

# Specific Learning Difficulties

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# Nomenclature

Specific Learning Difficulties

same as

Specific Learning Disabilities

An alternative phrasing is

Specific Learning Differences

# SpLDs include

ADHD

Dyslexia

Dyspraxia

ASD

Dysgraphia

# Overview

- The co-occurrence of other Specific Learning Differences (SpLDs) with ADHD
- Different SpLDs – but many common features in terms of neurocognitive profile
- Variations in incidence of depression and synaesthesia with SpLDs

# ADHD and it's co-occurrence with other SpLDs

General consensus that when ADHD is present there is a high probability of another SpLD being present as well.

(The same is true for psychiatric disorders  
as well.)

# ADHD and Dyspraxia (DCD)

e.g. C Gillberg

1983 DAMP (deficits in attention, motor control and perception)

about 50% of children had the combination of ADHD and DCD

# ADHD & Reading

e.g. S.D. Mayes & S.L. Calhoun, 2006

Frequency of reading, math and writing disabilities in children with clinical disorders:

71% when ADHD (Combined)

NB 18/19% when just depression present

# ADHD & Dyscalculia

e.g. In 2013 Butterworth & Kovas reported a co-occurrence frequency of 11% for ADHD & Dyscalculia



# ADHD & ASD

e.g. Ronald (2014) cites a finding by Rommelse *et al* of a frequency of 20% to 50% for ADHD & ASD (Autistic Spectrum Disorder).

September 2010 to July 2014

Post-16 assessments

N = 166 (50% females)

ADHD sole diagnosis 48%

ADHD + Dyslexia 19%

ADHD + DCD 26%

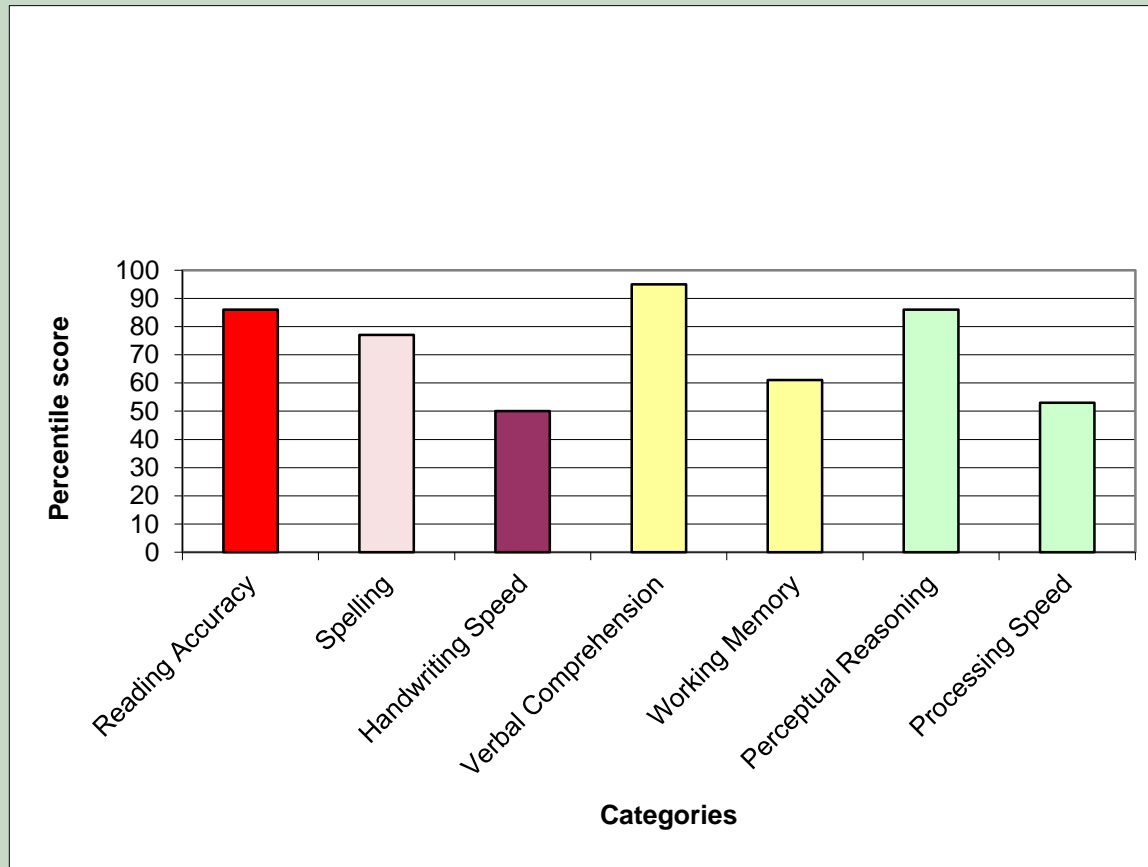
ADHD + other SpLDs 7%

# Partnership

- value of specialist assessors and psychiatrists working in partnership brings a broad spectrum approach to diagnosis
- plus a current profile of educational skills and neurocognitive strengths and weaknesses

# Commonalities and diagnostic issues

- As a generalisation the neurocognitive profiles for ADHD, Dyslexia and Dyspraxia are very similar: stronger performance on tests of verbal and visual reasoning than on tests of working memory and processing speed



## ADHD profile N = 65

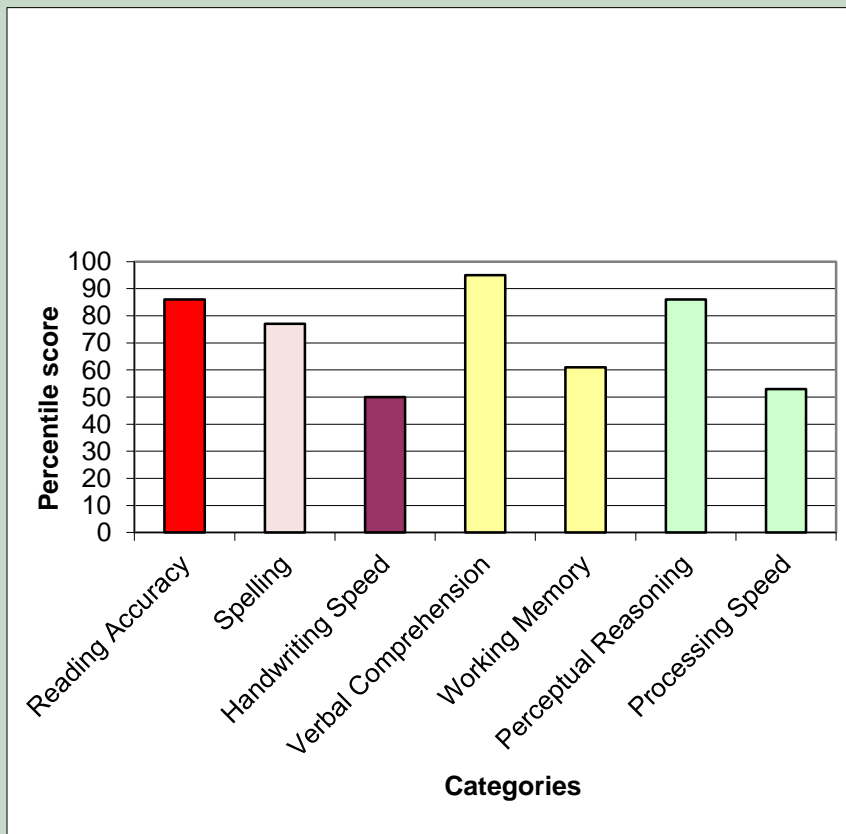
Mean WRAT-IV Word Reading Accuracy and Spelling scores, and ART Handwriting speed, plus the 4 WAIS-IV Index figures, expressed as percentile scores, for 65 individuals with a sole diagnosis of ADHD

# ADHD cohort

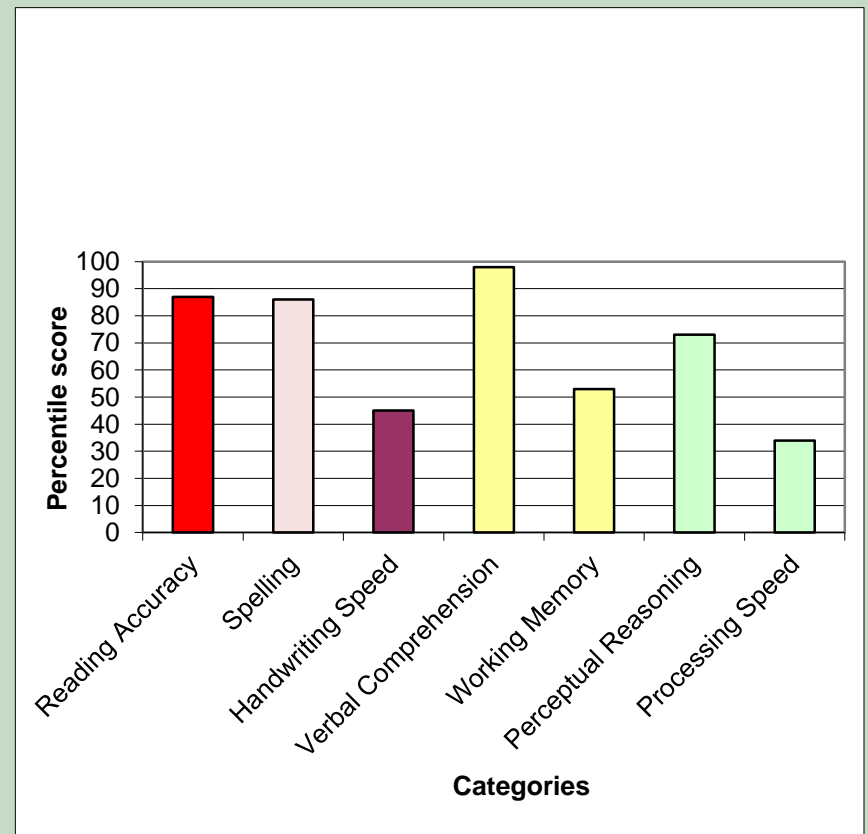
- High IQ, average Verbal Comprehension standard score of 124. Over 90% in HE.
- Equal numbers of males/females.
- About 50% Inattentive presentation.
- **Cautionary note: WM & PS deficits vary significantly across individuals: they are not core deficits**

# ADHD & DCD comparison

ADHD N = 65



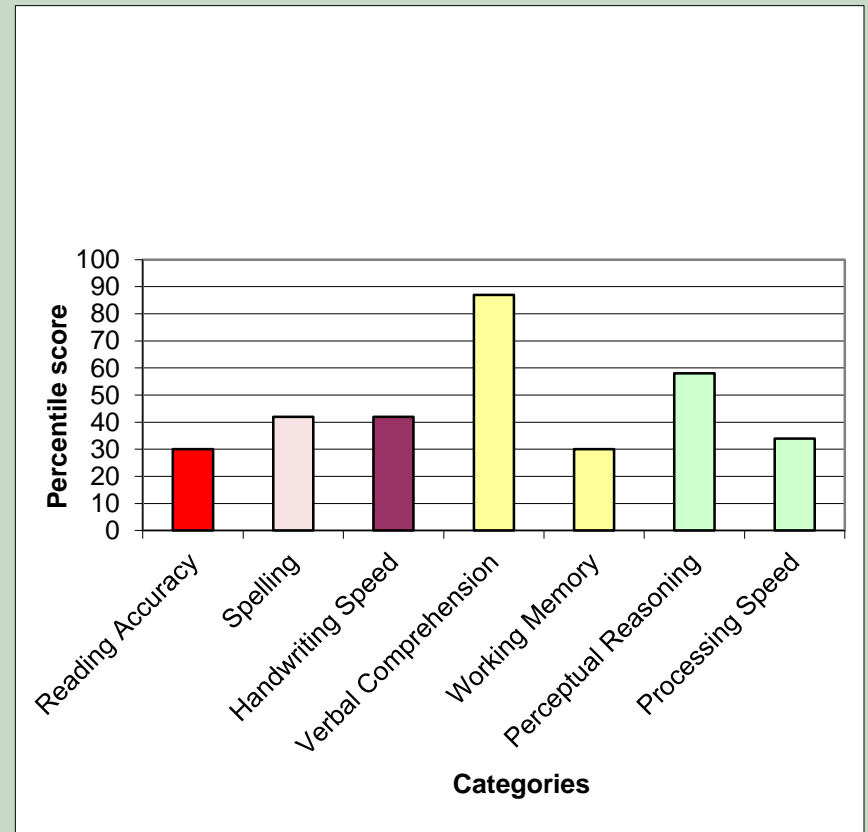
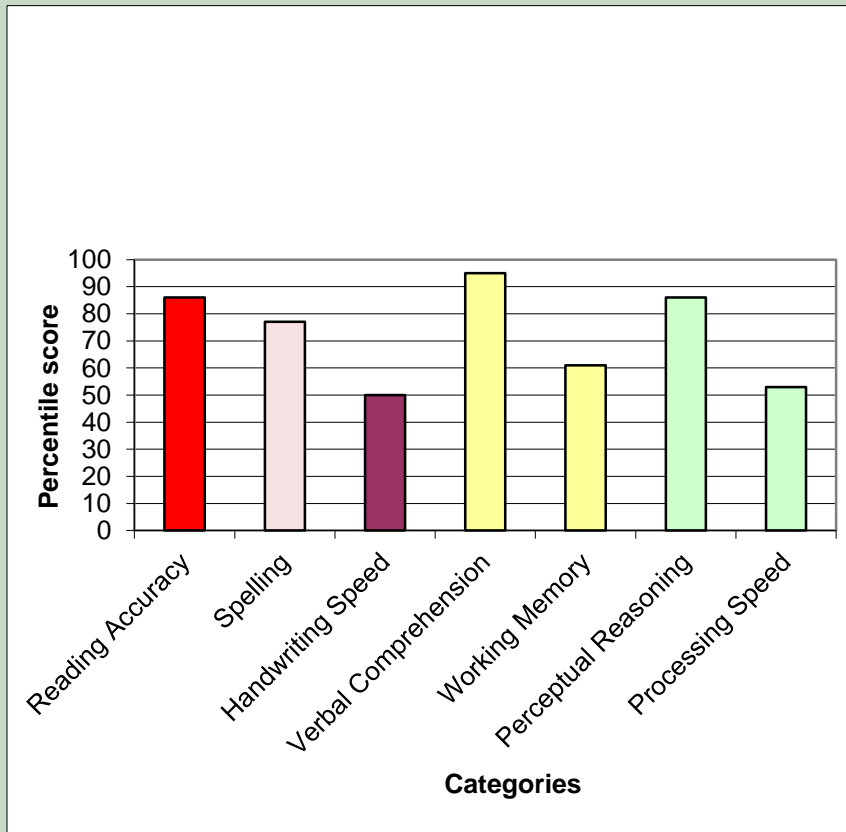
Dyspraxia N = 40



# ADHD & Dyslexia Comparison

ADHD N = 65

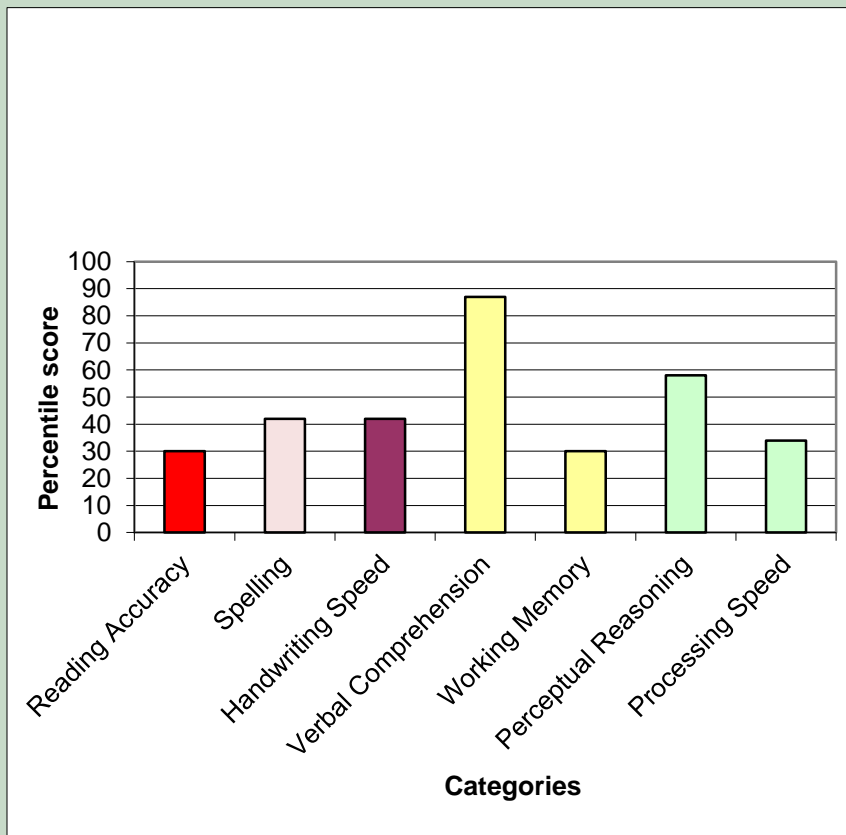
Dyslexia N = 20



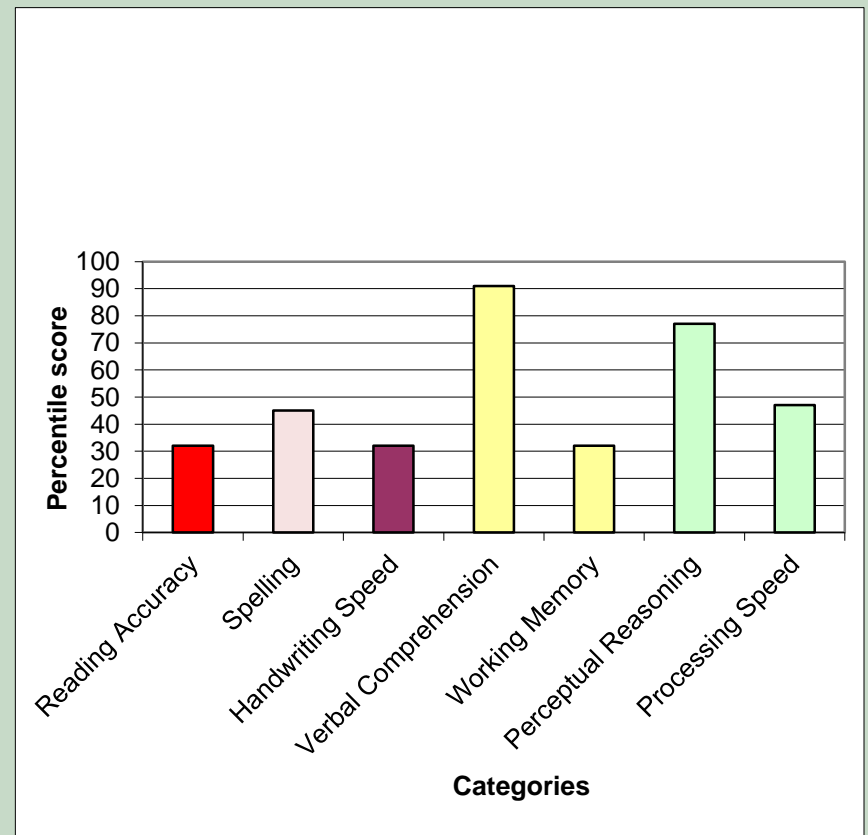


# Dyslexia with and without ADHD

## Dyslexia (10m 10f)

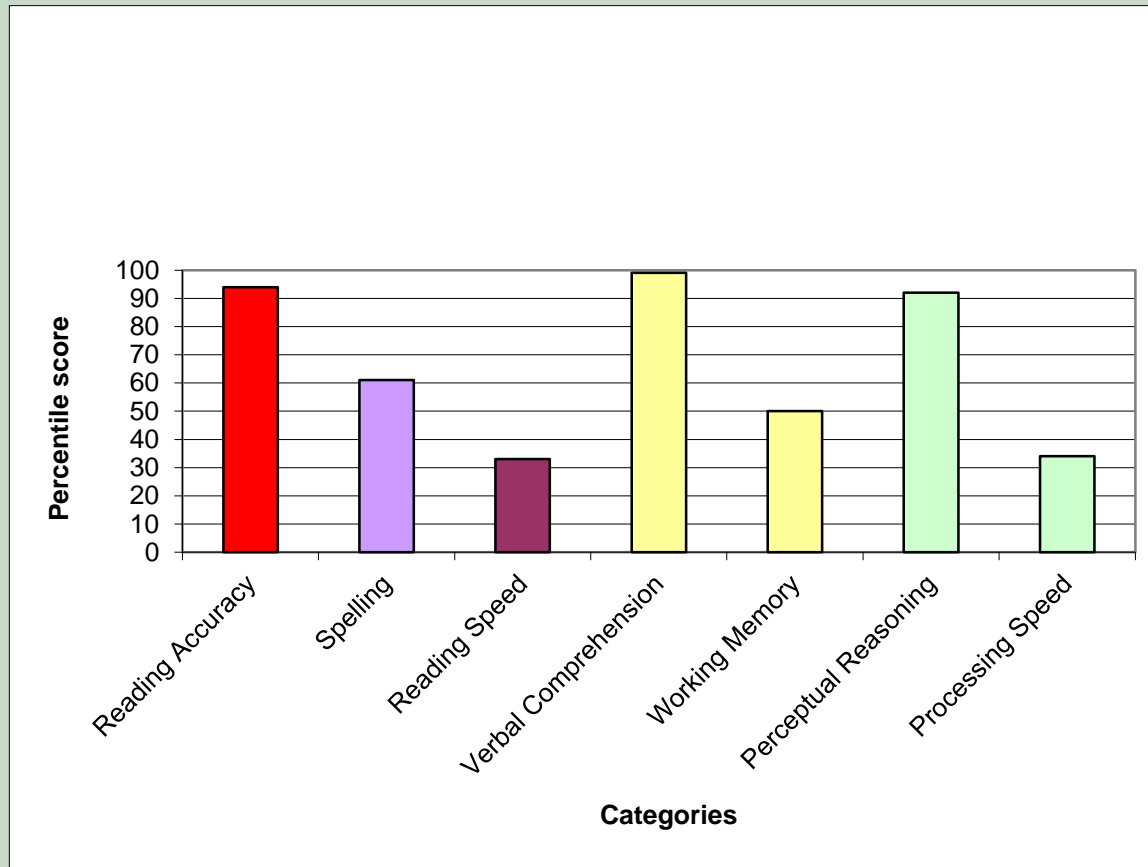


## Dyslexia + ADHD (10m 10f)

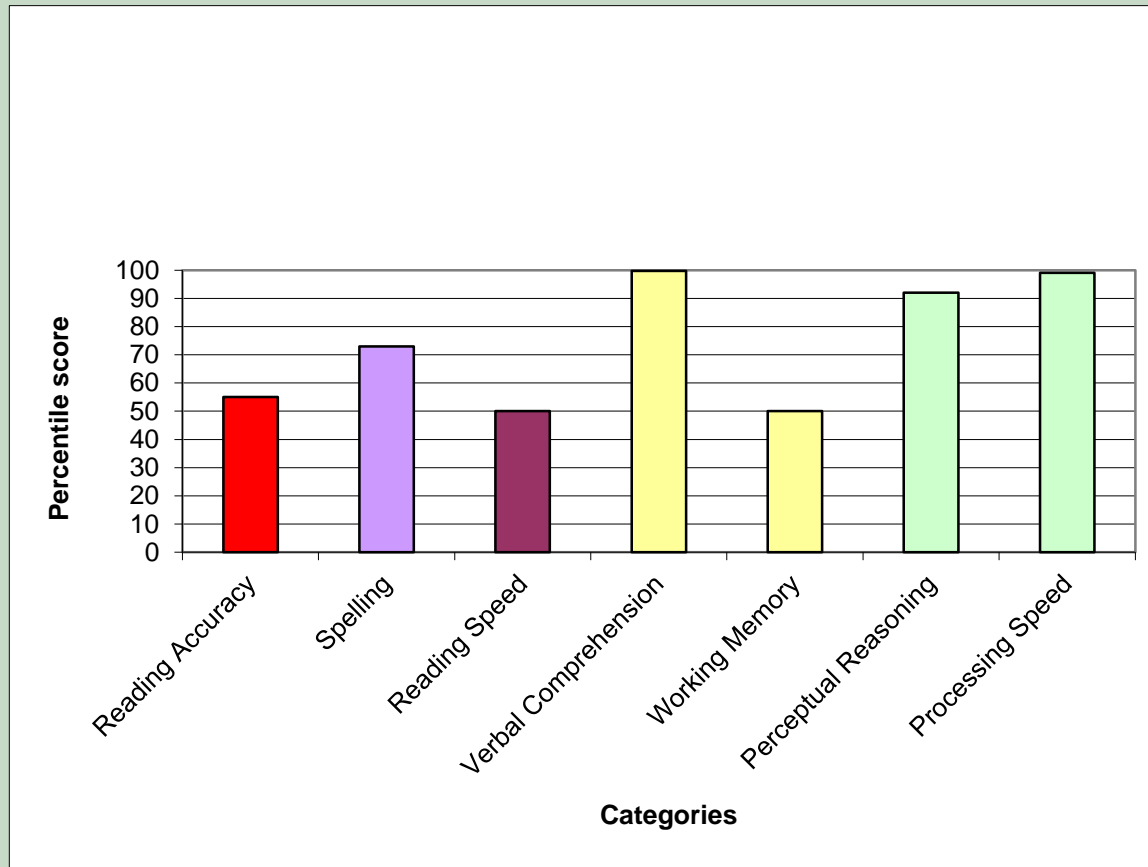


# Medication

Neurocognitive profile appears to be stable



**Male student with psychiatric diagnosis of ADHD**  
Commenced medication just prior to SpLD diagnosis



## **Male student with a psychiatric diagnosis of ADHD**

Dyslexia also present. SpLD diagnosis undertaken after student has been taking Concerta for 2 months

# Commonality Implications 1

Diagnosis is fundamentally dependent on the taking of a detailed development history for there is no one standardised test for adult ADHD, Dyslexia, DCD or Maths Impairment

# Commonality Implications 2

- Similar educational difficulties reported, such as slowness in reading for comprehension,
- Brown et al, 2011 advise: *‘Allowing extended time for adolescents with ADHD to complete tests involving reading may help to compensate for their impairments of working memory and processing speed, allowing them to score closer to their actual verbal abilities.’*

# Commonality Implications 3

- Care needs to be taken to tease apart diagnostic features, such as reading difficulties and instances of clumsiness

# Signs of Dyslexia?

## Colin

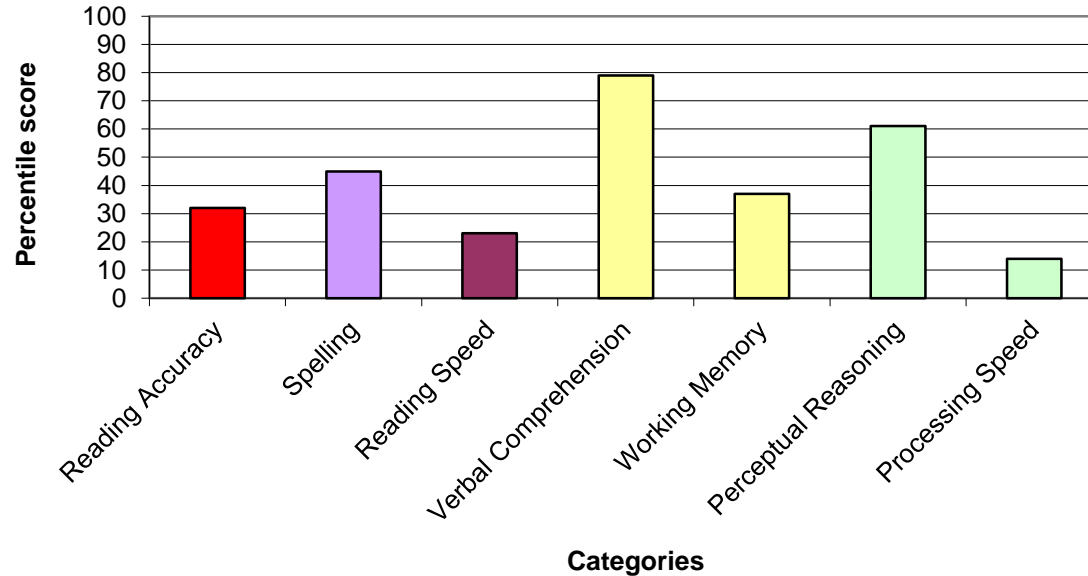
... estimated he has read fewer than five books (excluding textbooks) from cover to cover but has started 'upwards of a hundred' that he has never finished. He said it takes him 'ages to read' anything because 'I have to read [no more than] a phrase of three or four words for it to go in'.

## William

... mentioned that over the past few years he has 'tried to read more for pleasure'. In spite of this he estimated he has read 'not even ten' books (excluding textbooks) from cover to cover and has started but never finished 'about 30' others. William explained that, because reading is difficult, it is as if as soon as he begins to read he starts 'to look for a way out'.



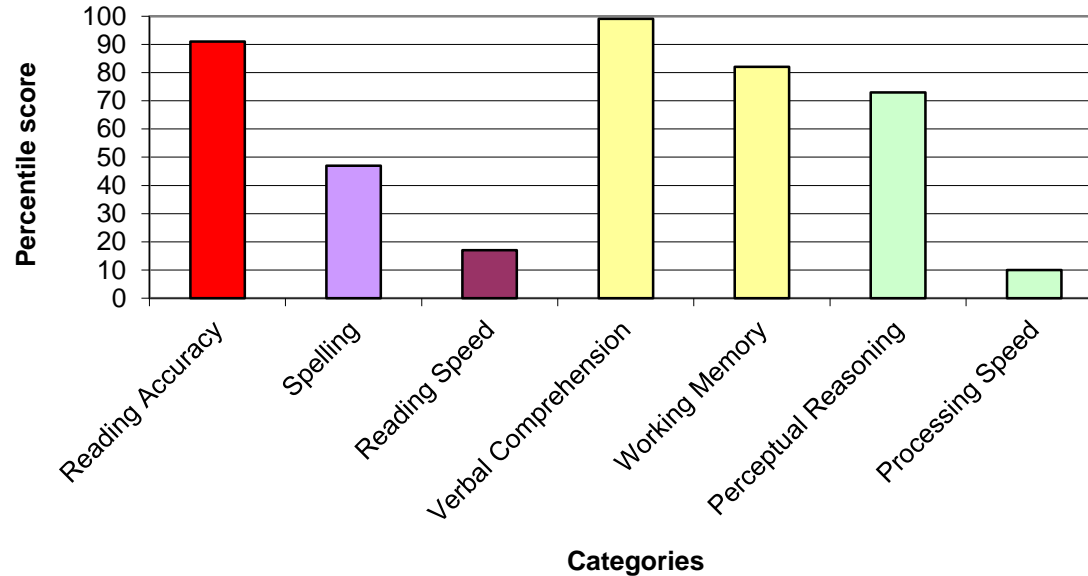
**William's Word Reading Accuracy and Spelling scores, and Reading-for-Comprehension speed, plus the 4 WAIS-IV Index scores, expressed as percentile scores**



**William**

**Typical Dyslexia Profile**

**Colin's Word Reading Accuracy and Spelling scores, and Reading-for-Comprehension speed, plus the 4 WAIS-IV Index scores, expressed as percentile scores**



**Colin**

**Diagnosis: ADHD + Dyspraxia**

# Dyspraxia or ADHD?

## David

When the different forms that clumsiness can take were explored with David he said he bumps into things, knocks things over, drops items and spills liquids.

## Betty

When the different forms that clumsiness can take were discussed with Betty, she said she sometimes bumps into things (especially with her hips and shoulders), knocks things over and 'drops things a lot'.

# David

- ...his father recalled David as being 'good at assembling things from early on'.
- He has always enjoyed sports and football is his favourite sport.
- When asked whether he is a restless kind of person he replied he is. He has found that after engaging in a sports activity, or after working out in a gym, he experiences a period of feeling at peace.
- David recalled being 'fine' at learning handwriting skills and was 'very determined to make it neat'.

# Betty

- Betty enjoyed gymnastics, dance and acrobatics at school. She was 'always good at PE and gymnastics' but had problem remembering dance routines. She has always been restless and recalled spending several hours each day as a teenager dancing at home. She found that doing this calmed her down. Betty also pointed out that her dancing is 'powered by emotion'.

# Features of Co-occurrence

for bouts of depression

for synaesthesia

Frequency of both varies with SpLDs

<b>Diagnosis</b>	<b>N</b>	<b>% reporting bouts of depression</b>	<b>Male/Female comparisons</b>
<b>Dyslexia</b>	94	<b>10%</b>	<b>10% vs 10%</b>
<b>Dyspraxia</b>	35	<b>22%</b>	<b>41% vs 8%</b>
<b>ADHD</b>	79	<b>41%</b>	<b>33% vs 50%</b>
<b>ADHD plus Dyslexia</b>	33	<b>24%</b>	<b>30% vs 14%</b>
<b>ADHD plus Dyspraxia</b>	43	<b>61%</b>	<b>64% vs 59%</b>
<b>ADHD plus other SpLDs</b>	11	<b>36%</b>	<b>33% vs 40%</b>

<b>Dyslexia</b>	<b>94</b>	<b>9%</b>
<b>Dyspraxia</b>	<b>35</b>	<b>14%</b>
<b>ADHD</b>	<b>79</b>	<b>17%</b>
<b>ADHD plus Dyslexia</b>	<b>33</b>	<b>18%</b>
<b>ADHD plus Dyspraxia</b>	<b>43</b>	<b>37%</b>
<b>ADHD plus other SpLDs</b>	<b>11</b>	<b>27%</b>

## **Frequency of synaesthesia by SpLD**



# Example of music synaesthesia

- ‘With regards to colour and music – I’ve always seen music in colour. It tends to be the timbre, register or texture of the music that most effects what colours I’ll see. Debussy, for example, often uses textures that seem to me to be blues and purples. Perhaps this is also influenced by the themes of his music, such as water and clouds, as Elgar’s Pomp and Circumstance for example I would describe as having richer colours like reds and yellows. ...’

# Sensory overload

- She finds many words evoke strong associations, which include mental pictures, emotions and textures. *Giraffe* triggered an image of black and yellow spots, *panda* is 'a really soft, furry word', *medieval* evoked a collage of images; *Tuesday* was 'grey and rubbery', *Thursday* 'furry, grey', and *Monday* 'green and it has a shape'.
- There are times when the richness of her associations results in an experience of sensory overload.



## Number/Colour Synaesthesia

# Synaesthesia & ADHD Link?

**Inhibition factor?** synaesthesia might be the consequence of disinhibited feedback in neural pathways, particularly the visual pathways including the primary visual cortex (Rich & Mattingley, 2002) This proposal is compatible with the recent report of a link between synaesthesia and enhanced cortical excitability in the primary visual cortex (Terhune *et al*, 2011)

# Synaesthesia & DCD Link?

- Synaesthetes have greater colour discrimination than control group (Yaro & Ward, 20-7)
- Linked with hypersensitivity in parvocellular pathway but at cost of reduced sensitivity in magnocellular pathway (Bannisy et al, 2012)
- Synaesthetes have reduced motion perception (Janik, 2013 – presentation in Berlin)

# Conclusion

Effective diagnostic, treatment and support for individuals with ADHD can only be undertaken within a broad spectrum approach

David Grant, September, 2014,  
ADHD 4<sup>th</sup> Congress, London

## Key References

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# Synaesthesia Illustration

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