The Ling Consortium
The Ling Consortium is an international consortium of university accredited postgraduate training institutes for educating listening and spoken language professionals.

Dimity Dornan, PhD, CpSp, FSPAA, LSLS Cert AVT
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The Ling Legacy: Speech in the 21st Century

Mary McGinnis, PhDc, CED, LSLS Cert AVT
Director
Graduate Program
John Tracy Clinic

Goals

- Dan’s professional legacy (Todd)
- Speech norms (Mary)
- Brain research (Carol)
- Order in Ling System (Christina)
- PLE demonstration (Mary & guests)
- Suprasegmental targets (Marietta)
- Facilitating contexts for targets (Judy)
Legacy

“You are not here to make a living. You are here to enable the world to live more amply, with greater vision, and with a finer spirit of hope and achievement. You are here to enrich the world.”

-- Woodrow Wilson

The Young Professional – A Chance Encounter

- Born in Wetherden, England in 1926
- Trained in radar and communication technology in the Royal Air Force (RAF) in the 1940’s
- Graduated from St. John’s College in York majoring in Music Education
- During a music practicum, he met a child with significant deafness and became interested in how to teach him.
- This encounter led Dan to study audiology and education of the deaf at Manchester University -- under Sir Alexander and Lady Ethel Ewing.
A Life Changed: A Focus on Deafness

- His first position as a teacher of children with deafness occurred in Sheffield, England (1951-55)
- From 1955-1963, he served as Director of Deaf Education in Reading, Berks where he used his knowledge of technology to build & modify hearing aids, which allowed more children profoundly deaf children to be taught primarily through hearing and integrated into regular school classes

Scholar & Researcher

- The methods he developed became the basis of research – first through the Cambridge Institute of Education – and later as a PhD project in the Department of Psychology at Reading University
- Sir Edward Boyle, then Minister of Education for Great Britain, recognized the value of Dan’s work – which was allowing children with deafness to acquire spoken language – and arranged for programs around the country to be created based on Dan’s model

- Oh, Canada! – In 1963, Dan moved to Montreal to serve as Principal of the Montreal Oral School for the Deaf & completed his PhD at McGill University

Professor & Dean

- Over a 21 year period, Dan served as Director of Speech and Hearing Clinics, Professor, and Chairman in the Department of Communication Disorders at McGill University
- 1984-1991 – Dan served as Dean of the Faculty of Applied Health Sciences at The University of Western Ontario
Service To the Profession
- Fellow, American Speech-Language-Hearing Association (ASHA)
- President, Alexander Graham Bell Association for the Deaf and Hard of Hearing
- Founding member, International Committee on Auditory-Verbal Communication (ICAVC)
- Founding member, Auditory-Verbal International (AVI)
- Officer of the Order of Canada

Author and Teacher
- Numerous books & other materials
- More than 250 publications, journal articles
- Countless presentations at workshops and conferences
- Consultations around the globe

Mentor and Friend
A Community of Legends
Helen Hulick Beebe, 1909-1989
Ciwa Griffiths, 1911-2003
Doreen Pollack, 1920-2005
Daniel Ling, 1926-2003

We All Share Dan’s Legacy

Brain Research and Ling
Carol Flexer, PhD, CCC/A, LSLS Cert AVT
Distinguished Professor of Audiology
School of Speech-Language-Pathology & Audiology
The University of Akron
The Hearing-Brain Connection

- Dr. Ling was prescient about the need to develop auditory brain centers, even though he did not emphasize “brain” terminology.
- He also was prescient in identifying the need for a great deal of practice in creating critical neural pathways for the development of spoken language skills.
- Let’s discuss a bit more about auditory brain development and the need for practice, practice, practice.

Neuroplasticity – Some Generalizations

- To change the cortex, one must control attention and working memory.
- **Experience-dependent plasticity**: Repeated auditory stimulation leads to stronger neural connections. (Kilgard, 2006)
- Sensory experience directly shapes the rewiring that makes learning possible...especially guided neural reorganization. (Merzenich 2010)
- The skills and abilities that we develop are a product of our culture -- our exposure, experience and practice.
- Attention plays a major role in activation of the auditory cortex. (Musiek, 2009)

How Much Practice is Needed to Influence Neural Structure?

- Malcolm Gladwell: 10,000 hours of practice
- Hart and Risley: 46 million words heard by age 4
- Dehaene: 20,000 hours of listening as a basis for reading
- Pittman: Children with hearing loss require three times the exposure to learn new words and concepts due to the reduced acoustic bandwidth caused by the hearing loss.
Bottom Line......

- As Ling taught us, hearing is a first-order event for the development of spoken communication and literacy skills.
- Anytime the word "hearing" is used, think "auditory brain development"!
- Acoustic accessibility of intelligible speech is essential for brain growth.
- The brains of typical children have access to sound 24 hours per day – humans are organically designed without "earlids".
- The brains of children with CIs/HAs have access to sound only when wearing their technologies.
- Signal-to-Noise Ratio is the key to hearing intelligible speech.

The Ling Legacy:
Speech in the 21st Century

Mary McGinnis, PhD, CED, LSLSCert AVT
Director
Graduate Program
John Tracy Clinic

Comments I've Heard…
“Why do we have to spend so much time on speech acoustics?”
“I’ve never heard of auditory feedback or auditory feedforward.”
“Ling is old, and his research is dated.”
“Ling doesn’t follow typical development.”
“Ling is only good for remediation.”
“Our children hear, so we don’t need Ling anymore.”

How do you feel about evaluating and teaching speech?

Various Rationale for Teaching Order in Speech
- Frequency of occurrence in speech
- Degree of organic difficulty
- Available visual information
- Available tactile information
- Available acoustic information
- Contrastive pairs for more salience
- Common articulatory features
- Norms based on hearing children
Traditional Model of Speech Teaching

Traditional Teaching

- Might not:
- Reference previously acquired targets
- Use auditory teaching
- Use knowledge of phonetic development
- Use targets based on frequency in language
- Work on several targets at a time
- Spend enough time on phonetic skills, but move immediately to phonologic speech, after brief “stimulability” trial

Traditional Assessment

- Based on hearing children
- Hearing children do not often have
  - Vocal quality issues
  - Vowel system issues
- Hearing children frequently misarticulate
  - /s/
  - /r/
  - /l/
  - /th/
- Tests are phonologic, not phonetic
What are people doing in speech?

“Dina”

“Her speech is not good.”

What’s wrong with it?

“I don’t know. . .”

Analysis of Patterns: Dina

- **Voice**
  - Lacked pitch

- **Vowels**
  - Tongue retracted
  - Teeth clenched
  - No lip rounding on /u/

- **Consonants**
  - All consonants affected due to vowels
  - Lacked /th/, /s/ (lateral)
  - Nasal voice on /m/ with /a, u, i/
  - Alternation-nasalized plosives /mba/ /nda/
  - Step 4-no difference between voiced/voiceless
Dina’s Audiological Management

- All unaided thresholds above aidable levels
- Sloping aided thresholds
  - 20 db in lows
  - 40 db in highs
- Ling 6 Sound Test
  - All detected at 12 feet
  - Except /s/, discriminated at 6 feet
- Eliminated production issues
  - Discriminated /s/ vs /sh/ at 1 foot, but inconsistently

Summary of Needs

- Knowledge of deaf children’s unique needs
- Systematic approach to assessment
- Systematic approach to development
- Systematic approach to remediation
- AND—concern for speech development in general

Do we have speech norms?
What's first?

- An isolated phoneme or in a syllable?
- Vowels?
  - Front or back?
- Consonants?
  - Front or back?
  - Voiceless or voiced?
  - Initial or final position?
- What about voice and suprasegmentals?

What are the Norms?

- Handouts
  - Sander vs Prather
  - Age Levels for Consonant Development
- What do you notice?

Cross-Sectional Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Ages</th>
<th>Stim</th>
<th>Phones</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wellman</td>
<td>204</td>
<td>2-6</td>
<td>Pix Questns</td>
<td>133</td>
<td>75% (2)</td>
</tr>
<tr>
<td>Poole</td>
<td>140</td>
<td>2.6-8.5</td>
<td>Pix/Obj Questns</td>
<td>23</td>
<td>100% (3)</td>
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<tr>
<td>Templin</td>
<td>480</td>
<td>3-8</td>
<td>Pix</td>
<td>176</td>
<td>75% (2)</td>
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<tr>
<td>Prather</td>
<td>142</td>
<td>2-4</td>
<td>Pix</td>
<td>44</td>
<td>75% (2)</td>
</tr>
<tr>
<td>Arlt</td>
<td>240</td>
<td>3-6</td>
<td>Repeat words</td>
<td>79</td>
<td>75% (3)</td>
</tr>
</tbody>
</table>
Why do you think the studies don’t agree?

Variation
- Subject selection criteria
- Age ranges
- Examiners
- Methods of gathering data
- Type of data gathered
- Analysis of data

  Smit, 1986

All studies agree that:
1. Vowel-consonant contrasts are earliest
2. Stops & nasals develop before fricatives, affricates, & liquids
3. Place contrasts develop before voicing contrasts
4. Singletons develop before clusters
5. Consonant contrasts develop: Initial, then medial, then final
Broad Generalizations

- By 4: artic closely resembles adults
- By 8: acquired most of adult sound system
- After 8: refinements in system (intonation)
- Girls are a bit ahead of boys till age 12
- More males are phonologically delayed
- More misarticulation in low SES groups
- Familial tendency for misarticulation (sibs)

Remember!

- Speech refinements after age 8
- Auditory cortex does not fully mature until after age 15 (or older!)
  - Curtis Ponton

So Do We Have Norms?

"The order in which sounds are incorporated into speech varies from child to child and does not necessarily follow a specific sequence."
  - Bernthal & Bankson, 1981

- "Variability among children in the ages at which they successfully produce specific sounds is so great as to diacourage pinpoint statistics."
  - Sander, 1972
“Given appropriate hearing aids and sufficient involvement in speech communication, many ... children can receive enough acoustic information to acquire speech naturally. The need for speech teaching varies from child to child.... The more severely hearing impaired the child, the more likely it is that he will need to be taught speech production skills.”

“The main thrust of this text is toward habilitation rather than rehabilitation—toward the development, rather than the remediation of verbal skills.”

- Ling & Ling, 1978

How do hearing children do it?

Development in Hearing Children

- Discontinuity between 0-7 mos & later development
- After first 6 months, broad classes develop:
  - Voice control
  - Variety of vowel patterns (front, then back)
  - Consonants develop front to back
  - Stops, nasals, and semivowels dominate
  - Then fricatives
  - Then affricates & liquids
Speech Perception Research that Supports Ling
Janet Werker & Patricia Kuhl

➢ Research articles:
  ➢ http://infantstudies.psych.ubc.ca/

➢ YouTube clips on infant speech perception:
  ➢ http://www.youtube.com/watch?v=WXWGnryjEaY
  ➢ http://www.youtube.com/watch?v=Ew5--xbc1HMk&NR=1

➢ Between 10-12 months:
  • Babies lose ability to perceive universal speech categories
  • Become language-specific in perception

How do children with hearing loss do it?

Children with hearing loss have unique speech issues

➢ Voice faults
➢ Vowel system issues
➢ Consonant issues
Tendencies in deaf speech that affect speech development

- Delay in abundant vocalizations
- Lack of DIP control, especially pitch
- Voice faults (teach vocal play)
- Tongue retraction (teach /i/ & vowel range)
- Neutralization of vowels (teach /a,i,u/)
- Lack of velopharyngeal closure/nasality (teach contrastive vowels)
- Lack of coordination (teach in syllables)
- Intrusive voicing (teach unvoiced stops)

Why?

- Not phonological processes disorders
  - Though normal phonological processes occur
- Can’t hear speech
  - Inaccurate auditory models
  - Probably would not have speech problems if they heard (though some may)
- Motor speech issues
  - Not enough practice with articulation

Take Home Messages—No one agrees on much

- Nothing is set in stone in speech
  - Not IPA
  - Not sound classification system
  - Not order of development
  - Not theories of how acquisition occurs
Take Home Message: Individual Differences

"The order in which sounds are incorporated into speech varies from child to child and does not necessarily follow a specific sequence."
- Bernthal & Bankson, 1981

> "Variability among children in the ages at which they successfully produce specific sounds is so great as to discourage pinpoint statistics."
- Sander, 1972

Take Home Message: Audition is the Basis for Speech

- Latest research validates audition as basis for speech perception & production
- Infants are hard-wired for universal sound
- Infants become language-specific through listening
  - Pat Kuhl, Janet Werker

- Children have a "sensitive period," and, in CIs, a critical period of auditory development
  - Anu Sharma

Take Home Message: Only Ling Knows Speech & HL

- Audition as basis for speech development
- Habilitation integrates speech, language, audition
- Sequence of motor skills/phonetic
- Prerequisites for phonologic (known to unknown)
- Diagnostic teaching/instant analysis
- Facilitating contexts: acoustic & orosensory
- Anticipatory sets based on shared features
So

- We have to choose what to believe:
  - What IPA symbols to use
  - What sound classification system to use
  - What order to apply
  - What theory to ground our work

How do you approach speech development in children with a hearing loss?

What do you believe?

Phonetic Level Speech Assessment & Teaching

Christina Perigoe, PhD, CCC-SLP, CED, LSLS Cert AVT
Associate Professor
Early Oral Intervention Graduate Program
University of Southern Mississippi
With thanks to my friend and mentor, Dr. Daniel Ling.

The Ling Speech Model

- Theoretical framework
- Order for assessment and teaching - at both phonetic and phonologic levels
- Specific speech teaching strategies

- Strategies related to speech acoustics
- Emphasis on listening as the primary modality for learning spoken language

GOAL: Oral Communication

The Ling System & Current Best Practices

Early Identification and Intervention - child must be well aided as early as possible - from the first few weeks/ months of life

- Developmental Approach
- Parent Guidance

Remedial hierarchy of learning speech for older children
### Early Intervention

**Developmental Approach**
- Early Vocalizations & Suprasegmentals
- Vowels and Diphthongs
- Babbling & Early Consonants
- First Words
- Carryover of Phonetic Level Speech to Phonology

**Parent Guidance**
- Participate as the primary agents of intervention
- Guided in strategies and techniques

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### The Ling System & Current Best Practices

**Foundation: Hearing & Audiology**
- Maximize Audition
- Emphasis on auditory strategies - visual and tactile used later if needed - then put back into hearing

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**The Ling System & Current Best Practices**

**Teaching based on assessment and goal setting**
- Initial assessment
- On-going assessment & diagnostic teaching

**Focus on outcomes:**
- Spoken Language Communication
The Ling Thing

35 years of Ling

- Addressed the link between Speech Perception and Speech Production
- Children SPEAK the way they HEAR
- Evaluate both what they can HEAR and what they can SAY

Assessment...

Problem solving - Is it a problem of:
- SPEECH PERCEPTION
- SPEECH PRODUCTION
- LANGUAGE

- Morphology
- Syntax
- Semantics
- Pragmatics

The Ling Assessments

Criterion Referenced Evaluations

- Six Sound Test
- Phonetic Level Evaluation
- Phonologic Level Evaluation

Intervention is based on the results of careful analysis of evaluations.
‘Rounding Out’ the Assessment

- Speech Perception: Six Sound Test
  (speech production mirrors speech perception)
- Oral Motor Screening (if needed)
- Phonetic Inventory: Phonetic Level Evaluation

- Word Test (e.g., PAT or Goldman-Fristoe)
- Spoken Language Sample (Phonology & Language): Phonologic Level Evaluation or PC/PEP; Stone, CASLLS, Language Analysis

Ling Six Sound Test

What SPEECH SOUNDS can the child detect?
Determine access to sounds across the speech spectrum (Speech Banana) oo, ah, ee, m, sh, s

Add – nothing & “surprise” sounds
Look at aided thresholds
Evaluate effectiveness of hearing technology
The SII-Based Method for Estimating the Articulation Index

SII Count-the-Dots Audiogram Form

Detection or Identification over Distance (vary order and timing)

<table>
<thead>
<tr>
<th>Ling Sound</th>
<th>1 m</th>
<th>2 m</th>
<th>3 m</th>
<th>4 m</th>
<th>5 m</th>
<th>_ m</th>
</tr>
</thead>
<tbody>
<tr>
<td>/u/ oo</td>
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<td>/a/ ah</td>
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<td>/s/ ss</td>
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<td>/m/ mm</td>
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<td>nothing</td>
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<td></td>
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<tr>
<td>“surprise”</td>
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</tr>
</tbody>
</table>
Implications for Implementation

The older the child and the less well the child uses his/her hearing, the more formal your teaching will need to be.

Two Levels of Speech Assessment and Development

**Phonetic Level**
- Gain mastery over the basic mechanics of talking
- ~ speech reception
- ~ speech production
- ~ feedback skills

**Phonologic Level**
- Using speech patterns meaningfully in ways that convey thoughts and feelings

7-Stage Model of Speech Development

**Phonologic Level**
- All speech intelligible and voice patterns natural
- Consonants by manner with all vowels
- Consonants by place with all vowels
- Consonants by voicing with all vowels
- Uses different vowels to approximate words
- Uses different voice patterns meaningfully
- Uses different voice patterns

**Phonetic Level**
- Uses vocalization as means of communication
- All vowels & Consonantal patterns
- Voiceless & Consonantal patterns
- Some words said clearly with some voice patterns
- Some words said clearly with many voice patterns
- Some words said clearly with many voice patterns
- Some phrases said clearly with many voice patterns
- Some sentences said clearly with many voice patterns
Phonetic Level: Non-Meaningful

1. Elicitation
   Based on teacher’s ability to elicit the desired sound from the child using best sense modality and strategies to which the child is most receptive.

2. Development
   Produce syllables with a variety of suprasegmental patterns. Alternate with other syllables as the basis for word building. (Automaticity)

Phonologic Level: Meaningful

3. Generalization
   The process of extending phonetic or phonologic skills.

4. Carryover
   The child’s transfer of formally taught speech skills from the therapy session/classroom to real-life communication situations with a variety of people, places, language and conversational situations.

Assessing Speech (Mary McGinnis)

- Phonetic Level Evaluation (PLE)
  - Kurt
  - Age 10
  - Conductive HL Bilaterally
  - Cholesteatoma (left) Surgery April/2012
  - Ossicular Reconstruction Surgery Soon
    - No HAs yet
    - Tolerates FM (left) only at school
    - Mainstreamed half of the day
    - Family suspects other challenges
Suprasegmentals of Speech and Prosody

Marietta M. Paterson, EdD, CED
Director
Education of the Deaf Program
University of Southern Mississippi

Topics

- What are the suprasegmentals of speech?
- What is prosody?
- Auditory perception of suprasegmentals and prosody (hearing aids, cochlear implants)
- How do we produce SSs and prosody?
- Assessment issues
- Teaching and learning suggestions

Historical speech production errors of HI speakers

- Inadequate breath control
- Excessive and inappropriate pausing
- Inappropriate pitch register
- Hypernasality
- Excessive tenseness or harshness
- Inappropriate duration of syllable articulation
- Inappropriate duration of vowels
- Inappropriate duration of both stressed and unstressed syllables
- Omission and misarticulation of some phonemes
What are the suprasegmentals of speech?

<table>
<thead>
<tr>
<th>Segments of Speech</th>
<th>Suprasegmentals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vowels</td>
<td>Vocalization</td>
</tr>
<tr>
<td>Diphthongs</td>
<td>Duration</td>
</tr>
<tr>
<td>Consonants</td>
<td>Intensity</td>
</tr>
<tr>
<td>Consonant Blends</td>
<td>Pitch</td>
</tr>
</tbody>
</table>

Ling, PLE, 1976

How do SSs occur, if they are not speech sounds?

- SSs are produced over a “period of time” longer than a segment.
- Perceived as an “acoustic envelope” across phrases, sentences and sentence juncture.
- Also, rapid changes in pitch, intensity and duration can be produced at will to add to meaning.

Ling Spectrogram Intonation Contour
Exercise in sentence stress:
Listen and match meaning!

Linguistic Context: Possible Meanings:
1. I have a blue car. A. Possession
2. I have a blue car. B. Object identification
3. I have a blue car. C. Feature identification

What is prosody?

➢ Prosody is the term that describes the use of the suprasegmentals in linguistic context.

Suprasegmentals in Prosodic Context

<table>
<thead>
<tr>
<th>SSs (Ling, PLE) Non-linguistic</th>
<th>Prosody Linguistic manifestation of SSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocalization</td>
<td>Vocal quality, Voice timbre</td>
</tr>
<tr>
<td>Duration</td>
<td>Timing, Rhythm, Juncture, Pause, Rate</td>
</tr>
<tr>
<td>Intensity</td>
<td>Overall voice loudness</td>
</tr>
<tr>
<td></td>
<td>Stress marking in words, sentences</td>
</tr>
<tr>
<td>Pitch</td>
<td>Overall pitch register</td>
</tr>
<tr>
<td></td>
<td>Intonation patterns in sentences</td>
</tr>
<tr>
<td></td>
<td>Tone of voice, affect Paterson, 1986</td>
</tr>
</tbody>
</table>
Lack of attention to SSs as prosody

- Voice production errors have greatest speech impact for HI speakers speech intelligibility.
- In mid 1980's: too much attention to phonetic level teaching and teaching of SSs in isolation.
- Not Ling’s intention: Cole and Paterson, 1984; Paterson, 1986; Paterson, 1986, AGBell short course on prosody the missing link in speech intelligibility; Paterson & Cole, PC-PEP.

Suprasegmentals as Prosodic Features

Production of SS’s allow the speaker:
- to convey the structure of the sentence
- to stress important words
- to signal meaning shift
- to convey shades of meaning
- to convey mood, attitude

The Melody is the Message

Infants in the first year of life, tune-in to the melody of the parent’s message and auditorily comprehend parent intent before they acquire words.
- Implications for infants and young HI children:
- Sing, chant, speak in rhythmically, vary your voice.
How much hearing access to perceive prosodic features of speech?

- Prosodic features are NOT coded visually AND are predominantly an AUDITORY event.
- SSs and prosodic features are available even with only low frequency hearing in the 500Hz-1000 Hz range.

SSs & Different Listening Conditions

- Hearing aid wearers: acoustic hearing
  - Aided in low frequency to mid-frequency.
- Cochlear implant users: electrical hearing
  - Should perceive all SSs
  - Especially pitch cues which are higher

Listening Activity: Bev loves Bob

1. Who loves Bob?
2. Focus on the process verb "love."
3. Incredulity – is it possible Bev loves Bob?
5. What do you think?
How do speakers produce SSs?

We produce SSs through control of:
1. Phonation: onset and offset of vibratory cycle of vocal folds (voicing), control of airflow (breath control)
2. Duration: phonation, airflow control and dynamic force in lungs
3. Intensity: phonation, sub-glottal pressure variation
4. Pitch: phonation, vocal fold tension and vocal fold mass changes

Paterson’s Comparison Table (1996)

<table>
<thead>
<tr>
<th>SSs Perceptual</th>
<th>Prosody-Linguistic</th>
<th>Anatomy &amp; Physiology</th>
<th>Acoustic Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocalization</td>
<td>Vocal quality, voice timbre</td>
<td>Vocal fold action, phonatory control, manage airflow</td>
<td>Fo</td>
</tr>
<tr>
<td>Duration</td>
<td>Timing, rhythm, juncture, pause, rate</td>
<td>Vocal fold action, phonatory control, ability to maintain steady state vowels, manage airflow</td>
<td>Msecs</td>
</tr>
<tr>
<td>Intensity</td>
<td>Overall voice loudness, Stress marking in words, sentences</td>
<td>Vocal fold action, manage airflow and ability to vary sub-glottal pressure</td>
<td>dB</td>
</tr>
<tr>
<td>Pitch</td>
<td>Overall pitch register, Intonation patterns, Tone of voice, affect</td>
<td>Vocal fold action, ability to adjust vocal fold tension and mass, manage airflow</td>
<td>Frequency</td>
</tr>
</tbody>
</table>
Assess, Target, Teach

Assessing suprasegmentals in non-linguistic context
- Phonetic Level Evaluation – Ling, 1976
Assessing SSs in linguistic context:
- Phonologic evaluation [Ling, 1976, 2002]

Assessment and teaching order issues
- Some professionals only assessing SSs at PLE level and then using VDIP as a teaching order (anecdote of pitch teaching) Never what Ling intended …
- Need vowels and transitions to work on pitch and not meant to be in isolation
- Very difficult to assess and teach SSs in isolation from language - requires skill.
- All teachers can more safely teach SSs through attention to aspects of prosody in linguistic context

Ling PLE, Suprasegmental evaluation
- Vocalization: _____ not able _____
- Vocal Duration: ___ short ___ long ___ long-short
- Vocal Intensity: ___ loud ___ quiet ___ whispered
- ___ varied
- Vocal pitch: ___ low ___ mid ___ high ___ varied
- ___ continuously varied ___ discretely varied
Applications to Teaching
In the past, insufficient attention to the important role of the suprasegments of speech as prosody (Cole and Paterson, 1984, Paterson, 1986, 1992, 1994).

- There has tended to be a separation of segmental work from spoken language.
- Suprasegmentals are difficult to work on isolated from speaking.
- Cole and Paterson, 1984 added info about suprasegmentals at both levels and other stages of practice.

Teaching SSs and Prosodic Rules: Practice in Phrases and Sentences

- Suprasegmentals as aspects of prosody carry a HEAVY meaning load in English.
- To learn how prosodic patterns in English contribute to auditory linguistic meaning, HI children must be listening to sentence level language and to information across sentence boundaries.

Pitch, Intonation Patterns in Sentences

Each sentence modality in English is defined by it's habitual prosodic intonation pattern:

- Sentence: typically falling pattern
- Question: typically rising pattern
- Command: highly stressed words and voice loudness
- Negation: word that is negative is stressed
Duration: Pause Patterns

➢ Pause, rate, juncture: CELF preschool test, Listening to Sentences in Context (testing the signal for the speaking turn and memory

- And the whole family were tired, and mother said, “……………. “.
- Only best auditory learners had learned the pause cue for direct discourse, others failed the sub-test.

Key Role of Marking Stress Patterns

➢ English is a stress-timed language

➢ So, control over the physiological functions that control production of stress change is crucial for fluency.

KEY ROLE OF MARKING STRESS PATTERNS

➢ How does the body create a stressed syllable in running speech?

Stress Changes Signal Meaning Changes

Verb conduct vs. Noun conduct

- The maestro conducts the orchestra.
- The boy’s conduct in class was bad.

➢ Grammatical class change is signaled by changing the syllable that requires primary word stress.

➢ Only perceived through listening!
Rules for Stress Marking

- Should be part of ongoing vocabulary acquisition, single, double and multisyllable words as well as morphemes, affixes
- Notice that the need to change stress is highlighted in the sentence context.
- It is easier for the child to develop the rule.
- Speech production practice occurs best in context

Strategy: Intensity Footsteps (Paterson, 1978)

To help improve control of phonation, voice loudness variations at a "gross level" and stress marking.
- Whisper, soft voice, conversational loudness, loud voice and outside voice
- Step One: child perceives and judges your voice loudness
- Step Two: child practices making voice changes using known language (counting) and then adds increasingly open conversational load.

References

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- Cole & Paterson, 1986 Advances in Speech Disorders...
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- Paterson, 1994, Phonological Disorders ...
- Paterson-Cole, PCPEP, unpublished
- Small, 2008, Articulatory Phonetics
FACILITATING SPEECH PRODUCTION

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Speech Development
Ensure best use of
RESIDUAL HEARING
(Don’t leave it all to others)

As speech perception improves, there is a reciprocal development in speech production: SO USE HEARING!

If child hesitates or refuses to imitate, give more input: you CANNOT force speech production

All Consonants Have Prerequisite & Facilitating Vowels
1. Vowels: frequencies and placement

2. Characteristics of consonants: establishing sets, cognate pairs

3. Co-articulation: for affricates and blends

4. Techniques: whispering, pausing, timing, alternating syllables, establishing sets, finger drop technique
Vowels Facilitate Frequency and Placement

- Mid frequency vowel (uh), [ʌ], facilitate nasals [m] (uhmm) & [ʌnn] and fricatives (uhfff) & (uhshsh) in final position.
- Low frequency vowels lower frequencies to make back consonants more audible, [gogogo], [kukuku]
- High frequency (ee), [ɪ] raise tongue for mid plosives, i.e., [di] and [ti].

Phonetic: [ʌ] Layman: (uh)

CONSONANT CHARACTERISTICS

Characteristics to help in identifying consonants in order of ease of hearing

- Manner cues
- Voicing cues
- Place cues
CONSONANT CHARACTERISTICS

1. MANNER
2. VOICING
3. PLACE CUES

<table>
<thead>
<tr>
<th>Nasals</th>
<th>m</th>
<th>n</th>
<th>ng</th>
<th>Voiced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosives</td>
<td>p</td>
<td>t</td>
<td>k</td>
<td>Unvoiced</td>
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<td>Fricatives</td>
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<td>Liquids</td>
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<tr>
<td>Affricates</td>
<td>ch</td>
<td>j</td>
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<td>Unvoiced</td>
</tr>
</tbody>
</table>

Front | Mid  | Back

DEVELOPING NASALS

Place of Production

Voiced

Front | Mid | Back
m | n | ng

- Develop (m) in isolation (mmm) or in final position with facilitating vowel (ummm).
- Transfer to medial position [ummu] [umu], then to initial position [mmmu] [mu].
- Alternate with vowel variety (mae) (mi).
- Transfer to phonology in phrases: mmm good, hi Mummy, I want more.

DEVELOPING FRIкатIVES

Place of Production

Unvoiced

Front | Mid | Back
f | sh| s | h (first)

Voiced

V | z

- Develop (h) in isolation unvoiced (hhh) and (f) in final position with facilitating vowel (ufff).
- Transfer to medial position [uffu] [ufu], then to initial position [fffu] [ffu].
- Alternate with vowel variety: (fae) (fo) (fi).
- Transfer to phonology: off, fish, in phrases.
DEVELOPING PLOSIVES

<table>
<thead>
<tr>
<th>Place of Production</th>
<th>Front</th>
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<th>Back</th>
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<tbody>
<tr>
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</tbody>
</table>

- Develop in initial position in repetition: bababa or unvoiced papapa.
- Develop with vowel variety, bu and bi
- Alternate with vowel variety: babaeb (baby)
- Alternate with syllables varying in manner: baba, nonona, Banana, I want a banana.

2. CONSONANT CHARACTERISTICS
   FACILITATE

- Cognate pairs: voice voiceless pairs such as [fʌvʌ]; facilitate by medial blending: [ʃfʃvʌʃvʌ], (ussszzzuu)
- Establishing sets from known to unknown, most audible to least audible: Place cues, i.e., (budugu), (bambo, bando, banggo)

[h] FACILITATES

- To reduce nasality for vowel, [hhhuu]
- To develop fricatives, (hhuffff, hhuff)
- To define and reduce nasality for [l]- [hlæ] or [hlho], concurrently articulate as much as possible. Try with whispering.
- To prevent implosion of plosives in consonant vowel syllables, i.e., s-hhoap, soap instead of stoap, (s-hhock), sock instead of stock.
3. COARTICULATION FACILITATES
Normal Speech in a Series of Co-articulated Sounds

- **Affricates** – (utshhhah) or familiarity with (utchoo!)
- (Shut – shut – faster…. shut, shut-chu, chu, choo)
- **Blends** – [sma] – sequential, [ssss mmmm= sma] or
- [mas, mas say faster mas-smas, sma]
- (bla) – (lab, lab), say faster, (lab-bla-bla)

4. TECHNIQUES THAT FACILITATE

- **Whispering**- teach whispering with (hhh…. pa, pa, pa)
  - contrast with voicing= unvoiced papa..mm..papa..
  - (tee, tee, tee) pause (ko, ko, ko)
- **Pausing** to denote a change– (ba, ba, ba),..pause 
  ....(dee,dee, dee)
- **Temporal processing**…timing – (ummmm, no, no, no)
- **Alternating syllables** – semi-vowels, [w]= [u… a],
  [u-w-a], faster… [uwa], [wa], [wa]. Same with [y]=
  [i+y+a]
- **Establishing sets**
- **Finger-drop technique** for unreleased plosives

Make it fun, with games, brief, & always aim to integrate into phonology!
Wrap Up

Ling Consortium Launch
Dimity Dornan

The Ling Consortium is an international consortium of university accredited postgraduate training institutes for educating listening and spoken language professionals.

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Founder/Director
Hear and Say Centre
Brisbane