

## Adults learning to read in a second script: What we've learned

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**Introduction.** What happens when people learn a new language written in a new script? What can educators do to make the process more efficient and rewarding for students? Why does anecdotal evidence suggest that learning to read a language written in a new script is such a hard process? Research in reading both first and second languages (L1 and L2) has concentrated on other areas, such as comprehension and strategy instruction, and has not addressed the basic issues of acquiring new scripts. As a result, the field lacks solid information on which to base pedagogy.

At the Foreign Service Institute, we have been teaching languages in non-Roman writing systems to native English speakers for many years. Recently, we have been making concerted efforts to investigate the process by which adults learn to read languages written in these scripts and how students continue to make progress in reading these languages. This paper summarizes research literature pertinent to the acquisition of new writing systems, and presents findings from action research that I have conducted at the Foreign Service Institute. I address the pedagogical implications of the research and make suggestions for future research.

I am referring only to learning to read in alphabetic writing systems in this paper. I do not discuss reading in logographic writing systems such as Japanese Kanji or Chinese, except when reviewing published literature that refers to these writing systems.

**The reading process.** We know that reading is a complex process involving a number of components (Adams 1994; Juel 1991; Perfetti and Marron 1995). Grabe (1991) identified six major components as (1) automatic recognition skills, (2) vocabulary and structure knowledge, (3) formal discourse structure knowledge, (4) content and world background knowledge, (5) synthesis and evaluation skills and strategies, and (6) metacognitive knowledge and skills monitoring. These components are interactive; that is, they are thought to occur simultaneously and to support each other. The first two, automatic recognition skills and vocabulary and structure knowledge, are generally considered bottom-up, data-

driven processes that are dependent on the text for activation. The other four are top-down, context-driven processes inherent in the reader and applied to comprehension of the text.

Automatic recognition skills refer particularly to feature, letter, and word level recognition (Samuels 1994; Stanovich 1991). At these levels, “automaticity may be defined as occurring when the reader is unaware of the process, not consciously controlling the process, and using little processing capacity” (Grabe 1991: 379–380). The automaticity of the process results in freeing of processing capacity in the working memory, and the freed processing capacity that is then applied to global comprehension is essential for fluent reading (Daneman 1991).

Children achieve automatic recognition skills by learning to identify words in stages (Ehri 1994). The first is the logographic stage, in which children can identify letters and words that occur in the environment, such as “McDonald’s” or “Coca-Cola,” or the “m” in the word “camel” because it resembles a hump. At this stage, they base their recognition on only a small portion of the visual array. They then progress to the alphabetic stage, where they gradually become able to phonologically recode, that is, to convert the visually based representation into its corresponding phonological code (Daneman 1991). After converting the visual representation into the phonological code, the children can then determine the meaning of the word based on their knowledge of the spoken language. Children achieve full automaticity in the orthographic stage, which is characterized by the ability to instantly analyze words into orthographic units without converting the words phonologically. The phonological information is accessed along with the visual representation and is available to the reader; but fluent readers normally access the word in its holistic form and not in its constituent, phonological parts (Samuels 1994). This instant analysis of the word is referred to as word recognition, in which readers encode the visual pattern of a printed word and access its meaning in their mental dictionary or lexicon (Daneman 1991). Stanovich (1991) suggested that word recognition in fluent readers is an automatic skill occurring as a modular process. Modular processes are encapsulated; that is, they occur rapidly and without attention and are not influenced by prior knowledge structures stored in long-term memory. In short, encapsulation allows readers to know a word independent of context. Indeed, when readers need to use context to comprehend a word, they are using a compensatory mechanism that necessarily results in more attention being focused on the word and not on determining the global meaning of the text (Stanovich 1980, 1991).

Kintsch (1994) proposed a model of fluent reading, the construction–integration model, which includes automatic recognition skills as a critical component. After initial automatic word recognition, several other processes come into play. At the sentence level, readers must extract the underlying propositions, the basic units of meaning that describe a state or action, and the participants of

that state or action (Kintsch 1994; Daneman 1991). From the knowledge acquired from the merging of the extracted information and the general knowledge of the reader, readers then construct a text base. This text base is tentative, fragile, and subject to change, based upon further integrating the information into a coherent whole (Kintsch 1994). That is, readers constantly weigh the locally extracted information in light of their general comprehension of the text as a whole, and integrate the new information they have constructed into a more confident and solid rendering of the text. Working memory, where information is temporarily stored, is where this construction and integration takes place (Daneman 1991). Less skilled readers demonstrate smaller working memory capacities because they are presumably devoting so much attention to word and proposition-level reading that they are not easily able to integrate that information with previously read text. Furthermore, they often are not aware of inconsistencies in their representation of the text because of this inability to devote attention to this higher-level text integration (Daneman 1991). Poor readers “have problems interrelating successive topics and integrating information to derive the overall gist or main theme of a passage” (Daneman 1991: 526–527). Skilled readers, on the other hand, have larger functional memory capacities, most likely because of their encapsulated automatic word recognition skills. They are able to concentrate their attention on integrating the easily constructed basic units, and subsequently are able to achieve an overall interpretation of a text (Kintsch 1994).

**Reading in a second language.** Reading in a second language involves both language and reading skills. Two hypotheses have been advanced to explain the interaction of these two skills (Bernhardt and Kamil 1995: 17). The *linguistic threshold hypothesis* suggests that “in order to read a second language, a level of second language linguistic ability must first be achieved.” The *linguistic interdependence hypothesis* states that “reading performance in a second language is largely shared with reading ability in a first language.”

Both of these hypotheses are appealing as explanations for understanding reading ability in an L2, but neither is completely explanatory. Indeed, Bernhardt and Kamil (1995) found that even after combining both explanations for reading skill, 35 to 50 percent of the variance in L2 reading was left unexplained. Second language reading is ultimately “a process that requires some unique reading capacities and lexical and grammatical flexibility” (Bernhardt and Kamil 1995: 31). The unique reading capacities clearly would encompass the skills necessary for reading in non-Roman scripts.

**Research findings in L2 reading.** Second language readers bring several types of knowledge to the reading process. As adults, they often have extensive background knowledge, or schemata, for comprehending the text, and well-developed strategies for processing text (Carrell and Eisterhold 1988; Wenden

and Rubin 1987). What the new readers lack is knowledge of the language. And this deficiency in language obviously affects the lower-level processes of reading, which are so closely tied to language comprehension abilities (Eskey 1988).

Automatic word recognition processes are very difficult for new readers in an L2 to achieve. Indeed, researchers have found that inefficient word recognition processes can hamper the reading of even advanced readers of an L2 (Segalowitz, Poulsen, and Komoda 1991). For example, French-English bilinguals demonstrated comparatively slow reading skills when reading in their less dominant language. Another study found that native English readers could read a social science text in English in twenty minutes, but native Hebrew students in the same college class took from one to two hours to complete the same text (Cohen et al. 1988). Although the researchers did not draw the conclusion that script differences may have been responsible for the differences in processing in this study, it seems reasonable to suspect that they could have been a factor.

A reader's awareness of the form class of a word has been shown to be a predictor of reading abilities in English as an L2 (Guarino and Perkins 1986). Readers who demonstrate an awareness of the root meanings of words encountered and sensitivity to the grammatical function of morphemes and the placement of the word within the phrase or sentence read more accurately than readers who lack this awareness.

Beyond words and phrases, L2 readers also differ in overall comprehension. In one study, college nonnative and native readers of the same English text recalled equal numbers of high-level or macrostructure ideas of a text but differed significantly in their ability to recall subordinate propositions (Connor 1984). The native English speakers recalled a larger number of these subordinate propositions and included elaborative details in their recall. The nonnative readers mentioned the main ideas but supplied minimal elaboration.

*Readers of different scripts.* Only a very few studies of L2 reading have focused on issues of script differences, although several studies have included subjects whose native language was not written in Roman script and who were reading English as an L2. Recently, studies have been conducted that take differences in scripts as a point of departure.

One of the first studies to focus on readers of different scripts investigated two college levels of native readers of Chinese reading English (Haynes and Carr 1990). The study found that even though the Chinese were students who had read many of their texts in English, their mastery of the English writing system was not complete. The problems the students demonstrated were not at the letter level, however. At the grapheme level they read with the same facility as native readers of English. The Chinese readers differed from native readers at the word level. For example, they were unable to profit from predictable sequencing of letters. The problems they had at the word level affected their reading speed, their overall

comprehension, and their ability to learn new words from context. The more experienced Chinese readers were superior in new word learning from reading, suggesting that reading more in the L2 does ultimately have its rewards.

The researchers concluded that speed of reading eluded the Chinese readers more than either comprehension or skill at inferring word meanings from context. They added that word learning may depend on both accuracy and speed of reading. These researchers also observed a relationship between the subjects' general knowledge of English as a spoken medium of communication and their skill in reading English. One of the significant conclusions from this work is that "writing-system knowledge continues to exert an impact on reading outcomes beyond the early stages of language learning in general and beyond the early stages of exposure to any given text, particularly in situations like that of new word learning in which effective discrimination among potentially confusable word forms is essential" (Haynes and Carr 1990: 413).

Other studies have looked at the transfer of reading skills across orthographies (Chikamatsu 1996; Horiba 1996; Koda 1990, 1992). Using a construct of a continuum from shallow to deep orthographies, these researchers have compared native readers of different orthographies reading different scripts. Shallow orthographies are those that are highly recodable, having a high correspondence between sound and symbol. Examples are Serbo-Croatian, Japanese Kana (syllabaries), and Hindi and Nepali. Deep orthographies are those like Chinese or Japanese Kanji, where the relationship of sound to symbol is not easily discerned. English and several other languages, such as Arabic, Hebrew, and Thai, lie between the two extremes. Japanese and Chinese readers are assumed to rely more on visual access to process words because in reading their native language they first access meaning visually, then phonologically. These readers employ these visual processing strategies when reading English. Conversely, native readers of English reading Chinese and Japanese Kanji demonstrate a reliance on the phonological recoding inherent to English even when an initial visual strategy would have been more appropriate (Chikamatsu 1996; Koda 1990, 1992).

In think-aloud protocols of Japanese and American students reading stories in their nonnative languages, subjects made comments more frequently on lower-level processes and less frequently on higher-level processes, whereas while reading in their native language the subjects did the reverse (Horiba 1996). Specifically, the L2 readers commented on grapheme, word, and sentence phenomena, while L1 readers elaborated on the basic factual information in the text that they had clearly understood. On rereading the same texts, the L2 readers paid more attention to larger linguistic units and elaborated more. Overall, "L2 readers were not sensitive to how the ideas in the sentence were related to the prior text; they did not generate backward inferences according to the causal structure of the text" (Horiba 1996: 449–450).

Evidence from interviews with nonnative readers of Nepali supports the results of the empirical studies cited above (Abadzi 1994). These readers of Nepali

as an L2 suggested that their reading got off to a brisk start, but soon reached a plateau beyond which they could not progress. They also said they had limited ability to recognize patterns of spelling and letter combinations in words. They read at a low speed and had difficulty consolidating the material they were reading. These readers had high error rates in what they read, and were overly dependent on context to make sense of words. They also found they had to sound words in order to read them. They frequently segmented words incorrectly across morphemes. Likewise, they had difficulty recognizing letters they knew when they encountered nonstandard writing or printing styles. In short, these readers found themselves in a perpetual beginning stage, even though they were advanced speakers of Nepali.

*Investigations at FSI.* For several years, I have been conducting informal observations and action-research projects with students of Hindi and Nepali. Both languages are written in the same script, Devanagari, which has close sound to symbol correspondence. My formal efforts have been as a teacher of Hindi to beginning (Red 1995) and intermediate students (Red 1997), and as a teacher of Hindi and Nepali to intermediate students as described in an unpublished study. As a teacher of new students, I taught two adult students two hours a day for four days a week. One student took class for sixteen weeks, and the other for twenty-three. I kept notes on my teaching and conducted interviews with the students on several occasions. I compiled the observations from this class into a report (Red 1995).

On another occasion, I worked with two students of Hindi reading authentic texts once a week for one to two hours (Red 1997), using the following methodology:

- (1) Student read passage aloud in Hindi.
- (2) Student gave meaning of entire passage in English, with no comment from me.
- (3) Student read passage silently as long as needed.
- (4) Student added to initial report in English, again with no comment from me.
- (5) I provided student with vocabulary gloss and had him or her read passage silently as long as he or she felt necessary.
- (6) Student read sentence by sentence aloud in Hindi and gave meaning in English. I explicated the grammar, vocabulary, syntax, and morphology as much as needed to help the student to understand the text. I also helped with pronunciation and phrasing, if necessary.
- (7) Student read entire passage aloud in Hindi.

I chose this methodology because I wanted to determine how efficiently the students would read new text material, and what they would understand with

several readings. The first reading of the text aloud gave me an understanding of their general comprehension as demonstrated by their control of the letters, words, phrases, and sentences. The second reading of the text indicated to me whether the students were able to understand more with a second, silent reading. The third reading with a vocabulary list allowed me to learn how much of their comprehension difficulty was based on vocabulary and how much was based on lack of understanding of syntax and other linguistic features.

I had the students read sentence by sentence aloud for two reasons. First, I wanted to determine if after interacting with the text several times, they would demonstrate a greater understanding of the grouping of letters, syllables, and words in their oral reading. Second, I wanted to determine if they were able to understand the microstructure, or lower-level ideas, of the text.

The final oral reading was to determine whether, after several interactions with the text and discussion about meaning, syntax, and word forms, the students would demonstrate their better understanding by reading aloud more expressively.

An unpublished study I conducted with Hindi and Nepali students investigated the types of interactions I had to perform as a teacher to help the students read a text. By tape-recording the sessions, I was able to analyze the frequency with which I performed different types of interactions. Overwhelmingly my comments to the students were focused on vocabulary and correct assignment of meaning, including identifying letters correctly, correcting misreading of words, and correcting misunderstandings about the part of speech of a word. Approximately half of my interventions were at the word level. My next most common intervention was helping them to understand the grammatical form of a sentence and to provide them with a translation when they were unable to fully comprehend the manner in which the elements combined to convey meaning.

**Observations about learning new scripts.** Based on my review of the research literature and my own research efforts, I have formed ideas and hypotheses about learning to read in new writing systems. These observations are in the categories of general issues, word-related issues, reading-aloud issues, and overall-comprehension issues.

*General issues.* I propose five general issues for new readers of different scripts. They are:

- (1) The issue is not the script itself; instead, it is the automatized recognition of letters and words. Learning to read a new alphabetic system is a task that most learners can accomplish quickly. The problems arise after the recognition of new letters has been accomplished, because the recognition of the letters takes a long time to become automatized (if it occurs at

- all). Also, combining the letter recognition into word recognition is a laborious task because most words encountered are new to the students.
- (2) Training in reading should take place with actual reading texts, and interventions should be appropriate for the student. Strategy instruction in general will not be effective if the students are not applying the strategies to the actual texts they are required to read. Intervention should be based on the need of the student at the time to ensure that they learn the most from the intervention. I have observed that students can become quite proficient in reading nonauthentic texts—those created for classroom use—but then can have immense difficulty with authentic texts—for example, newspaper articles from a given country. The language and forms are so different in authentic texts that students must learn appropriate strategies for comprehending those texts, even when they have developed sophisticated strategies for comprehending the nonauthentic classroom-generated texts. This observation does not negate the need for practice with nonauthentic texts. I believe such texts are necessary for building skills. But in order to process authentic texts, students must receive explicit instruction in how to read them.
  - (3) Students improve over months of training, but remain at a low level of reading proficiency compared to their native language ability. Reading in a second script remains laborious throughout the initial year of training (and likely beyond). The skills that students have in skimming and scanning their native language are rarely achieved in the new writing system. The difficulty of reading encourages them to make guesses about the overall content of text, but they lack the skills to easily check for the accuracy of their guesses.
  - (4) Students exhibit small working memory capacity, having to reread text multiple times to form a complete idea of the text. The demands of reading in a second script take their toll on the working memory. In order to construct a text base and integrate it as one reads along, the reader must make multiple attempts to read the same text.
  - (5) People do not benefit from shallow orthographies, that is, from predictable sound-symbol correspondences. The shallowness of Hindi and Nepali orthography has not proven to be of great help to students because they still do not attend to each letter and the especially important endings on words. Even though with appropriate time they should be able to sound out letters and thus pronounce words, observation suggests that they do not always manage to do this.

*Word-related issues.* Students appear to have the most trouble reading at the word level. Among their problems with words are the following:

- (1) In writing systems that lack capital letters, students sometimes misidentify proper nouns and other word forms. Students lack the knowledge of the meaning of words and must use context and other clues to learn the meaning. Their incomplete knowledge of syntax and vocabulary on one level, and lack of cultural background knowledge on the other combine to make word identification very difficult. Their random guessing of the meaning of words, or admittance that they have no idea about the word illustrates the difficulties they face in trying to become fluent readers of the language. Students are very sensitive to typeface changes, often misreading words and numbers they know in other typefaces. With increasing use of computer typefaces, students face numerous stylistic differences in presentation of letters and numbers. Their incomplete knowledge of the writing system is revealed in their inability to recognize all forms of letters and numbers, and their consequential lack of automaticity at even the feature and letter level.
- (2) Lack of vocabulary knowledge hampers students throughout their training period. Students certainly acquire vocabulary during their training periods of up to ten months at FSI. The preponderance of vocabulary used in the press, however, continues to stymie students, resulting in reading being difficult throughout training. One of the features of most languages written in non-Roman scripts is that they are very foreign to English, and practically every word in the language must be learned. Almost no cognates and only a few English borrowings combine to make learning vocabulary a major part of learning the new language.
- (3) Students find it very hard to learn vocabulary from reading and need to receive glosses primarily in English. Students encounter several new words in each sentence or paragraph of authentic texts. The number of new words requiring attention does not allow students to use other clues in the text to understand the words. Even presenting the students with simple definitions in the target language has proven to be of limited use. Translating words into English has been the most effective means to provide students with enough knowledge to continue reading texts.
- (4) Throughout their training time, students read word-by-word upon their first contact with text. The act of reading aloud has shown me that students still struggle with text when they first encounter it. They are dealing with the individual words and their elements and are not able to read in word groups using natural phrasing. This reading style is evidence that they are not yet able to comprehend text easily on the first encounter.
- (5) Students often misread longer, unfamiliar words. They appear to access the first letters of a word and for the sake of utility neglect to read the full word. Evidence of this comes from their misidentification of a number

of words when reading aloud. This phenomenon suggests that students' working memories are overtaxed and they are compensating by reading a minimum of text to gain understanding.

- (6) Students have trouble with affixes and syllabification due to lack of knowledge of word formation. They certainly appear to lack information about word formation in the two languages I have studied. From their reading aloud, I have learned that they have trouble recognizing prefixes or suffixes appended to roots, and thus do not break words down into their constituent parts. As a result, students complicate the process of learning words by trying to remember each word they encounter as a discrete unit, rather than as a member of a family of words.

*Reading aloud.* The practice of reading aloud is not currently advocated in teaching reading to adults, yet I have observed benefits of this practice. Having students read has alerted me to their understanding of grammatical constructions, affixes, and syllabification. As mentioned in the previous section, students often misread word endings and parse words incorrectly in their first encounter with text. They also indicate by reading word by word that they are not able to group words together in natural phrasing. By correcting them as they read, I have been able to alert them to problems and provide them with knowledge they can apply to subsequent readings. I want to caution here that I am endorsing reading aloud once the students have some fundamental knowledge of the writing system and the language. In addition, the texts they read aloud have to be at least partially accessible to them. Otherwise the practice is merely testing decoding without achieving any meaningful purpose. Obviously, in logographic scripts where sound-symbol correspondence is minimal at best the time for reading aloud by students will be at a much more advanced stage.

Students benefit from being read aloud to by a teacher because it informs them of natural phrasing and pausing and forces their eyes to move across the page at natural speed. Understanding of texts appears to be aided by the teacher reading aloud. Because at the Foreign Service Institute students are learning the spoken language in separate classes, and their spoken language is superior to their reading, hearing texts read aloud enhances their understanding.

*Overall comprehension.* Students demonstrate an increasing ability to give an overall gist of a text in the latter stages of their training, but not without large gaps due to lack of vocabulary knowledge and lack of understanding of grammatical constructions. When asked to give a summary of a text that they had read once, students have been able to give a more accurate summary of such texts as the training progressed. Frequently, however, they leave out major portions of the text in their reporting. They also misinterpret sections of the text they

thought they had understood. In the latter case, the reports the students have given indicate that they were using their background knowledge to interpret the text and were not relying on every aspect of the actual text on the page for their information.

**Relation between L1 and L2 reading theory and implications for instruction.** In many instances, L1 reading theory is helpful in explaining L2 reading. Differences exist in some areas, primarily because L1 reading theory is based on initial acquisition of literacy by children, whereas those learning foreign languages at FSI are adults who are already fluent readers of their native language. Comparing similarities and differences between L1 and L2 reading acquisition can at least guide us in designing appropriate training for L2 readers.

*Differences between L1 and L2 reading acquisition.* A primary area of difference between L1 and L2 reading acquisition is in the area of emergent literacy (Purcell-Gates 1995). Emergent literacy is the term that describes a child's growing awareness of the meaning of print in the environment. Clearly, literate adults have gone through this stage and enter the learning of reading in an L2 already fully aware of the significance and use of print. Similarly, children go through a logographic phase of reading development. In this stage they recognize letters and words as much because of their shape and environment as the letters and words themselves. Adults do not demonstrate this stage much in the classroom other than mentioning early in training that they remember a letter because of its shape or distinguishing characteristics. Because adults already have developed the alphabetic principle from reading English, they enter into the alphabetic stage almost simultaneously to learning the letters. They differ substantially from children, however, in not reaching the orthographic stage that fluent readers acquire (at least not within the first year of training, and likely not after that). Thus interventions for new L2 readers should focus on building automatic recognition skills very early in their training and continue throughout.

*Similarities between L1 and L2 reading acquisition.* Similarities between L1 and L2 reading acquisition appear to exist, suggesting that interventions used for L1 readers also can be appropriate for L2 readers. Stanovich (1980) hypothesized that readers compensate for deficiencies in one part of the reading system by relying upon others, and the adult readers I have encountered display behaviors that suggest they were compensating. Specifically, they compensate for the lack of vocabulary and word recognition skills by over-relying on their background knowledge and other higher-level skills. The adult readers bring with them sophisticated cognitive and metacognitive skills and strategies and appear to rely upon these to compensate for their inability to decode the text. Another example of a compensatory strategy is when students neglect to read endings of words because in read-

ing their L1 they access the word so quickly and completely that they do not need to devote attention to its parts. This strategy fails them in reading Hindi or Nepali because the strategy is dependent upon automatic word recognition. Focusing on this problem area should help students to recognize the necessity of paying attention to all the elements of a word.

At a more global comprehension level, the readers in my studies and in others have consistently assumed they have full knowledge of the content of the text, even when their reports suggest otherwise. In terms of Kintsch's model of reading, they were performing integration without having adequately constructed the more basic elements of text. In schema-theoretical terms, they were relying on their initial interpretation of the text and not heeding (or not understanding) information that contradicted their interpretation (Anderson et al. 1977). Focusing their attention on the linguistic elements in texts should help students rely less on top-down strategies and more on essential bottom-up ones.

When students read a text more than one time, especially after intervention by the teacher to aid comprehension, they demonstrate far more accurate comprehension. This phenomenon suggests that on their first reading the local context comprehension process overtaxes their working memory, and they are unable to direct their attention to overall comprehension. Only by successive rereading are they able to free their working memory to create a coherent representation of the text. This is the same process poor readers demonstrate in their L1. Encouraging rereading is an easy and effective intervention that students can practice throughout their training period.

In addition, students demonstrate little knowledge of syllable juncture and derivational knowledge, presumably because of their unfamiliarity with the language in general and word formation in particular. Native English readers show this same problem in early stages of reading for the same reasons. American students in school require four to five years of education to demonstrate a sufficient knowledge of syllable juncture and derivational knowledge. Students reading at the Foreign Service Institute usually cannot make significant progress toward acquiring this bank of knowledge in their less than one year of study. I know of no research that indicates how long it would take native readers of English to acquire this knowledge in languages written in non-Roman scripts. Teaching students explicitly about word formation throughout training could help them in this area.

In general, the problems that students face when reading languages written in non-Roman scripts appear to be located more at the construction phase, or lower-level processing phase of reading. Integration does not easily occur, but one can presume that if the students attained a sufficient knowledge of the language and vocabulary, they could use their sophisticated background knowledge and well-developed reading strategies to full advantage. Thus, Kintsch's reading model is especially appealing as a model for those working with students learning to read

languages written in non-Roman scripts because it focuses on the necessity of word recognition and basic syntax connection to ensure integration of the text elements into a cohesive whole.

**General pedagogical implications.** Teachers should continue to foster solid reading practices in their students that focus on higher-level skills, such as predicting, schema activation, and monitoring of reading. Yet they should also give more attention to developing their students' lower-level skills. Exercises that focus students on letter, word, and basic syntax areas would greatly benefit their progress in overall reading.

At a very basic level, students should be provided with a print-rich environment. All the objects in a room can be labeled, so students are constantly associating written symbols with items in a meaningful context. Similarly, from the very beginning teachers should teach the writing system. They should also write all new words on the board, even before students can easily read them. Constant bombardment with print can help the students to become familiar with the written language more quickly.

Similarly, students should be encouraged to write from the very beginning of their training. At first, they should be encouraged to write down all their words in the script, rather than in transliteration as they often prefer to do. Later, they should begin writing lists, sentences, and notes in the language. As in L1 literacy acquisition, journal writing would be very helpful for new students to become immersed in the literate form of the language. Teachers could also encourage the students to create dialogue journals, in which teacher and student carry on conversations in writing.

Whatever exercises or activities are created for enhancing reading skills, they should be directly linked to actual reading material. Isolated exercises are often ineffective for preparing students to read texts. Ideally, the student would have a teacher who would work with the student on specific texts and when problems or examples arose, the teacher could address them at that moment. The intervention would be most memorable because it would be timely and necessary. The teacher could elaborate on points, draw comparisons with previously taught material, or encourage the student to use appropriate strategies. If the teacher is not able to provide the student with this kind of intervention because of class size, then the solution can be well-designed activities and exercises.

A special set of exercises should be developed to enforce automaticity as much as possible. One way to build this automaticity is to create readings that are simple and repetitive enough to free the working memory to work on overall comprehension. Creating written exercises that use only vocabulary and grammar that the student has encountered is one good way to ensure easy reading. Adults studying languages written in non-Roman scripts appreciate reading materials that are not peppered with new words, so creating simple texts can also boost their feeling of accomplishment. As the students increase in sophistication in the language, the

teachers can create extensive exercises that prepare the students for reading authentic texts themselves.

Every writing system and language has specific features that students need to learn to recognize and utilize. Generic reading strategy instruction is useful, but cannot address each specific language. Consequently, special care must be given to providing the student with practice in attending to the special forms to which native readers attend while reading. Teachers should, therefore, create exercises that focus the students on the specific strategies that are helpful for reading the language. An example from Hindi would be to create exercises that forced the students to pay attention to word endings that indicate the relationship of the nouns to the verb. The verb in many types of Hindi sentences falls at the end of the sentence and indicates gender; it will usually agree with a noun in the sentence, whether the subject or the object, depending on the construction of the sentence. Frequently students ignore this crucial information because it is of little importance in English, and therefore do not recognize visual signals about the agent or patient of a sentence, thus missing the essential meaning of a sentence.

Furthermore, exercises should be developed that focus the reader on improving the speed at which they read. Here, too, specially created texts can be combined with appropriate exercises that force students to read with increasing speed. In the absence of special exercises, rereading can be a simple approach to building reading speed.

**Further research.** The need for further research on the question of how students learn to read languages written in non-Roman scripts is obvious. Perhaps the most pressing need is to disentangle the effects of orthography from the effects of language structure, that is, to separate word recognition from syntax and other linguistic knowledge. It may be that it is impossible to separate the two, but without research we can only guess. This research could help us better design materials that will strengthen students' abilities in both areas of knowledge.

At another level, it would be helpful to know how native readers of non-Roman script languages read their languages. This information would guide us in developing strategy training for our students because we could help them to attend to those features that native readers do.

The current trend toward more research on the brain and its functions could be potentially useful to our field. For example, we could learn if there are indeed patterns established in the brain for reading in different languages. We could also learn if biliterates are accessing different parts of the brain to accomplish the reading task. Brain research could help us to learn what we might change and enhance by intervention, and what would not benefit from intervention.

A pressing need is to find whether adults can achieve automaticity in reading in non-Roman scripts at all. Much language acquisition research has suggested that language learning that occurs after puberty does not result in native-like proficiency. It is not unreasonable to expect parallels for script acquisition; people

may well attain a level of proficiency but may not be neurologically able to mimic native-like reading proficiency. Thus, more research on the process of adults acquiring a new writing system could help us learn the limits and possibilities for our students and guide our instruction. In a similar vein, conducting research on literacy acquisition of adults who have never attained literacy could provide insights into the process of adult script acquisition. Comparing the results of this research with research on literate adults acquiring a second writing system could inform us of basic issues in script acquisition.

**Conclusion.** The process by which students learn to read in a non-Roman script is becoming clearer to us. We know that students can quickly learn the script itself but have most problems at the word level. This difficulty at the word level appears to be a major factor in preventing students from attaining fluent reading in the new L2. For native English students, the large amount of new vocabulary encountered in languages written in non-Roman scripts means that many words encountered in reading are encountered relatively infrequently. Since frequency of exposure to a word is a determining factor in efficient word recognition, then we know that our students have a difficult task before them.

The research I have conducted is qualitative and limited to a very special population. I cannot predict how much of what I observed will be found in other populations. I therefore call upon members of the profession to conduct research and share their insights, so we can have a better picture of the reading acquisition process in languages written in non-Roman scripts. Research I have reviewed and conducted along with practice I have implemented in the classroom have suggested what types of intervention are effective in helping students to learn. We need to know much more. I hope that other practitioners and researchers will begin to work in this fascinating, but neglected area of reading.

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