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AN ASPECT OF THE JAPANESE LANGUAGE IN RELATION TO DYSLEXIA

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## ABSTRACT

These studies were conducted to examine the processing of two kinds of Japanese orthography, namely, kanji and hiragana by a group of dyslexic Subjects and Subjects in a control group of similar age, in order to ascertain the effectiveness of hemispheric specialization. An analysis of variance showed that in visual-learning there was a significant main effect for script type for both groups,  $F(1,36), = 28.125, p < .001$ . There was also significance for the dyslexic group in verbal-recall,  $F(1,36), = 13.15, p < .001$ . There was a significant interaction between group and script for direction-orientation with kanji showing higher correct responses,  $F(1,36), = 4.142, p < .05$ . These results confirmed expectations based on research and also identified left brain (Right Hemisphere) strengths. Thus it seems that a much closer examination of learning styles and modes of learning is crucial for the dyslexic group. Japanese brain lateralization, seen to differ from Western lateralization, appears to be linked with environment which is closely related to language type. This study is an investigation from a culture-specific perspective with a consideration of neurolinguistics in cerebral hemispheric lateralization. This is considered in view of the existence of certain difficulties with regard to reading and the possible influence of life-style and familial career selections to which those difficulties might accrue.

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## INTRODUCTION

Despite the volumes of investigation and literary contributions made in the field of reading difficulties, it has only been in the past two decades that studies in this field have become considerably more specific. In this context Berk (1984) asserts the need for a theoretical definition for a learning difficulty and it must of necessity be constitutionally meaningful for it to be used scientifically.

A universal definition has not been easy to find, but Critchley (Pavlidis & Miles, 1981) gives us an up-to-date version which is adequately comprehensive to be useful. It was accepted by the World Federation of Neurology: Specific Developmental Dyslexia, in 1968, as follows:

"Specific Developmental Dyslexia is a learning disability which initially shows itself by a difficulty in learning to read, and later by erratic spelling and by lack of facility in manipulating written, as opposed to spoken, words. The condition is cognitive in essence, and usually genetically determined. It is not due to intellectual inadequacy or to lack of socio-cultural opportunity or to failure in the technique of teaching, or to emotional factors, or to any known structural brain lesion. It probably represents a specific maturational defect which tends to lessen as the child grows older and is capable of considerable improvement, especially when appropriate remedial help is offered at the earliest opportunity" (p.103).

It is termed specific to differentiate it from any notion of a lack of intellectual capacity or deficiency in opportunities for education. It relates directly to reading.

Depending on the country as well as the opinion of reading disability specialists in different professions, the terminology varies.

Rabinovitch et al., (1954) explain that "many alternative terms have been coined, such as congenital symbolamblyopia, congenital typhlexia, congenital alexia, amnesia visualis verbalis, analfabetia partialis and bradylexia" (Naidoo, 1972:8). These terms were cast aside almost

immediately, though strephosymbolia of Orton's derivation sometimes still appears. It means twisting of symbols (Money, 1962:91). Tarnopol (1981) enumerates terminology as "dyslexia, specific language disabilities, perceptual disorders, minimal brain dysfunction, word blindness, minimal cerebral damage, instrumental disabilities, brain damage, educational handicap, learning difficulties, neurological handicap, learning disabilities," (p.6) etcetera. Each name presented possesses slightly different characteristics and philosophies of cause.

The study of dyslexia and its concomitant difficulties is necessarily a long-term one and it is unrealistic to attempt to obtain extensive data in a short period of time. This particular study purposes to look at certain aspects of dyslexia as a syndrome and to investigate the processing facility of two types of Japanese script, namely, kanji and hiragana, by a group of Subjects with dyslexia in comparison with a control group of normal reading ability Subjects matched for age. The present study will investigate whether or not there is any significant difference between groups in their perceptual ability to memorise and recall these two types of orthography accurately. Hopefully the findings will contribute in some small measure to the broad spectrum of investigation that has already been undertaken to achieve an understanding of dyslexia and the functions of the brain.

For a glossary of terms used in the literature concerned with dyslexia and throughout this study, see Appendix I.

## LITERATURE REVIEW

### 1.0 Historical Overview

In 1861, a Frenchman, Paul Broca, noted the occurrence of disturbed articulation in a patient after a specific portion of the brain was damaged (Geschwind, 1972). Thirteen years later, a German neurologist, Carl Wernicke (Ellis, 1984) localised another area in the brain where reading and writing depend on visuo-perceptive skills, often including comprehension and auditory perception. The loss of these abilities is now known as dysphasia and in the case of writing, dysgraphia. These profound discoveries of brain lateralization and their relatedness to language were the harbinger of a retinue of research that has since been performed. There has been a search to find keys for the uniqueness of human learning, attributed to a highly organised brain and a very complex nervous system (Geschwind, 1984; Lerner, 1985).

A German physician by the name of Kussmaul, in 1877, invented the initial term word-blind when he discovered different types of problems among his patients caused by cerebral vascular injury, through which the ability to read was lost, but sight, intellect and speech remained unimpaired. In 1895, a Glasgow ophthalmologist, James Hinshelwood, published a paper on the subject (Naidoo, 1972). British doctors, James Kerr and Pringle Morgan, both independently also became aware of the condition and spoke publicly on the subject. Hinshelwood's studies continued and his publications in 1900 and 1917, drew the attention of other doctors whose patients with similar problems provided data for early research (Ellis, 1984). Out of this early investigation by Hinshelwood and Morgan (1896) emerged a condition termed congenital word-blindness (Vellutino, 1979), attributed to a maldevelopment in a region of the angular gyrus. This term, congenital word-blindness, was founded on the notion that an individual has no ability to perceive and store images of words or, of course, recall them. Geschwind (1982) notes that medical autopsies performed on dyslexics who had died in accidents had brain cell abnormalities identical with those of aphasic

patients. The visual centres of the brain were not able to interpret what was set down in written language (Lerner, 1985; Howes,<sup>1</sup> 1962). This was a pathological diagnosis.

There was little research published about reading difficulties during the first quarter of the twentieth century (Vellutino, 1979).

Pavlidis claims that the term dyslexia was conceived by Berlin in 1887. Orton, an American psychiatrist and neurologist, used this term in literature in 1925 and 1937. Orton directed his studies to "reversals, directional confusion and difficulties with orientation...the hallmark of specific reading disability or strephosymbolia...a failure in recognition of a printed word even after it has been encountered many times" (Pavlidis & Miles, 1981).

For a number of years there was disagreement over characteristics and causes and it took time for the syndrome to become accepted as a specific area of learning disability (Simpson, 1979).

In the search for identification of specific reading difficulties and etiology, Rabinovitch (1968) distinguished between reading retardation from 1) primary deficit in which the disorientation of letter and word symbols reflect a neural disturbance, 2) secondary to brain injury, 3) secondary to environmental factors and specific developmental dyslexia (Naidoo, 1972). Ingram (1964) made the distinction between specific developmental dyslexia and acquired dyslexia, exhibited as a result of minimal brain dysfunction. Concepts of genetic transmission became evident in studies performed by Edith Norrie in Copenhagen and Hallgren and Hermann, in particular, through working with twins (Naidoo, 1972). Since then, a wide variety of studies has been taken up on aspects such

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<sup>1</sup>Cited in J. Money, (Ed.). (1962). Reading Disability, Progress and Research Needs in Dyslexia.

as genetic factors, maturational lag, neurological dysfunction, cognitive processes, sensory-motor and perceptuo-motor abnormalities, patterns of cerebral dominance and lateralization functions involving switching hemispheric mechanisms, depending on aetiology.

Orton first raised the question of "cause and effect" (Goldberg & Schiffman, 1972), the role of cerebral dominance and subsequent delays and confusion in language with reference to an unestablished preferential laterality (Vellutino 1979). This proposal was taken up by a leading neurologist, Lord Russell Brain, who contended that the failure to establish laterality results in difficulties rather than being the cause of them. Professor O.L. Zangwill, another authority, agrees that "a certain proportion of children with ill-defined laterality have, in addition, a slowness in maturation" (ibid., 1971:132). These authors propose that difficulties in learning and confusion of laterality are the result of cerebral immaturity.

Many have taken up the concept of laterality to examine preferences in eye, ear, hand and foot. According to Goldberg and Schiffman (1972), the outcome of this particular series of investigations is that statistically, there is no significant difference between those who display a crossed dominance and those with an established lateralization for eye, ear, hand and foot. It is maintained that "the anomaly of handedness is a corollary and not a cause of dyslexia" (p.131-132).

In Japan, according to Nakano and Suzuki (1981), learning disabilities within the field of reading and writing have gone almost unnoticed. Much of the Japanese research is based on theories of neurological disorders and minimal brain damage.

In 1968, Makita indicated that about 1% of school-age children in Japan have reading problems. This, he estimates to be about one tenth of the incidence in countries where English is the first language. But later research seriously questions this prognosis. Hirose and Hatta (1985)

maintain that precise and adequate testing has not been possible because of a lack of Japanese standardised diagnostic tests and methods and that the area of specific reading disabilities is still in its experimental stages.

Tsunoda (1985) postulates a theory that Japanese patterns of the cerebral hemispheres are different from Western patterns. He suggests that the major difference is in the lateralization of vowel sounds. Tsunoda contends that there is a subcortical switching mechanism which is related to language and culture. His investigations deal with both conscious and subconscious systems. His theories have been contrasted with those of Liberman of the Haskins Laboratories in the United States (1971), who has demonstrated that hemispheric lateralization does fluctuate. The studies of Albert and Obler (1978) in bilingualism substantiate this.

Tsunoda (1985) in more recent studies, however, asserts that there is a critical age for dominance patterns to emerge and that this is associated with a mother tongue and culture. His studies conclude that dominance is effected in the first eight years of a child's life and that the critical period determining lateralization is most significant between the age of six and almost nine years of age. Tsunoda maintains that the learning of a foreign language is, therefore, more effective after this crucial period of development.

Hatta's (1986) research on cerebral hemispheres also shows that there is an integrated interaction of both hemispheres for Japanese. As well, he observed differences in hemispheric organization between Japanese, Israelis, and British. He claims that this is due to cultural effects on language attributed to unique styles in writing systems.

## Etymology

The term dyslexia is derived from its Greek roots dys and lexis which translate into faulty and speech, "cognate with the Latin legere (to read" (Simpson, 1979:431). By definition these roots equate with a common experience of all dyslexics, that is, a difficulty in the use of words (Pavlidis & Miles, 1981; Howells & Osborne, 1984). Hornsby (1984) emphasises the fact that often there can be confusion concerning the term because there are so many differing characteristics. Furneaux (1969) contends that because most factors are found only in a small percentage of the population, the incidence of difficulties is not any more significant than in a normal population. This was based on the premise that characteristics "do not group together in any significant way" (ibid., 251). It is true in fact, that those with dyslexia vary greatly except that they seem to have specific difficulty with written forms of language. Because the problem has been ill-defined, the specific has been incorporated in the general term learning disability. This reference in generic terms has been applied to all children educationally handicapped no matter what the reason (Telford & Sawrey, 1972).

Dyslexia refers to a subgroup of reading disabilities. Descriptions of dyslexia strongly emphasise that it is a complex syndrome and the central characteristic is the difficulty experienced in the use of words, coding and encoding in any written form. Criteria for inclusion in the category of dyslexia are that the subjects have average or above average intelligence and are at least two years below the normal reading level for their age group (Thakurdas & Thakurdas, 1979; Miles & Miles, 1983). Low intelligence, cultural deprivation, minimal brain damage, or emotional disturbance are not included in the definition (Naidoo, 1972).

Young and Tyre (1983) rather vociferously criticise the use of the term dyslexia and its introduction into common parlance as a label for those experiencing specific reading difficulties. They contend that rather

than labelling individuals it is more important to discriminate their problem area and to meet these needs individually. This view is also stressed by Wedell (1973) who states that classifications should not exceed analysis. Tansley and Panckhurst (1981) state that in the United Kingdom, the term specific reading difficulty is preferred.

Conversely, Miles and Miles (1983) state that they prefer to see dyslexics separated into a separate category from the all-inclusive spectrum of reading difficulties, because this alerts a specific educational need that ought to be recognised and assisted on an individual basis. Critchley's (1970) view is that the rejection of a term is tantamount to denial of the condition. Bannatyne (1971) also supports the classification system on the grounds that when cases exist, they will not be misdiagnosed or given the wrong remediation.

Basically, both arguments attempt to narrow down a complex syndrome and seek to know possible causes. Caution is necessary so that labelling does not cover up differences that are important. For practical purposes this study will use both terms.

## Characteristics of Dyslexia

### 2.0 Symptoms

Dyslexia is a specific disability which is quite distinct from a mental deficiency. In the event of a child experiencing difficulties in learning to read, it could be for one of several reasons, such as poor vision or hearing; an inefficient teacher or one who employs a faulty methodology; incompatible classroom environment; emotional stress or because English is a second language. Beyond these reasons, characteristics of the reading difficulty then become critically important and require informed diagnosis.

A person who is dyslexic has great difficulty in acquiring a working knowledge of systems of sequential symbolism. A child may have poor visual memory; visual or auditory imperception; confusion of letters with reversals in letters or words; mirror-writing; uncertainty of order, or left/right orientation which might result in a tendency for some letters and words to be read or written backwards, inverted or rotated; late speech development; directional confusion; hyperactivity; motion sickness; perseveration, that is, continuing an action such as a temper tantrum or stammering longer than usual; or general clumsiness and poor coordination (Telford & Sawrey, 1972). Naidoo's (1972) studies with dyslexic boys reveal that poor voluntary motor control is evident quite early. Any of these characteristics are possible in part or whole (Kirk & Kirk, 1974).

An awareness of any of these symptoms needs close observation and identification so that support, encouragement, and remediation can be given.

## 2.1 Giftedness

Although signs of giftedness may not be manifested in a classroom, scoring is frequently high when aptitude tests are administered (Tarnopol & Tarnopol, 1981; Hornsby 1984). There are instances when intellectual giftedness of a very high calibre becomes apparent in dyslexic subjects (Lerner, 1985; Goldberg & Schiffman, 1972).

In spite of the tremendous effort required to overcome problems of learning to read and write, some dyslexics have risen to eminence in a wide spectrum of fields. From an anecdotal aspect, for example, Leonardo da Vinci wrote his notes in mirror-writing. Examples of this may be viewed in the British Museum in London. The manuscripts of the prolific Danish author, Hans Christian Andersen have revealed that he was almost certainly dyslexic. The French Sculptor, Auguste Rodin was deemed ineducable by his family, though at the mature age of 67 he had an honorary doctorate conferred on him at Oxford University. Albert Einstein did not talk until he was four years old, and at school he failed in mathematics (Raymond, 1976). The American inventor, Thomas Edison had constant problems with reading, writing and mathematics skills, yet gave to the world such things as the telephone, microphone, and phonograph as well as electric light bulbs. The twenty-eighth American President, Woodrow Wilson, had a poor school record, was read to by his family until the age of eleven, but he excelled at debating (Lerner, 1985). The outstanding brain surgeon, Harvey Cushing, a scholar of Harvard and Yale Universities, could not spell, yet despite this became an author and recipient of the renowned Pulitzer prize in literature (Hornsby, 1984). Virginia Woolf's writing drafts were always checked for spelling and punctuation by her husband because her efforts were so erratic. Likewise Agatha Christie found writing and spelling extremely difficult, and was looked on by the family as the "slow one". Yet, she wrote some 68 novels and 100 short stories as well as 17 plays (Simpson 1979).

Patient perseverance has brought its rewards to each of these individuals with characteristics of dyslexia.