

## 22

# COMMUNICATION (D310–D369)

*Sharynne McLeod, Elspeth McCartney and Jane McCormack*

### **What is the construct?**

This chapter describes assessment of the activities and participation domain of communication (d3) as it relates to children and young people with developmental disabilities. In the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY), communication relates to ‘general and specific features of communicating by language, signs and symbols. . .’<sup>1</sup> and encompasses the following: communicating – receiving (d310–d329); communicating – producing (d330–d349); and conversation and use of communication devices and techniques (d350–d369).

#### **COMMUNICATING – RECEIVING (D310–D329)**

Comprehending the messages produced by others is an essential element of successful communication. Messages may take a number of forms, both verbal and non-verbal, and successful comprehension involves being able to understand both literal and implied meanings expressed in those messages.<sup>1</sup> In infancy, successful comprehension is typically evaluated as an infant’s ability to recognize and respond to the human voice (i.e. a spoken message) (d3100) with changes to breathing, gaze or movement. In childhood, comprehension of spoken messages is assessed as the ability to respond appropriately, with words or actions, to increasingly complex messages from basic commands or requests (d3101) through to questions and multistep instructions (d3102). As children develop, comprehension of other forms of messages (e.g. non-verbal messages, sign-language measures, written messages) may be evaluated as well.

#### **COMMUNICATING – PRODUCING (D330–D349)**

The ability to produce messages, whether in verbal or non-verbal forms, is the other essential element of communication. In infancy, the messages produced may be vocal, but may not consist of real words. Thus, children’s

vocalizations (pretalking) (d331) may be evaluated for communication intent (e.g. babbling when parent is close or during turn-taking activities). In childhood and adolescence, producing verbal messages may be evaluated through activities such as speaking (d330) and singing (d332), while the production of non-verbal messages may be assessed through examining the use of body language (e.g. facial gestures, body movements, postural changes) (d3350) and more formal sign language (d340), such as that used by children with hearing loss. In addition, children’s production of non-verbal messages may be evaluated through examining their ability to convey meaning through activities such as producing signs and symbols (d3351) or drawings (d3352), and for older children, producing written messages (d345).

#### **CONVERSATION AND USE OF COMMUNICATION DEVICES AND TECHNIQUES (D350–D369)**

Successful communication involves both receiving and producing messages, whether with familiar or unfamiliar people, with one person or several and during formal or informal settings. In conversation (d350), this reciprocity takes the form of an exchange of ideas, which may be evaluated through examining an individual’s ability to initiate, sustain and terminate dialogue. In discussion (d355), the reciprocity takes the form of examination of matter, argument or debate. Both conversations and discussions may be carried out using verbal or non-verbal means, and both are activities that may be performed by children and young people. Other communication-based activities that may be evaluated involve the use of communication devices such as telephones (d3600), computers (d3601) and use of communication techniques (e.g. lip reading) (d3602). Some people require the use of specific assistive products and technology for communication (e1251) if they are unable to speak.<sup>2</sup>

## QUALIFIERS

When measuring the domain of communication (d3), it is important to consider both an individual's communicative *capacity* and communicative *performance*. *Capacity* refers to the ability to execute a task or an action and so aims to indicate 'the highest probable level of functioning that a person may reach in a given domain at a given moment'.<sup>1</sup> According to the World Health Organization (WHO), capacity is 'measured in a uniform or standard environment, and thus reflects the environmentally adjusted ability of the individual'.<sup>3</sup> In contrast, *performance* refers to 'what an individual does in his or her current environment. . . ' (and) can be understood as 'involvement in a life situation'.<sup>1</sup> Evaluation of communicative performance considers children's communication skills in the context in which they live, and so also takes into account their performance with any assistive devices they typically use or personal assistance that they have.

### General factors to consider when measuring this domain

#### ASSESSING CAPACITY VERSUS ASSESSING PERFORMANCE

The difference between a child's capacity and their performance reflects the difference between their skills in a standardized environment versus their everyday environment.<sup>2</sup> Previous researchers have described the limited availability of tools to explore the communication domain in the activities and participation component.<sup>4</sup> Our understanding of the capacity and performance qualifiers leads us to agree that there are few tools available to assess *performance*, but also to suggest that there are a number available to assess *capacity*. As capacity refers to a child's ability to execute an action in a standard environment, communicative capacity may be measured by standardized tools. Many standardized assessments of communication measure the functions underlying communication [e.g. voice and speech functions (b3) or specific mental functions of language (b167)], as well as the outcome of these functions: communication and conversation. Thus, the tools described in relevant body functions chapters (b167 'Specific mental functions of language', Chapter 12 in this text; and b3 'Voice and speech functions', Chapter 15) also apply to the assessment of communication capacity. The rules for administration of standardized tools (such as the *Clinical Evaluation of Language Fundamentals*, fourth edition<sup>5</sup> or the *Diagnostic Evaluation of Articulation and Phonology*<sup>6</sup>) are intended to limit the influence of environmental factors so as to ensure that the test context is uniform or standard, regardless of the child participating in the assessment. Consequently, these tools enable

professionals to determine a child's ability to execute activities without strategies, prompts, cues or devices to assist; that is, to determine a child's 'true ability'.<sup>3</sup>

The measurement of communicative capacity focuses on the skills of the individual, and, as stated, contrasts with the measurement of communicative performance, which takes into account environmental factors such as the impact of the physical, attitudinal and social world on children's communication-based activities and participation. Tools available to assess communication capacity are described elsewhere (see Chapters 12 and 15) and so will not be a focus of the current chapter, which will concentrate on the limited number of assessments that explore children's performance of communication activities in their everyday environments (see 'Overview of recommended measures', below).

The WHO<sup>3</sup> suggested that comparing capacity and performance 'provides a useful guide as to what can be done to the environment of the individual to improve performance'. One way to examine what can be done to improve performance is to assess a child's ability to execute an activity in a standard environment, but with assistance. For children with developmental disabilities, dynamic assessment provides one way to examine capacity with assistance. Dynamic assessment involves evaluating a child's ability to execute activities when provided with additional cues or information; that is, when the linguistic context is modified. This contrasts with static, standardized assessments, when adult input is minimized and the environment stays constant.<sup>7</sup> There are a range of dynamic assessment techniques (e.g. scaffolding, test-teach-retest) for children with developmental disabilities (e.g. autism, Down syndrome, language impairment)<sup>8</sup> as well as for children from culturally and linguistically diverse backgrounds.<sup>9,10</sup> It has been suggested that dynamic assessments reveal 'learning potential' rather than simply measuring skills, and provide direction about the best ways to help children achieve potential and facilitate the transfer of skills to other environments.<sup>11</sup>

#### ASSESSING COMMUNICATION ACTIVITIES VERSUS ASSESSING LIFE ACTIVITIES

It is important to recognise that successful communication encompasses many ICF-CY chapters beyond communication (d3). Other activity and participation domains should be considered simultaneously when evaluating communication in order to avoid 'ignoring the effect that a communication disability may have on all areas of life'.<sup>12</sup> Indeed, Eadie et al<sup>4</sup> stated: 'Although specific communication acts are found in the third chapter of the ICF-CY manual, communication is a construct that is pervasive and is required to fulfil other aspects of

participation found in most of the other chapters (e.g. communication involved in job performance, academic performance, self-care, community roles, establishing and maintaining relationships).<sup>7</sup> For example, activities and participation that may be difficult for children with speech impairment (b230) identified in a recent systematic review<sup>13</sup> include learning to read (d140), reading (d166), learning to write (d145), writing (d170), focusing attention (d160), thinking (d163), calculating (d172), mobility (d4), self-care (d5), interpersonal interactions and relationships (d7), relating with persons in authority (d7400), informal relationships with friends/peers (d7500/d7504), parent–child relationships (d7600), sibling relationships (d7602), major life areas (d8), school education (d820), acquiring, keeping and terminating a job (d845) in addition to communication (d3).<sup>13,14</sup>

Holistic assessment of communication skills incorporates assessment of the full range of activities and participation domains, along with consideration of all other ICF-CY components. Researchers have identified that assessment data are most useful (in terms of determining eligibility for services, developing intervention plans and evaluating treatment effects) when information about impairments of body structures and functions are considered in association with functional abilities and limitations.<sup>15,16</sup>

### Overview of recommended measures

Several measures to assess children’s communicative performance have been created, including some which use the ICF-CY as a guiding framework. This review will focus on five recent measures. These measures have been selected for inclusion in this chapter because they rely on different communicative partners [speech–language pathologists (SLPs), parents and teachers] assessing the child’s communication performance in typical everyday contexts. The perspectives of parents may well differ from the perspectives of professionals.<sup>17,18</sup> Additionally, the perspectives of children regarding their communication performance, areas of strength and difficulty, potential need for assistance and goals for intervention may well differ from adults.<sup>19</sup> Thus, in the evaluation of communicative performance, it is important to consider the range of different perspectives that may exist. Additional measures are presented in summary tables at the end of the chapter. Some of the measures evaluate the communication performance of children and young people with specific communication impairments (e.g. speech impairment/speech sound disorder, voice disorder or stuttering), while other measures may be used for a range of populations.

### SPEECH–LANGUAGE PATHOLOGIST-REPORT MEASURES

Speech–language pathologists are professionals specializing in the area of communication, and have traditionally focused assessment and intervention plans on functions underlying communication (e.g. body functions and structures, including voice and speech functions and mental functions of language) or communicative capacity – components which are more concrete and easier to test objectively than other components.<sup>4,20–22</sup> However, the success (or otherwise) of a child’s communication may be judged by their communication performance; that is, their ability to engage in the full range of life activities in which they wish to take part in their everyday environment. The Therapy Outcome Measures (TOMs) is an assessment tool developed for use by professionals as a way of evaluating communication performance. The TOMs are described in more detail below. The Focus on the Outcomes of Communication Under Six (FOCUS) is another tool that may be used by professionals to evaluate a child’s ability to communicate and participate in a range of activities (see summary table), while tools such as the American Sign Language Proficiency Assessment (ASL-PA)<sup>23</sup> and Profile of Multiple Language Proficiencies (PMLP)<sup>24</sup> provide this information specifically for children with hearing loss.

#### *Therapy outcome measures*

##### Overview and purpose

The TOMs<sup>25</sup> were developed as a before and after therapy measure to reflect outcomes in the WHO’s ICF categories of impairment, activity and participation. In addition, they use a construct entitled ‘well-being/distress’, which aims to capture ‘emotions, feelings, burden of upset, concern and anxiety and level of satisfaction with the condition’.<sup>22</sup> There are individual TOM scales for a variety of clinical conditions (including speech, language, voice and fluency), and also a core scale that may be adapted for any client. The TOMs have been adapted for use in Australian clinical practice (AusTOMs).<sup>26</sup>

##### Administration and scoring

The child’s SLP assesses impairment, activity, participation and well-being/distress based on their knowledge of the child. Severity on each is scaled from 0 (most severe/profound) to 5 (appropriate for the child’s age and culture) using the best fit from a series of illustrative descriptors. Half-way points on the 0 to 5 scale give an 11-point ordinal scale.

THERAPY OUTCOME MEASURES (TOMs)	
Purpose	Published standardized protocol Aims to assess outcomes in the World Health Organization International Classification of Functioning, Disability and Health categories of body function, activity and participation, and assess 'well-being/distress'. May be used as an outcome measure
Population	Any child client
Description of domains (subscales)	Domains not specified/one scale as relevant to functional impairment, e.g. phonological disorder, dysarthria, dysfluency, dysphonia
Administration and test format	Time to complete: estimate of 10min Testing format: speech–language pathologist (SLP) evaluates impairment, activity, participation and well-being/distress based on their knowledge of the child Scoring: 11-point ordinal severity scale ranging from 0 to 5, where zero is most severe/profound and five is appropriate for the child's age and culture (half-way points may be used). SLP selects best fit from descriptors provided Training: designed for SLPs; training within SLP services recommended
Psychometric properties	Normative sample: No normative sample <i>Reliability</i> Inter-rater: SLPs working in the same service: Spearman's correlations for impairment 0.84–0.94; activity 0.77–0.91; participation 0.71–0.91, well-being/distress 0.70–0.93. No across-service information <i>Validity</i> Face validity: specialist SLPs involved in constructing the descriptors. Construct – TOMs Impairment Scale Spearman's correlation –0.50 with speech production scores, both computed by the same SLP Responsiveness: no information retrieved
How to order	Enderby P, John A, Petheram B (2006) <i>Therapy Outcome Measures for Rehabilitation Professionals</i> , 2nd edition. SLT, Physiotherapy, OT, Rehabilitation Nursing, Hearing Therapists. Chichester: John Wiley & Sons.
Key references	Enderby P, John A, Petheram B (2006) <i>Therapy Outcome Measures for Rehabilitation Professionals: Speech and Language Therapy, Physiotherapy, Occupational Therapy</i> , 2nd edition. Chichester: John Wiley & Sons. Roulstone S, John A, Hughes A, Enderby P (2004) Assessing the construct validity of the Therapy Outcome Measure for pre-school children with delayed speech and language. <i>Int J Speech Lang Pathol</i> 6: 230–236.

#### Psychometric properties

Reliability studies carried out by SLPs are reviewed in the manual. A total of 80 SLPs working with children in six UK national health services were included. SLPs were trained on TOMs procedures using their own clients as examples, and then rated video tapes and case history data. SLPs working for the same service showed inter-rater reliability Spearman's correlations for impairment of 0.84 to 0.94; activity 0.77 to 0.91; participation 0.71 to 0.91; and well-being/distress 0.70 to 0.93 subscales. No service descriptions are provided. Training within

services to establish reliability is recommended in the manual.

Face validity was established by specialist SLPs contributing to the content of the scales' descriptors using Delphi techniques and comparing TOMs results with their own observations. Construct validity was tested by SLPs completing a TOMs scale and a range of communication measures for children under 3 years of age involved in a large trial,<sup>27</sup> including 27 children with predominately speech difficulties. The TOMs impairment scale showed a highly significant Spearman's correlation of –0.50 with

FOCUS ON THE OUTCOMES OF COMMUNICATION UNDER SIX (FOCUS)	
Purpose	To measure ‘real world’ outcomes of communication interventions (i.e. child’s ability to communicate and participate in the community)
Population	Preschool children (<6y)
Description of domains (subscales)	50 items (statements) in two parts: Part I requires respondents to identify how well items describe the child (e.g. ‘My child talks a lot’). Part II requires respondents to identify the amount of cueing required by the child to complete items (e.g. ‘My child will sit and listen to stories’)
Administration and test format	Two versions (one for parents and one for clinicians) containing identical items. The clinician version has space to record the basis for the rating (either observation or parent report)  FOCUS items are rated at the start and completion of intervention and difference between the ratings indicates change  Time to complete: estimated 10min  Testing format: parent/clinician responds to written statements  Scoring: seven-item Likert scales. For Part I, responses range from ‘not at all like my child’ to ‘exactly like my child.’ For Part II, responses range from ‘cannot do at all’ to ‘can always do without help’ to evaluate the level of assistance required to complete items successfully  Training: no training required
Psychometric properties	Scale development sample: no normative comparisons are available owing to nature of measure. Testing of the measure occurred with 165 families of children (mean age 3.8y, standard deviation 0.91y, range 1.2–5.5y) attending speech and language services (and their clinicians). 72% ( $n=119$ ) of participants were males, 13% ( $n=22$ ) had specific medical diagnoses (including autistic spectrum disorders, cerebral palsy and Down syndrome). Most participants had developmental speech disorders (80%) or expressive language disorders (72%)  <i>Reliability</i>  Internal consistency: clinicians’ internal consistency was high at the start of treatment (Cronbach’s alpha 0.97) and completion (Cronbach’s alpha 0.94). Test–retest – parents’ test–retest correlation was high ( $r>0.95$ ), and clinicians’ test–retest correlation was acceptable ( $r>0.70$ ). Rater – inter-rater reliability has been established as high ( $r>0.90$ ) for both Part I and Part II of the FOCUS  <i>Validity</i>  Content validity: FOCUS items were derived and worded from prospective observations of change as reported by parents and clinicians of 210 preschool children. The FOCUS measure was developed and tested with parents and clinicians of an additional 165 children. Constructs used in the FOCUS measure were derived from the ICF and respondents reported they accurately captured children’s communication skills. Construct validity – 22 parents also completed the Pediatric Quality of Life Inventory (PedsQL) at the start and completion of intervention. Children with higher FOCUS scores after treatment also had higher PedsQL scores ( $r=0.47$ , $p=0.029$ ). Correlation with PedsQL – psychosocial domain was particularly strong ( $r=0.49$ , $p=0.013$ ). Responsiveness – the FOCUS is currently undergoing validity testing to establish its responsiveness to change
How to order	FOCUS items are listed in the journal article (below) describing its development. The user version of the FOCUS will be available for download from a website after 2011
Key reference	Thomas-Stonell N, Oddson B, Robertson B, Rosenbaum P (2010) Development of the FOCUS (Focus on Outcomes of Communication Under Six): a communication outcome measure for preschool children. <i>Dev Med Child Neurol</i> 52: 47–53.



phonology error scores, although both were computed by the child's SLP. The result gives some support to the construct validity of the TOMs impairment scale for this client group. Lubinski et al<sup>28</sup> note, however, that SLP-gathered treatment outcomes of this type could be viewed as potentially biased and present less good evidence than even professional consensus opinion.

#### PARENT-REPORT MEASURES

Parents have unique knowledge of their children and can provide insights into their children's communication performance in their everyday environment. There are an increasing number of measures available to assess the perspective of parents regarding their children's communication skills. Some of these, such as the Pediatric Voice Handicap Index (pVHI)<sup>26</sup> (see description below), Intelligibility in Context Scale (ICS)<sup>30</sup> and the Parents' Evaluation of Aural/Oral Performance of Children (PEACH)<sup>31</sup> (see summary chart) focus solely on the perspective of parents. However, others measures, such as the FOCUS<sup>32</sup> (see summary chart), enable a comparison of the perspectives of parents and others. Some measures have determined the different perspectives of parents and professionals. For example, the Communication Function Classification System<sup>33</sup> for individuals with cerebral palsy is a validated measure of communicative function informed by the ICF-CY, and has been determined to have good professional inter-rater reliability and moderate parent-professional inter-rater reliability.<sup>33</sup>

#### *Pediatric Voice Handicap Index*

##### Overview and purpose

The adult version of the VHI<sup>29</sup> is a self-assessment quality of life measure for dysphonic clients, with items derived from case history interviews. The VHI assesses severity of functional, physical and emotional impacts of voice impairment. A revised and shortened adult version (VHI-10) is also available. The paediatric version (pVHI) was derived from the adult VHI as a proxy version to be completed by parents or carers of a child with voice dysfunction.<sup>29</sup>

##### Administration and scoring

The pVHI is a questionnaire for parents/carers who rate their child's overall talkativeness and then rate 23 descriptions of functional, physical and emotional aspects of voice on five-point subscales. A total score is also computed.

##### Psychometric properties

The adult VHI met Health Service/Technology Assessment Test 52 reliability and validity criteria,<sup>34</sup> and

in a further study met seven of 11 criteria and was the preferred measure in relation to item information, practicality and reliability, thus supporting its clinical use.<sup>35</sup> The pVHI was standardized<sup>29</sup> on 45 parents of children aged 3 to 12 years with no history of voice dysfunction, and 33 parents/guardians of dysphonic children aged 4 to 21 years awaiting or following laryngotracheal reconstruction. Test-retest reliability was established by 10 parents of dysphonic children who received no intervening treatment, repeating the assessment within 3 weeks: Pearson's coefficients 0.95 (functional), 0.77 (physical), 0.79 (emotional), 0.82 (total).

Mean scores differentiated dysphonic from non-dysphonic children – dysphonic children: means=13.94 (functional), 15.48 (physical), 12.15 (emotional) and 41.58 (total); non-dysphonic children: means=1.47 (functional), 0.20 (physical), 0.18 (emotional) and 1.84 (total), suggesting little overlap in scores and therefore construct validity. Correlations between subscales ranged from 0.59 (functional and physical) to 0.86 (functional and emotional). A moderate correlation was obtained between parent report of severity on a visual analogue scale and the pVHI total score. A systematic review<sup>36</sup> including pVHI-agreed validity and reliability criteria were met, but no responsiveness data were given. The review noted that in common with other instruments adapted from existing adult measures for paediatric use, the pVHI was constructed by eliminating items not relevant to children rather than establishing items that were specifically relevant to quality of life in childhood. The use of such instruments as outcome measures is limited by this factor.

#### CHILD-REPORT MEASURES

According to the United Nations Convention on the Rights of the Child, children ought to be asked about their views on issues that concern them, and their views should be given due consideration.<sup>37</sup> A recent book documented methodologies for listening to children and young people with speech, language and communication needs.<sup>38</sup> Although it may be difficult to establish the views of very young children when reliant solely on verbal measures, their views can be investigated using other modes. For instance, researchers have recommended that drawings can be used as a way of enabling children to express themselves and enabling others to access children's perspectives.<sup>19,39,40</sup> In addition, self-report measures have recently been developed for children with speech impairments [e.g. Speech Participation and Activity Assessment of Children (SPAA-C<sup>22</sup>)] and dysfluency [e.g. the Behavior Assessment Battery for School-age Children who Stutter<sup>41</sup> (BAB)] to determine their perspective regarding their communication performance. The SPAA-C will be

PARENT'S EVALUATION OF AURAL/ORAL PERFORMANCE OF CHILDREN (PEACH) SCALE	
Purpose	To evaluate the oral and aural abilities in daily life of infants and children with hearing impairment using parent observations
Population	Infants (aged 1mo) through to school-aged children
Description of domains (subscales)	11-item questionnaire for assessing functional auditory performance in everyday life Two subscales: six items examine children's auditory performance in 'quiet' situations (e.g. respond to name in quiet, respond to verbal instructions in quiet); five items examine children's auditory performance in 'noise' (e.g. respond to name in noise, respond to verbal instructions in noise)
Administration and test format	<p>Time to complete: questionnaire is completed by parents (approximately 10 min) based on child's behaviour during the previous week</p> <p>Testing format: if the PEACH were used to evaluate aided performance, parents are requested to check that their children use hearing devices for &gt;50% of their waking hours, and that the use of devices does not lead to loudness discomfort. Parents then rate the frequency (never: 0%, seldom: 1–25%, sometimes: 26–50%, often: 51–75%, always: 75–100%) with which their children display behaviours in different real-life scenarios described in the questionnaire. Parents may be interviewed regarding their responses on the questionnaire. The interviewer (speech–language pathologist or audiologist) scores questionnaire items on the basis of parent reports and interviews</p> <p>Scoring: five-item scales (0=never, no examples of behaviour given, 1=seldom, 2=sometimes, 3=often, 4=almost always, more than six examples given or behaviour reported more than 75% of time). The PEACH scale provides an overall score, a 'quiet' and 'noise' subscale score based on subsets of items. A comparative score, on a five-point scale, is also available when the PEACH is used for comparing performance in two conditions</p> <p>Training: speech–language pathologist/audiologist required to interview and score PEACH</p>
Psychometric properties	<p>Scale Development Sample: parents of 90 children with normal hearing [mean age 13.4mo; standard deviation (SD) 11.4mo; range 0.25–46.0mo] and 90 children with hearing impairment (mean age 95.6mo; SD 64.0mo; range 4.0mo–19.8y). Hearing status of children with normal hearing was ascertained by pass at newborn hearing screening or pass in visual reinforcement audiometry. No children with normal hearing had any known history of ear/hearing problems. Children with hearing impairments varied in degree of hearing loss (mild to profound) and type of amplification used (seven unaided, two with unilateral hearing aids, 65 with bilateral hearing aids, 16 with hearing aid and cochlear implant in opposite years). Children with known disabilities (in addition to hearing loss) were excluded</p> <p><i>Reliability</i></p> <p>Internal consistency: factor analysis revealed moderate reliability of items in the 'quiet' subscale (Cronbach's alpha 0.76) and 'noise' subscale (Cronbach's alpha 0.79). The correlation between the quiet and noise subscales was 0.85 (<math>p&lt;0.001</math>). Test–retest – the PEACH was re-administered within 2–4 weeks to a subsample of parents (15 had children with normal hearing; 17 with hearing impairment). Test–retest correlation was high for all scales: overall: <math>r=0.93</math>; quiet: <math>r=0.81</math>; noise: <math>r=0.93</math>). Rater – inter-rater reliability has been established as high (<math>r=0.95</math>, <math>p&lt;0.001</math>) for the overall score on the PEACH</p> <p><i>Validity</i></p> <p>Content validity: the PEACH focuses on aural/oral behaviours in real-life speech communication situations, as the goal of amplification is to ensure audibility for speech input. Professionals including teachers of the deaf, early intervention teachers, and audiologists contributed to the design of the items. Construct validity – functional performance in real life as measured by the PEACH was significantly correlated with auditory comprehension and expressive communication as measured by the Pre-school Language Scale (Ching et al, 2010)</p> <p>Sensitivity: The sensitivity of the PEACH scale to differences in amplification strategies has been shown in Ching et al (2008)</p>

How to order	The PEACH questionnaire has been modified for use with teachers (TEACH) and for children to self-report their listening function (SELF). All three questionnaires and score forms can be freely downloaded from the Australian National Acoustics Laboratory website: <a href="http://www.outcomes.nal.gov.au">www.outcomes.nal.gov.au</a> . The key references (below) also contain questionnaire items as appendices
Key references	<p>Ching TYC, Hill M (2007) The Parents' Evaluation of Aural/Oral Performance of Children (PEACH) Scale: Normative data. <i>J Am Acad Audiol</i> 18: 220–235.</p> <p>Ching TYC, Hill M, Dillon H (2008) Effect of variations in hearing aid frequency response on real-life functional performance of children with severe or profound hearing loss. <i>Int J Audiol</i> 47: 461–475.</p> <p>Ching TYC, Crowe K, Martin V, et al (2010) Language development and everyday functioning of children with hearing loss assessed at 3 years of age. <i>Int J Speech Lang Pathol</i> 12: 124–131.</p>

PEDIATRIC VOICE HANDICAP INDEX (PVHI)	
Purpose	<p>Standardized questionnaire; derived from the adult VHI; a quality-of-life self-assessment for dysphonic clients</p> <p>Aims to assess functional, physical and emotional impacts of voice disorder and provide a proxy quality of life measure via parents or carers of a child with voice dysfunction. May be used as an outcome measure</p>
Population	Standardized on dysphonic children aged $\geq 3$ y
Description of domains (subscales)	Seven domains/five subscales: Talkativeness (one item); functional (seven items), physical (nine items), emotional (seven items) and overall severity (one item)
Administration and test format	<p>Time taken to complete: estimated 5–10min</p> <p>Testing format: questionnaire for parents/carers, who rate the child's overall talkativeness, and 23 descriptions of functional, physical and emotional impact of voice disorder</p> <p>Scoring: five- to seven-point rating scales for talkativeness, and functional, physical and emotional scales (subscale and total scores). There is a visual analogue scale for severity</p> <p>Training: none required</p>
Psychometric properties	<p>Normative sample: 45 parents of children aged 3–12y with no history of voice dysfunction. 33 parents/guardians of dysphonic children aged 4–21y awaiting/following laryngotracheal reconstruction</p> <p><i>Reliability</i></p> <p>Test–retest Pearson's coefficients 0.95 (functional), 0.77 (physical), 0.79 (emotional), 0.82 (total)</p> <p><i>Validity</i></p> <p>Subscales correlated from 0.59 (functional with physical) to 0.86 (functional with emotional). Moderate correlation for total score with severity Scores differentiated dysphonic from non-dysphonic children</p> <p>Responsiveness: no information retrieved</p>
How to order	Information from Zur et al (2007), below
Key references	Branski RC, Cukier-Blaj S, Pusic A, et al (2009) Measuring quality of life in dysphonic patients: A systematic review of content development in patient-reported outcomes measures. <i>J Voice</i> .

[190]



Key references	<p>Franic DM, Bramlett RE, Bothe AC (2005) Psychometric evaluation of disease specific quality of life instruments in voice disorders. <i>J Voice</i> 19: 300–315.</p> <p>Zur KB, Cotton S, Kelchner L, Baker S, Weinrich B, Lee L (2007) Paediatric Voice Handicap Index (pVHI): a new tool for evaluating paediatric dysphonia. <i>Int J Pediatr Otorhinolaryng</i> 71: 77–82.</p>
----------------	--

reviewed in the next section; the dysfluency measures are described in further detail below.

### *Behavior Assessment Battery for School-age Children who Stutter*

#### Overview and purpose

The BAB<sup>41</sup> aims to investigate the personal views of children aged 6 years and over concerning their fluency-associated emotional, disruptive, coping and attitudinal reactions. Children decide if statements about speech and fluency apply to them. There are three separate scales to offer a multidimensional view: the Speech Situation Checklist (SSC); the Behavior Checklist; and the Communication Attitude Test (CAT). Responses index activity and participation in communication, particularly conversation, interpersonal interactions and relationships, and education.

The SSC has two independent subscales: emotional reactions (ER), measuring a child's reported emotional reactions to speech situations; and speech disruption, measuring the amount of difficulty a child perceives when talking in a range of different situations. The Behavior Checklist details the child's conscious avoidance behaviours when anticipating a moment of stuttering, and so is not a measure of activity or participation. The CAT measures a child's negative and positive beliefs about his or her speech ability.

#### Administration and scoring

[191] The scales are administered by the child's SLP, who reads statements for the child to evaluate, or supports older children as they read themselves. Responses are true or false or semantically scaled, and are summated and compared with the mean and standard deviation for children in the standardization sample who did and did not stutter.

#### Psychometric properties

The standardization sample comprised 578 children aged 6 to 13 years with no history of stuttering and 139 stuttering children. Mean scores for children who stuttered were systematically and significantly lower in all subscales than those who did not, but the distributions overlap.<sup>41</sup>

An evaluation of instruments measuring health-related quality of life in children and adults who stuttered<sup>42</sup> included versions of the SSC-ER subscale and the CAT. The CAT met stringent criteria for internal consistency and test-retest reliability, but not content validity measures, as some questions did not relate to health-related quality of life. The SSC-ER addressed only mental functioning, and so failed the strict content validity criterion as a quality of life measure, and also failed strict test-retest criteria.

As the CAT differentiated children who stuttered from those who did not, the review's authors considered that its ability to differentiate stuttering from typical fluency suggested it would be responsive to major changes in a child over time, but no data were collected. Additionally, no data were available on longitudinal responsiveness. The authors recommended the 'cautious' use of the CAT scale as the best available measure for group-level decision-making for dysfluent children in the absence of a more psychometrically sound measure. Studies of children with speech difficulties other than stuttering (reviewed by Johannisson et al<sup>43</sup>) suggested that the CAT also differentiated among children with voice, speech and fluency disorders.

### *Communication Attitude Test for Pre-school and Kindergarten Children who Stutter*

#### Overview and purpose

Stuttering frequently manifests in the preschool years. The KiddyCAT (CAT for Pre-school and Kindergarten Children who Stutter)<sup>44</sup> investigates the communication attitudes of children (3–6y) who stutter in relation to their communication skills. It is a downward extension of the CAT, one of the subtests in the BAB<sup>41</sup> (described in the preceding section).

#### Administration and scoring

The SLP asks the child 12 questions relating to stuttering, recording a 'yes' or 'no' answer. Responses are summated and compared with the mean and standard deviation for children in the standardization sample who did and did not stutter.

BEHAVIOR ASSESSMENT BATTERY FOR SCHOOL-AGE CHILDREN WHO STUTTER (BAB)	
Purpose	Published standardized assessment Aims to investigate the child's personal views concerning their fluency-associated emotional, disruptive, coping and attitudinal reactions. May be used as an outcome measure
Population	Children $\geq 6$ y who stutter
Description of domains (subscales)	Five domains/four subscales: Behaviour Checklist (BC); Communication Attitude Test (CAT); emotional reactions (ER); speech disruption (SD)
Administration and test format	Time to complete: estimated 8–9min Testing format: child evaluates statements read by speech–language pathologist (SLP)/child Scoring: True/false or semantic scale. Scores are compared with norms from stuttering (stammering) and non-stuttering children Training: designed for SLPs
Psychometric properties	Normative sample: 578 children aged 6–13y with no history of stuttering and 139 stuttering children <i>Reliability</i> CAT scales meet stringent criteria for test–retest reliability and internal consistency. ER fails strict test–retest criteria <i>Validity</i> Mean scores for children who stutter are lower in all subscales than for non-stuttering children, but distributions overlap. CAT scale addresses quality of life, but not all items are relevant to this construct. ER addresses only mental functioning, and so fails a strict content validity criterion as a quality of life measure. Responsiveness: no longitudinal data retrieved
How to order	Plural Publishing
Key references	Brutten G, Vanryckeghem M (2006) <i>Behaviour Assessment Battery for School-age Children who Stutter</i> . San Diego: Plural Publishing. Franc DM, Bothe AK (2008) Psychometric evaluation of condition-specific instruments used to assess health-related quality of life, attitudes, and related constructs in stuttering. <i>Am J Speech Lang Pathol</i> 17: 60–80.

[192]

### Psychometric properties

A standardization samples was composed of 63 children aged 3 to 6 years with no history of stuttering and 45 stuttering children. Mean scores for children who stuttered were systematically and significantly lower in all subscales than for those who did not, but distributions overlapped. Split-half reliability measures report Cronbach's alpha as 0.72 for non-stuttering children and as 0.75 for children who stutter, suggesting internal consistency. Test–retest reliability measures are not given. The KiddyCAT reports criterion-related and construct validity measures based on studies of the CAT (see above).

### MEASURES OF MULTIPLE PERSPECTIVES

(INCLUDING CHILD-, TEACHER- AND FRIEND-REPORT)

There may be a number of 'significant others', such as a child's teacher or friends, who can also provide valuable information about their communication performance during a range of communication-based activities in everyday contexts. The perspective of teachers and friends regarding the communication performance of a child with speech impairment may be obtained through the use of measures such as the SPAA-C<sup>22</sup> (described below) and ICS,<sup>30</sup> which both also enable comparison with parent perspectives. Other measures which provide information about the communication of children with specific

COMMUNICATION ATTITUDE TEST FOR PRESCHOOL AND KINDERGARTEN CHILDREN WHO STUTTER (KIDDYCAT)	
Purpose	Published standardized assessment. A downward age extension of the CAT subscale of the Behaviour Assessment Battery for School-Age Children who Stutter (BAB). Aims to assess talk-associated attitudes of preschool children. May be used as an outcome measure
Population	Children aged 3–6y who stutter
Description of domains (subscales)	Two domains/one scale (12 items)
Administration and test format	Time to complete: estimate 5–10min Testing format: SLP asks the child 12 yes/no questions about talking Scoring: true/false. Total score is compared with norms from stuttering (stammering) and non-stuttering children Training: designed for speech–language pathologists
Psychometric properties	Normative sample: 63 children aged 3–6y with no history of stuttering and 45 stuttering children <i>Reliability</i> Split-half Cronbach’s alpha 0.72 non-stuttering children, 0.75 children who stutter. Test–retest – no information retrieved <i>Validity</i> Mean scores for children who stutter are lower in all subscales than for non-stuttering children, but distributions overlap. Reports criterion and construct validity measures based on studies of the CAT (below) Responsiveness: no longitudinal data retrieved
How to order	Plural Publishing
Key references	Brutten G, Vanryckeghem M (2006) <i>Behaviour Assessment Battery for School-age Children who Stutter</i> . San Diego: Plural Publishing. Vanryckeghem M, Brutten G (2006) <i>KiddyCAT: Communication Attitude Test for Preschool and Kindergarten Children who Stutter</i> . San Diego: Plural Publishing.

difficulties include the teacher version of the PEACH,<sup>31</sup> the Teachers’ Evaluation of Aural/Oral Performance of Children,<sup>45</sup> which investigates teachers’ perspectives of the communication performance of children with hearing loss, and the Peer Attitudes Toward Children who Stutter,<sup>46</sup> which explores the communication skills of children with fluency difficulties from the perspective of his or her friends.

#### *Speech Participation and Activity Assessment of Children: Version 2.0*

##### Overview and purpose

The SPAA-C<sup>22</sup> is a preliminary attempt to evaluate aspects of activity and participation relevant to children with speech impairments and to plan intervention that impacts

upon the child’s whole life. It comprises semi-structured interview schedules with children with speech impairment and/or their friends, siblings, parents, teachers and relevant others, as appropriate. It was developed by over 100 SLPs during a conference and refined at a separate workshop. The questions derive from attendees’ collected narratives about the impact of communication impairment with a focus on child speech difficulties. Activity, participation, and environmental and personal factors were considered in constructing questions. Further SLP professional critique was undertaken to derive the second version (Version 2.0).

##### Administration and scoring

Semi-structured interviews are carried out lasting from 10 minutes to 1 hour, depending upon the number of

SPEECH PARTICIPATION AND ACTIVITY OF CHILDREN: VERSION 2 (SPAA-C2)	
Purpose	<p>Preliminary development of standardized protocol</p> <p>Aims to evaluate aspects of activity and participation relevant to children with speech impairments and support the planning of intervention to impact upon a child's whole life. May be used as an outcome measure</p>
Population	Children with speech impairment and their parents, teachers, friends, siblings and others, as appropriate
Description of domains (subscales)	Four domains/one scale: 5–27 items, according to respondent category
Administration and test format	<p>Time to complete: interviews 10min upwards. Transcription and content analysis time not retrieved</p> <p>Testing format: semi-structured interview with the child and/or relevant others</p> <p>Scoring: scaled responses to 10 child items (and field notes)</p> <p>Training: designed for speech–language pathologists (SLPs)</p>
Psychometric properties	<p>Normative sample: no normative comparisons retrieved</p> <p><i>Reliability</i></p> <p>No data retrieved</p> <p><i>Validity</i></p> <p>Content validity: &gt;200 SLPs involved in the construction of the questionnaire. Thematic analysis identified four major themes relevant to sibling experience and three major themes relevant to children with speech impairment and their parents</p> <p>Responsiveness: no information retrieved</p>
How to order	Provided as an appendix in McLeod S (2004) Speech pathologists' application of the ICF to children with speech impairment. <i>Int J Speech Lang Pathol</i> 6: 75–81.
Key references	<p>Barr J, McLeod S, Daniel G (2008) Siblings of children with speech impairment: Cavalry on the hill. <i>Lang Speech Hear Serv School</i> 39: 21–32.</p> <p>McCormack J, McLeod S, McAllister L, Harrison LJ (2010) My speech problem, your listening problem, and my frustration: The experience of living with childhood speech impairment. <i>Lang Speech Hear Serv School</i> 41: 379–392.</p>

participants being interviewed at one time, and the age of the interviewee – child interviews are shorter than adult interviews.<sup>19,47</sup> Friends, siblings and relevant others are asked five or six questions about the child, such as what they like about them, what they like doing together, what the child has trouble with and what the interviewee does if they do not understand the child's speech. Questions to the child's siblings and friends are broad and do not directly mention speech, in order to avoid affecting children's relationships with each other, although there is opportunity to discuss it. Questions for the child with speech impairment, parents and teachers do overtly invite responses about speech and the impact of speech difficulty. The child with the speech impairment is asked up to 27 questions about their preferences, their friends,

their school or preschool and their talking. Included are 10 questions on how they feel about talking in a variety of contexts, scaled using cartoon 'smiley faces' indicating 'happy', 'in the middle', 'sad', 'another feeling' or 'do not know'. Parents are asked 20 questions about their child, their child's speech and the impact of the speech difficulty, including questions about exclusion, limits to participation and responses. Teachers are asked up to 19 questions about the child's school participation and talk in class.

#### Psychometric properties

Over 200 SLPs were involved in constructing the SPAA-C.<sup>22</sup> The SPAA-C is a structured interview to obtain standardized descriptive information, but is not scored. It is designed to elicit qualitative information with

maximum flexibility, and no information on psychometric properties has been published, although work is ongoing. Activity, participation, and environmental and personal factors are not distinguished. When the SPAA-C was used to examine the experience of preschool children with

speech impairment<sup>19</sup> and siblings of children with speech impairment,<sup>47</sup> the data elicited could be coded reliably and thematic analysis could be used to identify major themes relevant to their experiences.

## ACKNOWLEDGEMENT

The first author acknowledges support from the Australian Research Council Future Fellowship (FT0990588) and the third author acknowledges support from The Sir Robert

Menzies Memorial Research Scholarship in the Allied Health Sciences.

## REFERENCES

1. World Health Organization (2007) *International Classification of Functioning, Disability and Health – Children and Youth Version*. Geneva, Switzerland: WHO.
2. Raghavendra P, Bornman J, Granlund M, Björck-Åkesson E (2007) The World Health Organization's international classification of functioning, disability and health: implications for clinical and research practice in the field of augmentative and alternative communication. *Aug Alt Comm* 23: 349–361.
3. World Health Organization (2001) *International Classification of Functioning, Disability and Health*. Geneva: WHO.
4. Eadie TL, Yorkston KM, Klasner ER, et al (2006) Measuring communicative participation: A review of self-report instruments in speech language pathology. *Am J Speech Lang Pathol* 15: 307–320.
5. Semel WA, Wiig EH, Secord WA (2003) *Clinical Evaluation of Language Fundamentals – Fourth Edition*. San Antonio, TX: The Psychological Corporation.
6. Dodd B, Hua Z, Crosbie S, Holm A, Ozanne A (2002) *Manual of Diagnostic Evaluation of Articulation and Phonology (DEAP)*. London: Psychological Corporation.
7. Donaldson AL, Olswang LB (2007) Investigating requests for information in children with autism spectrum disorders: Static versus dynamic assessment. *Int J Sp Lang Pathol* 9: 297–311.
8. Law J, Camilleri B (2007) Dynamic assessment. *Int J Sp Lang Pathol* 9(4).
9. Laing SP, Kamhi A (2003) Alternative assessment of language and literacy in culturally and linguistically diverse populations. *Lang Speech Hear Serv Sch* 34: 44–55.
10. Peña E, Iglesias A, Lidz CS (2001) Reducing test bias through dynamic assessment of children's word learning ability. *Am J Speech Lang Pathol* 10: 138–154.
11. Law J, Camilleri B (2007) Dynamic assessment and its application to children with speech and language learning difficulties. *Int J Sp Lang Pathol* 9: 271–272.
12. Worrall L, Hickson L (2008) The use of the ICF in speech-language pathology research: Towards a research agenda. *Int J Speech Lang Pathol* 10: 72–77.
13. McCormack J, McLeod S, McAllister L, Harrison LJ (2009) A systematic review of the association between childhood speech impairment and participation across the lifespan. *Int J Sp Lang Pathol* 11: 155–170.
14. Teverovsky EG, Bickel JO, Feldman HM (2009) Functional characteristics of children diagnosed with childhood apraxia of speech. *Dis Rehab* 31: 94–102.
15. Lollar DJ, Simeonsson RJ (2005) Diagnosis to function: Classification for children and youths. *J Dev Beh Pediatr* 26: 323–330.
16. Reed GM, Lux JB, Bufka LF, et al (2005) Operationalizing the International Classification of Functioning, Disability and Health in clinical settings. *Rehab Psych* 50: 122–131.
17. McCormack J, McLeod S, Harrison LJ, McAllister L (2010) The impact of speech impairment in early childhood: Investigating parents' and speech-language pathologists' perspectives using the ICF-CY. *J Comm Dis* 43: 378–396.
18. Thomas-Stonell N, Oddson B, Robertson B, Rosenbaum P (2009) Predicted and observed outcomes in preschool children following speech and language treatment: parent and clinician perspectives. *J Commun Disord* 42: 29–42.
19. McCormack J, McLeod S, McAllister L, Harrison LJ (2010) My speech problem, your listening problem, and my frustration: The experience of living with childhood speech impairment. *Lang Speech Hear Serv Sch* 41: 379–392.
20. Eadie TL, Baylor CR (2006) The effect of perceptual training on inexperienced listeners' judgments of dysphonic voice. *J Voice* 20: 527–544.
21. McCooley-O Halloran R, Worrall L, Hickson L (2004) Evaluating the role of speech-language pathology with patients with communication disability in the acute care hospital setting using the ICF. *J Med Sp Lang Path* 12: 49–58.
22. McLeod S (2004) Speech pathologists' application of the ICF to children with speech impairment. *Int J Sp Lang Pathol* 6: 75–81.
23. Maller S, Singleton J, Supalla S, Wix T (1999) The development and psychometric properties of the American sign language proficiency assessment (ASL-PA). *J Deaf Stud Deaf Educ* 4: 249–269.
24. Goldstein G, Bebko JM (2003) The Profile of Multiple Language Proficiencies: A measure for evaluating language samples of deaf children. *J Deaf Stud Deaf Educ* 8: 452–463.
25. Enderby P, John A, Petheram B (2006) *Therapy Outcome Measures for Rehabilitation Professionals: Speech and Language Therapy, Physiotherapy, Occupational Therapy*, 2nd edition. Chichester: John Wiley & Sons.
26. Perry A, Skeat J (2004) *AusTOMs for Speech Pathology*. Melbourne: LaTrobe University.
27. Roulstone S, John A, Hughes A, Enderby P (2004) Assessing the construct validity of the Therapy Outcome Measure for pre-school children with delayed speech and language. *Int J Sp Lang Pathol* 6: 230–236.
28. Lubinski R, Golper LA, Frattali CM (2007) *Professional Issues in Speech-Language Pathology*, 3rd edition. Clifton Park: Thomson Delmar Learning.
29. Zur KB, Cotton S, Kelchner L, Baker S, Weinrich B, Lee L (2007) Pediatric Voice Handicap Index (pVHI): a new tool



- for evaluating pediatric dysphonia. *Int J Ped Otorhinolary* 71: 77–82.
30. McLeod S, Harrison LJ, McCormack J (2011) Intelligibility in Context Scale: Validity and reliability of a subjective rating measure. *J Sp Lang Hear Res*.
  31. Ching TYC, Hill M (2007) The Parents' Evaluation of Aural/Oral Performance of Children (PEACH) Scale: Normative data. *J Am Acad Audiol* 18: 220–235
  32. Thomas-Stonell NL, Oddson B, Robertson B, Rosenbaum PL (2010) Development of the FOCUS (Focus on the Outcomes of Communication Under Six): A communication outcome measure for preschool children. *Dev Med Child Neurol* 52: 47–53.
  33. Hidecker MJC, Paneth N, Rosenbaum PL, et al (2011) Developing and validating the Communication Function Classification System (CFCS) for individuals with cerebral palsy. *Dev Med Child Neurol* 53: 704–710.
  34. Biddle A, Watson L, Hooper C, Lohr KN, Sutton SF (2002) *Evidence/report technology assessment No. 52*. (Prepared by the University of North Carolina Evidence-based Practice Center under Contract No 290–97–0011). AHRQ Publication No. 02-E010. Rockville, MD: Agency for Healthcare Research and Quality.
  35. Franic DM, Bramlett RE, Bothe AC (2005) Psychometric evaluation of disease specific quality of life instruments in voice disorders. *J Voice* 19: 300–315.
  36. Branski RC, Cukier-Blaj S, Pusic A, et al (2009) Measuring quality of life in dysphonic patients: A systematic review of content development in patient-reported outcomes measures. *J Voice* 24: 193–198.
  37. UNICEF (1989) *The United Nations Convention on the Rights of the Child (UNCRC)*. Available at: [www2.ohchr.org/english/law/crc.htm](http://www2.ohchr.org/english/law/crc.htm) (accessed 25 May 2009).
  38. Roulstone S, McLeod S (2011) *Listening to Children and Young People with Speech, Language and Communication Needs*. London: J&R Press.
  39. Einarsdottir J, Dockett S, Perry B (2009) Making meaning: Children's perspectives expressed through drawings. *Early Child Dev Care* 179: 217–232.
  40. Holliday EL, Harrison LJ, McLeod S (2009) Listening to children with communication impairment talking through their drawings. *J Early Child Res* 7: 244–263.
  41. Brutton G, Vanryckeghem M (2006) *Behavior Assessment Battery for School-age Children who Stutter*. San Diego: Plural Publishing.
  42. Franic DM, Bothe AK (2008) Psychometric evaluation of condition-specific instruments used to assess health-related quality of life, attitudes, and related constructs in stuttering. *Am J Sp Lang Pathol* 17: 60–80.
  43. Johannisson TB, Wennerfeldt S, Havstam C, Naeslund M, Jacobson K, Lohmander A (2009) Communication Attitude Test (CAT-S): normative values for 220 Swedish children. *Int J Lang Com Dis* 44: 813–825.
  44. Vanryckeghem M, Brutton G (2006) *KiddyCAT: Communication Attitude Test for Preschool and Kindergarten Children who Stutter*. San Diego: Plural Publishing.
  45. Ching T, Hill M. *Teachers's Evaluation of Aural/Oral Performance of Children (TEACH)*. Chatswood: Australian Hearing.
  46. Langevin M, Kleitman S, Packman A, Onslow M (2009) The Peer Attitudes Toward Children who Stutter (PATCS) scale: An evaluation of validity, reliability and the negativity of attitudes. *Int J Lang Com Dis* 44: 352–368.
  47. Barr J, McLeod S, Daniel G (2008) Siblings of children with speech impairment: Cavalry on the hill. *Lang Speech Hear Serv Sch* 39: 21–32.

[194]

[195]