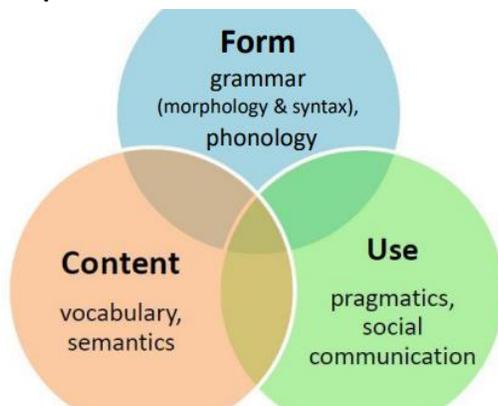


## Impairment Across Domains:



### Early school

- Difficulty understanding and following instructions
  - Difficulty telling or retelling a logical story (e.g. linking ideas together; sequencing)
  - Using incorrect grammar (syntax and morphology) in speaking (e.g. He play soccer; I seed two cat)
  - Fuzzy representations of words, unable to retrieve the correct words
  - “When the boy fell out of his cycle he got a hurt.”
  - Difficulty learning new words
  - Incorrect pronunciation (‘fuzzy’ representations)
- Difficulties with word retrieval (e.g. use lots of fillers or nonspecific words)
  - Significant implications for early literacy learning
  - Difficulty understanding parameters of play and social situations
  - Frustration trying to get needs and wants across
  - Comprehension difficulties; non literal language is especially difficult

### School age: Range of symptoms:

- Difficulty following instructions
- (appear as students who zone out and don’t pay attention)
- Difficulty engaging in classroom activities and maintaining ‘attention’
- May be difficult to understand (‘fuzzy’ representations); frequent WFDs
- Use limited sentence structures (may be present in writing)
- Difficulty with reading comprehension
- Difficulty retelling stories, formulating arguments, structuring ideas

### Adolescence - Research shows that adolescents with a history of DLD experience...

- Less likelihood of achieving successful outcomes at school leaving age
- Less likelihood of having a part time job, and to have lower career aspirations than TD peers
- Poor language has a lasting impact on sense of independence – can impact development of independent functioning into adulthood
  - o Young adults with DLD are less likely than peers to have obtained drivers’ licence at 24; are more likely to benefit from support during preparation

### LEARNING ENGLISH AS AN ADDITIONAL LANGUAGE OR DIALECT:

- Impairment apparent in both languages
- Parental concern in home language is a good predictor
- Learning 2+ languages does not cause DLD

### Potential Cause Factors:

- Environment? ■ Brain damage? ■ Neurobiology? ■ Genes?

### ENVIRONMENT: Evidence against poor language environment as cause of DLD

- Most children develop adequate language despite very variable levels of language input from parents/caregivers/environment e.g.
  - o Different cultures
  - o Children in exceptional circumstances, including hearing children of deaf parents
  - o Twin studies: dizygotic twins growing up in same environment can be very different

## **BRAIN DAMAGE:** Evidence against brain damage as cause of DLD

- No obvious signs of neurological impairment in most cases of DLD
- No excess of perinatal problems in DLD
- Children who do have focal lesions affecting the language areas don't develop DLD

## **NEUROBIOLOGY DIFFERENCES** in DLD children: are apparent, but doesn't necessarily CAUSE DLD

- Identified differences in grey matter
- Reduced activity on comparison with siblings and TD. Reduced L lateralization
- *Badcock, Bishop, Hardiman, Barry & Watkins, 2012* • Previous studies have identified differences in brain structure in individuals with DLD

## **GENETIC** causes of DLD: Research in early stages

- Support for localisation to a small number of genes
- Some candidate genes have been identified for speech sound disorders and reading disorders
- Recent research has suggested overlapping gene influence on language and literacy
- DLD: Family aggregation - Rates of language/learning difficulties higher in relatives with DLD
- Gender imbalance: DLD affects boys:girls at a ratio of 4:1
  - o suggests a possible genetic link (X/Y chromosome)

## **THEORIES OF DLD**

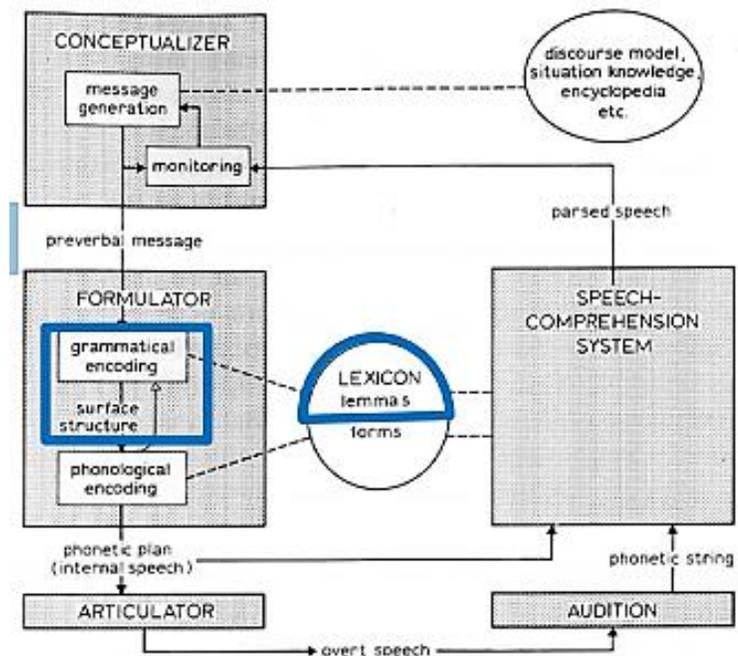
- Domain (grammar) specific accounts
- Processing
- Mapping theory
- Procedural Deficit Hypothesis

## **Domain Specific Accounts:** Hypothesised underlying deficit: Missing or impaired language knowledge

- Linguistic knowledge are innate
- Children with DLD have either missing or impaired knowledge
- Most researchers moving away from this theory.
- Fail to account for other linguistic (e.g. word retrieval, phonological processing) and nonlinguistic (e.g. motor) deficits

## **Important characteristics of DLD**

- Accuracy and speed of phonological awareness is compromised
- Imprecise speech output
- Lexical (word) retrieval difficulties
- Spelling errors
- Problems with memory, perception, articulation
- All involve the processing of phonological information:
  - o Analysing incoming information, encoding, storing it, retrieving it, maintaining it, as well as being aware of it! → Phonological representations



## Processing Difficulties:

Hypothesised underlying deficit: limitation in information processing capacity (Leonard, 2014).

- Limited capacity of resources available for processing and storage
  - o Working memory
  - o Computational energy
  - o Processing rate
- The difficulty with this account...
  - o Fail to account for discrepancy between processing & linguistic deficits in some children

Specific Processing Deficit - Impaired perception & processing of speech may interfere with the development of phonological representations which affects other aspects of language.

**Evidence for Specific Processing Deficit:** Impaired perception & processing of speech may interfere with the development of phonological representations which affects other aspects of language.

- **Deficits seen in DLD**, consistent with a SPD:
  - o Phonological processing: the use of sound based information in processing language.
  - o Phonological awareness – e.g., identification, deletion of sounds
  - o Coding phonological information in working memory – Nonword repetition
  - o Retrieving phonological information from long term memory - RAN

**Grammatical or Processing?** Tasks involving short term-memory (non-word repetition and sentence recall) were superior to those assessing syntactic skills at identifying groups of children with a history of SLI at a younger age, even when language skills had improved. The study also found that sentence recall, which very likely combines short-term memory and linguistic knowledge, gave the most accurate results.

**Phonological Processing Theory** that phonological memory is the only factor:

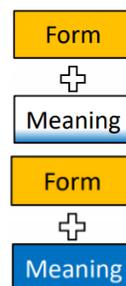
- Doesn't consider deaf children with DLD
- World learning difficulties
- If phonological processing is the root cause: - Learning words of similar phonological properties should be equally difficult ... but they are not
- Students with DLD have difficulty learning: ■ more abstract concepts ■ highly unfamiliar words ■ verbs in general (but especially mental state verbs, temporal terms)
- e.g. fish & wish 'wish' = harder Implies that phonological processing alone is not enough - meaning is also linked to students' underlying difficulties

**MAPPING Theory:** Hypothesised underlying deficit: Difficulty mapping form to meaning MAPPING

- Mapping theory predicts effects will cross levels by specifying the mapping process in detail and where it might break down
- Broader consequences than just 1 domain...

**Types of mapping** (words & grammar)

- Fast mapping: representations for form and meaning can be quickly 'mapped' and stored with a few exposures
- Slow mapping: the long-term storage/consolidation/ refinement of that word as more exposure occurs



Children with DLD generally struggle:

- Learning words (& grammatical structures) where the referent (semantics) is further removed from the form = the child is more dependent on phonological cues
- On fast mapping tasks (where reliance on meaning is limited).
  - o May have ongoing implications for how words are learned (specification of phonological, semantic and syntactic properties) → Fuzzy representations