


Albert Anker, 1862. The school exam



Developmental Dyslexia

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Lecture 6, 29.10.2020

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Roadmap for today's lecture

- What is developmental dyslexia
 - History
 - Symptomatology
 - Definitions
- Underlying causes of dyslexia
 - Causal theories
 - Interventions for remediation
 - A miracle cure for dyslexia?

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Learning outcomes

1. Define developmental dyslexia
2. Describe common behavioral difficulties experienced by dyslexic individuals
3. Critically discuss the claim that IQ should feature in the definition of developmental dyslexia

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In Lecture 5...

Children who can listen and speak well, yet have difficulty learning to read/spell

Language comprehension processes

Word recognition processes

GOOD

POOR

A B

C D

Good word recognition, good language comprehension

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How does developmental dyslexia manifest?

- **Poor reading & spelling**
- Impaired phonological processing
 - Poor phonological awareness
 - Rapid naming
 - Impaired verbal short-term memory
 - Slow verbal processing speed

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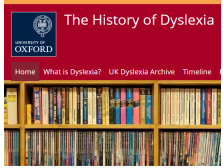
How does developmental dyslexia manifest?

- Directional confusion
- Messy handwriting
- Finger differentiation problems
- Visual difficulties (e.g., tracking text)
- Difficulties with mental arithmetic, remembering sequences etc.
- Motor dysfunction (e.g., poor balance)

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A brief history of developmental dyslexia






- The UK Dyslexia archive project
- Collaboration between history, psychology, geography. Based at St John's College and the Faculty of History, University of Oxford
- Maggie Showling, William Whyte, Kate Nation, Kieran Fitzpatrick, Philip Kirby, Robert Evans, Denise Cripps
- Collection includes patient files of the Word Blind Centre, files of the BDA etc.
- Oral histories with dyslexia pioneers and others key to the story of dyslexia

Welcome
Welcome to *The History of Dyslexia*, a project tracing the origins of dysgraphia in the late 18th century, to its present widespread and hard-fought pioneers and researchers of dyslexia who got us where we are today.

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A brief history of developmental dyslexia

- 1878: Patients with "word blindness" (Adolph Kussmaul) 
- 1877: "Dyslexia" term coined (Rudolf Berlin) to describe similar cases 
- 1896: First case study of congenital word blindness in an "otherwise bright and intelligent child" (Pringle Morgan; Hinshelwood) 
- 1925: First 'cognitive' theory of dyslexia (Samuel Orton)

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A brief history of developmental dyslexia

- 1960-1970s
 - Further shift towards theory development
 - 1962: the Word Blind Centre, London
 - 1970: Critchley's 'Dyslexic child'
 - 1972: British Dyslexia Association
- Post 1960..
 - Increased awareness but also dyslexia seen as an 'invented disorder'





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The curse of the geniuses?




The typical media dyslexic child



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Case studies

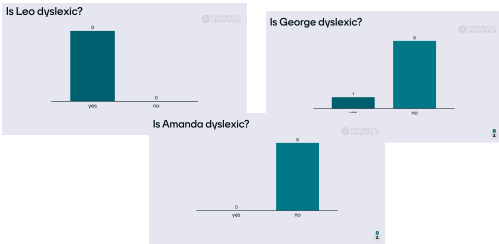
- Leo is 13-years-old boy referred to an educational psychologist for a dyslexia assessment. His assessment reveals that he is an incredibly bright boy who struggles significantly with reading and spelling.
- George is 13-years-old boy referred to an educational psychologist for a dyslexia assessment. His assessment reveals that he has average intelligence but struggles significantly with reading and spelling.
- Amanda is 13-years-old girl referred to an educational psychologist for a dyslexia assessment. Her assessment reveals that her intelligence score is below average and she struggles significantly with reading and spelling.



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Menti-meter results



Question	Yes	No
Is Leo dyslexic?	4	0
Is George dyslexic?	1	4
Is Amanda dyslexic?	0	4

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The curse of the geniuses?

- Diagnosis based on very little or anecdotal evidence (e.g., verbal reports of relatives, biographers, themselves); many alternative explanations of difficulties



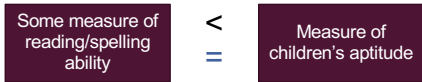
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The discrepancy definition

- Categorical model (i.e. different categories of reading disability) popular in educational classification and a requirement for identification of LD in the US until 2003

Garden variety poor reading, literacy difficulties expected on the basis of low intelligence (as well as inadequate instruction, low motivation etc.)

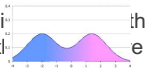


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The Isle of Wight epidemiological study

- Prospective epidemiological study by Rutter & Yule (1975): Tested the entire 9-year-old population of Isle of Wight (n= 2300)
- Noted statistically visible "hump" in the lower tail of the distribution of reading ability (i.e., bimodal distribution model of reading ability)
- Taken as evidence that IQ differentiation "specific reading retardation" from the "general backwards readers"



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Are these children meaningfully different?

1. Criticism to Rutter and Yule - children with intellectual disability and brain injury were included in 'backwards readers' groups
2. Normal distributional characteristics in other epidemiological studies
 - The Connecticut Longitudinal Study (Shaywitz et al. 1992): American children (n=400) attending kindergarten in 1983 followed to 11 yrs of age
 - Similar findings from New Zealand (Silva, McGee, & Williams (1985) and Jorm, Share, Matthews, & Matthews (1986)

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Are these children meaningfully different?

- Francis et al. (1996): No evidence of different prognosis for reading problems of "bright and otherwise capable youngsters" from those less able to cope with school
- Francis et al. (2005): Discrepancy definitions prove unstable over time
 - Shown in 'favourably' simulated data (i.e. assuming high reliability and stability in IQ and discrepancy) as well as data from the Connecticut Longitudinal Study
 - e.g., Children diagnosed at Grade 3 as IQ discrepant AND low achieving move to the low-achieving only group (19%) and typically achieving group (22%) at Grade 5


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Are these children meaningfully different?

- Meta-analysis of 19 studies (Hoskyn & Swanson, 2000; see also Stuebing et al. (2002) has shown similar cognitive functioning in the two groups, e.g., reading and phonological processing performance but differences in e.g. vocabulary skills
 - Suggests when differences are found, these are unrelated to critical reading problems under investigation
- Increasing evidence from intervention studies suggesting that IQ does not affect response to remediation (Vellutino, Scanlon, & Lyon, 2000)


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So what is a useful definition of dyslexia

- Dimensional view – that is, dyslexia as the 'lower tail' in the normal distribution of reading abilities
 - Appropriate when human characteristics (much like hypertension and obesity) are distributed in a statistically normal way along a continuous dimension.
 - Varying in severity from mild to severe
 - This does not diminish the seriousness of difficulties seen in dyslexia
 - Also, does not mean that high vs low poor IQ reading difficulties cannot be aetiologically different

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So what is a useful definition of dyslexia

- Disorder of neurobiological origin (not syndrome)
 - Runs in families and is more often seen in monozygotic and dizygotic twins (much like DLD)
 - Heritable variation estimated at 50-70% (Caylak, 2007; DeFries et al., 1987) resulting from combined influence of many genes (e.g., DYX1C1, ROBO1, DCDC2, KIAA0319)
 - Although how these genes interact to cause differences in brain structure/function is not yet understood
 - Genetic - environmental risk factors interact reciprocally

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Core & recommended reading

- Hulme C., & Snowling M. J. (2014). The interface between spoken and written language: developmental disorders. *Phil. Trans. R. Soc. B* 369, 20120395.
- Vellutino, F. R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M. (2004). Specific reading disability (dyslexia): What have we learned in the past four decades? *Journal of Child Psychology and Psychiatry*, 45, 2-40.
- Grigorenko (2001). Developmental dyslexia: An update on genes, brains, and environment. *Journal of Child Psychology and Psychiatry*, 42, 91-125.
- Fletcher et al. (2005). Psychometric approaches to the identification of LD: IQ and achievement scores are not sufficient. *J Learn Disabil.*, 38(2), 98-108.
- Shaywitz, S. E., Escobar, M. D., Shaywitz, B. A., Fletcher, J. M., & Makuch, R. (1992). Evidence that dyslexia may represent the lower tail of a normal distribution of reading ability. *New England Journal of Medicine*, 326, 145-150.
- Stuebing, Fletcher, LeDoux, Lyon, Shaywitz, & Shaywitz (2002). Validity of IQ-Discrepancy Classifications of Reading Disabilities: A Meta-Analysis. *American Educational Research Journal* Summer 2002, 39 (2), 469-518.
