Ling Consortium

- International consortium of professionals
- Developing and delivering globally recognized university-based courses on teaching listening and spoken language
- Focused on bringing speech and hearing to children with hearing loss
- Enabling a life of abundance
- Named in honor of the foundational work and extraordinary contributions of the late Dr. Daniel Ling, O.C., a pioneer of Auditory-Verbal practice for children with hearing loss.

Global Vision:
Children and adults with hearing loss will reach their full potential through listening and speaking.

Global Mission:
The Ling Consortium is helping more children to speak and hear thanks to a coordinated worldwide effort.

Who was Dr. Daniel Ling and why are his theories and practices still relevant today?

- One of the pioneers of listening and spoken language for children with hearing loss – Auditory-Verbal practice.
- Audiologist and internationally recognized authority on teaching speech to children who are deaf/hard of hearing.

Objectives: Participants will...

- examine how Daniel Ling’s legacy has transformed the field of listening and spoken language for children and adults with hearing loss
- appraise how his legacy exists in harmony with knowledge from neuroscience and 21st century hearing technology
- analyze current research in the field of speech development
Objectives: Participants will...

- appraise how Daniel Ling’s legacy has influenced practitioners from around the world
- Discuss future influences of Daniel Ling’s legacy

The way we were....

Speech production

- Speech development in children with hearing loss is highly susceptible to delays and disorders.
- Infants produced less and later canonical babbling and more limited range of consonants (e.g., Oller & Ellers, 1986, Lynch et al., 1989; Stoel-Gammon, 1988; Yoshinaga-Itano, 2000).
- Phonetic repertoires of infants with severe-profound loss were very restricted; e.g., fewer multisyllabic utterances (e.g., Kent et al., 1987; Lach, Ling, et al., 1970; Stoel-Gammon & Otomo, 1986).

The way we are...

- Access to speech spectrum results in many more children with intelligible speech – ‘Typical’ children with any degree of hearing loss are expected to develop highly intelligible speech.
- Predictors of speech development:
  - Cognitive abilities (Geers et al., 2002; Tobey et al., 2003)
  - Auditory experience (e.g., Geers, 2004)
  - Integrity of the oromotor system
  - Other language disorders or additional disabilities

Speech intelligibility

- Severity of hearing loss affected the extent of speech disorders (Boothroyd, 1969; Levitt, 1987).
- For children with severe to profound loss, about 20% of words were intelligible to unfamiliar listeners (Markides, 1979; Smith, 1975, Osberger, 1992).
- Little improvement after ~age 8 yrs (Smith, 1975; McGarr, 1987).

Early speech development: Cochlear implants

- Children with CI achieved majority of speech-like utterances after 12 m of auditory experience compared to 18 m experience for peers with normal hearing (Ertmer, 2013).
- Consonant production accuracy was delayed in children with CI with 24 m experience (Ertmer et al., 2012; Leigh et al., 2013).
- Children with CI showed consonant acquisition patterns similar to peers with normal hearing when CI age was similar to chronological age of peers (Spencer & Guo, 2012).
- The phonetic complexity of early babbling is related to later speech and language skills (Walker et Bass-Ringdahl, 2008).
Early speech development
Children with hearing loss

- At 12 m, children with HL (>50 dB) showed fewer consonant multisyllabic utterances, fewer fricatives/stops and more restricted vowel tongue positions (McGowan et al., 2008).
- At 10-24 m, children with HL showed delays in consistent canonical babble and in consonant development (Moeller et al., 2007).
- At age 24 m, children with mild to severe HL had vowel production similar to peers with normal hearing but weaker consonant production (Ambrose et al. 2014).
- At age 3-4 y, consonant clusters were within the expected range for children with normal hearing (Fulcher et al., 2014).

Speech sound accuracy:
Children with cochlear implants

Speech sound accuracy: Children with cochlear implants

- At 3 yrs, speech production on GFTA-2 = mean standard score of 74 (late) to 101 (early) (standard score) and from 86 to 106 by age 5 yrs (Fulcher et al., 2013).
- At 3 yrs, speech production on DEAP = median standard score of ~80 (consonants) to ~85 (vowels) (Ching et al., 2013).
- At 4-5 yrs, speech production on GFTA-2 = mean standard score of 93 for children with HA and 80 for children with CI, and 107 for peers with normal hearing. (Fitzpatrick et al., 2011).

Speech production

- Over 90% of children with profound loss develop intelligible speech (Yoshinaga-Itano, 2008).
- At age 5.5 yrs, children with CI implanted before 2 yrs had intelligibility scores of ≥80% (Habib et al., 2013).
- For adolescents with CI, speech intelligibility scores (McGarr sentences) ranged from 81 to 88% (Tobey et al., 2010).

Speech intelligibility
Conclusions

• Children with hearing loss still have reduced access, later access, and reduced auditory experience compared to peers — they are still at risk for speech difficulties

• “Improved hearing sensitivity does not, by itself, guarantee the ability to discriminate between sounds or to interpret speech for oral communication purposes.”

(http://www.asha.org/aud/Facts-about-Pediatric-Hearing-Loss/)

The Ling Thing

38 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

The Ling Speech Model

• Remedial hierarchy of learning speech for older children

• Can be adapted for developmental approach

The Ling Speech Model

• Theoretical framework

• Order for assessment and teaching

• Specific speech teaching strategies

• Strategies related to speech acoustics

• Emphasis on listening as the primary modality for learning spoken language

GOAL: Oral Communication

The Incubator

The McGill University program
Auditory-Oral (Re)habilitation & Education of Hearing Impaired Children (AORE)

• Began in 1977

• Approximately 50 AORE graduates

• Additional 12 research Masters and PhD graduates

THE CANADIAN LANDSCAPE

Anita Bernstein, M.Sc., LSLS Cert AVT
VOICE for Hearing Impaired Children
Current Canadian Landscape

2 university programs
• Training professionals to support Deaf and Hard of Hearing
• Course content focused on the Ling speech system including an applied component

Current Landscape

Survey of 3 training programs for Speech Language Pathologists

Exposure to development of speech utilizing an auditory approach, the Ling remedial system and Ling 6 sound test

Current Landscape

2 programs developed to enhance the skills of practitioners with a focus on developing listening and spoken language
• VOICE Mentorship program
• Certificate in Auditory Verbal Development

Intensive theory and practice component on the Ling Speech Model

Informal Survey

Rate on a scale 1-5
1. introductory
2. more in depth discussion of the Ling model; acoustics of speech and 6 sound test
3. knowledge and some practical experience
4. able to apply the Ling approach with students with hearing loss
5. confident in the application of the Ling speech model

Moving Forward

Interest and need by professionals in developing knowledge and skill in the Ling Speech Model

THANK YOU
FUNCTIONAL AND PRACTICAL APPLICATION OF LING’S STRATEGIES: A GLOBAL PERSPECTIVE
A LING CONSORTIUM DISCOVERY SESSION

Auditory verbal UK
Rosie Richardson, LSLS Cert AVT, Clinical Lead

The VALUE To AVUK of Ling's principles

- Infants: Expectations & techniques
- Parents: Structure & Clarity
- Professionals: Goal setting
  It works!

The challenge of using Ling’s principles across cultures

At AVUK London
- 50% of our families have E2L
- 16 different first languages, many more different countries

Stages of the parental Journey (Stokes, 2013)
What is it you want for your child? What are your hopes for him/her? What is it going to take?

Using Ling principles with OUR RANGE OF languages

- Accent: English is non-rhotic, Scottish & Irish are rhotic
- Language: Using the parent’s knowledge, Knowing home language development pattern
- Ling: Ling teaching strategies work once the speech target is identified.

What innovative practices are you using with special populations?

ANSD functional discrimination
Championing early intervention
Special populations
PROMPT
THANK YOU

www.avuk.org / @auditoryverbal / rosie@avuk.org

AURED Mumbai: Established in 1986

First AVT Centre in India. Started by 2 professionals with 16 and 17 years experience in teaching deaf children.
- Enrolled today - 700 of which 550 are CI recipients, from 90 cities in India and 16 neighbouring countries
- 80% receive free therapy and mapping
- 40% with additional challenges
- 95% integrated
- Age group - 4 months onwards

Established a Satellite centre in Hyderabad. Affiliate centres in Delhi and Kenya.
- 17 therapists and 4 audiologists
- Total Staff-22

Introduction of Daniel Ling and AVT

1981 & 1991 – Ling Workshops + 6 hours of mentoring by Ling in individual therapy sessions.
1986 – 1991, mentored in AVT by Alan Kelly, AVT Cert., Australia, who studied under Ling for his MSc

An in-depth study of Ling’s *Foundation of Spoken Language & Speech & the Hearing Impaired Child* – applied in Language, Speech and Auditory development of children at AURED.

Speech Evaluation chart has been adapted and modified for additional consonants unavailable in the English Language.

Special emphasis on Ling’s Speech Acoustics

AURED partners a University course in AVT for graduates in Sp. Education.

1996 - Cochlear Implants .

The Aziza Grid

- Dearth of tools to explain complex terms of mapping parameters.
- The *Aziza Grid* was developed primarily to give a visual picture of the map and to enhance communication amongst audiologist/therapist/teacher and parent.
- Correlation between frequencies represented in each electrode and Ling’s Acoustic phonetic and phonologic levels.
Purposes of The Aziza Grid

- Serves several purposes: A tool for Auditory Habilitation
  a) Tracking children’s speech perception progress post switch-on/activation
  b) Guidelines in setting appropriate auditory goals
  c) Trouble-shooting

- Maps may vary due to the category the candidate falls into:
  Adults, pre-lingual, post-lingual, older children, infants, anatomical deformities, medical side effects

- After each Map, a child’s T and C levels should be transferred to the Grid

- Auditory goals should be targeted with a diagnostic approach

1st 5 maps – post switch-on

Nupur’s maps

- 1st Map
- 2nd Map
- 3rd Map
- 4th Map
- 5th Map

...continued

- This tool is for the development of listening skills. Follow Ling’s Hierarchy of listening.
- Listening cannot be separated from the general process of communication through speech and language. When setting goals, therapist must correlate auditory development with the candidate’s ability to process language.
- Progress will depend on the category the CI recipient falls into.
- The question now is – What’s next?

THANK YOU

AURED-Aural Education for Hearing Impaired Children, Affiliated with AG Bell

www.aured.org
An Australian Perspective

Hear and Say Children and Families
- Auditory-Verbal Therapy
- Audiology
- Social Skills
- Education Support

Hear and Say Research and Innovation
- Evidenced-based Clinical Practice

Hear and Say WorldWide
- Professional Training and Education
- Parent Education

The Ling Six Sound Test

- mmm
- ooo
- eee
- shh
- sss
- ahh

Ling’s Principles In Action

Ling’s Work is Relevant Today ... and will be Tomorrow

Professional Education Opportunities

Amplification For Special Children
Thoughts For The Future

Access to listening and spoken language must be the first option for all children with hearing loss.

FUNCTIONAL AND PRACTICAL APPLICATION OF LING’S STRATEGIES: A GLOBAL PERSPECTIVE

A LING CONSORTIUM DISCOVERY SESSION

Auditory-Verbal Practice in Korea

son-A Chang
Korea

Background Information

- Korea had not had a long history of special education or therapeutic services for the deaf and hard-of-hearing.
- The first cochlear implantation was done at 1989 and the surgery cases increased quickly by late 1990s and early 2000s.
- AVT was introduced along CI.
- It has been introduced by well-known AVTs like Warren Estabrooks, Dimity Dornan, Judy Simser, Ann Fultcher, etc.
- They offered lectures and supervision mainly for the speech therapists.
- Special schools and centers which deal with mainly hearing aids resisted to the concept and techniques of AVT at the

Korea in the World

Ling’s 7 Stage Model: Phonetic and Phonological Levels (English)

Ling’s 7 Stage Model: Phonetic and Phonological Levels (Korean)
Ling’s Principles

- Korean has less phonemes in high frequency region
- Ling 6 Test is still useful
- Different symbols for /a/, /i/, /u/

Professional Education Courses

- The first Korean Auditory Verbal Therapist was certified in 2004.
- Before and after the first Korean received certification, many lectures and seminars were held in Korea.
- Several universities adopted the concepts and practices of Ling’s methods.
- Yet, official education programs of Ling’s practices or AVT was not opened in Korea.
- Currently, Ling’s concepts are being taught to emerging clinicians at several universities and graduate schools.

Professional and Extended Education Program is Coming

- Without official and fundamental education programs teaching Ling’s practices and AVT, therapy for the deaf and hard-of-hearing has been altered in some ways in Korea.
- Nowadays, the practitioners are moving to form the committee of AVT and open an official program teaching AVT based on Ling’s work.
- We are expecting to gather and share as well as learn and practice AVT, so that many innovative idea and practices can be facilitated in Korea.

40% with Other Special Needs:

All have a range of severity.
- Sensory (e.g., hearing, vision)
- Motor/Physical (e.g., Cerebral Palsy, Oral-Motor)
- Cognitive (e.g., Down Syndrome)
- Learning Disability/disorder (verbal, non-verbal)
- Behavioral & Emotional (e.g., ADHD/ODD)
- Communication (e.g., Autism Spectrum Disorder-ASD, PDD)
40% with Other Special Needs:
- Neurological (e.g., TBI, seizures)
- Medically Fragile / Chronic Illness (e.g., Cystic Fibrosis)
- Multicultural / Multilingual
- Socioeconomic
- Gifted
- Multiple Special Needs (esp. syndromes)
- Specific to Speech (cleft palate, dyspraxia, dysarthria, dysfluency, phonological disorder)
- Consider also “Late Starters” (late to listening)

Ling System - Assessment and Development of Speech Sounds (Remedial)

<table>
<thead>
<tr>
<th>Consonants</th>
<th>( b/p )</th>
<th>d/t</th>
<th>g/k</th>
<th>voicing</th>
</tr>
</thead>
<tbody>
<tr>
<td>stop b/p</td>
<td>stop d/t</td>
<td>stop k/g</td>
<td>b - p</td>
<td></td>
</tr>
<tr>
<td>w (wh)</td>
<td>/l (yl)</td>
<td>r</td>
<td>g - k</td>
<td></td>
</tr>
<tr>
<td>h</td>
<td>f/v</td>
<td>s/z</td>
<td>ch/dg</td>
<td>f - v, th - th</td>
</tr>
<tr>
<td>th/th</td>
<td>th/shzh</td>
<td>m</td>
<td>ng</td>
<td>s - z, sh - zh</td>
</tr>
<tr>
<td>Initial Consonant Blends</td>
<td>&gt; developed concurrently</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Consonant Blends</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Setting Speech Goals: Speech Target Summary

Suprasegmentals
- Syllables
- Phonetic Level
- Phonologic Level
- Words
- Phrases
- Sentences

Hearing Loss + PLUS: May have Characteristics of “Deaf Speech”
- Remedial Assessment and Teaching Model
- Criterion referenced testing – flexible (compared to self rather than norms)
- Importance of establishing prerequisite skills
- Strategies are appropriate based on the sense modality best for the child
- Remedial model and strategies are needed
- May require additional practice

Children with Hearing Loss with optimal auditory access (otherwise typically developing)

Expect Developmental acquisition of:
- Suprasegmentals
- Vowels and Consonants and Consonant blends

Children with Hearing Loss with optimal auditory access PLUS Additional Challenges
- Suprasegmental issues
  - Monotone
  - prosody
- Vowel issues
  - Neutralization
  - Diphthongs>monothongs
- Consonants issues
  - Tongue movement (tip)
  - Nasalization
- Consonant blend issues
  - Cluster reduction
  - Can’t co-formulate REMEDIAL


Adapting Assessments & Teaching

- Adapt to child’s hearing age
- Adapt to child’s language level
- Adapt to child’s cognitive level
- Involve parents/caregivers
- Include real-life observations and play assessments and teaching

Do not underestimate the value of teacher-made tests.

GOAL: Speech needs to be linked to FUNCTIONAL LANGUAGE and CONVERSATION.

VIDEO

Thank you

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Your turn!

- Please note any use of Ling’s principals that have not already been mentioned.
- Please note any education courses that are available in your location.
- Please note any innovative practices you are using that have not yet been mentioned.
- What do you want from the LING consortium? (Resources, continuing education courses, webcasts, symposium...)

Roundtable discussions

SUMMARY: Future Steps

Trudy Smith, Manager Continuing Education Royal Institute for Deaf and Blind Children (RIDBC), North Rocks, NSW, Australia

Functional and practical application of ling’s strategies: a global perspective

A LING CONSORTIUM DISCOVERY SESSION

Final thoughts

Dimity Dornan, A.O., Ph.D., LSLS Cert AVT Hear and Say, University of Queensland, Australia and Griffith University, Australia
Who was Dr. Daniel Ling and why are his theories and practices still relevant?

• Trained with the Ewings in England and emigrated to Canada. (Montreal Oral School for the Deaf. McGill University.)
• *Speech and the Hearing-Impaired Child: Theory and Practice* (1976, 2002).
• *Aural Habilitation* (with A. Phillips Ling 1978)
• *Ling Speech Cards* (now available through John Tracy Clinic)
• Numerous articles and book chapters.

Ling & Current Best Practices

Foundation: Hearing and Audiology

❖ Maximize Audition
❖ Emphasis on auditory strategies - visual and tactile used later if needed - then put back into hearing
❖ Ling used knowledge of speech acoustics & perception (what the child hears) to drive his model for teaching speech production (what the child says).

Ling & 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

(Ling Model: Remedial hierarchy of learning speech for older children. Can be adapted for developmental approach.)

The Ling Thing

38 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

Major Contributions

**Ling Six Sound Test:** m, oo, ah, ee, sh, s,
Determine access to sounds across the speech spectrum (Speech Banana)

**Phonetic Level Evaluation**

**Phonologic Level Evaluation**

**Speech Teaching System** based on speech acoustics, prerequisite speech skills, practice and carryover into spoken language

Ling’s Legacy

“A life of abundance” for children with hearing loss everywhere, will continue to be transformational well into the future - truly “Magic Made Real”.