

## **Types, Incidence and Causes of Dyslexia among Children and Adults with Special Needs**

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### ***Abstract***

*Dyslexia, a language disorder that affects the ability to read, otherwise known as word blindness (alexia) has been discussed extensively from purely medical perspectives. However, little has been done from a psycholinguistic perspective. This study therefore addressed Dyslexia from a purely psycholinguistic perspective in order to examine issues relating to incidence, causes and rehabilitation. Specific attention has been devoted to issues relating to diagnoses/identification/treatment/rehabilitation and hope/optimism for people living with Dyslexia caregivers as well as speech/language pathologists and other language specialists should collaborate to help such people recover their lost abilities.*

*Finally, the different types of Dyslexia have also been examined such as Developmental/Acquired. Such distinctions have equally been clarified on Dysgraphia. The concluding part discussed coping strategies for patients. The paper ended on the note of optimism that the problem is not a permanent one, on the basis of conspicuous demonstration and collaboration among caregivers, medical practitioners, speech*

*pathologists, et. cetera suffere.*

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## **Incidence and Causes of Dyslexia in Children**

### **Dyslexia and dysgraphia**

The onset of brain damage in adult life frequently leads to a disorder of reading or writing in people who have previously been literate. The condition is usually accompanied by aphasic symptoms affecting spoken language; occasionally, it is the only, or predominant, symptom. In all cases, the reading disorder is referred to as (acquired) dyslexia and the writing disorder as (acquired) dysgraphia. The a-prefix is also used, especially in Europe and North America (alexia, agraphia). The label “acquired” distinguishes the disability from the more widely known developmental kinds of dyslexia and dysgraphia that occur in young children where there is no evidence of any brain damage.

Neuropsychological studies of these disabilities have generally proceeded by classifying individuals with these conditions into types, based on a detailed description of the kinds of errors made. The process is a slow and difficult one, partly because of the large amounts of vocabulary that have to be analysed before an error pattern emerges, and partly because there are usually associated language symptoms that also need to be taken into account. Nonetheless, since the 1970s several types of acquired dyslexia and dysgraphia have been proposed, based on a small number of case studies.

### **Types of Acquired Dyslexia**

According to Crystal (1987), the following types of acquired dyslexia.

**(a) Phonological dyslexia:** People with this problem are unable to read on the basis of the “phonetic” rules that relate graphemes to phonemes. This means that they can manage to read familiar words, but they have great difficulty with new words (such as technical terms) or with simple nonsense words (such as *lak*).

**(b) Deep dyslexia:** Here too people are unable to read new or nonsense words, but in addition they make many semantic errors (for example, reading *forest* as *trees*). There are also several other types of difficulty, including visual errors (for example, reading *signal* as “single”), and errors that combine visual and semantic properties (for example, reading *sympathy* as *orchestra*, presumably because of the link via *symphony*). Words with concrete (as opposed to abstract) meanings are easier to read. The table (right) gives further examples of this unusual syndrome.

**(c) Surface dyslexia:** People with this problem are very poor at recognising words as wholes, and rely greatly on a process of "sounding out" the possible relationship between graphemes and phonemes. Irregular words (such as *yacht*) pose particular difficulty. A wrongly pronounced word will be given a meaning on the basis of how it sounds, not how it looks (e.g. one person read "begin" as "begging", then added "collecting money"). There is a problem with homophones Crystal (1987) (e.g. one person understood *bury* as "a kind of hat").

Several other types have been proposed. There is, for example, a visually based dyslexia, in which people fail to read the parts of a word correctly (for instance, one patient read „night“ when shown near + light), or confuse words of similar appearance (as when "met" was misread by one patient as "meat", and rib as "ride"). In such cases, the person with the disability can often name the letters of the word correctly, but remains unable to identify the whole word. There are also several disorders of a neurologically more "peripheral" kind, such as letter-by-letter reading, in which people living with the disability find it necessary to name all the letters of a word (aloud or sub-vocally) before they can identify it.

This search for "pure" types of dyslexia is complicated by the occurrence of individual differences between patients, and by the existence of cases where symptoms are "mixed". Problems of interpretation are therefore considerable. Are deep dyslexic errors due to a partial impairment of the left hemisphere alone, or is the right hemisphere involved in some way? And, within the first of these possibilities, is the disorder, the result of an impaired semantic system, or is that system intact, with the problems arising out of an impaired ability to make correspondences between graphemes and phonemes? Answers to such questions will only emerge once the database is enlarged by in-depth linguistic descriptions of many more cases.

### **Types of Acquired Dysgraphia**

Most works in the field of psycholinguistics have studied the disruption caused to spelling ability (p. 213). Three syndromes have been proposed, analogous to those proposed for acquired dyslexia. Crystal (1987).

**Phonological dysgraphia:** People with this problem can spell real words but not nonsense words (though they can sometimes read many of them and speak them aloud).

Deep dysgraphia: Here too there is no ability to spell on a phonetic basis; asked to write a dictated nonsense word, for example, it is often replaced by a real word that is similar in sound (for instance, "blom" is written "flower", presumably because of the word "bloom"). Errors seem to be semantically related (for example, one person, asked to write "bun", wrote "cake"). The spelling of words with concrete meaning is better than that of words with abstract meaning. The relationship to reading ability is unclear: one patient studied had normal reading ability, but most seem to have some deep dyslexic symptoms also.

**Surface dysgraphia:** People with this problem can spell spoken nonsense words in a plausible way, but cannot spell irregular real words (for example, one person wrote “biscuit” as “bisket”) – and even regular words may be affected. They seem dependent on using grapheme-phoneme conversion rules; whole-word spelling is impaired, though not entirely lost (for instance, one person spelled „yacht“ as “yhagt”, showing some visual recall).

People living with Acquired dysgraphia are usually also dyslexic to some degree. Moreover, classification must allow, for cases where there are specific motor or sensory impairments. For example, there are people who can speak, read, spell aloud, and type, yet who cannot produce the letter shapes or movements required for writing by hand. Letters are badly termed, misplaced, repeated, or omitted. In such cases, it is graphetic rather than graphological ability that is affected Crystal (1987).

### Developmental Dyslexia

Developmental dyslexia occurs when children after a few years at school, are consistently seen to fail at the tasks of reading, writing, and spelling, despite normal intelligence, instruction, and opportunity to learn. No medical, cultural, or emotional reason is available to explain the discrepancy between their general intellectual and linguistic abilities and their level of achievement in handling written language. There is often a history of early language delay, but by age 9 or so, spoken language ability is apparently normal, whereas written language skills may remain at the level of a 5- or 6-year-old (Tserdanelis and Wong, 2004).

These are the children who have been called “dyslexic”, though alternative labels have been devised for the condition in an attempt to escape the original medical connotations of this term (notably “specific reading disability” and “learning disability”). In fact there are around 40 different terms used for problems in this area, some of which retain a medical bias, such as “minimal brain dysfunction” and (in parts of Europe) “legasthenia”. Because the condition is viewed as a problem with “written language” in all its forms, the term „dyslexia“ usually subsumes the kind of difficulties referred to as “dysgraphic” in the brain-damaged adult.

According to Tserdanelis and Wong (2004) The hampered school career of such children, when no-one recognises their condition, has been well documented. Their inability to read, whether for information or pleasure, and their daily failure in their attempts at written work, has a devastating effect upon their ability and motivation to learn. There are often associated problems in coping with number symbols (in arithmetic), and in tasks requiring short-term memory, such as following instructions. Their poor writing and spelling tend to be viewed as a symptom of educational subnormality or lack of intelligence – or, if the child is known to be intelligent, leads to a charge of laziness or “not trying”, with subsequent punishment in school and increased family tension at home. Career prospects, in such cases, are minimal.

Questions of incidence and causation are discussed below, along with a more detailed illustration of the range of dyslexic symptoms.

### **Incidence of Dyslexia**

The dyslexia problem is becoming increasingly recognised, with many countries now setting up organisations to draw attention to the condition and to provide special help. In a very few countries, this help is guaranteed by legislation. In one survey of 16 countries, the mean percentage of non-retarded children with reading difficulties was 8% - but this covered a range that went from 1% (China) to 33% (Venezuela). Some estimates suggest that dyslexic boys outnumber girls in a ratio of around 3:1, others that it may be as many as 10:1 (Crystal 1987).

### **Causes of Dyslexia**

This question of causation has also created great controversy. Until recently, there was a widespread assumption that all dyslexics were fundamentally alike, and that a single cause of the condition could be found. A large number of candidate "causes" were therefore proposed, postulating any of several medical or psychological factors, such as visual perception, intercessory integration, memory, attention, eye movement, verbal processing, and hemispheric dominance. There could be several possible approaches within any one of these headings. For example, under dominance it has been argued that dyslexia could be caused by (a) a lack of dominance, (b) a lag in dominance development, (c) a specific left-hemisphere deficit, (d) right hemisphere interference, or a disintegration of functioning between the two hemispheres. The role of the left hemisphere is strongly implicated (as is suggested by associated spoken-language delays and errors, and problems of motor coordination), but its exact influence is unclear (Tserdanelis and Wong, 2004).

Recent reviews of what is now a vast experimental literature indicate that a unitary explanation for dyslexia is illusory. The modern focus on individual case studies (as opposed to the traditional use of group studies) is bringing to light the existence of a variety of dyslexic syndromes, reflecting several possible causes. A popular contemporary view is that there is a large set of factors implication in dyslexia, some sub-set of which turn up in individual cases. For example, in one group of children, there was clear evidence of an unstable eye dominance: the children had not established a stable "leading" eye in their reading. This is one possible cause another group showed difficulties with making perceptual distinctions (e.g. distinguishing same/different letters). A further group displayed problems with short-term memory. See Crystal, *et al.* (1976) and Tserdanelis and Wong (2004).

The main methodological problem in such research is to determine whether the weakness shown by dyslexics is the cause or the result of the condition. For example, many of these children have faulty eye movements (shorter saccades, longe fixations, more regressions, but it is an open question whether these form a constitutional problem that made it difficult for them to learn to read, or whether the poor movements began as a result of their difficulties with reading, or whether there is no functional relationship between them at all. If information is not available on what the children were like before they began to read, and on how they perform with non reading tasks, it may be difficult to interpret the results of such experiments (Tserdanelis and Wong 2004).

The conflicting and ambiguous research findings, linked with ambitious claims about “the” cause of dyslexia, have led to a great deal of skepticism about the condition, especially when the possibility of an underlying medical cause is being stressed. It will take some time before these doubts are resolved, and new research initiatives will need to be evaluated; in particular, devising individual developmental profiles, along the lines of the acquired dyslexia research and relating findings more to the nature of reading developing in normal children, in order to establish what counts as an “abnormal” error. In such ways, it will be possible to devise better development classifications based on behavioral symptoms. From the foregoing, we can point out that causes of dyslexia; visual problem, hemispheric dominance or lack of dominance, lag in dominance development, hemispheric deficit, faulty eye movements and so on.

### **Acquired versus Developmental Dyslexia**

Dyslexia is referred to as developmental when it is occurred from childhood after a few years in school. It is acquired when it suddenly appears in adulthood. The several similarities between the symptoms presented by the two kinds of dyslexia have led some scholars to argue that there is an underlying identity. Parallels have been proposed between developmental dyslexics and acquired deep dyslexics – for example, both groups have trouble in reading nonsense words, and are better at reading concrete words. However, so far there is little clear evidence that children display the kinds of semantic error that are crucial to the identity of the deep dyslexia syndrome. Similarly, there have been proposals that developmental dyslexia displays a parallel with acquired surface dyslexia (e.g. because of similarities in direct visual word recognition). None of these positions has yet produced a substantial child database, however, and several difference between the adult and child populations remain – particularly, the greater variability of children's performance.

There is, moreover, always the possibility that the brain mechanisms that underlie reading acquisition are different from those used to maintain reading skills in later life.

### **Coping Strategies**

**(a) Diagnosis:** the very first step is to identify the cause (s) of the problem. The medical doctors can do this by carrying out visual tests and examining the brains of people living with such disability.

**(b)Treatment:** if the handicap is as a result of a treatable ailments, then the appropriate treatment should commence. If the disability is as a result of visual problem or damage to the brains, the medical doctors should proceed with appropriate treatments.

**(c) Rehabilitation:** All the stakeholders should come together and rally round the patient in the rehabilitation process – Teachers, parent, medical personnel, neurolinguists, psycholinguists and other care givers should be involved by deploying visual aids and other technological devices appropriately. People living with such disabilities should equally be encouraged to develop a positive attitude of hope and assurance in God's providence.

### **Summary, Conclusion/Recommendation for Further Studies**

This paper set out to clarify the controversies surrounding Dyslexia, identified its types, and distinguished it from other disabilities like Agraphia/Dysgraphia, etc. This was captured in the introductory part. Controversies/ambiguities that surround these language disabilities were then discussed. Sub-topics such as identifications, diagnosis, treatment, cure and pathological issues were then discussed. Reference was made to the confusions surrounding extant literature, paucity of research were equally discussed briefly. Coping strategies were then discussed along with how to alleviate the patients' fears and doubts by creating an optimistic attitude towards their condition. This calls for a collaborative activity among caregivers, medical professionals as well as speech pathologists to facilitate/enhance rehabilitation. Upcoming researchers are encouraged to explore different manifestations of these special language disorders.

In conclusion, people living with dyslexia should be encouraged to develop a positive attitude by viewing the problem as temporary and transitional that would soon be overcome. The caregivers, health workers as well as speech pathologists and audiologists should do this by demonstrating their optimism in a conspicuous manner.

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