3- Visually similar rhyme(main task)

No	Words	Yes	No
1	door-poor		
2	cake-take		
3	seen-tried		
4	side-best		
5	door-spoon		
6	size-prize		
7	brown-town		
8	night-light		
9	sheep-rail		
10	nest-test		

4- Visually dissimilar rhyme (main task)

N0	Word	Yes	No
1	four-door		
2	pail-trees		
3	light-cried		
4	trees-freeze		
5	date-sail		
6	front-hunt		
7	train-lane		
8	hole-coal		
9	form-slide		
10	code-dirt		

Appendix

The samples of materials used in the phonological decoding task

1-Marking task

	Yes	No
1		o
2	O	
3	O	
4		o
5	O	
6	O	
7	O	
8		o
9	O	
10	O	

2-Wording task

No	Words	Yes	No
1	book-book		
2	radio-road		
3	car-car		
4	book-back		
5	radio-radio		
6	car-cow		
7	basket-basket		
8	fan-fan		
9	basket-better		
10	fan-fly		

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and deliberate from the start and others (Mclaughlin, 1990; Grabe 1991) view development of automaticity in word identification skill critical to fluent reading. Having not been involved in a complete English environment from the beginning, and not been engaged in an English immersion course in subsequent years, the subjects may not have been able to improve unconscious tackling of word processing.

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Discussion

It appears that the null hypothesis indicating that *There is no significant relationship between the subjects' ability in conversion of letter-to-sound in L2 and their L2 reading ability* is rejected.

Different reading skill groups show different patterns of result with respect to their speed in phonological decoding. To our surprise is the fact that to extent subjects are more efficient in their general reading comprehension, they are faster in their decoding to sound ability. The greater score they gained in their reading proficiency test, the faster they were in the grapheme-sound conversion task. Of course, there was no "trade off" between speed and accuracy. As it was stated, there were no reliable difference in the errors made by the four groups. In other words, to the extent the more phonological burden of the task has been increased the more time has been needed to process it. As in second part of basic task (**Table** 1) involving sorting the same orthographical words from the different ones, we see there is a linear progression in the amount of time taken to process even this low level verbal component of basic task which was not expected (time taken in second for each item for four groups in turn. SD shown in parentheses 1.24 (.3), 1.27 (.39), 1.68 (.48) and 1.89 (.45)).

However, it cannot be concluded that lower level group deficiency in L2 reading was necessarily due to their slower process of letter-sound conversion because no interaction between similar/dissimilar rhyming tasks was found (**Table 2**). Regarding the ratio of difference between similar/dissimilar tasks for different groups, no significant difference was observed. It seems all groups have engaged in phonological processing, although those groups which were more proficient in L2 did the task faster than those which were less proficient.

The reason behind this finding may be that unconscious or automatic processing of sound decoding has not yet been achieved. In one end of the extreme, Vygotsky (1962) considers learning a foreign language a conscious

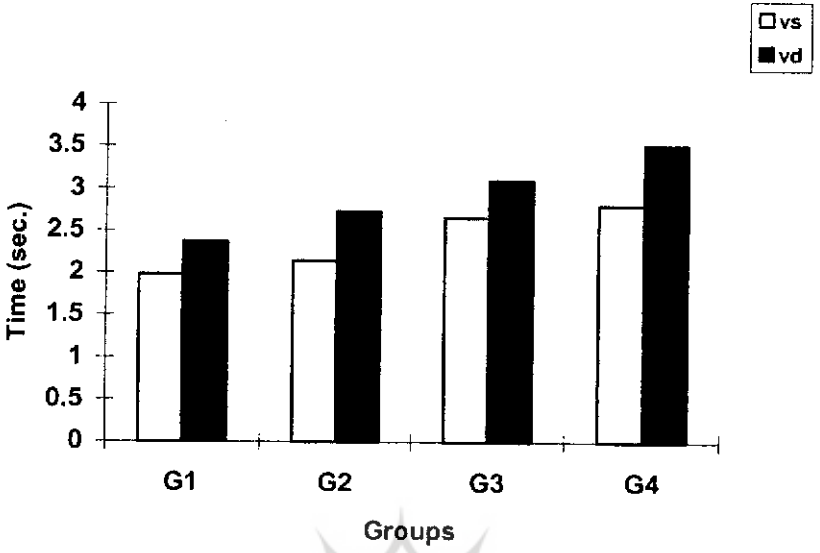

Figure -1: Mean sorting time per item: visually sim. vs. visually dissim.

There was no significant difference between the four groups in the number of errors made. Analysis of variance showed no reliable difference in amount of error of the similar and dissimilar rhyming judgement as follows respectively: $F(3, 36)=1.42$, $P<.25$ for similar and $F(3, 36)=.86$ $P<.46$ for dissimilar items.

Additionally, the result of ANOVA on the difference between similar and dissimilar time for the groups showed no significant difference between the groups $F(3, 36)= 1.09$ $P=.36$ indicating that the ratio of difference between two tasks (dissimilar minus similar) taken for each group is roughly similar to other group (**Figure -1**). It implies all groups have been involved, probably consciously, in grapheme-phoneme conversion, though, based on their reading proficiency levels, the higher levels have been faster than the lower ones to carry out the task. Had it been the case that the most skilled groups (1 & 2) showed no difference in doing visually similar/dissimilar tasks it might have been plausible to claim that they had done the job by direct visual access rather than going through the letter-sound conversion task

Table 2: ANOVA for time in phonological-decoding related to material and reading skill levels

key: S= subjects Gr = reading skill groups Mat = materials (visually similar vs. visually dissimilar)

SOURCE	SS	D.F.	MS	F	P
Between					
Gr	11.738	3	3.913	4.45	<.01
Mat	5.698	1	5.698	56.98	<.0001
Gr x Mat	.332	3	.111	1.11	n.s
Within					
S (Gr)	31.927	36	0.88		
S x Mat (Gr)	3.648	36	0.19		

As Table 2) indicates the difference between the groups was highly significant F(3,36)=4.45, P<.01. The effect of the type of materials exceeds highly the critical value F(1,36) = 56.98 P<.0001. By looking at the F-ratio for the interaction of reading skill level and materials on overall gain scores, we see the interaction is not significant, F (3, 36) = 1.11, P>.05 which means in both types of materials the groups have performed differently.

If we plot (**Figure -1**) the mean reading time of four reading skill groups (per item in a second) due to the lack of interaction between material and groups it can be clearly seen that all four reading skill groups took longer to read the visually dissimilar rhymed pairs of words in ratio to read visually similar one.

The result and the discussion of the experiment done individually with selected groups of the subjects following the same materials and procedure are as follows:

Results

Table 1: Mean sorting time per item (seconds) as a function of reading skill level and type of materials with SDs in parentheses.

Exp. Tasks	Condition	G1	G2	G3	G4
Basic task	Non-verbal	.49 (.07)	.46 (.11)	.56 (.11)	.58 (.10)
≈≈ ≈≈	Sam. / dif.	1.24 (.3)	1.27 (.39)	1.68 (.48)	1.89 (.45)
Main task	Vis. Sim.	1.98 (.43)	2.14 (.36)	2.66 (.81)	2.80 (.70)
≈≈ ≈≈	Vis. Dis.	2.37 (.45)	2.73 (.70)	3.10 (.78)	3.52 (1.06)

An analysis of variance was computed for the data from the basic and main tasks. There was no significant difference between the four reading skill groups regarding the non-verbal (marking time) of basic task. However, with respect to Scheffe test with significance level .05 a significant difference was seen between group 1 & 2 vs 4 on word matching (same/different) of the basic task.

In a simple factorial design, we have two independent variables each with some levels: the first one is our reading skill groups with four levels, and the second, is the materials with two levels. An attempt has been made to investigate to what extent the four different reading skill groups respond to two types of phonological word decoding differently.

as much as possible the amount of time taken to put the mark from the word time processing when it comes to do so in main experimental task (to sort visually-similar and dissimilar rhymed pairs of words). The other one was a "same/different word sorting task" which involved to look at a pairs of words to see whether they were just orthographically different or same and put a mark under "Yes" if they were the same and under "No" if the words were different (Appendix). This task provided a measure of marking time when a low level verbal component was involved. It could be that any verbal component in the task will hinder the less-skilled reading groups if they are taking more time to process words.

If it is the case that the four different reading skill groups differ on their phonological decoding speed, then they can be expected to differ in the amount of time taken to sort visually dissimilar rhymes, where phonological decoding is obligatory. If, however, the less skilled groups tend to use grapheme-phoneme conversion system, even when the task can be accomplished sufficiently by a direct-visual access, they would be expected to differ from more skilled reading groups not only on visually-dissimilar words but also on the similar rhymes.

Procedure

The four independent subjects acted as their own control, each doing the basic task and rhyming task on the same day. The subjects were told that they were doing to do a three part test and each part should be done according to the criteria of the particular condition (e.g. pairs of words that rhyme and those that do not). They were told they should do the work as quickly as possible without making mistakes. After the practice trial for each set, the subjects' errors, if any, were pointed out to them and they were asked if they had any questions about the task. If not, the experiment began. The researcher handed the pupil a pack of papers for one trial, gave the signal to begin, and started a stopwatch. The watch was stopped as soon as the final mark had been put and the marking time (to the nearest 0.01 second) was noted. For subsequent tasks the subjects were reminded of the previous marking task and appropriate instructions for the current task.

were defined as the reading-level group (1) and respectively those with one SD above the mean, one SD below the mean and two SDs below the mean were operationally characterised as groups (2), (3) and (4). For each group 10 subjects were selected.

Material

The four reading groups selected for the study participated in an experiment to sort pairs of words into two "Yes/ No" groups depending on whether words in the pair rhymed or not. The rhymed pairs of words originally provided by Oakhill (1981) were of two different kinds: (1) visually-similar rhymes *(ride-hide)* and (2) visually-dissimilar rhymes *(side- cried)*. Oakhill (1981) points out that the words were chosen from a pool of 4-6 letter common words and were read with 100% accuracy by an independent group of readers who had reading ages of 7:10 to 8:2. The age level roughly corresponded to level of ERT (stage 1) used to measure L2 reading attainment of the subjects.

For each kind of rhyme there were 30 pairs of words. These were listed separately which were then printed in a column format on two sheets of A4 papers (Appendix). A YES/NO box was placed after pairs for the subjects' answer. To each list, 30 pairs of unrhymed words formed by randomly pairing the pair words were added to make a list of 60 pairs of words. Rhymed and unrhymed pairs were reduced to 50 words after pilot study.

Oakhill (1981) argues that in the case of visually-dissimilar rhymes, phonological decoding is obligatory to decide whether or not each pair of word rhyme but for visually-similar words the task can be accomplished without such decoding. In the condition created, therefore, it is possible to get an insight of the phonological decoding ability of different reading-skill groups: whether or not the lower level groups are less efficient and slower in applying the grapheme-phoneme conversion rules of English to do the task.

Two basic tasks were also included: one was a measure of marking dexterity and involved putting a mark under "Yes or No" boxes according to whether the boxes had a dot or were blank (Appendix). This was included to measure subjects' dexterity in putting mark in appropriate boxes to eliminate

the instruments to be employed; for it would have been quite difficult, if not impossible to conduct tests in cities across the UK.

From the accessible population of Iranian students in Manchester (155 boys and girls) about 105 children were selected. They were at age level of 10-15 which constituted the last year of primary school (junior year pupils in year 5) and the three years of guidance "Junior" school (early secondary pupils in year 6, 7, 8) as well as the first year of high school (early secondary pupils in year 9). (For the full account of the subjects selection refer to Fazilatfar, 1998)

Selection of the measurements

In the absence of any standardised reading comprehension test designed specifically to measure the reading ability of those readers who were non-native speakers of English particularly at the age range of the subjects (10-15 years old), the Edinburgh Reading Test "ERT stage1" (ERT & score manual "stage 1", 1994) was thought suitable for use as a reading proficiency scale An effort was made to assess the appropriateness of the test to the present study. The test was originally designed for native English speakers 7-9 years old who usually begin to learn to read formally at age 6. It was thought the test would also be applicable to subjects a little older who had been acquiring English in an English community. Unlike their younger English counterparts who had been absorbing English from their birth and had well-developed language competence these subjects were acquiring English in Manchester. However, there were also strong commonalties. The content of the test items as well as their face validity matched roughly the type of materials and examinations to which the subjects were accustomed

The test was carried out. The subjects were encouraged to attempt all of the items of the test and to consider the test as part of a general evaluation of their language proficiency. In the light of this view, an attempt was made to classify the groups according to their reading proficiency levels. So that the levels established by ERT result could be used as an independent variable for the study. Four levels were established by the position each subject took in relation to the mean and standard deviation established by ERT original standardisation. (Mean= 60 SD= 20). Those with two SDs above the mean

different reading skill groups performance on phonological decoding in a sense it is defined in the study. If it is the case that the groups differ on their phonological decoding speed, they would be expected to differ in the amount of time taken to sort visually dissimilar rhymes, where phonological decoding is obligatory (Oakhill, 1981). If, however, the less skilled groups tend to use grapheme-phoneme conversion system, even when the task can be accomplished sufficiently by a direct-visual access, they would be expected to differ from more skilled reading groups not only on visually-dissimilar words but also on the similar rhymes.

Aim

This part of the study is designed to explore whether there are differences in word-decoding speed between our four groups of ESL readers at different level of reading proficiency skill. It can be hypothesised that while recoding may not be necessary for retrieving the meaning of words, the ability to use phonological decoding is related to the subjects' reading skill.

Subjects, materials and procedure

The subjects of the study were Iranian students acquiring English as an L2 in the Iranian and non Iranian schools in the United Kingdom. They are both the children of Iranian people who have been living in UK for many years or the children of Iranian students who are studying for their PhD degrees. The children who go to Iranian schools study the same Iranian national curriculum, sit exactly the same final examination as children in Iran and follow the same religion and social customs. Those who go to non Iranian schools follow the main stream curriculum of UK. Therefore, Iranian children with the similar traits of level of parental education, socio-economic status and religious traditions represent the target population of this research.

Because the target population of the present study was geographically dispersed and because the researcher did not have access to student records, it was not possible to perform a perfect type of random sampling of the target population. Therefore, the researcher chose to study the Iranian children in the city of Manchester. This accessible population was one that was manageable both in terms of time and resources, as well as in terms of

examine whether the slower reading rate of L2 readers is related to their use of phonological information in reading at the single word level. In two experimental tasks, sixteen English bilinguals (their L1 was English) and sixteen French bilinguals (their L1 was French) at the age range of 23-27 years old participated. In the lexical decision task consisted of both English and French homophones, pseudowords and nonwords, the subjects had to see a letter string and then judge as being either a word or a nonword in the language. Reaction times and error scores were collected for words and nonwords but no evidence was elicited to support the view that slower readers of L2 to rely upon phonological recoding in L2 for lexical access.

In the sentence verification task, the same subjects had to judge the meaningfulness of sentences in which appropriate or inappropriate homophones and control words were used. The result of this task confirmed that slow bilingual readers showed a phonological effect when judging sentences in their L2. That is, L2 slow readers of each language made more errors (15%) with sentences containing homophones "*She said the weather was fair outside.*" than with sentences (8.8%) containing control words "*She said the weather was nice outside.*"

Unfortunately, few studies of reading comprehension in L2 context have addressed phonological decoding. It seems, the development of automatic perceptual identification skills is only beginning to be recognised as an important issue in SL reading. (Mclaughlin,1990; Grabe, 1991). These skills are, however, widely recognised by cognitive psychologists and educational psychologists as central processes in fluent reading (Adams, 1990; Rieben & Perfetti, 1991). In fact many cognitive psychologists now see the development of automaticity in reading, particularly in word identification skill, as critical to fluent reading (Stanovich, 1991a; Gough & Juel, 1991).

The present study

This study makes an effort to investigate phonological decoding ability of the subjects and its relation to their reading proficiency. The ability to do so is operationally defined in terms of the subjects' ability to judge whether a pair of words is rhymed. Since the list of words consisted of visually-similar (night/ light) and visually-dissimilar (train /lane), it makes possible to assess the four

button which stopped a timer. Delays and errors were recorded. The results indicated, on words having high frequency, the same pattern of latency and errors between good and poor in the third and fifth grade. But, on infrequent words the poor readers made more delay and errors.

In another study by Golinkoff and Rosinski (1976), third and fifth grade subjects read two word lists. One contained nonsense words of consonant-vowel-consonant (CVC) structure, and the other one contained words from first grade reading materials. When the time spent to read these two lists was compared, there was no significant difference between on the time to decode common first grade level words. However, the poor readers took almost twice as long as the good readers to decode the CVC structures.

Regarding how readers get involved in visual processing, Doctor and Coltheart (1980) suggested that in the early stages of reading, lexical access is predominantly affected by the non-lexical phonological process, that is, readers access meaning through a grapheme-phoneme conversion system. In another research, however, Francis (1984) proposed that very young readers (5 years old) use some form of direct visual access before grapheme-phoneme conversion skills develop. She also argues that the lexical entries of visual word recognition system of the early stage are more likely to be high imaginable/concrete and content words. Therefore, for beginning readers, these should be easier to read than low imaginable and function words.

Phonological decoding in L2 context

In contrast to first language, reading in second language requires a reader to be more conscious of what he is doing. Vygotsky (1962) viewed learning a foreign language as "conscious and deliberate from the start". If it is the case that "deliberate effort" plays an important role in SL/FL reading , a primary goal should be to study how an SL reader encounter word identification process.

In a study, Segalowitz and Hebert (1990) investigated phonological decoding by skilled English and French bilinguals. The aim of the study was to

autmaticity in word identification skill critical to fluent reading, the study has some implications for L2 reading education.

It is widely accepted that the determinants of reading comprehension include: phonological decoding ability, the capacity to effect lexical access , understanding the structural form of sentences and facility in constructing integrative meaning from different parts of the text (Perfetti, 1985 ; Yuill & Oakhill, 1991). Listing the sub-skills of reading comprehension, however, does not indicate that they occur serially during actual reading. A skilled reader may skip the first component completely and go directly to lexical access (Ehri, 1995). But, it seems likely that the acquisition processes underlying comprehension skill requires mastery of grapheme-phoneme conversion, lexical and structural understanding and the ability to achieve a general view of the text (Fazilatfar, 2002).

Among these determinants word recognition needs to be more explored in more detail. The fundamental role of word recognition which has been reaffirmed by L1 researchers (Gough, 1984; Stanovich, 1991b) There are several recent L1 investigations which show that reading comprehension is dependent upon efficient visual information, but still attracts little attention in an L2 context.

Also eye movement research demonstrates that approximately every content and most of the function words receive direct visual fixation (Rayner & Pollatsek, 1989). If a single letter missing in a word it can reduce reading efficiency. Retrieving information from a text's words is a critical part of the reading process and much as that deficiency in word recognition is directly linked to poor comprehension. It seems imperative, therefore, to make use of these new insights in L2 studies.

Phonological decoding in L1 context

In a study conducted by Perfetti and Hogaboam (1975), the capabilities of a group of good and poor readers were examined. When the subjects were ready to pronounce a word, they were asked to press a

Young Persian Speakers'L2 Phonological Decoding Abilities & Their L2 Reading Comprehension Proficiency[1]

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Abstract

One of the determinants of reading comprehension is phonological decoding ability (Perfetti, 1985 & Ehri, 1995). The ability to pronounce the printed word, if not sufficient appears to be necessary to reading comprehension. The mastery of grapheme-phoneme conversion has been reaffirmed by L1 researchers (Gough, 1984; Stanovich, 1991). However, compared with cognitive and metacognitive processes, few studies have been devoted to phonological decoding in L2.

In order to test the question that lower level reading-skill groups in L2 may be hindered by slow decoding, it was designed to explore whether there are differences in word-decoding speed between four groups of ESL readers at different levels of reading proficiency skill. So they were asked to sort pairs of words into two groups depending on whether the words in the pair rhymed. The rhymed pairs of words were of two different kinds: (1) visually-similar rhymes (ride-hide) and (2) visually-dissimilar rhymes (side- cried). The result indicated that the difference between the groups was highly significant F(3,36)= 4.45, P<.01. The effect of the of materials exceeds highly the critical value F (1, 36)=56.98 P<.0001. The f-ratio for the interaction of reading skill levels and materials on overall gain scores is not significant, F (3,36)= 1.11, P>.05 which means in both types of material the groups have performed differently. It implies all groups have been involved, probably consciously, in grapheme-phoneme conversion, though, based on their reading proficiency levels, the higher levels have been faster than the lower ones to carry out the task. The reason behind this finding may be that unconscious or automatic processing of sound decoding has not yet been achieved. As Mclaughlin (1990) and Grabe (1991) view development of

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