Children's Speech and Literacy Difficulties:
A Psycholinguistic Framework for Practice
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Aims for the Day
1. Introduce principles of a psycholinguistic approach to assessment and intervention.
2. Demonstrate a psycholinguistic way of thinking.
3. Examine links between spoken and written language.
4. Summarise research findings from using a psycholinguistic approach.
5. Stimulate further study and reading (see reading list at end of this handout).

What's in the Psycholinguistic Framework? There are 3 tools you can use – focus on 1 today:
1. Speech processing profile (Stackhouse & Wells 1997 Book 1 Chaps 4 &5)
2. Box and arrow model (Stackhouse & Wells 1997 Book 1 Chap 6)
3. Developmental phase model (Stackhouse & Wells 1997 Book 1 Chaps 7,8, 12)

What is Speech?
Speech Difficulties in Children are one of the most common communication problems. It is estimated that around 5% of primary school children have speech difficulties (range 3-25%!). Number of children within a school class reported to be between around 2 but depends on socio-economic factors.

Common Speech Difficulties (from Chapter 2 in Snowling & Stackhouse, 2006)
'Sound' omissions and substitutions, simplifying processes:
 front/back – t/k
 voice/voiceless – d/t
 close – f/th, v/the, w/r
Clusters:
 clean - "telean"
 stream - "tweam"
 splash - "ba"
Sequencing:
 systematic - "synsemacit"
 car park –"par cark"
Connected Speech:
 'mumbley' – omits end of syllables/unstressed syllables;
  jerky - ? breath control;   hesitant ;   non-fluent.
Word Finding (Ref: Constable, 2001 –Chapter 10 in Stackhouse and Wells Book 2):
  Moustache –> "beeyer , stash, boustashe, beeyer, beeyerd, stash, stas, boustase"
Prosody (Ref: Wells and Peppe, 2001 - Chapter 11 in Stackhouse and Wells Book 2)

What is Literacy?
Reading Comprehension
Reading Aloud
 Context
 Single Words   - familiar/new
Spelling
 Spontaneous writing
 To Command
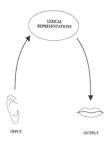
Perspectives (Ref: Stackhouse and Wells 1, p 4-8):

Medical	Diagnosis
Linguistic	Description
Developmental	Norms; Change
Educational	Literacy; Curriculum
Psychosocial	Self esteem
Psycholinguistic	Processing
Personal	Own and Child's View

Psycholinguistic Assessment

What is in the Lexical Representations?
Semantic; phonological; motor programme; grammatical; orthographic

Aims of the Psycholinguistic Approach:
1. Develop and use a **systematic assessment** procedure.
2. Have a better **understanding** of speech, language and literacy difficulties.
3. Plan and carry out **appropriate intervention** programmes.
4. Be able to **evaluate** intervention.
5. Contribute to **theories** of normal/atypical spoken and written language development.
6. Develop the theory and practice of intervention – **the 'thinking therapist'**.
7. Provide pre /post qualification **training materials/courses.**

"Psycholinguistic assessment is an approach carried in the head of the user and not in a case of tests."
(Stackhouse and Wells, 1997, p.49)
There are no specially designed psycholinguistic materials for intervention.
All teaching and therapy material can be used in a psycholinguistic way.
Psycholinguistic intervention is derived from **a way of thinking**.
What to do with whom, how to do it, when, why, and how often!

Activity 1 & 2: What Do Tests Really Test?: Auditory and Speech (see separate handout)
Don't believe what you read in a title of a test - analyse the psycholinguistic demands yourself!

Speech Processing Profile
1. Based on the simple speech processing model
2. Organized in terms of a series of questions which can be posed about the levels of possible breakdown in processing.
3. Questions distinguish between input and output skills (with different degrees of lexical knowledge involved)
4. Input on the left, output on the right of the profile
5. Tasks dependent on lexical representations = top of the profile = higher level tasks
6. Tasks not dependent on lex. representations = bottom of the profile = lower level tasks

Psycholinguistic Assessment
Aim: To identify level(s) of <u>STRENGTH</u> as well as DIFFICULTY within the speech processing system.
Need both for planning intervention. Principle: Put diagnostic labels to one side.

Assessment Resources
Stackhouse, J. Vance, M. Pascoe, M. Wells, B. (2007*) A Compendium of Speech and Auditory Tasks. Children's Speech and Literacy Difficulties 4*. Chichester: Wiley. **(see handout)**

Selecting and designing your own tests (Stackhouse & Wells 1997 Book 1 Chap11)

A psycholinguistic assessment <u>does NOT need to take a long time</u> :
e.g. Ben CA 7:11 (Vocabulary ss 108). Speech: Backing – says 'g' for 'd' and 'k' for 't'
Therapist: Have you finished learning to talk yet?
 Ben:: " well not yet, because I think I have a problem with 'g's and 'g's *(he means 'd's and g's)* and maybe on 'k's as well because it seems like if I say 'k' *(he means 't')* it seems like its going into a 'k'.

Speech Processing Profile Used in Research, e.g. <u>Longitudinal Study</u> (Nathan et al, 2004a)
A matched-pairs longitudinal design was adopted to investigate the speech, language and literacy skills of a group of 47 children with specific speech impairment and a group of 47 typically developing controls at three points in time : mean age 4;07, 5;08 and 6;08.

Summary of main findings:
1. At age six, the children in the study with delayed literacy skills had:
> Persisting speech problems; Language problems; Poor phoneme awareness; Poor letter knowledge; Increased occurrence of hyperactivity

2. Critical Age Hypothesis – Children who have not resolved their speech and/or language problems by ~CA 5;6 are likely to have associated literacy problems.
3. Children who have speech AND language problems more likely to have literacy problems than those who have speech OR language problems.
4. Children with speech AND language problems had more severe speech difficulties plus problems with speech input, phoneme awareness, and letter knowledge.
5. Children with persisting speech difficulties are likely to have associated spelling difficulties.
6. Lasting impact of a speech and language difficulties on educational performance (e.g. on national attainment tests carried out at school - SATS/GCSEs), even when 'resolved'.

Predicting Persisting Speech Difficulties
> CA 4:06 -   Severity of speech output - real and non-word tasks
> > Auditory Discrimination (ABX)
> > Expressive Language (Bus Story)

Speech Processing Profile used in <u>Case Studies</u>

Zara at 5;03
Speech Output Difficulties resolved. No Language Delay.
No Speech Input Difficulties. Developing Letter Names and Sounds

Tom 5;02
Obvious Speech output difficulties. Language Delay
Speech Input Difficulties (auditory discrimination and mispronunciation detection)
Poor letter knowledge

Spelling at CA 6 years

	Zara (6;3)	Tom 6;2
Rabbit	√	HBT
Tiger	ti<u>g</u>ger	J<u>K</u>
<u>P</u>ig	√	<u>B</u>
Dog	√	xolol
Gorilla	gerriler	micedav
Giraffe	gererfer	oml
Butterfly	Beterfly	gom
Elephant	Elerfint	m

Psycholinguistic Approach to Assessment
1. Formulate hypotheses from first impressions and rate intelligibility
2. Examine background data from different perspectives
3. Analyse speech output and formulate hypotheses about underlying 'causes'
4. Select appropriate assessments/observations.
5. Collate results onto the speech processing profile
6. Interpret results further if you wish with reference to box and arrow model and or developmental phase models of speech and literacy development.
7. Plan programme of intervention and select specific targets to work on.

Case Presentation – Zoe (Stackhouse and Wells, 1997, Chapters 9 and 10)
No medical problems at birth; good health; General Co-ordination and motor skills appropriate; No obvious chewing or feeding problems; Babbling normal; First word at CA 0;11; No problems apart from her speech and language difficulties; First seen by an SLT at CA 2;10; No family history of speech/language difficulties but her brother was subsequently referred to therapy

CA 3;9
Hearing: Passed standard tests, e.g. audiometry.

Auditory Discrimination (same or different + pictures)
    Correct: beg peg; tart dart; bag back; cup cub; bear pear; bad bat; guard card; card cart; goat coat.
    Incorrect: lock log; tear dear; robe rope.

Oral Examination: Normal Structure. Generally good rate and range of lip and tongue movements.
    Some groping and problems with lateral tongue movements

Imitation of Single Sounds
    Plosives 'good'; fricatives 'distorted'; affricates 'poor'; some vowels 'distorted'.
Sequencing of Sounds
    Same place: ppp; ttt; done but with irregular rhythm.
    Place change: ptptpt difficult; unable to sequence 3 place changes ptkptk.

CA 5;11
Auditory Discrimination Plus Pictures(Morgan Barry Test 1988)
        Voicing - all incorrect: pear bear; fan van; coat goat; lock log.
        Place - Correct: key tea; mouth mouse; cap cat; seat feet; sum sun. Incorrect: wing-ring.
        Manner - Correct: head hen; pin fin; watch wash. Incorrect: mat bat.
        Clusters Correct (but hesitant): grass glass; crown clown ; train chain .

Spelling
> pet bt; lip hb; cap cb; bump bb; trap tb; tent tt; bank bt; fish fl; sack s.

Picture Rhyme Detection
> cat: fish mat (semantic distractor); goat: gate boat (alliterative distractor).

Naming
> Voicing. Cluster reduction. Compare spontaneous v imitated response:
> goat: goa   goat; throw: fow fwow; brushing: bushing bushing.

Rhyme Production
> Unable to produce rhyming words to a target , e.g. key: "lock; ga; ye; we ne".

Real Word Repetition
> head het; coat goat; brother bufe; bridge bitch; brushing bushin; fruit fut.

Nonword Repetition
> See pumpkin example which was a new word for her.

CA 9;8

Auditory Lexical Decision
> caravan carafan; helicopter heligopter; parachute; pawachute.

Rhyme Production
> sock – sock tock silly old tock, sock tock pack too, sock loo gooli goo.
> two – two poo lili poo, two voo lili voo, two pig pili goo, two voo libi loo.

Imitation of Nonwords
> bobikladid – bobigladid; bobigladid; ba be badiblagid.

Spelling
> tent tant
> sink sing; desk disg.
> floor fole; star sote; snail sane.
> clown calren; dress darse; small semll.
> giraffe gafe; brother borth; sleeping selding; collar core; kitten clke.
> telephone tlefon; understand undsand; umbrella unbe; pyjamas beg.

Use of the Speech Processing Profile
Collate assessment findings systematically; Identify at risk child;
Monitor progress over time; Uncover hidden speech processing problems;
Reveal individual differences; Plan and evaluate intervention.

Feedback from users: more balanced assessment - makes us attend to input skills

Activity 4: Profiling Children's speech input and output skills (see separate handout)

Activity 5 : From Profile to Programme

The Intervention Process
Assessment ->Hypotheses -> Aims ->Tasks ->Evaluation

Linguistic: WHAT to work on
> Articulation Therapy: To improve sound production
> Phonological Therapy: To use segments contrastively to convey meaning

Psycholinguistic: HOW to work on targets
> Speech processing strengths and weaknesses - Input/Output/Representations.
> Auditory Discrimination; Articulatory ease; Mispronunciation detection; Self-monitoring

(Stimuli Design : Chapter 11, Book 1, St &W 1997;Chapters 3, 5, & 7 in Book 3, Pascoe et al 2006).

What is a task?

<u>Task</u> = Materials + Procedure + Feedback +/- Technique
Altering any one of these 4 components will change the psycholinguistic nature of the task and the demands made on the child. (Rees, Chapter 3 in Stackhouse and Wells, 2001)

Activity 6: What Do Tasks Really Tap?

Task A
Materials: Five picture cards of simple words beginning with /t/: 'tap, tea, talk, tall toast'
          Five picture cards of simple words beginning with /k/: 'king, kiss, key, kite, kick
          Two posting boxes, one labelled 't' and one labelled 'k'.

Procedure: The picture cards are shuffled and placed picture side downwards on the table in front of the child. Both posting boxes are within reach. Child has to pick up each picture in turn, name it aloud, decide whether the word started with /t/ or /k/, match this choice to the label on one of the boxes and post the card in the appropriate box.

Feedback: When the child names the picture correctly and chooses the correct box the therapist rewards them verbally. If child is not sure which box to choose or starts moving a picture towards the wrong box the therapist asks the child to say the word again and asks what sound the word starts with. If child is unable to respond, the therapist repeats the first consonant and then asks the child to choose one of the labels. If child is still unable to choose or chooses incorrectly, the therapist repeats the consonant and points to the corresponding letter simultaneously and then asked the child to post the picture.

Task B
Materials: Three picture cards of each of the following words (making twelve cards in total):
              'tea, key, tap, cap'
              one posting box

Procedure: The picture cards are shuffled and placed picture side up in front of child who has to name each one in turn. After each one is named the therapist picks up the appropriate card and asks whether it was the correct one and, if it was, posts it in the box.

Feedback: When child names the picture correctly the therapist picks up the appropriate card and posts it in the box. If child looked at a picture and named it using its minimal pair (e.g. looked at the picture of 'key' and said "tea"), the therapist picks up the picture of 'tea' and says "this is what I heard" and encourages child to change their pronunciation to match the word they had intended to say. If child says "key" the therapist picks up the picture of 'key' and says something like "now I clearly heard that one" and posts the picture in the box.

Now Answer these Questions for both Tasks:
    Q4a. Does the child have to reflect on his/ her speech production?
            Task A: Yes or No?   Task B: Yes or No?

Q4b. Does the child have to show awareness of the internal structure of phonological representations/spoken stimuli?
> Task A: Yes or No?   Task B: Yes or No?

Q4c. If yes, what kind of segmentation is required?
> Task A: Task B:

Activity 7: Link with Literacy
Discuss the psycholinguistic properties of the following task which is made up of plastic letters. Consider the 3 procedures listed. What else could you do with this task?

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                    c                                          j
        t                   h                         f              g
b                                  f                s                        b

            at                                              un
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Procedure 1. Therapist pulls down a letter from the letter rainbow and blends the onset and rime for the child to repeat.
Procedure 2. Child pulls down a letter from the rainbow into the onset slot and reads the word.

Procedure 3. Child pulls down a letter from the rainbow into the onset slot, reads the word and matches it to a picture. Aim: to find out which letter produces a non-word.

ACTVITY 7: Summary Sheet
Q1. Does the child have to use his / her lexical representations to complete the task? If not, how likely is it that representations may be accessed?
1.   2.   3.

Q2. Does the task target the input channel, the output channel or both?
1.   2.   3.

Q3. Does the task target a specific level (or levels) of speech processing? If so, which level/s are targeted?
1.   2.   3.

4. Metaphonological Skills:
Q4a. Does the child have to reflect on his/ her speech production?
1.   2.   3.

Q4b. Does the child have to show awareness of the internal structure of phonological representations or of spoken stimuli?
1.   2.   3.

Q4c. If so, what kind of segmentation is required?
1.   2.   3.

Q4d. Does the child have to manipulate phonological units?

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1.   2.   3.

Q5. What demands are made on the child's memory in order to make responses during the task?
1.   2.   3.

Q6. What are the instruction demands? Can all or parts of the task be demonstrated?
1.   2.   3.

Q7. Is any technique being used to support the child with the task? If so, how is the technique providing support?
1.   2.   3.

Discuss and summarise effects of additions or changes to the procedure.

Intervention Evaluation Examples:

1. **Intelligibility ratings**

2. **Generalisation** (Chapter 9 in Pascoe et al , 2006 – Book 3)
Across: a) segments, e.g. from one fricative targeted to others which were not targeted;
      b) word positions, e.g. from final to initial or initial to final, or initial/final to within word
      c) words, e.g. from practiced words to non-practiced/new words
      d) tasks, e.g. from auditory discrimination to speech; from speech to spelling;
      from treated to untreated words.
      e) Connected speech: (Chapter 7 & 8 in Pascoe et al , 2006 – Book 3. Katy paper).
      Say the following (p167):Great Elephant; Great Tiger; Great Cat; Great Bear
      Stimuli design: Facilitatory sentence – The rope pulled the car. This leaf feels wet.
                Neutral sentence – There's rope on the road. The leaf is in the air.
                Challenging sentence – This rope got frayed. This leaf got torn.

3. **Self-correction** (Level L on Speech Processing Profile, Stackhouse & Wells Book 4, 2007)
1. Corrects own speech error spontaneously.
2. Attempts to correct speech error and produces a response closer to the target, but not yet correct.
3. Attempts to correct speech error and produces a variable response, which may or may not be closer to the target.
4. Attempts to correct speech error, but response is same as original error.
5. Only attempts to correct speech error if listener does not understand.
6. Makes no attempt to correct speech error.

Core Principles of the Psycholinguistic Framework
One of the perspectives needed (not the only one or in isolation from the others)
Identify processing strengths and weaknesses– input/output/representations
Questioning and hypothesis testing – a particular way of thinking.
Link with literacy
Not a single approach to therapy but 'mix and match' depending on child's needs
Task analysis and manipulation are key skills
Therapy can be done in groups – it does not have to be individual
Non-therapists (e.g. parents or assistants) can carry out therapy if trained and supervised
 All assessment and intervention materials have psycholinguistic properties which will change depending on how they are presented.

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Reading List:
A Psycholinguistic Approach to Children's Speech and Literacy Difficulties

Books

Snowling, M. Stackhouse, J. (2006) *Dyslexia Speech and Language: A Practitioner's Handbook*. 2nd edn. London:Wiley.

Pascoe, M. Stackhouse, J. Wells, B. (2006) *Persisting Speech Difficulties in Children. Children's Speech and Literacy Difficulties 3*. London: Whurr. (Focus: Intervention with school age children)

Stackhouse, J. Wells, B. (1997) *Children's Speech and Literacy Difficulties 1: A Psycholinguistic Framework*. London: Whurr. (Focus: Principles and assessment)

Stackhouse, J. Wells, B. (2001) *Children's Speech and Literacy Difficulties 2: Identification and Intervention*. London: Whurr. (Focus: Intervention)

Stackhouse, J. Vance, M. Pascoe, M. Wells, B. (2007*) A Compendium of Speech and Auditory Tasks. Children's Speech and Literacy Difficulties 4*. Chichester: Wiley. (Focus: Interpretation of assessment procedures, normal development, identification of at risk children)

Williams, L., McLeod, S. and McCauley, R. (eds) (2010) *Treatment of Speech Sound Disorders in Children*. Paul Brookes Publishing Co. (includes a DVD of therapy approaches).

Case Examples (all above books include case examples)

LUKE – Dyslexic: Nathan , L. Simpson, S. (2001) Designing a literacy programme for a child with a history of speech difficulties. In Stackhouse, J. Wells, B. (2001) *Children's Speech and Literacy Difficulties 2: Identification and Intervention*. London: Whurr

KATY – Therapy on Connected Speech: Pascoe, M. Stackhouse, J. and Wells, B. (2005) Phonological therapy within a psycholinguistic framework: Promoting change in a child with persisting speech difficulties *International Journal of Language and Communication Disorders.40 (2) 189-220.*

JARROD – Multiple Targets: Stackhouse, J., Pascoe, M. and Gardner, H. (2006) Intervention for a child with persisting speech and literacy difficulties: A psycholinguistic approach. *Advances in Speech-Language Pathology,* 8 (3) 231-244.

ZOE – Unfolding Speech and Literacy Difficulties CA 3 -9 yrs: Stackhouse, J. Wells, B. (1997) *Children's Speech and Literacy Difficulties 1: A Psycholinguistic Framework*. London: Whurr. Chapters 9 & 10

Longitudinal Study of Speech and Literacy Difficulties (age 3-7 years)

Stackhouse, J. Vance, M. Pascoe, M. Wells, B. (2007*) A Compendium of Speech and Auditory Tasks. Children's Speech and Literacy Difficulties 4*. Chichester: Wiley. (includes the assessments and findings re how speech and auditory tasks can help to identify at risk children)

Nathan, L. Stackhouse, J. Goulandris, N. Snowling, M. (2004) The development of early literacy skills among children with speech difficulties: A test of the critical age hypothesis. *Journal of Speech, Language and Hearing Research,* 47, 377-91.

Nathan, L. Stackhouse, J. Goulandris,N. Snowling, M. (2004) Educational consequences of developmental speech disorder: Key Stage 1 National Curriculum assessment results in English and Mathematics. *British Journal of Educational Psychology.* 74, 173-86 .

Resource: Williams, P. and Stephens, H. (2004) *Nuffield Centre Dyspraxia Programme* (3rd edition). Windsor: Miracle Factory.