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# A digital tool to assess Chinese character writing

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# In this workshop…

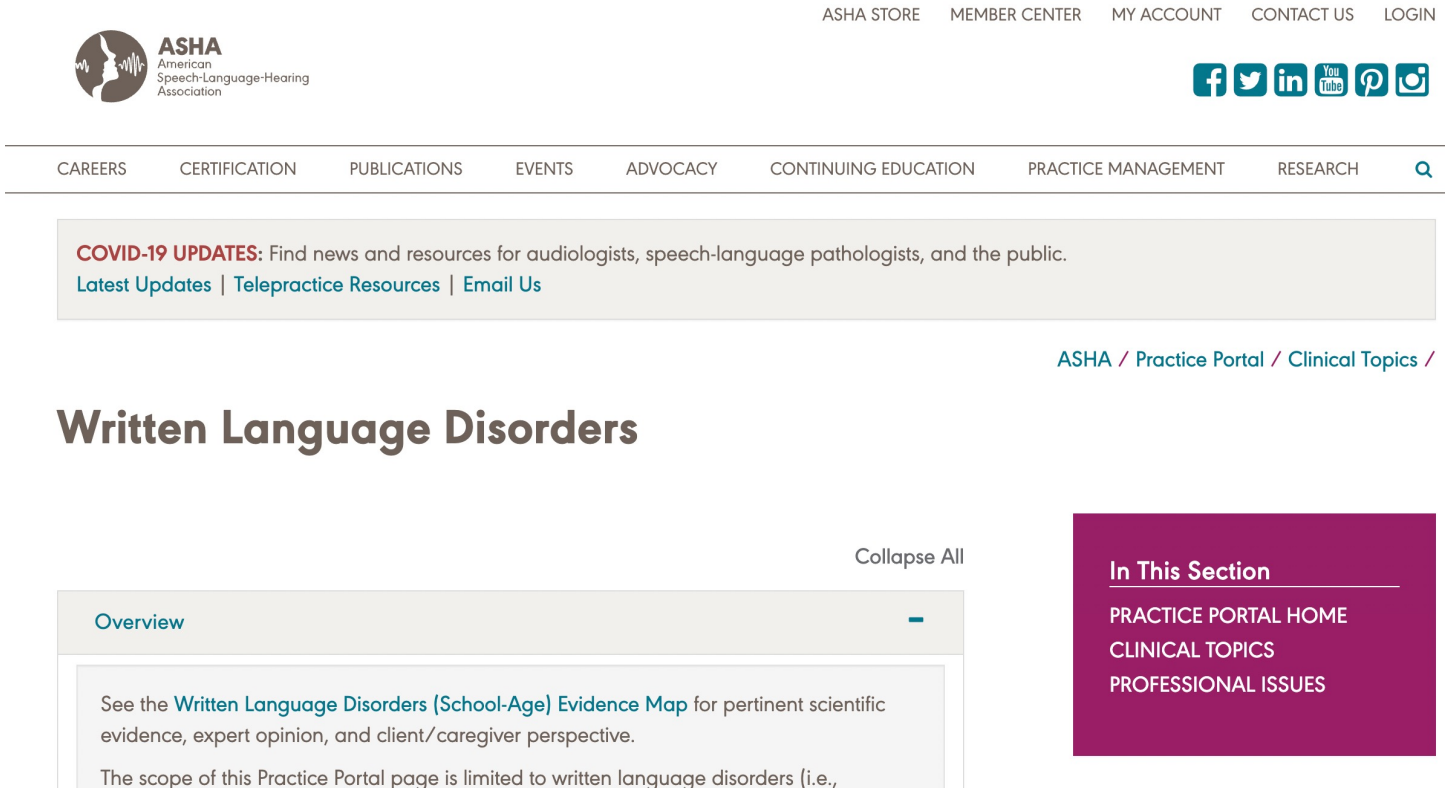
- Defining the problem
- Central and peripheral processing of Chinese character writing
- The digital app (and other online resources…)

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# Written Language Disorders

# Written language disorders

- ASHA webpage…



# Reading difficulties as a “language” problem

THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY
ACAMH
*Journal of Child Psychology and Psychiatry* 53:5 (2012), pp 593–607 doi:10.1111/j.1469-7610.2011.02495.x

## Annual Research Review: The nature and classification of reading disorders – a commentary on proposals for DSM-5

**Margaret J. Snowling,[1] and Charles Hulme[2]**

[1]Department of Psychology, University of York, York, UK; [2]Division of Psychology and Language Sciences, University College, London, UK

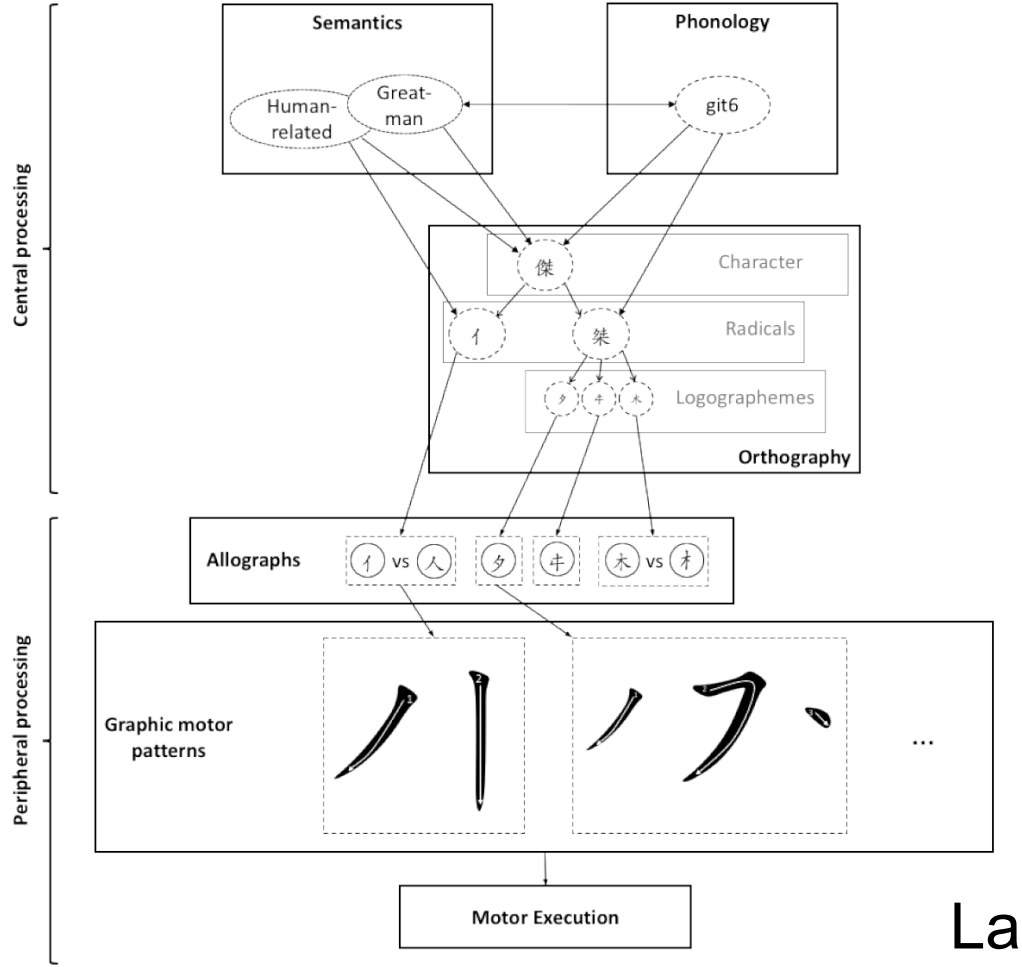
This article reviews our understanding of reading disorders in children and relates it to current proposals for their classification in DSM-5. There are two different, commonly occurring, forms of reading disorder in children which arise from different underlying language difficulties. Dyslexia (as defined in DSM-5), or decoding difficulty, refers to children who have difficulty in mastering the relationships between the spelling patterns of words and their pronunciations. These children typically read aloud inaccurately and slowly, and experience additional problems with spelling. Dyslexia appears to arise principally from a weakness in phonological (speech sound) skills, and there is good evidence that it can be ameliorated by systematic phonic teaching combined with phonological awareness training. The other major form of reading difficulty is reading comprehension impairment. These children read aloud accurately and fluently, but have difficulty understanding what they have read. Reading comprehension impairment appears to arise from weaknesses in a range of oral language skills including poor vocabulary knowledge, weak grammatical skills and difficulties in oral language comprehension. We suggest that the omission of reading comprehension impairment from DSM-5 is a serious one that should be remedied. Both dyslexia and reading comprehension impairment are dimensional in nature, and show strong continuities with other disorders of language. We argue that recognizing the continuities between reading and language disorders has important implications for assessment and treatment, and we note that the high rates of comorbidity between reading disorders and other seemingly disparate disorders (including ADHD and motor disorders) raises important challenges for understanding these disorders. **Keywords:** Reading disorders, language disorders, dyslexia, reading comprehension impairment, intervention.

# Implications

- Speech therapists play significant role in the management of children with written language disorders
- Similar training goals as typical oral language intervention
  - Learning the items
  - Acquiring the rules behind

# Central and peripheral processing of writing

# Central and peripheral processing of character writing




Lau (under revision)

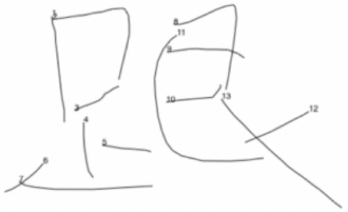
# Error analyses

# Issues with central processing

| | | | |
|---|---|---|---|
| Example 3 | Central processing | 螢 |  |
| Example 4 | Central processing | 落 |  |
| Example 5 | Central processing | 奪 |  |
| Example 6 | Central processing | 落 |  |

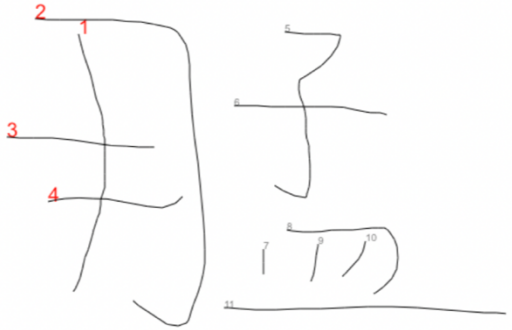
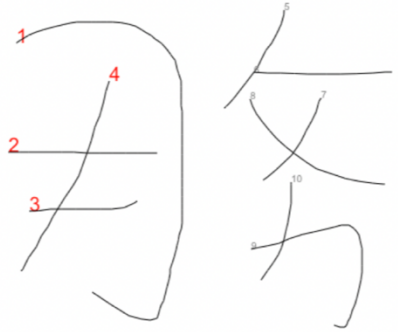
# Issues with allograph selections

Table 2. The written output of children with dyslexia in a writing-to-dictation task.

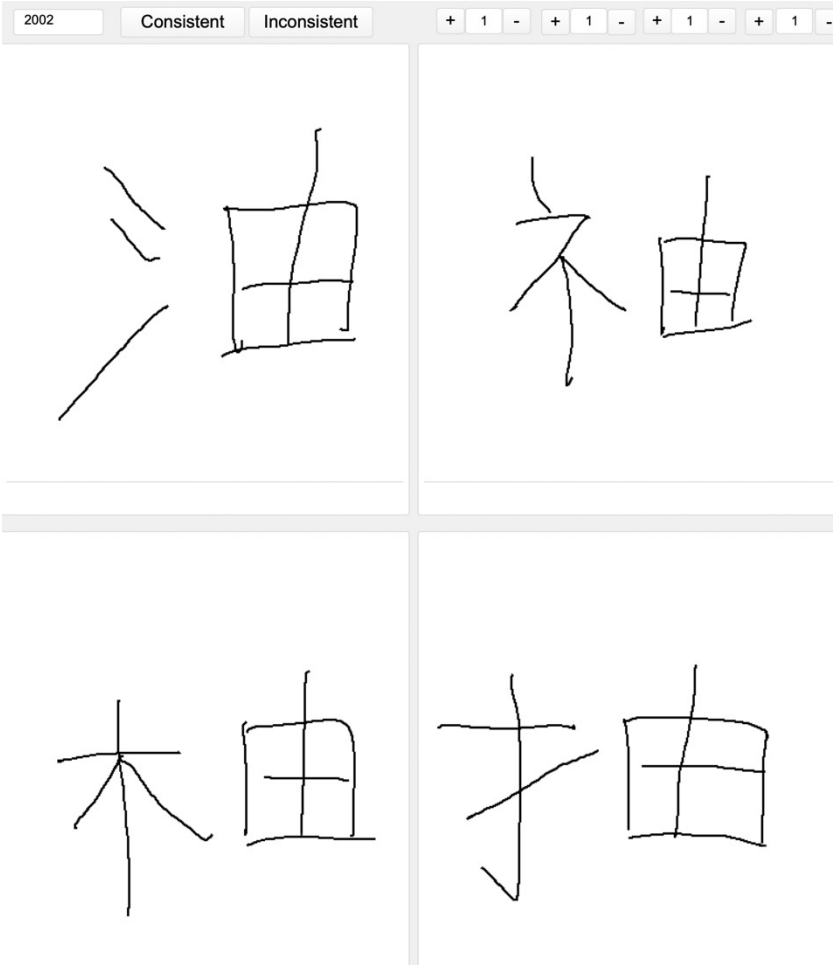
| | Loci of writing problems | Target character | Children's written output |
|---|---|---|---|
| Example 1 | Peripheral processing | 捉 |  |
| Example 2 | Peripheral processing | 跟 |  |

# Issues with graphic motor patterns

Table 1. The written output of a child with dyslexia in a copying task. The order of stroke sequence was indicated next to the onset position of each stroke.

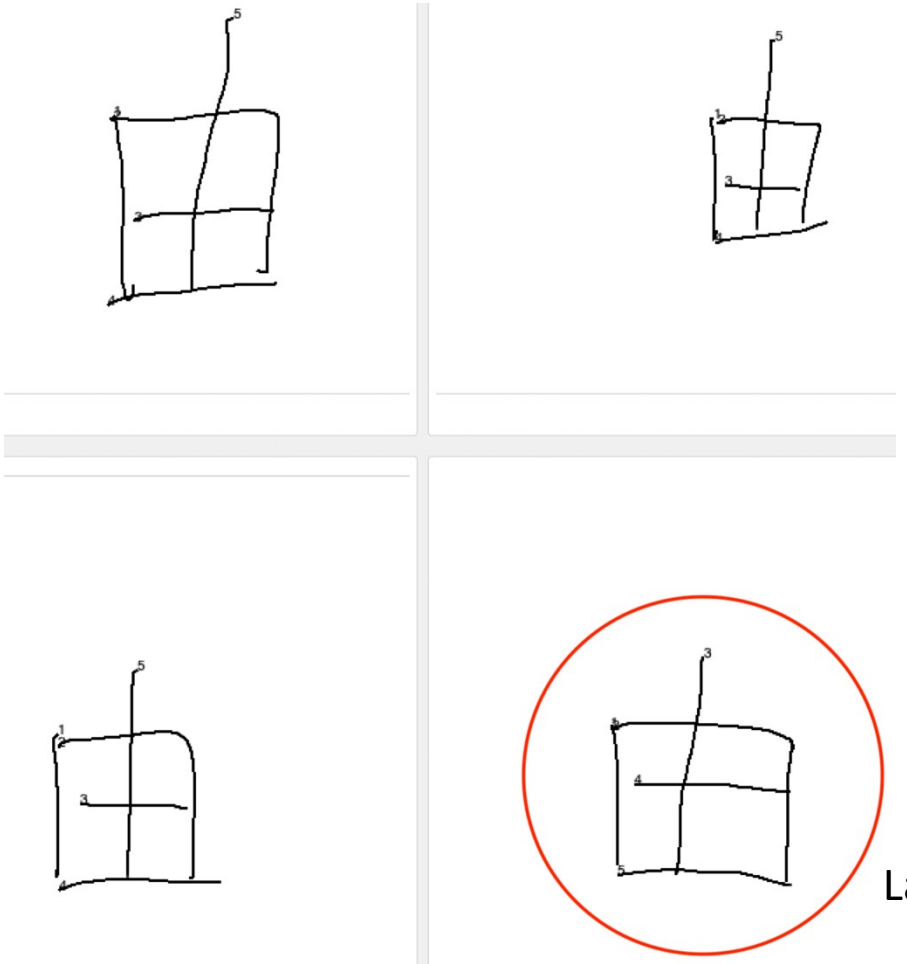
| | Target pseudo-character | Child's output |
|---|---|---|
| Example A | 腽 |  |
| Example B | 胯 |  |

# Immediate copying task




Lau et al. (under revision)

# Risk factor #1: Inconsistent stroke sequence



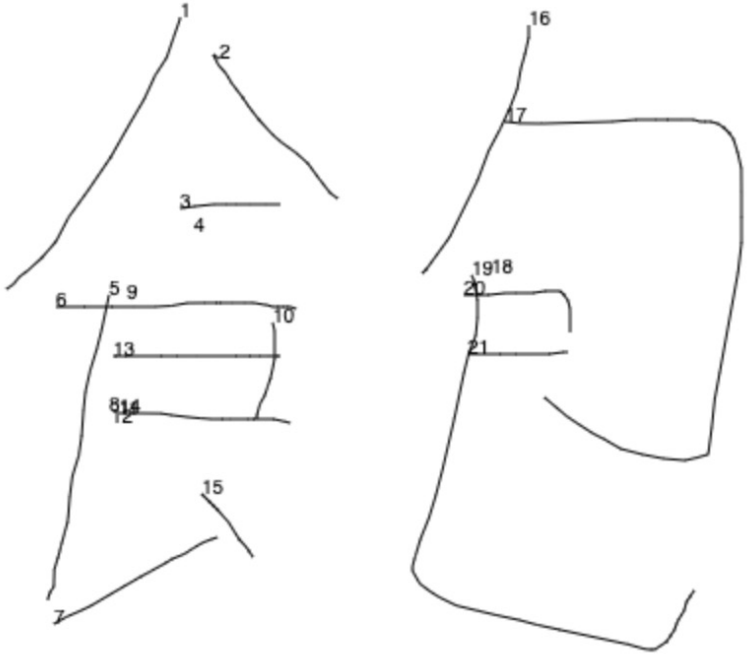
Lau et al. (under revision)

# Pauses…



Lau et al. (under revision)

# Risk factor #2: Inappropriate pauses…




Lau et al. (under revision)

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# A digital app for assessment

# My new webpage…



Speech Therapy Resource Centre

# Check stroke sequence consistency

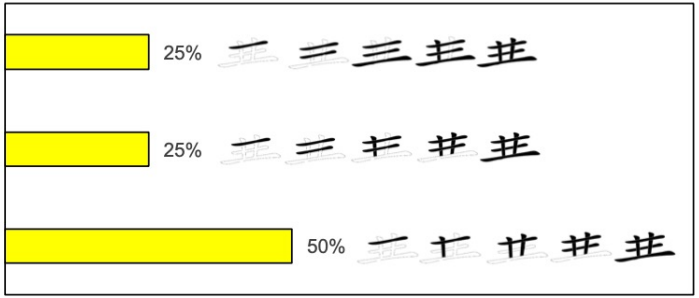
- Did you apply consistent stroke sequence when you wrote the following?

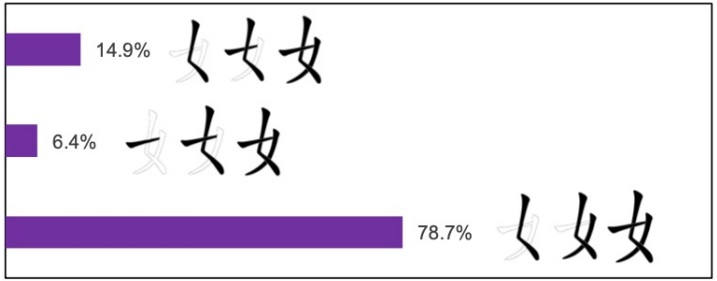
 as in 菇 (item 1) and 苓 (item 6)

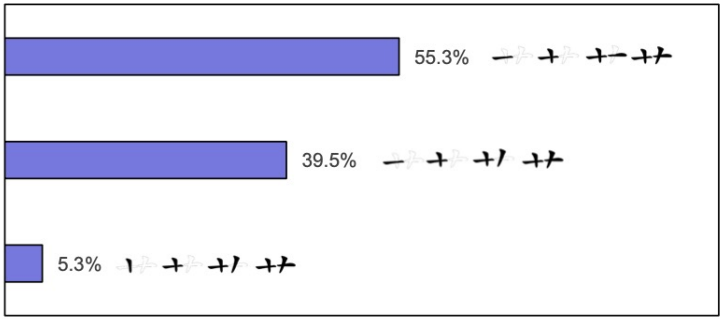
 as in 溝 (item 3) and 塞 (item 5)

 as in 菇 (item 1) and 汝 (item 4)

# Variations across individuals



# Measures of interstroke intervals (ISI)

Figure 1. Examples of stroke organization and *elapsed time* and *distance* calculations



Radical Boundary

Figure 1. Examples of stroke organization and *elapsed time* and *distance* calculations



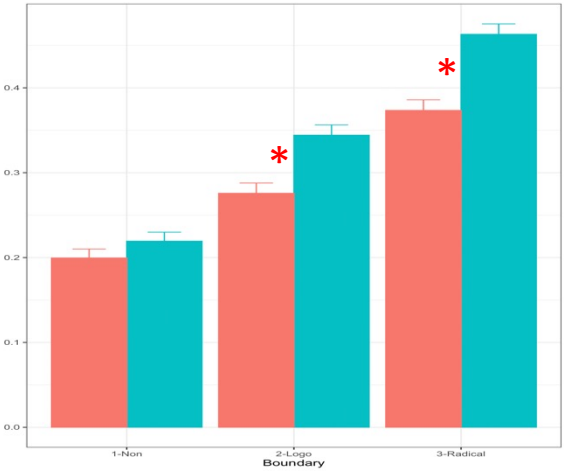
Logographeme Boundary

Figure 1. Examples of stroke organization and *elapsed time* and *distance* calculations

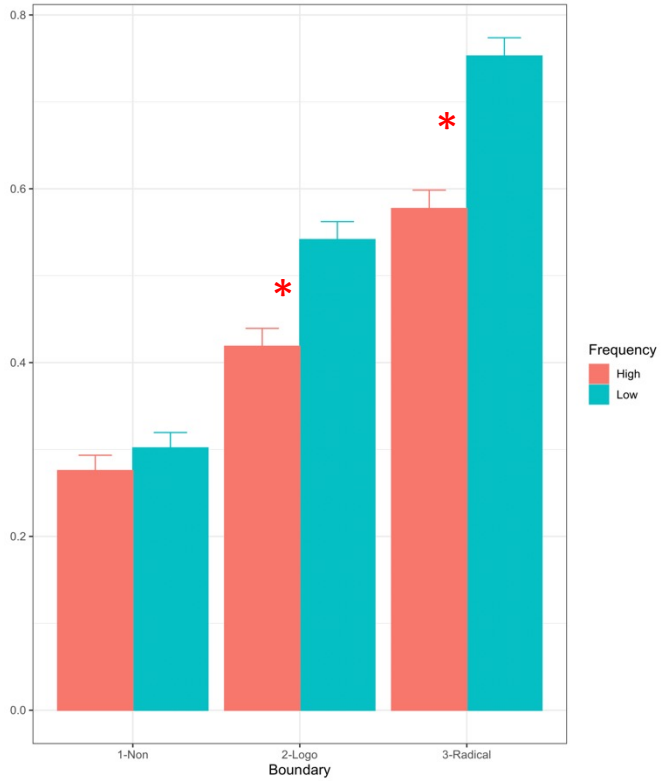


Non-Boundary

# Lau, Chu, Liang & Leung (2017)




Grade 5




Grade 2

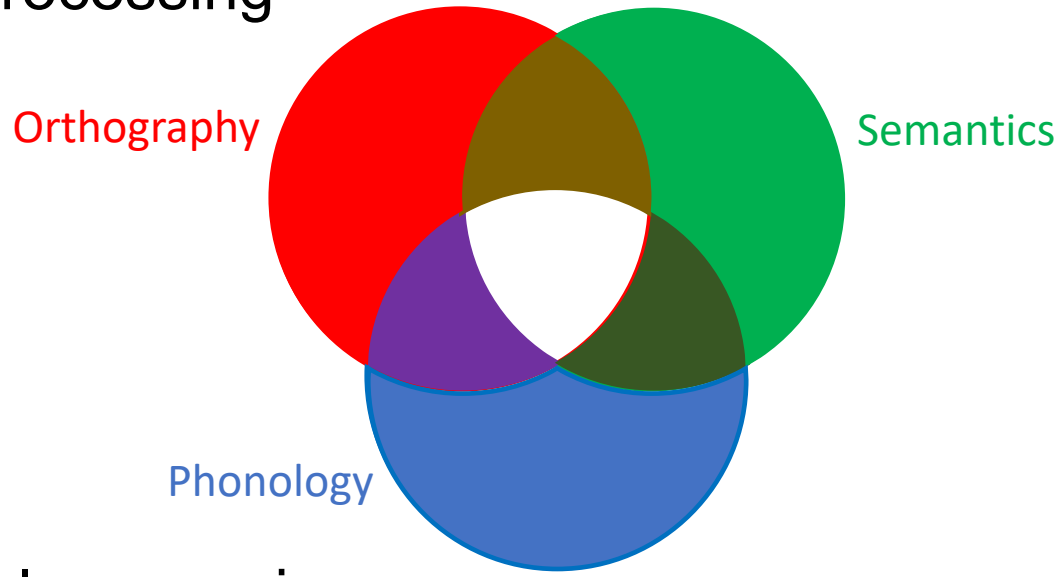
# However,…

- Lots of trials are needed
- Covary with Inter-strokes distance (ISD)

# Summary

# Try to identify the loci of the problem

- Central processing




- Peripheral processing
  - Allographs
  - Graphic motor patterns

# My webpage

- https://mst-cbs.polyu.edu.hk/Resources/




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