

Dyslexia

Experts agree that dyslexia is a developmental difficulty of language learning and cognition and that professional expertise should be developed in identifying dyslexia and developing effective ways to help learners overcome its effects.

The recent Rose Report (2009) identified that:

- ◆ Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling
- ◆ Characteristic features of dyslexia are difficulties in phonological awareness (ability to manipulate sounds in words), verbal memory and verbal processing speed
- ◆ It occurs across the range of intellectual abilities
- ◆ It is best thought of as a continuum rather than a distinct category and there are no clear cut off points (differing degrees)
- ◆ There is evidence from twin studies that if there is dyslexia in the family then the probability that a child will have dyslexic difficulties is increased.
- ◆ Other difficulties may also occur such as motor coordination, concentration, organisation and language
- ◆ A good indication of the severity and persistence of dyslexic difficulties can be gained by examining how the individual responds or has responded to well founded intervention

Prevalence

Recent research suggests that dyslexia may affect the literacy attainments of 4-8% of children. It has been reported that boys are more likely to have dyslexia than girls (Rutter, Caspi, Fergusson et al, 2004), however there is also some evidence that this difference in the prevalence of dyslexia between genders may be inflated due to referral bias in favour of males (Shaywitz, Shaywitz, Fletcher et al, 1990).

Possible Causes

It has often been observed that dyslexia runs in families, and evidence from family and twin studies have shown that genetic factors do play a role, and gene markers and one candidate gene have been identified to be associated with dyslexia (Hulme & Snowling, 2009). Genes do not work in isolation; environmental experiences will have an influence on the impact of genes and the severity of difficulties.

A number of theories regarding the cognitive causes of developmental dyslexia have been proposed. One popular theory postulates that individuals with dyslexia have a *phonological deficit*- an impairment in the representation, storage and/or retrieval of speech sounds. There is a great deal of evidence that supports the notion that individuals with dyslexia perform poorly on tasks that require phonological skills (Vellutino, Fletcher, Snowling et al, 2004). The

cerebellar theory postulates that a mildly dysfunctional cerebellum at a biological level may impact on motor control and automaticity, resulting in problems with speech articulation and therefore deficient phonological representations and difficulties learning grapheme-phoneme correspondences (Nicolson & Fawcett, 1990). There is some evidence that dyslexia is associated with difficulties in processing information coming in via the senses, including visual and auditory information. The *magnocellular theory* attempts to explain this by proposing an association between dyslexia and dysfunction of the magnocellular pathways (Stein & Walsh, 1997), however the finding of an auditory deficit in cases of dyslexia has not always been replicated.

The cognitive causes of dyslexia are still hotly debated and it is certainly possible that dyslexia, which is defined at the behavioural level, may have different biological and/or cognitive origins in different individuals. It is generally agreed however that individuals with dyslexia have impairments in phonological skills which can exist independently of any sensory or motor impairment, but may be accompanied by additional visual, motor or auditory disorders (Ramus, Rosen, Dakin et al, 2003).

Diagnosis and Assessment

Dyslexia has been often been defined in research as reading achievement below that expected by IQ, that is, a *discrepancy* between an individuals actual and expected reading performance. The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 2004) describes reading disorder as reading achievement below that expected given a persons age, intelligence and age-appropriate education. However, the usefulness of a discrepancy definition has been questioned, as there is a lack of evidence to suggest that children with word decoding difficulties will vary in their responsiveness to teaching according to their IQ level (Hulme & Snowling, 2009).

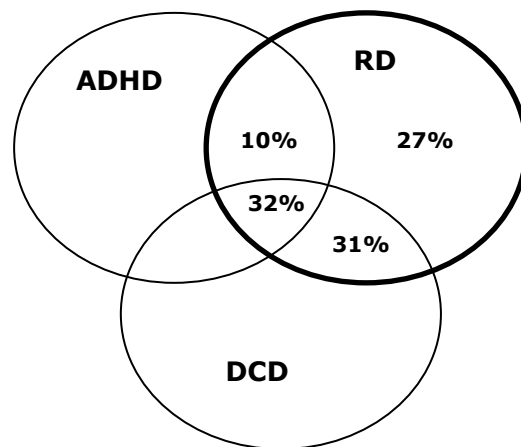
The British Psychological Society working definition of dyslexia is as follows;

"Dyslexia is evident when accurate and fluent word reading and/or spelling develops incompletely or with great difficulty. This focuses on literacy at the 'word level' and implies that the problem is severe and persistent despite appropriate learning opportunities. It provides the basis of a staged process of assessment through teaching." (British Psychological Society, 1999)

The usual assessment procedure involves a test of general intellectual abilities using standardised objective tests, to determine the adequacy of operation of other mental capacities. The results of these are also used as a baseline for evaluation of any discrepancy between that and achievement in reading, spelling or writing. Other diagnostic tests are used to investigate the bases of the errors produced and recommendations are made for treatment.

Comorbidity

Investigations conducted with individuals with dyslexia selected from both specialist clinics and from population samples have repeatedly found that the occurrence of other developmental disorders, such as DCD and ADHD, in these children and adolescents is significantly higher than that found in individuals without reading deficits (Haslum & Miles, 2007; Iversen, Berg, Ellertsen et al, 2005; Kadesjo & Gillberg, 2001; Willcutt, Pennington, Olson et al, 2007). This overlap is demonstrated by Kaplan, Wilson, Dewey et al (1998); in an investigation of the co-occurrence of reading disability, DCD and ADHD in a sample of 115 children meeting the criteria for at least one specific learning difficulty, seventy-one children in the sample met the criteria for a reading disorder. The frequency of overlap with ADHD and DCD is shown below, demonstrating that overlap of these disorder is the rule rather than the exception;



There is also evidence of an association between dyslexia and language disorders, with children with early specific language impairment (SLI) at a greater risk of dyslexia than typically developing controls (Pennington & Bishop, 2009). Dyscalculia, a difficulty with mathematics, has also been found to occur in individuals with dyslexia with greater frequency than in the general population (Dirks, Spyer, van Lieshout et al, 2008; Knopik, Alarcón & DeFries, 1997)

It is evident therefore that dyslexia is often associated with difficulties in a number of areas such as attention, motor co-ordination, and organisation, and this has implications in terms of research, assessment and intervention.

Persistence and Impact

With appropriate intervention, reading accuracy in individuals with dyslexia can reach reasonable levels, however reading speed is more difficult to remediate and adults may still be impaired in terms of spelling.

The ability to read and write well are key to success in education as well as key skills for life. Whilst some individuals can develop coping strategies and achieve success, others can become disaffected and disengage from education. A number of studies have investigated early reading problems and later emotional and behavioural difficulties and have found evidence of an increased prevalence of both externalising behaviours, such as conduct

disorder, and internalising behaviours, such as depressed mood (Maughan, Pickles, Hagell et al, 1996; Morgan, Farkas, Tufis et al, 2008; Tomblin, Zhang, Buckwalter et al, 2000). However individuals with dyslexia may be just as good as their peers at many things such as during oral and group work. They may also have good general knowledge and verbal understanding of concepts but unexpected difficulties when they come to put this down on paper. Early recognition of a child's difficulties and appropriate intervention that recognises a child's strengths may help to protect against losses in confidence and self-esteem and may assist in minimising the risk of anti-social behaviours.

Intervention

There is no cure for dyslexia, however a number of different methods have been proposed to help individuals with dyslexia overcome their reading and writing difficulties. It is generally agreed that dyslexia is associated with phonological problems, and subsequently highly structured phonic reading tutoring together with activities designed to help improve phonemic awareness have been found to be effective in reducing reading difficulties in children with dyslexia. It is generally agreed that teaching should be structured and thorough, with regular revision of skills that have previously been learnt. Gradual development of skills will help children develop their confidence, and a multi-sensory approach may help individuals learn better (for example, being taught to see a letter, say its name and sound, and write it in the air). Many hours of specialist intervention may be required however, with ongoing support over extended periods of time (Hulme & Snowling, 2009).

Future direction and research

In a review of dyslexia, the Rose Report (2009) stated that there were many primary schools in England that demonstrated a well-structured reading tuition, however the provision for children with persistent reading difficulties in secondary school requires greater attention. Increased training of teachers was recommended to increase dyslexia expertise in schools. In Wales, a cross-party rapporteur group produced a report, "Support for people with dyslexia in Wales", in June 2008, which highlighted the need for a standard definition of dyslexia to be used across all local education authorities in Wales, and a review of the content of initial teacher training in relation to additional learning needs. The Welsh Assembly Government have now commissioned a benchmarking exercise to investigate current dyslexia provision across Wales.

Areas for future research include investigations into the similarities and differences between different subgroups of children with dyslexia and co-occurring difficulties and further elucidating the successful components of intervention for these different groups of individuals.

Useful References

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Useful books

HULME, C. & SNOWLING, M. (2009). Developmental disorders of language learning and cognition. Chichester: Wiley-Blackwell

Reid, G. & Wearmouth, J.(editors) (2002) Dyslexia and Literacy John Wiley & Sons chichester

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Websites

<http://www.dyslexiaaction.org.uk/>

Dyslexia Action is a national charity and the UK's leading provider of services and support for people with dyslexia and literacy difficulties

www.interdys.org

The International Dyslexia Association (IDA) is a non-profit, scientific, and educational organisation dedicated to the study and treatment of dyslexia as well as related language-based learning differences.

<http://www.bdadyslexia.org.uk/>

The British Dyslexia Association provides information, advice and support for people concerned with dyslexia - children, adults, families and professionals in education, health and employment.

<http://www.dystalk.com/topics/1-dyslexia>

Dystalk presents a number of free talks and lectures about dyslexia and other specific learning difficulties.