Chapter 3: Assessment

Assessment of a child presenting with a speech disorder, begins with a detailed case history, and consideration of his overall communication skills and development. Areas investigated may include: play, social skills, communication skills, verbal comprehension, expressive language, oral examination, phonology, articulation, voice, prosody, auditory skills, gross and fine motor skills, visual/tactile skills, non-verbal skills and emotional well-being (Clinical Guidelines by Consensus for Speech and Language Therapists, 1998). In many cases, other professionals, such as paediatricians, psychologists, occupational therapists, audiologists, will contribute to the assessment.

Initial assessments will suggest the nature and cause of the child's difficulties, and may indicate the presence of developmental verbal dyspraxia (See chapter 1 for discussion of characteristics of developmental verbal dyspraxia).

However, detailed investigation of the child's speech is necessary in order to plan intervention. Therapists typically employ a range of formal and informal assessment tools, to elicit single words, connected speech and a phonetic inventory, depending on the level of the child's speech and expressive language. Phonological analysis of this data reveals his sound system, at various positions in syllable structure, and relationships between the adult target and the child's production.

The Nuffield Dyspraxia Programme Assessment takes this process a stage further, recognising the dyspraxic child's increasing difficulty with longer words and phrases, by sampling and analysing separately words and sentences of increasing phonotactic complexity. Vowels are sampled systematically, as well as consonants. Evaluation of oral motor skills, diadochokinetic skills (DDK), and connected speech are also included. Closely related to the treatment programme, the Nuffield Dyspraxia Programme Assessment also provides a sensitive measure of progress.

Psycholinguistic approach

Since the Programme was last published in 1992, understanding of complex speech disorders has benefited from the development of psycholinguistic models of speech processing. Psycholinguistic models attempt to explain the process of speech, and therefore speech difficulties, as opposed to linguistic analysis, which describes the end result. Therapists at the Nuffield Centre have particularly been working with the model developed by Stackhouse and Wells (1997), and the discussion and diagrams below are based on this.

The basic tenet of a psycholinguistic approach is that speech processing involves the routing of information between ear, brain and mouth.

The first distinction to be made is whether information is being routed from the ear up to the brain (input processing), or from the brain down to the mouth (output processing). These can be thought of as two information channels: on the input side, speech information is received and decoded, and on the output side, speech information is encoded and transmitted.

In addition to the two information channels, the psycholinguistic approach assumes that there must be a store of information (a representation), which serves as a basis for recognising speech as well as generating speech output. The representation would include details of a word's meaning (semantic representation), its sound structure

(phonological representation), and instructions for articulation (motor programme). An important clinical distinction to make, is whether it is the stored information (lexical representation) which is faulty, or on-line processes, such as discrimination and motor programming. Assessment tasks must therefore be analysed to ascertain whether lexical representations must be accessed, may be accessed, or cannot be used, to be performed successfully.

It should also be noted that information may be routed in a top-down direction (utilising stored information) and/or a bottom-up direction (utilising peripheral sensory input) in order to perform a task. This applies to either side of the model. For example, as incoming speech is being processed (bottom-up), the brain may predict a part of it (e.g. the final syllable of "caterpi…" caterpillar). Equally the basically top-down processing of the output side of the model may be influenced by kinaesthetic feedback from the articulators. This is an important consideration in the design of therapy programmes, where it may be possible to utilise stronger processes to support weaker ones, and it may be necessary to experiment with various processes and processing routes in order to elicit a target.

When applied to clinical assessment, it is clear that children with speech disorders may have difficulty at one or more points along this processing route. Assessment tasks can be selected to check specific processes. In this way a profile of the child's processing strengths and weaknesses can be created, avoiding the need for diagnostic categorisation, where this is unhelpful, and facilitating well-targeted treatment.

Psycholinguistic Model

The Stackhouse and Wells speech processing model is reproduced below, with permission. In the notes on each level of processing, which follow, we have combined the speech processing model with the questions from Stackhouse and Wells' speech processing profile. However, it should be noted that the questions do not strictly map onto particular processing levels, but relate to processing routes, (including or bypassing particular levels) required by types of assessment task. Two further questions (X, Y) have been added on the output side of the model, to clarify issues particularly relevant to children with features of developmental verbal dyspraxia.

Levels of processing are represented by boxes, and possible processing routes by arrows. Although not strictly hierarchical, there is a sense of processing order. For instance, the child must have discriminated the phonetic characteristics of a word before recognising it as a stored phonological representation. The levels do not differ in terms of absolute ease or difficulty, but in terms of relative cognitive sophistication. Off-line processing units appear as shaded boxes, indicating that processing at this level does not occur during the real time performance of the task i.e. on-line, but at some point afterwards i.e. off-line. Broad arrows indicate that information flows between boxes as part of a learning process, rather than in the on-line processing of familiar input.

For a detailed, and very readable, discussion of the speech processing model, its relation to normal speech acquisition and speech disorders, and analysis of assessment procedures, readers are recommended to refer to the original text (Stackhouse and Wells, 1997).

Speech Processing Model