Part 1

A practical update

Chapter 1

The evolution of current practices

Conceptual frameworks are easy to ignore. Like the air we breathe, their presence is everywhere, once they are looked for. Yet, they are often taken for granted, under-estimated and under-examined. One way to reveal the influence of frameworks today is to study their use in the unfamiliar contexts. For example, an examination of past practices of speech therapists raises questions about what practitioners did then as well as how and why they did it. Such an investigation creates the distance needed for clinicians to apprehend aspects of their own practice that are ordinarily taken for granted.

Duchan 2006

One of our profession's few historians, Duchan (2001) believes there has been too little work on the evolution of current practices. She observes that most histories of the origins of speech pathology in the US focus on organisational matters and place the genesis of the profession in about 1925, when workers in the field of speech disorders and speech correction established their own organisation. This same institutional focus is found in chronologies by Margaret Eldridge, recording the development of speech therapy in Australia (Eldridge 1965) and the Commonwealth of Nations (Eldridge 1968a, b). Beginning in the 19th century, Duchan has produced a fascinating history that is broader in scope than its predecessors and different because it includes a systematic record of the science and ideas underlying practice. All of this and more is freely available on the Internet (Duchan 2001).

Aubrey Nunes, who has a PhD in Linguistics from the University of Durham, shares Duchan's interest in our history. But as a Speech and Language Therapist (SLT), Linguist, perennial student, and thinker, he prefers to take an even longer view. Graduating as an SLT from the National Hospital College of Speech Sciences in 1979, Aubrey worked for 10 years in the 1980s as a National Health Service SLT with children and youth, and he has been engaged in child speech-related research since 1976. In A3, Dr. Nunes explains why he believes 'modern' speech therapy had its genesis in 17th century England.

Q3.   Aubrey Nunes: The British origins of child speech practice

An aim of this book is to provide a practical update for clinicians working with children with speech sound disorders (SSDs), with reference to about 70 or 80 years of the history that underpins what we do as speech-language clinicians in assessment and therapy. You have said (Nunes 2006) that speech-language pathology (SLP)/SLT can be seen to originate in the 17th century, and not the 20th. Can you expand on that theme, and comment on what you have called 'the very practical, anti-theoretical, and subjectivist stance of SLT in Britain'?

A3.   Aubrey Nunes: A legacy lost

Eldridge (1968a, b) traces a century of the treatment of speech disorders, starting over 200 years after its genesis in England in 1667, when William Holder proposed the theory of distinctive features and described its application to work with the deaf. Scarcely remembered or acknowledged as pioneers of speech intervention, William Holder (1616–1698), John Thelwall (1764–1834), and Alexander Melville Bell (1819–1905) took a 'top-down' approach to speech impairment, highlighting the need to understand what constitutes 'normal speech'. But in relation to the academic preparation of SLTs, the British professional association, the Royal College of Speech and Language Therapists (RCSLT), and the Health Professions Council (HPC) have a quite different perspective.

In 2005, the University of Essex had just obtained the funding for an SLT course. Martin Atkinson (personal communication 2007) tells how the University pitched one aspect of the proposed curriculum to an Accreditation Panel from the HPC and an observer from the RCSLT. Students would be taught linguistics by world-class researchers in speech and language development and pathology. The unanimous reaction was that these proposals were unacceptable. 'The problem,' the Panel said, 'is that there's too much linguistics.' This unanimity reflects a paradigm that is bottom-up and anti-theoretical; starts from pathology, not normality; disdaining categories not detectable at the beginning of normal speech development, such as the prosody.

Linguistics is the science of speech and language. The RCSLT mentions speech, language, and communication as aspects of SLT (RCSLT 2006, p. 2), but the responsibility for SLT training now lies with the HPC. The HPC (2007, p.13) specifies linguistics as one of 10 bodies of knowledge relevant to 'profession-specific practice' that also includes anatomy and psychology. But this says nothing about what SLTs should know about linguistics and the scientific basis of that discipline from the invention of the alphabet 3,000 years ago to works such as Chomsky (1965), Chomsky and Halle (1968), Smith (1973), and their academic progeny. The most serious likely shortfall in course content is key information around the discovery, by Chomsky in particular, that there is interest in *how* most children learn to talk during what Lenneberg (1967) calls 'the critical period'—from infancy to puberty. In remedying the superficiality and apparent 'dumbing down' of the SLT linguistics curriculum, any addition to it could be reconciled with all the other competing pressures by defining more precisely the irreducible core of SLT through a process of discussion between practitioners, academics, and researchers of the appropriate balance between the 10 topics.

Generative linguistics and an acquisition module

For Chomsky, Halle, and Smith (see above), there are not just words like *browning* and *brownish*, but possible words like *unbrown* and *brownable*. This is why typically developing children as young as two or three find it fun to hear parents calling themselves, for example, *Mumanimumpy* and *Dadamadandy*, since *Mummy* and *Daddy* are recoverable by what is known as a 'grammar', and such a grammar is 'generative', hence 'generative linguistics'. Chomsky (1965, pp. 3–62) stresses the need to explain the acquisition of a grammar from an initial state to an end-state of 'competence'. At 2;6 the child's errors, which are not always consistent, can involve phonotactics (e.g., cluster reduction), phonemics, (e.g., fronting), phonetics, (e.g., production errors with /s/), prosody, (e.g., unstressed syllable deletion), and rules (e.g., *a elephant*). The notion of an error presupposes a standard of comparison, called 'competence' in generative linguistics. Linguistic competence is different from other proficiencies. For instance, in singing, there is a continuum with Amy Winehouse near one end, this contributor near the other, but insoluble arguments about the ranking in between. There is a distinction between the capacity, that competence represents, and the use of that capacity in speech. Competent speakers of a language generally have no difficulty distinguishing between normal and impaired speech, and their language spoken in a variety of dialects and accents, and their expectation is that other competent speakers can do the same.

No matter how the grammar is expressed, it must be finite—like a book with so many pages and words—and acquired within the critical period. And there is an expectation that this is possible. The expectation is only surrendered under diagnoses such as Down syndrome, where competence is rarely found. This expectation, obvious to all parents, is defined by 'learnability'. There are theories about how such an acquisition module might work, with Nunes (2002) arguing that, because all languages have *featural*, *segmental*, and *prosodic* structure, it may use nothing more than these three components. But because the grammar is finite, if acquisition works separately for each aspect (phonotactics, prosody, phonemics, and rules), the finiteness has to be separately defined for each one. It is simpler to assume just one acquisition module: simple, abstract, powerful, but developmentally vulnerable.

By deduction from generative linguistics, learnability theory, and biology, the acquisition module is the most likely focus of disorder. But this is at odds with the informal RCSLT paradigm, which happens to converge with the radical liberal sociolinguistics of Labov (1966). Following such radical liberalism, defining all linguistic variables sociologically, Law (1992) emphasises developmental variation (rather than universal capacity and an end state of competence). By this disavowal of both competence and the notion of a critical period, a therapy outcome of 'improvement', rather than normal speech, becomes a legitimate, ethical, and expeditious goal, and terminating therapy at 5;0 or 6;0, long before speech acquisition is typically complete (possibly at around 9;0 according to Nunes 2002), becomes acceptable practice. This handicaps the description of developing speech and denies crucial insights that offer potential to assist and expedite intervention. One solution is to embrace and update the work of our three forgotten pioneers. Nunes (2002, 2006) describes how this can be done, not by abandoning accumulated practical wisdom or by adopting a fashionable terminology, but by invoking Chomsky's subtle insight: that the normality of acquisition is itself remarkable.

The three pioneers

Holder (1669) defined phonemes in terms of features that combined to create a 'derivation', rendering any independent existence for phonemes impossible. The features Holder identified were place, voice, nasality, continuance, sonorance in consonants, and tongue position, 'tension' and the use of the lips in vowels. He described his intervention for one boy's speech as progressing from consonant–vowel combinations repeated in sequences, such as BAH-BAY-BEE-BAW-BOO and DAH-DAY-DEE-DAW-DOO, to words. He used *theory* to justify treatment. Also theoretically driven, and several lifetimes later, Thelwall (1812) developed a theory of prosody. He treated children with various speech disorders, who would come to stay with him and his wife for months at a time, with his wife responsible for education and pastoral care.

Like Holder, Alexander Melville Bell was familiar with the speech difficulties of hearing-impaired speakers because his wife was deaf. In Bell (1849), he advanced Holder's work with fuller schedules of nonsense words for therapy and a more complete theory of distinctive features. Both Holder (1669) and Bell (1886) recognised that features had to be universal. Bell charted vowel height and 'backness' as positions on a V-shaped diagram with EE, AH, and OO at the extreme points. At the same time, he started developing 'Visible Speech', expressing features systematically, for clinical use.

The three British SLT pioneers all reasoned from theory and stressed the importance of fun and empathy with children. Their notion of featural and prosodic elements, combining in language-specific ways, provides the basis for extended series of nonsense words in therapy, foreshadowing 'possible words' in generative phonology.

Enter Henry Sweet (1845–1912). A phonetician and scholar of English, Sweet (1908) refers to the 'inestimable privilege' of having being taught by Bell, but omits him from the bibliography. Intrigued, the Irish playwright, critic, political activist, and spelling reformer George Bernard Shaw immortalized the story in the Higgins, Pickering, and Eliza trio in his 1913 *Pygmalion*. Bell's wife was Eliza, and there is Bell in Higgins and Pickering. Sweet was a Henry, and the gracelessness of Higgins is clearly his.

At the zenith of the British Empire, Sweet and Daniel Jones (1881–1967) were preoccupied with the teaching of English as a foreign language, taking no interest in impairment. Jones (1967, first published in 1918) used Bell's notion of the V to define his own idealisation of 'cardinal vowels'. His narrow elitism sacrificed the insight from Bell and Holder that features define phonemes, not vice versa. Bell and Holder were interested in universality. Jones was interested in 'educated' speech or that of 'persons educated in one of the great English public schools' (Jones 1967, p. 4). Jones artfully obliterated Bell's legacy, putting in its place a covertly prescriptive system of phonetic transcription that is unhelpful to clinical practice in a sociolinguistically complex world (Munson, A45, p. 342), where subtle judgments are needed about transcription (Müller 2006) and where the standard is neither given nor obvious.

The balance sheet

In the UK in child-speech pedagogy and clinical practice, linguistics is now replaced by a clinical linguistics that can only describe the most typical delays and disorders. It exaggerates the dichotomy between the cognitive and sensori-motor aspects of speech, and

is incapable of defining the possible limits of disorder (its most severe forms). In my view, it thereby diminishes the potency and probability of success in the treatment of the very disorders that are most likely to cause lifelong communicative frustration, educational and vocational limitations, and social penalties (Van Riper 1939; Gierut 1998). Suspiciousness of theory opens the door to subjectivism, easily mistaken for the right to believe what one wants. This can allow false claims, such as those put forward by the proponents of non-speech oral motor therapies (NS-OMT), to become the cornerstones of therapy modalities (Lof, A30). A prominent British example of this is in Williams and Stephens (2004), who implausibly hold that the most problematic aspect of speech acquisition is that which is least variable, namely movement, and that the least problematic is that which is most variable, like the phonological detail of /t/ and /d/ before sonorants in unstressed syllables.

Clinical practice driven by learnability is a way of thinking and more. In the treatment of speech sound disorders (SSD), it looks for the totality of what is missing, not by counting phonemes or processes, but by clinical description of the smallest possible number of words, maybe just 10 or 20. Given an acquisition module that normally and finitely extracts a target grammar from the random accidents of the input, this should be the main initial focus of SLT/SLP clinical enquiry if there is no clear medical diagnosis or social catastrophe. Intervention can take many traditional SLT forms. But the essence is to mimic nature, subtly enhancing normal child-experience, aiming for normal speech, not as particular outputs, but as empowerment.

Suppose a child says *potato* as '*popoTAYto*' with two adjacent unstressed syllables on the left. In such speech, the acquisition module misconstrues how stress in English is mostly on *alternating* syllables. It might take a treatment session to show that non-continuance, labiality, voice, place, and schwa-features, can all go once, contrastively into one initial, unstressed syllable, followed by a particular sort of foot. So *potato* can facilitate *tomato*. The outcome is greater, faster, and more complete because the decisive events are in the child's mind. In a way consistent with current developmental psychology, the process is advanced positively by revelation, not negatively by correction. This cannot be emulated in computer software; no two children are the same; the grammar can develop in the child's mind in minutes of therapy. This cannot be devolved to parents, volunteers, classroom assistants, by worksheets, handouts, or home programs; it can only be done by skilled clinicians. It is efficient; it makes optimal use of precious time; and it leads to the most nearly complete possible outcomes.

The modern roots of therapy for children's speech

As Nunes (A3) proposes, by rights our history begins with William Holder, John Thelwall, and Alexander Melville Bell, but our swift trip will not be as rich in detail as the Duchan (2001) account. Rather, it will resemble a 'sampler tour', summarised as a timeline in Table 1.1 It provides a glimpse of the notable SLP/SLT and Linguistics influences on contemporary child speech practice, in a breakneck dash from the 1930s to the millennium and beyond. Connections are made between our history of practice and practice today.

Our timeline jumps from Holder, Thelwall, and Bell to the 1930s and Lee Edward Travis (1896–1987), whose *Speech Pathology: A Dynamic Neurological Treatment of*

Table 1.1 Timeline: Milestones in the history of children's SSD

Pioneers	William Holder (1616–1698) John Thelwall (1764–1834) Alexander Melville Bell (1819–1905)	
1931	Lee Edward Travis	'The Travis Handbook' contained one paragraph on articulation and a word list
1934	Irene Poole	Produced a developmental schedule for 'normal' articulatory proficiency
1937	Robert West	Published *The Rehabilitation of Speech*
1937	Samuel T. Orton	Published *Reading, Writing and Speech Problems in Children*
1938	Sara Stinchfield & Edna Hill-Young	Treated delayed/defective speech with a motor-kinaesthetic therapy
1939	Charles Van Riper	Developed a social theory of speech acquisition coupled with an auditory–phonetic therapy
1940	Grant Fairbanks	Published a voice/articulation drill book with listening lists and minimal pairs
1940	Theory–Therapy Gap—Research–Practice Gap	The principles of practice were often at odds with theory and research
1941	Roman Jakobson	Developed a linguistics theory of phonological universals
1943	Mildred Berry & Jon Eisenson	Linked a linguistic–mentalist acquisition theory with articulatory–motor therapy
1945	World War II ended	SLP/SLT was informed by physiology, psychology, and psychiatry (not linguistics)
1948	Kurt Goldstein	Discussed symbol formation, and this sort of thinking lead to the novel idea of 'underlying representation' and 'psycholinguistic processing' in phonology
1952	Helmur Myklebust	Used the same term: symbol formation
1957	Charles Osgood	Talked about mediation/psycho-linguistic processing
1957	Mildred Templin	Published *Certain Language Skills in Children*
1959	College of Speech Therapists	Formulated a definition of dyslalia
1959	Margaret Hall Powers	Defined functional articulation disorder
1968	Noam Chomsky & Morris Halle	Wrote SPE presenting distinctive features theory and generative phonology
1968	Jon Eisenson	Presented the notion of symbol formation
1968	Charles Ferguson	Developed contrastive analysis
1970s	American Behaviourism	3-position testing and Traditional Articulation Therapy dominated assessment and intervention
1972	Muriel Morley	Implied that 'functional articulation disorder' did not have a neuromotor basis
1973	David Stampe	Explicated natural phonology and phonological processes
1975	Pamela Grunwell	Showed the relevance to SLP/SLT of Clinical Linguistics
1976	David Ingram	Changed the SLT/SLP view of SSD with his book *Phonological Disability in Children*
1979	Frederick Weiner	Published *Phonological Process Analysis* (Test)
1980	Lawrence Shriberg and Joan Kwaitkowski	Published *Natural Process Analysis* (Test)

Table 1.1 (*Continued*)

1980	Barbara Hodson	Published *Assessment of Phonological Processes* AAP (Test)
1981	Frederick Weiner	Presented an account of conventional minimal pairs therapy
1982	Stephen E. Blache	Applied distinctive features theory to phonological assessment and therapy
1983	Barbara Hodson and Elaine Paden	Published *Targeting Intelligible Speech*: Patterns therapy/Cycles approach
1984	Dana Monahan	Published (perhaps the first) phenological Assessment and Therapy Package
1985	Pamela Grunwell	Published *Phonological Assessment of Child Speech*: PACS
1985	Marc Fey	Published the 'Inextricable constructs' article, making everybody think!
1985	Carol Stoel-Gammon and Carla Dunn	Published the groundbreaking *Normal and Disordered Phonology in Children*
1986	Elizabeth Dean and Janet Howell	Published the Developing linguistic awareness article, heralding *Metaphon*
1986	Mary Elbert and Judith Gierut	Published the *Handbook of Clinical Phonology*
1989	Gwen Lancaster and Lesley Pope	Described auditory input therapy for under 3s, and 'difficult' young clients
1990	Elizabeth Dean, Janet Howell, Anne Hill and Daphne Waters	Published *Metaphon* as an assessment and therapy resource pack
1992	Marc Fey	Headed up a challenging LSHSS clinical forum
1993	Lawrence Shriberg	Looked at development differently with the early, middle and late 8
1997	Martin Ball and Raymond Kent	Published The *New Phonologies: A Book for Clinicians and Linguists*
1997	Joy Stackhouse and Bill Wells	Published the first volume of a book series on the psycholinguistic framework
1998–1999	B. May Bernhardt and Joseph Stemberger	Developed clinical applications of non-linear phonology
2001	World Health Organization	Introduced the *International Classification of Functioning, Disability and Health* (ICF-CY)

Normal Speech and Speech Deviations (Travis 1931) contained just one paragraph on articulation therapy and a list of initial–medial–final-sound production practice words in an appendix. Although 'the Travis handbook', as it was affectionately or even reverently called, offered a minuscule contribution as far as articulation therapy was concerned, it was highly regarded as a standard text, providing outlines of the neurophysiological bases for and clinical subtypes of fluency, articulation and voice problems, and aphasia. Uninfluenced by linguistics theory, Travis presented a view of disorders that had the speech sound (or segment) as the basic unit of speech. There was a hopeful sign in the same year that more was to come with the appearance of and article by Wellman, Case, Mengert, and Bradbury (1931), reporting on the development of 'speech sounds' in young children. Publications by other American SLPs soon followed with such revealing titles as: *The Rehabilitation of Speech* (West, Kennedy, and Carr 1937), *Reading, Writing*

and Speech Problems in Children (Orton 1937), and *Children with Delayed or Defective Speech: Motor-Kinesthetic Factors in Their Training* (Stinchfield and Young 1938). Robert West (1892–1968) wrote the first section of West, Kennedy, and Carr (1937) and introduced information about articulation difficulties due to oral deformities and hearing impairment. Speech remediation suggestions in the second half of the book included muscle relaxation, non-speech oral motor exercises (NS-OME), phonetic placement strategies, and drill.

There was another flurry of influential 'child speech' speech pathology publishing activity between 1939 and 1943. It started with the first of nine editions of *Speech Correction: Principles and Methods* (Van Riper 1939). Ahead of his time in many ways, Charles Van Riper (1905–1994) emphasised the significance of social context on the day-to-day experience of speech-impaired individuals, with portents of the ICF-CY (McLeod, A1). His social perspective is revealed in his famous definition: 'Speech is defective when it deviates so far from the speech of other people in the group that it calls attention to itself, interferes with communication, or causes its possessor to be maladjusted to his environment' (Van Riper 1939, p. 51). Van Riper's cultural sensitivity and inimitable insight into what he called the 'penalties' of communication impairment may have stemmed in part from his intrapersonal and interpersonal experiences of stuttering. Discussing what people with communication 'differences' might make of their social situations, and what they might perceive others to read into their symptoms, he wrote, 'The difference in itself was not so important as its interpretation by the speech defective's associates' (p. 66). Reflecting sourly on the likely reactions of the said associates, he wrote, 'Personality is not merely individuality but evaluated individuality' (p. 67). So intensely important was the social level for Van Riper that he recommend trainee speech correctionists undertake assignments, such as lisping for a day, to develop empathy for individuals with speech difficulties and appreciation of their emotional landscapes. The social aspect was present in his intervention advice, too, when he suggested that correctionists should work with *teachers and parents* in pursuing therapy goals.

Paradoxically, although Van Riper espoused and sustained a sincerely held social view of speech impairment and of disability when it came to presenting his treatment approach—classically referred to as 'Traditional Articulation Therapy' or 'Van Riper Therapy'—it could never have been regarded as communication-focused. He incorporated many disparate elements in an atomistic array of peripheral procedures that included stimulus–response routines; sensory training that he called auditory stimulation, comprising auditory discrimination, 'ear training', and auditory sequencing; and production drill. These all became part of an auditory–phonetic (or sensory–motor) therapy that is still practised today (Hegde and Pena-Brooks 2007; Raz, A4). In the same highly productive period, practical manuals, books of exercises, source books, and workbooks for the speech correctionist began to appear, replete with practise word and sentence lists, listening lists, rhymes, stories, therapy tips, advice and ideas, and techniques and activities to be used in speech lessons (Fairbanks 1940; Nemoy and Davis 1937; Robbins and Robbins 1937; Twitmeyer and Nathanson 1932).

In work whose impact was far-reaching, Irene Poole, a school speech teacher at the University Elementary School in Ann Arbor, Michigan, produced, for her doctoral research, a developmental schedule for phonetic development (Poole 1934). This was consistent with the prevailing, and persisting, view that therapy for child speech should be based on normative expectations. Other accounts of normative phonetic proficiency

Table 1.2 Developmental schedules for phonetic development

Age of acquisition[a] (Kilminster and Laird 1978)	Order of acquisition[b] (Shriberg 1993)
3;0 p b t d k g n m ŋ w j ʒ h	Early-8
3;6 f	m n j b w d p h
4;0 l ʃ tʃ	
4;6 z s dʒ	Middle-8
5;0 r	t ŋ k g f v tʃ dʒ
6;0 v	
8;0 ð	Late-8
8;6 θ	ʃ ʒ l r s z ð θ

[a] Data source: single-word citation-naming.
[b] Data source: conversational speech samples.

criteria have followed, up to the present day (McLeod 2009), including Arlt and Goodban (1976); Kilminster and Laird (1978); Prather, Hedrick, and Kern (1975); Sander (1972); Smit, Hand, Freilinger, et al. (1990), and Templin (1957). Following Poole's pioneering lead, one study of phonetic mastery (Kilminster and Laird 1978) involved single-word citation-naming by children age three to eight and a half in Queensland, Australia and determined the typical ages, in years and months, by which 75% of children had mastered 24 English phones. Most of the available developmental profiles for speech sound acquisition are similarly structured, but Shriberg (1993) took a novel approach when he produced a clinically useful breakdown of the 'early-8', 'middle-8', and 'late-8' acquired sounds, based on conversational speech samples, with 8 phones in each category. The norms provided by Kilminster and Laird, and Shriberg's early-, middle-, and late-8 are contrasted in Table 1.2.

Inconsistencies between theory, therapy, and practice

The release in 1943 of *The Defective in Speech* (Berry and Eisenson 1942) provided an alternative view, with a swing away from Van Riperian auditory perceptual and ear training, refocusing on auditory memory span, and the motor execution component of speech output, in treatment that saw the therapist administering general bodily relaxation procedures and speech musculature exercises, which today are generally referred to synonymously as non-speech oral motor exercises, oral motor therapy, oral motor treatment, or oro-motor exercises (the preferred UK term). Apparently ignoring the social context of and consequences for the client of his/her communication impairment, Berry and Eisenson wrote about the mechanism of first-language learning for the first time in the speech pathology literature. They embraced the associative–imitative model (Allport 1924) from psychology theory, conceptualising speech in linguistic–mentalist terms. But again, these insights were not reflected in their intervention suggestions. Like Van Riper's, their therapy belied any appreciation of language, and they proceeded from bottom up, starting with tongue, lip, and jaw exercises, with stimulation of individual phones, and using phonetic placement techniques and repetitive motor drill. In her analysis of these disparities, Duchan (2001) highlights the genesis of 'a familiar trait in our

professional development, the theory-therapy gap' and also comments that 'a second identifiable gap was between research findings and therapy practices', pointing to a sort of interdisciplinary gap that saw speech pathologists failing to take much advantage of the developmental psychology research that flourished from the 1920s to the 1950s.

Throughout the 1940s and beyond, linguistics theory blossomed in the hands of individuals like Jakobson (1941), who studied child language, aphasia, and phonological universals; Velten (1943), who investigated in the growth of phonemic and lexical patterns in infants; and Leopold (1947), who explored sound learning in the first two years of life. These developments in linguistics later proved highly relevant to practice, but, during and immediately following World War II, the profession tended towards physiology, psychology, and psychiatry for elucidation, and not linguistics or education. By the 1950s, however, the literature revealed that thinkers knew something more was going on in speech besides auditory, visual, and tactile perception and motor execution of sounds. The idea of an inner process or underlying representation as a clinical construct was imminent. Eisenson (1968) talked about symbol formation, Goldstein (1948) and Myklebust (1952) alluded to inner language, and Osgood (1957) used two terms: mediation and psycholinguistic processing.

Dyslalia or functional speech disorder

SLP/SLT was a young profession when SSD were called 'dyslalia' or 'functional articulation disorders'. In its *Terminology for Speech Pathology*, the College of Speech Therapists (1959) defined dyslalia as: 'Defects of articulation, or slow development of articulatory *patterns*, including: substitutions, distortions, omissions and transpositions of the sounds of speech.' Almost simultaneously in the US, Powers (1959, p. 711) defined it, with a different name, using the word 'functional' in its medical pathology connotation 'of currently unknown origin' or 'involving functions rather than a physiological or structural cause'. Powers said: 'The term functional articulation disorder encompasses a wide variety of deviate speech *patterns*. These can be described in terms of four possible types of acoustic deviations in the individual speech sounds: omissions, substitutions, distortions, and additions. An individual may show one or any combination of these deviations.' How interesting it is to find that as early as 1959 SLPs in Britain and the US had an agreed definition and terminology and included the notion of speech *patterns* when they described speech development and disorders. Nonetheless, it must be remembered that they did so without taking into account speech sounds' organisation and representation, cognitively. The 'phoneme' and constructs like it were the domain of clinical linguistics, and it would not be until twenty years or more after the formulation of the British and American definitions that the beginnings of a practical assessment and 'therapy connection' (Grunwell 1975; Ingram 1976) would be forged between phonological theory and SLP practice.

In Britain and Australia, the designation dyslalia remained in vogue until the 1960s, when the preferred American term, functional articulation disorder, gained currency. The ongoing preoccupation of therapists, in the 1960s through to the mid-1970s, with individual sounds in the so-called 'three positions' (initial, medial, and final) still constituted a strictly phonetic approach to the problem and somehow isolated the linguistic function of speech from the mechanics or motoric aspects of speech. It is enlightening

to return to Grunwell's 1975 critique of contemporary practice and her proposal for a more linguistically principled approach to assessment and remediation than the ones that had evolved from practice in the 1930s.

Functional articulation disorders were graded in severity as mild, moderate, or severe. In the severe category were the children with 'multiple dyslalia' or 'multiple misarticulations' whose speech was generally unintelligible to people outside of their immediate families. It was readily acknowledged that children with severe functional articulation disorders could usually imitate or quickly be taught how to produce most speech sounds (Morley 1972). In other words, the supposed motor execution problem or 'articulation' disorder appeared to reside in the children's difficulty in employing speech sounds for word production, which they could produce in isolation. Intervention concentrated on the mechanical aspects of establishing the production of individual phonemes, one at a time, context by context. By defining the problem in articulatory terms, and focussing in therapy on speech and accuracy of production, SLPs/SLTs failed to take into account something that they already knew: that speech serves as the spoken medium of language in a system of contrasts and combinations that signal meaning-differences. That is, when children are acquiring the agreed pronunciation patterns of a language and learning the correspondences between articulatory *movements* and sounds, they also discover relationships between *meanings* and sounds.

Linguistic theory and sound patterns

The linguistic linkage that enticed speech-language clinicians to consider speech disorders in terms of sound systems or patterns came about when researchers in the area of generative linguistics, Chomsky and Halle (1968), expounded distinctive features theory in *The Sound Patterns of English*, a book so famous and influential in linguistics circles that it is commonly referred to simply as SPE. Contemporaneously, Ferguson (1968) looked at contrastive speech analysis and phonological development (see also Ferguson 1978; Ferguson and Farwell 1975; Ferguson, Peizer, and Weeks 1973). Then, Stampe (1973, 1979) forged another link, but this time in the area of natural phonology; leading most saliently for us to Ingram and his innovative work (Ingram 1974, 1976) uniquely dedicated to the understanding of disordered speech. Finally, what had been interpreted by SLPs/SLTs as multiple individual errors came to be seen as sound class problems, involving multiple members of those classes. From this solid beginning, grounded in scholarship, stemmed the development of clinical applications of phonology—linear and, in due course, non-linear (Bernhardt and Stemberger 1998, 2000) quickly acquiring in the process both an international and a cross-disciplinary flavour.

But, we have to remind ourselves that all of this clinically relevant information emerged in the 1970s environment in which practice was still heavily influenced by the medical model and American Behaviorism; 'SODA' articulation analysis of errors of (S) substitution, (O) omission, (D) distortion, and (A) addition; and 'Traditional Articulation Therapy'. This therapy, or at least close variations of it, is still widely implemented today. For example, Mirla Raz, an experienced licensed speech pathologist certified by the American Speech-Language-Hearing Association, regularly uses the approach in her practice. Furthermore, she has written three workbooks, intended for clinicians, aides, and parents working with children with SSD and marketed on the Internet.

Q4.   Mirla G. Raz: A clinician's interpretation of 'Van Riper therapy'

Your *Help Me Talk Right* workbooks (Raz 1993, 1996, 1999) have their roots in the so-called 'traditional approach' to articulation assessment and intervention. These sound-by-sound hierarchical therapies still have a place in the speech and language clinician's repertoire, but perhaps not always in a form that would be instantly recognisable to Van Riper (1978). Can you provide an account of the way you implement traditional assessment and therapy for the later developing sounds (/s/, /l/, and /r/), explaining what attracts you, as an experienced SLP, to use this methodology. What have you retained from the original Van Riper methodology. What, if anything, have you discarded or added? Are there ethical concerns associated with selling 'self-help' articulation workbooks directly to consumers whose children may or may not have received diagnosis by a certified SLP/SLT?

A4.   Mirla G. Raz: One clinician's streamlining of traditional articulation therapy

In my first job as a SLP in the US in the mid-1970s, I serviced three schools in a public school district, where the majority of my clients could not say /r/, /l/, and/or /s/. Suddenly everything I learned, as a Master's level speech pathology student, had to be put into practice. But which approach was best? Stumped, I turned to my supervisor. She suggested an adaptation of the 'traditional' approach to articulation therapy described by Charles Van Riper in *Speech Correction: Principles and Methods* (Van Riper 1939) and subsequently with John V. Irwin in *Voice and Articulation* (Van Riper and Irwin 1958). The 1958 book informs my implementation of traditional therapy.

In the Van Riper and Irwin approach, a sound is targeted sequentially: in isolation, syllables, words, and, finally, in 'normal speech'. The authors emphasise the 'corrector function', with the first therapy task being '. . . to make our case interested in the articulation of others, to make him learn to listen to the exact sound sequences of words spoken by his therapist and friends.' They also stress 'searching for the target', with the tongue exploring the mouth, in 'tongue training exercises', 'babbling' or 'random, relaxed, free vocalizations', 'modification of other sounds', and phonetic placement through 'hunting.' When 'hunting', clients experiment with tongue placement until they hit on the target. They explain, 'Like the hunter who targets his rifle, the articulation case must learn to get the range, then shoot a series of shots to the right and left and up and down, until he knows exactly where to adjust the sights' (p.138). Once 'found', the target is 'fixated' in key words through drill.

> *The teacher writes the word on one of several cards (or pictures representing it). Then she asks the student to go through the series one at a time, saying the word on each card ten times. Finally, the special word to be used is repeated a hundred times, accenting, and prolonging, if possible, the sound which in other words is made incorrectly.* (p. 148)

Finally, the client enters the 'terminal therapy' phase, during which stabilisation of the sound is emphasised under conditions of speed (increased tempo) and various emotions.

Although the traditional hierarchy was appealing, there were several niggling questions. Can anyone 'make' a child interested in the speech of others, and is it necessary? If it

is necessary, I speculated, might it not be more effective to *demonstrate* how the child's production of a sound differed from standard production? Why require children to search for phonetic placement when it can be easily taught? Why administer tongue exercises when they are valueless (Lof 2003)? What is the point of boring, unchallenging drill? Might it be more time-efficient to move to the next level once a child showed proficiency at the level just mastered (let us say 80% proficiency with 20 different words, where 'proficiency' implies accurate production of the target at a specified level: single sound, syllable, word, phrase, or sentence)? Further, might therapy sessions be used more efficiently if sounds were stabilised over time, with increasing *contextual* challenges, up to and including the conversational level rather than with different speech-rates and emotions?

With the benefit of clinical experience, I found satisfactory answers, for me as a therapist, to these questions and in the process developed a system of sound correction that I felt was more streamlined than the original. My hierarchy moves from the target sound in: (1) isolation, (2) CVs and VCs, (3) word pairs, (4) simple sentences, (5) the within word position, (6) clusters, (7) random sentences, (8) elicited conversations, and (9) conversational speech. Here follow examples of stimuli for my additional steps.

- **Target /s/ in word pairs and simple sentences:** 'see seven', 'pass dress', and 'I see a seven'
- **Target /r/ within words and in clusters:** 'carrot', 'turtle', 'green', and 'scrub'
- **Target /l/ randomly in sentences:** 'The pilot flew the plane.'
- **Target /l/ in elicited conversation:** The therapist manipulates input to encourage the child to use the target conversationally. For instance, playing an airport game, I might ask, 'Who flies the plane?' to elicit 'pilot'.

Case example

On initial assessment in July 2007, 'Aaron', 6;3 achieved receptive and expressive standard scores of 81 and 76 on the PLS-3 (Zimmerman, Steiner, and Pond 1991). His expressive vocabulary (Williams 1997) was poor. His literacy skills, according to his parents and teacher, were well-below grade level, although his score on the Lindamood Auditory Conceptualization Test (Lindamood and Lindamood 1979) was grade-appropriate. Aaron's speech was characterised by /w/ for /r/ and /f/ for /θ/ replacements, and interdental production of the alveolars /s/, /z/, /l/, /n/, /t/, and /d/, which I felt could be corrected as a sound class.

Therapy began in August 2007. Aaron was seen individually for 45-minute sessions, which were increased to 60-minute sessions. Receptive and expressive language (including vocabulary), reading, and the alveolars were targeted in each session with approximately 10-15 minutes devoted to his speech for the first six sessions, and 20 minutes in sessions 7–9. Thereafter, errors were corrected incidentally while we worked on other areas of deficit during the 60-minute sessions. In all, approximately 5 face-to-face hours over 27 sessions were devoted to correcting his alveolars, plus time spent on homework. By session 27, his sound targets were used conversationally in all obligatory contexts.

In therapy session 1, I explained to Aaron what his error was and, using imagery, what he needed to do to correct it. He had to 'keep the tiger (his tongue) in the cage (his teeth closed)'. Aaron practised saying the six targets in isolation, remembering to 'keep the tiger

in the cage'. As this was easy, I immediately introduced production of CVs and VCs. As the session progressed, I increased the challenge to producing the targets SIWI (e.g., 'took', 'dip', sick'), avoiding words with the targets word-finally (e.g., 'lot'). In session 2, I noted that he had maintained the ability to produce the targets SIWI, so words with the targets SFWF (e.g., 'kiss' and 'ball') were introduced. Before long, he could produce the targets initially *and* finally in the same word (e.g., 'lace' and 'date'). By session 3, Aaron easily produced word pairs (e.g., 'see soup' and 'pass bell'), so we advanced to simple sentences with targets SIWI and SFWF, continuing this in session 4. By session 5, at single word level, he was producing the targets within words and in initial consonant clusters. Progress was steady, so in sessions 5 and 6, we worked on the sounds in random sentences. Elicited conversation in play began in session 7, using airport and space centre games and characters and 'setting him up' to produce utterances containing all targets. Elicited conversation continued in sessions 8–10. With targets produced with 30% accuracy by session 11, Aaron was ready for a motivational program to encourage generalisation to conversation. His mother was provided with typewritten instructions on modelling and a photocopy of the motivational home program from Raz (1993), encouraging revisions and repairs and instating a simple reinforcement schedule, using pennies as rewards. All targets were in 100% use conversationally by session 13. Correct alveolar production continued in sessions 14 and 15, so Aaron was allowed to select a toy from the toy chest. His father had already purchased a longed-for DVD as Aaron's reward for completing this aspect of therapy, and when I said the word, he presented it to him!

Homework was complicated because Aaron's parents are divorced and share custody. In all sessions, I wrote the homework in his speech notebook. He attended once weekly with his mother, with whom he lives most of the time, and once weekly with his father or one of his paternal grandparents. His mother observed three sessions, but this was avoided because Aaron became demanding and clingy with her. His grandmother did not observe, but his father and grandfather sat in when they attended. When his mother came, a few minutes at the ends of sessions were devoted to explaining the homework. Homework was designed to take 10 minutes daily, increasing to 20-minute elicited conversation sessions with his mom. Prior to each therapy session, Aaron's mom reported on homework, always commenting that he had co-operated and performed well.

Discussion

Motivational program

When introducing a motivational program, I talk to children about using their sound(s) *all* the time. I tell them it is really their responsibility to remember to use their sound at home, at school, and when talking to friends. If they forget, I or their parents (if that can be arranged) will remind them. To further motivate them, I tell them that whenever they use their sound in the therapy room, they will earn a chip (to put in a cup decorated with a happy face) and the number of chips they need to earn in that session. For instance, in motivational session 1, children must use the target three times in order to earn three chips. This increases to five chips in the next session. I continue to adjust the reinforcement, increasing the challenge in each consecutive session, to a maximum of 15 chips. Earning the minimum number of chips or better for that session earns them a candy or small toy. Once successfully using the target conversationally, a child selects a toy from my treasure chest, as Aaron did.

Parent involvement

Motivational programs work best, I believe, with parental involvement. I discuss, by phone or in person, what motivates their child: pennies, stars, happy faces, a favourite toy, or treat? We also explore what *they* can do to help the child focus on using the target habitually. Once the child is successful in integrating the target into conversational speech, I encourage parents to provide a special reward, such as a restaurant meal or a toy that the child wants.

Homework

As with Aaron, the goal of speech homework is to reinforce and carry-over what a child accomplishes in therapy sessions. For example, if a child produced a target SIWI, the picture sheet used is sent home with written instructions in his/her homework notebook. This is done for every session, whether parents work with the child or not.

Parent-administered therapy

In a tightly regulated and 'ethics driven' profession like SLP/SLT, the question arises of whether there are ethical concerns associated with selling 'self-help' articulation workbooks (e.g., Raz 1993, 1996, 1999) directly to consumers to use with their own children, whose speech may or may not have been assessed by a SLP/SLT. The overriding issue, I believe, is what happens to children for whom there are no viable alternatives. Ultimately, it is important that the child benefits, even if it is the parents who do the therapy. Unfortunately, for many children, therapy administered by a speech and language professional is not an option. Many school districts in the US offer therapy only for problems that negatively impact *educational* outcomes. A misarticulated sound or two does not necessarily qualify a child for speech services (ASHA 2004a). Some home-schooling parents elect not to access school-based services. Furthermore, there are families who cannot afford, cannot travel to, or do not wish to avail themselves of private practitioner services. The goal of the *Help Me Talk Right* books (Raz 1993, 1996, 1999) is to provide such parents with a structured approach to the remediation of their children's /l/, /r/, /s/, and /z/ difficulties.

There are four final points I would like to highlight. First, feedback from parents (which can be viewed at the Web site http://www.speechbooks.com) about the books has been uniformly positive. Second, had they been available, the books would have been of great help to *me* when I first started out as a clinician. Third, the books can be used by para-professionals (speech assistants). And fourth, most of the *Help Me Talk Right* books have been purchased by speech pathologists and school districts, so for me there is tremendous satisfaction in knowing that the books are accepted by colleagues in our profession and are used in their work.

Clinical phonology

In the 1970s, linguists and academic and clinical SLPs/SLTs were talking to each other about language in general and clinical phonology in particular. For phonologists Pamela Grunwell and David Ingram, there was a clear mission to help the SLP/SLT profession

in the practical application of phonological principles to the treatment of children with 'phonological disability': and many clinicians, the author included, devoured every word they wrote! Clinical phonology, according to Grunwell (1987), a British linguist working in the UK, was the clinical application of linguistics at the phonological level. Ingram (1989a), an American located in Canada at the time, considered that phonology embraced the study of: (1) the nature of the underlying representations of speech sounds (how they are stored in the mind); (2) the nature of the phonetic representations (how the sounds are articulated); and (3) phonological rules or processes (the mapping rules that connect the two). To complete the international (but English language) flavour of all of this, in the US, Stoel-Gammon and Dunn (1985) provided further theoretically principled guidance in a book about assessment and therapy, as did Elbert and Gierut (1986).

From a therapy point of view, the most radical aspect of the new principles was their focus on changing phonological patterns by stimulating children's underlying systems for phoneme use. There was an apprehensive feeling abroad in the clinical community that, because of the theoretical paradigm shift, therapeutic approaches, intervention goals, and therapy procedures and activities should now be different, or at least revamped. Fey (1985, p. 255) answered these concerns and uncertainties in a reassuring article, in which he wrote:

> *. . . adopting a phonological approach to dealing with speech sound disorders does not necessitate the rejection of the well-established principles underlying traditional approaches to articulation disorders. To the contrary, articulation must be recognized as a critical aspect of speech sound development under any theory. Consequently phonological principles should be viewed as adding new dimensions and new perspectives to an old problem, not simply as refuting established principles. These new principles have resulted in the development of several procedures that differ in many respects from old procedures, yet are highly similar in others.*

What revolution?

Did the hackneyed term 'paradigm shift' (Kuhn 1962) overstate what actually happened? *Was* there a phonological revolution? *Did* the new principles change practice? Certainly there were changes in the way assessments were being conducted (Grunwell 1975, 1985a; Hodson 1980; Ingram 1981; Shriberg and Kwiatkowski 1980; Weiner 1979), but did the *intervention* work of Elbert, Dunn, Gierut, Grunwell, Hodson, Ingram, Paden, Stoel-Gammon, and others alter what happened in therapy? The answer probably has to be, 'not much'. As recently as December 2004, when Barbara Williams Hodson, co-developer in the mid-1980s of patterns or cycles therapy (Hodson and Paden 1983, 1991), was asked in an online interview for *Thinking Big News* (Thinking Publications 2004): 'If you could change one thing in how SLPs work with clients what would it be?' Her response was: 'The one thing I wish most is that SLPs would work on patterns when serving an unintelligible child, rather than to focus on teaching isolated sounds to a criterion.' This resonated with something she wrote some 12 years before (Hodson 1992, p. 247) about the relative lack of application of phonological principles, by North American SLPs to either assessment or intervention:

My own observation, based on interactions with practising clinicians while giving clinical phonology presentations in some 40 states and 5 Canadian provinces, is that even now in the early 90s, only about 10% of the practising clinicians across the United States and Canada seem to be incorporating any phonological principles in their assessment and/or remediation.

Dr. Barbara Hodson is a Professor and Doctoral Program Coordinator at Wichita State University. A Fellow of ASHA, in 2004, she received the ASHF Frank Kleffner Lifetime Clinical Achievement Award. In A5 she discusses the continuing adherence by many therapists to sound-by-sound therapy.

Q5. Barbara Hodson: A therapy that focuses on phonological patterns

In the preface of *Evaluating and Enhancing Children's Phonological Systems: Research and Theory to Practice* (Hodson 2007, p. 177), there are echoes of the statements you made in 1992 and 2004, warning colleagues of the pitfalls for severely and profoundly involved clients, of focusing on individual phonemes (e.g., /f/ as a singleton) until mastery as opposed to cycling patterns. You go on to write:

Most treatment programs are phoneme-oriented. The majority of these focus on mastering each phoneme before progressing to the next target. Some use contrastive techniques (e.g., minimal pairs, maximal oppositions, multiple oppositions). A few target word structures, referred to as 'phonotactic' by Velleman (2002). Our preference for children with severe/profound disordered expressive phonological systems is to target patterns that are deficient, including word structures related to omissions (e.g., /s/ clusters, final consonants) as well as phoneme categories (e.g., velars, stridents). Phonemes are considered to be a means to an end rather than the true targets.

Given the empirical evidence for Cycles (for a review, see Baker, Carrigg, and Linich 2007), it really is unfathomable that this still needs to be said. How do you account for the apparent reluctance of so many clinicians to abandon hierarchical therapies based around phonetic execution, and how would you convince them of the advantages, for the client, of doing so?

A5. Barbara W. Hodson: Enhancing phonological *patterns* to expedite intelligibility gains

Most likely, it is not as much that SLPs/SLTs have a reluctance to abandon phoneme-oriented traditional therapy, as Q5 suggests, as it is that a good many apparently do not really know how or exactly what to do differently to facilitate the development of phonological patterns in children with highly unintelligible speech. Recent graduates, as well as veteran practitioners, have informed me during numerous national and international presentations over the past three decades that the common practice in their college SSD/phonology classes has been for professors to discuss a number of treatment approaches briefly, but not to really help students learn how to implement phonological approaches. This information was the impetus for Hodson (2007).

SLPs/SLTs also report that many professionals who supervise university clinical and school practicum experiences remain focused on having all children with speech sound errors, including those with highly unintelligible speech, master each phoneme one at a time (e.g., to 90% criterion). We do know that virtually every treatment approach helps children improve their speech (Ingram 1983). The issue remains, however, that we need to expedite intelligibility gains so that children have adequate phonological/metaphonological skills necessary for success in literacy (Larrivee and Catts 1999). Literacy difficulties have been found to correlate strongly with phonological deficiencies (Gillon 2004). Children with severely disordered phonological systems have repeatedly experienced difficulties in the area of phonological awareness (Gillon 2004), phonological representation (Nathan, Stackhouse, Goulandris, et al. 2004; Stackhouse 1997), reading (Bird, Bishop, and Freeman 1995), and spelling (Clarke-Klein and Hodson 1995).

Time considerations

If a child has only a few sounds in error, targeting one phoneme at a time to mastery seems to suffice. Children with numerous phonological deviations and unintelligible speech, however, typically require years of treatment when targeting phoneme by phoneme to mastery (personal communications). Time is critical for children with disordered phonological systems. According to the Critical Age Hypothesis (Bishop and Adams 1990), children need to be intelligible by age 5;6 or literacy acquisition most certainly will be hindered. It must be noted, however, that simply being intelligible does not guarantee literacy acquisition, because other factors (e.g., dyslexia, hearing loss) may also be involved.

Assessment considerations

Another concern pertains to clinicians and researchers still relying mostly on phoneme-oriented assessment measures (e.g., Goldman and Fristoe 2000) that do not differentiate between omissions, substitutions, and distortions in the scores (Prezas and Hodson 2007). A common practice is to note the number of phonemes in error in the final tally, with all types of errors receiving equal weighting. Thus, a child with distortions often appears to be as severe as a child with the same number of omissions, even though omissions have a much more deleterious effect on intelligibility and underlying phonological representations. Moreover, children's improvement over time is often 'clouded' by phoneme-oriented tools (Velleman 2005). It is imperative that assessment measures differentiate types of errors and also document improvement over time (Hodson 2003, 2004).

Evidence considerations

Evidence for the effectiveness of a modified Cycles Phonological Remediation Approach (with minimal pairs) has been provided by group studies (Almost and Rosenbaum 1998), and the effectiveness of the Cycles approach (unmodified) has also been reported in a number of case studies (Hodson 1997). Moreover, videos are available demonstrating dramatic changes in intelligibility of children after approximately 40-50 contact hours in less than 2 years (Hodson 2005). Kamhi (2006b) stated that the Cycles Approach combines an 'efficient goal attack strategy with traditional speech therapy and metaphonological

activities' (p. 275) and appears to be 'effective', but he noted that more research is needed to investigate efficiency aspects. Clearly, a large, randomised, well-designed, controlled study comparing results of approaches (e.g., oral motor, contrasts, patterns, phoneme mastery) for highly unintelligible children is needed—with the proponents of the respective methods being involved for fidelity, but with independent investigators conducting the study.

Summary comments

Even though phonological analyses and phonological intervention approaches often require greater knowledge, skills, and effort, we must provide the most efficacious services possible for all clients. Moreover, helping a young child with highly unintelligible speech to develop the phonological/metaphonological abilities necessary for success in school is one of the most rewarding experiences an SLP/SLT can have.

> *. . . it is notable that the development and acceptance of new revelations within our profession is a surprisingly slow process. Many individuals are just now encountering the concept of the Cycles Approach for the first time almost 30 years after it was introduced. In a broader sense, that ours is a healthy profession is revealed in that the search for knowledge and improvement in service delivery is never-ending. May this ever continue to be the case for our healthy, inquisitive profession.*
>
> (Paden 2007)

Models of phonological acquisition

It has become axiomatic in the literature to say that, because so little is known about normal phonological development, a cohesive and convincing linguistic theory of phonological disorders has yet to be formulated. Ingram (1989a) surveyed various attempts in the field of linguistics to construct a phonological theory that covered both normal and disordered phonological acquisition, indicating that the most likely sources of elucidation of *normal* acquisition might be universalist/structuralist theory (Jakobson 1941/1968), natural phonology theory (Stampe 1969), or the Stanford cognitive model (Macken and Ferguson 1983). Of the three, only Stampe's was directly tied to a phonological theory.

The behaviourist model

The behaviourist model dominated linguistics from the 1950s to the early 1970s. It applied a psychological theory of learning to explain how children came to distinguish and produce the sound system of the ambient language. Its adherents, like Mowrer (1952, 1960), Murai (1963), and Olmstead (1971), identified the role of contingent reinforcement in gradually 'shaping' a child's babbling to meaningful adult forms through classical conditioning. An important aspect of the model was the emphasis on *continuity* between babbling and early speech. The behaviourists believed that the infant came to

associate the vocalisations of the mother (usually) with primary reinforcements, such as food and nurture, with adults' vocalisations assuming secondary reinforcement status. Eventually, the infant's vocalisations would become secondary reinforcers (providing self-reinforcement) due to their similarity to adult models. From this point, the caregiver could refine the sound repertoire of the infant through selective reinforcement. The behaviourist framework did not presuppose, or indeed show any interest in, an innate order of speech sound acquisition. The sounds acquired depended on the reinforcement obtained from the linguistic environment.

The structuralist model

The structuralist model (Jakobson 1941/1968), which stemmed from structuralist linguistic theory, proposed *discontinuity* between babbling and speech. In addition, the structuralists postulated an innate, universal order of acquisition, with distinctive features emerging hierarchically and predictably. Jakobson regarded babbling as a random activity virtually unrelated to the development of the sound system. Research evidence of regularities in prelinguistic vocal patterns (Ferguson and Macken 1980; Oller, Wieman, Doyle, et al. 1976) has, however, weakened this position. As well, mid-1970s research challenged Jakobson's hypothesis of a sequence of phonemic oppositions as the basis for the earliest stages of phonological development. Kiparsky and Menn (1977) demonstrated that the child's word count is too small to provide objective evidence of the distinctive features 'unfolding' in the way proposed by Jakobson. Really, the developmental order of phonemic oppositions has proved difficult to ascertain, because analysis has to take into account the adult targets attempted as well as the child's phonetic repertoire. To complicate matters, children seem to selectively *avoid* saying words containing certain consonants that are difficult for them to produce (Ferguson and Farwell 1975; Schwartz and Leonard 1982). Studies of evidence of lexical avoidance (or 'lexical selection') lent weight to the theory that, in the first-50-words-stage, children target whole words (Ingram 1989a, pp. 17-22). The phonetic variability readily observed in children in the 9- to 18-month age range may also provide evidence against a universal order of phoneme acquisition. Irrespective of such shortcomings, Jakobson's views exerted a tremendous, enduring influence on linguist thought. Ingram (1989a) for one, counted the structuralist model as one of the 'most likely candidates' (p. 162) for a theory of normal phonological acquisition. He talks about this in A6.

Dr. David Ingram received his PhD from Stanford University in 1970, where he studied language universals under Professor Joseph Greenberg and phonological acquisition in children under Professor Charles Ferguson. His interest in language disorders was developed during two subsequent years as a Research Associate at the Scottish Rite Institute for Childhood Aphasia. He was a professor at the University of British Columbia from 1972 to 1998 and has been a professor at Arizona State University since 1998. His research is on language acquisition in typically developing children and children with language and phonological disorders. The focus is on both English-speaking children and children acquiring other languages. The language areas of primary interest to him are phonological, morphological, and syntactic acquisition. He has published over 100 articles and is particularly known for his seminal work, *Phonological Disability in Children* (1976), and his comprehensive textbook, *First Language Acquisition* (1989).

Q6.   David Ingram: Theory and SSD

Can you comment on this quotation from Powell, Elbert, Miccio, et al. (1998) who said, 'Perhaps we err in our attempt to find a single theory to support all of our work with children with phonological disorders. When we acknowledge the heterogeneity of this target population, we are logically moving towards acknowledging that different theoretical approaches may have to guide our work with different subgroups. We seem to have moved past the more simplistic "one theory fits all" view.' It is a moot point in SLP/SLT circles whether clinicians spend much time thinking about theories, but most clinicians probably incorporate into their 'theory of intervention' (Fey 1992b) the idea that you cannot work effectively with children with SSD unless you have a good grasp of normal development. In this context, the notion of 'typical acquisition' is usually around age-of-acquisition and order-of-acquisition schedules that focus on surface forms and not much to do with theories of development and models of phonology. Do you continue to regard the structuralist model as a frontrunner in the formulation of a theory of normal phonological acquisition (Ingram 1989a), and what are the other contenders? How do you see a theory of acquisition informing the development of theories of disorder and intervention, and how can clinicians use this information?

A6. David Ingram: The role of theory in SSD

This quotation by Powell, Elbert, Miccio, et al. (1998) is a well-intended comment on the complexity of determining a theoretical account of children's SSD. The effort to do so has a long history of moving from simpler to more complex explanations. Originally, SLP began with little if any theory, treating speech sound errors as errors with individual sounds, and subsequent treatments based on the intuitively reasonable assumption that improvement would result from drill and repetition. These early efforts were supported by subsequent acceptance in many circles of behaviourism, a movement clearly described in the present book.

With the demise of behaviourism (Chomsky 1959), a new era of linguistic explanations emerged, with the result over time being a daunting range of possible theoretical accounts (c.f. summaries in Ball and Kent 1997). In the 1970s, the field of SLP was sympathetic to these efforts, and the proposals have constituted major sections of most textbooks since (Stoel-Gammon and Dunn 1985; Bauman-Waengler 2004). At least two potential problems arose with these efforts at theoretical explanation. For one, phonological theories became more and more complex and abstract, and de facto harder to assimilate and make clinically relevant. Second, no clear theoretical approach has won out, in the sense of demonstrating it is, without argument, the best and clinically most relevant account. The positive from all this is the impression that a range of approaches 'work' (with some debate whether one or another might be even more effective). The Powell et al. suggestion captures this state of the art. That is, they reflect the impression: (1) that many theories have shown success, and (2) that children with a range of speech sound problems respond to different approaches. This leads the authors to the intuitively reasonable conclusion that specific theories, and their subsequent treatment approaches, may work better for some disorders than others.

Like behaviourism, however, this intuitively reasonable assumption is wrong. It errs on both the side of treatment and the side of theory. Concerning treatment, it is certainly good news that a range of treatment approaches work and also good news that SLPs/SLTs know

them. There is the implication, however, that a reasonable arsenal of treatment approaches is sufficient to treat SSD. Unfortunately, a range of available treatment approaches is no guarantee of future success without some theoretical grounding. There is no foundation to the prediction that what worked with one child will work with another child, just because the two children appear to be similar based on some assessment. Nor does it make sense simply to run a child through the approaches until one clicks. We need to understand the disorders better than that, and a better understanding can only come from a sound theoretical approach.

Let me try to make this more concrete. Let's say I am a practicing SLP with excellent skills at two quite different treatment approaches. On the one hand, I am very experienced in using a cycles approach (in a group setting) with target selection based on using developmentally appropriate sounds. At the same time, I am also well trained at using a maximal contrast approach, involving intense one-on-one intervention with target sounds well beyond the child's current developmental level. On Tuesday, I evaluate two children, Barbara and Judy. I conclude from my clinical intuitions that Barbara will benefit from a cycles model, whereas Judy will be best served with the maximal contrast therapy.

At one level, this is evidence-based practice. When I meet with Barbara's parents, I will discuss the cycles approach and refer to Hodson (2004) and other references as needed. When meeting with Judy's parents, however, my justification will be through discussing work by Gierut (2001) and the references therein. I will also be doing exactly what Powell et al. suggest, that is, moving past the simplistic 'one theory fits all' view. I will rely on my clinical experience over many years of practice, an invaluable part of my decision-making process. Given the latitude afforded to me by Powell et al., I also have one additional option. If one or both children don't meet my treatment goals, I can just switch them to the other approach. Or, if I get to attend a national convention in the interim, I can bring home a new approach I might learn at a workshop there. I have also satisfied Powell et al. by not thinking too much about theories throughout the whole process.

Is what I have just described 'best' practice? I don't think so. The bottom line is that knowing a range of treatment approaches and selecting from them as needed for specific subgroups is not sufficient. There needs to be a single theoretical basis for these decisions. In Ingram and Ingram (2001), we discuss a situation similar to the one above. We offer the hypothesis that there may be two subgroups of children with SSD: one with poor whole-word skills and one with good whole-word skills. The former group will be children with poor intelligibility, who are having difficulties matching their speech sounds to the target models. The latter group, on the other hand, are matching the target words relatively well (over 50% of the segments) but are possibly delayed in terms of their speech. We go on to suggest that the former children are candidates for a developmental approach, such as the one described for Barbara. The latter children, however, with good matching skills, may respond well to the maximal contrast approach as mentioned for Judy. Importantly, these decisions follow a single theory, a theory that incorporates whole-word abilities into our account of how children acquire their phonological systems. Within this theory, it makes sense to select the treatments as mentioned, and no sense to do it the opposite way.

Turning to the implications about theories by Powell et al., they make a false assumption about what theories are about. While referring to the 'one approach fits all' view as simplistic, they replace it with a Rodney King 'why can't we all get along' view. Rodney King was an American whose arrest was videotaped and found to include an excessive use of force by the police. This quote was his response to the arrest. He later went on to make significant contributions to the American civil rights movement. Oops, that was Martin Luther King.

Here's an example of how this point of view could be applied. In Ingram (1989a), I contrast two theories of language acquisition: a maturational approach and a constructionist (Piagetian) approach. These theories make very different claims about how language is acquired. For example, it is known that certain syntactic constructions are acquired late, for example, more complex forms of passive sentences. A maturational account would say that this is because the grammatical principles needed to form passive sentences do not mature until later, say age 6. A constructionist approach would predict that these sentences could be acquired earlier through the right combination of exposure to them and internal developments of the child's language acquisition.

Can these theories co-exist? They can, according to Powell et al. Let's again turn to a concrete example from speech sounds disorders. We know that children acquire certain English sounds late, such as the dental fricatives. On Wednesday, I assess two four-year-olds, both referred with problems with these fricatives and a concern that intervention may be appropriate. I reach the following conclusions. One child, Dan, strikes me as very constructionist in his learning, whereas the other child, Tom, appears maturational. My recommendations are as follows. Dan will start an intervention program where we will use auditory bombardment to stimulate his acquisition of the dental fricatives. We will work on a selective vocabulary with these sounds, which in turn will lead to internal gains in his language knowledge. Poor Tom, however, cannot learn these sounds because his speech development needs to mature. No amount of intervention will help Tom, who will be left alone to acquire these sounds at age six when his maturation is complete. If this makes sense to you, there's some land in Florida I'd like to talk to you about.

The Rodney King approach underlies a basic misunderstanding that somehow theories can co-exist. Here's one further demonstration of this misconception. Let's consider a theory of phonological acquisition that proposes children use phonological processes to simplify speech. This theory has many processes, including Fronting (which changes k to t, e.g., 'key' is [ti]), and Backing (which changes t to k, e.g., 'tea' is [ki]). Another theory, NeoJakobson Theory, says that children's productions reflect their underlying distinctive features. This theory allows Fronting, but not Backing, as a natural process. On Thursday, I assess two children: one who shows Fronting (David) and one who is doing Backing (Caroline). My conclusions are that David is using the phonological process theory to acquire his speech sounds, whereas Caroline is using the NeoJakobson theory. Again, this is nonsense. The problem with the phonological process theory (as stated) is that it makes up any process it needs, and is therefore too powerful. By explaining everything, it explains nothing. The more restricted theory is to be preferred. How then, can the NeoJakobson Theory account for our data? The theory states that children's first feature distinction is between a labial consonant and a non-labial consonant. The first non-labial consonant can either be a [t] or a [k]. Most children will opt for the [t], a more common sound in early productions, and this choice is the predicted, or unmarked, sound. Some children, however, may select to produce [k] instead, since it still has the same underlying value of the [t], that is, both being non-labial. This becomes, therefore, the less common, or more marked, choice. It is not always easy to evaluate theories and decide that one is more explanatory than the other, but the bottom line is that such evaluations are the way theories are assessed, not by saying they all happily coexist.

If I am to stand by and defend the simplistic (sic) view that one theory fits all, then I should provide some suggestions on what this theory might look like. In Ingram (1997), I outline the basic properties of such a theory. The first point to make is that our theory

for SSD has, in the short term, different goals than phonological theory. The latter has as its goal the characterization of the phonological systems of the thousands of languages that exist in the world. Our goal, by no means trivial, is to have a theoretical account of the phonological systems of children's first words, often less than a thousand in number. This goal does not require the extent of theorisation or formalism needed in linguistic theory. As suggested in Ingram (1997), it is possible to isolate the shared assumptions of phonological theory in general to form the basis of our theory of SSD. Here are some of those shared characteristics: the acquisition of an early lexicon involves the acquisition of phonological representations; these early representations, like adult representations, consist of phonological features; the early representations of children are underspecified, that is, they do not contain the full range of features of those for adult speakers; children first acquire a subset of the features underlying all languages; my research leads me to suggest these early features are consonantal, sonorant, labial, dorsal, continuant; voice; the child's productions are speech sounds that have one or more of these features; the first syllables are constructed from a small set, that is, CV, CVC, VC, CVCV, CVCVC; children's productions attempt to match the adult models, in typical development around 70%.

I'll finish with one of my favourite quotes: 'Theory without practice is speculation, practice without theory is dangerous.'[1]

The biological model

Like Jakobson, Locke (1983) stressed universality in his proposal of a biological model of phonological development. However, Locke emphasised *biological* constraints rather than linguistic ones. Rejecting Jakobson's idea of discontinuity between babbling and speech, Locke postulated relatively rigid maturational control over the capabilities of the speech production mechanism. For Locke, phonology began before 12 months of age with the pragmatic stage when certain babbled utterances gained communicative intent. At the same time, the phonetic repertoire was essentially 'universal', constrained by the anatomical characteristics of the vocal tract. During the 'cognitive stage' that followed, the biological constraints persisted while the child learned to store and retrieve relatively stable forms of phonemes learned from adult language models. At 18 months, in the 'systemic stage', biologically determined babbling production patterns gave way to more adult-like speech. These speech attempts reflected phonologically the target language. Patterns found *only* in adult speech were acquired and patterns not contained in it were 'lost'.

The natural phonology model

Meanwhile, Stampe (1969) had proposed his natural phonology model of phonological acquisition. He posited that children come innately equipped with a universal repertoire of phonological processes: Stopping, Fronting, Cluster Reduction, and so on. These

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[1] Source lost in time.

processes were 'mental operations' that change or delete phonological units, reflecting the natural limitations and capacities of speech production and perception. In Stampe's view, natural processes amounted to articulatory restrictions, which came into play like reflexes. The effect of these 'reflexes' (which were not reflexes in the physiological sense) was one of preventing accurate production of sound differences. This occurred despite the sounds being perceived correctly auditorily and stored as 'correct' adult phonemic contrasts in the linguistic mechanism in the brain. The processes operated to constrain and restrict the speech mechanism per se. Stampe held that these universal, innate simplifications of speech output involved children's cognitive, perceptual, and production domains. In essence, he believed that the processes simplified speaking in three possible ways. Given a potential phonological contrast, a process favoured the member of the opposition that was the:

1. least complex to produce;
2. least complex to perceive; or,
3. least complex to produce and perceive.

For instance, given the choice of saying /d/ or /ð/, the assumption was that /d/ was easier, because, in typical development, it was acquired earlier; for example, 'this' (/ðɪs/) is often realised by young children as /dɪs/ (an example of Stopping).

The child's developmental task was to suppress the natural phonological processes to achieve full productive control of the phonemes of the ambient language. He also believed that, from the time they began using speech meaningfully, children possessed a fully developed, adult-like, phonological perceptual system. Thus, while they exhibited natural processes in output, they already had an underlying representation (a mental image or internal knowledge of the lexical items) of the appropriate adult target form (so 'this' would be /ðɪs/ underlyingly and /dɪs/ on the surface). Stampe relied heavily on a deterministic explanation of phonological change. He maintained that children 'used' processes for the phonological act of simplifying pronunciation.

The progression to adult-like productions (for instance, the use of consonant clusters) represented mastery of increased constraints (upon output phonology). This development occurred through the suppression of natural processes and consequent revision of the universal system. Change occurred through a passive mechanism of suppression as part of maturation. Stampe did not consider cognitive constraints related to the pragmatics of communication, or of the active learning of a language-specific phonology through problem-solving, as in the Cognitive Model. Possibly the most contentious aspect of Stampe's interpretation of Natural Phonology was his claim that the processes were psychologically real, with Smith (1973, 1978) concluding that there was no psychological reality to the child's system because there was no evidence for the 'reflex mechanism' proposed by Stampe in applying, or rather 'using', phonological processes.

The prosodic model

The prosodic model of Waterson (1971, 1981) introduced another novel theoretical construct. It involved a perceptual schema in which 'a child perceives only certain of the features of the adult utterance and reproduces only those he is able to cope with' (Waterson 1971, p.181) in the early stages of word production. Waterson (1971),

Braine (1974), Macken (1980), and Maxwell (1984) asserted that, in infants, perception and production are both incomplete at first. Both developed and changed before they could become adult-like. Unlike the more generally applied phonological process-based (segmental) description, Waterson's schema provided a gestalt of child production rather than a segment-by-segment comparison with the adult target. Waterson's approach is particularly useful in describing the word productions of toddlers and may explain those that do not readily appear to be reductions of adult forms.

The cognitive/Stanford model

The Stanford or cognitive model of phonological development (Ferguson 1968; Kiparsky and Menn 1977; Macken and Ferguson 1983), and also Menn's (1976) 'interactionist discovery model', construed the child as *Little Linguist*, a captivating idea that dates back at least as far as Comenius (1659). Comenius insisted that, for a child, language-learning was never an end in itself but rather a means of finding out about the world and forming new concepts and associations. In problem-solving mode, the child met a series of challenges and mastered them, thereby gradually acquiring the adult sound system.

Because the child was considered to be involved actively and 'cognitively' in the construction of his/her phonology, the term cognitive model was used. Phonological development was an individual, gradual, and creative process (Ferguson 1978). The Stanford team proposed that the strategies engaged in the active construction of phonology were individual for each child and influenced by internal factors: the characteristics and predispositions of the child; and external factors: the characteristics of the environment. The external factors might include the child's ordinal position in the family, family size, child-rearing practices, and interactional style of the adults close to the child.

Levels of representation

Both Stampe and Smith recognised only two levels of representation. Stampe saw phonological processes as mapping from the underlying representation to the surface phonetic representation, whereas Smith (1973) saw realisation rules assuming this function. Stampe *and* Smith insisted that the child's phonological rules or processes were innate or learned extremely early. Then, Ingram (1974) coined the term 'organisational level' to connote a third, intervening component, related to, but distinct from, the perceptual representation of the adult word. A similar three-level arrangement, implicit in Jakobson's distinctive features theory, was central to cognitive or Stanford theory.

Smith rejected the hypothesis that each child has a unique system, and assumed full, accurate perception and storage of adult speech targets. He proposed a set of ordered and universal phonological tendencies and realisation rules. Realisation rules were physical expressions of abstract linguistic units. Any underlying form had a corresponding realisation in substance. In this instance, phonemes were 'realised' or manifested in 'phonic substance' as phones (whereby meanings were transmitted). Smith's view was that the processes acted as a filter between the correctly stored adult word and the set of sounds produced by the child. Again, the problem arose of the child being perceived as passively allowing the realisation rules to 'apply' in reflecting the adult word.

Theories of development, theories of disorder, and theories of intervention

The theoretical assumptions upon which any speech-intervention approach is based derive first from a theory or theories of normal phonological development, or how children normally learn the speech sound system through a combination of maturation and learning. Exploring this idea, Stoel-Gammon and Dunn (1985) posited four basic interacting components necessary for the formulation of a model of phonological development.

1. An auditory–perceptual component, encompassing the ability to attend to and perceive linguistic input.
2. A cognitive component, encompassing the ability to recognise, store, and retrieve input and to compare input with output.
3. A phonological component, encompassing the ability to use sounds contrastively and to match the phonological distinctions of the adult language.
4. A neuromotor component, encompassing the ability to plan and execute the articulatory movements underlying speech.

From the practitioner's beliefs and assumptions about *normal* development comes a theory of *abnormal* phonological development: that is, a theory of disorders that explains why some children do not acquire their phonology along typical lines. Then, from the theories of normal and abnormal acquisition, and their formalisms, a theory of *intervention* can evolve. The nature of a theory of intervention (or theory of therapy) depends on how the individual clinician understands, interprets, incorporates, adapts, and modifies knowledge of normal and abnormal acquisition, and what theoretical assumptions are made in the process. Michie and Abraham (2004) suggested that intervening without a theory of therapy can lead to 'reinventing the wheel rather than re-applying it'. Expanding on this point, they explained that, if we can isolate which parts of a treatment are doing the work of facilitating desired goals, it is possible to 'fine-tune' therapy to maximise those effective components while reducing components that do not seem to exert much effect on the outcome.

A theory of therapy, that is, how best to improve the speech of a child with SSD beyond the progress expected with age, must logically rely on *assessment procedures* that are congruent with the interventionist's theories of development, disorders, and intervention (Fey, 1992a, b; Ingram, A6). In this regard, our timeline should record the development, mainly in the 1980s, of new speech assessments based around Natural Phonology theory and emphasising phonological process analysis. These included, in order of publication: Weiner (1979), Shriberg and Kwiatkowski (1980), Hodson (1980), Ingram (1981), Grunwell (1985b), and Dean, Howell, Hill, et al. (1990). Phonological process analysis introduced the concept of an abstract level of knowledge. This was revolutionary in its time, and was the phonological version of syntactic deep structure.

The first minimal pair therapy, inspired by Natural Phonology, appeared in the literature when Frederick Weiner had a dazzling idea! Calling it 'the method of meaningful contrast' (Weiner 1981a), he described what we now know as conventional minimal pairs therapy (Barlow and Gierut 2002). More therapy ideas based on linguistic principles followed rapidly. For example, a year later, Blache (1982) presented a systematic approach to minimal pairs and distinctive feature training in a book chapter; Hodson and Paden (1983) produced the first edition of *Targeting Intelligible Speech*, which

described their 'patterns' approach, popularly called 'cycles therapy' (Hodson, A5); Monahan (1984, 1986) devised a minimal pairs therapy kit called *Remediation of Common Phonological Processes*; and Elbert and Gierut (1986) wrote the *Handbook of Clinical Phonology*. In the same period that all this activity was going on in the US, in the UK, Grunwell (1983, 1985b) provided intervention guidance in peer-reviewed journal articles; Dean and Howell (1986) wrote an inspiring article about the metalinguistic aspect of therapy for child speech that heralded the development of the *Metaphon Resource Pack* (Dean, Howell, Hill, et al. 1990); and Lancaster and Pope (1989) developed a therapy manual, *Working with Children's Phonology*, that focused on an auditory input therapy (thematic play) approach suitable for very young children and older children with cognitive and attention-span challenges (Lancaster, A20). Still in the UK, the first of a series of books (Stackhouse and Wells 1997) devoted to an influential psycholinguistic framework appeared (Gardner, A21).

A clinical forum on phonological assessment and treatment, edited by Marc Fey, was published in 1992 in one of the ASHA journals, *Language, Speech, and Hearing Services in Schools* (LSHSS). Other such forums followed in 2001, 2002, 2004, and 2006, but this particular one, with articles by Edwards (1992), Elbert (1992), Fey (1985, 1992a, b), Hodson (1992), Hoffman (1992), Kamhi (1992), and Schwartz (1992), is still extraordinarily helpful as a comprehensive introduction. In one of the articles, Fey (1992b) captured the clear distinction between intervention approaches, intervention procedures, and intervention activities when he described and applied a structural plan for analysing the form of language interventions, such as phonological therapies. This hierarchical plan (displayed in Table 1.3) was adapted by Bowen (1996a) and discussed in Bowen and Cupples (1999a).

For clinicians, one good reason for knowing the theoretical underpinnings of the 'therapies' in his/her repertoire is that it enables them to pick and choose among them, or even to combine aspects of them, based on client need. In suggesting that we should be more aware of theories, it should not be assumed that theories are only incorporated into intervention if we, as clinicians, are conscious of them. As Duchan (personal correspondence 2008) points out, 'I feel that we can look at any intervention and deduce its theoretical underpinnings or at least the assumptions it is based on, even if the clinician cannot articulate them. For example, drill is based on an assumption or theory that learning is like exercise, the more you practice saying a sound or word, the better you "know" or can say it next time.'

Fey's useful hierarchy covered the steps involved in modifying and adapting theoretical principles into a practicable intervention approach. It shows the progression from (1) a given phonological theory (e.g., Natural Phonology) to (2) a phonological analysis that is congruent with that theory of phonological development (e.g., Independent and Relational Analysis) to (3) the phonological therapy approach under consideration (e.g., Conventional Minimal Pairs Therapy), informed by (1) and (2). It then allows description of three levels of intervention goal—basic goals, intermediate goals, and specific goals—with goal-selection and goal-attack as critical components. From these arise (4) the intervention procedures of choice within the selected therapy model or a coherent combination of models and (5) workable intervention activities that are both consistent with the preceding four levels and suitable for a particular client.

The 'other' clinical forums, so useful to clinicians, referred to above include one in LSHSS edited by Barlow (2001, 2002); one in the *American Journal of Speech-Language*

Table 1.3 Theory to intervention hierarchy

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1. PHONOLOGICAL THEORY

Clinician's <u>own</u> Theory of Development ∼ Theory of Disorders ∼ Theory of Intervention

CONGRUENT WITH

↓

2. PHONOLOGICAL ASSESSMENT APPROACHES

↓↑

CONGRUENT WITH

↓↑

3. PHONOLOGICAL THERAPY APPROACHES

Incorporating goal selection and goal attack via 3 levels of intervention goals:

<u>LEVEL 1</u>

Basic Intervention Goals

(1) To facilitate cognitive reorganisation of the child's phonological system and phonologically oriented processing strategies; (2) to improve the child's intelligibility.

<u>LEVEL 2</u>

Intermediate Intervention Goals

**To target *groups* of sounds related by an organising principle
(e.g., Phonological Processes or Phonological Rules)**

<u>LEVEL 3</u>

Specific Intervention Goals

To target a sound or sounds or structure, using <u>vertical strategies</u> , working on a goal until a criterion is reached, then treating a new goal; or <u>horizontal strategies</u> , e.g., targeting several sounds within a process, and/or targeting more than one process simultaneously, and/or targeting syllable structures, metrical stress, etc. simultaneously with a process or processes.

↓

4. INTERVENTION PROCEDURES

e.g., stimulability training, or phonetic production

↓

5. INTERVENTION ACTIVITIES

Contexts and events, such as games and tasks

Pathology edited by Williams (2002a, b); another in *Child Language Teaching and Therapy*, guest edited by Bernhardt (2004); and, one in *Advances in Speech-Language Pathology* (now renamed the *International Journal of Speech-Language Pathology*) edited by McLeod (2006). More specific clinical forums dealing with particular therapy approaches are also available to guide the clinician. For example, there is one on *Metaphon* (Dean, Howell, Waters, et al. 1995) in *Clinical Linguistics and Phonetics*, and one on Parents and Children Together: PACT (Bowen and Cupples 1999a, b) in the *International Journal of Language and Communication Disorders*.

Looking at Table 1.1 and the seventy years from the Travis articulation paragraph in 1931 to the impact of phonology in the 1970s, via the information explosion of the Internet era, to the ICF-CY view of speech impairment post 2001, we see the dominant influence of linguistics on child speech practice. Interestingly, Bleile (personal correspondence 2005) sees the effects of linguistics, and particularly the impact of phonology, on our

practice as being less than we thought it would be. He uses the analogy of waves crashing onto a beach, and a 'wave height' metaphor from surfing. The first wave, distinctive features theory, was 'over head' and went way, way up the beach; then came natural phonology theory and phonological processes, 'head high' and not so far up the beach; following that, nothing was quite 'shoulder high' or even 'waist high', with metrical phonology, auto-segmental phonology, and other nonlinear approaches creating small ripples that barely dampened the sand. Can it be that linguistic theory is now exhausted as a source of ideas and insights about phonological disorders, like behavioural psychology that ran out of puff in the 1970s? Perhaps information processing models like the psycholinguistic model of speech processing and production (Stackhouse and Wells 1997, 2001) hold promise of enticing waves on the intervention side in the future. Maybe it is time for big new insights to come from biology, particularly developmental neurology, and genetics. This notwithstanding, there are aspects of linguistic and psycholinguistic theory that we clinicians should be well acquainted with, because certain linguistic principles can help in devising evidence-based therapies that are conducive to treatment efficacy.

Communication and advocacy

Our recent history has unfolded alongside the creation and expansion of the Internet, comprising the World Wide Web (Berners-Lee 2002) and e-mail, and the growing use of information and communication technology (ICT) by academics in general (Hallett 2002), speech and language professionals in particular (Bowen 2003), and consumers of SLP/SLT services. E-mail, electronic mailing lists, message boards, and other Web-based discussion have facilitated quick, easy, and enjoyable international sharing and collaboration among academics and specialist clinicians who have the time to devote to it, and have provided novel opportunities for professionals and consumers to engage with each other. Part of this Internet expansion has included the growth of child speech-related advocacy Web sites, the most prominent of which is the Apraxia-KIDS Web site (Gretz 1997). Frustrated in 1997 by the lack of information on childhood apraxia of speech (CAS), consumer advocate Sharon Gretz worked with local SLP academics and clinicians to develop training programs for SLPs and accessible Web-based information for families new to diagnosis, those seeking ongoing support, and individuals interested in the research side. She talks about this in A7.

Q7. Sharon Gretz: Consumer advocacy and CAS

As the parent of a teenager who had severe CAS at the age of three, founder and Executive Director of Apraxia-KIDS and the Childhood Apraxia of Speech Association of North America (CASANA), and a doctoral student in communication sciences and disorders, you have made an extraordinary contribution to our field and have a unique perspective on SLP/SLT child speech practice. Impressively, CASANA has become the only national non-profit organization in the US and internationally with the sole focus of CAS. Can you provide a little of the history of what inspired you to follow this path and share your thoughts on the mutual needs, goals, expectations, roles, responsibilities, and costs for

the child (or adolescent or young adult), family, and therapist in the assessment, therapy, and management of CAS? Where do consumer advocacy and Web-based communication fit, and what is your vision for the future of organisations like CASANA and smaller, more local 'CAS associations' that currently need to raise funds in order to operate?

A7. Sharon Gretz: Apraxia-KIDS^{SM} and the Childhood Apraxia of Speech Association of North America (CASANA)

Beginning in 1994 and for a span of several years, from my seat behind a one-way mirror, I witnessed my child's emergence as a speaker and communicator. I witnessed his incredible struggle, effort, resolve, and, ultimately, success. Eventually, after over 200 individual speech therapy sessions, my son (who had been diagnosed with severe CAS and dysarthria) was a 'talker', his speech intelligible. To say that observing the painstaking, persistent work of both clinician and child was inspiring is an understatement. Fuelled by an appreciation for the good outcomes possible with proper diagnosis, treatment, and clinician–parent partnerships, I turned my thoughts to what I could do to help others in similar circumstance. At the time, little information on CAS existed that could be interpreted by families. The Apraxia-KIDS listserv, followed by the Web site, were created to address gaps in information and to create an international community of concern regarding children affected by this disorder.

Clearly, in the mid to late 1990s, CAS did not appear to be a speech disorder receiving adequate time or attention in the professional literature. Additionally, training opportunities on the topic for practicing professionals were infrequent. These professional circumstances existed alongside several critical needs of parents and caregivers, including the need to:

- gain support for the emotional and practical aspects of raising children with CAS;
- develop advocacy skills to benefit children with CAS; and,
- learn how to help their children with speech and communication practice at home.

CASANA was founded in 2000 to address the above areas of need. Perhaps more importantly, the association has served as a catalyst and a galvanising force for heightened professional interest, education, research, and support worldwide for children with CAS and their families. High-quality Web sites and online communities, such as the Apraxia-KIDS Web site and its companion e-mail listserv, appear to play a vital role in providing reliable information and support. For example, in a survey, Boh, Csiacsek, Duginske, et al. (2006) found that 93% of parents of children diagnosed with CAS used Internet sites as information sources regarding their child's disability. Overwhelmingly, parents report that the *most* helpful information they receive is not obtained from treating SLPs/SLTs, but rather from the Apraxia-KIDS listserv (Lohman 2000). Furthermore, SLPs/SLTs report that they routinely visit specific consumer group Web sites, such as Apraxia-KIDS.org, to gain information relative to clinical cases (Nail-Chiwetalu and Bernstein Ratner 2007).

Apraxia-KIDS and CASANA at work

To illustrate the impact that Apraxia-KIDS and CASANA resources have on families and children, consider the story of a mother named 'Jenna' and her five-year-old son 'Greg'.

Jenna subscribed to the Apraxia-KIDS listserv in a panic. Greg had been receiving both private and school-based speech therapy for nearly three years. He was identified through public early intervention as having CAS near his third birthday, and yet, in the several years that he had seen three different SLPs, he continued to have just a handful of single-syllable words that were intelligible enough for unfamiliar listeners to understand. Through both reading of listserv e-mail, Apraxia-KIDS website articles, and her active questions to the listserv regarding her son's situation, Jenna learned that several key issues might be influencing her son's poor progress. First of all, she learned that his school speech therapy group, comprised of her son and five other children, was not the recommended service delivery model for a child with severe CAS. She also learned that by law (Individuals with Disabilities Education Improvement Act [IDEA] 2004) she was considered a team member in her son's individual education planning (IEP) and that there were rules governing the process that might help her advocate for improved services for Greg, including individual speech therapy. Jenna also learned that the bubbles and horn-blowing activities that occupied most of her son's private speech therapy time were not likely to make a significant difference in his speech production skills (Lof, A30). Additionally, Jenna came to realise that she should be working at home with her son in specific ways that would benefit carry-over of skills learned in treatment. Through local parents involved with CASANA's groups, Jenna located a different, private SLP. She now felt prepared to interview the new SLP to assure herself that the professional understood both the nature of CAS and its treatment and the need to actively involve Jenna in helping her son at home. Jenna was also able to attend a national conference on CAS held in a city in a nearby state. At the conference, Jenna attended sessions where she learned more about CAS, but also about other associated problems that Greg was facing and could possibly face in the future. Ecstatically, Jenna reported to her online community (the Apraxia-KIDS listserv) that, for the first time, Greg was making significant progress in his speech and communication skills. He also had several friends at school, his handwriting was improving, and his reading difficulties were being addressed. Jenna now had hope for Greg's future and also felt more competent and confident as his chief advocate. She also reported with delight that Greg's new school SLP was attending a CASANA workshop to learn more about appropriate assessment and treatment of children with CAS. After several years of involvement and with increased frequency, Jenna now often *answered* questions posed by new parents to the listserv,sharing the information she had learned with others in similar circumstances.

Because of life situations like that of Jenna and Greg, CASANA's board of directors believes that its work is of an urgent nature. The presence of severe speech disorder, and thus communication impairment, has serious ramifications on the quality of life for youth growing up with this disorder. Above and beyond the complicated and challenging speech disorder and its frequent co-morbidities, issues regarding the children's inclusion, relationships, education, emotional functioning, and social well being and independence are also likely to be at stake (Markham and Dean 2006).

Roles and challenges for the future

As more research is produced and knowledge is gained about best assessment and treatment practices and the long-term ramifications of CAS, undoubtedly consumer groups will have a role in the widespread dissemination of information regarding toddlers, children,

and youth of all ages with this disorder. One challenge will be to educate professionals and parents to evaluate readily available Internet information and to critically judge its authority, reliability, and credibility. An additional challenge is likely to be ongoing funding for consumer non-profit groups like CASANA. In some ways, the organization is a victim of its own success. Through the work of CASANA, there is increased interest in and attention to CAS. This interest and attention leads to increased demand for assistance and education, which in turn requires more funding. Financial resources to support ongoing operations or new programs, such as research, will need to develop for long-term sustainability of these efforts.

Barriers made of words

Gretz (A7) includes, among the motivational factors driving the development of CASANA, the paucity of information on CAS that could be interpreted by families. Her observation accords with the view of McNeilly, Fotheringham, and Walsh (2007) that terminology in comunication sciences and disorders 'presents a significant barrier to the profession's advancement in research, clinical effectiveness, public image and political profile'. Insisting that change is imperative, McNeilly et al. are clear that, 'influencing attitudes and understanding about something as fundamental and closely tied to one's professional identity as terminology is no small task'. They also underscore the need for sufficient will, resources, and cooperation, as well as a realistic timeframe within which to effect such change. Against the historical backdrop provided here in Chapter 1, the following chapter covers a range of currently applied systems of terminology and the issues that surround them, as well as accounts of the classification, description, and assessment of children's speech.