

**An Examination of
Developmental Dyslexia among
Iranian EFL Second Graders**

By:

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Abstract

The aim of the present study was to investigate whether Iranian Dyslexic Students had difficulties learning English as a foreign language. Ten Iranian students of the second grade of the secondary school with developmental dyslexia and ten normal students were assessed on a constructed test battery of reading, spelling, and phonological processing tasks. The findings showed that the dyslexic group performed significantly lower than the normal control (normal) group in all the English measures. These findings suggest that Iranian dyslexic students also encounter difficulty in learning English. Moreover, phonological processing skills were found to correlate significantly with English reading in the dyslexic group. The results support the view that there are relationships between phonological skills and reading ability.

Key Words: Developmental Dyslexia, Persian, Orthography, Phonological Processing, Reading, English as a Foreign Language

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List of Abbreviations

FL: Foreign Language

EFL: English as a Foreign Language

L۱: First Language

L۲: Second Language

EL۱: English as a First Language

ESL: English as a Second Language

CHAPTER I

Introduction

۱.۱. Background

Developmental dyslexia is a specific learning difficulty or learning difference which affects many aspects of life and learning. The most widely accepted current definition of dyslexia is the following:

“Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by 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. Secondary consequence may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.” (Lyon, Shaywitz, & Shaywitz, ۲۰۰۳, p.۲)

Past studies on dyslexia have focused on difficulties in acquiring first language. Since it is a worldwide trend for people to learn more than one language, there is growing interest to investigate the effect of dyslexia in learning another language. This study focused on English as a foreign language in a group of Iranian dyslexic students, compared to an age and gender matched control group. A test battery constructed for the purpose was given to both groups to assess the pupils' reading, spelling, and phonological processing skills in English. Further analyses were carried out to reveal the contribution of phonological processing skills to the dyslexics' reading ability in English as a foreign language.

۱.۲. Statement of the Problem

While previous studies have examined dyslexia in native languages, recently some researchers have tried its effect on learning a second language (Helland & Kaasa, ۲۰۰۶; Ho & Fong, ۲۰۰۶). In a study of an English-Japanese bilingual boy it was found that the boy's reading and writing difficulties were confined to

English, his native language, but not Japanese (Wydell & Butterworth, ۱۹۹۹). In contrast with the previous study in Norway and China, it was revealed that the dyslexic students encounter difficulties in learning English as a second language and their problem is not confined to their mother tongue (Helland & Kaasa, ۲۰۰۵; Ho & Fong, ۲۰۰۵). Both of the studies underlined the importance of further research on this topic. As far as I know, no one has tried this issue in Iran where English is a foreign language. Therefore, it seems that there is a need to address the issue in our country. Moreover, the phonological deficit hypothesis considers deficit in processing phonological information as the core cognitive deficit in dyslexics. This phonological viewpoint has become more prominent over the last quarter of the century (Stanovich & Siegel, ۱۹۹۴; Ramus, ۲۰۰۱). However, Nicolson and Fawcett (۱۹۹۵) have argued that there is persistent evidence which indicates that dyslexic children suffer from problems in some skills which are independent of phonological processing. An additional criticism of the phonological viewpoint has been proposed by Stein (۲۰۰۴) who argues that not all those with reading problems have significantly impaired phonological ability (cited in Elbeheri & Everatt, ۲۰۰۷). Therefore, the current study also aims to investigate the role of phonological processing skills in Iranian dyslexic students' reading ability in English as a foreign language.

۱.۳. Significance of the Study

"Cross-cultural communication is becoming increasingly important especially it is important in minor languages to be able to communicate in one or two of the major languages of the world, such as English, French or German" (Helland & Kaasa, ۲۰۰۵, p.۱).

The present study will examine whether Iranian dyslexic students have problems learning English as a foreign language. Knowing that English language presents students with opportunity to communicate in an international language, to expand their resources for studying and to extend the range of their employment in future, it seems to be important to see if dyslexic students have

difficulties learning English as a foreign language. If it is revealed that Iranian dyslexic students have difficulties learning English, it will have good implications for language teachers and students. Teachers should become conscious that learners' difficulty in learning another language might be due to their learning disability in the first language. Therefore, instead of labeling them as retarded, they should try to develop materials, teaching strategies, and assessment tools which can enhance the learning of these students.

Dyslexic students may become conscious of the fact that their slow progress in learning English might be due to their first language learning disability. Being aware of what hinders their learning they can start developing strategies and learning styles to overcome this problem or they may decide to consult a language specialist.

Moreover, since studies on the effect of dyslexia on the foreign language learning are limited, this study can help enrich the findings.

It is also hoped that by examining the contribution of phonological processing skills to dyslexics' reading ability in English as a foreign language, more information concerning phonological deficit hypothesis, which suggests that phonological processing deficit may constitute the core deficit underlying individuals' reading difficulties can be obtained (Anthony et al., ۲۰۰۶).

۱.۴. Purpose of the Study

The major aim of the present study is to examine whether Iranian dyslexic students have difficulties learning English as a foreign language. Moreover, attempts will be made to reveal the contribution of phonological skills toward reading ability of the dyslexic students in English as a foreign language.

۱.۴.۱. Research Questions:

Q۱: Do Iranian dyslexic students have more difficulties in learning English as a foreign language than non-dyslexic ones?

Q۲: If the answer to the first question is positive then which areas of reading, spelling, and phonological processing of English as a foreign language are more problematic to Iranian dyslexic students?

Q۳: Are there any relationships between phonological processing skills and reading ability of Iranian dyslexic students in English as a foreign language?

۱.۴.۲. Research Hypothesis:

H۰۱: Iranian dyslexic students do not have more difficulties in learning English as a foreign language than non-dyslexic ones.

H۰۲: There are no areas of reading, spelling, and phonological processing of English as a foreign language which are more problematic to Iranian dyslexic students.

H۰۳: There are no relationships between phonological skills and reading ability of Iranian dyslexic students in English as a foreign language.

۱.۵. Definitions of Key Terms

Orthography: The way letters and diacritic symbols represent the sounds of language in spelling.

English as a Foreign Language: A person, whose mother language is not English, learns English as a foreign language if they study the language in a non-English speaking country.

Spelling: Spelling is forming words with letters according to the principals underlying accepted usage. Spelling was assessed through single word dictation in this study.

Reading: Reading is the ability to decode individual words and written texts accurately and to recognize and determine their meanings. In this study, reading was assessed in terms of the ability to recognize and determine the meaning of individual words, read the words out of context, read the written text and answer comprehension questions, and read the written text accurately and in normal speed.

Phonological Processing: Phonological processing refers to one's ability to detect or manipulate sounds (phonological awareness), to retain sounds (phonological memory), and to access them speedily (phonological access). Phonological processing was assessed through the tasks of rhyme detection, phoneme deletion, backward digit span, and rapid picture naming in this research.

۱.۷. Delimitations of the Study

There are some limitations in this study which must be taken into consideration while analyzing, applying, and interpreting the results of the study. The delimitation originates from the context of the study, participants, data collection, procedure, instruments, etc. However, some of the main delimitations are mentioned here. First, this study was conducted with the students of the second grade of the secondary school. The result might be affected if the students of other grades were included. The second limitation is related to the number of participants. A larger sample will let researchers draw more generalization of the result. Third, due to the scarcity of dyslexic subjects and difficulty of finding them, the dyslexic students were not randomly selected. Fourth, the test battery was constructed by the researcher and it has not been used by any other researcher (see the details in chapter three). And finally, since learning a foreign language is a complex process, scores obtained from a battery of test will not be as revealing as longitudinal studies on its development.

CHAPTER II

Review of Related Literature

۲.۱. Introduction

Developmental dyslexia is a learning difficulty characterized by specific problems with word recognition, spelling, and reading. As it was mentioned in chapter one, in today's world cross-cultural (international) communication is becoming increasingly important. Especially it is important for the speakers of minor languages to be able to communicate in one of the major languages of the world. Therefore, the number of studies investigating dyslexia in the second or foreign language learning is increasing. In this chapter, the detailed review of dyslexia in the first and the second language would be presented.

۲.۲. History

“The problem of dyslexia has been highlighted by the developing need of humans to communicate with the written word.” (Thompson & Watkins, ۱۹۹۸, p.۱). The term dyslexia was first coined in ۱۸۲۷ by an ophthalmologist Rudolf Berlin who used Greek etymology: dys : meaning difficulty; lexis: meaning the written word. To put it simply, it is a difficulty with reading or decoding the written word. He used the term to refer to a case of a young boy who had a severe impairment in learning to read and write in spite of showing typical intelligence and physical abilities in all other aspects (Thompson & Watkins, ۱۹۹۸).

Then in ۱۸۹۶ W. Pringle Morgan, a British physician, published a description of a reading – specific learning disorder in a report titled “congenital word blindness”, describing the case of a young boy who showed normal intelligence but had not yet learned to read (Seif-e-Naraghy & Nadery, ۲۰۰۵; Taylor, Duffy & Hughes, ۲۰۰۷; Thompson & Watkins, ۱۹۹۸).

Hinshelwood in ۱۹۱۷, in a major ophthalmological study considered the condition as a congenital defect occurring in children with otherwise normal, undamaged brains, characterized by a disability in learning to read. He focused on the concept of congenital word blindness, his patient's problems being caused, not by defective vision but by a "grave defect in the visual memory center". Moreover, Hinshelwood drew parallels between the difficulties of dyslexic children (developmental dyslexia) and those of brain – injured adults (acquired dyslexia) (Ellis, ۱۹۸۴; Miles & Miles, ۱۹۹۰; Tabrizy, ۲۰۰۷; Thompson & Watkins, ۱۹۹۸).

In ۱۹۲۵, Orton, an American neurologist, made an important contribution with his theory which was based on the assumption that the dyslexic individuals perceived images in an inverted or twisted way caused by conflicting stores of visual information in left and right cerebral hemispheres. He proposed the term strephosymbolia to describe this condition (Miles & Miles, ۱۹۹۰; Tabrizy, ۲۰۰۷; Thompson & Watkins, ۱۹۹۸).

Orton later worked with psychologist Anna Gillingham to develop a systematic teaching program that pioneered the use of simultaneous multi sensory instruction. The Orton – Gillingham approach to remedial reading instruction is still used and forms the basis of many reading intervention programs (Miles & Miles, ۱۹۹۵; Omidvar, ۲۰۰۵).

During ۱۹۳۰s and ۱۹۴۰s the enquiry moved away from the neurological domains into those of the educational and sociological areas, so that during ۱۹۴۰s and ۱۹۵۰s the Word Blind Institute in Copenhagen was one of the first to begin to investigate the nature of dyslexia and to help the dyslexic with positive teaching (Miles & Miles, ۱۹۹۰; Thompson & Watkins, ۱۹۹۰).

The use of neuroimaging techniques to study brain structure and function enhanced the research in the ۱۹۸۰s and ۱۹۹۰s (New Zealand Ministry of Education,

2008). More recently, genetic research has provided increasing evidence supporting a genetic origin of dyslexia (Shstry, 2007).

2.3. Causes of Developmental Dyslexia

Developmental dyslexia is defined as a discrepancy between reading ability and intelligence in individuals receiving adequate conventional instructions (Boets, Wouters, Wieringen, Smedt, & Ghesquiere, 2008; Ramus et al., 2007). Since the definition is behavioral it leaves open the causes for reading failure. Despite years of intensive research, the underlying biological and cognitive causes of dyslexia are still hotly disputed. In fact, there are no less than 3 major theories of dyslexia (Boets, et al., 2008; Ramus et al, 2007). The following is a neutral overview of the different theories of dyslexia. Each theory has different versions in literature. However, attempt has been made to describe the most currently prominent version of each theory.

2.3.1. The Phonological Theory

This theory suggests that dyslexics have specific impairment in the representation, storage and/or retrieval of speech sounds. It explains dyslexic's failure in reading by appealing to the fact that learning to read requires learning the grapheme – phoneme relationship. If the sounds are poorly represented, stored or retrieved, the learning of grapheme - phoneme relationship will be affected accordingly. While theorists have different views about the nature of the phonological problems, they concur with the central and causal role of phonology in dyslexia. Support for this theory comes from evidence that dyslexics perform particularly poor on tasks requiring phonological awareness (the ability to recognize, identify, or manipulate any phonological unit within a word). At the neurological level, anatomical work and functional brain imaging studies show that a dysfunction with the left perisylvian is the basis for the phonological deficit (Boets et al., 2008; Ramus, et al, 2007).

Research findings generally support Stanovich's 'phonological-core variable difference model' that alphabetic dyslexic readers have in common

deficiencies in the phonological area but vary in other language and cognitive characteristics (Anthony, Williams, McDonald, & Francis, ۲۰۰۷; Ho & Fong, ۲۰۰۵; Lundberg, ۲۰۰۲). Research studies conducted on different languages, including not only alphabetic English but also logographic Chinese give consistent support to this hypothesis (Chan, Ho, Tsang, Lee, & Chung, ۲۰۰۶; Leij & Morfidi, ۲۰۰۶).

The challengers of the phonological theory do not deny the existence of the phonological deficit and its contribution to reading failure; rather, they believe that the disorder is much more extended having its roots in general sensory, motor or learning processes, and that the phonological deficit is only one aspect or result of the general disorder (Boets et al., ۲۰۰۸; Ramus, et al, ۲۰۰۳). Moreover, Nicolson and Fawcett (۱۹۹۵) have disputed that there is evidence which suggests that dyslexic children suffer from deficit in skills which are independent from phonological processing. An additional criticism of the phonological viewpoint has been set forth by Stein (۲۰۰۴) who postulates that not all those with reading problems have significantly impaired phonological ability (cited in Elbeheri & Everatt, ۲۰۰۷).

۲.۳.۲. The Rapid Auditory Processing Theory

One way to challenge the specificity of the phonological deficit is to suggest that it is secondary to a more basic auditory deficit. This is the claim of the rapid auditory processing theory, which specifies that the deficit is found in the perception of short or rapidly varying sounds. Support for this theory comes from evidence that dyslexic individuals show poor performance on a number of auditory tasks, including frequency discrimination and temporal order judgment. In addition, abnormal neurophysiological responses to various auditory stimuli have been demonstrated. The failure to correctly represent short sounds and fast transitions would cause more problems particularly when such acoustic events are the cues to phonemic contrasts as in /ba/ versus /da/. There is also evidence that the dyslexic may have poor categorical perception of certain contrasts. In this

view, the auditory deficit is the direct cause of the phonological deficit, and therefore of the difficulty in learning to read (Boets et al, ۲۰۰۸; Ramus, et al., ۲۰۰۳).

۲.۳.۳. The Visual Theory

In visual theory dyslexia is considered as a visual impairment which gives rise to difficulties with the processing of letters and words on a page of text. This may take the form of volatile binocular fixations, poor vergence, or increased visual crowding. The visual theory does not exclude a phonological deficit, however emphasizes a visual contribution to reading difficulties, at least in some dyslexics.

At the biological level, the suggested etiology of the visual dysfunction is based on the division of the visual system into two distinct pathways which have different roles and characteristics: the magnocellular and parvocellular pathways. The theory suggests that the magnocellular pathway is selectively disordered in certain dyslexic, resulting in deficiencies in visual processing, and, by the posterior parietal cortex, to abnormal binocular control and visuospatial attention. Support for this theory comes from anatomical studies showing abnormalities in the magnocellular layers of the lateral geniculate nucleus, psychophysical studies demonstrating decreased sensitivity in the magnocellular range, i.e. low spatial frequencies and high temporal frequencies in dyslexic individuals, and brain imaging studies (Boets et al, ۲۰۰۸; Ramus, et al., ۲۰۰۳).

۲.۳.۴. The Cerebellar Theory

This theory postulates that the dyslexics' cerebellum is mildly dysfunctional and that a number of cognitive difficulties follow. Firstly, the cerebellum plays a role in motor control and hence in speech articulation. It is suggested that backward and dysfunctional articulation would result in deficient phonological representations. Secondly, the cerebellum plays a role in automatization of over learned tasks, like driving and reading. A weak capacity to automatize would affect, among other things, the learning of grapheme-phoneme relationships. Support for this theory comes from evidence of poor performance of dyslexic individuals in a large quantity of motor tasks, and in time estimation. In addition

brain imaging studies have demonstrated anatomical, metabolic and activation differences in the cerebellum of dyslexics (Boets et al, ۲۰۰۸; Ramus, et al, ۲۰۰۳).

۲.۳.۵. The Magnocellular Theory

There is a unifying theory which tries to incorporate all the aforesaid findings. A generalization of the visual theory, the magnocellular theory suggests that the magnocellular dysfunction is not limited to the visual pathways but is generalized to all modalities (visual and auditory along with tactile). Moreover, as the cerebellum receives an immense amount of data from various magnocellular systems in the brain, it is also predicted to be affected by the general magnocellular deficiency. Therefore this theory manages to account for all known manifestations of dyslexia: visual, auditory, tactile, motor and, subsequently, phonological. Evidence which specifically supports this theory comes from poor performance of dyslexic individuals in the tactile domain along with magnocellular abnormalities in the medial along with the lateral geniculate nucleus of dyslexics' brains, and the co-occurrence of visual and auditory problems in certain dyslexics (Boets et al., ۲۰۰۸, Ramus, et al., ۲۰۰۳).

Although the auditory and visual theories have been presented here individually for historical and logical reasons, their supporters now concur that those visual and auditory disorders in dyslexia are parts of a more general magnocellular dysfunction.

Each theory also has weaknesses or shortcomings associated with it. The phonological theory does not account for the occurrence of sensory and motor disorders which occur in a significant proportion of dyslexics, while the magnocellular theory suffers from its inability to account for the absence of sensory and motor disorders in a significant proportion of dyslexic individuals. The cerebellar theory displays both types of problems. Although these theories are considered individually, it is evident that all these theories might be true for different individuals (Boets et al, ۲۰۰۸; Ramus, et al., ۲۰۰۳).

۲.۳.۶. Differences in Neuronal Anatomy

Galaburda et al. (۱۹۸۵) described the first biological evidence as enlarged right plana temporale leading to atypical asymmetry in developmental dyslexia (cited in Leonard, Eckert, Given, Virginia & Eden, ۲۰۰۶). This investigation was post – mortem and therefore encompassed individuals with a wide variety of deficits including some in oral language. More recent studies have not found planar symmetry, but have given an account of a perplexing range of anatomical differences between children with developmental dyslexia and controls. These differences encompass reductions in temporal lobe, frontal lobe, caudate, thalamus and cerebellum, insula, anterior superior neocortex, occipital cortex, relative increases in the size of temporal and parietal plana and posterior cortex. There might be slight alterations in callosal morphology, inferior frontal gyrus and cerebellum. Two studies using diffusion weighted imaging have shown localized loss of directionality either bilaterally or confined to the left hemisphere, perhaps because of alternations in pathway location (Leonard, Eckert, Given, Virginia, & Eden, ۲۰۰۶).

Researches have concurred that brain imagery studies have demonstrated differences in the anatomy, organization and function of a dyslexic brain, but it is not known whether these differences are a cause or effect of the reading difficulty (New Zealand Ministry of Education, ۲۰۰۸).

۲.۳.۷. Genetics

Developmental Dyslexia is a highly familial and heritable disorder, but the pathophysiology and mode of its transmission are not known. There might be two sorts of reading impairments: one could be attributable to genetics and the other to environmental influences (e.g. emotional problems). There is strong evidence for a genetic contribution to the disorder. On the report of twin studies certain reading related skills are inherited and the heritability of the disorder is about ۰.۷۱. When children of consanguineous marriages were observed, the rate of reading impairment is higher in children of first-cousin parents than that of second – cousin or unrelated parents. This postulates a genetic basis of reading disabilities.