Language Skills and Learning to Read: Literacy Outcomes for Children at High-Risk of Reading Difficulties

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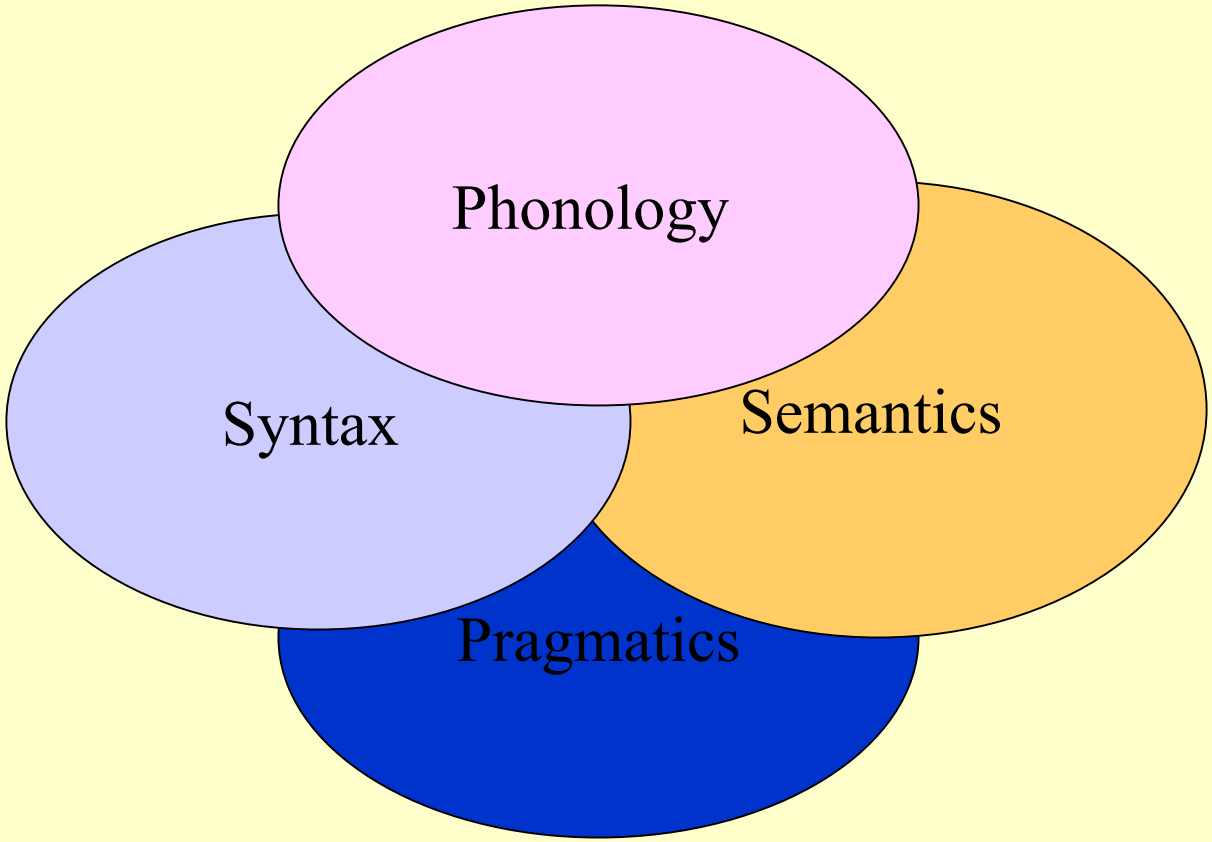
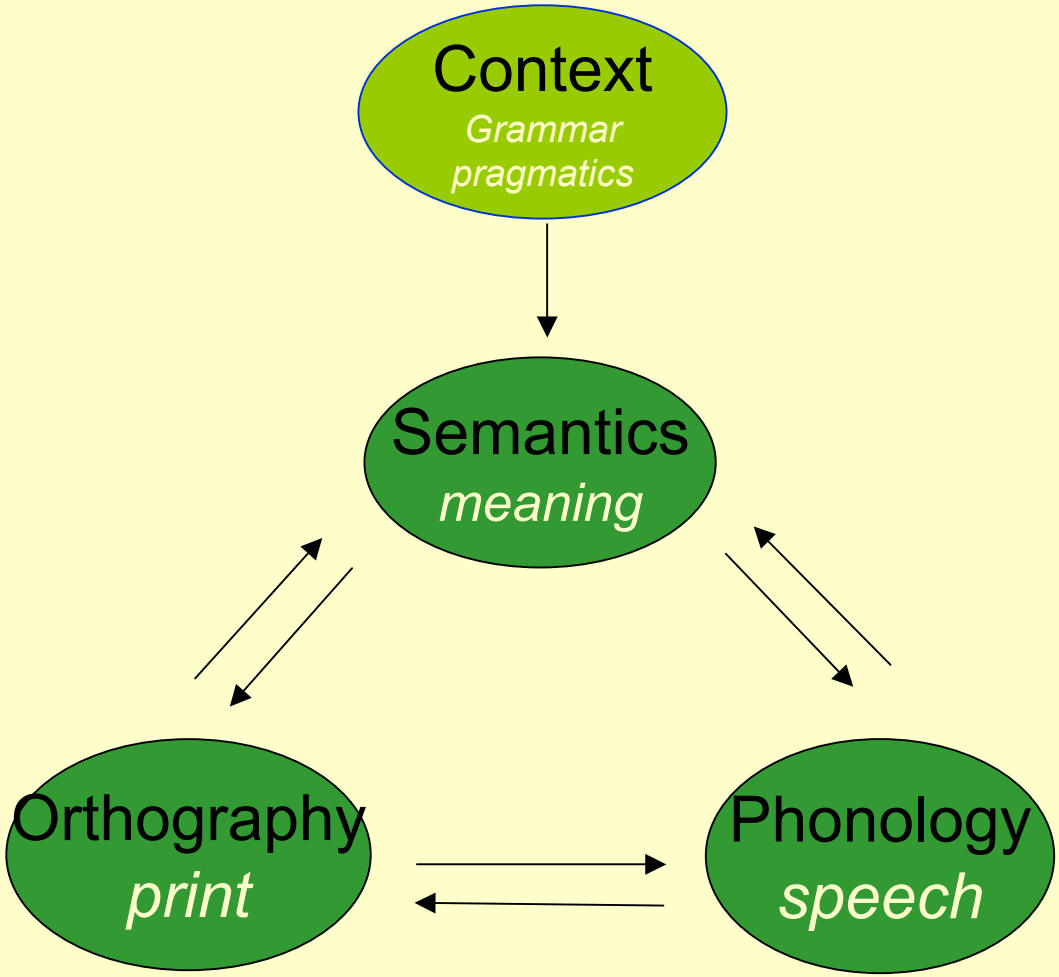
http://www.york.ac.uk/res/crl



By the time most children enter school they can use language well

Literacy builds on a foundation of oral language skills:

- Speech skills (phonology)
  - Foundation for the creation of mappings between letters and speech sounds (the alphabetic principle)
- Language skills (beyond phonology)
  - For understanding words and sentences
  - For integrating meanings of sentences within texts and making inferences



"Triangle Model"

Seidenberg, McClelland, Plaut and colleagues (1989; 1996)

In sum:

- Oral language skills are the foundation of the written language system

Implication:

- Children with oral language difficulties are at risk of literacy failure

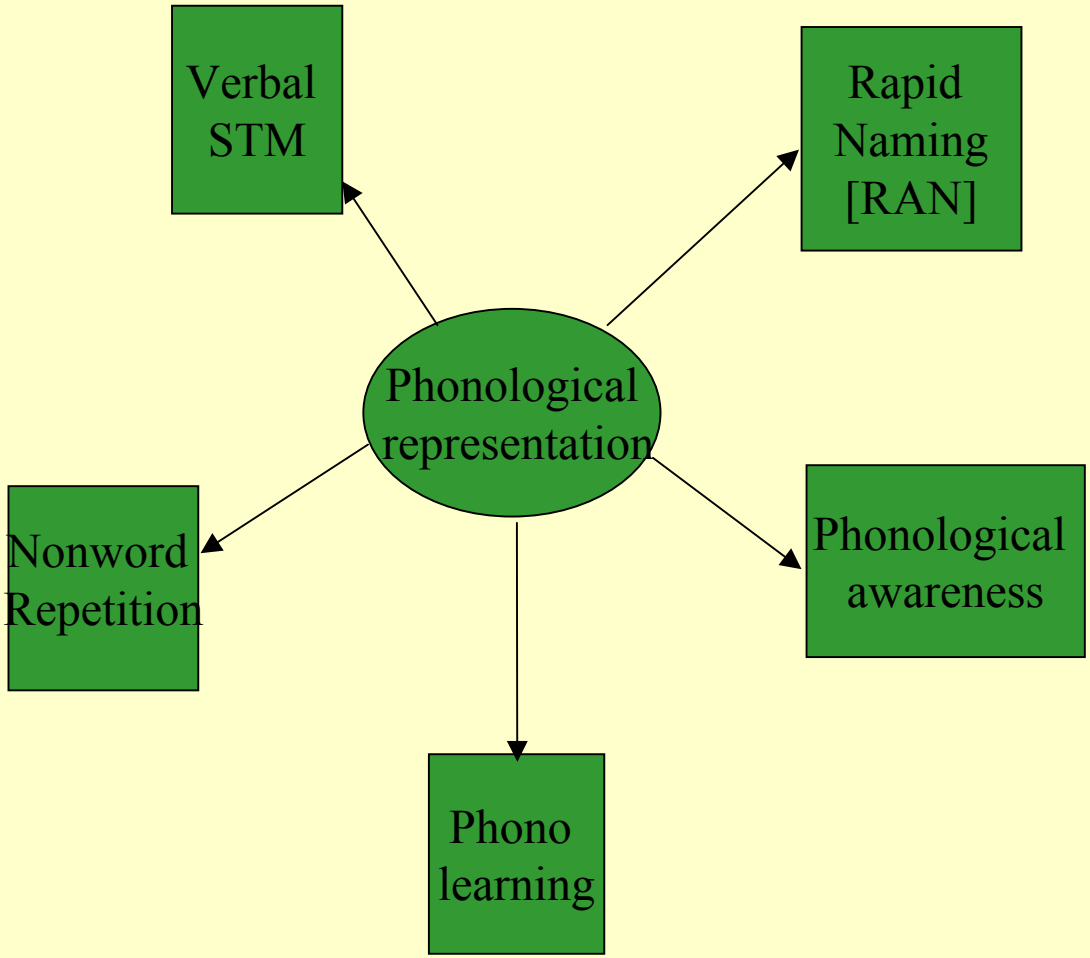
Predictions….

- Phonological difficulties place children at risk of word-level (decoding) difficulties
  - Affect phoneme awareness
  - Affect phonological learning (letter sounds)
- Wider language difficulties carry risk of reading comprehension problems

Structure of the talk

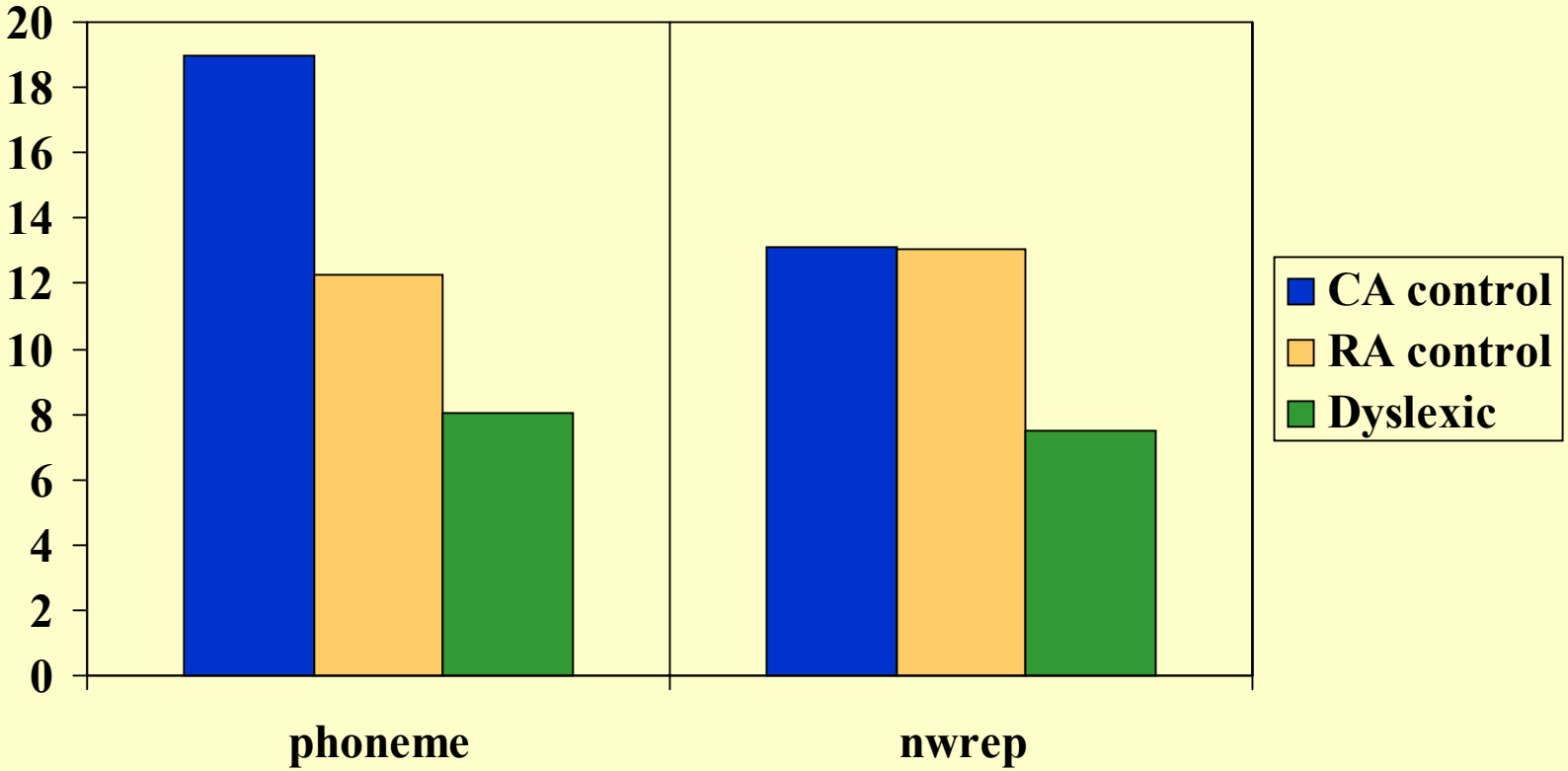
- Consider individual differences in reading development
  - Children with dyslexia
  - Children with poor reading comprhension
- Longitudinal study of children at genetic risk of dyslexia
- Propose a spectrum of reading disorders

Cognitive Definition of Dyslexia



Phonological Deficits: Dyslexia

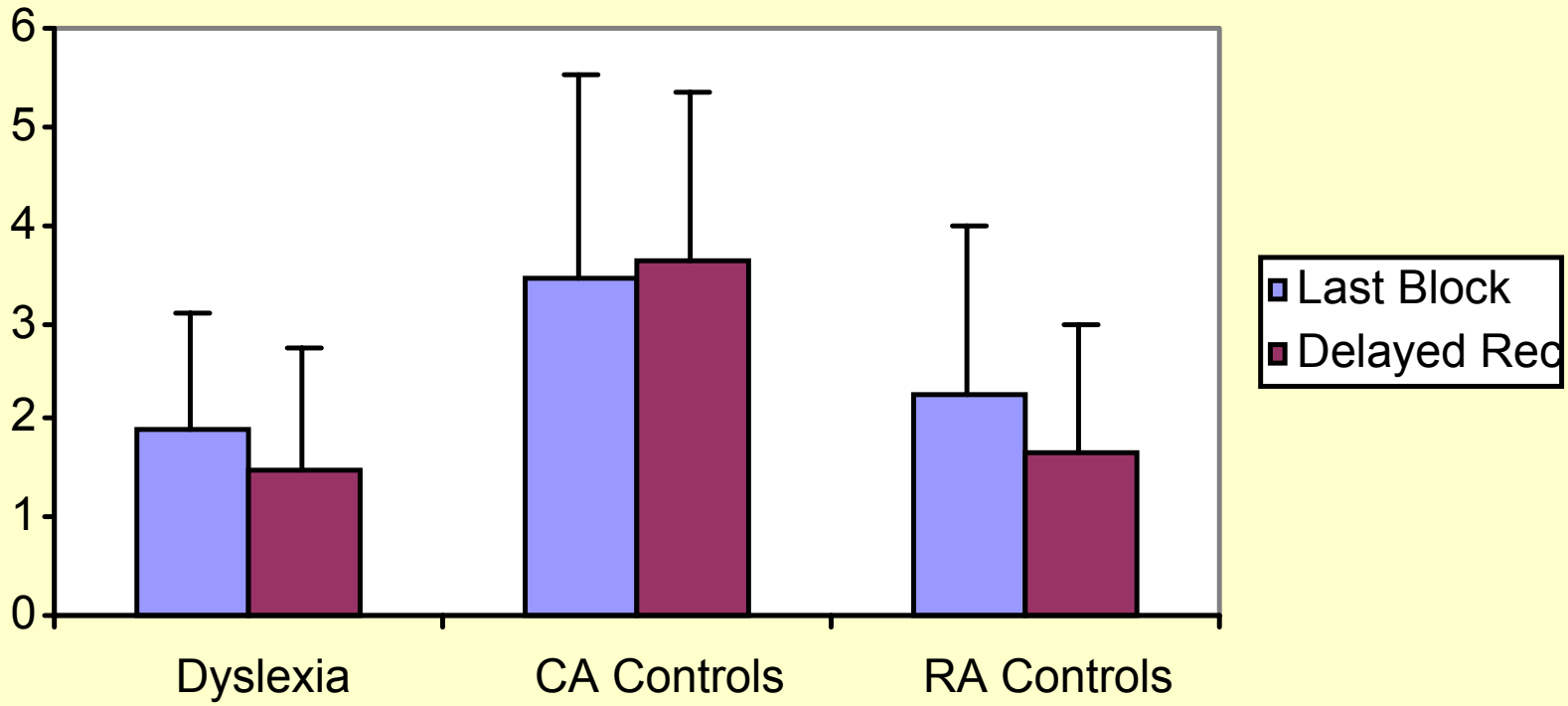
Phoneme deletion
"bice" - [b] = ?
"cleaf"-[k] = ?



Marshall, Snowling & Bailey (2001)

Letter Learning in Dyslexia

Δ Σ λ Ξ Φ Ψ



Goetz & Snowling, in prep

Phonological Learning in 5-year-olds at risk of dyslexia

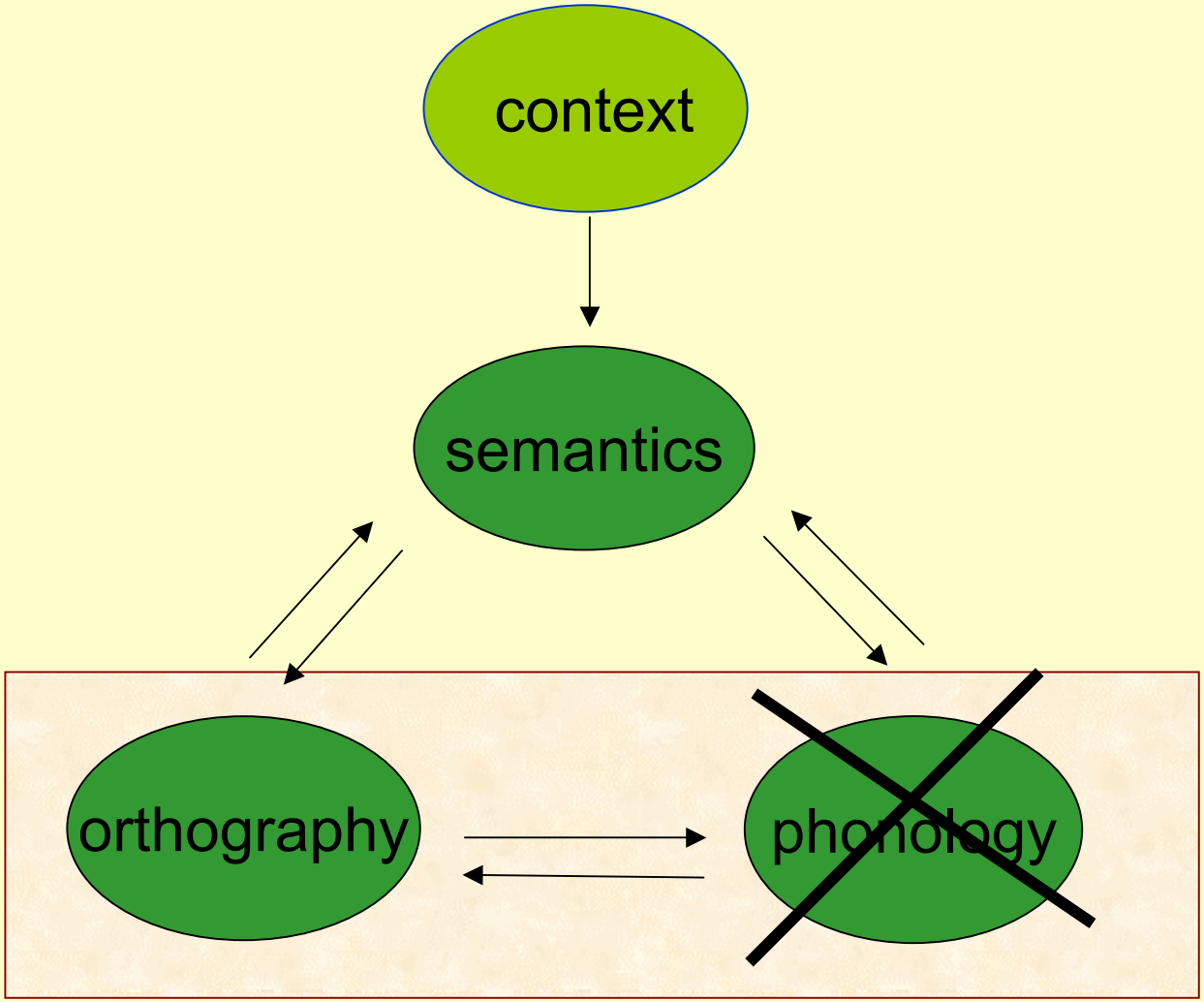
New word learning (dynamic measure)

- Children listen to a story about a monster called a Gruffalo
- The story contains 6 words relating to the Gruffalo not previously known by the children (tusk, talon, lilac, amber, gnarly and wart)
  - Recall and recognition tested two days later

Carroll & Snowling, 2004

Phonological Learning

	Control	Family Risk	Speech
Vocabulary SS	104.3	102.6	100.9
New Word Learning Š recognition	5.08 (1.16)	3.45 (1.57)	3.67 (1.44)
New Word Learning - recall	1.58 (1.31)	0.55 (0.52)	0.58 (0.67)



"Triangle Model"

Seidenberg, McClelland, Plaut and colleagues (1989; 1996)

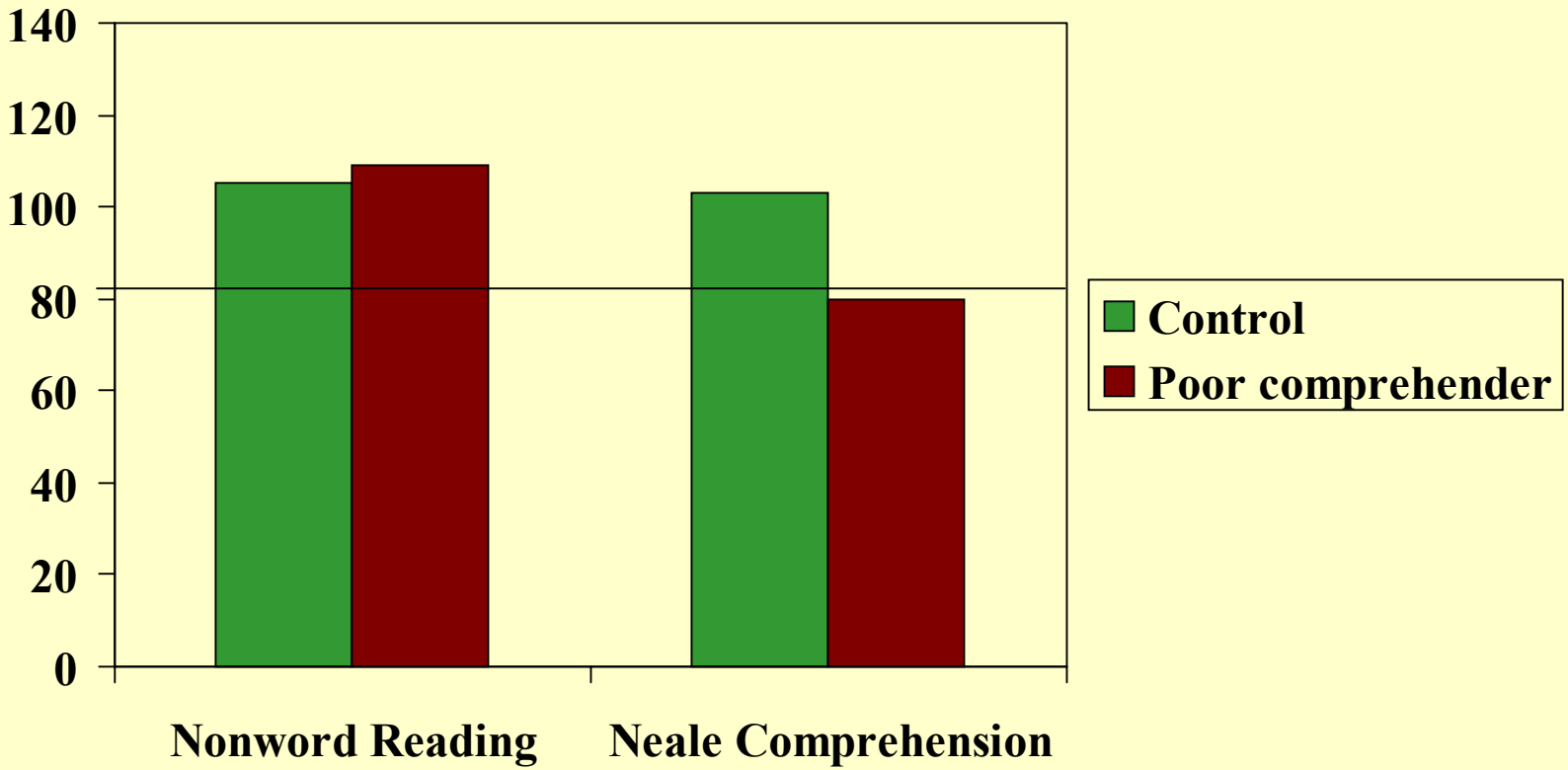
Consequences of Poor Phonology

- A problem decoding words:
  - problems reading novel words eg tegwop
- A problem with spelling
  - dysphonetic spelling eg trap -> thew
- Reading comprehension relatively intact
  - Effects on comprehension mediated by word level decoding deficits

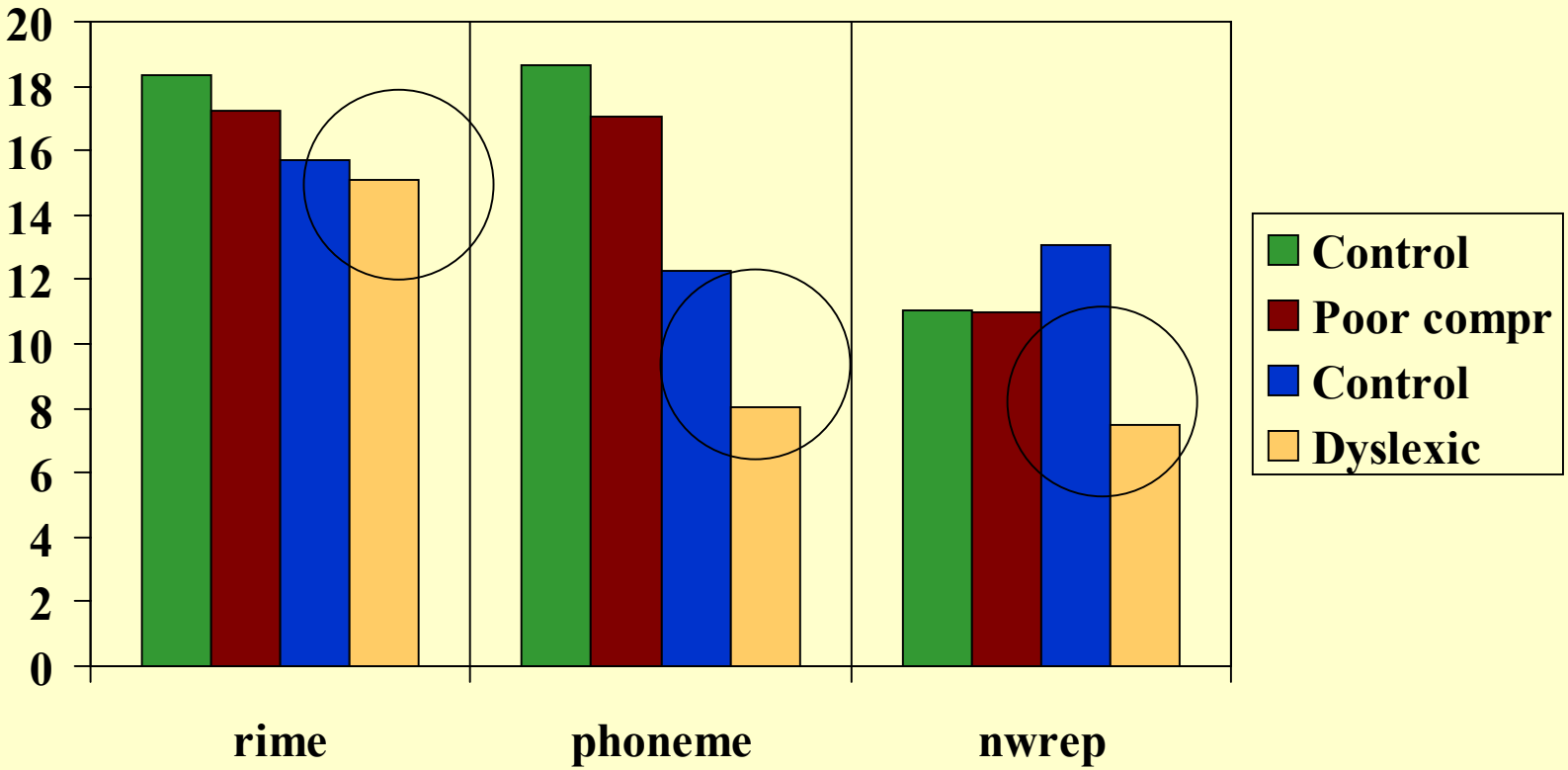
'Poor Comprehenders'

- About 10% of school population (Oakhill et al; Nation & Snowling, 1997)
- Decode well (age level or better)
- Poor reading comprehension

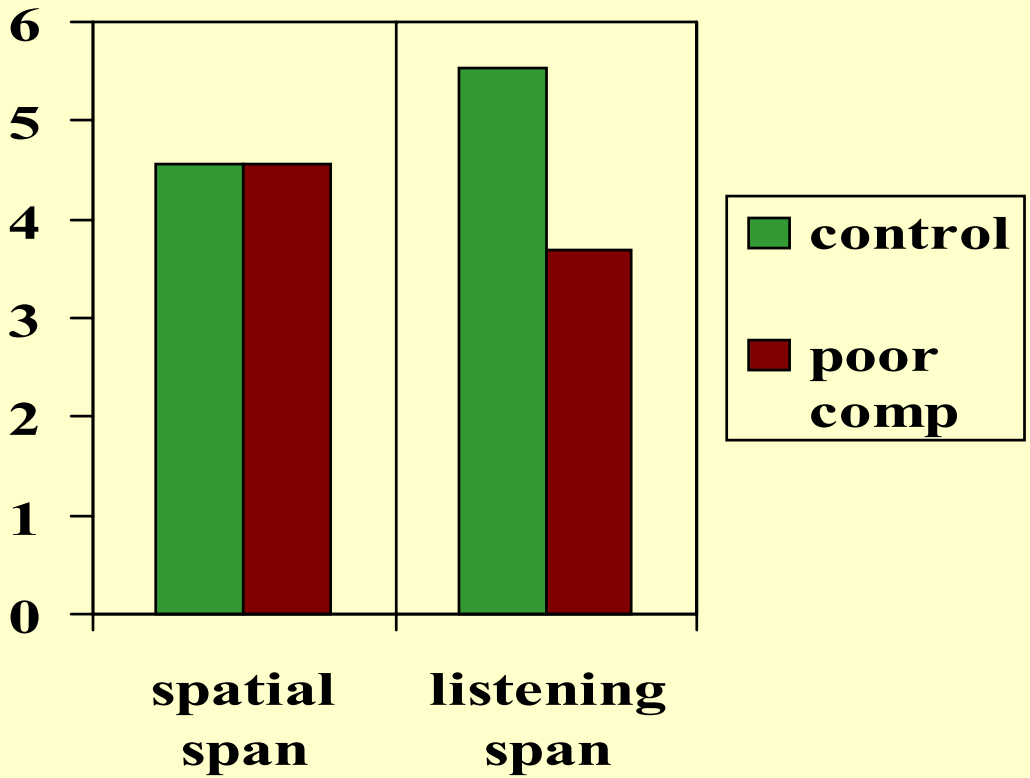
Profile of Poor Comprehender



Contrast with Dyslexia [RA-controls]

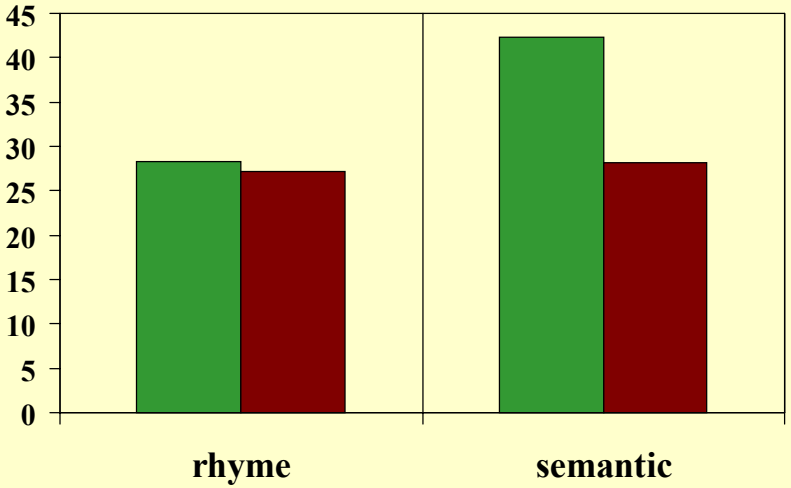


Working Memory Deficits



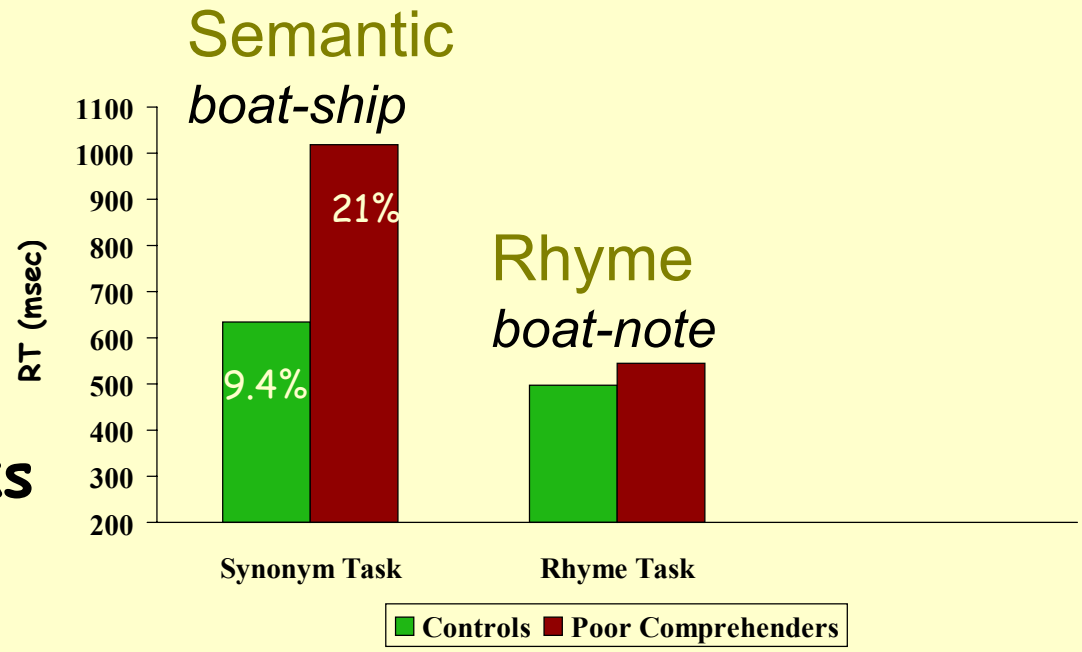
Nation, Adams, Bowyer-Crane & Snowling (JECP 1999)

Non-phonological language deficits: Poor Comprehender

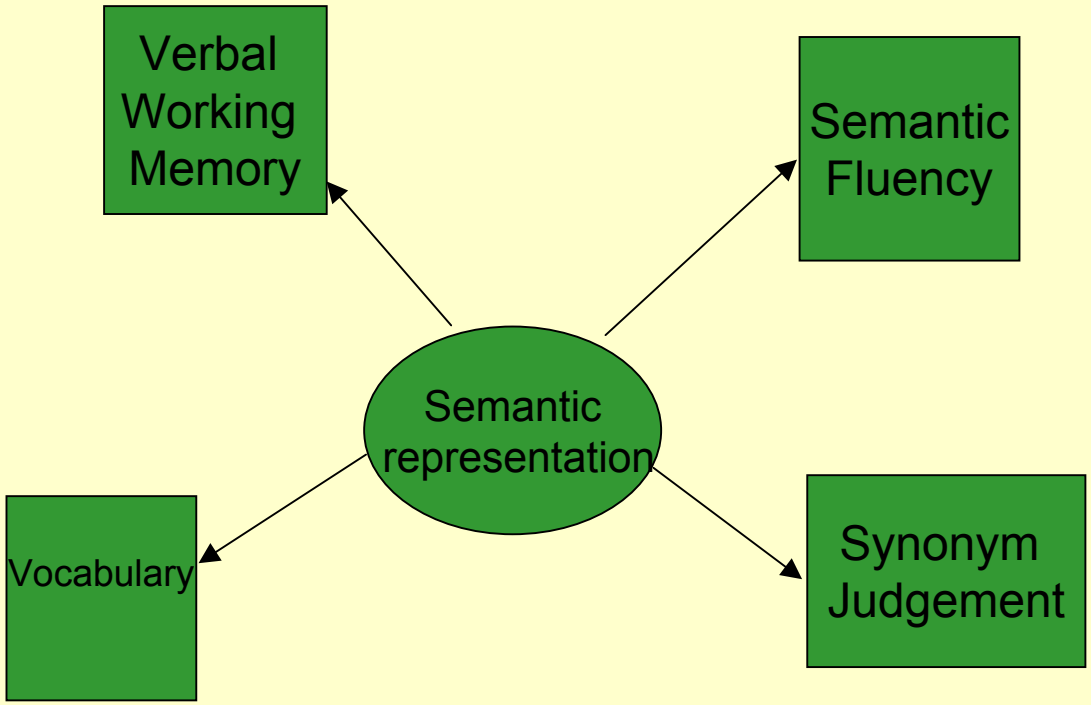


Oral fluency

Judgement tasks



Poor Comprehenders' Deficits

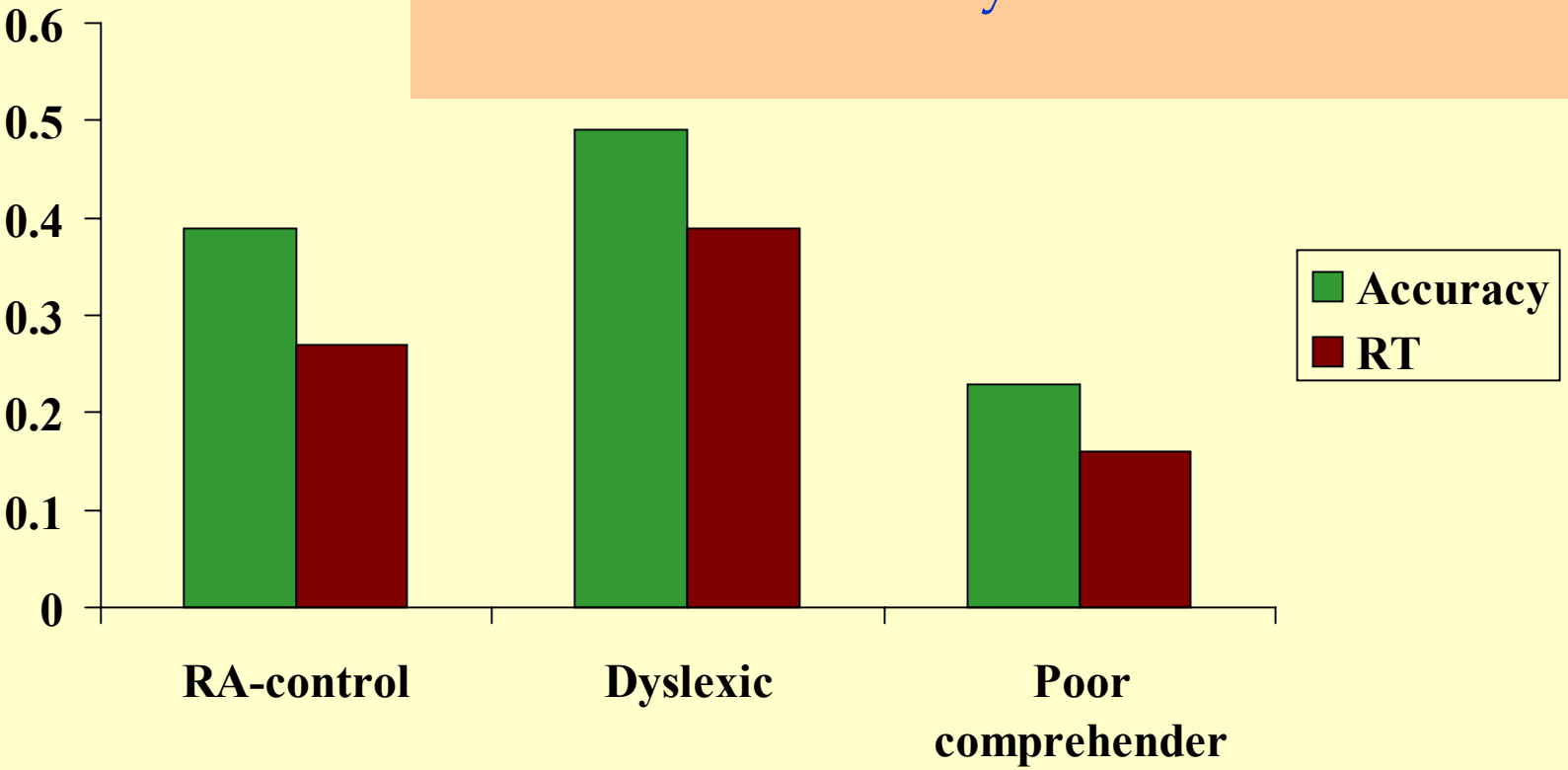


% Contextual Facilitation: Poor Comprehenders and Readers with Dyslexia

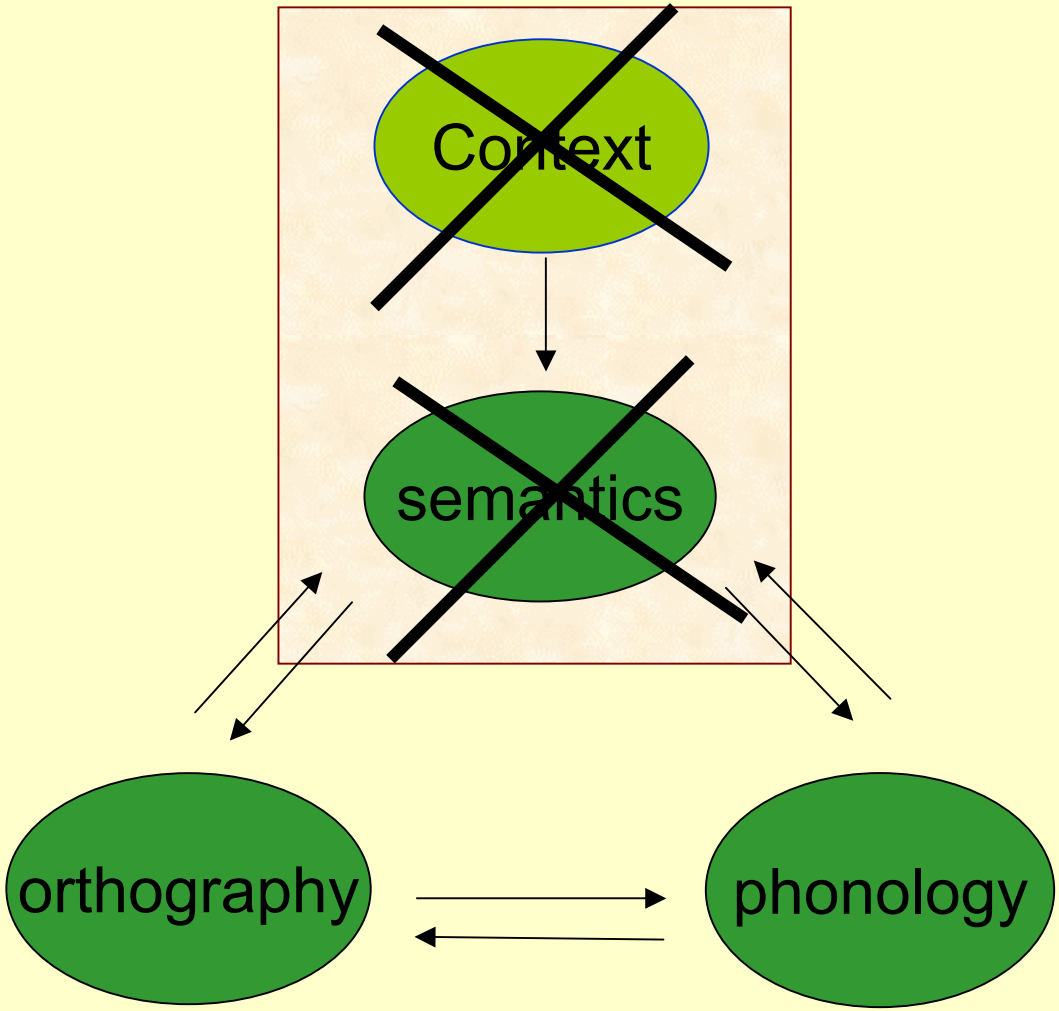
Low constraining contexts

I went shopping with my mother and my..

We end assembly at school with a ...



Nation & Snowling, 1998 Child Dev



"Triangle Model"

Seidenberg, Plaut and colleagues (1989; 1996)

Consequences of poor semantic knowledge

- A problem reading irregular words:
  - eg vase -> 'vaize'; broad -> 'brode'
- No problem with spelling
- Reading comprehension impaired

Disorders of Reading

- Two 'types' of specific reading difficulty
  - Poor decoding skills, normal comprehension (dyslexia)
  - Poor comprehension, normal decoding

BUT pure disorders are rare in development

Longitudinal Study of 'At Risk' Groups

- 74 children at high risk of dyslexia
- 37 controls from families with no history of dyslexia
  - seen at 3;09, 6 and 8 years
- WORD composite at 8 years
  - 66% at risk impaired
  - 14% controls

Snowling, Gallagher & Frith,2003

Oral Language and Phonological Skills

	At risk impaired @8 yrs	At risk unimpaired @8 yrs	Control normal
Pre-school			
Vocabulary	96.6 (10.2)	106.6 (11.7)	111.1 (10.3)
Expressive language	9.0 (5.1)	17.8 (9.8)	19.0 (9.9)
Age 6			
Rime oddity	15.2 (6.9)	21.1 (6.5)	25.6 (5.9)
Phoneme deletion	2.9 (3.8)	7.5 (3.7)	9.5 (3.6)

Emergent decoding skills (O-P)
phonological pathway

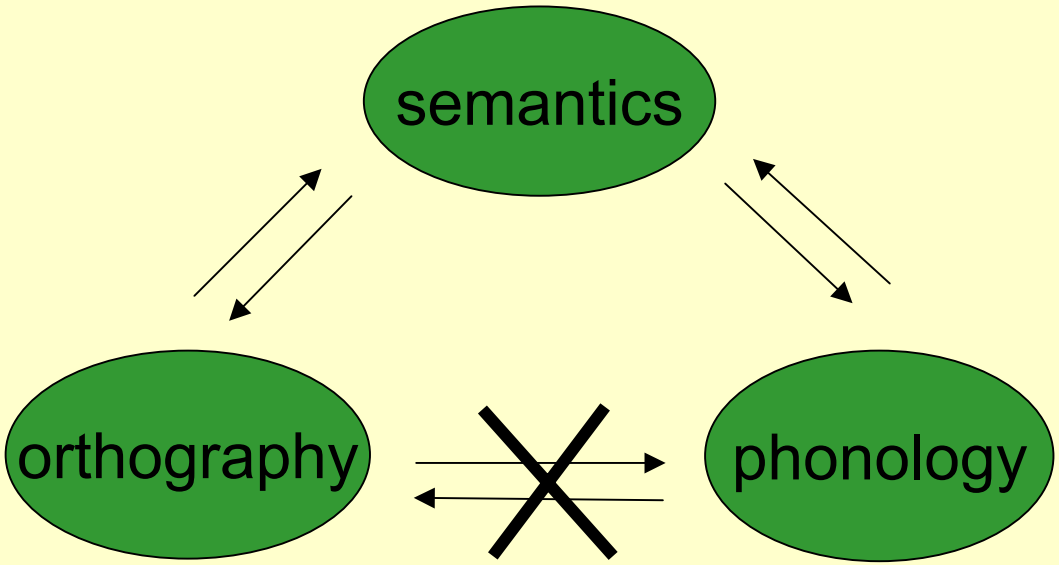
	At risk impaired @ 8 yrs	At risk unimpaired @ 8 yrs	Control normal
Pre-school			
Letters	2.4 (4.8)	5.9 (6.7)	9.9 (9.3)
Age 6			
Letter knowledge	15.7 (5.6)	21.6 (3.4)	23.2 (1.4)
Phonetic spelling skill	12.9 (8.2)	13.2 (8.6)	27.0 (6.1)
Nonword rdg	0.7 (2.7)	2.7 (3.2)	6.1 (6.8)

Literacy skills at 6 years (O-S-P)
semantic pathway

	At risk impaired @8 yrs	At risk unimpaired @8 yrs	Control normal
Reading	93.4 (5.8)	105.5 (9.0)	116.6 (16.7)
Spelling	90.0 (9.6)	104.6 (8.3)	111.1 (13.5)
Readcomp	86.0 (7.0)	98.9 (10.9)	107.4 (15.1)

Task	At-risk Impaired @ 8yrs	At Risk Normal reader @ 8 yrs
Oral Language	X X	=
Phonological awareness	X X	=
Phonic transcoding	X X	X X

Triangle model

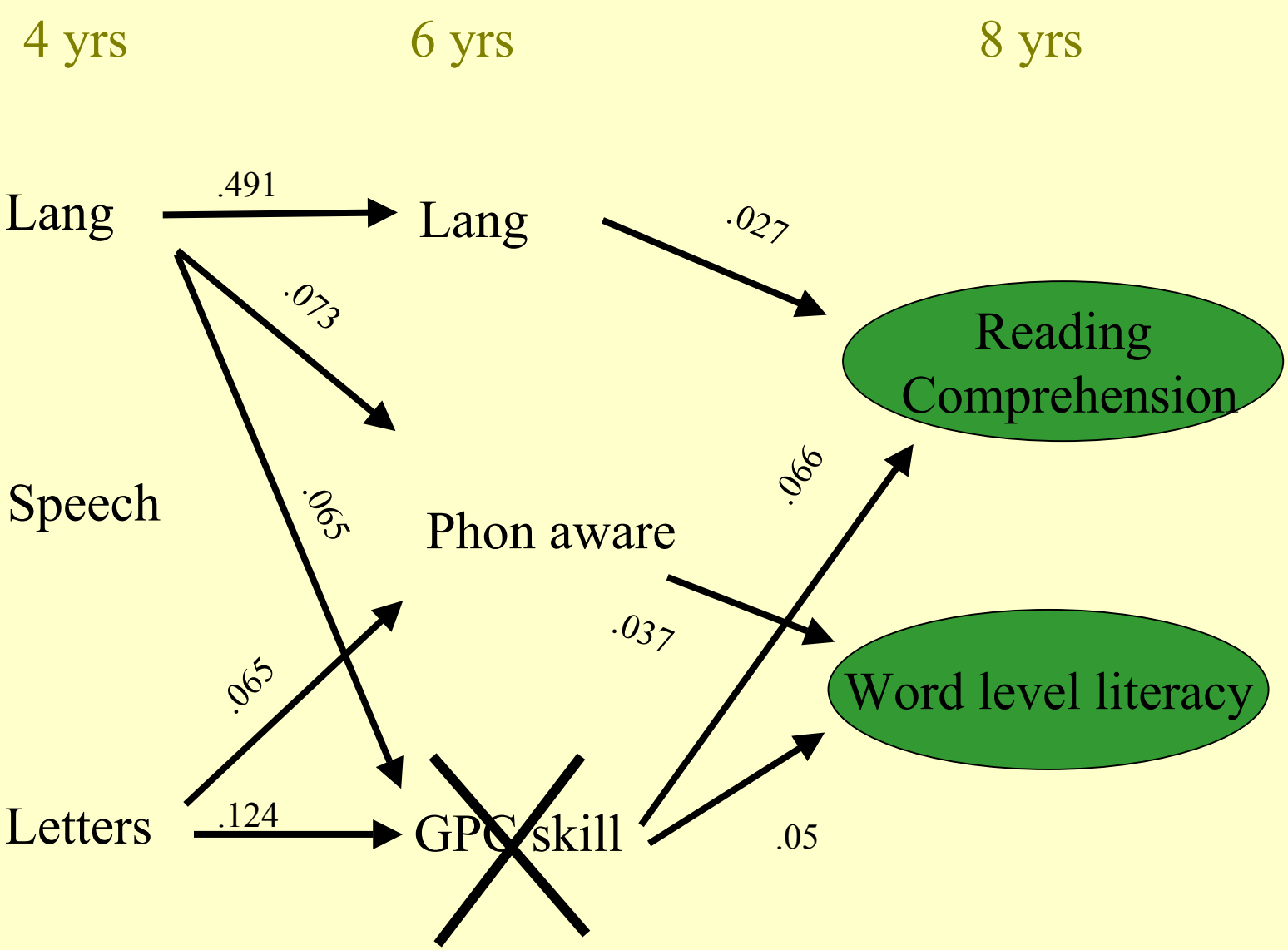


What is the relationship between language and literacy?

- Path analysis
  - Pre-school (4 yrs)
    - Oral Language
    - Letter knowledge
  - Age 6
    - Vocabulary
    - Phonological awareness

Predict phase 3 (8 yrs)

Basic reading skills (word level literacy)
Reading Comprehension


4 yrs
6 yrs
8 yrs
Lang
.491
Lang
.027
.073
Reading Comprehension
Speech
.065
Phon aware
.066
.037
.065
Word level literacy
Letters
.124
GPC skill
.05

Family risk is continuous

- At risk unimpaired children show:
  - Poor letter knowledge at 4 yrs (symptom of a learning impairment)
  - Deficient use of phonological pathway at 6 yrs
- Our findings suggest that reading development is bootstrapped by stronger speech/language resources in 'unaffected' children

Summary

- Children with poor oral language skills are at high risk of literacy failure
- To understand nature of risk it is necessary to take account of both phonological and wider language skills
- Among children with poor phonological learning, the availability of good language skills can mitigate risk of reading difficulties

Learning to Read

- Phonological Skills
  - Letter learning
  - Decoding (O-P)
  - Sight vocabulary (automaticity)
- Wider language (semantic) skills
  - Sight vocabulary (exception words)
  - Reading Fluency
  - Reading for Meaning

The contrasting profiles of dyslexic readers and 'poor comprehenders' suggests a developmental double dissociation between phonological and semantic skills

Implications for Understanding 'Dyslexia'

Individual Differences in Reading depend upon:

- Proficiency of phonological skills
- Integrity of language skills outside phonological module (e.g., semantic skills)
  - "Protective factor"
  - Compensatory strategies
  - Modified by language of learning and teaching
- The interaction of these factors produces a spectrum of related disorders that include dyslexia

Spectrum of Reading Disorders