frequency and priorities*

Obvious questions at this point are: how often should one reassess and what are the priorities for reassessment? Unfortunately, these questions do not have easy answers! The rate of progression of the aphasia and the areas in which progression is observed will vary across individuals. If treatment is being offered, then it is likely that contact with the individual will be regular. But if not, it may be most fruitful to be flexible and suggest that the person with progressive aphasia and/or their family request review appointments when they observe a change. Similarly, the decision on which areas of language are a priority for reassessment should be informed by discussion with the person with progressive aphasia and their communicative partners. Nevertheless, given the importance of comprehension and word retrieval at a functional level, and the prevalence of impairments to these processes, we would recommend regular assessment on tests of semantics (e.g., using PALPA subtest 47, word-picture matching; PALPA synonym judgements, or the *Peabody Picture Vocabulary Test*; Dunn & Dunn, 2006) and word retrieval (e.g., using the *Boston Naming Test*; Kaplan, Goodglass, & Weintraub, 1983). In addition, regular samples of spontaneous speech and writing often provide a sensitive measure of change. It is important, however, that the same topic is sampled on each occasion (e.g., recalling a particular event – a wedding, particular holiday, describing a previous occupation, or even telling the story of Cinderella). This sample will allow tracking over time of fluency, syntax, and word retrieval in spontaneous speech. More formal measures of sentence comprehension and production may also be useful. The Northwestern Anagram Test (Weintraub et al., 2009) has been developed to assess syntax in patients who may also present with speech production, word comprehension, and/or word finding difficulties, and reduced working memory capacity. Mesulam et al. (2009) argue that the Northwestern Anagram Test, together with the Peabody Picture Vocabulary test, may be useful in subtyping progressive aphasia, although reliable subtyping and mapping of these subtypes onto the underlying pathology are still in their infancy and the relevant subtypes are hotly debated (see Croot, 2009).

Finally, at each (re)assessment, time must be taken to discuss once again the issues that were raised in the initial in-depth interview, probing the extent of any changes and identifying any new issues. Critically, detailed documentation of each interview and comparison across interviews must take place. As Simmons-Mackie and Damico (2001) note, clinicians routinely obtain this information, but fail to foreground it and use it to its full potential.

## Summary and conclusion

We have argued that the approach to assessment of progressive language impairments should be similar to the assessment of non-progressive language impairment. Specifically, the aims of assessment are to:

1. identify the current status of the language impairment, and to understand the person’s involvement and success in communication activities, and the impact of progressive aphasia on participation and quality of life in order to enable goal-planning for treatment, and

2. establish the nature, extent, and rate of change in language skills over time.

The choice of assessments to use in progressive aphasia is driven by many of the same considerations as in non-progressive aphasia: assessments need to be sensitive to change and reliable enough that differences in performance will reflect real underlying changes in functioning. However, we also noted that there are additional considerations in the assessment of progressive aphasia. The first assessment may need to be more comprehensive than for non-progressive, post-stroke aphasia, in order to facilitate tracking of change and plan for the future. In addition, when interpreting the results of treatment, a successful outcome may not be restricted to improvement in treated stimuli or skills, but instead may be reflected in stability or slowed decline. Hence, assessment of the effects of treatment must include design factors to enable detection of such outcomes.

In sum, appropriate assessment of progressive aphasia is vital. It is only through this assessment that we can identify with confidence the person's current strengths and weaknesses in language function. Identification of these patterns will enable the individual with progressive aphasia to make informed choices for the future, and with careful tracking of changes in language function over time, enable revision of these choices and strategies as required to facilitate optimal outcomes. Finally, the importance of regular in-depth interviews with the person with progressive aphasia and their communication partners cannot be overemphasised. Only by taking the time to listen can we ensure truly collaborative goal-setting and tracking of change across all facets of life that are affected by progressive aphasia.

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**Professor Lyndsey Nickels** is a research speech pathologist, currently an NHMRC senior research fellow and professor at Macquarie University. She has a long history of research into the nature of the impairments in acquired language disorders and their treatment. **Cathleen Taylor** is Australia's leading speech pathologist clinician and researcher in the area of progressive aphasia. She has established a specialist service for this client group at War Memorial Hospital Waverley and recently chaired the 2010 Australian Aphasia Association Biennial National Conference, where for the first time she introduced a session devoted to the unique needs of people with progressive aphasia. **Dr Karen Croot** is a lecturer in psychology at the University of Sydney with teaching and research interests in speech and language production. She has been researching progressive aphasia for over 15 years, and recently co-edited with Lyndsey Nickels the first book on intervention and management in progressive aphasia.

Correspondence to:

**Professor Lyndsey Nickels**

ARC Centre of Excellence for the Study of Cognition and its Disorders

Macquarie Centre for Cognitive Science

Macquarie University, Sydney NSW 2109

phone: +61 (0)2 9850 8448

email: lyndsey.nickels@mq.edu.au





# Subtypes of developmental reading disorders

## Recent developments and directions for treatment

Kristy Jones, Anne Castles, and Saskia Kohnen

**This paper presents an overview of several subtypes of developmental reading disorders including phonological dyslexia, surface dyslexia, hyperlexia, poor comprehenders, and the less-recognised subtypes of letter-position dyslexia and attentional dyslexia. Although clinicians may be familiar with the symptoms of phonological and surface dyslexia, the symptoms of the other reading disorders noted may be less familiar and therefore methods of assessment and directions for treatment may be unclear. Each subtype is described and accounted for in the context of the dual route theory of reading. Current research on remediation strategies is also surveyed, providing a basis for developing treatment programs for both pure and complex developmental reading disorders.**

Although most clinicians are familiar with terms such as “specific reading disorder” or “dyslexia”, the different kinds, or *subtypes*, of developmental reading disorders that can affect children may not be as widely known. This is particularly true for some of the subtypes that have only recently become the focus of research attention. In this article, we outline the symptoms that characterise six specific subtypes of reading disorders and provide suggestions for diagnosis and treatment, based on theoretically driven research.

It is unusual for a child to suffer from just one subtype of reading disorder. Although *pure* cases do exist (e.g., Broom & Doctor 1995a; Castles & Coltheart, 1996; Friedmann, Kerbel, & Shvimer, in press; Friedmann & Rahamim, 2007; Rowse & Wilshire, 2007), in most cases children with a developmental reading disorder will show symptoms associated with more than one subtype (e.g., Brunson, Hannan, Coltheart, & Nickels, 2002a). It should also be acknowledged that although some of the subtypes we discuss, e.g., phonological and surface dyslexia, are well-known and have been thoroughly researched in terms of causal links and treatment, other subtypes, e.g., letter-position dyslexia and attentional dyslexia, are still relatively new, with research being in its infancy. Appropriate caution should therefore be exercised in relation to decisions about assessment and treatment in the latter instances. Finally,

it should be emphasised that we see these subtypes, not as distinct subgroups that are qualitatively different from normal readers, but as subgroups at the extreme ends of a continuum of performance on a particular subskill.

Before we describe the different subtypes of reading disorders, we will outline the set of processing abilities children need to acquire, to become proficient readers. In order to conceptualise the complex cognitive processes involved in reading, we rely on dual route theory (e.g., Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001; Friedmann et al., in press; Jackson & Coltheart, 2001; see Figure 1). Although there are other models of the reading process (e.g., Plaut, McClelland, Seidenberg, & Patterson, 1996), the modular nature of the dual route model makes it particularly suitable for identifying and accounting for different types of reading disorders: it is possible to easily and clearly identify the different processes that need to be acquired for skilled reading and to develop specific tests to assess the functioning of those processes. Such assessment aids clinicians in developing a focused treatment approach.

According to the dual route theory, various processing steps take place from first seeing a written word to subsequently reading it aloud and/or comprehending its meaning. As illustrated in Figure 1, the initial set of processes is summarised as *visual orthographic analysis*. There are three functions within visual orthographic analysis. First, letter identification takes place. This involves recognising what is seen as a series of letters, not numbers or symbols. Second, letter position within a word is encoded (so that words like *sliver* and *silver* can be distinguished from each other). Last, when more than a single word is being read, letter-word binding occurs, such that the letters of each word are correctly associated with the word they appear in, and not another one (Friedmann et al., in press). For example, in order to read the two words *tall walk* correctly, the letters T A L L need to be associated with the first word and the letters W A L K with the second word. If the association process goes wrong, a reading error such as *wall talk* may occur.

The word is then further processed via two different routes. The type of word that is read predicts which route will be successful in producing the correct response. Regular words (e.g., *cat*, *hut*, *pet*) and words (or nonwords) that a child has never come across before can be sounded out phonetically via the letter-sound-correspondences, along the so-called *nonlexical* route (Coltheart et al., 2001). However, for irregular words (e.g., *friend*, *yacht*),

### KEYWORDS

DUAL ROUTE MODEL

DYSLEXIA

READING DISORDERS

TREATMENT

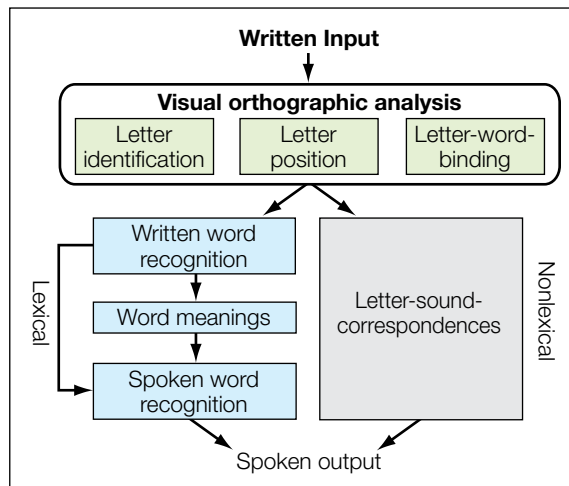
THIS ARTICLE HAS BEEN PEER-REVIEWED



Kristy Jones (top), Anne Castles (centre), and Saskia Kohnen

which cannot be sounded out phonetically, written word recognition of individual whole words needs to occur before access to word meanings and spoken word production can take place. This occurs as part of the whole word procedure or *lexical* route (Coltheart et al., 2001).

In the various subtypes of reading disorders we describe below, one or more of these different processing steps is lacking or not working to a sufficient level. We will begin by describing some of the better known subtypes before moving on to subtypes that may be less familiar.



**Figure 1. The dual route model**

Source: based on Friedmann et al., in press

## Phonological dyslexia

Children with phonological dyslexia show difficulties reading nonwords and unfamiliar words. When sounding out, incorrect letter-sound-correspondences are used (e.g., *uh* for the letter *A*), producing an incorrect word (e.g., reading *cat* as *cut*). Often, nonwords are misread as similar looking words (e.g., reading *drick* as *drink*). In addition, with this subtype there can be a tendency to leave off or replace the ending of a word. The consequence of this is sometimes a morphological error, meaning the suffix of the word is said incorrectly (e.g., *needed* read as *need*).

In relation to dual route theory, reading along the nonlexical route is proposed to be impaired in children with insufficient knowledge of letter-sound correspondences. However, processing along the lexical route is functioning well (Broom & Doctor, 1995a), which explains why a reader with pure phonological dyslexia is typically able to read sight-words to a normal or high level.

To identify phonological dyslexia it is best to test nonword reading because, in order to read a nonword correctly, the nonlexical route must be used. When assessing reading ability using a test that consists of real words only, the reading performance of children with phonological dyslexia may be overestimated. Children with phonological dyslexia will often also perform poorly on phonological awareness tasks such as rhyme judgement, phoneme deletion (e.g., say *tiger* without the /t/ sound), blending (e.g., r-u-n becomes *run*) and sound categorisation (e.g., three words are read aloud and the child is asked to identify which word does not begin with the same sound as the others) (Rowse & Wilshire, 2007).

To improve processing along the nonlexical route, intervention-based research has focused on the teaching of phonics, or (unknown) letter-sound-correspondences, using regular words and nonwords (e.g., Broom & Doctor, 1995a;

Rowse & Wilshire, 2007). A range of off-the-shelf phonics programs may be suitable for this purpose. Broom and Doctor (1995a) found improved reading for nonwords after such training, affecting not only trained but also untrained letter-sound-correspondences. This result suggests that the treatment of letter-sound correspondences may target both specific skills, such as the learning of particular letter-sound correspondences, and general skills, such as the ability to break down words into their phonological components (Rowse & Wilshire, 2007).

## Surface dyslexia

Children with surface dyslexia demonstrate a difficulty in reading out loud irregular words, i.e., those that do not follow letter-sound rules. In contrast to children with phonological dyslexia, those with surface dyslexia sound out nonwords and regular words to a competent level (Broom & Doctor, 1995b; Castles & Coltheart, 1996). As these children are not able to read successfully via the lexical route, they resort to the nonlexical route, which is working normally (Broom & Doctor, 1995b; Friedmann & Lukov, 2008). Typically, children with surface dyslexia “regularise” or sound-out all words, even words with irregular pronunciations. For example, the word *iron* may be read as [ˈaɪrɪn] rather than [ˈaɪərn].

Within the dual route theory, the reading behaviour of children with surface dyslexia suggests that they have difficulties accessing sight-words using written-word recognition on the lexical route, or that they have fewer representations of written words in their memories (Broom & Doctor, 1995b). One reason why a child may demonstrate surface dyslexia is the lack of ability to form and maintain visual representations of written words (Castles & Coltheart, 1996; Di Betta & Romani, 2006).

Children with surface dyslexia can be identified by asking them to read irregular words. The reading performance of children with surface dyslexia can be overestimated if assessed on tests that include a mixture of regular and irregular words, as these children will be able to successfully sound out the regularly spelled words. The Castles and Coltheart Reading Test 2 (Castles et al., 2009) allows identification of both surface and phonological dyslexia, since it contains both irregular words and nonwords.

Successful treatment of surface dyslexia focuses on teaching the association between the spelling and the pronunciation of the words a child cannot read correctly. This is usually achieved by repeatedly exposing the child to the written and spoken words and can be done with flashcard training. In addition, visual-mnemonic (i.e., picture cues) and additional copying exercises have also been used successfully (e.g., Broom & Doctor, 1995b; Rowse & Wilshire, 2007). Improvements usually affect only treated irregular words, while words that are not specifically trained will not be read any better, which means that the success of treatment will depend on the number of individual words that the child can be taught and the frequency of those words (Broom & Doctor, 1995b).

## Poor comprehenders

Poor comprehenders have difficulty understanding what they are reading (Nation & Snowling, 1998). These children often show normal reading accuracy and even fluency, yet when they are asked questions about what they have read, they are unable to answer, or answer incorrectly (Stothard & Hulme, 1992; Yuill & Oakhill, 1991). Most poor comprehenders do not have a *reading* problem. It is their poor oral language skills that hamper their comprehension of written text. Other

symptoms include having trouble with making inferences, poor word knowledge and vocabulary, as well as being poor at understanding written and spoken instructions (Cain, Oakhill, Barnes, & Bryant, 2001; Nation, 2005).

Within dual route theory, poor comprehenders' difficulties with spoken word meanings would be said to arise in the word meanings, or semantics component and also within spoken word recognition, or the phonological lexicon. Poor comprehenders who know fewer words than their peers may be said to have fewer representations of spoken words in their phonological lexicon. Impoverished word meanings may be due to less sophisticated semantic networks for words.

Readers who have poor comprehension, or a poor understanding of the meanings of words, will show evidence of this difficulty in their reading comprehension and also in other tests of comprehension such as oral vocabulary tests. Poor reading comprehension may also exacerbate vocabulary and general knowledge impairments, as these skills will not be enhanced through reading (Nation & Snowling, 1998).

This type of problem may be difficult to identify in a classroom environment, as poor comprehenders may not demonstrate any lack of reading fluency or accuracy (Stothard & Hulme, 1992). Poor comprehenders are often identified by the classroom teacher in the later primary school years, when students are required to gather information from written texts. Poor ability in following both oral and written instructions may be signs that could alert a classroom teacher. Poor comprehenders can be formally identified by administering a reading comprehension test (e.g., Neale Assessment of Reading Ability; Neale, 1999) where they will show normal reading accuracy for their age, but impaired reading comprehension.

In terms of treatment, a recent randomised control trial compared three types of training approaches for developmentally poor comprehenders, aged 8–9 years: text comprehension training, oral language training, and a combination of both text comprehension and oral language training (Clarke, Snowling, Truelove, & Hulme, in press). Text comprehension training was based on four components: 1) encouraging the use of metacognitive strategies, 2) reciprocal teaching, including prediction of what may occur next, 3) learning about basic inference, and 4) analysing written narratives. Oral language training, also based on four components, included vocabulary training by introducing new words and meanings, reciprocal teaching using spoken language, analysis of figurative language such as jokes, and analysis of spoken narrative. The combined program used aspects of text comprehension training and oral language training. All three types of training led to significant improvements in reading comprehension. However, only the oral language training yielded improvements beyond the immediate duration of the study.

## Hyperlexia

Children with hyperlexia read words very accurately, often well beyond the level that would be expected for their age and cognitive level, but do not understand much of what they are reading, typically struggling with spoken and written comprehension (Aaron, 1989; Aram, 1997; Castles, Crichton, & Prior, 2010; Nation, 1999; Seymour & Evans, 1992). Although similar to children who are poor comprehenders, those who present with hyperlexia are typically diagnosed with an intellectual delay, autism, or Asperger's syndrome (Atkin & Lorch, 2006; Castles et al., 2010; Nation, 1999). Children with hyperlexia may display a range of other cognitive impairments, including low

nonverbal intelligence (although this aspect varies considerably among different cases; Nation, 1999). Children with hyperlexia often demonstrate an obsession with written text from a very young age, prior to expressive language development (Castles et al., 2010; Nation 1999). A hyperlexic profile can also include higher than average reading for regular and nonwords, and average reading of irregular words (Castles et al., 2010). It is thought that such results are due to a highly developed nonlexical route as a result of a preoccupation with reading (Nation, 1999).

In terms of dual route theory, we would once again locate the deficit of this subtype of reading disorder at the level of word meanings. Similar to poor comprehenders, children with hyperlexia use a direct route from written word recognition to spoken word recognition, and once again it can be identified by administering tests that have separate measures of reading accuracy and reading comprehension such as the Neale (1999).

There is a lack of research regarding treatment for developmental hyperlexia. However, given that one of the proposed deficits is in the domain of spoken word comprehension, training may best be focused on improving receptive and expressive vocabulary (e.g., Beck, McKeown, & Kucan, 2008). In addition, if a thorough assessment of oral language abilities reveals further impairments (e.g., grammar, syntax) this needs to be addressed as well. Individual assessments may be necessary to establish if this is due to nonverbal cognitive impairments.

## Letter-position dyslexia

Children with letter-position dyslexia have difficulty with, or are unable to differentiate between, words that contain transposed letters, leading to reading responses such as *board* for *broad* and *cloud* for *could* (Friedmann & Gvion, 2001; Friedmann & Rahamim, 2007). Typically errors occur when reading a less frequent word (*three*), giving the spoken output of its migratable higher frequency partner (*there*) (Kohnen, Nickels, McArthur, & Castles, 2010). Letter-position coding can be impaired in children whose phonics skills and other components of the reading system are completely intact (Friedmann & Gvion, 2001, Kohnen et al., 2010). They perform normally on standard (non-migratable) word and nonword reading tasks, as well as on tests of letter identification, spoken output, and the reading of numbers. Pure cases of this subtype demonstrate that these children identify the letters correctly, but that the correct letter position has not been encoded. Using the example of *cloud*, the letter "l" is processed in the wrong position, resulting in an incorrect word (*could*) being accessed during written-word recognition (Friedmann & Gvion, 2001).

While clinicians and special needs teachers report that letter transposition errors occur commonly in their poor readers, pure cases of this disorder have only recently begun to be documented in the literature. Several pure letter-position dyslexia cases have now been reported in Hebrew and Arabic (e.g., Friedmann & Gvion, 2001; Friedmann & Haddad-Hanna, in press; Friedmann & Rahamim, 2007) and recently there has been a reported case of pure letter-position dyslexia in English (Kohnen et al., 2010). It is possible that the failure to document these cases earlier is due to the fact that most reading tests contain too few words with possible migrations (such as *there/three*) to elicit letter-position errors. To test for letter-position dyslexia, it is best to present children with these kinds of migratable words to read aloud (e.g., Kohnen et al., 2010). Nonsense words that make a word if a letter is

transposed can also be used (e.g., *gule*, which the child may read as *glue*) (Friedmann & Rahamim, 2007).

A group study with Hebrew-speaking participants with developmental letter-position dyslexia, aged between 9 and 29 years, trialled six different strategies to reduce letter-position errors (Friedmann, Shvimer, Kerbel, Rahamim, & Gvion, 2010). The strategies included inserting two or six spaces between letters, inserting a symbol after the first letter or between migratable letters, presenting the letters in different colours, and finger tracking. Participants responded differently to the different strategies; however, finger tracking was shown to be the most successful strategy in reducing letter-position errors.

## Attentional dyslexia

Children with attentional dyslexia are better at reading single letters than reading single words, and they are better at reading single words than reading sentences (Davis & Coltheart, 2002; Friedmann et al., in press; Hall, Humphreys, & Cooper, 2001; Humphreys & Mayall, 2001; Mayall & Humphreys, 2002). There is reason to believe that when a child with attentional dyslexia is presented with a sentence, they are unable to narrow their attention to the individual words, which may result in the omission of letters, so *sport spell* is read as *sort spell*, or letter intrusions such that *fleece feet* being read as *fleece fleet* (see Friedmann et al., in press, for more details on error types).

It is thought that within dual route theory, a letter-word binding deficit exists within this subtype, meaning that the letters migrate between words. This type of reading disorder would be best assessed by presenting word pairs such as those shown above, to find evidence of migration errors occurring between the words (e.g., Friedmann et al., in press).

Friedmann, et al (in press) trialled six different types of strategies to try to reduce reading errors, with participants who demonstrated developmental attentional dyslexia, aged from 10 to 62 years. Treatment strategies included using a reading window or a word-sized cardboard cutout, finger tracking while reading, words presented in a table, words shown in a different format (i.e., adjusted font or font size) and different sizes of spaces shown between words.

All of the strategies aimed to focus attention on one word at a time. Of the six strategies, a reading window showed the most success in reducing reading errors. Finger tracking also led to a reduction in reading errors, although neither method was successful for all participants.

## Summary

We have presented brief descriptions of six different subtypes of developmental reading disorders (refer to Box 1 for an overview) and have provided suggestions on how to identify these disorders in a school or clinical setting, with reference to successful treatment methods. Although pure cases are rare, familiarity with the subtypes in their pure form provides a good basis for diagnosing more complex, mixed cases of developmental dyslexia, as the link between children's reading behaviours and deficits, and in particular reading processes can be identified (see Brunson et al., 2002a; Brunson, Hannan, Coltheart, & Nickels, 2002b for treatment of mixed cases). A specific diagnosis provides a good basis for developing targeted treatment programs for children with both pure and complex reading disorders. It is important to ensure that a detailed assessment precedes treatment and that treatment effects are monitored closely, as response to treatment varies between children and depends on the exact nature of the difficulty (Coltheart & Kohnen, in press).

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### Box 1. Subtypes of developmental reading disorders and suggested assessments

Reading disorder	Assessment	Performance pattern
Phonological dyslexia, surface dyslexia and mixed dyslexia	Castles & Coltheart Reading Test 2 (Castles et al., 2009) MOTIF – motif.org.au	Phonological dyslexia: below average non-word reading; average or above average irregular word reading. Surface dyslexia: below average irregular word reading; average or above average nonword reading. Mixed dyslexia: below average irregular word reading; below average nonword reading.
Poor comprehenders	Neale Assessment of Reading Ability (Neale, 1999)	Average or above average accuracy score and below average comprehension score.
Hyperlexia	Neale Assessment of Reading Ability (Neale, 1999)  Non-verbal IQ test	Above average or very advanced accuracy score and below average comprehension score.  Below average score – may have additional intellectual impairments.
Letter-position dyslexia	Castles & Coltheart Reading Test 2 (Castles et al., 2009) MOTIF – motif.org.au  Migratable words	Average irregular word reading; average nonword reading.  Above average number of letter-position errors.
Attentional dyslexia	Castles & Coltheart Reading Test 2 (Castles et al., 2009) MOTIF – motif.org.au  Word pairs	Average irregular word reading; average nonword reading.  Above average migration errors between words.

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**Kristy Jones** is a research assistant at the Macquarie Centre for Cognitive Science (MACCS) working on a large training study of children with reading difficulties. **Professor Anne Castles** is currently director of MACCS and has been exploring different types of reading difficulties in children for over 20 years. **Dr Saskia Kohnen** is a postdoctoral research fellow at MACCS and investigates the effects of different types of training on developmental dyslexias and dysgraphias.

Correspondence to:

**Kristy Jones**

Macquarie Centre for Cognitive Science

Macquarie University

Sydney NSW 2109, Australia.

phone: +61 2 9850 6736

email: kristy.jones@mq.edu.au

# What's the evidence?

## Evidence based practice in the assessment context

Mary Claessen and Jade Cartwright



Mary Claessen  
(top) and Jade  
Cartwright

### Scenario

"As I sit in my office in a local health service drinking my morning coffee with a new client booked in to see me in an hour, I ponder what it means to work with a client in an evidence based manner." This is a term I've read a lot about, and heard about in presentations, but how does it apply to me? I am an experienced speech pathologist who takes pride in keeping up to date with research and new treatment approaches. The other speech pathologists and I have developed an assessment protocol for new clients in our health service based on a combination of what we learnt at uni, professional development workshops attended recently and articles we've read. Surely that's enough; evidence based practice (EBP) is for researchers, not for me."

This scenario may or may not apply to you personally but many clinicians comment about the applicability of EBP and the time it takes to "do all that EBP stuff". When planning to see a new client, it is often easier to reach for the "old faithful" assessment. However, as speech pathologists we have a professional and ethical responsibility to approach each individual assessment with EBP in mind.

This column of "What's the evidence?" aims to guide clinicians through a series of questions that promote reflection on evidence based assessment and provide a framework for improving current practice. Questions to consider are:

- What is my professional responsibility for using evidence based practice?
- How can I balance use of craft and science in the assessment context?
- How do conceptual frameworks and theory guide my selection of assessment tasks?
- What are the psychometric properties of the assessments that I routinely use? What about the alternatives?
- Have I considered the ecological validity of my assessment approaches, measures and tools?
- How do the perspectives of my client influence my assessment choices?

### Evidence based practice

Speech pathology is undergoing transformation from a craft-based profession into one that relies on clinical decision-making models underpinned by evidence based practice (Justice, 2008). It is the position of Speech Pathology Australia (2010) that speech pathology is a "scientific and evidence based profession" (p. 3) and clinicians have a responsibility to incorporate the best available evidence from research and other sources into their clinical reasoning

and client management. The processes for upholding this professional responsibility evolved from evidence based medicine, defined as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, p. 71). Evidence based practice requires reasoned evaluation and integration of different sources of evidence, which include the clinical expertise of a clinician (craft), the best external evidence (science), and the values and perspectives of the client (Sackett et al., 1996; Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000). Evidence based practice should underpin all facets of speech pathology practice including not only treatment, but also the decision making that guides the planning, implementation and interpretation of diagnosis and assessment.

### Balancing craft and science for evidence based assessment

All speech pathologists would agree with Tate (2010) that good assessment forms the foundation of evidence based clinical practice. Assessment serves many purposes such as determining whether a disorder is present, assisting differential diagnosis and prognostic reasoning, and measuring treatment success. Considerable care must be taken when making initial assessment choices as these decisions direct the choice of treatment goals and approaches, ultimately shaping the outcomes of intervention (Kagan & Simmons-Mackie, 2007).

With clinical experience comes expertise and intuition that clinicians can use to guide the selection of assessment tools and measures. This *craft-based knowledge* develops over time from both theory and practice (Justice, 2010), allowing implicit judgements to be made about the client's presentation, the referral question, the management required, or the expectations of the clinical context or service. An experienced clinician can quickly identify the assessments "appropriate" for the given client or situation. But as practitioners, how often do we ask ourselves what factors actually make an assessment appropriate, and which evidence based assessment principles consciously guide our decision-making processes? It is important to ask whether a better alternative to our "old faithful" exists and this is where *science-based knowledge* plays a critical role. In the era of evidence based medicine, these are questions that should guide routine assessment planning and client management ensuring that use of craft and science is balanced.

A major barrier to achieving this balance in practice relates to the lack of tangible resources, evidence based

guidelines, systematic reviews, and high quality research available to support the “science” of evidence based assessment. Justice (2008) highlighted that for a profession to successfully undergo the craft to science transformation such tools and resources are of critical importance.

It is apparent that speech pathologists now have ready access to a range of evidence based practice resources such as the speechBITE™ website (<http://www.speechbite.com.au>) and dedicated journals like *Evidence-based Practice* (EBP) Briefs (<http://www.speechandlanguage.com/ebp-briefs>), and “Evidence-Based Communication Assessment and Intervention” (<http://www.informaworld.com/smpp/title~db=all~content=t744398443>) to help clinicians identify intervention approaches that are based on the best available evidence. The website of the New South Wales Evidence Based Practice Network also provides useful frameworks for clinicians and examples of critically appraised treatment studies and topics to assist the translation of EBP processes to clinical practice ([http://www.ciap.health.nsw.gov.au/specialties/ebp\\_sp\\_path/](http://www.ciap.health.nsw.gov.au/specialties/ebp_sp_path/)). The book *Evidence-based Practice in Speech Pathology* reviews the evidence for a selected number of speech pathology areas, such as voice, stuttering, and aphasia (Reilly, Douglas, & Oates, 2004).

While such resources have great clinical utility, overall the focus to date has been very much on intervention, with notably less attention devoted to the systematic review and compilation of research findings to guide evidence based assessment. This is a significant gap in the field that needs to be addressed. Although appropriate resources are being developed, clinicians require a framework to reflect on their own assessment practice and to guide decision-making. The astute clinician must not rely on intuition alone, but return to their theoretical and scientific knowledge to guide assessment choices.

## Selection of assessment tasks

Given the paucity of systematic guidelines for evidence based assessment, it is not surprising that the selection of assessment tasks can be extremely challenging in practice (Turkstra, Coelho, & Ylvisaker, 2005). Clinicians are required to choose from a vast number of assessment options, sampling behaviours through use of structured tests, dynamic assessment, classroom and real-life observations, via questionnaires and interviews, or conversational and discourse analysis (Plante, 1996; Tate, 2010).

It is apparent that use of standardised assessment tools continues to predominate in clinical practice (Verna, Davidson, & Rose, 2009), perhaps due to preconceived notions of their objectivity, reliability, and validity. However, how many times have you completed a standardised assessment and when you come to using the findings to formulate your plan and recommendations, find yourself struggling to clearly identify goals for therapy? Do you sometimes find yourself spending much of the first therapy session collecting more informal assessment data to help with goal-setting? This may be a consequence of how assessment tasks are selected and the decision-making models that are implicitly used.

While standardised tools have potential use in determining the presence of communication impairment or a client's eligibility for services, results from formal assessments often fail to translate into relevant and appropriate therapy goals. As clinicians we need to reflect on the purpose of each assessment session and ensure we utilise tasks that align with our overarching aims and goals. For example, if the purpose of an assessment session is to set therapy goals then one might consider using a range of

informal and dynamic assessment tasks (Hasson & Joffe, 2007). Such tasks allow a clinician to explore a client's strengths and weaknesses and their ability to learn new information, rather than simply detecting presence and severity of impairment. Use of theory and broad conceptual frameworks are presented in the following section as important starting points for the selection of tasks and measures to meet the needs of individual clients and contexts as part of evidence based assessment.

## Why is theory important?

Theoretical knowledge guides our clinical reasoning and decisions, allows us to explain and interpret our observations, and forms the foundation of our clinical predications and hypotheses about expected outcomes. Apel (1999) asserts that “armed with a theory of language learning, a scientist can develop creative ways to meet the individual needs of the child” (p. 102). Clinicians need to be clear and conscious in their own theoretical perspectives and to consider what frameworks they use to guide clinical reasoning.

At a broader level, choice of theory or theoretical perspective should drive a clinician's “approach” to assessment and also influence selection of “tools”. An approach is a theory-driven process, while products are just the tools that we choose to use (Apel, 1999). When treatment is provided without guiding theory, it is impossible to determine the mechanisms of change or why the treatment was successful (Apel, 1999). The same can be said for assessment.

Kagan and Simmons-Mackie (2007) highlight that the selection of assessment tasks is often determined by a range of different factors including “available tests, allegiances to particular theories, and/or initial impressions of the client” (p. 310). It is argued that for assessment to be evidence based, theory is a critical overarching factor. A strong theoretical framework is important for the selection of appropriate tools and measures, but more importantly, for the interpretation and integration of assessment results. A range of theoretical models can be used to guide evidence based assessment and treatment, with a useful review provided by Baker, Croot, McLeod, & Paul (2001).

## Use of the ICF in assessment

The World Health Organization's *International Classification of Functioning, Disability, and Health* (ICF; WHO, 2001) is a commonly used conceptual framework to guide the planning of assessment tasks and the interpretation and integration of findings. Researchers such as Sharynne McLeod, Travis Threats, and Linda Worrall have been key drivers in assisting the translation of the ICF framework to everyday clinical practice. While the ICF was developed for application across the lifespan, the *International Classification of Functioning, Disability, and Health – Children and Youth Version* (ICF-CY; WHO, 2007) was designed to capture some of the more specific health issues relevant to childhood (McLeod & Threats, 2008). McLeod and Threats (2008) provide a useful overview of studies that have used the ICF and ICF-CY to classify and profile childhood communication disorders. Similar examples exist in the adult field (Tate & Perdices, 2008; Threats & Worrall, 2004).

According to Tate (2010) best practice requires evaluation of each domain of the ICF to ensure comprehensive and ecologically valid assessment. However, traditional speech pathology assessments have focused attention on the body structure level with the goal of identifying the presence and severity of impairment (McLeod & Threats, 2008). Through evaluating a client's level of function within each domain of the ICF, the complex interactions and relationships between

components can be captured, quantified, and then targeted directly through intervention.

The Living with Aphasia: Framework for Outcome Measurement (A-FROM; Kagan et al., 2008) is a conceptual framework that builds on the ICF. The four key domains (Severity of disorder; Participation in life situations; Communication and language environment; and Personal identity, attitudes and feelings) are represented as intersecting circles, with the point of overlap constituting "life with aphasia" or quality of life (Kagan & Simmons-Mackie, 2007; Kagan et al., 2008). While the conceptual framework was developed for use with clients with aphasia, it has potential for use with any client group or disorder. Routinely used assessment tools can be mapped on to the domains of the ICF or A-FROM, to ensure that measurements are holistic and capture function at each level (Kagan & Simmons-Mackie, 2007; Kagan et al., 2008; McLeod & Threats, 2008).

## Psychometric properties of assessment tasks

While the ICF and A-FROM provide overarching conceptual frameworks to guide assessment, an evidence based practitioner must still consider the validity, reliability, and psychometric make-up of the individual assessment tools or methods selected. This can be a daunting and time-consuming task in clinical practice; however, it is a critical component of reliable and valid assessment practice.

Evaluation of psychometric properties is particularly important when assessment is being used to serve screening or diagnostic purposes. Screening tools aim to provide a quick and efficient means of identifying the presence or absence of a disorder while more comprehensive assessment or diagnostic batteries seek to profile and classify impairments and provide indices of severity. It is critical that clinicians consider features such as the extent to which the test measures what it is designed to measure (*validity*), whether the test provides representative sampling of the domain of behaviours (*content validity*), whether it has strong theoretical and empirical foundations (*construct validity*), whether its scores are reproducible and consistent (*reliability*), and whether it has sufficient *sensitivity* and *specificity* to detect the behaviours in question (Tate, 2010; Turkstra et al., 2005). Sensitivity values reflect the percentage of people with a disorder correctly identified by a given test or diagnostic procedure according to a reference standard (Dollaghan, 2007). Specificity values reflect the percentage of people without the disorder that are correctly identified as such (Dollaghan, 2007). The small number of systematic reviews that do exist in the literature have highlighted that many of the tests and measures used by speech pathologists have strong content and face validity (i.e., they are thoughtfully and carefully constructed); however, the construct validity is often weaker (Turkstra et al., 2005). Furthermore, many of the screening tools that are available, such as those for aphasia, provide insufficient reliability, validity and sensitivity/specificity data to make a true assessment of their clinical utility (Koul, 2007). These are again issues that need to be addressed by the field and considered in practice.

It has been acknowledged that psychometric appraisals can be difficult and time-consuming for clinicians to complete in practice, yet there are useful guides available in the literature. For example, Dollaghan (2007) provides a practical and useful framework for the critical appraisal of diagnostic evidence (CADE). It allows the evaluation of screening tools and standardised batteries designed specifically for detection of a disorder, differential diagnosis

and classification. It allows clinicians to make reasoned judgements about the validity, reliability, sensitivity, and overall utility of the tool in question, supporting the quest for evidence based assessment.

While the CADE framework allows evaluation of a tool's ability to diagnose or classify a particular disorder, it does not identify how effective or useful the tool is in directing goal-setting or treatment. As a result, in practice, clinicians also require a process for determining which assessment tools and measures can be used to direct goal-setting and enhance treatment outcomes (Dollaghan, 2007). Such targeted research is relatively absent in the evidence based practice literature and clinicians are again encouraged to return to their theoretical frameworks to ensure coherence between their overarching goals and selection of assessment measures.

## Ecological validity

It is widely recognised that performance on standardised language batteries such as the *Western Aphasia Battery – Revised* (WAB-R; Kertesz, 2006) and the *Clinical Evaluation of Language Fundamentals* (4th ed., Australian); (CELF-4 Australian; Semel, Wiig, & Secord, 2006) does not reflect real-life communication skills (Apel, 1999; Turkstra et al., 2005). Chaytor and Schmitter-Edgecombe (2003) state that ecological validity "refers to the degree to which test performance corresponds to real world performance" (p. 182). An important distinction should be made between the content and construct validity of a test and its ecological validity. In other words, a standardised test may have strong psychometric properties with little real world relevance.

It is promising that an increasing number of functional communication measures are being developed in the field. However, surveys of speech pathology services suggest that impairment-driven batteries remain the most commonly used assessments in clinical practice (Verna et al., 2009). Verna et al. (2009) found that 92.8% of their 70 respondents routinely used impairment-based language assessments, while only 21.4% included measures of functional communication and 2.9% of clinicians completed discourse analysis. Expert consensus supports a shift in practice, viewing standardised assessments as "only one component of an evaluative process that includes multiple sources of information" (Turkstra et al., 2005, p. 220). As a profession we need to continue developing and increasing the use of functional, dynamic assessment tasks to supplement the data obtained from standardised tests (Turkstra et al., 2005).

## Considering client values and perspectives

Our final, but perhaps most important, point of discussion requires reflection on the role that client values and perspectives play in evidence based assessment. Kagan and Simmons-Mackie (2007) suggest that the selection of assessment tools should be guided by the "real-life outcome goals" (p. 309) that are relevant to each individual client. This approach stands in stark contrast to the impairment-driven or traditional assessment. The desired end point is likely to be different for each client and is expected to change and evolve over time (Kagan & Simmons-Mackie, 2007). The uniqueness of each person's situation highlights the need for a tailored assessment approach that considers the desired end point from a functional perspective, with life participation in mind (Kagan & Simmons-Mackie, 2007).

Kovarsky (2008) presents an interesting discussion on the use of "personal experience narratives" when



conducting and interpreting efficacy research, ensuring that the voices of our clients are not marginalised or forgotten in the quest for evidence based practice. Directing assessment with the client's voice in mind links directly with notions of ecological validity and again argues for the use of an overarching framework like the ICF to ensure that the selection of assessment tasks, and subsequent goal setting and treatment planning are governed by a rich, holistic understanding of our client's needs, values, and perspectives.

## Summary

This column of "What's the evidence?" has called for clinicians to sit back and reflect on their assessment practice. Does the suite of assessments routinely used consider all domains of the ICF to allow functional and holistic outcome measurement? Do the assessment tools have adequate ecological validity, in addition to established psychometric credibility? Is assessment driven by a clear overarching theoretical framework to guide the selection of measures, interpretation, and integration of results? Following this reflection, it would be interesting to see whether we find the evidence to continue as we have done, or whether it highlights the need to throw the "old faithful" away and search for new measures or tools that support our goal to become evidence based practitioners. Ultimately, there is a need for dedicated research and the development of new tools and resources to guide not only intervention, but also evidence based assessment.

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**Mary Claessen** and **Jade Cartwright** are both lecturers at Curtin University involved in teaching the principles of evidence based practice to students and committed to bridging the divide between theory and research, and practice.

Correspondence to:

**Mary Claessen**

Curtin University of Technology

School of Psychology and Speech Pathology

Perth 6845 Australia

phone: +61 8 9266 3472

fax: +61 8 9266 2464

email: m.claessen@curtin.edu.au

# Dysphagia assessment and management at the end of life

## Some ethical considerations

Helen Smith, Noel Muller, and Trish Bradd



**Helen Smith (top), Noel Muller (centre), and Trish Bradd**

Assessing and managing people with dysphagia at the end of their life is an integral part of most adult speech pathologists' everyday practice in hospitals, nursing homes, and domiciliary care settings throughout Australia. Good palliative care is no longer viewed as important only for people with cancer. Long-term, life-limiting conditions such as increasing frailty, vital organ failure, dementia, and degenerative neurological conditions (e.g., amyotrophic lateral sclerosis, multiple sclerosis, or Parkinson's disease) account for 47% of deaths (Kellehear, 2009; Mahtani-Chungani, Gonzalez-Castro, Saenz de Ormijana-Hernandez, Martin-Fernandez, & Fernandez de la Vega, 2010). Where people have long-term, life-limiting conditions and are receiving care, speech pathologists have a clear role in supporting those clients (who develop dysphagia as part of their symptoms) and their carers through the cycles of wellness and decline in chronic palliative care as well as in the final phases of a terminal illness.

Managing the implications of dysphagia for people in the final phases of a terminal illness or for people suffering from an advanced life-limiting illness that impairs their quality of life raises a number of professional and ethical issues. This article uses a case study to discuss the importance of accurate diagnosis and prognosis to ensure that ethical decision-making processes are used in making informed decisions about care planning. It will briefly discuss available management options and will consider comfort, quality of life, harm reduction, and treatment futility inherent in some of these options. The critical roles that health literacy and teamwork play in ethical decision-making will also be considered.

### The client: presentation and history

Mrs Demarco<sup>1</sup> is an 89-year-old woman of Italian descent who lives at home with her daughter Anna. She presents to hospital following a fall when going to the toilet. She presents with delirium, dehydration, and a urinary tract infection (UTI). She also suffers from mild heart failure and reflux. This is her third admission to hospital in 6 months. She has lost 10 kg since her last admission and is now essentially bed-bound with cachexia<sup>2</sup>.

During Mrs Demarco's first admission the medical team diagnosed her with dementia and an ulcerated leg. During her second admission she was diagnosed with aspiration

pneumonia, and the speech pathologist prescribed a modified food and fluids diet in response to her moderate difficulties in swallowing (dysphagia) and the fact that she had developed aspiration pneumonia.

### The client: diagnosis and prognosis

Despite reduced alertness, poor communication in English and Italian, and difficulty managing oral secretions, the general medical team think that with intravenous fluids and antibiotics for the UTI, Mrs Demarco's general state of alertness may improve. The general medical team in consultation with Mrs Demarco's daughter have decided to treat Mrs Demarco actively, that is, by using therapeutic agents such as antibiotics to improve her general condition and to reduce some of her symptoms. As Mrs Demarco's status is for active medical treatment, the speech pathologist recommends that Mrs Demarco not eat or drink food and fluids (either modified or unmodified) at this point in time and that instructions for "nil by mouth" be noted in the file and by her bedside.

Mrs Demarco's daughter, Anna, is very concerned about her mother's restrictions in oral intake and her mother's inability to take her heart medications orally. Anna insists the doctors insert a nasogastric feeding tube (NGT) so that her mother will be able to receive nutrition via the tube. The medical team agree to insert the NGT as a therapeutic trial (to be reviewed after seven to ten days). After the first seven days, Mrs Demarco's conscious state improves, but as she becomes more alert, her tolerance for the NGT decreases. Mrs Demarco pulls the tube out five times in the next three days. The NGT is removed as it is causing Mrs Demarco great distress. Mrs Demarco also repeatedly pulls out the intra venous (IV) cannula (drip) that provides her with hydration.

On day ten Mrs Demarco is awake but unable to communicate effectively in either Italian or English. She is not able to get out of bed without assistance and cannot sit, stand, or walk, even with physiotherapy assistance. Mrs Demarco remains severely dysphagic and can tolerate only minimal amounts of extremely thickened fluids and pureed solids. Her ability to cooperate in taking modified food and fluids orally is variable and inconsistent. For the next few days Mrs Demarco intermittently appears to aspirate small amounts of food and fluid, particularly when tired. However, she has a strong cough and aspiration of small amounts of food and fluid do not appear to make her breathing uncomfortable.

Anna has heard about percutaneous endoscopic gastrostomy (PEG) feeding tubes as Anna's friend's mother had one placed after a stroke. The friend's mother eventually made a good recovery and went home after 3 months of rehabilitation. Anna asks if her mother can have a PEG feeding tube because she does not want her mother to be hungry or thirsty.

## Critical questions for the management team

This section discusses some of the key questions that the general medical team responsible for the management of Mrs Demarco's health care must consider in evaluating the next steps and the decisions they must make for her ongoing care.

### *1. Is this patient suffering from an advanced life-limiting illness impairing quality of life?*

In the past six months the trajectory of Mrs Demarco's health has shown cycles of wellness and decline. Despite maximal treatment during this admission (i.e., antibiotics, hydration therapy) and a trial of artificial feeding via the NGT, Mrs Demarco has not regained her pre-admission level of function, which was already compromised. An inability to increase oral intake, a decrease in cognitive function, refusal of food, recurrent chest infections, and multiple medical conditions are generally poor prognostic signs in dementia (Enck, 2010; Mino & Frattini, 2009). The general medical team agree that, based on their observations and medical interventions, Mrs Demarco exhibits signs of end-stage dementia and is unlikely to significantly improve in functional abilities of eating, hydration, general mobility, and physical safety. Her confusion associated with the dementia remains largely unchanged.

### *2. A percutaneous endoscopic gastrostomy feeding tube is considered an invasive medical procedure. Should it be considered as an option for Mrs Demarco?*

There is increasing evidence over the past decade that the use of a PEG feeding tube with the unwell elderly and with people with advanced dementia does not improve survival or other clinical outcomes (Anonymous, 2010). In fact, the mortality rate following a PEG feeding tube in people with advanced dementia is 90% at one year post-insertion (Shah, 2006). Of all elderly patients undergoing insertion of a PEG feeding tube, the mortality of dementia patients in particular remains significantly high (Shah, 2006). The general medical team who are responsible for Mrs Demarco's care has an obligation to provide the best possible treatment (duty of care obligations) and must make a decision about the insertion of a PEG feeding tube supported by evidence and prognostic markers including increasing age, severe cognitive impairment, hospitalisation, past history of aspiration, and physician-predicted poor prognosis (Shah, 2006) that in this case predict a poor outcome.

The general medical team believes that Anna could learn to manage the PEG feeding tube at home if necessary. However, Mrs Demarco has clearly demonstrated that she finds tubes uncomfortable by repeatedly pulling out IV cannulas and NGTs. A PEG feeding tube may be an added

burden that could potentially increase Mrs Demarco's agitation. If this were to occur, it may be necessary for Mrs Demarco to have additional medications that result in sedation, precipitate her admission to an aged care agency permanently, and in the worst case scenario force the introduction of physical restraints. These scenarios could place Mrs Demarco at risk of further medical complications and harm as well as increasing distress to her and her family (Anonymous, 2010; DiBartolo, 2006). Common medical complications of PEG feeding tubes include infection, bleeding, diarrhoea, and aspiration of refluxed feed (Tyler-Boltrek, Bonin, & Webb, 2009).

### *3. Is comfort oral feeding an option, despite the aspiration risk?*

Speech pathology assessment shows that although Mrs Demarco is at risk of aspiration, eating a modified diet, drinking thickened fluids or water, and sucking on ice chips appear comfortable for Mrs Demarco, that is, they do not result in her coughing excessively or make her breathing rapid or distressed. Mrs Demarco does require significant assistance with eating orally and will not achieve adequate nutrition and hydration via this route. It appears to the speech pathologist and Anna that when Mrs Demarco accepts some food or fluids she seems relaxed and shows preference for some items over others; however, Mrs Demarco is unable to reliably take her medications orally. Anna has demonstrated the ability to assist her mother with eating and drinking in a way that maximises her swallowing safety.

## Clinical management

This section discusses some of the critical aspects of providing high quality care in a woman with complex and challenging health care problems.

### *1. Informing the family using accurate and easy to understand facts and material*

The general medical team, including the consultant medical officer, determine the diagnosis and prognosis of the patient. The consultant medical officer is unavailable to talk with Mrs Demarco's family in a reasonably urgent time frame, and suggests the family seek a referral and meeting with the palliative care team. The palliative care team agrees to assist with the family meeting. Part of the palliative care team's function is to ensure that effective multidisciplinary palliative care planning assists the family and the patient to make informed decisions about the next stages of the care plan.

### *2. Education regarding the risks and benefits of all options, acknowledging language and health literacy levels*

The speech pathologist has spoken with Anna throughout the admission and has kept her informed of the outcomes of various speech pathology assessments. Anna was keen for her mother to have a "little pasta" but the speech pathologist explained the choking risk of these food items and why they were not recommended given the severity of Mrs Demarco's dysphagia. Anna acknowledged that her mother had appeared to "choke" several times even before this most recent admission and was happy to follow the speech pathologist's recommendations. She was very keen to assist her mother to eat and after some discussion and

education about appropriate consistencies Anna brought in appropriate home-made foods for her mother to eat.

Anna had asked the speech pathologist about the PEG feeding tube. The speech pathologist had explained in detail what it was and provided an information booklet. The booklet contained a worksheet for patients/families considering a PEG feeding tube procedure that included the advantages and disadvantages of feeding tubes. The speech pathologist was not sure Anna fully understood the information in the booklet. She revisited the information with an interpreter present. Anna still had many questions and the speech pathologist wondered about Anna's exposure to and understanding of health information matters. After a series of meetings and discussions, she thought that Anna demonstrated a basic understanding of the procedure and its complications.

### **3. Establishing who can give consent**

The social worker has established that Mrs Demarco's daughter has legal guardianship but that Mrs Demarco has not made any advanced directives or statement of choices regarding medical treatment or insertion of a feeding tube. Mrs Demarco has two other children. The physiotherapist has established that Mrs Demarco is now bed-bound and cannot stand or transfer safely. Mrs Demarco's three children need to understand Mrs Demarco's capabilities and difficulties before making any informed decisions about their mother's future care.

### **4. The importance of team work**

Anna's English, while functional, appears limited for complex health-related information. Accordingly the social worker arranges for an interpreter to be present at the family meeting. Anna and her two brothers attend the family meeting. Mrs Demarco is not in attendance as she is unable to participate in the discussion and decision-making due to her decreased cognitive abilities.

At the family meeting the general medical team provides the family with information regarding Mrs Demarco's diagnoses and prognosis. The signs of end-stage dementia are stressed. The family agree they have seen a marked deterioration in Mrs Demarco over the past six months in general and this admission in particular. The speech pathologist explains the difficulties that Mrs Demarco has with eating and drinking and the associated problems with choking and aspirating.

Anna asks again about the option of the PEG feeding tube as she does not want her mother to starve. The palliative care team explain how at the end of life people often stop feeling hunger and thirst. The team describe the role that comfort-feeding of foods that will not obstruct her airway, (that is, the choice of relatively low risk non-choke foods) and exemplary mouth care could play in maintaining Mrs Demarco's quality of life and comfort.

### **5. The importance of time**

The palliative care team sensitively explains to Anna why her mother's situation is different to that of her friend's mother. Anna begins to gently weep. The general medical and palliative care teams offer to give Anna and her brothers more time to discuss all the information and agree to revisit the issue in a couple of days. Over the ensuing days Anna asks many questions of all members of the team about PEG feeding tubes and comfort-feeding and end-stage palliative care. The palliative care social worker talks with the family about what supports could be provided at home or in a hospice or nursing home.

At the next meeting Anna and the family decide to take Mrs Demarco home with supports (including visiting nurses and home help) and to use comfort oral intake. Three months later Mrs Demarco passes away at home in her sleep after many meals of her favourite home-made gelato.

## **Ethical questions raised**

Box 1 lists a number of ethical questions raised in this case study. Refer to the Speech Pathology Australia Code of Ethics (Speech Pathology Australia, 2010) for more information.

### **Box 1. Ethical questions to ask when considering placement of a feeding tube in a client with life-limiting disease**

- Does the multidisciplinary team agree on the client's diagnosis and prognosis?
- Does the client understand her/his diagnosis and prognosis?
- Can the client make informed decisions about her/his medical care or is surrogate decision-making necessary?
- Has clear and accurate information (couched in terms that suit the family's level of health literacy) been provided to the family to enable them to make informed decisions (autonomy) and provide informed consent?
- Has the family had the opportunity to express their opinion and participate in the decision-making process?
- When considering active treatment has "non-maleficence" been considered (i.e., harm prevention and not intentionally causing harm)?
- Have the client's comfort and quality of life been considered (i.e., "beneficence" / benefiting others through our actions)?
- Is it possible to enhance the client's level of function or is active intervention "futile"?
- What level of clinical expertise is required? If necessary, have senior speech pathologists been consulted?

## **Implications for speech pathologists**

This case study attempts to illustrate the importance of accurate, meaningful dysphagia assessment, the complexity of truly informed consent, the importance of the consideration of futility of intervention or treatment and doing no harm, balanced with quality-of-life decisions and doing "good" in end of life dysphagia management.

These ethical considerations, however, illustrate that there are no easy answers to complex situations. Some clients presenting to hospital with life-limiting disease and dysphagia may not be provided with all options. These clients may receive PEG feeding tubes, may be sedated so they do not pull them out, and may receive the recommendation of "nil orally" to manage the risk of aspiration and pneumonia. Families may not be provided with essential information about the end-of-life process or may not be in a position to hear this information (because they may find it difficult to accept that their loved one is in the process of dying). The speech pathologist has an important role in facilitating complex conversations and communication of detailed and sometimes distressing information to the patient and the family.

While this type of situation is part of the daily life of many speech pathologists, students and clinicians inexperienced in this area need the mentoring, support, and guidance from experienced speech pathologists to help them navigate the complex interplay between clinical safety and

quality-of-life issues to ensure the best care for our most vulnerable elderly and unwell patients.

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- 1 Names have been changed to protect the privacy of the client.
- 2 Cachexia = generally unwell with emaciation, usually occurring with cancer or a chronic infectious disease or illness.

**Helen Smith** is elected by members to the Speech Pathology Australia Ethics Board. Helen has over 23 years of clinical, education, and management experience in speech pathology. She has practised professionally in the UK, Canada, Zimbabwe, and in metropolitan, rural, and remote Australia. She has a research interest in ethical practice and student education, and a clinical interest in palliative care. She is currently employed as the manager of speech pathology at The Queen Elizabeth Hospital in Adelaide and regularly presents to undergraduate and postgraduate students.

**Noel Muller** is a consumer representative on the Speech Pathology Australia Ethics Board. Noel has been an active executive member of a consumer advisory group for a number of years and has represented consumer rights/issues in numerous areas including housing, disability, respite, aged care, suicide prevention, and forensic mental health. Noel is the president of Queensland Voice for Mental Health – the state-wide peak body for consumers and carers that provides the Queensland government with policy advice regarding mental health initiatives from a consumer and carer perspective.

**Trish Bradd** is a senior council appointed member of the Ethics Board and a fellow of Speech Pathology Australia. She has extensive experience in the health sector, including many years as a speech pathologist working with an adult client population. Trish is currently the director of allied health for the Southern Clinical Support Transition Office, NSW Health.

Correspondence to:

**Helen Smith**

Manager, Speech Pathology Department  
The Queen Elizabeth Hospital, South Australia  
email: [helen.smith4@health.sa.gov.au](mailto:helen.smith4@health.sa.gov.au)

or

**Christina Wilson**

Senior Advisor – Professional Issues  
Speech Pathology Australia  
email: [sapi@speechpathologyaustralia.org.au](mailto:sapi@speechpathologyaustralia.org.au)

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# Webwords 40

## Speech-language pathology assessment resources

Caroline Bowen



Caroline Bowen

Speech-language pathology intervention starts and ends with a detailed assessment. We gather history, read the reports of others, observe, screen, measure, quantify, analyse, set baselines, encounter ceilings, probe, allow time, watch for trends, and think critically about whether treated behaviours have changed more than untreated ones.

Our skilled, evidence-based assessments are a form of data collection and analysis that may be informal, observational, speedy, and clear-cut (“Yes, it’s a lateral-s all right!”), or small contributions to a complicated, drawn-out, dynamic process that combines standardised and non-standardised procedures and consultation with families and colleagues, not necessarily leading to a definitive diagnosis (“Well, even after a year of intervention I’m not all that convinced that it isn’t severe phonological disorder and not childhood apraxia of speech”). You know how it goes! We assess along the way for the purposes of accountability, for our own elucidation – fine-tuning target selection, goal-setting and intervention choices relative to change in a client’s performance – and in response to clients’ and family members’ and others’ needs for progress reports.

### Assessment resources on the Internet

For speech pathologists, trustworthy Internet sources of assessment information are the scholarly journals that specialise in communication sciences and disorders, the informational pages developed by test publishers like **Pearson/PsychCorp**<sup>1</sup> and **PRO-ED**<sup>2</sup>, and reviews such as those provided by the BUROS Institute, which has a dedicated **speech and hearing**<sup>3</sup> category. Most assessment-related net offerings comprise information *about* assessments, and not the assessments themselves, or their manuals. Some assessment and screening instruments, however, are available on-line and are reasonably easy to locate by using advanced searches, especially within journal databases.

### Journal sources

A few examples among many of the journal articles that include assessment tools are: Lee, Stemple, Glaze, and Kelchner (2004) with a voice screener; Miccio (2002) with a screening oral peripheral examination for children and a protocol for eliciting later developing sounds and a variety of phonotactic structures during a play routine; and Johnson, Weston, and Bain (2004) with a fun, time-efficient method for establishing the severity of a child’s speech sound disorder.

Gaining access to journals usually requires a subscription, or a visit to a library, either of which may be impractical for some speech pathologists with regard to cost, travel, or both. It is good to know, therefore, that there are several quality journals that are freely offered on-line and that from time to time report assessment-focused work. One is *Contemporary Issues in Communication Science and Disorders*, the biannual, peer-reviewed, on-line-only, open-access journal of the National Student Speech Language Hearing Association (NSSLHA). Its fall 2010 issue holds two treasures: **A Tutorial in Advanced Phonetic**

**Transcription, Part II: Vowels and Diacritics**<sup>4</sup> and **Part III: Prosody and Unattested Sounds**<sup>5</sup>. The latter won the NSSLHA Editor’s Award for 2010 as an invaluable guide to assessing unusual speech patterns. The first part in the series, **Part I: Consonants**<sup>6</sup>, appeared in the journal’s fall 2009 issue. Other free electronic journals include the **Canadian Journal of Speech-Language Pathology and Audiology**<sup>7</sup>, **EPB Briefs**<sup>8</sup> and the **Journal of Medical Speech-Language Pathology**<sup>9</sup>.

Several non-standardised assessments that were originally published in journals have found their way on-line divested of crucial background information. For instance, there are the M-CHAT (Robins, Fein, & Barton, 2001) **checklist**<sup>10</sup> and **score sheet**<sup>11</sup> for autism in toddlers and the 2007 revision of the Garrett and Lasker (2005) **aphasia assessment materials**<sup>12</sup>.

### Conference sources

Conference websites are a ready source of free assessment tools and procedures. There are the **Computer Aided Assessment of Cluttering Severity**<sup>13</sup>, the **Predictive Cluttering Inventory**<sup>14</sup> from an ISAD fluency disorders conference and Elaine Pyle’s **Screening Protocols for Cleft Palate Team Speech-Language Pathologists**<sup>15</sup> that was presented at an ASHA convention in 2006. An assessment tool that was generated at a conference is Sharynne McLeod’s **SPAAC2**<sup>16</sup> which can be used to evaluate the activity and participation in society of children with speech impairment.

### Collegial sharing

Speech-language pathologists often share assessment resources on faculty or personal web pages. For example, there are Gail Gillon’s **Phonological awareness probes, administration and record forms**<sup>17</sup> and **pictures**<sup>18</sup>, Steven Long’s **Computerized Profiling**<sup>19</sup> and related language analysis procedures, Robert J. Lowe’s **ALPHA Test of Phonology**<sup>20</sup>, Sharynne McLeod and Linda Hand’s **Single Word Test of Consonant Clusters**<sup>21</sup>, Charity Rowland’s **Communication Matrix**<sup>22</sup> for measuring early communication development, and the author’s **Quick Screener**<sup>23</sup> of phonological development and the **Quick Vowel Screener**<sup>24</sup>.

### Assessment tools and tricky subjects

The tools we use to perform assessments range from high-tech to low-tech, from qualitative to quantitative, from budget-breaking to free, from sophisticated to simple, and from familiar and well tried to new and a little-bit-scary. The clients we assess also range in terms of “testability” on a scale that goes from piece of cake to gruelling via “please Jeremy, come out from under the chair!” Some clients seem to be born test subjects and take it all in their stride, while others (or their families) are uncomfortable in the spotlight. It can take special skill, learned over years of practice, to placate parents who find case history questions intrusive or offensive and help them to see their relevance, or to respond appropriately to criticism of the test protocol (“I can’t even answer some of these questions!”), its

administrator (“He knows the answers but he’s just not trying for you”) or its content (“She can’t tell you that because we don’t watch TV”).

Similarly, reporting results, verbally or in writing takes practice. At times the news is a pleasure to deliver (“ninety-eighth percentile” and “far more progress than I could have predicted” roll off the tongue and generally draw beaming smiles), but at other times it can evoke in a clinician anxiety and anguish as we picture and empathise with a family’s reaction to falling standard scores or the news that a child is “not a candidate for therapy” or that no further progress in therapy is probable in an adult affected by global aphasia. How does one find words to break disappointing news when prognosis is poor? The answer is, “with difficulty” and it is especially tricky towards the beginning of our careers.

## Mutual understanding

Experienced colleagues have usually “been there” and most willingly assume a mentoring role with less seasoned clinicians – if they seek such support. Talking to someone who understands the issues can be helpful, whether to role-play or plan the words to use, explore the strengths that the treating clinician can bring to the situation, prepare personally and emotionally, or debrief after “the news” has been communicated. It may also help to know that clients regularly meet us half way. They, or their families, often anticipate the conversation, know that therapy is not producing great outcomes, and are waiting to have the discussion. Of course, when the moment comes, some people will react angrily or sceptically, and some will want to try new avenues, or seek out someone to prove one wrong. In a lot of instances, however, if we support them through this agonising period, and leave the door open, they will come back when ready to talk. But mostly the “bad news” or the “poor prognosis” is greeted with relief as well as sadness, and rather than being the end of the client–clinician relationship, it can be the beginning of a positive, joint exploration of the next step.

## References

Garrett, K., & Lasker, J. (2005). Adults with severe aphasia. In D. R. Beukelman and P. Mirenda (Eds.), *Augmentative and alternative communication: Supporting children and adults with complex communication needs* (3rd ed.) 467–704. Baltimore, MD: Paul Brookes.

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## Links

1. [http://www.pearsonassessments.com/pai/ca/SpeechandLanguage.htm?Community=CA\\_Speech](http://www.pearsonassessments.com/pai/ca/SpeechandLanguage.htm?Community=CA_Speech)
2. <http://www.proedinc.com/customer/productLists.aspx?idCategory=4>
3. <http://buros.unl.edu/buros/jsp/clists.jsp?cateid=17&catename=Speech+and+Hearing>
4. <http://www.nsslha.org/publications/cicsd/cicsdF10/#1>
5. <http://www.nsslha.org/publications/cicsd/cicsdF10/#2>
6. <http://www.nsslha.org/publications/cicsd/cicsdF09/#4>
7. [http://www.caslpa.ca/english/resources/cjslpa\\_home.asp](http://www.caslpa.ca/english/resources/cjslpa_home.asp)
8. <http://www.speechandlanguage.com/ebp-briefs>
9. <http://www.accessmylibrary.com/archive/2167-journal-of-medical-speech-language-pathology.html>
10. [http://www.firstsigns.org/downloads/Downloads\\_archive/m-chat.PDF](http://www.firstsigns.org/downloads/Downloads_archive/m-chat.PDF)
11. [http://www.firstsigns.org/downloads/Downloads\\_archive/m-chat\\_scoring.PDF](http://www.firstsigns.org/downloads/Downloads_archive/m-chat_scoring.PDF)
12. <http://aac.unl.edu/screen/screen.html>
13. <http://www.mnsu.edu/comdis/isad8/papers/bakker8/bakker8.html>
14. [http://associations.missouristate.edu/ICA/Resources/Resources%20and%20links%20pages/clinical\\_materials.htm](http://associations.missouristate.edu/ICA/Resources/Resources%20and%20links%20pages/clinical_materials.htm)
15. [http://www.eshow2000.com/asha/2006/handouts/855\\_1232Pyle\\_Elaine\\_090792\\_111406091003.pdf](http://www.eshow2000.com/asha/2006/handouts/855_1232Pyle_Elaine_090792_111406091003.pdf)
16. <http://athene.riv.csu.edu.au/~smcleod/SPAAC2.pdf>
17. <http://www.education.canterbury.ac.nz/people/gillon/PA%20Assessment%20probe%20instructions.pdf>
18. <http://www.education.canterbury.ac.nz/people/gillon/PAprobepictures.pdf>
19. <http://www.computerizedprofiling.org/index.html>
20. <http://www.speech-language-therapy.com/alpha.html>
21. <http://athene.riv.csu.edu.au/~smcleod/Consonantclustertest.pdf>
22. <http://www.communicationmatrix.org>
23. <http://speech-language-therapy.com/tx-a-quickscreeener.html>
24. <http://www.speech-language-therapy.com/TheQuickVowelScreeener.pdf>

Webwords 40 is at <http://speech-language-therapy.com/webwords40.htm> with live links to featured and additional resources.

### ASD Education and Resources Online

A range of Autism Spectrum Disorders (ASD) resources and education modules have been developed by Speech Pathology Australia with the aim of providing professional development and capacity building for speech pathologists working in the area of ASD, to assist in their provision of services under the Helping Children with Autism package.

These initiatives have been supported by funding from the Government Department of Health and Ageing.

The speech pathology specific resources available are as follows:

- ASD Position Paper
- Online Peer Support Discussion Board
- DVD production of the Autism National Tour presentation
- Independent Study Resource

Visit: [www.speechpathologyaustralia.org.au](http://www.speechpathologyaustralia.org.au)



# My Top 10 assessment resources (with a paediatric slant)

Suze Leitão



Suze Leitão

Assessment is such a large part of our clinical practice that we really need to understand *what* we are doing and *why*. This will influence how we go about collecting information. Assessment requires us to make an informed judgement for a purpose, based on a sample of behaviour, and is framed by our theoretical knowledge and our understanding of the current evidence. Good assessment practice is functional, adaptive, dimensional, balanced, and grounded in theory. My Top 10 is based on this broad definition.

## 1 A clear purpose

Understanding “why” we assess is critical to helping us decide “what” and “how”.

There are many reasons for carrying out assessment, many of which overlap, but it is important to understand the purpose(s) before we start. These can include:

- screening
- prediction/early identification
- diagnosis, classification, and referral/placement
- determining eligibility for a service
- determining if a “problem” is real
- establishing baseline functioning
- establishing goals for intervention and approach to therapy
- evaluating progress/measuring change in intervention
- monitoring recovery, development, degeneration
- decision making about discharge.

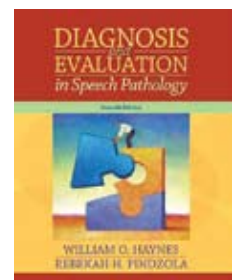
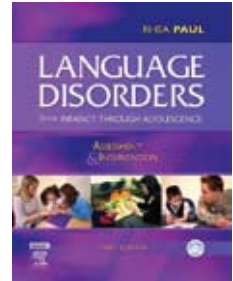
Each of these may require different tools and data collection and will involve the client to different degrees.

## 2 A good textbook that will stand the test of time and help us make an informed judgment

As clinicians we need to be informed. In paediatric assessment this means we need to understand typical developmental norms and trajectories as well as indicators of concern. We also need to understand the theories that underlie these trajectories, and the influences of different cultures.

I draw on three main texts in my paediatric clinical practice and my teaching:

- Paul, R. (2007). *Language disorders from infancy through adolescence* (3rd ed.). Philadelphia, PA: Mosby. This contains a wealth of information on assessment.
- Haynes, W. & Pindzola, R. (2008). *Diagnosis and evaluation in speech pathology* (7th ed.) Boston: Pearson Education. A great resource for clinical problem-solving and decision-making.
- Shipley, K., & McAfee, J. (2009). *Assessment in speech-language pathology: A resource manual* (4th ed., International Student Edition). New York: Delmar, Cengage Learning. This contains practical resources galore, many of which are adaptable.

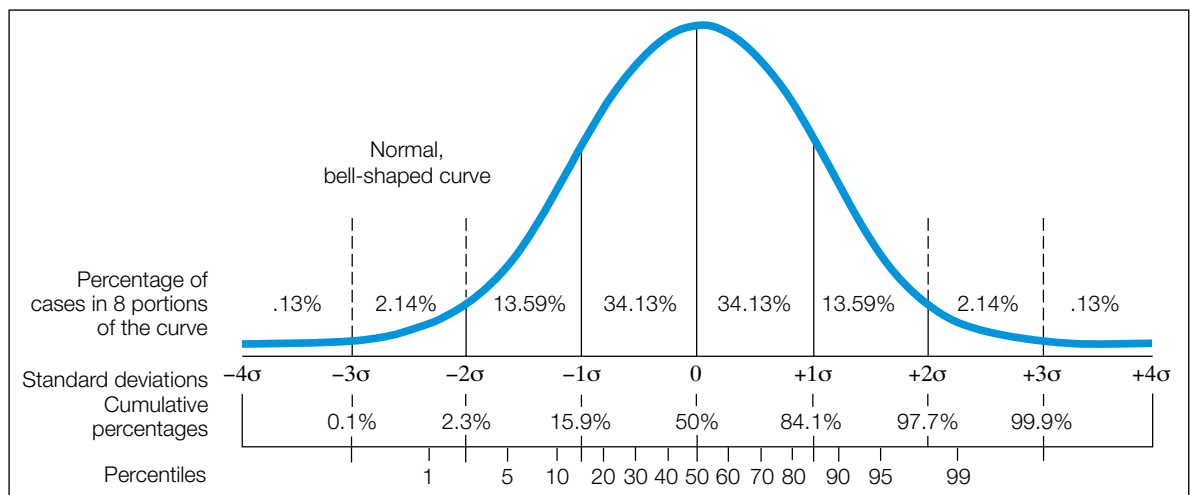


## 3 A good theory

Good assessment is strongly grounded in theory. The underlying assumptions of a theoretical framework will underpin what we choose to assess. Without a set of questions or hypotheses an assessment battery would be little more than a series of tests. Without drawing on theory and evidence, it would also be unethical. The texts mentioned under no. 2 provide some useful information on theories of language development.

## 4 The normal distribution

There is always debate about the advantages and disadvantages of using norm-referenced tests. Standardised tests do have their place in our clinical battery – but should be used and interpreted appropriately. The





normal distribution and the use of scores such as standard scores/percentile ranks allow us to determine where a child's score fits in the normal distribution. While they should be used with caution, they do allow us to interpret a score. A chart of the normal distribution is a good visual reference to explain standardised scores to parents/carers (see left).

In contrast, other scores such as age equivalents can be dangerous. They do *not* tell us the degree of impairment/difference. They do *not* say a child is performing the same as another child at that age equivalent (if a child aged 12 years obtains an age equivalent score of 5 years, it does *not* mean he or she is performing the same as a 5-year-old) as the score is usually calculated on a total raw score and the pattern of responses can be completely different. Age equivalent scores do *not* measure change and should not be used to state, for example: "he made 6 months progress in 3 months".

## 5 Criteria to evaluate a test against, which allow us to make an informed decision when we purchase a test

When we plan to buy a standardised test, we need to ensure it has strong psychometric properties. The books outlined above (see no. 2) cover these concepts in detail. In brief, we want a standardised test to provide information about the standardisation sample (so we know if it is valid to compare our client to the norms), as well as reliability and validity data – so we know that the scores will be consistent and reflect the areas the test aims to test, and that the test administration and scoring are clear. It is tempting to skip through the manual when considering purchase but this is the most important part of evaluating a test!

## 6 A well-developed standardised test

I have found the Clinical Evaluation of Language Fundamentals (4th ed.) (CELF-4) and the Clinical Evaluation of Language Fundamentals, Preschool (CELF-P) to be good value for money and they have strong psychometric properties (as well as the benefit of local "norms").

These tests are available from Pearson at <http://www.pearsonpsychcorp.com.au/productdetails/85/1/42> and <http://www.pearsonpsychcorp.com.au/productdetails/84>

## 7 Access to evidence in the research literature

Evidence based practice is as important to assessment as it is for intervention. When we come to develop and use non-standardised approaches to collect assessment data, we must still make sure they are reliable and valid as well as driven by theory.

Speech Pathology Australia has provided a position statement that makes a great starting point: [http://www.speechpathologyaustralia.org.au/library/position\\_statements/EBP\\_Position\\_Statement.pdf](http://www.speechpathologyaustralia.org.au/library/position_statements/EBP_Position_Statement.pdf)

And my favourite resources include:

- Dollaghan, C. (2007). *The handbook for evidence based practice in communication disorders*. Baltimore: Paul H. Brookes
- SpeechBite website: <http://www.speechbite.com/>
- [http://www.ciap.health.nsw.gov.au/specialties/ebp\\_sp\\_path/](http://www.ciap.health.nsw.gov.au/specialties/ebp_sp_path/)

## 8 A broad range of assessments in the "tool kit"

There are many times when it is not appropriate to use standardised tests – whether broad spectrum or specific.

These include assessment of children from a range of cultural and linguistic backgrounds and children with severe disabilities. In fact, for assessment to be balanced, it should *always* include information collected in different ways. We need to use standardised but not norm-referenced tests, criterion referenced assessments, non-standardised protocols, dynamic assessment, observation, and language sampling. We need to collect our data from a wide range of people involved in the process, including significant others, through interviews, observation, and questionnaires.

## 9 Discourse based sampling methods and analyses



We are seeing increasing use of language sampling in a range of text and discourse genres. One method of sampling that is very practical and has been field-tested with hundreds of children is the Westerveld and Gillon language sampling protocol available for free from <http://www.saltsoftware.com/salt/downloads/NewZealand.cfm> The systematic analysis of language transcripts (SALT) is also increasingly used in clinical practice and a lot of useful information on this approach is available on their recently updated website: <http://www.saltsoftware.com/>

## 10 Caroline Bowen's website

I don't think I could survive without this rich source of information. I often go to the website for information and the listserv discussions – a new "nugget" pops up regularly and I have found out about many new assessments, assessment protocols, and resources this way!

**Dr Suze Leitão** is a clinician, researcher, and lecturer in speech pathology at Curtin University in Western Australia. She has been teaching a unit about assessment for a few years and it has given her much to think about in her own clinical practice! Her top 10 is a mix of her thoughts and resources that have had an influence on her assessments of paediatric clients.

Correspondence to:

**Dr Suze Leitão**

email: [S.Leitao@curtin.edu.au](mailto:S.Leitao@curtin.edu.au)

# Measuring intelligibility

Anne Hesketh



Anne Hesketh

Assessment and evaluation of intervention effects for children with speech sound disorder (SSD) are mostly based on measures of accuracy, such as percent consonants correct (PCC), at a single word level. However, the functional consequence of SSD is reduced intelligibility; children have difficulty making themselves understood in their everyday interactions. Correlations between accuracy scores and intelligibility are significant but weak (Ertmer, 2010). Intelligibility is increasingly addressed in research studies (e.g., Baudonck, Bue Kers, Gillebert, & Van Lierde, 2009; Ellis & Belyukova, 2008) but is rarely assessed directly in clinical practice.

We do know how to assess intelligibility. The gold standard measurement, regarded as the most objective and socially valid approach, is the proportion of words correctly identified by a listener from a spontaneous connected speech sample (Flipsen, 2008; Gordon-Brannon & Hodson, 2000). The transcription of a connected speech sample yields an objective baseline of intelligibility in a communicatively functional task, against which change can be plotted.

So, why are we not assessing intelligibility in this way? The transcription method is time-consuming and requires the cooperation of another person. For unintelligible spontaneous speech a master transcript must be prepared, against which the percentage of words *correctly* identified by a listener can be calculated. It is not enough to simply count the words written by the listener, as they may have been misunderstood. The production of a master transcript is in itself problematic as not all the speech may be intelligible to even an “expert” listener, although solutions are proposed by Flipsen (2006). Furthermore, the amount understood will vary with the familiarity, experience, or linguistic sensitivity of the listener and with the nature of the speech task, so reassessment conditions must be closely controlled. Word or sentence imitation tasks allow us to control the target utterance (thus making it easy to calculate the percentage correctly identified) but these samples lack real-life validity. Therefore the search continues for a technique which is quick, accurate, reliable and applicable to spontaneous connected speech. The main alternative to transcription is the use of rating scales. Their speed of completion makes such scales more attractive clinically but there are doubts about their reliability and sensitivity, particularly mid-scale (Flipsen, 2006; Schiavetti, 1992).

Recently I worked with students in a series of studies on the assessment of intelligibility, comparing different approaches, the impact of listener experience, and the relationship between estimated and actual amount understood. We used a story-retell task to obtain video-recorded data of children with SSD to elicit a sample of adequate size, and for which we knew the approximate content. Altogether we have used recordings of 10 children aged 3;10–9;10 with a PCC range of 28–90% (representing

a severity range of severe to mild; even the children with the highest PCC made consonant errors not typical for their age). Different studies have used subgroups of these children.

First, in a study presented at the International Clinical Phonetics and Linguistics Association (ICPLA) conference (Hesketh, 2008), we investigated intra- and inter-rater reliability using a visual analogue scale (VAS) to rate the speech of five children (aged 4;4–7;2; PCC 30–86%). The VAS was a 10cm line, its extremities labelled as *speech is completely unintelligible and speech is completely intelligible*, with no further subdivisions. The score was reported as the distance in millimetres from the left side. Most raters ( $n = 40$ ) were naïve listeners having no experience working with children with SSD (psychology students) plus a small number ( $n = 6$ ) of speech pathology (SP) students who were more experienced listeners. We examined a) intra- and inter-rater reliability in both sets of listeners, and b) the difference in the level of rating between the two listeners.

Intrarater agreement for the naïve listeners yielded an intra-class correlation coefficient (ICC) of 0.81; some raters gave wildly differing responses across the two viewings (one week apart). SP students were more consistent across attempts with an ICC of 0.95. For naïve listeners, interrater agreement was even lower than intrarater agreement (ICC = 0.75), but the SP students showed much closer interrater agreement with an ICC of 0.94. There was no significant difference between the mean rating of the naïve and SP raters for any child, though the very small number of SP listeners and the very large standard deviations (SDs) for the naïve group make this a tentative finding. The VAS scale was problematic because it was difficult to place a response at exactly the same point on two occasions, even if intended, because of the lack of markings. We concluded that such ratings by inexperienced listeners would be unreliable as a measure of progress, and that visual analogue scales were difficult to use and time-consuming to measure.

Another study compared the performance of three measures of intelligibility: a VAS, a 5-point descriptor rating scale, and a word-by-word story transcription (the latter scored as the percentage of words correctly identified according to the SP's own transcription). We compared both interrater agreement within each measure, and the pattern of results across the three procedures. Participants were naïve listeners rating/transcribing the speech of two children (child 1, age 6;6, PCC 64%; child 2, age 5;9, PCC 44%). VAS scores showed much larger SDs (in relation to the mean) than the other two measures (see Table 1): this wide variance again indicates poor levels of interrater agreement yielded by VAS ratings. The 5-point rating scale and transcription scores had a more restricted spread, showing closer agreement between scores *within* each measure. Comparison *between* the measures showed some differences.

**Table 1. A comparison of intelligibility scores from VAS, a 5-point rating scale, and word-by-word transcription procedures**

		Intelligibility measure		
		VAS	5-point scale <sup>a</sup>	Transcription (% words identified)
Child 1	Mean (SD)	39.84 (19.56)	2.66 (0.69)	56.57 (11.92)
	Range	8–82	2–4	31–79
Child 2	Mean (SD)	26.49 (21.34)	2.27 (0.63)	43.97 (12.53)
	Range	2–93	1–4	16–64

Note. VAS = Visual Analogue Scale.

<sup>a</sup>Scale descriptors: 1 = I could not understand the child's speech; 2 = I could understand little of the content of the speech but was able to understand a few isolated words or phrases; 3 = I was able to understand, with difficulty, about half of the speech; 4 = I was able to understand most of the content of the speech; and 5 = I was able to understand all the child's speech.

For both children, ratings clustered at points 2 and 3 on the 5-point rating scale, with a lower average for the child with the lower PCC. Transcription scores (percentage of words identified correctly) had ranges which also reflected the greater severity of child 2's problem (see Table 1). Correlation between the two measures (5-point rating scale and transcription score) was moderately significant for child 1 (Spearman's  $\rho = .41, p < .01$ ) but non-significant for child 2 (Spearman's  $\rho = .23, p = .15$ ). Judgements of intelligibility using the 5-point scale appeared to under-estimate the amount listeners actually understood when transcribing the story. For both children, the most frequent rating was 2, for which the descriptor was "I could understand little of the content of the speech but was able to understand a few isolated words or phrases". However, for both child 1 and 2, listeners could actually correctly identify around half of the words (57% and 44% respectively).

We have also explored acceptability of speech as a separate issue. Where two children have similar levels of intelligibility, the speech of one may be more acceptable to listeners than the other. We hypothesise that this may vary with the age of the child, or typicality of their errors. For our first attempt we used the recordings of all 10 children and found that acceptability is a parameter harder to define and showing even wider variability of response than intelligibility. Further research will require more careful control of age, severity, and error type in the children to be rated.

In summary,

- Five-point rating scales show greater intra- and inter-rater reliability than a VAS, and are preferable as a quick rating approach.
- Transcription scores show similar or slightly closer agreement across raters than a 5-point scale and are an objective measure of the actual amount understood.
- The amount understood is a function of the listener as well as the speaker and the experience of the listener appears to make a difference. If transcription is used as a measure of change in intelligibility, the same listener should be used at all assessment points.
- "Acceptability" is difficult to define but requires further exploration as it may be an important consideration in clinical management decisions.

We are currently investigating whether a brief period of training or familiarisation with "disordered" speech changes the level or improves the agreement of listeners' ratings. In addition, we are exploring a definition of acceptability, asking what aspects of speech and communication are salient to listeners. Raising awareness about the importance of direct assessment of connected speech intelligibility remains an important aim.

For further information on research about children with communication disorders at the University of Manchester, including links to all staff research pages, please go to: <http://www.psych-sci.manchester.ac.uk/research/groups/neuroscienceandlanguage/chatru/>.

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**Anne Hesketh** qualified as a speech and language therapist in the UK in 1981 and worked in the National Health Service before joining the University of Manchester. Her teaching, research, and clinical work focus on children with speech sound disorder and on the effective practice of speech-language pathology.

Correspondence to:

**Dr Anne Hesketh**

HCD, School of Psychological Sciences

Ellen Wilkinson Building

The University of Manchester

Oxford Road

Manchester M13 9PL UK

phone: +44 (0)161 275 3375

email: [anne.hesketh@manchester.ac.uk](mailto:anne.hesketh@manchester.ac.uk)



# Around the journals

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## Assessment via telerehabilitation for Parkinson's disease

Constantinescu, G., Theodoros, D., Russell, T., Ward, E., Wilson, S., & Wootton, R. (2010). Assessing disordered speech and voice in Parkinson's disease: A telerehabilitation application. *International Journal of Language and Communication Disorders*, 45, 630–644.

Deborah Hersh

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There are good reasons for exploring alternative service delivery options for people with Parkinson's disease (PD). Despite approximately half this population having speech difficulties, a disparity between supply and demand of speech-language pathology services leads to poor availability and accessibility for many. The authors argued that telerehabilitation (the delivery of rehabilitation services to patients at a distance via telecommunication and information technologies) is a possible solution to this situation. Telerehabilitation has already been demonstrated as effective in assessment and treatment for patients with other neurological impairments and Internet-based video-conferencing via personal computer is making the process increasingly accessible.

This study, based in Queensland, aimed to investigate the validity and reliability of an Internet-based assessment protocol for the speech and voice disturbances in PD by comparing it to standard face-to-face assessment. Sixty-one participants diagnosed with PD and hypokinetic dysarthria were involved. They were not expected to be proficient computer users and, during assessments, the speech-language pathologist (SLP) controlled all displays on the participant's screen. Participants were randomly assigned to either face-to-face assessment ( $n = 31$ ) or online assessment ( $n = 30$ ). Three experienced SLPs conducted the assessments, following a 3-hour training session. In each assessment session, two of the three SLPs were involved, with one leading the assessment session and the other as a silent rater. The assessment battery took one hour and included perceptual ratings of voice and oromotor parameters, articulatory precision, speech intelligibility in reading and conversation as well as instrumental evaluation of sound pressure levels, prolonged vowel duration and pitch range (using the Lee Silverman Voice Treatment (LSVT) Evaluation Protocol).

The results, overall, suggested that an Internet-based assessment of speech and voice in PD was reliable and valid with generally good agreement across the range of assessments. Some vocal parameters (including breathiness, roughness, strained-strangled, and pitch breaks) were below the clinical criterion of good agreement and similarly, there was variability in judging masked facial expression and lip retraction. The authors suggested that such findings of lower agreement reflect general inter-rater variability in judging perceptual ratings of voice as well as

subjectivity in judging severity levels. But they stressed that agreement between the two environments was generally high across the assessments and that, on a satisfaction questionnaire, participants were satisfied with the online modality. Despite some audio-visual challenges, including the speed and quality of the connection affecting the image and sound, the authors argued convincingly for telerehabilitation as useful for on-line assessment of speech and voice in PD.

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## Using perception of wet vocal quality to assess for penetration/aspiration during swallowing

Groves-Wright, K. J., Boyce, S., & Kelchner, L. (2010). Perception of wet vocal quality in identifying penetration/aspiration during swallowing. *Journal of Speech, Language, and Hearing Research*, 53, 620–632.

Sue-Ellen Hogg

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This paper investigated the association between *wet vocal quality* (WVQ) and the presence of ingested material in the larynx, and in turn, WVQ's usefulness in identifying individuals at risk of aspiration in a clinical assessment. Listening for WVQ after a swallow is often included in dysphagia assessment protocols, as it is commonly believed to be suggestive of the presence of ingested material in the larynx. While some previous studies have found positive correlations between the presence of WVQ and aspiration, results have been variable. In addition, issues associated with reliability between raters in voice perception, inconsistent terminology, and lack of proximity of acoustic sampling and imaging in these studies has meant a definitive relationship remains unclear.

The aim of this study was to investigate whether there was a positive relationship between perception of WVQ and ingested material in the larynx during post-swallow phonation, and whether experienced dysphagia clinicians were reliable in their perception of this relationship. In order to overcome some of the issues identified in previous studies, collection of continuous and simultaneous acoustic and videofluoroscopic data occurred and multiple raters were used to calculate interrater reliability.

A total of 78 participants were recruited and participated in the study following referral for evaluation of dysphagia. Aetiology of the participants' dysphagia varied and individuals with a known vocal fold pathology or pathophysiology were excluded from the study. Each participant underwent videofluoroscopic evaluation of swallowing, where they were given boluses of thin, nectar, honey and puree consistencies. Immediately following each of the swallows, participants were cued to phonate / $\alpha$ / for approximately 3 seconds, and then cough. Five experienced dysphagia clinicians were then asked to perceptually rate the randomly ordered audio samples as having WVQ or not.

Results of the study showed that overall the raters' judgements of WVQ were not sensitive to the presence of material in the larynx. Only two of the five raters identified wet phonation samples significantly more when material was present in the larynx. Furthermore, interrater reliability between pairs of raters was variable and overall interrater reliability indicated only slight agreement.

The results of this study suggest the use of vocal wetness alone as a clinical indicator for aspiration risk is insufficient, and highlights the need for dysphagia clinicians to also evaluate post-swallow voicing for other perceptual changes to phonation that may result from material in the larynx (e.g., roughness, hoarseness). Limitations associated with high variability of clinician ratings of vocal quality and the need for the development of careful perceptual characterisation of the vocal consequences of material in the larynx should also be recognised.

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### Assessing quality of life in stuttering

Yaruss, J. S. (2010). Assessing quality of life in stuttering treatment outcomes research. *Journal of Fluency Disorders*, 35, 190–202.

Charn Nang

It is generally well accepted that stuttering is a complex disorder that involves not only the overt stuttering behaviours that can be seen (i.e., secondary non-verbal features of stuttering) and heard (i.e., disruptions in flow of speech), but also the features that underlie the disorder. A well-known analogy illustrating such complexity comes from Sheehan (1970) who coined the iceberg concept of stuttering, highlighting the not-so noticeable features of stuttering including negative behavioural and cognitive reactions associated with stuttering that a speaker may experience.

Yaruss began exploring the impact of stuttering on an individual's life in the late 1990s and developed the *Overall Assessment of the Speaker's Experience of Stuttering* (OASES; Yaruss & Quesal, 2006) to measure that impact. The OASES is based on the *International Classification of Impairments, Disabilities, and Handicaps* (ICIDH; WHO, 1980), and subsequently the *International Classification of Functioning, Disability, and Health* (ICF; WHO, 2001). This framework was identified as useful for describing the consequences of stuttering and for evaluating the outcome of treatment (Yaruss, 1998; Yaruss & Quesal, 2004).

In this article, Yaruss emphasises the measurement of the experiences of stuttering for an individual and argues that measures of these experiences should be an important treatment outcome *in addition to* measures of impairment (i.e., overt stuttering behaviour). Yaruss focuses on the concept of quality of life (QOL) as a "construct that is broad enough to account for many aspects of the speaker's experience of the stuttering disorder," (p. 192). He defines QOL as satisfaction with communication, taking into account the degree of interference with relationships, interference with employment, and interference with other aspects of life experience. He then presents preliminary data to support the position that people who stutter do experience reduced QOL and that QOL can be used as a measure of treatment outcome.

Improving the QOL of clients is essentially the crux of speech pathology and any tool that can assist in measuring

the social impact of communication disorders on individuals should be valued and utilised. This article is the next step forward for validation of the OASES which has been a journey spanning over a decade for Yaruss and colleagues. Yaruss concluded that ongoing validation of the OASES is required and that development of a version for children and adolescents who stutter is already underway.

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### Validity and reliability considerations in test selection

Friberg, J. C. (2010). Considerations for test selection: How do validity and reliability impact diagnostic decisions? *Child Language Teaching & Therapy*, 26, 77–92.

Chris Brebner

This is a timely and clinically relevant article from US author Jennifer Friberg. This easy-to-read article outlines a study which aimed to evaluate the overall psychometric validity of nine preschool and school-age language assessment tools. The tests used were selected from a large pool of commercially available assessments and were selected because of their established identification accuracy (i.e., the tools could accurately diagnose language disorder). Of particular relevance for the Australian context was the inclusion of the widely used Clinical Evaluation of Language Fundamentals (4th ed.) (CELF-4; Semel, Wiig, & Secord, 2003), the Clinical Evaluation of Language Fundamentals Preschool (2nd ed.) (CELF-P2; Wiig, Secord, & Semel, 2004), the Preschool Language Scale (4th ed.) (PLS-4; Zimmerman, Steiner, & Pond, 2002) and the Test of Narrative Development (Gillam & Pearson, 2004).

Each of the assessments were reviewed using criteria based on those from McCauley and Swisher (1984); each tool was evaluated against 11 psychometric criteria. These criteria included whether the purpose of the assessment was adequately explained in the test manual, whether the standardisation sample was adequate, and whether measures of validity and reliability were provided. It was interesting that none of the assessment tools met all of

the psychometric criteria in full. These areas of deficit were discussed in detail, which will assist clinicians in determining whether these assessment tools are suitable for use in their workplaces.

The author then provided an insightful discussion with direct relevance and utility for clinical practice, namely that clinicians should carefully consider the identification accuracy and the properties of a test before selecting it for use.

This was a comprehensive, clinically relevant paper highlighting the issues in the appropriate selection of standardised assessments. This article provides a “refresher” about the psychometric properties of tests that are critical to their validity and reliability. It also reminds us that as Australian clinicians we need more assessment tools that are specifically designed and standardised for our clinical populations.

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## Dynamic assessment of children with language impairment

Hasson, N., & Botting, N. (2010). Dynamic assessment of children with language impairments: A pilot study. *Child Language Teaching & Therapy*, 26, 249–272.

Chris Brebner and Marleen Westerveld

This article was written by authors from City University in London. It is a clinically relevant, interesting, and easy-to-read article, outlining the application of dynamic assessment techniques for expressive grammar deficits in children diagnosed with specific language impairment (SLI).

Dynamic assessment (as opposed to static assessment) in general aims to assess an individual's ability to learn and is often used to differentiate between language difference and language impairment in culturally and linguistically diverse populations. This pilot study aimed to develop a replicable procedure for the use of dynamic assessment (DA) to appraise the expressive grammar skills of children with language impairment. The authors argued that results from DA would be helpful in deciding which children would benefit most from intervention.

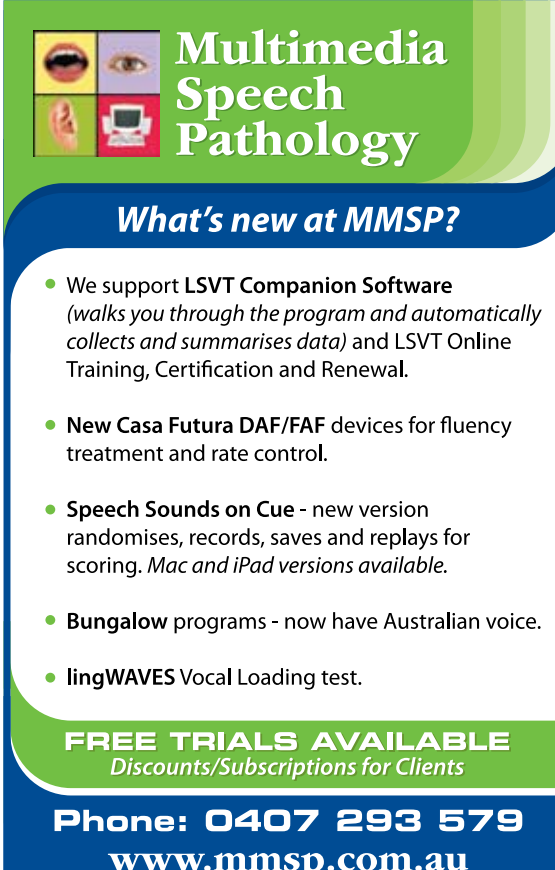
Utilising a multiple case study methodology, the article outlined three case studies. The participants were all boys who attended a language unit, were aged 11–12 years, and scored below 1.5SD on the Total Language Score of the Clinical Evaluation of Language Fundamentals (3rd ed.) (CELF-3; Semel, Wiig, & Secord, 2000). This same test (CELF-3) was utilised to measure change in test scores after the DA procedure and to explore whether the DA method assisted in the identification of differential intervention strategies for the three children with SLI. The DA method utilised a test-train-retest design. As mentioned above, pre-and post-testing used subtests from the CELF-3. Training consisted of three (individually tailored) 40-minute sessions aimed at improving expressive grammar. Training materials included 48 items, using a format similar to that used in the CELF-3 test, with an increasing level of difficulty.

Unfortunately, the results from this pilot study were found to be inconclusive. It was found that pre-test–post-test standardised testing lacked sensitivity in detecting change following training; change was only apparent if raw scores were used. However, the authors felt that the DA procedure allowed for a wealth of clinical information to be obtained, mainly based on behavioural observations of linguistic and metalinguistic knowledge of the children.

Despite the mixed findings of this study, clinicians may be interested in the way in which these researchers tried to implement DA and in the detailed behavioural descriptions of the three clients with SLI.

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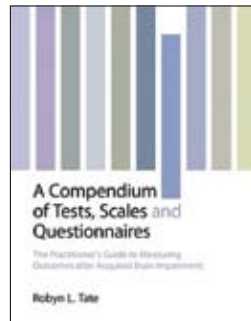


# Speech pathology resources

**Tate, R. L. (2010). *A compendium of tests, scales and questionnaires: The practitioners guide to measuring outcomes after acquired brain impairment*. East Sussex, UK: Psychology Press. ISBN 978 1 84169 561 7 (hbk); pp. 768; GBP£125; available from <http://www.psypress.com/>**

Jade Cartwright

Dr Robyn Tate's (2010) compendium of tests, scales, and questionnaires provides a comprehensive and practical review of over 150 specialist assessment tools for use with individuals with acquired brain impairment (ABI). It is an easy-to-read and accessible text.



The introduction sets the scene extremely well, establishing the foundations for evidence based assessment. A clear, concise, and psychometrically driven report is provided for each assessment tool included within the compendium. This provides an overview of the purpose or aims of each assessment, a description of the test items, background to the scale's development, and summary of administration procedures. The available psychometric properties are examined and clearly presented for each test, including validity and reliability values. The summary comments provided at the end of each report provide the reader with a sense of the clinical utility and worth of each scale. These reports can be used to aid the selection and review of assessment tools used in practice. They can be used in the planning stages of applied research in the ABI field.

This biopsychosocial framework is used to structure and present each of the tests, scales, and questionnaires, with each tool carefully mapped on to the most applicable component, domain, or category of the ICF. The organisation of this compendium is novel in its approach and goes a long way in promoting holistic, integrated assessment, while supporting translation of the ICF framework to practice.

The compendium is probably most useful for those working in a multidisciplinary team with this population, rather than a more general clinic. The compendium has a strong interprofessional focus, presenting a wide range of assessment instruments with relevance to the spectrum of practitioners working in the ABI field. As a result, the text may provide greatest value at a team, ward, or unit level to guide selection of outcome measures and implementation of clinical research. There are only a handful of tools within the text that specifically assess speech, language, communication, and swallowing functions, which may limit the direct value of the text for speech pathologists. That said, the questionnaires and scales measuring activities and participation, social roles and relationships, and

environmental factors have relevance for speech pathology practice.

Wherever possible, the questionnaires and tests reviewed have been reproduced within the text for clinical use, strengthening the practicality of the resource. The assessment measures presented also cover a wide range of populations, including progressive and non-progressive neurological conditions. While more scales and tools are reviewed for the adult population, 11 scales for use with youth and children are included.

Tate has achieved her aim of ensuring that the compendium provides a "representative array of instruments across broad ranges of functioning" (Tate, 2010, p. 2). It provides clinicians with an overview of the level of evidence that underpins assessments currently in use in the ABI field and highlights new assessments that may be of benefit to a team or service.

**Hegde, M. N. & Pomaville, F. (2008). *Assessment of communication disorders in children. Resources and protocols*. San Diego, CA: Plural Publishing. ISBN: 978 1 59756 291 1; pp. 514; US\$97.95; <http://www.pluralpublishing.com>**

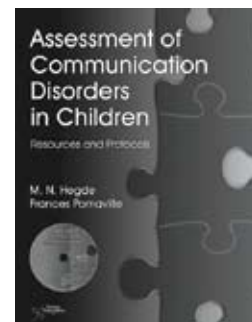
Marleen Westerveld

This 500-page book provides a wide range of resources (background information, normative data, lists of standardised tests, etc.) and protocols related to the assessment of communication disorders in children.

Furthermore, all the protocols are included in Word format on a CD and can be adapted to suit individual clients. The book

is divided into seven parts. The first part (118 pp) deals with general principles of assessment, whereas the other six parts focus on four specific areas of clinical practice (speech, language, fluency, voice), the assessment of nonverbal and minimally verbal children (27 pp), and literacy related assessments (26 pp).

The first chapter provides a brief description of different aspects of the assessment process including the case history, post assessment counselling, and the assessment report. Chapter 2 contains the most frequently used protocols as well as a developmental milestone chart (0–4 yrs) and a very detailed list of instructions on how to conduct an orofacial examination. The chapter on standardised assessment reiterates the purpose of administering standardised tests, clearly outlines the pros and cons, and explains how to interpret a child's performance. Chapter 4 deals with ethnoculturally diverse children. Although the principles may be of interest to clinicians in Australia, the specific cultural groups



discussed in this chapter may not be clinically relevant (e.g., Asian American, Hispanic). The final chapter of part 1 looks at alternative assessment approaches including dynamic assessment, portfolio assessment, and authentic assessment. It provides an excellent description of how to combine or integrate these approaches, along with an explanation as to why speech pathologists in general do not seem to utilise these approaches in clinical practice.

Parts 2 to 4 deal with specific areas of clinical practice: speech, language, fluency, and voice. Although it goes beyond the scope of this review to summarise all these parts, the chapter dealing with "assessment of language skills in children" was disappointingly generic. The main reason is probably because it tries to cover too much content in only 84 pages (e.g., overview of child language disorders [CLD], SLI, factors related to CLD, clinical conditions associated with CLD, language sampling). The chapter does provide some useful, easy-to-adapt protocols, including a case history form and a normal language development checklist. However, the language sample transcription protocol and its accompanying norms for MLU, Type Token Ratio, and bound morphemes are very basic.

In summary, this book provides a straightforward overview of common assessment procedures used by speech pathologists in clinical practice. Its strengths lie in the way in which it advocates the use of alternative assessment techniques and specifically addresses the assessment of communication skills in ethnoculturally diverse children. The book may be particularly suitable as a generic text book for university courses that deal with the assessment of communication disorders in children.

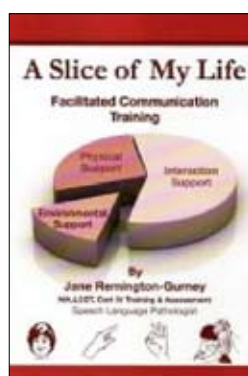
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**Remington-Gurney, J. (2009). *A slice of my life: A personal introduction to non-spoken communication (AAC)*. Kallangur, Qld: Options Communication Therapy and Training Centre. ISBN 978 0 646 50480 3; A\$50 including postage; pp. 150; [www.optionsctc.com.au](http://www.optionsctc.com.au)**

**Kirsten Tranter, Gill Greenwood, and Caterina Thompson**

This was an informative and easy-to-read publication, one that we believe would be beneficial for novices to read. The text clearly described various augmentative and alternative communication (AAC) systems and provided some practical starting points for using them. Jargon was kept to a minimum, quotes were utilised and descriptive case scenarios, cartoons and photos effectively conveyed the key points. Activities at the end of each section were useful for reinforcing key messages and allowing the reader to apply the information to their personal employment context. The space in the book for taking notes at the end of each section has the potential to be useful for readers to write notes for their reference.

Remington-Gurney's "Ten Core Ingredients" clearly described the essential elements for providing AAC and communication partner training. The quote "Communication is a basic human right and we cannot waste time experimenting with people's lives" (p. 12) could



be confronting to new graduates because problemsolving the appropriate AAC system for an individual takes time.

As we are working within the school system, the quote "funding managers be aware ... support staff need not only training in augmentative communication and supported conversation; they need to have their competencies regularly checked by people who have experience and skills in a wide range of communication strategies" (p. 12) rang true as too often training stops after attending a workshop! As we have always worked within multidisciplinary teams, Remington-Gurney's discussion as to the benefits of using a holistic approach when working with people with complex communication needs was pleasing. When working with people with complex needs, having support and access to practitioners who are experts in AAC is priceless! This needs to be kept in mind by employers.

We particularly liked the saying "if a tree doesn't grow, don't blame the tree" (p. 81). This statement reminds us that as therapists we have the responsibility to find a way for each client to communicate and understand the world around them. We must learn to look at ourselves and what we can change to foster a person's communication development.

There were a few points throughout the book which we felt required clarification. We were surprised to see Boardmaker Symbols and also Pragmatic Organisation Dynamic Display (PODD) referred to as types of symbols. Boardmaker refers to the software and PODD refers to a range of communication book templates. A symbol set that was not included in this book was Picture Communication Symbols (PCS).

Chapter 8 highlighted how gender impacts on the interaction style of communication partners, which is something that we often take for granted but can have a huge bearing, especially when a female is the main communication partner for a male who uses AAC.

There are many valid points throughout the book but they need to be taken in the context that it is an introduction to AAC. It would be recommended for families, teachers, new graduate speech pathologists and allied health staff / students, rather than experienced speech pathologists working in the field of AAC. We would consider utilising and recommending this text for these groups of people in the future.

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**Marsh, J., & Hallett, E. (Eds.). (2008). *Desirable literacies: Approaches to language and literacy in the early years* (2nd ed.). London: Sage; pp. 266; A\$147.00; [www.footprint.com.au](http://www.footprint.com.au)**

**Abigail Lewis**

This is the second edition of this book from the United Kingdom Literacy Association written for early years teachers. The book contains an extensive range of topics from researchers and experienced practitioners in the field. The first chapter "Learning to talk, talking to learn" is a good introduction to the area and the many activities that can be used to develop literacy in the classroom. Each subsequent chapter then focuses on a different aspect of literacy development and, as each chapter stands alone, the book can easily be dipped into for ideas and activities as required. Chapters cover a wide range of topics including environmental print, reading, creativity, bilingualism, multimodal literacies, drama, ICT, and family literacy. I found the chapters on poetry (including a description of a group multisensory poetry creation) and

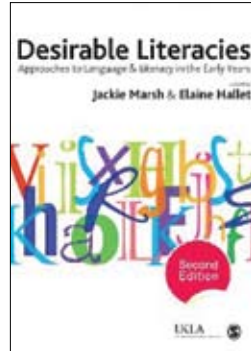


writing (describing the three main types of writing and the three elements of writing and how these can be developed in young children) particularly interesting areas often not considered by speech pathologists. Each chapter contains suggestions for further reading, extensive references to show the evidence base and practical examples and applications to the everyday classroom. Although reference is frequently made to the UK guidelines and regulations, the information is applicable to Australia and the new national curriculum.

“Play, drama and literacy in the early years” is the only chapter by an Australian contributor and gives wonderful examples of how literacy can be embedded in both structured and spontaneous dramatic play.

Several chapters address the impact of technologies on the development of literacy – in terms of multimodal literacies, ICT and literacy, and media literacy – bringing the content firmly up to date with current trends. The final chapter “Going fishing” gives examples of how children’s early literacy skills can be observed and assessed in order to inform curriculum planning.

Overall this book contains a huge range of research, activities, and ideas for literacy development in the early years for teachers and gives a comprehensive holistic view of literacy for the school-based speech pathologist.



structure, print–illustration relationship and a 3-page word count. This information is presented in paragraphs, a table and a decision tree, making it very easy to follow and apply. Examples of how to select a book based on a particular goal using the book selection analysis form are also given.

There are chapters on how to plan the session, set goals (with examples), and how to share storybooks with children using specific strategies. Additional materials, activities, and progress monitoring charts are provided. Although the book is aimed at shared book reading with a group, no information is given on how to adjust the activity to address a range of different goals and ability levels at the same time.

Overall this is an easy introduction to a common everyday practice that would be a great read for a teacher, giving plenty of good ideas. For an experienced speech pathologist, there is only a little new information: the book analysis, having more ideas to link teacher goals to language goals through shared book reading, and the useful charts. Some skill hierarchies or developmental milestones would be a useful addition along with some simple summaries of the information that could be shared with parents for home use. The speech pathologist would need to supplement this resource for teachers by giving further support for very low functioning children/those using AAC and by providing a wider range of goals than the examples given.

**Goldsworthy, C. (2010). *Linking the strands of language and literacy: A resource manual*. San Diego, CA: Plural Publishing; ISBN 978 1 59756 357 4; pp. 217; US\$49.95; [www.pluralpublishing.com](http://www.pluralpublishing.com)**

Andrea Murray

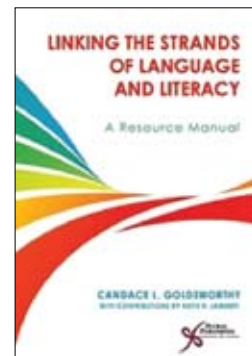
**MacKenzie, H. (2009). *One story at a time: Using the magic of storybooks to enhance development in children with learning challenges*. Winnipeg, Manitoba: Wired Fox. ISBN 978 0 9684466 1 4; pp. 127; CA\$24.95 plus postage; <http://www.drheathermackenzie.com/one-story-at-a-time.html>**

Abigail Lewis

*One Story at a Time* is written by a Canadian speech-language pathologist and teacher to support professionals (especially teachers) using shared storybook reading with children who have special needs. The book has eight, short, easy-to-read chapters, ten simple photocopyable charts to assess/track the various aspects of shared book reading, and a useful internet resource list.



As its title implies, *Linking the Strands of Language and Literacy* is a practical resource manual and CD, which is designed for use by both experienced clinicians and new graduates working with children and adolescents in the area of language and literacy. It is also designed to serve as a resource for clinicians in a leadership or teaching role by providing a review of the oral–written language continuum.



The author utilises the analogy made by Dickinson and McCabe (1991), where they describe the acquisition and development of language and literacy as a “French braid” rather than as a process that takes place sequentially. She refers to the “strands” of phonology, semantics, syntax, discourse, reading and writing which underpin the development of the oral–written language continuum and examines how the development of each strengthens and reinforces the development of other strands.

Using this framework, the resource is a useful tool in providing a scaffold for clinicians to identify key areas of weakness in the area of oral and written language and to formulate targeted intervention goals both on commencement and at intervals during the course of intervention.

Chapters provide an overview of the strands of language and literacy and the links between them; a rationale for early oral–written language intervention; practical ideas and strategies for developing listening skills and oral language; the value and use of play in intervention and a chapter on

oral narrative. While each chapter has some theory, the primary focus is one of “theory into practice” and the text provides both specific and practical examples, activities, and strategies that can be incorporated into assessment, review, and intervention. Material in each chapter is arranged in a developmentally sequential manner, making it easy to refer to. Each chapter also explores ways to strengthen all of the strands of language and literacy when working with a preschool or younger aged child, and thus advocates for clinicians to take a broad, proactive, and preventative stance when working with young children with speech and language delays.

Included with the resource is a CD which is designed to be used in tandem with chapter 6 which is titled “Oral narration outlines and language literacy activities”. The CD contains printable short stories, story map pages, and a range of worksheets to be used with language-learning disabled students when targeting oral and written narrative. They are easy to use, can be adapted for use with different age groups and would be suitable to use both individually or in group interventions.

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**Marinac, J.V. (2008). *Phonological core dyslexia in secondary school students: Identification and intervention*. San Diego, CA: Plural Publishing. ISBN 978 1 59756 090 0; pp. 170; US\$49.95; [www.pluralpublishing.com](http://www.pluralpublishing.com)**

**Melinda Schambre**

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Dr Marinac’s text is a valuable resource for speech pathologists working with adolescents in the secondary school setting. It is in fact a worthwhile read for all speech pathologists who work in the area of literacy difficulties as the author advocates for the role of the speech pathologist in supporting students with dyslexia. The text recognises the gaps in the research literature relating to secondary school students with literacy skills below the expected level, both in defining this group of students and in discussing options for assessment and management.

The first chapter of the book provides very clear and comprehensive explanations of the various terminology relating to dyslexia. Dr Marinac differentiates between developmental phonological dyslexia (as seen in young children who are still acquiring their reading skills) and phonological core dyslexia, when the difficulties are no longer considered developmental but show persistence and variable presentation in adolescence. She goes on

to discuss prevalence, causality for phonological core dyslexia (including physiological factors and environmental influences), and the complexity of the orthography of the English language. The definitions and terminology relating to dyslexia are clarified better here than in other literature on the subject.

The identification and assessment of students with phonological core dyslexia is discussed in detail, including a description of the design and development of the Classroom Identification Instrument, the screening component of the Phonological Awareness Training for High Schools (UQPATHS) program. The Classroom Identification Instrument is outlined as a whole class screening tool and is compared to more in-depth, individual assessments on the market.

These chapters are followed by a discussion of the relevant elements of an intervention program for phonological awareness and an outline of the UQPATHS program.

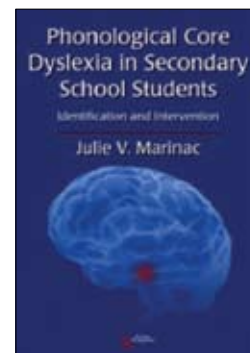
The program involves a triad approach where all students benefit from phonological awareness, auditory memory, and metalinguistic tasks which

have been imbedded into their English curriculum as a result of professional development provided to teachers.

Those students with mild–moderate deficits are then supported in small groups with specialist school staff and those students identified as having moderate to severe deficits receive in-depth, intensive therapy from speech pathologists.

Each chapter of the text concludes with a summary in the form of an imaginary conversation which the key ideas and attempts to answer questions relating the information pertained in the chapter. Following chapter 3, Dr Marinac provides a collection of slides from her own presentations at various seminars. This summary information helps to keep the text practical and extremely user friendly, rather than overly technical and hard to relate back to the classroom.

In summary, this text is a valuable resource from a theoretical perspective and also for the practical information it provides to clinicians working in secondary schools. Even more importantly, it emphasises the role of speech pathologists working collaboratively with secondary school staff.



## Electronic copies of *ACQ*

Speech Pathology Australia members are able to access past and present issues of *ACQ* via the Speech Pathology Australia website.

[www.speechpathologyaustralia.org.au](http://www.speechpathologyaustralia.org.au)

Hard copies are available to everyone (members and non members) at a cost by emailing [pubs@speechpathologyaustralia.org.au](mailto:pubs@speechpathologyaustralia.org.au).

# ACQ notes to authors

*ACQuiring Knowledge in Speech, Language and Hearing* is a major publication of Speech Pathology Australia and provides a professional forum for members of the Association. Material may include articles on research, specific professional topics and issues of value to the practising clinician, comments and reports from the President and others, general information on trends and developments, letters to the Editor and information on resources. Each issue of ACQ aims to contain a range of material that appeals to a broad membership base.

ACQ is published three times each year, in March, July and November.

Issue	Copy deadline (peer review)	Copy deadline (non-peer review)	Theme*
March 2012	3 August 2011	15 October 2011	Professional issues
July 2012	6 December 2011	1 February 2012	Working with people with complex communication needs
November 2012	14 April 2012	30 June 2012	TBA

\* articles on other topics are also welcome

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With rare exceptions, we do not publish material that has already been published.

Articles will be checked by a copy editor to ensure consistent presentation and standard of English.

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Articles should not usually exceed 3500 words (including tables and references). This is equivalent to approximately 11 double-spaced pages. Longer articles may be accepted, at the discretion of the editors. For further information go to <http://www.speechpathologyaustralia.org.au>

## Format

The article should be submitted electronically via email (as an attachment). One hard copy and a copy on disk (preferably in Microsoft Word) is required if the article contains symbols (e.g., phonetic font).

The title page should contain the title of the article, the author's name, profession, employer, contact phone number and correspondence address, as well as a maximum of five key words or phrases for indexing. Please provide brief biographical details (up to 15 words) for all authors.

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## Peer review

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