The Royal Children's Hospital Melbourne

Centre for Community Child Health

# Children with Learning Difficulties; assessment at the health-education interface

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Professional Development Program 2015
Centre for Community Child Health
The Royal Children's Hospital Melbourne

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Excellence in clinical care, research and education
The Royal Children's Hospital Melbourne
Murdoch Childrens Research Institute
The University of Melbourne

# Prevalence

- Learning ***difficulties*** - outcome of constitutional and environmental factors, prevalence 15-20%
- Learning ***disabilities/disorder*** - neurological, prevalence 2-4%

# Definition Learning Disabilities LDAC 2002

- Refers to a number of disorders which may affect the acquisition, organisation, retention, understanding or use of verbal or nonverbal information in those with otherwise at least average abilities
- Result from impairments in processes related to perceiving, thinking, remembering or learning

# Definition dyslexia – NICHD USA 2003

- Dyslexia is a specific learning disability that is neurobiological in origin. It is characterised by difficulties with accurate and/or fluent word recognition and poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction

# DSM-5 Specific Learning Disorder

- A. Difficulties learning and using academic skills eg word reading, comprehension, spelling, written expression, number sense, mathematical reasoning
- B. Substantially below age, significant interference in performance

Specific domains in reading, written expression, mathematics

# ICD 10 Dyslexia

- Difficulty learning to read despite conventional instruction, adequate intelligence and sociocultural opportunity. It is dependent on fundamental cognitive disabilities which are frequently of constitutional origin

# History dyslexia

- 1676 – Dr Johan Schmidt –acquired word blindness in 65 yr old with stroke
- 1877 – Dr Adolf Kussman – described word blindness with intact sight, intellect and speech
- 1896 – Dr W Pringle Morgan – 14 yr old boy, concept of developmental dyslexia
- Early 1900s – Dr James Hinshelwood – unexpected difficulty in learning to read, suggested screening and special education

# Paediatric perspective LDs

- Health education interface – developmental trajectory
- Life course perspective – social gradient of health
- Contribution of cognitive, developmental, behavioural, environmental and medical factors
- Complex – chronic illness/disability
- Requires multidisciplinary focus in assessment and management

# Co morbidities

- Language delay
- ADHD, other EBPs
- ASD
- Emotional disorders
- Family dysfunction
- Medical conditions eg epilepsy, VLBW
- NB giftedness,  borderline ID

# Approach in the Community Setting

Christos Symeonides

Paediatrician

*Merri Community Health Services*

NHMRC Research Scholar

*Murdoch Children's Research Centre*

# Roles of the Paediatrician

- Medical factors in school function
  - Mental Health, General Health, Sensory & Motor, Neurodevelopmental disorders.
- Formulation - The “Big Picture”
  - Bringing together & contextualising the information (social & environmental factors)
  - Co-ordinating specialist assessment & management (where appropriate)
  - Holding & re-evaluating that working formulation
- Advocating for the child

# Medical Factors

- Mental Health
  - Depression, anxiety disorders, disruptive behaviour disorders
- General Health
  - Sleep, Chronic illness, DM, NF, Epilepsy, Fe def, Prem...
- Sensory & Motor Impairment
  - Vision & Hearing
  - Neuromuscular & Musculoskeletal disorders
- Neurodevelopment
  - ID, ASD, ADHD, Language Disorder, DCD

# The BIG picture

- School function within an ecological model
- Contextualisation of cognitive functions within the child's broader health and within their social & cultural environment


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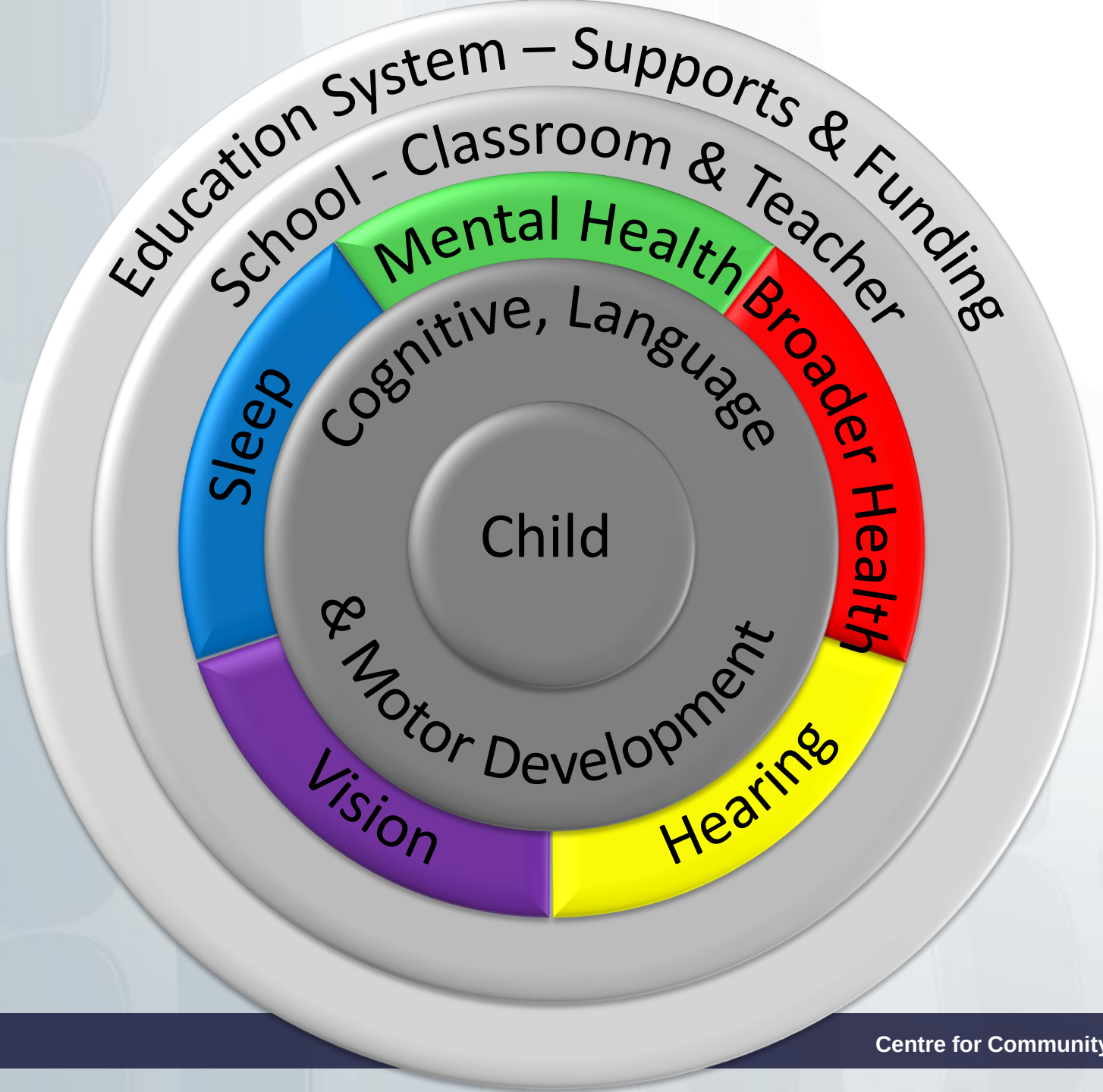


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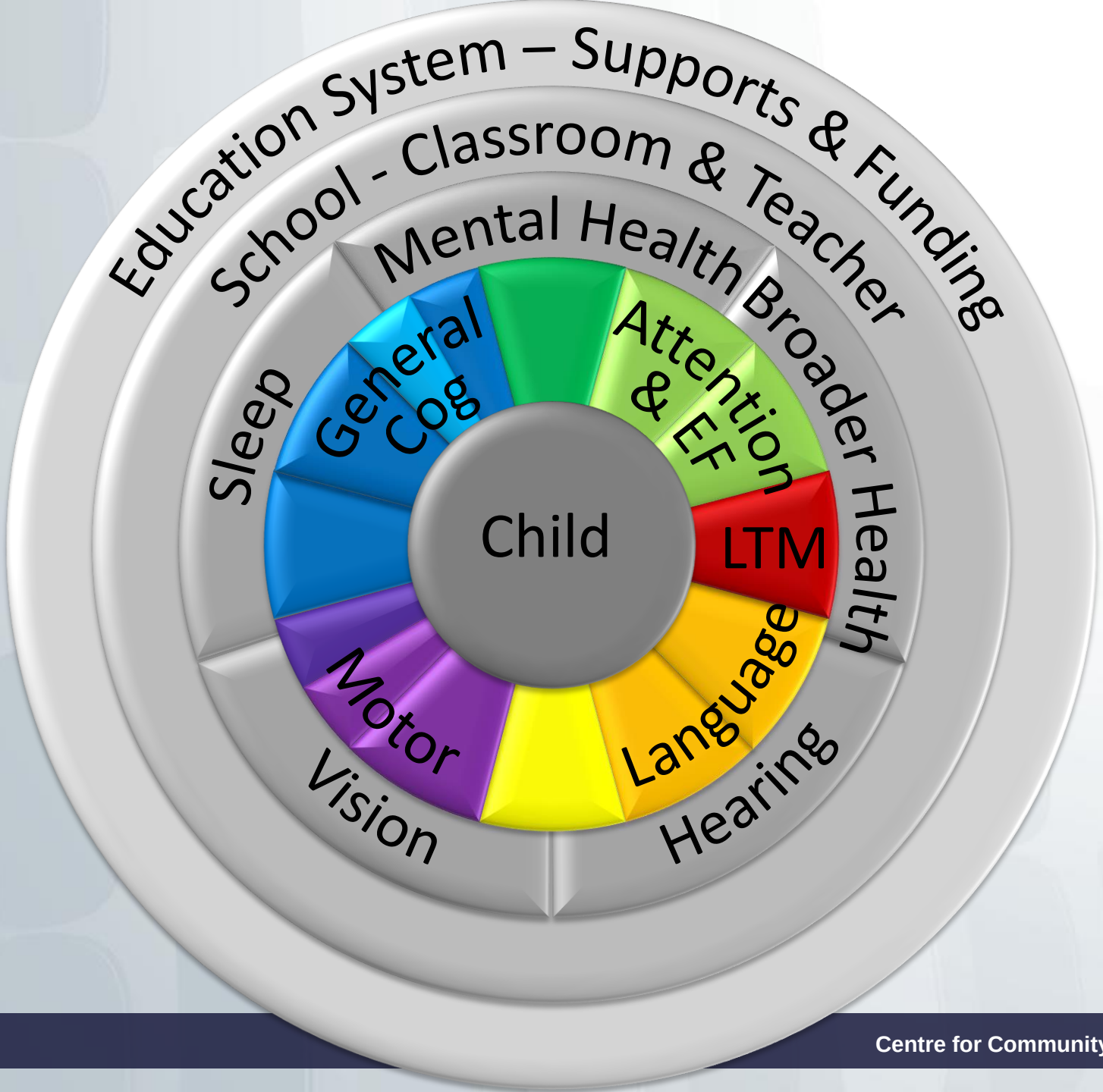
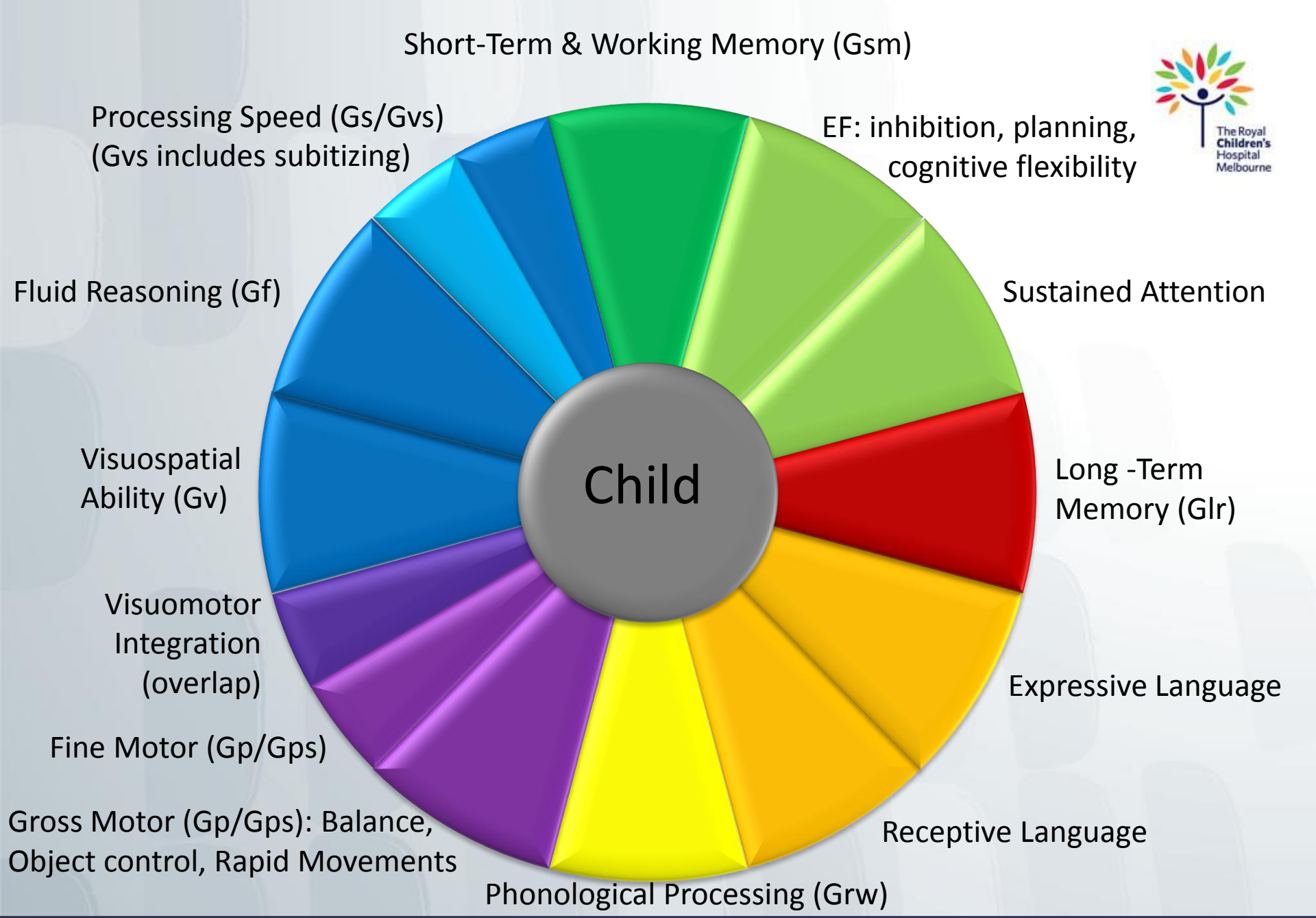

Education System – Supports & Funding
School - Classroom & Teacher
Mental Health
Broader Health
Sleep
General Cog
Attention & EF
LTM
Child
Motor
Language
Vision
Hearing


Short-Term & Working Memory (Gsm)
Processing Speed (Gs/Gvs)
(Gvs includes subitizing)
EF: inhibition, planning,
cognitive flexibility
Fluid Reasoning (Gf)
Sustained Attention
Visuospatial
Ability (Gv)
Child
Long -Term
Memory (Glr)
Visuomotor
Integration
(overlap)
Expressive Language
Fine Motor (Gp/Gps)
Gross Motor (Gp/Gps): Balance,
Object control, Rapid Movements
Receptive Language
Phonological Processing (Grw)

# Assessment in Your Rooms

## Beyond interpretation & medical factors - the role of the General Paediatrician in assessment

# Assessment in Your Rooms

- Specific Learning Disorder
  - Academic performance: school report, NAPLAN
  - General cognitive ability: school educational psychologist
  - Language ability: school speech pathologist
  - Vision & hearing: audiology & optometry
  - Mental Health
  - Attention deficit & hyperactivity
- So why have I felt the need to up-skill my own assessment skills?

# Assessment in Your Rooms

- Not all concerns are in the failing student
  - Limited availability of school-based assessment means this is targeted in-line with PSD funding
  - Low average and borderline ability
  - The gifted student
- Not all concerns are about Learning Disorder
  - Disruptive behaviour
  - Attention deficit
  - School avoidance
  - Developmental assessment of the late-preschool child
  - DHHS

# Assessment in Your Rooms

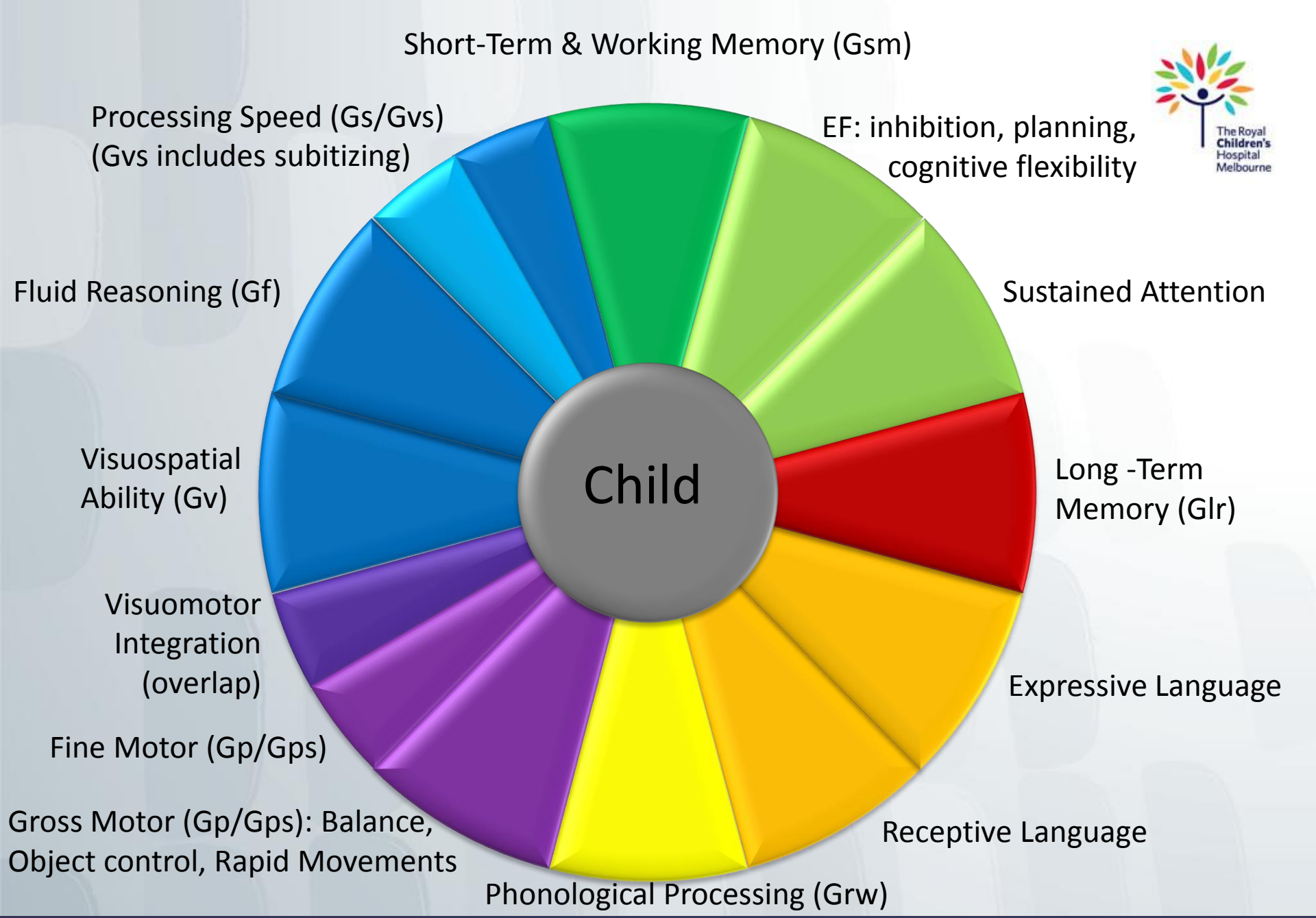
- The broader formulation
  - Importance of identifying (relative) strengths: . teaching to strengths, self-esteem
  - Co-morbidity the rule not the exception
- Domains of interest beyond school-based assessment
  - Cognitive – specific cognitive abilities e.g. Working Memory and Executive Function
  - Language/Literacy – phonological processing
  - Motor

# Assessment in Your Rooms

- What the General Paediatrician brings to assessment
  - “Expert generalists” in child development
  - Comfortable with managing uncertainty in assessments & building working formulations
  - Holistic approach
  - The advantage of follow-up
  - Time and response to supports as valid diagnostic information

# Assessment in Your Rooms

- Relevance
  - The domain, age & part of the normal curve that you are interest in
- Reliability & Validity
- Practical Considerations
  - Time, storage of equipment, cost
- Expertise required
  - Personal experience and opportunity for training
  - Tools reserved for specialists best left to specialists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# Summary

- Roles of the paediatrician in assessment in the health-education interface.
  - There are medical & biological issues which we have a unique responsibility to identify & manage within any team.
  - Bringing together a holistic view of the child in a formulation
  - Advocacy
- School function understood within an ecological model
- Assessment in your rooms
  - Key differences in purpose, administration & interpretation from more formal assessments by our specialist colleagues
  - An extension of the developmental assessment that is routine in younger years & some tools to support this.

# Psychology and learning difficulties

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# Do I need to refer for further assessment?

- Step 1: rule out other causes: sensory, emotional, intellectual, environmental

If LD can’t be explained by another cause

- Step 2: Further assessment

# What further assessment should I recommend?

- Psychologist
  - Intellectual assessment
  - Academic assessment*
  - Memory, executive functioning, attention
- Speech pathologist
  - Speech and language assessment
  - Phonological awareness*
- Which one depends on paediatrician's hypothesis (clinical algorithm)

# What will the psychologist do?

- Observation, interview, intellectual assessment & academic assessment

for **formulation** and **differential diagnosis**

- Learning disorder
- Language disorder
- Intellectual disability/low general abilities

and **management recommendations**

# Test theory 101

- **Reliability** - stable and consistent results
  - Test-retest: same test, different times, ame group
  - Parallel forms: different version, same group
  - Inter-rater: different raters/judges on same answers
  - Internal consistency: different items, same construct

# Test theory 101

- **Validity**- how well a test measures what it claims to measure
  - Face: measure appears to be assessing the intended construct
  - Construct: actually measures the intended construct
  - Concurrent: relationship with other tests & performance within special (clinical) groups
  - Predictive (rarely available): longitudinal

# Test administration

Important that all people are tested under same conditions; exact guidelines exist regarding

- wording of questions
- instructions given
- order of administration of items/tasks
- rules for pass/fail on an item
- discontinuation rules

= Standardised testing

# What will the psychologist do?

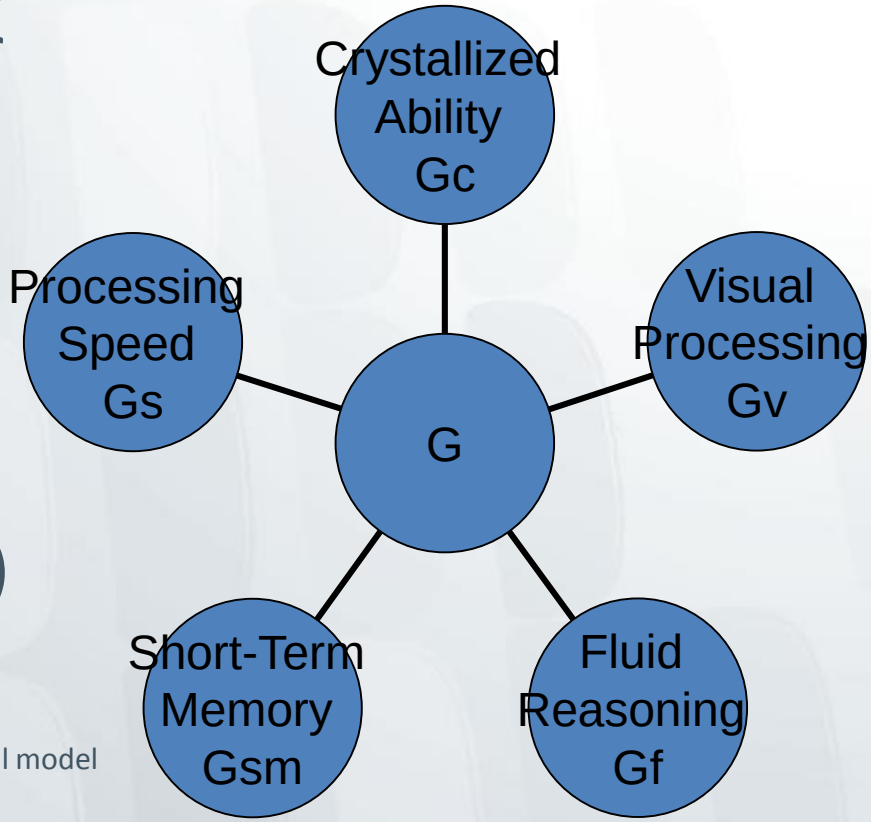
At a minimum

- Intellectual assessment
- Academic assessment
- Behavioural, emotional, social assessment

# Intellectual assessments

Currently, intelligence viewed as having a hierarchical structure, composed of specific abilities that cluster into higher-order domains:

- Crystallized Ability (Gc)
- Visual Processing (Gv)
- Fluid Reasoning (Gf)
- Short-Term Memory (Gsm)
- Processing Speed (Gs)




Cattell-Horn-Carroll model

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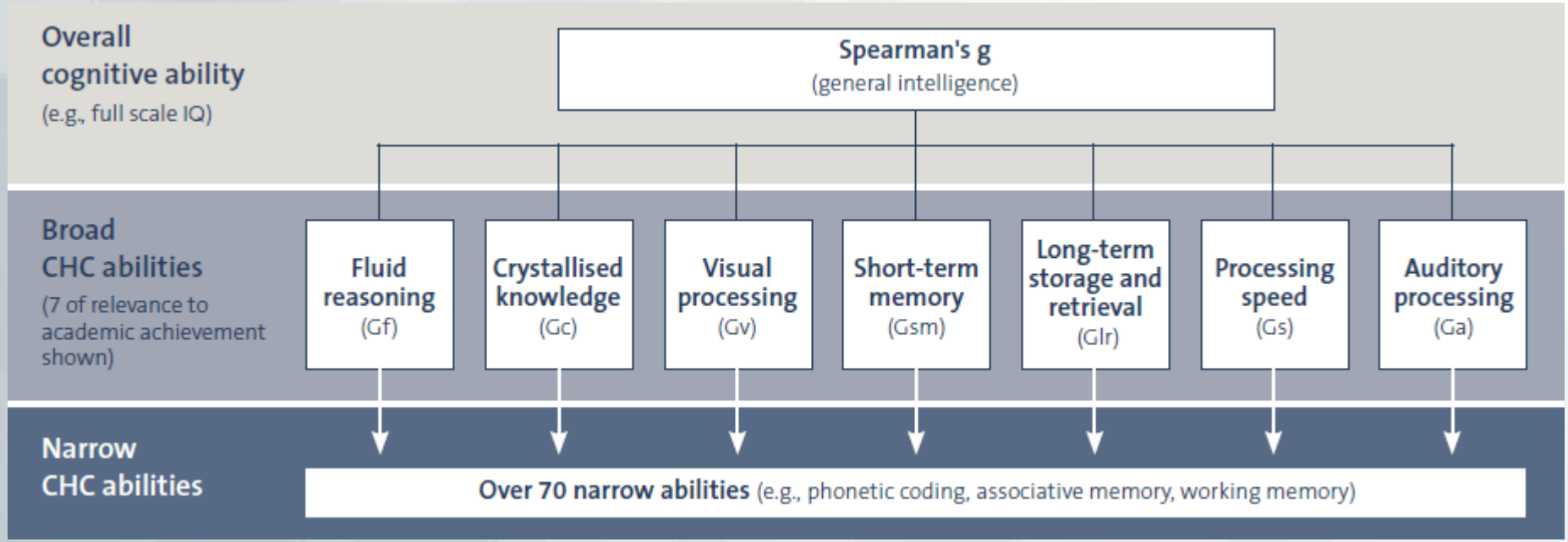
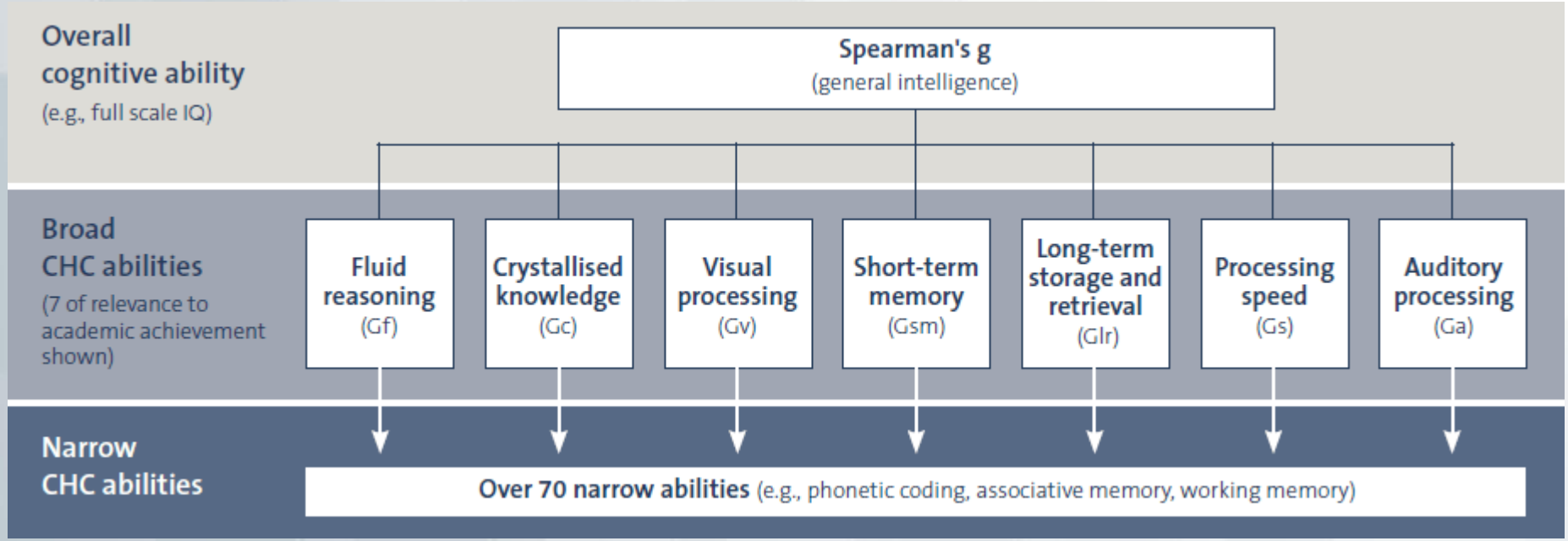


# Cattell-Horn-Carroll model




Note: CHC – XBA profiles are not effective for determining which treatment will be efficacious – no point testing for testings' sake

# Intellectual assessments

## Full

- Wechsler Intelligence Scale for Children – 4th ed (WISC-IV)
- Wechsler Preschool and Primary Scale of Intelligence – 4th ed (WPPSI-IV)
- Stanford Binet Intelligence Scale: Fifth Edition (SB5)

## Non-verbal

- Wechsler Non-Verbal (WNV)

## Brief/Screening

- Wechsler Abbreviated Scale of Intelligence – 2nd ed (WASI-II)
- Kaufman Brief Intelligence Test, Second Edition (KBIT-2)

# What does this cognitive assessment report mean?

WISC-IV Indexes

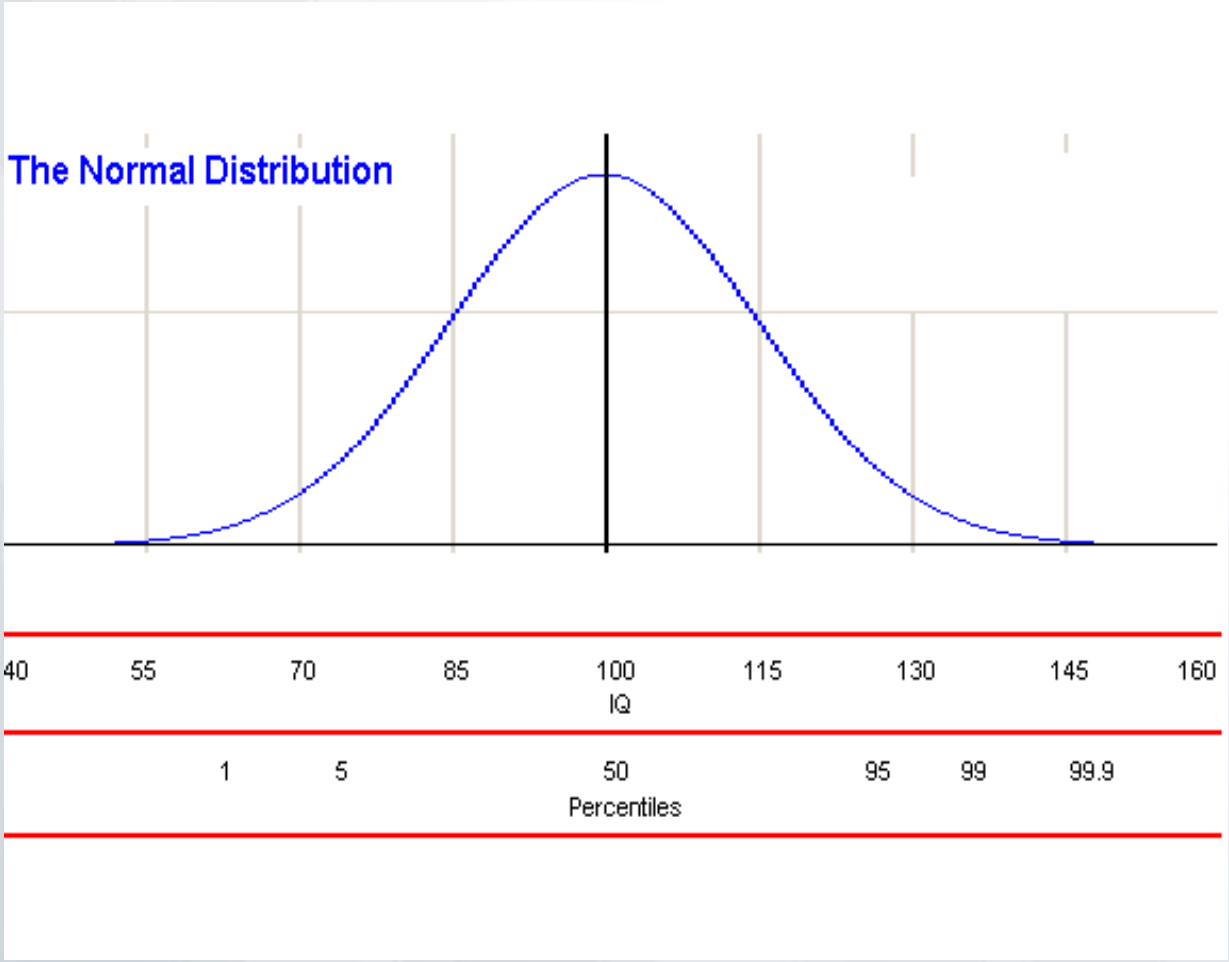
- Full Scale IQ (FSIQ)
- Verbal (VCI)
- Visual (PRI)
- Working Memory (WMI)
- Processing Speed (PSI)
- [GAI, CPI]

# DESCRIPTIONS OF IQ SCORES – Normative Comparisons

| Score | Classification | Percentiles |
|---|---|---|
| ≥130 | Gifted | ≥ 97 |
| 120-129 | Well above average | 91 - 96 |
| 111-119 | Above/High average | 76 - 90 |
| 90-110 | Average | 25 - 75 |
| 81-89 | Low Average | 10 - 24 |
| 71-80 | Well below average* | 3 - 9 |
| ≤70 | Extremely low | ≤ 2 |

*aka *Borderline*

# Normal Distribution



# Why can’t I have the scores?

?

# Why can’t I have the IQ scores?

- Confidence intervals
- Over-assignment of meaning of any single score
- All scores are estimates

# How can a child whose index scores are all in the borderline range be in the ID range on the FSIQ?

?

# Rules of thumb

- WISC-IV VCI and WMI both low?

  Language disorder
- WISC-IV VCI OK and WMI low?

  Reading disorder

# When is it a learning disorder and when is it not?

## DSM-5 *Specific learning disorder*

A. Difficulties learning and using academic skills eg word reading, comprehension, spelling, written expression, number sense, mathematical reasoning

B. Substantially below age, significant interference in performance

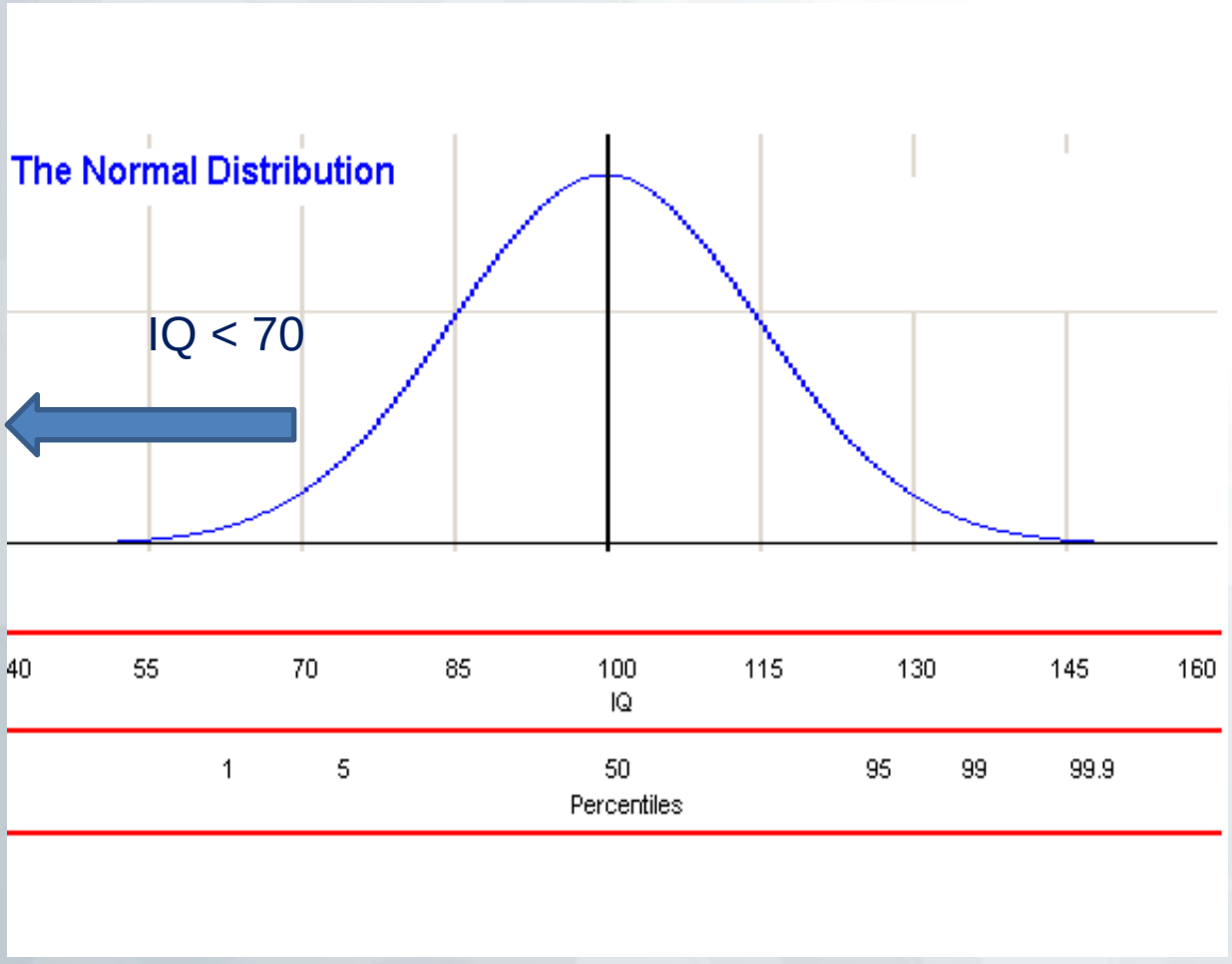
## ICD-10 *Specific developmental disorders of scholastic skills*

Normal patterns of skill acquisition are disturbed from the early stages of development

# When is it a learning disorder and when is it not?

- DSM-5 does not require a discrepancy between IQ and academic achievement
- What if IQ is actually low? Is it still a learning disorder?

# IQ < 70 with any reading score



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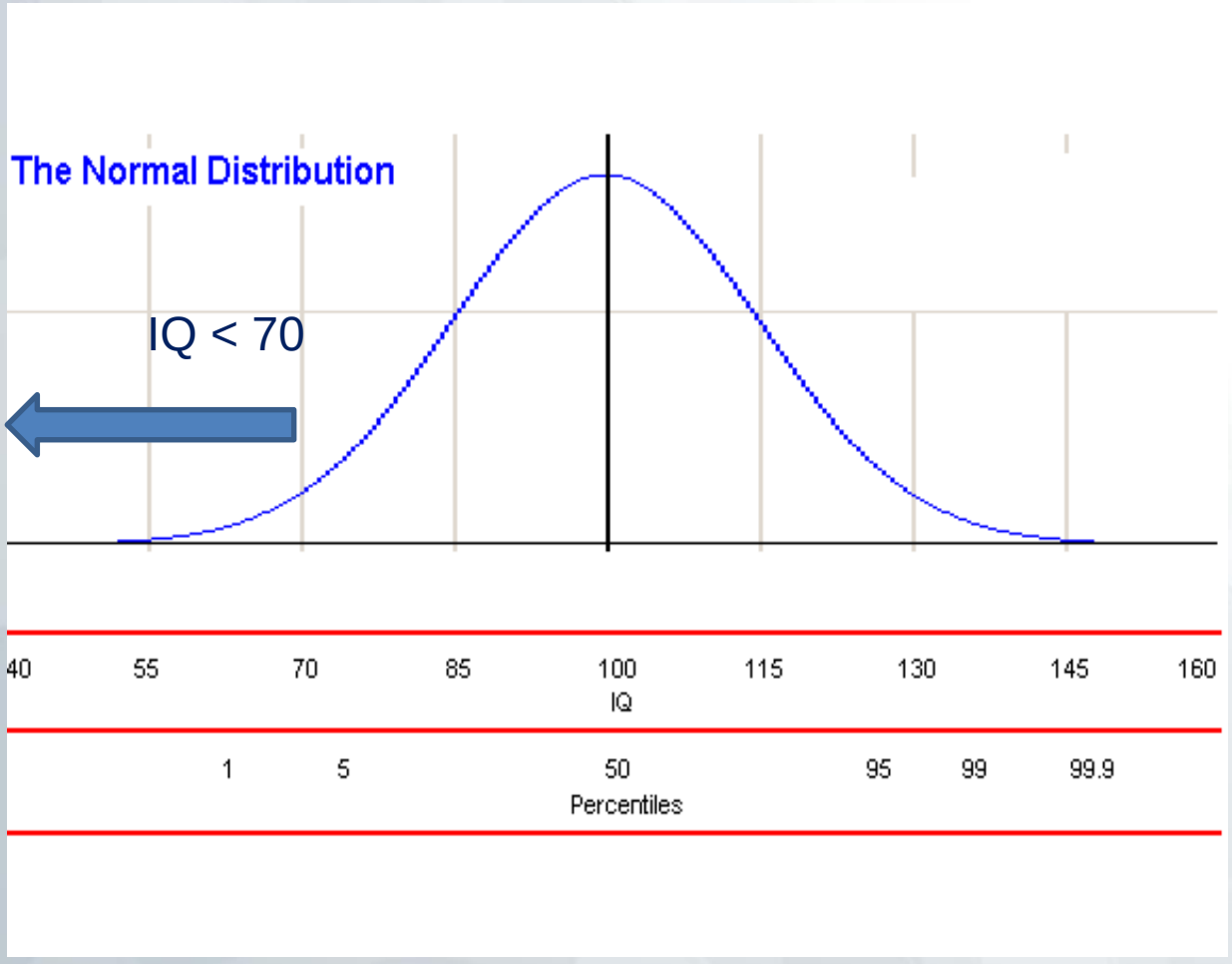
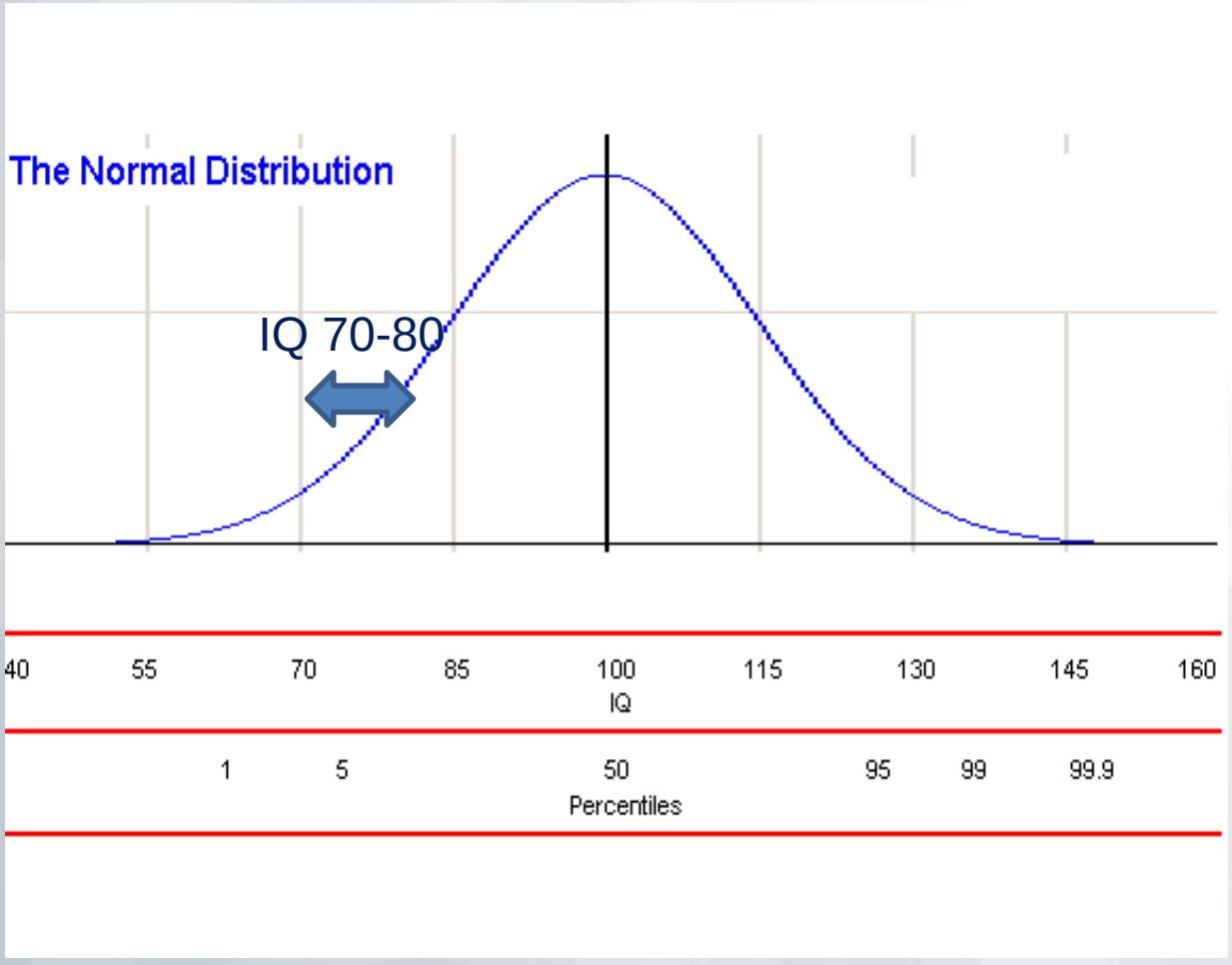



This is ID, not a learning disorder

✓ DSM-V

# IQ >2nd & < 10th percentile



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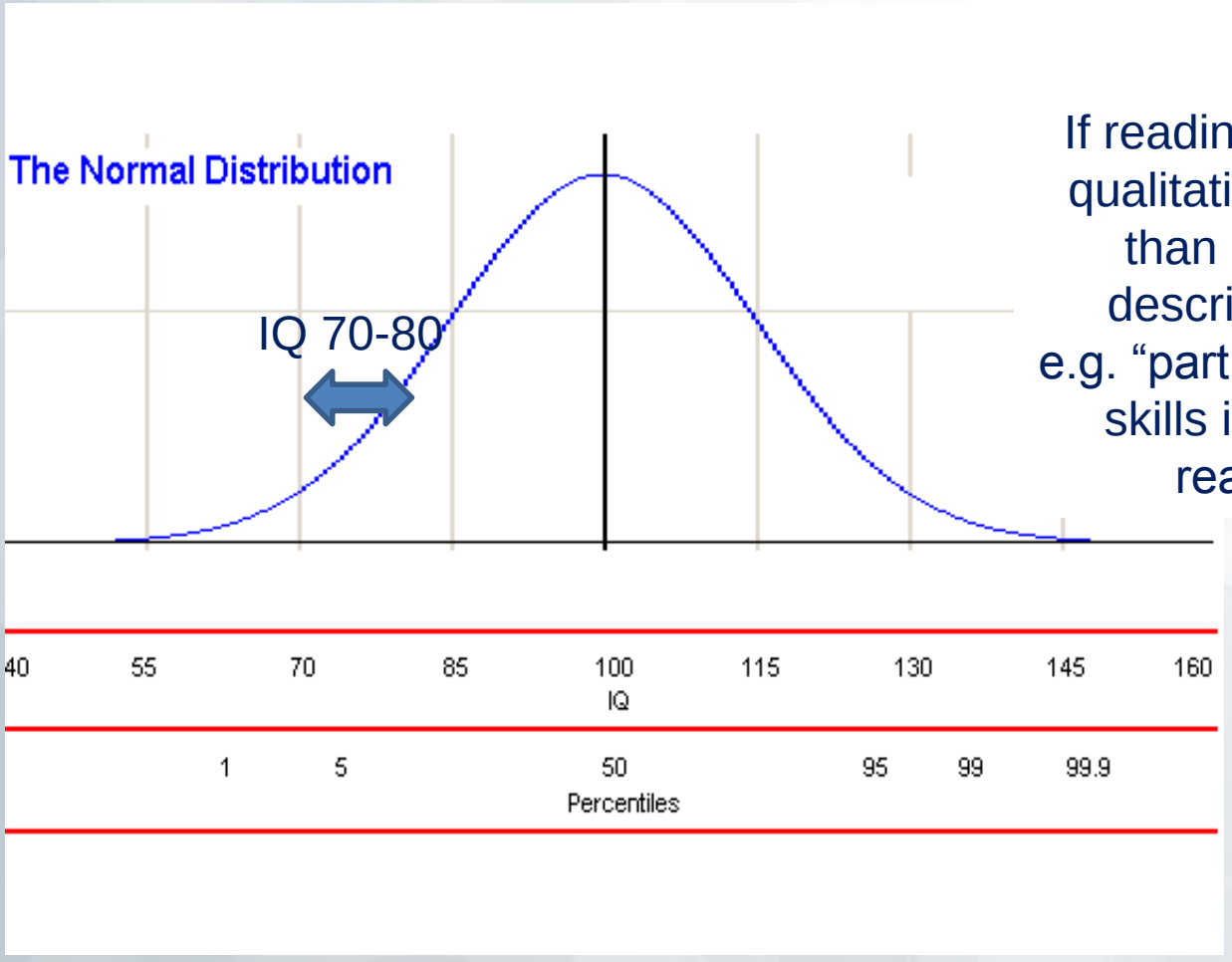
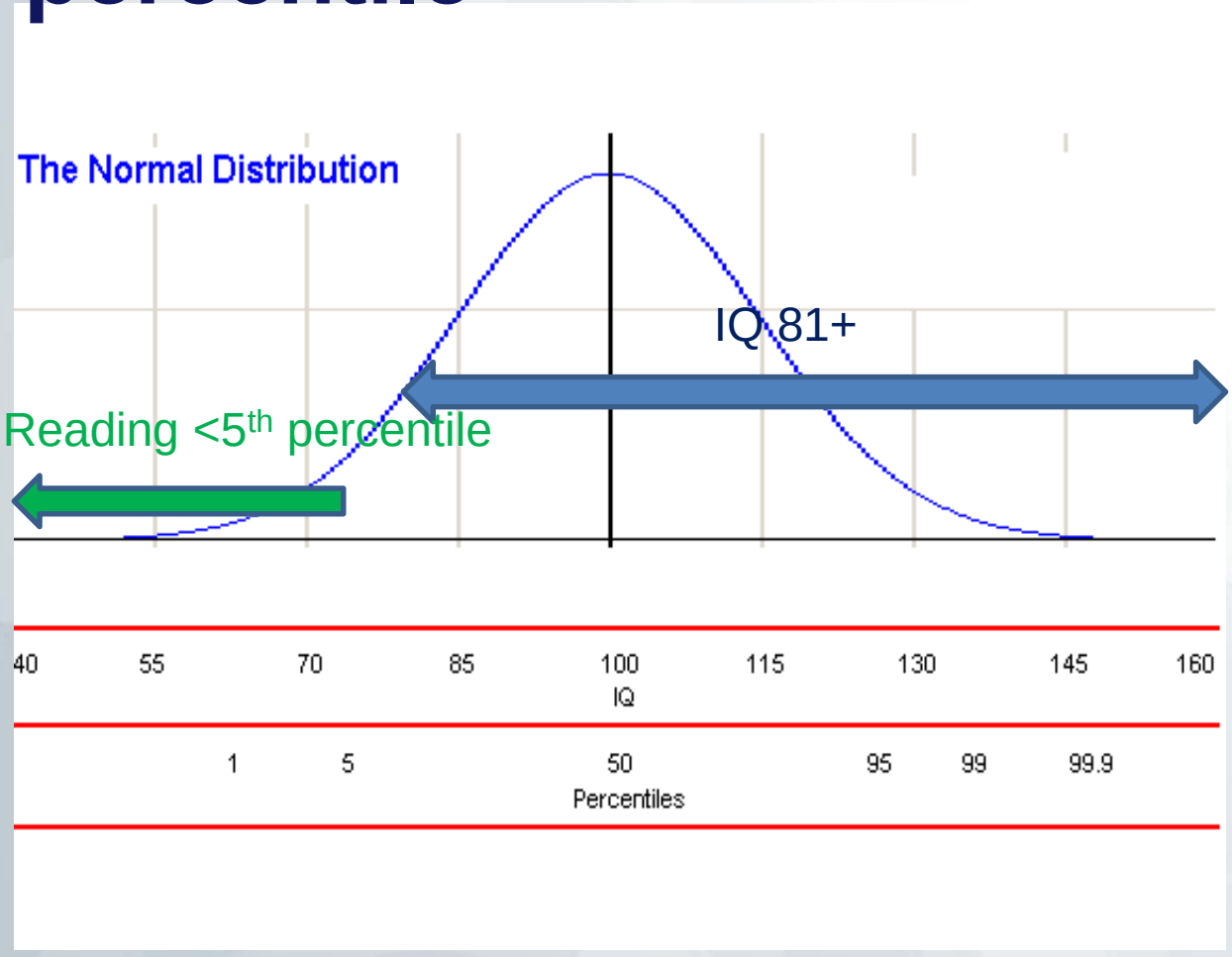



If reading skills are qualitatively worse than IQ, then describe these e.g. “particularly poor skills in area of reading”

This is low intellectual abilities, not a learning disorder

× DSM-V

# IQ ≥10th percentile, reading skills <5th percentile




This is a learning disorder (reading)

# Theoretical models of reading difficulties

- Dual model (Coltheart et al 2001)
  - Processing of known words
  - Processing of unknown words

# Components of reading processes

- Difficulties can arise in multiple areas
  - Letter identification dyslexia (impaired identification of letter names/sounds)
  - Letter position dyslexia (letter order errors when reading aloud, definitions, word/nonword)
  - Surface dyslexia (irregular word reading impaired)
  - Phonological dyslexia (nonword reading impaired)
  - Poor comprehenders (read ok but lack understanding)
- Specific tests for each; guide intervention

# Further considerations

- WISC-IV GAI
  - a summary score that is less sensitive to the influence of working memory and processing speed; for children with neuropsychological issues such as learning disorders, Attention-Deficit/Hyperactivity Disorder, where difficulties with working memory and processing speed may result in lower FSIQ score
  - used where VCI and PRI nsd, but VCI/PRI > WMI/PSI
- WISC-IV CPI
  - represents a set of functions whose common element is the proficiency with quick visual speed and good mental control; facilitates fluid reasoning

# Discussion on report writing

# Reports

- Clear simple language
- Paint a picture of child, STRENGTHS
- Acknowledge contribution of school
- List issues and actions
- Provide info about development and learning
- Don’t tell teachers how to teach

# Using different language
# O'Keefe, McDowell JPCH 2004: 40, 252-257

**Paediatricians**

- Individual
- Biology, family genetics, environment
- Developmental patterns
- Continuum, threshold of disorder
- How children learn

**Teachers**

- Child class/ school
- Family input, pressure
- Skill patterns
- Categories of disorder, NB funding
- How to teach children

# Management of learning difficulties

- Description of strengths and weaknesses rather than labels
- Interpret developmental findings  so can plan educational strategies
- Diagnosis where may be eligible for special resources
- Interpret biomedical findings
- Investigations as required eg audiology, genetics, EEG

# Management cont'd

- Specific management of comorbidities eg ADHD and medication
- Discuss CAM
- Provide parent and teacher information handouts
- Learn education system resources, DET, CEO, ISA
- Learn community resources eg remedial programs, tuition, CAL

# Learning difficulties matter

- High prevalence, long term consequences, need data and surveillance
- Prevention (early literacy)
- Early recognition and effective intervention
- Opportunity for advocacy at health – education interface

# “The Chaos” by Gerard Nolst Trenite (1870-1946)

Dearest *creature* in *creation*

Studying English pronunciation

I will teach you in my *verse*

Sounds like *corpse, corps, horse* and *worse*

- - - - - - - - - - - - - - - - - - - - - -

Finally, which rhymes with *enough,*

*Through, though, bough, cough, hough, sough, tough??*

*Hiccough* has the sound of cup…

My advice is: GIVE IT UP!