Chapter 5: Synthesis

All three parts of this research were planned and conducted with a view to achieve greater insight into process and problems associated with learning to read Persian orthography. While part one dealt with cognitive processes involving reading acquisition among normal Persian children, part two compared how phonological and orthographic skills contribute to reading and spelling for two alphabetic languages (Persian & English), that differ drastically, and part three addressed and classified reading and spelling error types among Persian dyslexic children. The results of each part have been discussed, within the specific area of Persian orthography. Here, therefore, a comprehensive overview of the work is attempted through a synthesis of the findings.

The role of orthography in reading acquisition

There is very little, if any, published work that has examined the development of reading skills among monolingual Persian children learning to read and write in their homeland and also, this little research literature is not at all clear about the cognitive processes involved in learning to read and spell Persian. There appears to be a general agreement among the researchers, however, that significant individual differences in literacy development could be accounted for by the properties of the language and orthography.

In part one of present study, cognitive processes involved in literacy acquisition of Persian was studied. Many orthographic factors, that may be thought to affect reading acquisition and literacy in Persian orthography, such as regularity and grapheme-phoneme correspondence; developmental pattern of reading in relation to deciphering consonants and attaching short/long vowels; transparency and frequency; multigraphemic forms of letters and the processes of moving through a sequence of phases of reading were considered for the study. Results indicated that Persian children were able to use assembled phonology strategy in reading different types of Persian nonwords and words with some success due to the regularity of the Persian orthography. Elder students were superior to younger students at such use due to their
greater knowledge of letter–sound correspondence rules, resulting in greater success in achieving phonological recoding via the phonics procedure.

Analysis of the reading errors of groups across lists indicated that the most frequent errors across Grades belonged to words with consonants and short vowels. Errors on words with consonants and at least one long vowel were in the second position and errors on transparent words (combination of long vowel and consonants) were the least. From the developmental point of view, therefore, Persian students after understanding consonants and vowels can read the words made up of consonants and long vowels (transparent words). In the next step, they can read the words, which are made up of consonants and long vowel, and then in the last step, Persian readers will be able to read words without any vowel representation. Analysis of the reading process of the students showed that Grade third and Grade fourth students had more tendencies to use long vowel in reading pure consonantal nonwords compared to the Grade fifth and seventh students. As outlined in chapter one, the short vowels in Persian are used only for beginner readers. Thus, the reader is faced with a string of mainly consonantal spelling. The expectation is that, by the time the diacritic marks are omitted, the reader has developed appropriate strategies for cognitive processes in reading and well-established visual orthographic lexicon. However, according to children's performance (on list four where vowels were absent from written words), the absence of vowels especially in low frequency words out of sentence context, may indeed cause ambiguity of various degrees for readers of Persian (even for skilled readers). This is also supported by Baluch (1992) who drew similar conclusions.

As described in the introductory chapter, Persian letters are written differently in different positions within a word. The present study revealed that children committed more errors in reading medial forms of letters than either word initial or word final forms. This is probably due to the fact that initial and final graphemic forms of letters resemble each other more than either of them with the word medial form. Thus the existence of multiple-grapheme forms in Persian makes reading more complex especially for younger students.

The overall results of the study suggest that Persian children rely mainly on phonological strategy in the beginning of reading acquisition and that phonological
processing helps them for the establishment of orthographic lexicon. A key feature of this claim is that reading acquisition in Persian children does not appear to be different from that of English children in going through certain stages of acquisition such as phonological and orthographic stages.

**Phonological and orthographic skills in reading and spelling Persian and English**

Research on English has identified early phonological skills as a strong predictor of later reading development (Goswami, 1990). Phonological skills are necessary for understanding the alphabetic principle that the segments of written language, that is, the graphemes, stand for phonemes, segments of spoken language. Second part was designed to examine these aspects of learning to read Persian and English by native Persian speakers. The interdependence hypothesis, proposed by Cummins (1979, 1981), may be relevant here as it holds that cognitive academic language proficiency (CALP) is transferred from one language to another. This hypothesis predicts that reading instruction in one language leads to a general language proficiency, which is strongly related to literacy in the second language even though specifics, such as orthography, develop separately. Cummins (1981), postulates that underlying cognitive academic language proficiency is common across languages, which creates high transferability of cognitive, academic, and literacy-related skills. The second part of the present study dealt with the following two research questions: (a) Do phonological and orthographic skills in reading and spelling English benefit from a transfer of same from Persian? (b) Does the orthographic complexity influence the role played by phonological and orthographic skills in reading and spelling?

The first question was related to the cross language transfer, and the prediction was that children who are good at Persian tasks are more likely to perform better in the parallel English tasks. Positive correlation was seen among the Persian and English tasks. As a whole, results are consistent with the view that skills and knowledge gained in first language can be transferred to a second language. To find out whether phonological and orthographic skills in Persian predicted performance in English reading and spelling, stepwise multiple regression analyses were carried out. The results revealed that phonological skills in Persian accounted for 14% and 6% of
unique variance for English reading and spelling respectively while orthographic skill in Persian did not account for any unique variance in English reading and spelling.

The second question was concerned with the relative importance of phonological and orthographic skills in leaning to read Persian and English. Based on orthographic depth hypothesis, it was expected that phonological skills play a more important role in shallow orthography (Persian) than a deep orthography (English), while orthographic skills play a more predominant in English than Persian. The results clearly suggest that orthographic skills did not account for any unique variance in reading and spelling Persian. On the other hand, phonological skills accounted for 4% and 3% unique variances of Persian reading and spelling respectively. This finding is consistent with Geva et al.'s (1993) results. Their study too used stepwise multiple regression analyses and concluded that beginning Hebrew readers generally rely on their phonological skills in reading. The finding for Persian reading is also consistent with the orthographic depth hypothesis. In contrast, orthographic skills emerged to be more important for explaining variance in English reading and spelling. For English reading, the unique variance accounted for by orthographic skills was 5%, while by phonological skills it was 4%. The difference was more evident in the case of English spelling as the criterion. While orthographic skills accounted for 8% unique variance, phonological skills accounted for only 2% unique variance. Overall results suggest that orthographic depth hypothesis accounts for the data of this study more satisfactorily than universal hypothesis. The results of second part study must be interpreted in the light of several limitations. First, correlations show the relation between two or more variables but do not indicate direction of nature of transfer. Thus, further research should be done to gather more information in order to determine more accurately the causal sequences of language transfer. Second, there were no standardized Persian parallel tests to English available, although the lack of standardized tests is a common drawback in most of cross-linguistic studies.

**Reading and spelling profile of Persian Dyslexics**

In the past decade, convincing evidence has accumulated to suggest that the major difficulty confronting the dyslexic child is in decoding single words. More recently, researchers have focused on the details of the word recognition process to
determine whether dyslexic children recognize words in idiosyncratic ways or similarly to normal readers. These studies focus on two basic mechanisms that can be used to recognize words. The first involves the use of phonological information. The reader uses knowledge of spelling sound correspondence to translate the written word into an internal phonological representation, which is then used to understand the word. The second process involves direct recognition of the printed word's meaning on the basis of its visual representation.

The determination of whether Persian dyslexic children use qualitatively different processes for word recognition must be made in light of existing data on the reading processes of normal children. Recent evidence suggests that normal beginning readers rely on phonological information to recognize words. However, with age, skilled readers switch to direct visual processes for the recognition of familiar, high-frequency words, whereas low frequency words are recognized on the basis of phonological information. Even though older children with good reading skills do not rely on spelling sound correspondence to recognize familiar words, their knowledge of these correspondences continues to expand and consolidate throughout childhood. The possibility that dyslexic children may not follow this normal developmental course is raised by studies of adults with acquired dyslexia. Dyslexic children like some of these adults, may not be able to recognize words on a direct visual basis, or they may not use phonological information for word recognition at any stage of their development.

In order to examine these issues, some researchers have used a reading level matched design, in which normal learners who read at the same level as dyslexic subjects serve as a control group. This procedure is particularly suitable for assessing whether dyslexic children's performance is qualitatively different from that of normal readers because it controls for the effects of skill level. Criteria for determining whether dyslexic children differ qualitatively or quantitatively from normal children have been proposed by Bryant and Goswami (1990). Qualitatively different characteristics exist when "the factors which are important in the reading development of the dyslexic children play little or no part in the development of normal readers. The dyslexic children are in difficulty for reasons which are quite idiosyncratic". Quantitative differences exist when there are no such idiosyncratic patterns, but
rather, the same obstacle cause difficulty to both normal and dyslexic children but are simply greater for the dyslexic children.

Using a reading level matched design several studies have examined dyslexic children's knowledge of spelling sound correspondences. Children read aloud pronounceable nonwords (e.g., PRING) or decided which of two pronounceable nonwords (e.g., KAKE vs. DAKE) sounded like an English word. It is argued that the only way the pronunciations of these unfamiliar, orthographically legal strings of letters can be derived is through the use of spelling sound correspondences. In several studies, dyslexics performed worse on nonword reading tasks than normal children with similar word recognition skills, leading some to conclude that dyslexics have a specific deficit in phonological skills, and that they do not use phonological information for word recognition. However, two additional pieces of data are required in order to make such conclusions. First, one must compare directly dyslexics' performance on nonwords of similar length and orthographic structure. If dyslexic children have selective impairments to the phonological coding system, then, compared with normal readers, they should show severe discrepancies between their ability to read nonwords and their ability to read words. If dyslexic and normal reader show similar patterns of reading nonwords versus words, but if the dyslexics simply make more errors than normals, then the dyslexic children's performance on the nonword task reflects quantitative differences. Second, one must assess the degree to which dyslexic children actually rely on phonological information for word recognition. It has been presumed but rarely tested that unlike normal readers, who use both visual and phonological processes for word recognition, dyslexic children rely primarily on visual information. A common method to assess word recognition processes involves comparing children's ability to recognize regular words, whose pronunciations can be generated by applying spelling sound correspondences (e.g., MUST), with exception words, whose pronunciations cannot be derived on the basis of spelling sound correspondence information is used, then regular words should be easier to recognize than exception words, assuming one has control for such factors as orthographic pattern, length, and frequency. However, if a purely visual strategy is used, then there should be no difference in the ability to recognize regular versus exception words.
In addition to reading problems, dyslexic children also exhibit severe spelling difficulties. Methodologies for assessing the processes used to recognize words have been adopted to test the common hypothesis that dyslexic children spell in a qualitatively different manner from either normal spellers or other types of poor spellers. For example Siegel and Ryan (1989) concluded that dyslexic children had poor knowledge of sound-spelling correspondences because they produced more error than level matched controls on a nonword spelling test. Researchers have also examined the degree to which dyslexic children produce phonologically motivated misspellings (e.g., BERD for BIRD) because such errors are thought to reflect the child's attempt to use spelling sound correspondences. In some of these studies, dyslexic and normal children produced similar rates of phonetic misspellings (Moats, 1983; Nelson 1980), whereas in other studies dyslexic children produced fewer phonetic misspellings (Olson, 1985).

The results the present study which compared the errors committed by dyslexic and control groups indicated similar reading and spelling error profiles (in quantitative analysis) were observed among dyslexics and the reading level matched group, and these profiles were different from the age matched group. This is in addition to the clear influence of the Persian writing system and its characteristics on reading and spelling. However, some performances of dyslexics and the reading level matched group were inconsistent. This can be attributed to the quantitative difference and to the phonological lag that characterizes the dyslexics. All three groups studies had mastered simple orthographic skill. The age matched normal group was more proficient in both phonological and orthographic skills. In contrast, reading matched children, who were at an earlier stage of normal reading development, were less proficient on simple phonological skill. The slopes of the overall profile in the two normal groups were parallel. This finding suggests that the normal developmental pattern is for fairly early (before fifth Grade) mastery of simple orthographic strategy. The results also did not find consistent, qualitative differences in phonological skill between dyslexics and younger normal readers. However, our results do not agree with the conclusion that there is not qualitative difference in the overall error profiles of dyslexics. Hence one cannot conclude that the dyslexics traverse the normal developmental trajectory at a slower uniform rate in all aspect of reading and spelling development. If this were so, their overall profile would always be parallel to reading
matched control and usually to normal age matched as well. This interpretation does not imply that dyslexics are qualitatively different on individual errors from younger normal. In that sense, the critics of a deviance (as opposed to delay) interpretation of dyslexics reading and spelling are correct.

On the whole, the three sets of experiments reported in the thesis has thrown some light on reading acquisition in Persian, which has an alphabetic script with some unique features but not studied so far in detail. The studies have been successful in bringing out some of the salient features of developmental process of reading as well as problems in normal reading. The results highlight need for more studies in neglected kinds of orthographies so that a universal theory of reading and dyslexia could be accomplished.

**Future Directions:** The role of Ezafeh Morpheme, difficulties that Persian readers may encounter in determining phrase boundaries, especially the boundaries of noun phrases should be explored. Determining phrase boundaries is difficult because Persian is a verb-final language and there are no markers to distinguish the subjects or the objects in a sentence. The roles of stress assignment and intonation in Persian have also not been studied elsewhere. Although understanding these rules may contribute to phonological disambiguation of written Persian, by itself it falls short when faced with problems caused by colloquial ambiguity. The change in the spoken version, what is known as Tehrani accent as mentioned in third part, has resulted in complete changes in stress assignment to a large corpus of Persian words, labeled as diglosisa. Persian morphological system in process of learning to read needs to be studied. In addition, the cognitive process in learning to read Persian for other Iranian minority languages such as Kurdish, Turkish, Baluchi and Arabic need to be studied. To gain better understanding of the skills involved in reading and spelling in Persian, the role of other cognitive factors should be studied. More studies should be done to determine the developmental process of reading and spelling as it moves from phonological to orthographic skills in Persian. More studies on reading and spelling among bilingual dyslexics are also necessary.