An investigation into the nature and causes of reading and spelling errors made by Arab ESL learners.

A thesis submitted in candidature for the degree of PhD of the University of Wales, Cardiff.

Helen Heathcote Emery
Centre for Language and Communication Research,
School of English, Communication and Philosophy,
Cardiff University.
DECLARATION

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed ........................................... (candidate)

Date ..................................................

Statement 1

This thesis is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

Signed ........................................... (candidate)

Date ..................................................

Statement 2

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

Signed ........................................... (candidate)

Date ..................................................
Summary.

The main research question of this study was why Arab learners of English as a Second Language should make so many reading and spelling errors. An analysis of a corpus of misspellings, taken from handwritten technical reports, showed that most errors involved vowels: either omission, addition, substitution or inversion, and that misspellings often resulted in the loss of some of the phonological properties of a word. Experiments carried out in the course of the study showed that both phonological and orthographic routes in reading were also affected. Orthographic deficiencies were more pronounced with lower-level learners, indicating that this was a developmental trend, and would improve as learners’ English did.

Previous researchers have suggested that the errors might be caused by a difference in strategies used for processing the written forms of L1 Arabic and L2 English. However, an investigation of current research in L2 reading showed that orthographic similarities between Arabic and English should have meant that ESL learners benefited from their L1 reading strategies, rather than being held back by them.

According to Frith’s (1985) model of reading and spelling development, appropriate instruction plays a vital role in the acquisition of alphabetic skills. Subsequent extensive practice is necessary for a learner to develop good orthographic reading and spelling skills. The second part of this thesis presents an investigation of the state education system in the United Arab Emirates. This study showed that a failure at the level of instructional methodology and materials was probably the major cause of the reading and spelling errors made by Arab learners. As a result of qualitative and quantitative deficiencies in their input, which prevent them from successfully mastering reading and spelling in English, it has become apparent that the learners tested do indeed suffer from a ‘developmental lag’.
Acknowledgements.

I would like to dedicate this study to my mum, Mary Emery, for her support and encouragement every step along the way. I am grateful to the many Arab students at Zayed University, Sultan Qaboos University and Petroleum Development Oman for their participation in testing. I would like to extend my thanks to the U.A.E. teachers, trainers and supervisors who took part in my Educational Study. Above all, I would like to thank my supervisor Dr. Alison Wray for her valuable advice, help and support throughout the course of this study.
TABLE OF CONTENTS

List of Tables ........................................................................ vi
List of Figures ........................................................................ viii
List of Appendices .................................................................... ix
Abbreviations used in the text ................................................ xi

Chapter 1.

1 Spelling Errors made by Arab ESL learners ............................... 1
  1.1 Introduction ..................................................................... 1
  1.2 Other research into spelling errors through corpus analysis .... 2
  1.3 Analysis of a corpus of spelling errors made by Arab ESL learners ... 4
      1.3.1 Aims of the study ...................................................... 4
      1.3.2 Subjects .................................................................. 5
      1.3.3 Method of data collection ........................................... 6
      1.3.4 Method of analysis ................................................... 6
      1.3.5 Results .................................................................. 7
      1.3.6 Discussion: Possible causes of spelling errors .......... 9
  1.4 Conclusion ....................................................................... 16
  1.5 Questions which this research aims to answer ..................... 16

Chapter 2.

2 Reading and spelling in English ................................................. 19
  2.1 Introduction ..................................................................... 19
  2.2 Reading and spelling in different languages ....................... 19
  2.3 Reading in English .......................................................... 20
      2.3.1 Dual-route reading theory ........................................ 20
      2.3.2 Phonological awareness and its relationship to reading ability ... 21
  2.4 Developmental stages in learning to read ............................. 23
  2.5 Reading by analogy to known words .................................. 29
  2.6 Skilled reading ............................................................... 35
      2.6.1 Eye fixations during reading ..................................... 36
      2.6.2 Visual word recognition ............................................ 37
  2.7 Word recognition strategies used by good and poor readers in English ......................................................... 38
      2.7.1 The Yes/No Vocabulary Test ..................................... 38
      2.7.2 The Yes/No Test and 5th Grade American Children .......... 42
      2.7.3 Use of contextual clues in word recognition ............... 44
  2.8 Spelling in English .......................................................... 46
      2.8.1 Dual-route spelling theory ........................................ 46
Chapter 3.

3 Review of research on reading errors made by Arabic ESL learners

3.1 Introduction

3.2 Vocabulary levels of Arab learners of English

3.2.1 The Yes/No Test and Arab learners

3.2.2 Misidentification of imaginary words

3.3 Reliance on consonants in word recognition

3.3.1 Ryan Homophone Discrimination Test

3.4 "Vowel blindness" in reading

3.5 Comparisons of errors made by developmental surface dyslexics and Arab learners of English

3.5.1 Subjects used in the studies

3.5.2 Effect of word-length, word-familiarity and spelling regularity on read aloud performance

3.5.3 Homophone confusion

3.5.4 Performance on dictated spelling tests

3.5.4.1 Phonetic spelling errors

3.5.4.2 Graphemic confusion

3.6 Comments on the studies reported in this chapter

3.6.1 Choice of subjects

3.6.1.1 Knowledge of additional languages

3.6.1.2 Standardisation of English language level

3.6.1.3 Previous English language education

3.6.1.4 Environmental influence

3.6.2 Testing recognition of words in isolation

3.6.3 Choice of word stimuli

3.6.4 Evidence for a phonological bias in reading and spelling

3.6.5 Lack of awareness of vowels in reading

3.6.6 Similarity of errors to developmental surface dyslexia

3.6.7 Effects of L1(Arabic) orthography

3.7 Conclusion

Chapter 4.

4 L1 reading and spelling processes as the cause of L2 errors

4.1 Differences in phonology of L1 and L2

4.2 Transfer of phoneme-grapheme correspondence rules from L1 to L2

4.3 Direction of script

4.4 The orthographic depth hypothesis and transfer of reading skills from L1 to L2

4.4.1 The structure of written Arabic
4.4.2 Reading in Arabic ................................................................. 102
4.4.3 A deep or shallow orthography?.............................................. 102
4.4.4 Effects of orthographic structure on word recognition and
spelling in Arabic ................................................................. 103
4.4.5 Learning to read in Arabic ..................................................... 104
4.4.6 Learning to spell in Arabic .................................................... 106
4.4.7 Skilled reading in Arabic ...................................................... 108
4.5 L2 reading errors as a result of L1 reading processes ................... 112
4.6 Ease of learning GPC rules used by L1 and L2 ............................ 115
4.7 Effect of L1 spelling strategies on spelling in L2 ......................... 115
4.8 Implications and feasibility of the cross-linguistic transfer theory
proposed by Al Sulaimani (1990) et al................................. 118
4.9 Conclusion ............................................................................. 119

Chapter 5.

5 A test for phonological decoding skill: Non-word reading test .......... 121
5.1 Introduction ........................................................................... 121
5.2 Method .................................................................................. 122
  5.2.1 The non-word reading test ................................................ 122
      5.2.1.1 Item construction ..................................................... 122
  5.2.2 Reading comprehension tests ............................................. 126
  5.2.3 Hypothesis ....................................................................... 127
  5.2.4 Ordering of items ............................................................. 127
  5.2.5 Subjects ........................................................................... 127
5.3 Data analysis and scoring procedure ........................................ 129
5.4 Results ................................................................................. 131
  5.4.1 Error types: vowel, consonant or phoneme inversion ............... 131
  5.4.2 Comparison of error rates on reading GPC based and analogous
non-words ............................................................................. 134
5.5 Discussion ............................................................................. 135
  5.5.1 Discussion of the hypothesis ................................................ 135
      5.5.1.1 Hypothesis 1: Analogous non-words will be read with
      greater accuracy than GPC based non-words ....................... 135
      5.5.1.2 Hypothesis 2: Vowels will cause more problems than
      consonants ...................................................................... 142
      5.5.1.3 Hypothesis 3: Readers with good comprehension scores
      will also score higher on the non-word reading test ............... 144
  5.5.2 Discussion of additional findings ......................................... 147
      5.5.2.1 Pronouncing non-words as real words ......................... 147
      5.5.2.2 Subjects' knowledge of English spelling conventions ....... 148
  5.5.3 Non-word reading test and native English speaking skilled
readers ................................................................................. 150
  5.5.4 Skilled readers' results and discussion .................................. 151
5.6 Conclusion ............................................................................. 153

Chapter 6.

6 A test of visual word recognition ................................................. 155
6.1 Introduction ........................................................................... 155
6.2 Ryan's test (1993) ................................................................. 156
6.3 Method ........................................................................................................ 159
6.3.1 The hypothesis ......................................................................................... 159
6.3.2 Subjects .................................................................................................... 159
6.3.3 The word discrimination test ..................................................................... 162
6.3.4 Scoring procedure ................................................................................... 163
6.4 Results ........................................................................................................ 164
6.4.1 Tests of the hypothesis ............................................................................. 165
6.5 Discussion .................................................................................................. 166
6.5.1 Analysis of a sample of test items ............................................................ 166
6.5.2 What do the results indicate about orthographic recognition
   skills of Arabic learners? ............................................................................... 168
6.5.3 Reliance on contextual clues for word recognition ................................. 169
6.5.4 Incorrect identification of the 20 correct sentences .................................. 171
6.5.5 Vocabulary knowledge, word recognition and reading practice ............. 172
6.6 Conclusion .................................................................................................. 173

Chapter 7.

7 The teaching of English literacy in U.A.E. government schools: the
   teachers, syllabus and methodologies ............................................................ 179
7.1 Introduction ................................................................................................ 179
7.2 Methods of teaching reading in English .................................................... 180
7.2.1 The Look and Say method ..................................................................... 181
7.2.2 Phonics teaching methods ..................................................................... 182
7.3 The study .................................................................................................... 183
7.3.1 Aims of the study .................................................................................. 183
7.3.2 The state educational system in the U.A.E. .......................................... 184
7.3.3 Method .................................................................................................... 185
   7.3.3.1 Interviews ....................................................................................... 185
   7.3.3.2 Observations ................................................................................. 186
   7.3.3.3 Textbook analysis ......................................................................... 188
7.4 Findings and Discussion ............................................................................ 189
7.4.1 Interviews ................................................................................................ 190
   7.4.1.1 Methods used in teaching literacy .................................................. 190
   7.4.1.2 Opinions of the coursebooks ......................................................... 193
   7.4.1.3 Methods of teaching spelling and pronunciation ........................... 194
7.4.2 Observations of English lessons .............................................................. 195
   7.4.2.1 The schools .................................................................................... 195
   7.4.2.2 Methods of teaching reading ......................................................... 196
   7.4.2.3 Reading for pleasure and other reading related activities .............. 199
   7.4.2.4 Teachers' use of L1 in English lessons ........................................ 199
7.4.3 Analysis of course books ....................................................................... 200
7.5 Conclusion .................................................................................................. 204

Chapter 8.

8 Conclusion ..................................................................................................... 205
8.1 The problem ................................................................................................ 205
8.2 Research into Arabs' spelling errors ......................................................... 205
8.3 A previously suggested cause of Arabs' errors ......................................... 207
8.4 Experiments conducted in the current study ............................................. 208
8.4.1 Testing alphabetic reading skills ................................................................. 208
8.4.2 Testing orthographic reading skills ............................................................. 208
8.5 What the experimental research presented in this thesis has shown .................. 209
8.6 A study of the methods used to teach reading and spelling in U.A.E.
   government primary schools ........................................................................... 210
   8.6.1 Methods of teaching reading ................................................................. 210
   8.6.1.1 Methods of teaching reading in U.A.E. schools ............................... 211
   8.6.2 The teaching of pronunciation ............................................................... 213
   8.6.3 The teaching of spelling ...................................................................... 215
   8.6.4 Learning to read English and Arabic in Grade 1 .................................... 217
8.7 Exposure to English and the effects of living in a bilingual
   community ....................................................................................................... 217
8.8 Summary of the findings of the educational study ........................................ 219
8.9 Frith’s (1985) model and the findings of the present study .......................... 220
   8.9.1 Applicability of Frith’s model to learners of English as a second
       language ....................................................................................................... 220
   8.9.2 Applicability of Frith’s model to non-dyslexic readers ....................... 221
8.10 Recommendations of this study ................................................................ 223
   8.10.1 Further research .................................................................................. 223
   8.10.2 Development of ESL teaching policies .............................................. 223

Appendices .......................................................................................................... 225

References ........................................................................................................... 284
LIST OF TABLES.

Table 2.1: Words read in the analogy and control conditions during training and in the transfer tasks (Ehri, 1998: 99) ................................................. 33

Table 2.2 Accuracy of nonsense word reading in English; nonsense words with familiar (DAKE) vs. unfamiliar (DAIK) rhymes (Goswami, 1997: 143) ........................................................................ 35

Table 2.3 Wordlikness of Gandhi and its possible misspellings (Campbell & Coltheart, 1984: 188) ..................................................................... 48

Table 2.4 Percentage of phonetic and non-phonetic responses when spelling real words (Frith, 1980: 501) ................................................................. 51

Table 2.5 Percentage of phonetic and non-phonetic responses when spelling nonsense words .................................................................................. 52

Table 3.1 Mean % errors for three groups on battery of three tests for Surface Dyslexia (Ryan, 1993: 217) ................................................................. 69

Table 3.2 Mean % errors in Silent Reading Homophone Discrimination Test (Ryan, 1993: 217) ................................................................. 71

Table 3.3 Examples of altered stimuli (Ryan & Meara, 1991: 535) .................................................................................. 72

Table 3.4 Mean % errors for three groups of subjects in deleted vowel recognition task (Ryan & Meara 1991: 536) .................................................. 73

Table 5.1 Accepted pronunciations of analogous non-words ................................................. 126

Table 5.2 Non-word reading test scores and reading comprehension scores ................... 132

Table 5.3 Non-word reading test: Vowel/consonant errors made by subjects .................................................................................. 134

Table 5.4 Comparison of reading accuracy on the two types of non-word ...................... 135

Table 5.5 Correct readings and errors on analogous non-words ........................................ 136

Table 5.6 Correct pronunciations of ‘embedded words’ in non-words ............................... 140

Table 5.7 Errors in reading the letter ‘c’ ........................................................................... 149

Table 5.8 Native English speaking skilled readers ......................................................... 150
Table 6.1  Mean % errors in three tasks (Ryan, 1993: 228) ................................. 158
Table 6.2  Results in word discrimination test ............................................. 164
Table 6.3  Correct sentences wrongly identified by each group ..................... 165
Table 6.4  Responses given by Arab 1 group in six sample sentences ............. 175
Table 6.5  Responses given by Arab 2 group in six sample sentences ............. 176
Table 6.6  Responses given by Spanish group in six sample sentences .......... 177
Table 6.7  Responses given by English native speakers in six sample sentences ........................................................................... 178
LIST OF FIGURES.

Figure 1.1 Distribution of error type in preliminary study of spelling errors......... 18

Figure 2.1 Simplified version of the dual-route model of reading(Harley, 1998: 104).................................................................. 21

Figure 2.2 Six-step model of skills in reading and writing acquisition (Frith, 1985: 311).................................................................. 24

Figure 2.3 Three-route model of reading (Hârley, 1998: 119)............................... 30

Figure 3.1 Flow chart indicating direction for continuation of research............... 94

Figure 4.1 Graphemic representations of the letter ha in Arabic............................ 101

Figure 5.1 Diagrammatic representation of error-types on non-word reading......................... 133

Figure 5.2 Error classification of SUCTORIFICE as read by subject W............... 137
APPENDICES.

Appendix 1.1 Samples of each error category recorded in the preliminary study of spelling errors .................................................. 225

Appendix 1.2 Classifying word spellings as regular or irregular .................................................. 228

Appendix 4.1 The Arabic alphabet .................................................................................................. 230

Appendix 4.2 Pages from Grade 1 Arabic reading book ................................................................. 231

Appendix 4.3 Pages from Grade 1 Arabic reading book ................................................................. 232

Appendix 5.1 Non-word reading test: List of items and accepted pronunciations ......................... 233

Appendix 5.2 Phonetic transcription symbols used in the text ......................................................... 236

Appendix 5.3 Reading comprehension test 1 .......................................................... 238

Appendix 5.4 Reading comprehension test 2 ................................................................................. 245

Appendix 5.5 Reading comprehension test 3 ................................................................................. 249

Appendix 5.6 Reading comprehension tests: Text complexity data ............................................... 253

Appendix 5.7 “Off-list” words in each text .......................................................... 254

Appendix 5.8 Articulatory differences between English and Arabic ............................................. 256

Appendix 5.9 Sources of difficulty in English pronunciation for Arabic learners: Vowels ............ 257

Appendix 5.10 Sources of difficulty in English pronunciation for Arabic learners: Consonants .... 258

Appendix 5.11 Non-word reading raw scores: Vowel and consonant error .................................. 259

Appendix 5.12 Pronunciation of analogous non-words by Arab learners .................................... 260

Appendix 5.13 Pronunciation of analogous non-words by Academic subjects ............................. 261

Appendix 6.1 Word discrimination test ......................................................................................... 262
Appendix 6.2 Word discrimination test: Correct sentences and sentences containing errors. ................................................................. 264

Appendix 6.3 Results of word discrimination test ................................................................. 266

Appendix 6.4 Number of instances where a correct sentence was wrongly identified. ................................................................. 267

Appendix 7.1 Interview questions: Teachers ................................................................. 268

Appendix 7.2 Interview questions: Supervisors ................................................................. 269

Appendix 7.3 Interview questions: Trainers ................................................................. 270

Appendix 7.4 Summary of interview responses: Teachers ................................................................. 271

Appendix 7.5 Summary of interview responses: Supervisors ................................................................. 273

Appendix 7.6 Summary of interview responses: Trainers ................................................................. 276

Appendix 7.7 Pages from “English for the Emirates” ................................................................. 279

Appendix 7.8 Pages from “English for the Emirates” ................................................................. 279

Appendix 7.9 Pages from “English for the Emirates” ................................................................. 280

Appendix 7.10 Pages from “English for the Emirates” ................................................................. 281

Appendix 7.11 Pages from “English for the Emirates” ................................................................. 281

Appendix 7.12 Pages from “English for the Emirates” ................................................................. 282

Appendix 7.13 Text of ‘The Olympic Games’, Book 9, English for the Emirates ................................................................. 283
LIST OF ABBREVIATIONS USED IN THE TEXT.

EFL  English as a foreign language.

ESL  English as a second language.

FK level  Flesch Kincaid reading level. A readability level based on American school grades, from Grade 1 (easiest text) to Grade 12 (most difficult text).

GPC  Grapheme-phoneme correspondence. The corresponding relationship between the printed letter and the sound it represents (in reading).

L1  First language, often referred to as the ‘mother tongue’.

L2  Second language. This term is often used to refer to a dominant language used by the speaker, although it may actually be his third or fourth language.

NS  Native speaker of English.

NNS  Non-native speaker of English.

PGC  Phoneme-grapheme correspondence. The corresponding relationship between a sound and the letter that is used to represent it (in spelling).
Chapter 1.

Spelling errors made by Arab ESL learners.

1.1. Introduction.

As a teacher of English to Arab students in higher education for almost 12 years, I had noticed that they seemed to experience particular difficulty with spellings. Even proficient language users who could write otherwise perfectly correct essays would make repeated spelling errors. I was not alone in commenting on the excessive amount of difficulty they seemed to experience with English orthography: Al Mutawa & Kailani (1989), Al Youssuf (1999), Kharma & Hajjaj (1989), Ibrahim (1978), Ryan & Meara (1991), Ryan (1993; 1997), Al Sulimani (1990) and Thomson-Panos & Thomas-Ruzic (1983) have all drawn similar conclusions.

The problem can be seen in the extreme with low level learners, who make a variety of spelling errors – some only marginally resembling the target word. Take for example, the spelling HCSWE (spelling errors are indicated in upper case throughout this study) taken from the technical report of a Foundations programme B.Tech trainee. Taken out of context, could this spelling be recognized as hacksaw? Why do Arabs experience such difficulty with English spellings? This is the key question that this research seeks to answer. In the course of answering this question, many other questions will need to be addressed. These will be raised in the course of this chapter and summarised explicitly at the end of it.

As a starting point for the study, it was decided that a corpus of errors should be collected and analysed in order to define the types of error most frequently being made. Possible reasons for these errors would then be investigated. Careful design of such a corpus is paramount. As will become clear below, understanding patterns in data depends on basic levels of homogeneity in the sample and careful record keeping. As a prelude to describing the present corpus, therefore, section 1.2. briefly reviews the nature of – and problems with – some previous surveys of spelling errors.
1.2. Other research into spelling errors through corpus analysis.

Most research into spelling errors made by adults was conducted in the 1970s and early 80s as since then, the advent of the word processor and computer spellchecker has made it difficult to collect large corpora of handwritten errors. Studies of native English speaking adults’ errors have tended to focus on ‘slips’: defined by Wing and Baddeley (1980) as an error which occurs in the heat of the moment of writing, although the writer is in fact fully aware of the word’s correct spelling. Errors which result from lack of knowledge of an irregular spelling they term ‘errors of convention’. Studies of young children’s developmental spelling errors conducted by Treiman (1993) focussed on the errors of native speaking children of English, while James, Scholfield, Garrett & Griffiths (1993) focussed on native Welsh speaking children’s errors in English. Azzam (1990) researched the errors in young children’s written Arabic.

It is not always easy to obtain a corpus of errors from a homogenous group, and sometimes researchers have had to combine errors made by different groups. Bebout (1985) compared the spelling errors of 9 – 12 year old native English children with Spanish speaking adults and adolescents whose second language was English.

Sometimes the script of the first language has been used as the condition for division into categories for error collection. Ziahosseiny and Oller (1970) compared errors made by two groups of second language speakers of English: those whose first language used a Roman alphabet, and those whose first language didn’t. Subjects in their first group spoke a Romance language (Spanish was the most common), Germanic or Slavic language. Subjects in the second group were from a more diverse group of first languages: a Chinese dialect, Japanese or a Semitic language.

Studies of spelling errors have been conducted with a variety of aims, and therefore yielded different results. Comparisons between different studies are often difficult because each had different goals and used different error classification systems. Some studies have attempted to classify errors according to their perceived cause, i.e. an aspect of first language interference (Bebout, 1985; Ibrahim, 1978; James et. al, 1993; Ziahosseiny and Oller, 1970). Luelsdorff (1986) attempts to explain the effects of first
language interference on English spelling through a longitudinal study of one native German speaking subject.

Studies involving native speakers of English tend to focus more on technical problems involving misspellings. Wing & Baddeley (1980) analysed misspellings in order to determine the exact part of a word that is most commonly misspelled: the beginning, middle or end. Mitton (1996) analysed native speakers errors in handwriting, and classified them according to the types of misspelling that can be corrected by a computer spellchecker, and those that can’t.

Some studies have focussed on general errors in written English, made by native and/ or non-native speakers of English. In these studies spelling errors constitute only a small proportion of the data analysed, and may be classified according to what was wrong with a spelling or the most frequently misspelled words (James, 1998; Wray, 1996). Usually the scope of such a study prevents further analysis of the causes of spelling errors.

The method of data collection varies widely from study to study. Some researchers have preferred to collect spelling errors from exam composition papers (Mitton, 1996; Wing & Baddeley, 1980). The advantage here is that all subjects will have written on the same topic, or a select choice of topics which would enable misspellings of individual words to be compared more easily. However, under exam conditions subjects may not perform in a natural manner, and as Wray (1996) explains, the post-writing checks that normally occur may not be in operation, and results may not concur with those obtained under normal writing conditions. Errors have also been collected from spelling tests (Brown, 1970) dictation of sentences (Luelsdorff, 1986) and cloze tests (Bebout, 1985).

It therefore becomes apparent that several factors must be taken into consideration when collecting and analysing a corpus of spelling errors:

1. The subject group. (Native speaking, non-native speaking: homogenous or mixed, and the age and educational level of subjects.)
2. The method of data collection: untimed essays, spelling tests, dictation, cloze or exams?
3. The method of data analysis.
4. The purpose of the study and interpretation of the results.

1.3. Analysis of a corpus of spelling errors made by Arab ESL learners.

The focus of this study is the spelling errors made in English by native Arabic speaking subjects aged 18 – 24, undergoing a course in higher education.

1.3.1. Aims of the study.

In order to assess the extent of the problem of Arabs’ spelling errors in English, a preliminary study was carried out, recording the spelling errors made in technical report writing by trainees at Petroleum Development Oman. The aim of the study was to determine the different types of error, and to assess which were most frequently being made. It was decided that all spelling errors should be collected – those that appeared to be ‘slips’ and those where it could be assumed the writer didn’t know a word’s spelling. By collecting all spelling errors, it would be possible to assess whether Arabs’ spelling problems were due to ignorance – perhaps they had not come across a word before, or some other reason. It was thought that data from essays would show both slips and errors of convention.

My previous teaching experience had shown that spelling tests generally indicated only words where students were ignorant of the spelling, not instances where they wrote something different in the heat of the moment. Presumably this is because a spelling test focuses the attention on the lexical structure of a word, whereas at the whole-text level the attention may be focused more on general comprehensibility at the expense of spelling accuracy, i.e. attention would be devoted to macro skills rather than micro skills.
A superficial examination of the errors showed that many involved vowels. It was therefore decided to focus on this feature in the preliminary investigation, in the hope that a pattern might emerge. It was hoped that findings of the study might lead to a further, more in-depth investigation of the problem.

1.3.2. Subjects.

The subjects were 32 Omani males aged 18 to 24 years who were taking the B.Tech qualification at Petroleum Development Oman, the national oil company. Most of the trainees came from small villages in the interior regions of Oman, and had undergone the standard primary and secondary English programme at Ministry of Education schools. Arabic was the first language of most, the few exceptions being men from the south whose first language was one of two unwritten dialects: Jabali and Mahra. These trainees were in their second year of an intensive programme which included workshop and laboratory sessions where for example, electrical experiments or metal working would be carried out. Trainees were required to write up workshop reports detailing the procedure carried out and the result. The length of each report varied between 300 and 600 words, and had to be written under the following sub-headings:

1. Task.
2. Tools and equipment used.
3. Safety equipment.
4. Safety precautions taken.
5. Job description.
6. Comments/ Problems.

Section 5 was a report of the procedure carried out, written in the past passive, in some cases extending to 350 words. Trainees were usually thoroughly familiar with all technical terms and their spellings beforehand, having completed several related exercises and been tested on spellings by the English teacher. These reports were always marked by two instructors for technical content and English language content. The language level of trainees could be described as ‘lower intermediate’ or ‘intermediate’. However this is only an approximate guide as their knowledge of technical terms and phrases was far greater
than would generally be expected at this level, due to the nature of the courses they were
taking.

1.3.3. Method of data collection.

Spelling errors were collected from 640 papers written by the 32 trainees over a period of
six months. In total 545 errors were recorded. Errors were listed with the correctly spelled
target word next to each one. Each instance of the same misspelling of a particular word
was recorded separately. It should be noted that some subjects recorded many more errors
than others: some in fact had no spelling errors at all.

1.3.4. Method of analysis.
A first trawl of the errors indicated they were mainly vowel-related, therefore it was
decided to group misspellings in accordance with this criterion. Highlighters of different
colours were used to mark words according to the following error types:

   Single errors:
1. Vowel substitution (wrong vowel in a word).
2. Vowel omission.
3. Mis-ordering of vowels (all vowels present, but placed in wrong position within the
   word).
4. Additional vowel (extra vowel inserted in a word).
5. Consonant error.

As the focus of the current analysis of misspellings was primarily concerned with vowel-
error, no differentiation has been made between different types of consonant error. Thus a
'consonant error' could be a wrong letter, missing letter or additional letter. However, a
consonant in the wrong place might involve vowel error also, and would therefore be
recorded as a vowel in the wrong place (category 3). As it would have been difficult to
ascertain whether such an error should be classified as vowel or consonant related, it was
decided not to distinguish between consonant errors at all.
Combination errors.

6. Additional vowel + missing vowel.
7. Additional vowel + wrong vowel.
8. Additional vowel + mis-ordered vowel.
11. Wrong vowel + mis-ordered vowel.
12. Consonant error + additional vowel.
13. Consonant error + missing vowel.
15. Consonant error + mis-ordered vowels.

Numbers of errors in each category were recorded and calculated as a percentage of errors in the whole sample.

1.3.5. Results.

Results of the data analysis are shown in pie chart format in Fig.1 (p 18) and are described below. Some examples of misspellings from each category are given in Appendix 1.1.

Single errors.

1. Wrong vowel in a word (vowel substitution) = 83 errors. (15.2%)
2. Missing vowel in a word = 73 errors. (13.4%)
3. All vowels present but in wrong order (mis-ordering) = 73 errors. (13.4%)
4. Extra vowel inserted in a word = 53 errors. (9.7%)
16. Consonant error = 93 instances. (17.0 %)

Combination errors:

17. Additional vowel/ Missing vowel = 6 errors. (1.1%)
18. Additional vowel/ wrong vowel = 10 errors. (1.8%)
19. Additional vowel/ Mis-ordered vowels = 4 errors. (0.7%)
20. Missing/ Wrong vowel = 19 errors. (3.5%)
21. Missing/ Mis-ordered vowels = 8 errors. (1.5%)
22. Wrong/ Mis-ordered vowels = 12 errors. (2.2%)
23. Consonant error/ Additional vowel = 6 errors. (1.1%)
24. Consonant error/ Missing vowel = 16 errors. (2.9%)
25. Consonant error/ Wrong vowel = 28 errors. (5.1%)
26. Consonant error/ Mis-ordered vowels = 18 errors. (3.3%)

Complex errors = 43. (7.9%)

Two different types of spelling errors were recorded: those that were clearly ‘non-words’ as their spelling did not conform to any word listed in the Oxford English Dictionary, and those which could be classified as ‘Real Word Errors’ (Mitton, 1996). The latter will be discussed in the next paragraph. A complex error involved more than two error types in a word. In the case of non-words which were also complex errors, words were so distorted that it is a fair assumption to say that the writer did not know the word’s spelling – these errors could in no way be classified as slips.

Some categories of error, due to the substitution, addition or omission of letters resulted in what is termed ‘Real Word Errors’. These errors accounted for 9.7% of the corpus. A Real Word Error is a spelling error which takes on the form of another word, and usually has a similar orthographic structure to the target word. Such errors when they occur in speech have been termed Malapropisms after the infamous Mrs. Malaprop in Sheridan’s play The Rivals. Examples of Real Word Errors from the corpus include: SOCK for souk; STARTED for sparked; FOLLOWING for flowing; RETAINS for returns; WITHER for weather; and the two infamous spelling errors which all teachers of English to Arab students have come across: TOW for two, and HOW for who. Only two out of 56 Real Word Errors were homophones: STEAL RULER for steel ruler and CENT for sent. However, many of the Real Word Errors constituted ‘near homophones’ (Mitton, 1996) – for example MOST for must; REPORTED for repeated and PAGER for paper.
1.3.6. Discussion: Possible causes of spelling errors.

Most of the spelling errors recorded were vowel related: 83% involved a vowel as opposed to 17% consonant-only error. This compares with the assertion of Sekemski, Deutsch and Adoram (2000) that many Hebrew speaking schoolchildren learning English in Israel “often write and read words without regard to vowels” (page 236). As Arabic and Hebrew are closely related Semitic languages, the fact that both sets of learners appear to make vowel related errors may be no coincidence. Can we therefore assume that the high proportion of this type of error can be attributed to some feature of the L1?

The Contrastive Analysis theory has been used to explain ESL spelling errors (Ziahosseiny & Oller, 1970) – a feature of the L1 which is not present in the L2, and vice versa. One possible line of enquiry might be the fact that Arabic does not write the short vowels. Could this feature of the L1 account for Arabs’ difficulties with written vowels in English? This idea will be explored in greater depth in chapter 4.

Ibrahim (1978) rejects contrastive analysis as a possible reason for the errors on the basis that both languages use different scripts, and therefore, there would be no interference from Arabic in the English spellings of learners. Or would there be? This is an interesting question and may go deeper than just an analysis of contrastive features of the two languages. James et. al (1993) state that learners will tend to generalize the letter-sound correspondences from the first to the second language if both languages use the same alphabet. Their studies of Welsh children’s errors in learning English as a second language illustrate their point clearly. Welsh uses the same alphabet as English, but employs regular phoneme-grapheme correspondences. As such, they argue that English words written by Welsh children will resemble Welsh spellings. Some examples of such misspellings are provided by my colleague Caroline Warren: DINNA for dinner; FFROM for from; DECAREISHYNS for decorations; WIDD for with; AWT for out; FEIFROT for favourite; PWDIN for pudding.

Some form of first language influence forms one possible line of enquiry, however another one might be that vowel error relates in some way to a developmental stage in spelling acquisition. Treiman (1993) analysed the spellings of first grade American
children learning to read and write through the “Whole Language Approach” with a teacher who put most stress on independent writing. The teacher’s belief that children should be left to figure out spellings of words on their own meant that errors representative of natural processes of spelling development in young children could be collected. She subsequently found that a great proportion of the errors in her corpus were vowel related, and could be linked to developmental phases in children’s spelling. The high proportion of vowel related errors made by Arabs would indicate that the writers did not appreciate the importance of vowels in English. For example the spelling FLAXU for soldering flux suggests that a learner is aware of the letters which are present in the word, but may not take account of the ‘sounds’ which can be represented by vowels. Can we therefore assume that this lack of awareness of the role of vowels in some way represents a stage in the acquisition of spelling skills for the Arabs?

Vowels were found to constitute a problem in reading for Arabs in a study carried out by Ryan and Meara in 1991. They tested groups of Arabic native speakers, English native speakers and other EFL learners on a series of computerized word recognition exercises where vowels had been systematically deleted from a different position in each word. The word was first flashed onto a computer screen with all vowels present, and its image remained there for a few seconds. Then the word was flashed onto the screen a second time, but with a vowel deleted from a particular position – i.e. 2nd, 4th, 6th etc. Subjects had to spot spellings where vowels had been deleted. Arabs’ scores were lower than those of the other groups tested, leading Ryan and Meara to conclude that they suffered from a form of “vowel blindness.” They suggested that Arabic speakers might be using mental representations of English words which ignore vowels and rely very heavily on consonantal segments.

The problems that vowels appear to cause for Arabs in both reading and spelling might conceivably relate to Developmental Dyslexia in young children. The study of Sekemski, Deutsch and Adoram (2000) which focused on native Hebrew speaking children learning English as a second language, found that when given a reading diagnostic test, a third of 7th graders (aged 12) appeared to be either dyslexic or suffering from learning difficulties in English. Developmental dyslexia is the term given to specific reading and spelling problems suffered by some children when trying to master L1 literacy. Masterson (1983) tested 13 seven year old English children who were beginning to learn to read and found
similarities in their reading performance with that of Acquired Surface Dyslexics: a lack of lexical development. She termed this condition Developmental Surface Dyslexia. Ryan (1997) takes the issue one step further and asks if some of the problems of learning word form faced by young L1 readers might also be found in non-native readers at early stages of L2 reading development. This theory would appear to concur with Treiman's (1993) belief that they represent a stage in the acquisition of reading development in young children. We might therefore ask to what extent do these errors indicate a 'developmental phase' in the spelling ability of Arabs? And ultimately: What is the significance of vowels in examining cognitive processes in spelling? What role might they play?

Ibrahim (1978) in his study of misspellings made by Arabic speaking undergraduates in the English Department at the University of Jordan used a more learner-orientated (qualitative) interpretation of the errors he recorded. Errors were classified according to seven assumed underlying causes:

1. Errors caused by the non-phonetic nature of English spelling.
2. Errors caused by differences between the sound systems of English and the learners' native language, in this case Arabic.
3. Errors which may be attributed to analogy.
4. Errors which may be attributed to the somewhat inconsistent and arbitrary nature of English word derivation.
5. Errors which may be described as transitional.
6. Hybrid spellings which appear to be a combination of American and British orthography.
7. "Items which defy categorisation." These errors would presumably cover a range of options, including real word errors, where a word with similar construction but totally different meaning has been written instead of the target word; and errors which bore little resemblance to the target word, e.g: HCSWE for hacksaw or TNKH for thankyou. In the latter case it would be difficult to attribute the misspelling to any of the categories 1-6.

Unfortunately the author does not specify the percentage of each type of error he found in his corpus analysis, so no direct comparisons can be made with the findings of the current
study. However, it is possible to assess some of the errors in respect of the causes that he proposes.

The idea that it is the often irregular nature of the English spelling system which is responsible for Arabs' spelling errors is echoed by Kharma and Hajjaj (1989: 56):

It is clear that the greatest difficulty encountered by Arab students arises from the seemingly irregular spelling system of English compared with the greater regularity of the predominantly phonetic script of Arabic.

If irregularity were the main cause of Arabs' problems in learning to spell, then we would expect native speakers of English to exhibit difficulties with English orthography also. According to an article in The Sunday Times of 31 March, 2002 (Driscoll, 2002) many of today's British schoolchildren do experience great difficulty with spelling:

The recent government review of national tests shows that despite the overall rise in standards in schools – and four years of the national literacy strategy – accuracy in spelling has declined.

Spelling problems are not restricted to pupils either: an article in the Chester Chronicle of 24 November, 2000 (Baker, 2000) states that trainee teachers are also guilty of poor spelling performance, and that "government inspectors found their work littered with errors". Good spelling, say Hilton and Hyder (1992) is not something that will come overnight – no-one can wave a magic wand and make you a good speller. So how does one become a good speller? What are the processes involved in accurate spelling, and how do they develop? Why do some people successfully acquire this skill and not others? It is proposed to answer these questions in Chapter 2 of this thesis.

It has been suggested that the non-phonetic nature of English orthography is to blame for difficulties in learning to spell, but just how irregular is English orthography? According to Crystal (1995) there are fewer than 500 words in English whose spelling is wholly irregular, but several of them are among the most frequently used words in the language – words such as give, have and pint. However, much depends on how the notion of regularity is defined. Crystal (page 272) states that regularity "implies the existence of a rule which can generate large numbers of words correctly," and that according to this
definition only about 3% of everyday English words are so irregular their spellings would have to be memorized.

How do we know then, which words to class as regular and which as irregular? Coltheart (1978) suggests that regular spellings, or what he terms a spelling "yielding a correct phonological representation" be classified on the basis that this is the pronunciation accorded to the majority of words containing this particular letter sequence. Exception words (irregular spellings) are those which yield an incorrect phonological representation from their grapheme-phoneme correspondences (GPC). For example, the digraph ‘ea’ which appears in the words peal, meat, reveal and read (but not the past tense form) sounds /i:/, whereas in the words deaf and steak it does not. As the former pronunciation of this digraph is more common, i.e. it appears in more words, this is the regular pronunciation and therefore these words are defined as having regular spellings. Deaf and steak on the other hand, would be accorded irregular status as their GPC rules are in the minority. Coltheart admits that his criterion for classification does not take word frequency into account. Words such as have and give are amongst the most frequently used in the English language, however, by Coltheart’s definition they are irregular as their GPC rules are in the minority.

Dobrovolsky and O'Grady (1996) report a study based on a computer analysis of 17,000 words which showed that 84% were spelled with regular phoneme-grapheme correspondences. In other words, we should be able to rule out orthographic irregularity as being wholly responsible for spelling errors and in fact, as has been shown by the corpus analysis, Arabs appeared to have more difficulty in spelling regular than irregular words. An analysis of the misspelled words in the present study showed that 73% were of regular construction, as opposed to only 27% irregular. (Appendix 1.2. details the criteria that I used in deciding which words were to be classified as regular and which as irregular in this study.) Regularity may therefore not be a factor in determining why words were misspelled by Arab learners.

Errors which fall into Ibrahim’s category two (errors caused by differences between the sound systems of English and Arabic) would seem to be caused by a learner’s faulty pronunciation of English. In other words, errors in this category seem to indicate that
spellers are using a phonetic route to write words, but failing to spell them correctly because of incorrect pronunciation. Ibrahim gives the example misspellings HALL for whole, and COAST for cost, which he attributes to Arabic phonology not having the phonemes /əʊ/ and /ɒ/. If we consider the differences between each pair of words Ibrahim gives, it is largely the vowels which differentiate them. It would therefore appear that vowel problems may in some way be connected with mispronunciations. Treiman (1993) suggests that many of the vowel related misspellings of her young learners were due to mispronunciation or incorrect phonological representation of a word. Could we therefore surmise that the often heavy L1-influenced pronunciation of Arabs may in some way be influencing their spellings? To what degree does pronunciation and the ability to discriminate between closely related phonemes affect spelling ability?

Most spelling errors made by English native speakers are phonologically accurate, i.e. they are homophones with the target word (Bosman & Van Orden, 1997; Campbell & Coltheart, 1984; Hotopf, 1980; Mitton, 1996; Morton, 1980). Bosman and Van Orden (1997: 175) define a phonologically accurate spelling error as one where “the error pattern can be pronounced identically to the intended word using grapheme-to-phoneme correspondence rules.” Many writers have said that if unsure of a word’s exact spelling, they will check the word by reading it aloud to see if it “sounds right” (Morton, 1980). However, when the Arab spelling errors were checked to see if they were phonologically plausible alternatives, only 2.7% fell into this category. We may wonder why Arab spelling errors deviate to such a degree from those made by native speakers. This is an issue which will be further investigated in the course of this thesis.

Another post-checking mechanism employed by uncertain spellers is to produce several different spellings of a word and see which “looks right” (Wing and Baddeley, 1980). However, this method can only really apply to spellings where one or two letters differ. For example, in an experiment carried out by Campbell and Coltheart (1984) only two out of 22 undergraduate students were able to correctly spell sacrilegious; the misspellings were divided among SACRILIGIOUS, SACRELEGIOUS and SACRELIGIOUS. If a writer was unsure about the exact spelling of this word, sounding-it-out would not be of much help as the target word and misspellings would all be pronounced as /sækrelɪdʒəs/.
In this case, writing different versions of the word appears to be the only way to judge whether it is spelled correctly, if a writer is unsure.

It is interesting to note in the above example, that it is the two central vowels which cause the spelling problem. This may be caused in part by the fact that unstressed vowels in English are reduced to schwa, and so letter-pronunciation is not a good guide to spelling. In this case, a writer has to rely on visual clues for spelling. Can this shed any light on the misspellings produced by the Arab learners? We may question why their errors are less-phonetic in nature than those made by native speakers, and if this in some way relates to the high instance of vowel-related misspellings.

Misspellings caused by a writer using a phonological route rather than a lexical one would also include homophones. Mitton found that many of his Real Word Errors (to be discussed subsequently) were in fact homophones, but when the 56 Real Word Errors found in the corpus currently under investigation were reviewed, only two appeared to be homophones.

Azzam (1990) found that many of the spelling errors made by first graders learning to read and write Arabic could be attributed to lack of letter knowledge. In Arabic, letters are often differentiated only by the dots, for example the letters which represent the sounds /s/ (و ) and /ʃ/ (ـ ) ; and the sounds /ʕ/ (ء )and /q/ (ق ). Some spelling errors from the present corpus might be attributable to a confusion between letters, for example: PAGER for paper. However, as this misspelling constitutes another word in itself, we cannot be sure whether the misspelling was due to letter confusion or word confusion.

Indeed, it is the Real Word Errors that provide the most interesting error-type. RWEs in the current corpus accounted for 9.7%. In another corpus of spelling errors that I collected from female Arab students studying in the Foundations department of Zayed University, Dubai (Emery, 2001), Real Word Errors accounted for 16% of the misspellings. By contrast, Mitton (1996) found that 40% of the misspellings he collected from 15 year old Cambridge schoolchildren, fell into this category. In both studies the figure for the Arabs is far lower than that for native English speakers. We might ask what induces a writer to
write a word semantically unrelated, but with a similar lexical structure to the target word, and not realize he is doing so. Instances of RWEs made by Arab writers may of course be coincidental, as a product of the error type; i.e. by changing a letter in some way, an existing word with different meaning is written. Subjects may not even have known the words they produced.

1.4. Conclusion

This chapter has attempted to shed some light on the reasons why Arabs might experience such great difficulty with spelling in English. Various possible explanations have been discussed, but no ultimate conclusion has been reached. Many of the errors are thought-provoking in that they appear to relate to different causes. Take for example:

INCE for nice: Letter inversion; pronunciation has been affected.
HOILDAY for holiday: As above.
DOTAR for daughter: A phonetic spelling (pseudo-homophone)
REDY for ready: As above.
ENRAGE for engage: Letter substitution resulting in a Real Word Error.
HOURS for horse: Real Word Error.
LESEN for listen: As above.
STOOR for store: Pronunciation and lexical properties of the word have been affected.
HCSWE for hacksaw: A complex error; bears little relation to target word; cannot be corrected by computer spellchecker ("no suggestions").

We may therefore ask: are all these errors attributable to the same underlying cause? On the surface they would appear to be caused by different processes, but is that a reasonable assumption to make? In order to assess this, it is necessary to look in depth at the spelling process, the links between reading and spelling and the developmental stages involved in each. These issues will be taken up in chapter 2.
1.5. Questions which this research aims to answer.

This preliminary study has provided an insight into the spelling errors of Arabs and raised some interesting questions which will be further investigated in the literature reviews and subsequent experiments. The questions which this study aims to provide answers to are:

Main question:
Why do Arabs experience such difficulty with English spellings?

Subsidiary questions.

1. Why are there so many vowel related spelling errors?
2. Why are so few phonologically accurate spelling errors made by Arab learners?
3. What skills are involved in accurate spelling and how do they develop?
4. Why do some people acquire these skills and not others?
5. To what extent do the spelling and reading errors represent a ‘developmental phase’?
6. What role does English orthography play in Arabs’ spelling errors, i.e. to what extent may they be attributed solely to the irregular nature of the orthography?
7. Are the spelling errors likely to be caused by differences between Arabic and English: either phonological or orthographic?
8. What is the relationship between reading and spelling? Are they “Two sides of the same coin” as Frith (1980) suggests?
9. To what extent can we know that a learner has reading difficulties, just because he makes spelling errors? Reading (a receptive skill) is more difficult to test than spelling (a productive skill); it is therefore possible that word recognition errors will go undetected. Do Arab ESL learners experience problems with word recognition?
10. What induces a writer to write a word that is semantically unrelated, but which has a similar lexical structure to the target word? These errors have been recorded in spelling, but would they necessarily occur in reading?
The 1: Distribution of error type in preliminary study of spelling errors.
Chapter 2.

**Reading and spelling in English.**

2.1. Introduction.

Chapter 1 presented an analysis of a corpus of spelling errors made by Arab learners of English. Questions raised at the end of the chapter asked if these errors could be attributed to a ‘developmental stage’ in learning to spell, and if so, what ‘stage’ the Arabs were at. This first literature review will outline cognitive processes in reading and spelling in English on the assumption that these strategies must be used in the same way by both first and second language users in order to achieve fluency. Subsequent theory, reported in later chapters, will investigate processes involved in learning to read in an L2 and possible consequences of a transfer of skill from L1 to L2. The aim of this first literature review is to provide a framework for experimentation which it is hoped will indicate skills which Arabs may be weak or lacking in, leading to the spelling errors we saw in chapter 1 and potential reading errors too. The final part of the thesis will then suggest reasons why Arabs may be making so many errors.

2.2. Reading and spelling in different languages.

Reading and writing involve low level processing skills in word recognition and production, and higher level text processing skills such as understanding main ideas, making inferences, predicting outcomes and guessing vocabulary from context (Anderson, 1999). Fluent reading involves both decoding and reading comprehension skills. The focus of this doctoral study is the micro skills of word recognition and production. Without these skills, reading for meaning and the ability to write coherently would not be possible. In psychological literature the term “reading skills” is frequently used to refer to word recognition processes, not the higher level reading comprehension processes. In this thesis therefore, I shall adopt the same principle, and use the term *reading skills* to refer to word recognition, and the term *spelling skills* to refer to a writer’s ability to generate the written form of a word. The term *reading comprehension skills* will be used to refer to global text processing abilities.
Different orthographies require different reading and spelling skills. For example Chinese, which has a logographic orthography, relies heavily on memorization of visual images of character sequences used to construct words. A typical literate Chinese adult possesses a vocabulary of 5,000 to 7,000 characters which would have been learned at the rate of 500 to 600 a year (Rayner, Foorman, Perfetti, Pesetsky & Seidenberg, 2001). Chinese is often described as more difficult to learn to read in than English as it relies so heavily on memorization of characters.

Alphabetic languages can be described as ‘economical’ in that many words can be constructed from a small number of letters. However reading in some languages which use the alphabetic principle is easier than others. Orthographies may be termed as either shallow or deep, depending on the ease of predicting the pronunciation of a word from its spelling. In a shallow orthography the spelling-sound correspondence is direct: anyone can pronounce a word correctly once they have been given the rules. In order to achieve this status an orthography must consistently use the same phoneme-grapheme mappings, and each sound must be represented by a single grapheme. Languages described as having shallow orthographies include Italian, Dutch, Spanish and Serbo-Croat (Smith, 1997). Deep orthographies on the other hand, may not use the same phoneme-grapheme correspondence rules consistently, may not represent certain sounds at all or may use digraphs and trigraphs to represent single phonemes. English orthography is usually described as deep because the spelling-sound correspondences are variable and many spellings involve the features of a deep orthography listed above.

2.3. Reading in English.

2.3.1. Dual-route reading theory.

Reading comprehension relies heavily on word recognition as well as basic language skills and the ability to process text. English, being an alphabetic language, but one with a deep orthography, relies on ‘dual routes’ in reading and spelling. The dual route model of reading in English has long been established (e.g: Adams, 1990; Coltheart, 1978; Coltheart, Curtis, Atkins & Haller, 1993; Coltheart, Rastle, Perry, Langdon & Zeigler,
2001; Rayner et. al., 2001). Readers have access to a phonological route whereby word meanings are accessed through their sounds, and a visual route where words are recognized as wholes. It has been proposed that words which are new to a reader and words of low frequency, are accessed through the phonological route. Meanwhile, high frequency, familiar or irregularly spelled words – or at least parts of them, are accessed through the visual route. A simplified, generic version of the dual-route model of reading (Harley, 1998) is shown in Fig. 2.1. The processes whereby a reader utilises phonological or visual information in his efforts to recognise words are referred to as skills. Throughout this thesis, these skills will be referred to constantly as they are of paramount importance for reading in English.

![Diagram of the dual-route model of reading](image)

**Fig. 2.1. A simplified version of the dual-route model of reading (Harley, 1998: 104).**

2.3.2. Phonological awareness and its relationship to reading ability.

The first question we may ask is: How are these skills acquired? According to Chomsky, humans are “wired” for (spoken) language, but it does not follow that we are innately programmed to read. One of the earliest predictors of a child’s later reading ability is phonological awareness: Can he accurately distinguish the different sounds of English?
Several longitudinal studies have been carried out investigating the relationship between phonological awareness and success in reading. Perhaps the most notable is that of Bradley and Bryant (1983), the principal focus of which was to see whether scores on a sound categorization task were a good predictor of children’s reading ability several years later. They tested 368 four to five year olds who were not able to read at the start of the study, and followed their progress for the next four years. The first part of the study consisted of a series of rhyming tasks, aimed at finding out which children could detect the odd word when presented with a group in which all but one shared a common phoneme. At the end of each trial, children were given a standardized test of reading and spelling ability. Their results showed “high correlations between the initial sound categorization scores and the children’s reading and spelling over three years later” (Bradley & Bryant, 1983: 419).

However, it could be reasoned that phonological abilities and literacy are both simply the outcome of early support in these areas; i.e. that children who learn to read and write at an early age develop their knowledge of sounds as a result of doing so. To investigate whether that was the case, Bradley and Bryant carried out a second investigation, to see whether directly intervening with children’s phonological and alphabetic skills would influence their later progress with literacy. They selected a group of 65 children from the original study who had weak sound categorization skills and who could not read at the start of the project. These children were divided into two experimental groups and two control groups:

1. The first experimental group received 40 training sessions in sound categorization over a period of two years. Children were taught that words could vary by just one sound to make alliterative or rhyming patterns.
2. The second experimental group received the same training as group 1, but additionally were taught with the help of plastic letters, how each common sound was represented by a letter of the alphabet.
3. The third group, which was a control, received training merely in categorizing the words into similar conceptual groups – for example: hen, bat (animals); hen, pig (farm animals).
4. The fourth group received no training at all.
In terms of reading development, the results showed that the experimental groups made significantly more progress, with the children who had been given both alphabetic and sound training (Group 2) improving the most. This group made 12.5 months more progress with reading than the children in the control groups, who had not been given any extra help in reading or sound categorization. Their results led Bradley and Bryant (1983: 420) to conclude that “training in sound categorization is more effective when it also involves an explicit connection to the alphabet.” Additionally, there was a greater effect in terms of spelling improvement with Group 2, indicating that phonic training combined with letter awareness training are crucial in learning to spell. From these investigations we can conclude that high quality phonological representations of words are necessary for efficient reading and spelling.

2.4. Developmental stages in learning to read

Due to the nature of English orthography, phonological skills alone are not sufficient for word recognition: they must be supplemented with good visual memory skills. The question we may ask now is: How does a reader acquire the skills needed for fluent reading in English? Does reading acquisition develop in a series of stages? This question has been asked by researchers for many years, and several models outlining the stages of development have been proposed. Perhaps the most widely recognized is that of Frith (1985). This model attempts to explain the acquisition of reading and spelling skills by native speaking English children in three main stages:

1. **Logographic.** This stage refers to the instant recognition of familiar words. Words are recognized by ‘salient graphic features’. Letter order is largely ignored and phonological factors are largely secondary.

2. **Alphabetic** skills refer to knowledge and use of individual phonemes and graphemes and their correspondences.

3. **Orthographic.** This stage refers to the instant analysis of words into orthographic units without phonological conversion. The orthographic strategy is distinguished from the logographic one by being analytic in a systematic way,
and by being non-visual\textsuperscript{1}. It is distinguished from the alphabetic one by operating in bigger units and by being non-phonological.

(Frith, 1985: 306)

Frith (1985: 311) divides each skill into two parts: the stage it is used in reading and the stage it is used in spelling. This is justified on the basis that "writing and reading skills sometimes show dissociations in development," and leads to the subsequent hypothesis that normal reading and spelling development proceeds out of step. At different stages either reading or spelling will act as the pacemaker. A fundamental principle of all stage models is that all children pass through the same stages in the same order, a point which will later be argued against. Frith's model of the order that these skills are acquired in reading and writing is reproduced in Fig. 2.2. below.

<table>
<thead>
<tr>
<th>Step.</th>
<th>Reading.</th>
<th>Writing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>logographic - 1</td>
<td>(symbolic)</td>
</tr>
<tr>
<td>1b</td>
<td>logographic - 2</td>
<td>logographic - 2</td>
</tr>
<tr>
<td>2a</td>
<td>logographic - 3</td>
<td>alphabetic - 1</td>
</tr>
<tr>
<td>2b</td>
<td>alphabetic - 2</td>
<td>alphabetic - 2</td>
</tr>
<tr>
<td>3a</td>
<td>orthographic - 1</td>
<td>alphabetic - 3</td>
</tr>
<tr>
<td>3b</td>
<td>orthographic - 2</td>
<td>orthographic - 2</td>
</tr>
</tbody>
</table>

Fig. 2.2. The six-step model of skills in reading and writing acquisition (Frith, 1985: 311).

(STRATEGIES ACTING AS 'PACEMAKERS' AT EACH STAGE ARE ITALICISED. THE NUMBERS REFER TO THE LEVEL OF SKILL ATTAINMENT – 1 = VERY BASIC; 2 = MORE ADVANCED, AND SO ON.)

Thus, Frith's model assumes that children begin by reading 'logographically,' and that this skill subsequently acts as the pacemaker for logographic spelling. Both these ideas have been contested in more recent research. Ehri (1998) relabels Frith's logographic

\textsuperscript{1}By referring to orthographic recognition as non-visual, I assume Frith means that it is based on the more sophisticated knowledge of letters and spelling patterns, rather than the purely visual symbol-recognition which characterises the logographic phase.
reading phase the ‘pre-alphabetic phase’ in order to distinguish visual cue reading from what she terms true logographic reading, such as that performed by readers of Chinese, “who process words as visual Gestals.” According to Ehri, true logographic reading in young children can be seen in such things as recognition of the arches in the McDonald’s logo, and represents a very early stage of development, lasting only until children have been introduced to the alphabet. Stuart and Coltheart (1988) found that phonological skills played a role in children’s reading from the very start, and this led them to conclude that “it is incorrect to claim that the first stage of learning to read always involves such non-phonological procedures as ‘logographic’ processing” (Stuart and Coltheart, 1988: 139). According to Ellis (1997), young children taught to read by the Look and Say method have been found to develop logographic recognition procedures. Therefore we may conclude that the first stage in learning to read may not always be logographic, and that development of this skill may in fact depend on the early methods of teaching reading that are used.

Although there is some dispute over exactly how long the logographic stage persists in reading, most researchers accept its existence. However the existence of a logographic stage in spelling has been seriously questioned (Ellis, 1997). Treiman (1993), in her exhaustive study of the spelling errors of American first graders, found strong phonetic influences from the beginning stages of learning to spell. Lennox and Siegel (1998) report an investigation in which the spelling errors of 420 children aged six to sixteen were analysed. Their results indicate that both phonological and orthographic skills develop from the early years of learning to spell. These studies – and others, dispute the existence of a logographic stage in spelling.

In the second stage of Frith’s model alphabetic spelling acts as the pacemaker for alphabetic reading, although exactly why this should be, is not explained. Goswami and Bryant (1990: 148) sum up the situation:

It is still not clear why children are so willing to break up words into phonemes when they write, and yet are so reluctant to think in terms of phonemes when they read. But there can be little doubt that at first children’s reading and spelling are different and separate. The most dramatic demonstration of this separation is
the fact that young children often cannot read some words which they know how
to spell and also fail to spell some words which they can read.

One of the strengths of Frith’s model, is the idea that children first gain explicit insight
into the alphabetic code through spelling practice, and that this causes a shift from a
logographic reading strategy to an alphabetic one. Stage 2 is broken down into two
components: 2A, that phonological awareness is more related to early spelling than to
early reading; and 2B, alphabetic spelling precedes alphabetic reading. Stage 2A asserts
that practice in using phoneme-grapheme correspondence rules (PGC) in spelling will
help develop grapheme-phoneme correspondence (GPC) knowledge in reading. Ellis
(1997: 277) sums up why this is:

Early spelling practice typically involves dividing spoken words into phonemes
and representing these phonemes with letters. In this way experience in spelling
words affords the opportunity for making comparisons between the phonetic
information in individual letters and sounds as they are embedded in the spoken
word.

Thus, the connections between phonemes and graphemes are reinforced through
constant practice in spelling. However, the idea that children can in effect learn by
themselves the often complex relationship between sounds and letters in English has
come under attack. Stuart and Coltheart (1988) question the feasibility of a child
‘acquiring’ knowledge of digraphs, such as in the word chain. A letter-by-letter
decoding strategy would not help the child to read the word accurately; rather, he must
somehow have learned that ‘ch’ can sound /tʃ/ and ‘ai’ can represent the diphthong /əɪ/.

Rayner et. al. (2001) suggest that it is at this point that specific instruction is necessary
in order to master alphabetic decoding in a complex orthography like English. They
advocate the use of phonics-based teaching in early literacy classes, to help children
learn the sound-symbol relationships. The authors add a note of concern that “for more
than 30 years, research has supported the effectiveness of methods that are based on
direct instruction in phonics or decoding” but that “the practice of reading instruction
has remained out of touch with research, emphasising a variety of language activities,
but minimising the teaching of grapheme-phoneme relationships” (Rayner et. al., 2001:
43). If Rayner et. al. are correct in their assumption that explicit instruction is necessary
for children to effectively master the alphabetic stage of reading and spelling, we might
assume that a failure to do so will lead to a failure to acquire orthographic skills as well. According to Frith, each new stage “capitalises” on the earlier ones. If one stage has not been fully mastered, we might expect that the foundations would not have been effectively laid for the next stage, leading to reading and spelling errors.

In Stage 3 of Frith’s model, orthographic reading acts as the pacemaker for orthographic spelling. However, Frith offers no explanation as to how the transition from stage 2 – alphabetic reading, to Stage 3 – orthographic occurs. How does a skilled decoder, who can sound out words letter-by-letter, make the transition to recognising words as wholes? The situation is made all the more complicated because, according to Frith, there is no phonological input in the orthographic stage. It becomes clear that three issues are at stake here:

- How does a beginning reader make the transition from alphabetic to orthographic reading skills?
- Can we be sure there is no phonological input in visual word recognition?
- Why is orthographic spelling acquired later than orthographic reading?

These questions will be dealt with in order. Firstly, Frith proposes that considerable practice at reading by means of an alphabetic strategy leads to the development of orthographic representations of words. This idea is reinforced by Rayner et. al. (2001) who assert that reading practice will help to strengthen the connection between a word’s phonological form and its spelling, which will in turn, increase the speed of word identification. As a reader becomes more familiar with a word’s spelling, he will develop fast, automatic recognition processes, leading to high quality lexical representations. This is the goal of orthographic recognition.

A study by Reitsma (1983) investigated how many times a beginning reader needs to have read a particular word, in order to recognise the word-specific pattern of letters. Reitsma’s subjects were 14 Dutch children with an average age of 7;7. Each child had been attending school for 14 months prior to the study, and could read. The children were taught a series of 50 pseudowords, which were all pronounceable and
orthographically legal, and ranged from four to seven letters in length. Three days after being taught the pseudowords, children were tested on reading a selection of these words, together with some control words, which they had not seen before. Reitsma reasoned that if the children were decoding the words letter-by-letter in order to read them, naming times for both sets of words would be the same. However, if lexical representations of pseudowords they had been taught had been stored in memory, these words would be read faster. The results clearly showed that children who had read a pseudoword four times had committed it to lexical memory and could read it faster than a new word which had to be decoded. From Reitsma's results, it appears that young readers begin to develop orthographic images very soon after learning to decode words, and that a word only needs to be read four times for its representation to be stored in lexical memory. However, in order for a reader to develop high quality lexical representations, i.e. so that he can distinguish a word from a visually similar one, a great deal of reading practice is required.

The second question concerns the apparent dissociation between visual and phonological properties of a word during orthographic recognition. The traditional visual route view postulates that connections are formed between the visual features of words and their meanings (Coltheart, 1978). However, Ehri (1998: 92) describes these connections as "unsystematic and arbitrary" and as a consequence they "take longer to learn, are harder to remember and hence are less reliable." According to the alternative visual phonological route view, connections are formed between letters in the spellings of specific words and phonemes detected in their pronunciations. Readers then utilize their knowledge of the GPC system to form these connections for specific words (Ehri, 1998). These connections are stored in memory and form the lexical access route for word recognition. Thus we can see that from this perspective, visual word recognition depends on a certain degree of phonological input from the written word.

The third point: why is orthographic spelling acquired after orthographic reading, will be discussed in section 2.8: Spelling development.
2.5. Reading by analogy to known-words.

An addition to the dual-route reading model is 'reading by analogy,' the skill whereby a reader is able to pronounce a previously unseen word (or non-word) by mapping its orthography onto a word that he is able to read. For example, if a reader knows the word *house* but has not encountered *mouse* before, he will substitute the initial phoneme, and pronounce the rime in accordance with the pronunciation of the word he knows with similar spelling. Harley (1998) provides a generic example of this addition to the dual-route model of reading (see Fig. 2.3.) and describes the three components of this model:

1. A standard grapheme-phoneme conversion mechanism is supplemented with a body subsystem that makes use of information about correspondences between orthographic and phonological rimes.

2. A direct route between orthography and phonology, which does not access word meanings.

3. A second direct route which involves reading through meaning, called the lexical-semantic route.
Fig. 2.3. The three-route model of reading (Harley, 1998: 119).
As reading by analogy is not mentioned in Frith's (1985) model of reading and spelling development, we may question how it relates to the other two reading routes, and at what stage this skill emerges. According to Harley's diagram, reading by analogy begins with sight-recognition of a letter sequence which the reader associates with a particular pronunciation. He terms this 'non-semantic reading'. However, the model is perhaps slightly over-simplified in that it does not take account of the fact that when reading by analogy, one or more letters differ between the known word and the new word. For example, in the case of *house* and *mouse* the reader will have to substitute the initial phoneme in reading the word - a process which will involve grapheme-phoneme recoding, and therefore recourse to the alphabetic route. It therefore becomes apparent that reading by analogy requires use of both routes.

So when does this skill begin to develop? It has sometimes been suggested (e.g. Goswami, 1986) that reading words by analogy is one of the earliest methods used -- a method that appears even before beginners are able to phonologically recode words. However, an analysis of the processes involved (as described above) raises doubt that analogising is possible without rudimentary decoding skill. Ehri (1998) lists four things that readers must be able to do when reading one word by analogy to another:

1. They must recognise how the two words are both similar and different.

2. They must be able to segment the spoken and written words into onsets and rimes, and recognise how letters match up to spoken segments.

3. They must recognise what sound the onset letter in the unfamiliar word symbolises (P = /p/), and they must be able to blend the new onset with the old rime to say the new word.

4. In addition, if the clue word is not present during the reading task, but must be accessed in memory as a sight word, then readers must possess sufficient memory
for letters in the sight word to recognise the partial correspondence between the known and new words.

She reasons that non-readers and novice beginning readers (for example, those who were at Frith’s logographic stage or just entering the alphabetic stage) would lack some of these requisites and therefore would not be able to read by analogy.

An experiment carried out by Ehri and Robbins (1992) bears out this hypothesis. The authors showed that learners could be taught to read words by analogy, and that this instruction improved reading abilities to a greater extent with decoders than with non-decoders, i.e. those children who could read words by GPC assembly, as opposed to those who could not. They selected kindergarteners and first graders as subjects, and gave them a non-word reading task to distinguish “those who could decode at least a couple of words from those who could not.” They hypothesised that decoders would possess the requisite skills to read words by analogy, whereas non-decoders would not. Subjects were then assigned to either a control or experimental group. Each group was given a pre-test to verify that members did not differ in their reading ability.

Both groups were then taught to read a set of five words (see Table 2.1.). Once they had learned to read these words, they were shown five new transfer words and asked to read them. For the experimental subjects, the words were analogous to words they had learned. For control subjects, they were not analogous, but contained the same letter-sound relations found in training words. The words had non-standard but systematic spellings, which were explained to children as they learned them:

The middle two letters have a line over them. The line tells you that the letters say their own name in the word.

(Ehri, 1998: 99)

Ehri explains that they created spellings for words which would be easy for novice beginners to decode graphophonically. All letters used in the spellings had names that included the relevant sounds (eg: RĀāN for rain, consisting of R whose name ‘ar’ includes /r/, A saying its own name, and N whose name ‘en’ includes /n/). The letters
were printed in capitals, which says Ehri, are more familiar to beginners than lower-case letters.

<table>
<thead>
<tr>
<th>Analogy words</th>
<th>Control words</th>
<th>Transfer words</th>
</tr>
</thead>
<tbody>
<tr>
<td>KÄÄV (cave)</td>
<td>RÄÄN (rain)</td>
<td>SÄÄV (save)</td>
</tr>
<tr>
<td>FÉEL (feel)</td>
<td>KEEEP (keep)</td>
<td>ÑÉEL (seal)</td>
</tr>
<tr>
<td>MĪN (mine)</td>
<td>FĪT (fight)</td>
<td>SĪN (sign)</td>
</tr>
<tr>
<td>RŌOP (rope)</td>
<td>BŌOL (bowl)</td>
<td>SŌOP (soap)</td>
</tr>
<tr>
<td>BŪUT (boot)</td>
<td>MŪUV (move)</td>
<td>SŪUT (suit)</td>
</tr>
</tbody>
</table>

Table 2.1. Words read in the analogy and control conditions during training and in the transfer tasks (Ehri, 1998: 99).

After subjects were able to read the training words, they received a transfer task in which they attempted to read the transfer words without any help. Children were told:

“Now I am going to show you some new words. These words all begin with the letter S. The letters that come after S will be the same as you saw before in the other words. Look at each word and try to read it by remembering how you read the other words. If you don’t know what it says, try to figure it out.”

(Ehri, 1998: 99)

The results showed that readers who were able to decode words were better at reading by analogy, than readers who could not decode. Among decoders, the analogy group read significantly more words correctly than the control group (M = 1.84 versus 0.84 words correct). Among non-decoders, 90% failed to read any words correctly in both conditions. Ehri reports that an analysis of non-decoders’ errors showed that they tended to mis-read new words as old words when the words shared letters, indicating the use of phonetic cue reading. For example, the transfer word SĪN (sign) was misread as the
training word **MINE** (mine). Decoders did not make this type of error – rather, most of their misreadings began with /s/, which precluded the training words.

Non-word reading tests are frequently used to test a subject’s alphabetic reading skills, and are “especially helpful in identifying children whose reading difficulties are associated with impaired phonological skills” (Snowling, Stothard & McLean, 1996: 5). In such a test, the non-words are constructed from novel letter strings which use familiar GPC rules, but are unfamiliar as units in themselves, eg: DAIK. The rime ‘aik’ is not found in any English words, but its legitimate construction allows it to be pronounced. Therefore the only way to read a non-word like DAIK is to assemble GPCs. In a standard non-word reading test “all the non-words can be pronounced according to regular letter-to-sound conversion rules” (Snowling, Stothard & McLean, 1996: 5).

However, there is another way of constructing non-words, according to Goswami (1998). This is by using real words and changing one letter in a short word, or two letters in a longer word. These non-words could then be read by analogy to the real word. An example of this kind of non-word is DAKE, which rhymes in accordance with *cake*, *lake*, *bake* and *make*. Goswami, Gombert and Fraca de Barrera (1998) carried out an experiment to test speed and accuracy of reading the two types of non-word, by English, French and Spanish children aged 7, 8 and 9. Non-words used were either monosyllabic or bisyllabic. Some examples from the English list are:

<table>
<thead>
<tr>
<th>Real word</th>
<th>Analagous non-word</th>
<th>GPC-based non-word</th>
</tr>
</thead>
<tbody>
<tr>
<td>cake</td>
<td>DAKE</td>
<td>DAIK</td>
</tr>
<tr>
<td>page</td>
<td>VAGE</td>
<td>VAIJ</td>
</tr>
<tr>
<td>little</td>
<td>DITTLE</td>
<td>DITTEL</td>
</tr>
<tr>
<td>taxi</td>
<td>HAXI</td>
<td>HACKSI</td>
</tr>
</tbody>
</table>

The results for English children are shown in Table 2.2. The accuracy advantage of reading words like DAKE was as large as twenty percentage points for the youngest readers, indicating that even at this young age, children are using analogous strategies for reading new words, as opposed to purely by GPC rules. Speed was also found to be a
factor: words of familiar rime patterns were read faster than words without familiar patterns.

<table>
<thead>
<tr>
<th>List type (% correct)</th>
<th>Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAKE</td>
<td>DAIK</td>
</tr>
<tr>
<td>56.3</td>
<td>36.2</td>
</tr>
<tr>
<td>64.1</td>
<td>48.2</td>
</tr>
<tr>
<td>91.7</td>
<td>78.9</td>
</tr>
</tbody>
</table>

Table 2.2. Accuracy of nonsense word reading in English: nonsense words with familiar (DAKE) vs. unfamiliar (DAIK) rhymes (Goswami, 1997: 143)

The results obtained by Ehri & Robbins (1992) and Goswami et. al. (1998) show that it is easier for beginners to read new words by analogy than by phonological recoding. However, they also indicate that readers must possess some measure of alphabetic decoding skill to be able to apply analogy in reading new words. Frith (1985: 306) suggests that it is not until the orthographic stage that readers are able to use analogy to read new words, but the results of Ehri and Robbins' experiment indicate that this skill is emerging much earlier. From their results, we may conclude that skills of reading by analogy begin to develop after alphabetic decoding has started, perhaps at stage 2B of Frith's model.

2.6. Skilled reading.

In the early 1970s reading was thought to be a psycholinguistic guessing game where readers interacted with the text, forming predictions about which word would come next, moving their eyes to the word and quickly confirming this prediction, then based on this information, predicting what the next word would be (Goodman, 1970). However, a large amount of research on reading has more recently replaced this hypothesis-testing

---

2 This table is reported in an earlier article by Goswami (1997). She mentions that the Goswami, Gombert & Fraca de Barrera (1998) article was at that time, in press. This exact table is not given in the 1998 article.
view with one where skilled reading processes occur very rapidly, so that the
information needed gets into the processing system very quickly (Rayner, Foorman,
Perfetti, Pesetsky & Seidenberg, 2001).

Although context plays an important part in the higher level processes of interpreting
meaning, it plays little role in the word recognition of skilled readers. According to
Rayner et. al. (2001) two lines of research have been influential in shaping current views
about skilled reading: research into eye movements during reading, and into word
recognition.

2.6.1. Eye fixations during reading.

As we read, our eyes travel across the page taking in limited amounts of information in
‘chunks’. The eye movements are referred to as saccades, and the chunks as fixations.
Saccades typically last about 20 – 40 milliseconds (ms), and fixations about 200 – 250
ms (Rayner et. al. 2001). It is during the fixations that a reader acquires information
from the text. In addition to forward-moving saccades, readers often move their eyes
backwards over the text in order to re-read it, a process often driven by comprehension
breakdown. Rayner et. al. specify that regressions occur 10 – 15% of the time with
skilled readers, and up to 50% of the time with beginning or poor readers.

Vital information taken up during fixations which is used to identify words, is normally
restricted to seven or eight letter spaces to the right of the fixation. Whilst skilled readers
fixate on about two thirds of the words in a text, beginning or poor readers fixate on
almost every word, frequently making more than one fixation on a word. Words that are
skipped by skilled readers are typically short or highly predictable from the preceding
context (Rayner et. al. 2001). Low frequency words are fixated for longer than high
frequency words. During word identification, all letters in a word are processed – this is
how a reader distinguishes between similarly spelled words such as explore/explode,
conversation/conversion.
2.6.2. Visual word recognition.

According to Ehri (1980; 1992; 1998) words which have been read several times and are therefore familiar to the reader, may be read by sight. Less familiar words on the other hand might be read by phonological recoding — applying GPC rules and blending the phonemes into pronunciations with recognizable meanings so that an entry can be accessed in the lexicon. This automatic recognition of words allows the reader to proceed fluently and to devote full attention to the meaning of the text. Sight word recognition involves several skills in operation simultaneously. A word may be initially identified through one source, but its identity may be confirmed by other sources — a process which creates redundancy in the system. Ehri (1998: 90) explains how this operates in principle:

For example, a particular word may be identified by sight because lexical access is fast operating. World knowledge and linguistic knowledge may immediately confirm that the word fits semantic and syntactic expectations. Graphophonic knowledge may verify that the word’s pronunciation corresponds to its spelling pattern.

Ehri suggests that in the skilled reader, word recognition involves the interaction of multiple sources of knowledge operating in parallel. These processes operate automatically, without conscious effort, which allows skilled readers to devote their full attention to comprehending meaning.

As mentioned in the previous section, all letters in a word must be processed in sequence for a reader to build a specific representation of the word that can be accessed quickly and accurately (Rayner et. al. 2001). This point has implications for the teaching of reading, particularly with reference to the Look and Say method, which encourages children to memorise the shapes of words in the early stages. Although this method may be initially helpful in getting children to read, it is not enough for reading development to continue, and must be supplemented with phonics and extensive reading practice. The teaching of reading will be further explored in Chapter 7.
As we have seen so far, orthographic recognition involves direct access from print to meaning and subsequently to pronunciation. This skill relies heavily on stored memory of letter sequences, as well as incorporating letter-sound knowledge. It is a fast, automatically-occurring process and is the end point of skilled reading. Exposure to print, i.e. extensive reading practice, will help develop good orthographic recognition skills.

2.7. Word recognition strategies used by good and poor readers of English.

We have seen that fluent readers make different eye fixations to beginning readers and poor readers, who may fixate on a word for longer and make more regressions, presumably in an attempt to understand the text. We have also seen that skilled reading depends on fast, automatic word recognition, and that word recognition skills are essential to reading comprehension. The dual route reading theory stipulates that a reader must be able to utilise both phonological and orthographic routes efficiently if he is to become a skilled reader. Frith (1985) states that logographic, alphabetic and orthographic stages in reading must be acquired in the given order, and that mastery of a stage is essential before a reader (or speller) can progress to the next stage. Teachers often refer to a learner's ability to recognise and pronounce a word as "word attack skills". We may question then, what the differences are in the word attack skills of children who are good readers and those who are not. A study by Anderson and Freebody (1983) may shed some light on this.

2.7.1. The Yes/No Vocabulary Test.

Anderson and Freebody carried out what they termed a "Yes/ No Vocabulary Test" on young American children learning to read English. This test was initially developed as a measure of the children's vocabulary knowledge, but I shall report it here as the results give an interesting insight into how children who were good readers, and those who were poor readers, processed words. Teachers of English as a Foreign Language have traditionally used the multiple choice (MC) test as a means of testing vocabulary levels. However, the validity of this test is criticised on two counts by Anderson and Freebody (1983):

38
1. The distractors in a test item strongly influence performance.
2. Test-taking strategy is inevitably a factor in performance in MC tests.

As a result of these weaknesses in the test design, scores obtained from administering the MC test have proved to be unreliable indicators of the level of vocabulary knowledge possessed by a subject.

Anderson and Freebody (1983) propose that the Yes/No test is a more reliable measure of testing vocabulary because it simplifies the task demands and so makes it easier for young readers and poor readers to show what they know. The Yes/No Vocabulary Test was first used by Anderson and Freebody (1981, 1983) with native speaking American children, and later developed for use with learners of English as a second language by Meara and Buxton (1987).

The test consists of a number of real words and a number of imaginary words – which look like actual words, but are not. Testees are instructed to mark each item as ‘yes’ they know the word, or ‘no’ they don’t know it, or in some cases ‘don’t know’. If the latter option is included, generally it is counted as a ‘no’ response; its purpose is to help alleviate feelings of stress in a testee who feels he isn’t sure whether he knows the word. Imaginary words are included as a measure of the overall reliability of the testee’s judgements on the real words. As such, the imaginary words are a secondary aspect of the test design, the primary one being to see how many of the real words the testee knows.

According to the Yes/No test, a subject scores a “hit” when he indicates that he knows the meaning of a real word, but a “false alarm” when he says he knows the meaning of an imaginary word. Scores are calculated in a manner designed to correct for untruthful or inaccurate answers, i.e. “hits” are awarded plus points, but “false alarms” result in an adjustment to the overall score. The resultant figure is taken as a measure of the vocabulary level that the learner has achieved.
Meara and Buxton do not mention on what basis subjects should decide whether they ‘know’ a word; however, Nation (1990) states that knowing a word involves both receptive and passive knowledge, and lists several criteria which this knowledge would be based on:

Receptive knowledge of a word would include:

- Being able to recognise the word when it is heard.
- Being able to distinguish the word from others with a similar form.
- Being able to judge if the word form sounds right or looks right.
- Having an expectation of what grammatical pattern the word will occur in.
- Knowing the meaning of the word.

Productive knowledge of a word includes receptive knowledge and extends it:

- Being able to pronounce the word correctly.
- Knowing how to write and spell the word.
- Knowing how to use it in correct grammatical patterns along with the words it usually collocates with.
- Knowing when a situation is suitable to use the word.
- Knowing the meaning of the word and being able to think of suitable substitutes for it, if there are any.

(Nation, 1990: 31-32)

The criteria given by Nation for ‘knowing a word’ are very thorough and as he says himself, probably apply completely to only a small proportion of the total vocabulary of a native speaker: “most native speakers cannot spell or pronounce all the words they are familiar with and they are uncertain about the meaning and use of many of them” (p. 32-33). To qualify as ‘knowing’ a word then, perhaps not all of the above criteria are necessary. As the Yes/No test asks subjects to read a list of words and tick those that they know, it would appear that only receptive knowledge of words is being tested, not a
subject's ability to spell them or use them creatively. As no listening or speaking is involved in the test, a knowledge of the sound properties of the words is not involved. Thus, it would seem that the Yes/No Vocabulary Test is actually a test of isolated word recognition, similar to a lexical decision test. Lexical decision tests have been used by psychologists for many years, as a means of finding out about word recognition skills. The task requires a subject to decide as rapidly as possible whether a string of letters presented briefly on computer is a word or non-word. The pattern of response latencies that the subject produces is considered a sensitive measure of lexical access processes. Studies have shown that several variables affect the ease of word recognition: in terms of real words, frequency was found to be a major factor, but word length was not; in terms of non-word identification, legality of spelling, pronunciability and similarity to an existing word all played a part (Harley, 1998). However, it is important to remember that in a lexical decision task, a subject is briefed that he will be presented with words and non-words, and that he must decide which are actual words. Whereas, in the Yes/No Vocabulary Test, a subject is asked whether he knows the words – he is not told that some may be non-words.

In their Yes/No test, Anderson and Freebody (1983) formed their imaginary words in one of two ways:

1. By changing one or two letters in real words, eg: flirt became FLORT; perfume became PORFAME.
2. By forming unconventional base plus affix combinations, eg: OBSERVEMENT, ADJUSTION; which the authors refer to as 'pseudo-derivatives'.

A subject who mistook the first type of imaginary words for real words, would be expected to have poor phonological decoding skills, i.e. he does not know the exact sound produced by the vowel graphemes. He would also be expected to have poor orthographic recognition skills as visual word recognition should indicate that the imaginary word differed from the original real word in one or two letters. A reader who indicated he knew the second type of imaginary word may well have thought he knew the word on the basis of the word's morphological structure: the root form and affixes belong to actual words, but do not co-exist as given in the test – a factor which might
confuse a subject whose vocabulary wasn’t very big. Thus we can see that the two types of imaginary word will involve differences in cognitive processing: false alarms on the first type of imaginary word may well indicate poor reading skills, but false alarms on the second type might indicate good reading skills, but lower levels of vocabulary.

2.7.2. The Yes/No Test and 5th Grade American children.

Anderson and Freebody (1983) tested the effectiveness of the Yes/No Vocabulary Knowledge Test in relation to a traditional multiple choice test, with 120 5th grade (aged 9 – 10) American native speaker children. Both tests used by Anderson and Freebody were based on the vocabulary subscale of the Stanford Achievement Test: a reading level test for schoolchildren. Their test included all the items from the 5th grade level, and approximately a third of the items from two levels above and two levels below this. These 195 vocabulary items were used as the basis for both the MC and Yes/No tests. Unfortunately the authors do not provide any examples of their MC questions, or mention on what basis children were asked to state whether they ‘knew’ a word. The correlation between MC scores and corrected Yes/No scores ( .84) shows a strong relationship between results of the two tests. This result would seem to indicate that the Yes/ No vocabulary test is at least as good an indicator of vocabulary knowledge as the standard MC test. However, further investigation of the relationship between MC tests and Yes/ No tests is outside the scope of this thesis. The main point of interest in the Anderson and Freebody study is their analysis of the children’s “false alarms”, i.e. instances where they thought they knew an imaginary word.

As mentioned previously, false alarms on imaginary words may involve different cognitive skills depending on how the item was constructed. Anderson and Freebody’s analysis of the false alarms showed that there was a difference in the type of imaginary words thought to be real by low and high ability children. Children whose overall scores for correct responses fell in the top quartile were classed as high ability, and those whose scores fell in the bottom quartile as low ability. The high ability children’s false alarms were pseudo-derivatives of existing words, eg: LOYALMENT, OBSERVEMENT, INSTRUCTNESS, FORGIVITY, REHEARSION. Low ability children’s false alarms included items such as JERBAL, COBE, ROBBIT, RISENT, MUDGE.
Anderson and Freebody propose that the high ability children were “aggressively applying the word-formation rules of English to hypothesize meanings for unfamiliar letter strings” (p. 240). To illustrate this point, they mention that the imaginary word LOYALMENT recorded 70% of the false alarms of this group of subjects as opposed to 44% of the low ability children’s false alarms. The low ability children on the other hand, scored the greatest number of false alarms on imaginary words which were phonemically or visually similar to real words. For instance, JERBAL which 67% of low ability children recorded a false alarm on (as opposed to 19% of high ability) is phonemically and visually similar to gerbil, a pet owned by many children. In the same way, 56% of low ability children thought they knew the word ROBBIT, but none of the high ability children made this mistake. It would seem from this analysis that the poor ability children, i.e. those who had lowest vocabulary levels as indicated by the tests, may in fact have been hampered by poor reading abilities.

Anderson and Freebody suggest that low ability children’s false alarms conform to a pattern in decoding: if their first attempt to decode an item matches a word they know, they accept this. However, they are aware they are not good decoders and so, if this first attempt does not yield any concrete results, “they keep jiggering the decoding until they find a match with a known word, or until they run out of decoding options or give up” (p. 242). They further suggest that the decoding options of a typical poor reader follow a predictable order:

1. Decode the item in the manner preferred in English, or at least in a manner legal in English. Say yes even though the item does not have conventional English spelling. Example: JERBAL → gerbil.
2. Change the vowel from short to long, or long to short. Examples: COBE → cob; RITTER → writer.
3. Change vowel to a phonemically or visually similar one. Examples: ROBBIT → rabbit or robot; GRELL → grill.
4. Try another permissible rendering of a consonant. Example: RISENT → recent.
5. Change a consonant to a phonemically or visually similar one. Examples: BLINT → blind; FLANE → flame.

(p. 242- 243)

In this suggested pattern of response, Anderson and Freebody do not distinguish between use of the two routes in reading: phonological and orthographic, referring to both as ‘decoding’. One reason may be that this represents an early study (1983) and whilst the dual route theory of reading had been proposed by Coltheart (1978), the actual role of each route may not have been widely acknowledged at this time. Despite this, the sequence of responses suggested by the authors concurs with the idea that false alarms on imaginary words constructed by changing one or two letters in an existing word, would be the result of poor visual and phonological reading skills.

Anderson and Freebody’s study may indicate that children who are poor readers have poor grapheme-phoneme knowledge, and so will read poorly via the alphabetic route. The authors have also suggested that poor readers may confuse similarly shaped letters, and thus confuse words. According to these findings, poor readers have poor alphabetic and poor orthographic skills – in other words, their “word attack skills” are very limited. The ‘decoding options’ listed above are suggested by Anderson and Freebody (1983: 242 – 243) as a series of compensatory strategies that may be followed by poor readers.

2.7.3. Use of contextual clues in word recognition.

In English, it is possible to recognise most words in isolation, the exceptions being homographs – and this is what skilled readers are able to do. I mention that this is specifically possible in English as this is not necessarily so in all orthographies, a case in point being Arabic, which is reviewed in Chapter 4. It should be noted that text comprehension is dependent on word recognition as well as contextual clues, word recognition on the other hand, operates without the aid of contextual clues in skilled readers. According to Stanovich (1980) the advantage of being able to recognise words independently is that a reader is able to devote more of his attention to the higher level
processes of text comprehension, without using the text to try and guess the meanings of words.

Anderson and Freebody (1983) suggested ways in which poor readers might try to compensate for their inadequate word recognition skills. These compensation strategies included overlooking certain letters in a word and mentally substituting others, in an effort to read the word. An in-depth review of experimental literature carried out by Stanovich (1980), indicates that the compensatory strategies used by poor readers may also include an overly-heavy reliance on context for word recognition. Stanovich carried out his review in order to assess the feasibility of top-down, bottom-up or interactive-compensatory models of the reading process. His review focuses on research into reading comprehension and word recognition strategies of good and poor readers. Stanovich concludes that:

- Good readers have superior strategies for comprehending and remembering large units of text.
- Good readers are superior at context-free word recognition.
- Good readers have automatised the recognition of word and sub-word units to a greater extent than poor readers.
- Good readers recognise even fully automated words faster than poor readers.
- Good readers have superior phonetic segmentation and recoding abilities so that they can rapidly decode a word when visual recognition fails.

(Stanovich, 1980: 64)

From this, it is apparent that poor readers have poor phonological decoding abilities, take longer to visually recognise words and as a result of these poor “word attack skills”, depend heavily on contextual information in order to recognise a word. The latter point is of great importance according to Stanovich, as rapid, context-free word recognition ability means a reader is less dependent on expectancies generated by the previous sentence. As a result, he will have more attentional capacity left over for comprehending the text. Stanovich’s argument is that by relying on context for word recognition, poor
readers are devoting too much attentional capacity to an activity which good readers find unnecessary. This attentional focus would be better directed towards "integrative comprehension processes".

2.8 Spelling in English.

2.8.1. Dual route spelling theory.

Frith (1980: 496) asked the question “Are reading a word correctly and writing a word correctly two sides of the same coin? Or are they separate processes which have little in common?” This issue intrigued researchers for many years, however, it is now fairly well established that as with reading, there is a dual route involved in spelling. The dual route model of spelling production proposes separable lexical and assembled spelling systems (the latter sometimes referred to as the ‘phonic’ or non-lexical route), in the same way that reading involves processes of visual word recognition and phonological decoding.

Evidence in support of two separable routes for spelling production comes from case studies of acquired dysgraphia: a loss of the ability to spell, caused by traumatic injury to the brain in adulthood and can be ascribed to Lexical or Phonological Dysgraphia. Seymour (1992) describes the case of a patient suffering from Lexical Dysgraphia (which would equate to surface dyslexia) who was able to write non-words to dictation with almost 100% accuracy, but made numerous errors in spelling irregular or ambiguous words. This impairment would seem to indicate that the phonological route for spelling was intact, but the lexical route was not. A patient suffering from Phonological Dysgraphia was able to repeat a spoken non-word but made numerous errors (82%) when writing non-words to dictation. However, in this case real-word writing was largely preserved with only 6% errors. This case would seem to indicate that while the phonological route for converting sounds to letters had been lost, the lexical route was still intact.

However, it would not be correct to assume that reversing the direction of the arrows in Harley's dual and triple-route models of reading (Figs. 2.1. and 2.3.) would account for
spelling processes. In fact, spelling in English seems to be a lot more complex than that, and the actual role of each spelling route has been the focus of much debate. Nelson (1980) proposed that a phoneme-grapheme rule-based strategy was used for spelling regular words, and a lexical strategy for spelling irregular words. The PGC route implies that words are assembled with the aid of rules for converting sounds to letters, whereas by the lexical strategy, spellings are retrieved from the memory as single units. This latter method is also referred to as word-specific memory.

According to Barry (1992) the lexical (or word specific) route retrieves the spellings of known words from an orthographic (or graphemic) lexicon. All known words can be spelled in this way because all words are assumed to have representations in the output lexicon. However it is possible, he claims, that only certain components of any particular word’s spelling are stored (for example, irregular spellings of vowels like the ach in yacht) and the remainder: perhaps the consonants, are spelled by the assembly process. It is generally accepted that to be a good speller in English, a writer must be able to utilise both spelling routes effectively: he must have a good knowledge of PGC rules and possess good word-specific images. He must also have a good knowledge of the orthographic system. A failure in any of these areas will lead to poor spelling abilities.

2.8.2. Why spelling is more difficult than reading.

Section 2.4. raised the question of why orthographic spelling skills were acquired after orthographic reading skills had been mastered. Orthographic spelling requires complete specification of a word’s constituents, whereas orthographic reading needs only to discriminate a presented word from other words (Rayner et. al, 2001). Campbell and Coltheart (1984) tested undergraduates at two London colleges on their ability to spell the word “Gandhi”. The authors found that all 57 subjects could instantly recognise the word – presumably because the Richard Attenborough movie of the same name had been released a few months earlier, and “the film title was writ large, both metaphorically and literally, in Londoner’s minds. It was displayed in letters two meters tall over Leicester Square and Charing Cross Road” (Campbell and Coltheart, 1984: 186). However, few of the subjects could actually spell it. All but eight thought it was spelled GHANDI. This example shows that whilst subjects were aware of all the letters
in the word, their exact sequence was less-well known. By way of explanation, Campbell and Coltheart (p.187) suggest that the most popular spelling, GHANDI "looks more like a correct spelling" than any of the other versions, including the correct form: Gandhi. An analysis of position-specific bigram frequencies for all given spellings, including the correct one, showed GHANDI to be two standard deviations beyond the mean of the five sets of scores (see Table 2.3).

<table>
<thead>
<tr>
<th>Summed position-specific letter frequencies.</th>
<th>GHANDI</th>
<th>GAHNDI</th>
<th>GANHD</th>
<th>GANDH</th>
<th>DANDIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summed bigram frequencies.</td>
<td>536</td>
<td>620</td>
<td>657</td>
<td>670</td>
<td>760</td>
</tr>
<tr>
<td>Summed position-specific bigram frequencies.</td>
<td>4396</td>
<td>1471</td>
<td>1827</td>
<td>3715</td>
<td>3035</td>
</tr>
<tr>
<td>Parsed constituent words.</td>
<td>ha</td>
<td>ah</td>
<td>an</td>
<td>an</td>
<td>an</td>
</tr>
<tr>
<td></td>
<td>hand</td>
<td></td>
<td>an</td>
<td>(Gandhi)</td>
<td>and</td>
</tr>
</tbody>
</table>

Table 2.3. Wordlikeness of Gandhi and its possible misspellings (Campbell & Coltheart, 1984: 188).

The fact that all the students recognised the word, but only eight out of 57 could spell it correctly, shows that orthographic recognition skills in themselves are not sufficient for orthographic spelling to take place. The reason for this, state Bosman and Van Orden (1997) is that in English orthography there are generally more possible spellings for a word than possible readings. This is because a large number of phonemes map onto more than one grapheme. An example is the word /ri:d/ - this word can be spelled as reed, read or the Scottish name, Reid. A reader would immediately know which meaning to assign to the word, but a speller has to rely on his lexical knowledge to recall the precise form for the meaning. According to Bosman and Van Orden, not only English, but other orthographies such as Dutch, French, German and Spanish are more inconsistent in their phoneme-to-grapheme letter relations than in their letter-to-phoneme relations, and as a result, greater memory skills are required for spelling than for reading in these languages.
Most ESL teachers will tell you that their students find ‘production’ harder than ‘reception’ because recalling a word from memory without a stimulus, as required in spelling, is more difficult than recognising one where all the letters are given. According to Rayner et al. (2001) it is specific practice at spelling which develops these “high quality orthographic representations” of words, which are necessary for spelling. As we engage less in spelling than in reading, development of orthographic images of a sufficient quality to enable us to spell words accurately is a slower process than development of orthographic images sufficient for reading.

Because the lexical representations needed for spelling are more detailed than the representations necessary for reading, it can be difficult for a speller to spot his errors. In Chapter 1 it was mentioned that Wing and Baddeley (1980) divided misspellings into those that they termed slips: where the writer knew the correct spelling, but wrote something else in the heat of the moment, and errors of convention, where the writer did not know the correct spelling. Campbell (1987) found that writers could only spot their misspellings if these were words that they did know how to spell, i.e. they were slips. She found that merely being able to read and recognise a word (including knowing its meaning and being able to distinguish it from other similarly spelled words) was not sufficient for a writer to know when it had been misspelled. This point further emphasises the difference in orthographic knowledge required to progress from Stage 3A of Frith’s model, to stage 3B.

2.8.3. Strategies of good spellers and poor spellers.

Frith (1980: 496) asks what it is about the nature of English spelling that leads us to find three types of readers/ spellers:

Type A: Good readers, good spellers.
Type B: Good readers, poor spellers.
Type C: Poor readers, poor spellers.
In an attempt to explain this dissociation, she carried out an experiment with the following research questions:
1. Do those poor spellers who are good readers make different kinds of errors from those poor spellers who are at the same time poor readers?
2. Do poor spellers who are good readers recognise words differently from other good readers?

(Frith, 1980: 497)

As subjects, Frith chose 29 twelve-year-olds from South London secondary schools. She reasoned that this particular age group could “quite reliably be assessed as good or poor at reading or spelling” (Frith, 1980: 497). Individual children were selected on the basis of their reading and spelling performance, so that they could be divided into the three types of readers/spellers listed above. Age-matched reading and spelling performance levels were used to categorise children as ‘good’ or ‘poor’ in each skill. To test the children’s reading and spelling she used the Schonell graded word lists (Schonell, 1942).

Frith states that many of the children’s spelling errors “preserved the sound of the target word” (p.498) and could therefore be classified as phonetic errors. She provides examples of what she describes as phonetic and non-phonetic errors:

<table>
<thead>
<tr>
<th>Target word</th>
<th>Phonetic error</th>
<th>Non-phonetic error</th>
</tr>
</thead>
<tbody>
<tr>
<td>cough</td>
<td>coff, cof</td>
<td>couge, coft</td>
</tr>
<tr>
<td>freeze</td>
<td>freez, freas</td>
<td>frezze, fizzie</td>
</tr>
<tr>
<td>capacity</td>
<td>capasaty, capasertee</td>
<td>capsidy, cassaty</td>
</tr>
<tr>
<td>allotment</td>
<td>allotmont, allotmeant</td>
<td>aloment, attolment</td>
</tr>
</tbody>
</table>

Although Frith only provides 20 examples of what she calls phonetic misspellings, her criteria for designating them as such, compared to those she terms non-phonetic, appear to be the same as the criteria that were adopted in Chapter 1’s analysis of the Arab spelling errors. Deciding whether a misspelling represents a phonetic equivalent of the target word or not, is a contentious issue. Frith therefore asked two judges to classify the
errors. Misspellings on which no agreement was reached are listed separately. Her results are given in Table 2.4.

<table>
<thead>
<tr>
<th>Type of error</th>
<th>A Good readers</th>
<th>B Good readers</th>
<th>C Poor readers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good spellers</td>
<td>Poor spellers</td>
<td>Poor spellers</td>
</tr>
<tr>
<td>Phonetic</td>
<td>73</td>
<td>67</td>
<td>45</td>
</tr>
<tr>
<td>Non-phonetic</td>
<td>23</td>
<td>29</td>
<td>49</td>
</tr>
<tr>
<td>No agreement</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 2.4. Percentage of phonetic and non-phonetic errors when spelling real words (Frith, 1980: 499).

Immediately it becomes obvious that the poor readers, poor spellers (Group C) made proportionally fewer phonetic and more non-phonetic errors than the other two groups, although Frith states that the number of errors made by groups B and C was approximately equal. Group B made more phonetic errors than group C (t = 4.24, p < .01) and fewer non-phonetic errors (t = 3.40, p < .01). It is therefore the type of misspelling, and not the quantity, that separates members of groups B and C.

In an attempt to test whether her findings using the Schonell test stimuli were accurate, Frith subsequently conducted a non-word spelling test with the same subject groups. Her hypothesis was that group B would have no problem in using phoneme-to-grapheme correspondence rules, while group C would experience difficulty. Although this experiment pre-dates her (1985) model of reading and spelling development, we can see the rationale that group B, the “unexpectedly poor spellers” would have mastered alphabetic reading and spelling, but not the final stage of orthographic spelling. These subjects were therefore expected to do better on the non-word spelling test than group C, who had not mastered alphabetic reading or spelling.
The test consisted of 20 dictated nonsense words, which "were all possible English words, as they were derived from real words with a change of a few letters" (Frith, 1980: 500). Some examples of these non-words, together with their real-word counterpart are: ZATEST (latest), USTERAND (understand), RITUATED (situated), DETARDED (retarded) and REKIND (remind). Frith reports significant differences between Groups A and B (t = 2.46, p < .01) and Groups A and C (t = 3.23, p < .01)\(^3\). The results (given in Table 2.5.) are consistent with the hypothesis that group B has no problem using PGC rules, in contrast to group C, which does have such problems.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonetic conventional.</td>
<td>–</td>
<td>90%</td>
<td>75%</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>usterand</td>
</tr>
<tr>
<td>Phonetic unconventional.</td>
<td>3%</td>
<td>10%</td>
<td>7%</td>
<td>asterand</td>
</tr>
<tr>
<td>Nonphonic.</td>
<td>7%</td>
<td>15%</td>
<td>33%</td>
<td>austeran</td>
</tr>
</tbody>
</table>

Table 2.5. Percentage of phonetic and nonphonetic responses when spelling nonsense words (Frith, 1980: 501).

This experiment gave a further interesting result, in terms of the spelling-by-analogy abilities of each subject group. Whilst group B were able to utilise PGC rules accurately, they were not able to spell nonsense words according to existing words that they knew. Instead, they provided a higher proportion of *unconventional* phonetic spellings than other groups. Frith explains that the problem for this group, when spelling real words, is that they might "spell the word SEARCH like birch, like perch or like lurch — all of which sound correct, but look wrong." By contrast, group A were able to use both methods to spell nonsense words effectively. According to Frith’s (1985) model, group B subjects would seem to be at stage 3A: they have mastered alphabetic spelling and orthographic reading, but not orthographic spelling abilities. Group A subjects, who are

---

\(^3\) Hinton (1995: 105) states that it is not advisable to run t-tests on pairs of data from a set because "the more t-tests we perform on the data the more likely we are to …. accept a result as significant when it occurred by chance." Frith does seem to have obtained strong results from her experiment, however, it would probably have been better to use an ANOVA to test the data.
good readers and good spellers – and can spell new words by analogy to known ones, are at stage 3B: they have effectively mastered orthographic reading and spelling.

Frith’s findings tie in with those of Stanovich (1980) and Anderson and Freebody (1983) regarding the reading skills of good and poor readers. Thus we can see that good readers have good phonological decoding skills: a sound knowledge of the conventions of phoneme-grapheme and grapheme-phoneme correspondence rules, and good abilities to read and spell new words by analogy to words they already know. Good readers and spellers also possess good ‘sight word knowledge’, i.e. orthographic knowledge of a word.

Frith’s experiment raises the question: if the spelling errors recorded in Chapter 1 represent a developmental stage, which stage are the Arab learners at? The very low incidence of phonetic misspellings (2.7%) indicates that Arab learners have most-likely not yet mastered alphabetic spelling skills in which case they would either be at stage 2B or 3A of Frith’s (1985) model. If they were at stage 2B, we would expect them to be poor readers as well, as was the case with Frith’s Group C subjects. If on the other hand, they were at Stage 3A, we would expect them to be reasonably good readers, but lack orthographic spelling skills. Do Arab learners possess good reading skills? This is an issue which will be investigated in subsequent chapters, through a review of current literature and further experimentation.

2.8.4. Acquisition of spelling skills.

So far, we have learned why spelling a word in English is harder than reading it, and why this situation can lead to good readers who are poor spellers. The discussion also described research which indicated that poor spellers who were also poor readers had not mastered orthographic reading or orthographic spelling skills. It was further suggested that in some cases, alphabetic spelling skills had not been fully acquired either. We may question why some people learn good spelling skills, and others do not. How does a child learn the relationships between sound and symbol in a complex orthography like
English? How does one proceed from the alphabetic to orthographic stage of spelling? And how are high quality lexical representations of words developed? In this section, I will discuss each of these issues.

According to Frith's model, described in section 2.4, alphabetic spelling precedes alphabetic reading. Research conducted by Treiman (1993) and Lennox and Siegel (1998) has argued a strong case for alphabetic spelling as the first stage of spelling, and not logographic spelling, as Frith proposes. It is now well-established theory that young children's spellings begin with sound-symbol representations. Even pre-literate children have been found to use the sounds associated with the names of the letters, for example, American children's "spelling car as KR. This spelling uses the name of the letter R (/ar/) to capture both vowel and consonant" (Rayner et. al, 2001).

Treiman (1993) showed that young children become sensitive to both the orthographic structures and morphological structures present in spellings. She observed knowledge of orthographic conventions even in first grade children, for example, the fact that 'ck' never occurs as a spelling of /k/ at the beginning of a word, but does occur following a vowel. She also found that American children were sensitive to morphology in their spellings. For example, the word dirty was never misspelled as DIRDY even though the second syllable is pronounced /di:/ in American English. This indicates that children recognised that dirty is composed of the lexical morpheme dirt + suffix. Treiman found that children were more likely to substitute 'd' for 't' in a single morpheme word such as duty.

Treiman (1993) found that in the early stages children's spellings were an attempt to represent the sounds of the words rather than an attempt to visually memorise the sequence of letters in a word. This finding applied to children who were encouraged by their teacher to write on their own and experiment with spelling: a format often referred to as inventive spelling. These children were learning to spell with little guidance rather than being forced to memorise correct spellings of words. We can conclude from Treiman's findings that phonology plays a very important role in spelling from the start. It appears that in an alphabetic language children will begin to develop knowledge of PGC rules on their own, without specifically being taught these correspondences.
However, as there are many irregularities in the English spelling system, and no strictly controlled one-to-one letter-sound relationship, problems will occur if a child is left to learn spellings on his own. English has around 40 phonemes which have to be represented by 26 graphemes, either singly or in combination, and there is not always a one-to-one correspondence. It has been pointed out that children will not acquire knowledge of these complex letter-sound relationships without specific instruction (eg: Rayner et. al, 2001; Stuart and Coltheart, 1988). For example, the letters ‘ch’ at the beginning of a word sound /tʃ/ (unless they are of foreign origin such as cholera, chimera, chic), but if they appear in the middle of a word they may sound /ʃ/ as in machine, or /k/ as in school. It is at this point that the teacher's role becomes very important. Over the years many methods have been adopted for teaching reading and spelling skills to children – the main ones will be discussed in detail in Chapter 6. For the present discussion, it is sufficient to realise that spelling development cannot progress further than an elementary alphabetic stage without specific instruction.

According to Frith's (1985) model, the transition from alphabetic to orthographic reading skills occurs as a result of extensive exposure to print, i.e. a great deal of reading practice. Once orthographic images sufficient for word recognition have been developed, further practice in spelling will help strengthen the word-specific image, so that its 'quality' is sufficient for the word to be spelled accurately. It becomes clear then, that spelling development in the early stages is dependent on good quality instruction, and in the later stages on extensive reading practice, followed by extensive spelling practice.

2.9. Developmental dyslexias and dysgraphias.

Studies of dyslexia and dysgraphia provide one possible line of enquiry into why L2 learners make spelling and reading errors, because the performance of the L2 learner, as we shall see, is in some ways similar to that of the dyslexic. However, it is important to remember that Developmental Dyslexias are congenital neurological abnormalities (Temple, 1997), and as such, the reading and spelling skills of sufferers are unlikely to
improve. By comparison, poor readers and spellers and slow learners may improve their performance with correct instruction. Although there are recorded cases of good readers being poor spellers (Frith, 1980) there are no reports of children with developmental dyslexia who do not also have a developmental dysgraphia (Temple, 1997). Developmental dyslexia refers to congenital impairments of the reading routes, acquired dyslexia on the other hand, is the result of traumatic brain injury and as such, is not relevant to this thesis.

2.9.1. Developmental Phonological Dyslexia.

Phonological Dyslexia is described by Temple (1997) as the normal development of semantic, lexical and direct reading systems, but an impairment of the phonological reading route. Sufferers experience more difficulty reading aloud non-words than real words, indicating that their phoneme-grapheme decoding skills are impaired. Although Developmental Phonological Dyslexics are not able to decode new words letter by letter as an aid to pronunciation, this does not mean to say they cannot learn to read.

Temple (1997) says that Developmental Phonological Dyslexia is not easily explained in relation to stage models of reading acquisition, such as that of Frith. The problem is that according to Frith’s model, phonological reading skills must be acquired before orthographic. In the case of Developmental Phonological Dyslexics, it would appear that sufferers have failed entirely at the alphabetic stage, but continued to the orthographic regardless. “The only alternative is to suggest that phonological dyslexics have a significantly expanded logographic reading system which is able to incorporate thousands of words. However, no such logographic reading system has ever been described in normal children” (Temple, 1997: 205). To date, no research has been able to adequately explain Phonological Dyslexia in relation to stage models, except as a failure at the logographic stage which implies that sufferers have been able to build up massive sight-word vocabularies through a process of symbol-recognition. Further analysis of the issue is outside the scope of this PhD.

Temple describes the reading of a 10 year old boy, A.H. who suffers from Developmental Phonological Dyslexia: although at the age of 16 he had a reading age of
13;8 and still experienced great difficulty in reading non-words, he displayed an “almost adult level of competence in the recognition of real words.” This indicates that he must have developed substantial visual word-recognition abilities in order to cope with the demands of reading.

A.H. had very poor handwriting, so poor in fact that when asked to reread his spellings out loud, he often could not recognize the words. However, when the words were typed out for him, his performance improved dramatically. When normal adult readers were asked to read aloud his spellings they were only able to read between 40 – 60%, indicating that his misspellings were so deviant that they were unrecognizable. Temple describes his misspellings as consisting of 17% phonologically plausible errors, for example:

<table>
<thead>
<tr>
<th>Target word</th>
<th>Misspelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>motion</td>
<td>MOSHON</td>
</tr>
<tr>
<td>recent</td>
<td>RESENT</td>
</tr>
<tr>
<td>mattress</td>
<td>MATRES</td>
</tr>
</tbody>
</table>

Three percent of his errors resulted from phoneme-grapheme errors in relation to terminal “e”s, which largely resulted from omission of the final letter.

Sixteen percent of his errors related to what Temple terms ‘vowel substitution’, for example:

<table>
<thead>
<tr>
<th>Target word</th>
<th>Misspelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>nation</td>
<td>NATOIN</td>
</tr>
<tr>
<td>throat</td>
<td>THROT</td>
</tr>
<tr>
<td>cheery</td>
<td>CHERRY</td>
</tr>
</tbody>
</table>

Consonant error accounted for 60% of the total, and in conjunction with vowel and final “e” related errors, the total number of phonologically implausible errors was 80%.

Twenty percent of errors, according to Temple, were unclassifiable. Examples of these are:
<table>
<thead>
<tr>
<th>Target word</th>
<th>Misspelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>injure</td>
<td>INFER</td>
</tr>
<tr>
<td>relation</td>
<td>RECHON</td>
</tr>
<tr>
<td>jewel</td>
<td>JELLY</td>
</tr>
<tr>
<td>possible</td>
<td>OSBELLE</td>
</tr>
<tr>
<td>hid</td>
<td>HIND</td>
</tr>
<tr>
<td>mechanic</td>
<td>MICIAN</td>
</tr>
<tr>
<td>adjective</td>
<td>AGICEFT</td>
</tr>
<tr>
<td>child</td>
<td>CHILDRENRE</td>
</tr>
<tr>
<td>either</td>
<td>AROTHER</td>
</tr>
</tbody>
</table>

In summary, Temple states that A.H. displayed a pattern of spelling in which the majority of spelling errors did not preserve the sound-based characteristics of the word. He didn’t appear to be any better at spelling regular or irregular words, indicating that regularity was not a psycholinguistic dimension which affected his spelling ability. However, on the issue of orthographic regularity, Temple states that regularity for spelling and reading are different and that “the lists available to test such characteristics are less well developed for spelling than for reading.” In other words, although regularity may not appear to affect A.H’s spellings, it may have more effect on his ability to read words.

2.9.2. Developmental Surface Dyslexia.

Surface Dyslexia is an impairment of the semantic and visual routes in reading, where the phonological route remains intact and words must be recognized via their pronunciation – which is only recoverable through grapheme-phoneme conversions. Sufferers display no difficulties in reading non-words, but real word reading is restricted to pronouncing the word as it is spelled. Words which have regular orthography can be read aloud easily, but those with irregular spelling cannot. For example, the word subtle may be read aloud as /sʌbˈtɪl/. The simplest explanation for this condition is an arrest at the alphabetic stage of Frith’s (1985) model: sufferers have almost completely mastered alphabetic reading and spelling, but due to some neurological malfunction, cannot progress to the orthographic stage.
Spelling errors made by surface dyslexics largely reflect the phonological properties of the word. Temple (1997) describes the case of a 10 year old girl, R.B. suffering from Developmental Surface Dyslexia, and gives examples of her spelling mistakes:

<table>
<thead>
<tr>
<th>Target word</th>
<th>Misspelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>little</td>
<td>LITTL</td>
</tr>
<tr>
<td>who</td>
<td>HOW</td>
</tr>
<tr>
<td>puppy</td>
<td>PUPY</td>
</tr>
<tr>
<td>once upon</td>
<td>ONE APON</td>
</tr>
<tr>
<td>basket</td>
<td>BASKIT</td>
</tr>
<tr>
<td>money</td>
<td>MUNY</td>
</tr>
<tr>
<td>big</td>
<td>DIG</td>
</tr>
<tr>
<td>operation</td>
<td>OPRASHON</td>
</tr>
<tr>
<td>sunshine</td>
<td>SUNSHIN</td>
</tr>
<tr>
<td>join</td>
<td>JONE</td>
</tr>
<tr>
<td>whistle</td>
<td>WISLE</td>
</tr>
</tbody>
</table>

Overall, 52% of R.B.’s spelling errors were phonologically plausible. She demonstrated a tendency to confuse the letters ‘b’ and ‘d’, but if these confusions were ignored, a further 9% of her errors were phonologically plausible. Of the remaining errors 11% involved vowel substitution and 20% consonant error or “combinations of other error categories” which are not specified. When normal adult readers were asked to predict what they thought the target word was for R.B.’s spellings, in 80% of cases they were correct, indicating that overall the misspellings did not affect intelligibility.

According to Temple, R.B.’s spellings show that she is using a logical rule system (described as “a restricted set of appropriate rules”) which may be appropriate and effective to spell many regular words, but which is problematic for many irregular words in English. Because of the many different rules for phoneme-grapheme correspondences, particularly with regard to vowels, there can be ambiguities in the way similarly pronounced words are spelled. For example, the vowel sound in seat and feet is the same, however both employ legitimate but different spellings. The selection of one spelling over the other is dependent on word specific memory: a skill which is lacking in Surface Dyslexia. When R.B. was asked to reread 180 of her misspelled words after they had been typewritten, she managed to read 69 as correctly spelled words. From this it is apparent that R.B.’s own spelling code was as effective for herself as normal spelling.
2.10. Conclusion.

This chapter has focused on outlining the cognitive skills used in word recognition and production in English. It has highlighted the skills possessed by good readers and spellers, and suggested reasons for the failure of poor readers and spellers. The chapter also focused on the way the skills develop in young learners where English is the L1. Research has shown that a prerequisite for good reading ability is the possession of good phonological skills in the language. Possession of good phonological skills will give rise to high quality phonological representations of words in the lexicon, which will play a leading role in whether words can be recognized and spelled correctly.

Case studies of two forms of developmental dyslexia have been discussed, indicating the effects on reading and spelling where either the phonological or the orthographic route is impaired. These studies may help shed some light on the spelling errors made by Arabs, as seen in the corpus analysis in Chapter 1.

The type of spelling errors made by Arab learners indicates that they may be poor readers as well as poor spellers. Their spelling errors suggest that they may have an inadequate grasp of PGC rules – certainly this seems to be the case for spelling. According to Frith’s (1985) model, if they cannot spell accurately via the alphabetic route, they shouldn’t be able to read via the alphabetic route either. As mastery of the alphabetic route occurs before orthographic skills develop, we wouldn’t expect Arab learners to have particularly well developed orthographic images of words either. It has been suggested therefore, that Arab learners may be at Stage 2B or Stage 3A of Frith’s model – further testing will be necessary to ascertain which it is.

Chapter 3 investigates the existing research into reading errors made by Arab ESL learners, to see if it is consistent with placing them at Stage 2B or 3A of Frith’s model, or whether in fact their spelling errors do not serve to indicate an arrest in reading development, but may be caused by some other factor.
Chapter 3.

Review of research on reading errors made by Arabic ESL learners.

3.1. Introduction.

Chapter 1 commented on the frequent spelling errors made by adult Arab ESL learners, many of whom had studied English for a considerable period, all of whom were currently in higher education. The main aim expressed at the end of chapter 1 was to discover why this particular group of learners made so many errors, and whether an analysis of the errors themselves could help shed some light on this question. Chapter 2 outlined the skills necessary to acquire for successful word recognition and spelling in English, and described two forms of developmental dyslexia: where a failure to acquire a particular skill leads to specific reading and spelling deficiencies. Comparisons were drawn between the misspellings of Frith's (1980) Group C subjects, whom she classified as poor readers/poor spellers, and the misspellings made by Arab learners of ESL. It was suggested that the spelling errors might be representative of a developmental lag and that Arab learners might be at stage 2B or 3A of Frith's (1985) model. Chapter 3 aims to review the available research into reading errors made by Arab ESL learners, in the hope that the findings will indicate reasons for the spelling errors.

There appears to be scant research focussing on the reading errors made by Arab learners of English, and even less into their spelling errors. Three doctoral theses which have investigated word recognition problems of Arab ESL learners are: Al Sulaimani (1990), Al Hazemi (1993) and Ryan (1993). Two of these (Al Sulaimani & Al Hazemi) deal with isolated word recognition only, while Ryan tested word recognition in context. The research reported in these studies will serve as a starting point for further investigation of this issue.

3.2. Vocabulary levels of Arab learners of English.

Vocabulary knowledge is one of several important skills needed for effective reading comprehension (Nation, 1990). It therefore stands to reason that a reader with low levels of vocabulary is going to experience difficulty in comprehending texts. Al
Hazemi (1993) tested the receptive vocabulary levels of Arabic speaking learners of English, through the Yes/No test format described in Chapter 2.

3.2.1. The Yes/No Test and Arab learners.

The main aim of Al Hazemi’s research was to estimate the vocabulary size of Arab military cadets at the King Abdulaziz Military Academy (KAMA) in Saudi Arabia, using a vocabulary size test in the Yes/No format. The version of the Yes/No test he used was the computerised EVST (Eurocentres Vocabulary Size Test: Meara & Jones, 1987) which, he says, had not been tried on low-level learners before. After conducting a series of Yes/No tests with the KAMA cadets, Al Hazemi reached the conclusion that they possessed vocabulary levels of below 1000 words. This was a surprising finding as previous estimates – provided by educationalists in Saudi Arabia had suggested the figure to be around the 2000 level.

Although Al Hazemi’s research does not focus on word recognition and reading skills per se, it does provide some interesting data in the form of imaginary words which were incorrectly recognised as being real words by Arab learners. His conclusion that Arabs appear to have poor abilities to distinguish between real and imaginary words leads us to question what is happening with regard to word recognition skills, when they read in English.

3.2.2. Misidentification of imaginary words.

The Yes/No tests Al Hazemi used contained two thirds real words and one third imaginary words. Many of the imaginary words scored a “false alarm,” indicating that subjects experienced problems in deciding which words they knew and which they didn’t. Al Hazemi states that such high numbers of false alarms are very unusual, even with low level learners, and that this might point to rather specific problems in word recognition. He suggests these problems might be caused by two factors: firstly, Arabic learners may be misreading imaginary words as real words as a result of applying some aspect of their L1 orthographical system to the recognition of words in English. Secondly, phonological similarities between certain words may have caused confusion; for example, learners may confuse marriage with mortgage,
or dessert with desert. This particular example, and Al Hazemi’s assumptions will be discussed in greater detail in section 3.2.3.

3.2.3. Possible causes of misidentification.

In the initial experiments, Al Hazemi found that some imaginary words were more prone to ‘false alarm’ than others. Subsequent experiments attempted to define the particular features of these imaginary words which made them likely to be mistaken for real words. Al Hazemi suggests that ‘pseudohomophones’, which he defines as imaginary words with phonological similarity to real words, for example: GREAN, BLOOR, would trigger false alarms. He suggests that the imaginary word GREAN might activate either green or grain, and thus trigger a false alarm.

Al Hazemi used 70 subjects, all officer cadets at KAMA, to test this theory. The highest numbers of false alarms were recorded on the following imaginary words:

<table>
<thead>
<tr>
<th>Word</th>
<th>False Alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>WETAR</td>
<td>33</td>
</tr>
<tr>
<td>SMOLE</td>
<td>25</td>
</tr>
<tr>
<td>PLEEZE</td>
<td>17</td>
</tr>
<tr>
<td>STEEK</td>
<td>13</td>
</tr>
<tr>
<td>BLOOR</td>
<td>13</td>
</tr>
<tr>
<td>WAILK</td>
<td>12</td>
</tr>
<tr>
<td>GREAN</td>
<td>11</td>
</tr>
<tr>
<td>WIKE</td>
<td>11</td>
</tr>
</tbody>
</table>

The high number of false alarms recorded on these pseudohomophones led Al Hazemi to the conclusion that his low level Arabic learners were misreading words in the same way as the native speaking children had done, in the study of Anderson and Freeboby (1983). That is if an imaginary word looked visually similar to a known word, they would accept it as being this. Possessing poor decoding skills, they would be unable to distinguish the two forms on the basis of phonological information, and would therefore have to rely on orthographic similarity. As indicated above, the highest number of false alarms was recorded on the imaginary word WETAR. Thirty three subjects out of a total of 70, claimed to know this word—presumably they thought it was water. However, transposing the vowels in this word would not make it a pseudohomophone of the target water; it would make it orthographically similar, but not phonologically so. If Arab subjects have poor
phonological decoding skills, then quite possibly an imaginary word such as WETAR would be mistaken for a real word which is orthographically similar.

A combination of poor orthographic and phonological decoding skills may account for the high numbers of false alarms on items such as STEEK and WIKE. If pronounced according to the correct rules of grapheme-phoneme correspondences, /sti:k/ and /watk/ do not exist as words in English. However, if a reader has poor orthographic reading skills and is unsure of the exact pronunciation accorded to some of the graphemes, he may read these items as /sterk/ and /wi:k/. It would therefore appear that Arab subjects may be misreading the imaginary words on the basis of faulty orthographic and phonological processing.

Al Hazemi’s own explanations are somewhat confusing as he refers to the imaginary words as pseudohomophones, which indicates that they are pronounced in exactly the same way as an existing word, but spelled differently. Al Hazemi’s theory is that Arab learners mistake these imaginary words on the basis of their sound properties. However, the imaginary words he uses often appear to have more visual similarity to existing words than phonological. In fact many of the imaginary words he classes as pseudohomophones differ from the target word in only one or two letters, eg: TUDAY (today), HALODAY (holiday), YELLOE (yellow), PRUBLOM (problem). These particular imaginary words are among those which attracted most false alarms. This again seems to indicate that the Arab subjects do not know the spellings of certain words – they have poor orthographic recall of these words; a situation which would appear to be hampered by poor phonological decoding skills. The previously cited examples of students confusing words such as marriage and mortgage or dessert and desert are due to orthographic failure, not phonological decoding failure as Al Hazemi implies.

Data collected from a further experiment conducted by Al Hazemi may hold a key as to why some imaginary words are more prone to misrecognition than others. Al Hazemi suggests that items such as VERABLE, JOTHAM and LEDIARD were selected as real words by fewer subjects because they were not homophonic. On the other hand, items such as FEERY (very), WALTER (water), EADE (aid), ASTELL (still) and SEMPLE (simple) were picked because they sounded like existing words,
when pronounced by Arab learners. There may be some truth in the suggestion that these imaginary words either look or sound vaguely like existing words, but this would not explain all instances. For example, 26 of the 74 subjects (approximately a third) believed EADE to be a word. Al Hazemi’s suggestion is that EADE has been mistaken for ‘aid’. This would involve both orthographic and phonological transformations. It is well established that lexical access in English relies heavily on the initial phoneme – or its representative grapheme, and this is evident from studies of spelling errors too. Mitton (1996) found that only 7% of native speakers’ spelling errors involved the first letter; Arab spelling errors in the chapter 1 corpus recorded a figure of 5.1%. It therefore seems unlikely that Arabic learners would have mistaken EADE for ‘aid’. One possible explanation for this confusion might be that it is a cross-linguistic pseudohomophone: Eid, meaning ‘festival’ in Arabic. However, the English spelling Eid is listed in the Oxford dictionary and is well known in all Moslem countries, and should therefore, have been known by subjects.

One striking thing about this data is that imaginary words which are less frequently mistaken for real words contain more consonants, consonant clusters and consonant digraphs than other imaginary words. For example SHADBOLT (8), LEDIARD (7) and LIMBRICK (9) contain a high number of consonants compared to vowels, and are therefore more difficult to pronounce. In SHADBOLT the shift from a dental to a bilabial may cause pronunciation problems, particularly with a learners whose first language does not contain such consonants in sequence without an intervening vowel. On the other hand, MATEER (39) and WARMAN (49), imaginary words recording false alarms by more than half of the subjects, may not look like English words, but are much easier to pronounce. To my knowledge, these items do not represent cross-linguistic homophones. Why then are they thought to be real words by so many subjects?

Al Hazemi has suggested that imaginary words which sound similar to real words will be mistaken, and I have suggested in addition that imaginary words which look similar will be mistaken. It may also be that as these Arabic learners have such low levels of vocabulary, they are more likely to accept something as a word if they can pronounce it, even though they don’t know the meaning of it. A problem here may involve subjects’ expectations in tackling the Yes/No test. We do not know on what basis they were instructed to indicate that they ‘knew’ a word. It may have been that
they thought anything pronounceable was a word, and therefore they might indicate they knew it, or it may be that they thought they recognised the word and knew its meaning.

3.2.4. Translating items on the Yes/ No test.

One way of testing the theory that imaginary words were misidentified on the basis of either visual or phonological similarity to existing words, is to ask subjects to translate them into their mother tongue. In his last experiment therefore, Al Hazemi asked subjects to translate both real and imaginary words on the Yes/ No test. He found that misinterpretations fell into four categories, based on certain orthographic features of the stimulus:

1. Errors resulting from confusing certain consonants and vowels. For example, /b/ with /p/: “blow/ pillow”; /f/ with /v/ “infant/ invent”.
2. Errors resulting from confusing the order of letters in words with two or more consonants. For instance, “finish/ fishing.”
3. Errors in words which begin and end in the same letters. For example, “fight/ flight”.
4. Errors resulting from words which are semantically related. This will result in producing synonyms and antonyms instead of meanings. For example, “stay/ wait”, “front/ back.”

(Al Hazemi, 1993: 240 –1)

Al Hazemi informs us that “the types of misinterpretation included under categories 1, 2 and 3 are common among Arabic-speaking learners” and the findings of his translation experiment support the idea that “these learners may store vocabulary information and decode it differently from others” (p 241). However, further explanation of why Arab learners should misread words is beyond the scope of his study.

It is my interpretation that the results of the translations obtained by Al Hazemi strengthen the theory previously expressed, that neither the phonological nor the orthographic route is operating effectively in reading. Error categories 1 and 2 imply
a phonological-bias in word identification, which would indicate impairment to the orthographic route. However, phonological decoding skills are impaired through confusion of certain graphemes, hence confusion between pillow and blow. Had the orthographic route been working effectively, these words would not have been mistaken. Category 3 indicates reliance on the orthographic route, which is in itself impaired, and seems to rely to a large extent on consonants for word recognition. Categories 1, 2 and 3 could indicate his subjects are in a transition stage between 2A and 3B of Frith's (1985) model. Categories 1 and 2 may be in an early stage of transition, Category 3 may be in a later stage. What is clear though is that neither alphabetic nor orthographic reading skills are fully developed. Category 4 errors imply, as Al Hazemi states, that meanings of certain words were confused when they were learned.

3.3. Reliance on consonants in word recognition.

The aim of the research of Ryan (1993) was to demonstrate in experimental conditions the observation that Arab learners of English confuse words with a similar consonantal structure. She provides anecdotal evidence of this phenomenon in the form of EFL teachers' observations, for example pulls for plus; wheels for wells; left for life; model for middle etc. The exact nature of these errors is not given, just that they occur frequently in the oral and written work of Arabic-speaking students. Ryan remarks that most of these errors appear to preserve the consonant structure of the target word, and what distinguished these pairs of semantically unrelated words is the vowels. Ryan hypothesises that if Arab learners are unaware of the role played by vowels in English, pairs of similarly-spelled words will act as homophones to them, eg: must/ most, below/ bowl, train/ torn. Consequently, she reasons, they will experience difficulty in distinguishing these pseudo-homophones in context. Homophone confusion is a widely recognised feature of surface dyslexia and the similarity of errors made by sufferers of this condition and Arab learners, was investigated in detail by Al Sulaimani (1990). This study will be reviewed later.

The basis of the experiments conducted by Ryan (1993) was to show that Arab learners did indeed rely heavily on consonants in word recognition, and would consequently mistake words with similar consonantal structure, but different meanings. The experiment was carried out three times, using different subjects.
1. The first run acted as a pilot study, using two groups of four subjects: this experiment contrasted the performance of Arabic and non-Arabic ESL students (all of low-intermediate level), and used only what she refers to as “the Homophone Discrimination Test”.

2. The second run used the Homophone Discrimination Test as part of a battery of three tests for surface dyslexia. The other two tests were a test where subjects were asked to read aloud a list of isolated words and a spelling test. Three groups of 10 subjects were used: Arabic speakers, speakers of another language which did not use the Roman alphabet, and speakers of a Roman-alphabet language. All subjects were judged to be of low-intermediate English language level.

3. The third run was a longitudinal study of three subjects: two Arabic speakers (one advanced, and one elementary level) and one Farsi speaker (elementary level), using the battery of three tests for surface dyslexia. This experiment measured the performance of subjects prior to and after three months of English language instruction.

3.3.1. Ryan’s Homophone Discrimination Test.

Ryan’s Homophone Discrimination Test is of major interest here as the results show a tendency for Arabic learners to confuse words with similar consonant structures. The other two tests for surface dyslexia that Ryan used: a spelling to dictation test and a read aloud test, will not be discussed here as similar tests were carried out by Al Sulaimani (1990), and these will be reviewed subsequently.

The Homophone Discrimination Test consisted of 60 sentences, 20 correct and 40 containing errors where the target word had been replaced with one of similar consonant structure but different meaning, eg:

- You most see that very good film.
- Please step making so much noise.
- He had a both and went to bed.

Ryan selected the words for inclusion in sentences from “Thorndike and Lorge’s (1944) highest frequency band” (Ryan, 1993: 125). She chose Thorndike and Lorge
"because it was the largest database of words in use (in the USA) before the big
computer-based material came along and before Nation" (Personal communication,
Ryan, 7.6.03). She explains that Thorndike and Lorge’s word frequency lists “were
complied in the 1930s and 1940s as a teachers’ guide for USA schools, which had
large numbers of second generation immigrant children in their classes. The data
base included lots of novels, the American constitution, newspapers etc, but no oral
material”.

In each of the three runs of the Homophone Discrimination test, the procedure
followed was the same. Subjects were asked to silently read through the sentences
and underline any errors. They were asked to write the correct word above the error.
They were instructed that the test contained 20 sentences where there was no error,
and where they did not have to make any alteration. No time limit was set for the
test. The second run of the test will be described in this chapter. The third run will be
described here briefly and in more detail in Chapter 6.

In the second run of the test, Ryan hypothesised that of the three subject groups, the
Arab learners would be less able to spot an incorrect word in context than other
groups. The results showed that Arabs did indeed experience far greater difficulty in
spotting an incorrect word in a sentence, and also that they were less able to correct
the errors than other groups (see Table 3.1.).

<table>
<thead>
<tr>
<th>Subject group</th>
<th>Homophone discrimination test</th>
<th>Spelling test</th>
<th>Read aloud test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>69.6</td>
<td>45.3</td>
<td>21.1</td>
</tr>
<tr>
<td>SD</td>
<td>16.1</td>
<td>15.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Roman</td>
<td>49.7</td>
<td>27.2</td>
<td>17.7</td>
</tr>
<tr>
<td>SD</td>
<td>22.9</td>
<td>13.8</td>
<td>6.5</td>
</tr>
<tr>
<td>Non-Roman</td>
<td>38.6</td>
<td>24.3</td>
<td>10.9</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>16.3</td>
<td>9.9</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Table 3.1. Mean % errors for three groups on battery of three tests for Surface Dyslexia. (Ryan, 1993: 217)

An ANOVA showed that there was a significant group effect [F(2,27) =9.58, p< .001], a highly significant task effect [F(2,54) =99.49, p< .001] and a small but complex interaction between group and task [(4,54)= 3.5, p= .013] (Ryan, 1993:
Ryan reports that a series of one-way ANOVAs on each separate variable showed that the groups behaved differently on the different tests, but unfortunately she does not provide the figures for these statistics. She does, however, say that for the homophone discrimination test “the Arabic speakers are significantly worse than other non-Roman speakers; for spelling Arabic speakers are significantly worse than both Roman and non-Roman speakers; for reading aloud however, both Arabic speakers and Roman speakers were significantly worse than the non-Roman group” (Ryan, 1993: 216).

A more worrying trend was that Arab learners falsely identified words as being wrong in some of the all-correct sentences. This latter point is unfortunately not well documented, as Ryan only recorded this data for the first run of the test - when comparing two groups of four subjects. She did not count instances where correct words had been falsely identified as being wrong, when the test was run as part of the battery of three tests for surface dyslexia. Nevertheless, the results indicate that Arab learners experience difficulty with word recognition in context, when the given word and the target word share the same consonantal structure.

Ryan says that in the non-Roman group she included a Vietnamese student. It is unclear why this student was included in the non-Roman group, since the Vietnamese alphabet is based on the Roman one. Quoc Ngau, the written form of Vietnamese which has been in use since its inception in the late 18th century, uses the Roman alphabet with a series of diacritical marks above vowels to denote tone. If it was an oversight on Ryan’s part, then it would, of course, affect the reliability of the results, particularly as this group contains only 10 subjects.

The final run of the test used three subjects: two Arabic speakers and a Farsi speaker in a longitudinal study over three months. Farsi, or Persian, is written using the Arabic alphabet, and like Arabic, does not write short vowels. However, it differs morphologically as it is an Indo-European language and does not base words on the tri-consonantal root system of the Semitic languages.

Subjects were given the test initially, then again after three months of intensive English language instruction at the Centre for Applied Language Studies, University of Wales, Swansea. Ryan’s belief was that it was certain features of the Arabic
morphological system which were responsible for Arab learners’ word recognition difficulties in English, not the script per se. She therefore hypothesised that the performance of the Farsi speaker would improve to a greater extent than that of the Arabic speakers, over the three month period. The results are given below in Table 3.2. It should be noted that Ryan does not provide any inferential statistics for these scores, however, in this case they are not really necessary as the anomalies in this data are evident from observing the raw scores.

<table>
<thead>
<tr>
<th></th>
<th>Test 1</th>
<th>Test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Arabic speaker</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>Farsi speaker</td>
<td>70</td>
<td>62.5</td>
</tr>
<tr>
<td>Advanced Arabic speaker</td>
<td>62.5</td>
<td>67.5</td>
</tr>
</tbody>
</table>

Table 3.2. Mean % errors in Silent Reading Homophone Discrimination Test (Ryan, 1993: 228).

Although the results bore out the initial hypothesis, they cannot be relied upon for several reasons. Firstly, the fact that the elementary Arabic speaker actually appeared to get worse – with a score of 100% errors in the second run of the test. This is unusual, given that the version of the test used both times was identical: if she knew the words the first time, why hadn’t she remembered them the second time? The Farsi speaker had improved marginally: his error score after three months is slightly lower than in the original test. However, the advanced Arabic speaker has also made more mistakes in the second test. Because of the extremely small sample size, it is not possible to generalise these results. There also appears to be a methodological problem in that the same version of the test was given to the elementary and advanced subjects – it is quite likely that the elementary learners did not know many of the words. Although Ryan included 20 correct sentences in this test, presumably as controls, she admits that in the end these were not taken into consideration. We therefore cannot see which subject made most false corrections of correct sentences.

Despite the various methodological problems described here, Ryan’s Homophone Discrimination Test seems to have uncovered interesting findings in that, in general, Arab learners do experience more difficulty than others in spotting a semantically
incorrect word in context, when it shares the same consonantal structure as the target word.

3.4. “Vowel blindness” in reading.

If Arab learners rely heavily on consonants for word recognition, it stands to reason that they therefore must largely ignore the vowels. Ryan and Meara (1991) attempted to demonstrate that this was in fact what Arabs did when reading words in English. They set up a computerised word recognition test, where letters were systematically deleted from different positions within words. The experiment used 100 frequent ten-letter words which were taken from the Thorndike and Lorge (1944) AA\(^3\) to 20 per million categories. Each word appeared on a computer screen for approximately one second and was then blanked out for approximately two seconds. The word then reappeared either spelled correctly or in an altered form. Altered forms consisted of spellings in which one vowel had been removed. Of the 100 stimuli, 40 words appeared in their correct form and 60 appeared with deleted vowels. Fifteen words had the vowel deleted from the second position, 15 from the fourth position, 15 from the sixth position and 15 from the eighth position. Examples of the altered stimuli can be seen in Table 3.3.

<table>
<thead>
<tr>
<th>1st presentation</th>
<th>2nd presentation</th>
<th>vowel deleted from</th>
</tr>
</thead>
<tbody>
<tr>
<td>department</td>
<td>department</td>
<td>second position</td>
</tr>
<tr>
<td>distribute</td>
<td>distribute</td>
<td>second position</td>
</tr>
<tr>
<td>experiment</td>
<td>expriment</td>
<td>fourth position</td>
</tr>
<tr>
<td>automobile</td>
<td>automobile</td>
<td>fourth position</td>
</tr>
<tr>
<td>management</td>
<td>managment</td>
<td>sixth position</td>
</tr>
<tr>
<td>revolution</td>
<td>revoltion</td>
<td>sixth position</td>
</tr>
<tr>
<td>sufficient</td>
<td>sufficint</td>
<td>eighth position</td>
</tr>
<tr>
<td>photograph</td>
<td>photgraph</td>
<td>eighth position</td>
</tr>
</tbody>
</table>

Table 3.3. Examples of altered stimuli (Ryan and Meara, 1991: 535).

\(^{3}\)“The AA list refers to the words in the list having frequency of 100 or over per million. There are 1,069 AA words in the list according to their introduction.” (Paul Rayson, Lancaster University Centre for Computer Corpus Research on Language, personal communication, 7.10.04.)
Subjects were asked to decide whether the two presentations were identical, and to log their responses by pressing either a YES or a NO key on the keyboard. Three groups of subjects were tested:

1. Ten Arabic speaking students with an English language proficiency range from lower intermediate to intermediate level. All subjects were in their early twenties, male and “came from the middle east” (Ryan & Meara, 1991: 535).
2. A control group of ten non-Arabic speaking ESL students at a comparable level of proficiency to the Arabic speakers. The group consisted of seven men and three women.
3. A second control group of ten native speaking teachers from the Centre for Applied Language Studies at the University of Wales, Swansea.

The results obtained by Ryan and Meara can be seen in Table 3.4. An analysis of variance (ANOVA) in which the main effects were group and stimulus type showed a highly significant group effect [$F(2,27) = 10.3$, $p<.001$]. Ryan and Meara (p. 537) summarised this result: “the Arabic speakers performed very badly overall, the native speakers performed very well overall and the non-Arabic speakers performed at intermediate levels.” The analysis also showed a significant position effect [$F(4,108) = 3.25$, $p<.017$] – basically, errors were fewest in position 0, where the two items were identical.

<table>
<thead>
<tr>
<th></th>
<th>Pos 0</th>
<th>Pos 2</th>
<th>Pos 4</th>
<th>Pos 6</th>
<th>Pos 8</th>
<th>overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic speakers</td>
<td>9.75</td>
<td>20.7</td>
<td>17.3</td>
<td>20.7</td>
<td>18.7</td>
<td>17.23</td>
</tr>
<tr>
<td>Non-Arabic</td>
<td>1.51</td>
<td>7.3</td>
<td>1.3</td>
<td>6.0</td>
<td>10.0</td>
<td>5.26</td>
</tr>
<tr>
<td>speakers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native speakers</td>
<td>1.25</td>
<td>1.3</td>
<td>0.0</td>
<td>0.7</td>
<td>0.7</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Table 3.4. Mean % errors for three groups of subjects in deleted vowel recognition task. (Ryan & Meara, 1991: 536).

The results show clearly that the Arabs experienced more difficulty than the other two groups in spotting when letters had been deleted from words. In the table above, Position 0 refers to unaltered stimuli, and it will be noted that in almost 10% of
cases, Arabs failed to spot when no letters had been deleted. This indicates that either the Arab subjects have poor orthographic recall, or these were previously unseen words – in which case they may not have been able to spot that no changes had been made during the two presentations. The authors recorded the reaction times of all subjects, and found that Arabs took considerably longer than other EFL learners to complete the task, and almost twice as long as native speakers.

By way of explanation for these results, Ryan and Meara argue that vowels appear to cause particular difficulty for Arabic speakers and suggest that this might be due to their using mental representations of English which ignore vowels and rely very heavily on consonantal segments. This theory is compatible with Ryan’s (1993) experiments which indicated that Arab learners tended to misrecognise words in context, on the basis of their consonantal structure. Ryan and Meara suggest that this reliance on consonants, at the expense of vowels, may stem from the morphological structure of Arabic, which relies on a tri-consonantal root system, but do not go into detail about exactly how Arabic is read as a consequence, or in what way learners’ reading of English may be affected as a result. They conclude that they “are not aware of any empirical data which actually provides evidence supporting (this theory). Indeed, what evidence there is seems to point in other directions” (p 533). We are left with the intriguing puzzle of why Arabs should be so unaware of the role of vowels in written English, and why they should rely so heavily on consonants for word recognition.

3.5. Comparison of errors made by Developmental Surface Dyslexics and Arab learners of English.

Al Sulaimani (1990) conducted a series of experiments using Arabic learners of English, with the following aims:

- To provide a better understanding of the characteristics of their reading behaviour.
- To compare these characteristics with the performance of native speaking surface dyslexics.
- To investigate the effects of English and Arabic writing systems on the reading processes of Arabic ESL learners.
Masterson (1983) showed that errors made by surface dyslexics had many features in common with those made by young, native speaking children learning to read and spell. Al Sulaimani takes this idea further by suggesting that some groups of L2 learners may also display dyslexic-like patterns of behaviour. He therefore sets out to show, under experimental conditions, that Arabic learners of English make similar types of error to native speaking surface dyslexics. Chapter 2 of this thesis outlined the characteristics of developmental surface dyslexia, namely, a failure in the orthographic route in reading and spelling.

Al Sulaimani bases his experiments and the rationale for using them, on an early study of surface dyslexia carried out by Coltheart, Masterson, Byng, Prior and Riddoch (1983). The authors of this study note that a patient with surface dyslexia “not only read listen as ‘liston’ but added the gloss ‘that’s the boxer…..’”\(^4\), indicating that his view about what this word meant was obtained via the use of his (incorrect) phonological recoding” (p 471). They term this a regularisation error – i.e. an irregularly spelled word has been pronounced in accordance with GPC rules as if it were regularly spelled, indicating a failure in the orthographic route in reading. The sufferer understood the meaning of the word in accordance with the pronunciation he had used. The study of Coltheart et. al. had three aims:

- To investigate how often the surface dyslexic’s comprehension of a printed word depends upon his phonological recoding of that word (as in the listen example), with neglect of the word’s orthographic code.
- To investigate the additional kinds of errors which can be observed in surface dyslexic reading – and whether there are systematic kinds of error in spelling to dictation and spontaneous writing.
- To consider the relationship between developmental and acquired surface dyslexia.

Their study focused on two subjects: C.D. a 19 year old girl with normal intelligence but severe reading and spelling difficulties, thought to be a developmental surface dyslexic; and A.B, an acquired surface dyslexic who had possessed normal reading and spelling abilities until he sustained traumatic injury to the right frontal area of the

brain in a motorcycle accident. A.B. was an unusual case in that he was presumed to be right-hemisphere lateralised for language. According to Coltheart et al, all other reported cases of acquired surface dyslexia had left hemisphere damage. Their experiments revealed the following general traits of surface dyslexia:

- Irregular words such as broad or steak are less likely to be read aloud correctly than regularly-spelled words like breed or steam; and when irregular words are misread, the incorrect response is often a regularisation (reading broad as "brode" and steak as "steek", for example).
- When reading comprehension was tested, homophones were often confused with each other: for example, soar was understood as an instrument for cutting, and route was understood as being part of a tree.
- Spelling was also impaired, with the majority of spelling errors being phonologically correct: for example, search was spelled SURCH.
- “Orthographic errors” in reading aloud (omitting, altering or transposing letters) were also noted. These errors were not due to defects at elementary levels of visual processing.
- Both developmental and acquired surface dyslexics behaved in a similar manner.

(Coltheart et. al., 1983: 469)

In the next section of this chapter, I will review the experiments Al Sulaimani carried out in order to compare the reading and spelling errors made by Arab learners and surface dyslexics. Specific comments relating to individual experiments will be added after the description of each, and general comments relating to this and other studies reviewed in this chapter, will be added at the end.

3.5.1. Subjects used in the studies of Al Sulaimani (1990).

The experiments contrasted the performance of two groups of Arabic EFL learners: one at beginner level, the other advanced. Al Sulaimani states that he has purposely selected groups of Arabic speakers of different nationalities, so that he may gain a more comprehensive idea about the reading problems that face all Arab learners of
English. He does, however, exclude any subjects who may speak a third language such as French.

The elementary group of subjects consisted of 20 male and 20 female students who were studying at the King Fahad Academy in London. Their ages ranged from 11;8 to 18 years. Their length of stay in the United Kingdom ranged between one month and five years. The advanced subjects were 20 male post-graduate students who were doing PhD research in different areas of specialisation at the University of London. Their ages ranged from 24 – 43 years. Lengths of residence in the UK ranged from two days to seven years. It will be noted that in both groups of subjects the age range, nationality and length of stay in the UK prior to testing, varies widely. This point will be addressed in section 3.6.1.

3.5.2. Effect of word-length, word-familiarity and spelling regularity on read aloud performance.

One feature of surface dyslexia noted by Coltheart et al (1983) is that in read aloud tasks, sufferers tend to pronounce silent letters in words such as *castle, plumber* and *knife*. Al Sulaimani argues that Arabic learners of English also mispronounce irregularly spelled words, and that this is the result of differences between English and Arabic orthography:

> While Arabic orthography is highly phonemically regular, the English one is not so. Accordingly, it will not be surprising to find out that Arab readers of English tend to 'regularise' English (i.e. misread irregular words according to the phoneme-grapheme correspondence)

(Al Sulaimani, 1990:31)

Arabic orthography doesn’t contain any silent letters, such as are found in English words like *plumber, knife* and *castle*. Therefore Al Sulaimani says, Arabic learners – especially beginners, tend to pronounce every written letter in English: a common trait in the reading of surface dyslexics.
In order to test this observation under experimental conditions, he set up timed word recognition tests which used words of varying length, frequency and regularity of spelling. Four types of stimulus word were used:

1. Regular and familiar words (e.g.: man, garden, important, interesting)
2. Irregular and familiar words (e.g.: eye, height, moustache, luxuriously)
3. Regular unfamiliar words (e.g.: tam, tarsal, heterodox, centenarian)
4. Irregular unfamiliar words (e.g.: ere, chough, crescendo, butyraceous)

A total of 160 words were used, 40 of each type. Each word was flashed onto a computer screen and subjects were instructed to read it aloud. Timings were recorded by instructing subjects to “hit the space bar as soon as they were able to recognise a word. Hitting the space bar stopped a timer and recorded the length of time for which each word had been displayed.” Al Sulaimani also asked subjects to read aloud each word they recognised.

The results showed that:

- Regular words were recognised faster than irregular.
- Longer words were read more slowly than shorter ones.
- Some graphemic confusion was evident, particularly with consonants where one member of the pair did not appear in Arabic, such as b/p and f/v.
- 98% of the mispronunciations of the elementary group and 95% by the advanced group, involved a vowel or diphthong.
- The elementary group read 74% of regularly spelled words correctly, but only 46% of irregular words.
- The advanced group read 90% of the regularly spelled words correctly, but only 62.5% of the irregular words.

Al Sulaimani proposed that the findings of these experiments concur with reading errors made by surface dyslexics:

- Regular words are read faster than irregular.
- Incorrect readings of irregular words are usually clear examples of regularisation.
- Polysyllabic words sometimes pronounced correctly, but wrongly stressed.
• Occurrence of orthographic errors such as letter omission, addition or transposition.
• Difficulties with consonant clusters.
• Graphemic confusion.

3.5.3. Homophone confusion.

As noted by Coltheart et al, a deficit in the orthographic route in reading, such as indicated in cases of surface dyslexia, not only leads to the regularisation of irregular words when read aloud, but may affect comprehension of these words too. Al Sulaimani’s first experiments had shown that Arabic learners experienced difficulty in reading irregular words, and tended to regularise their pronunciation. In addition, he noticed that the beginners had sometimes comprehended regularly spelled words according to their own pronunciations and not their graphemic representation. For example, *wen* was misread as */wɪn/* and defined as ‘to win a match’, indicating confusion over the pronunciation of the vowel. Graphemic confusion is mentioned by Coltheart, Masterson, Byng, Prior and Riddoch (1983) as being a feature of surface dyslexia. Homophones – pairs of words with the same pronunciation in speech, but different spellings and meanings, are frequently confused by surface dyslexics. He gives the example of the word *sale*, which may be used to mean ‘sailing in a ship’. In his next experiments therefore, he tested Arabs’ comprehension of words of regular spelling, irregular spelling and homophonic construction.

In total 100 words were used in this experiment. Words were printed on cards and shown to subjects one by one. In the first test, subjects were asked to either translate the word or explain what it meant. They were specifically told not to read the words aloud in order to avoid contamination of the response by possible phonological error. In the second test, subjects were asked only to read the words aloud, in order to monitor decoding skill. The same two groups of subjects were used as in experiments 1 and 2.

Of the 11 pairs of homophones tested, six contrasted the orthographic pattern: CaiC and CaCe:
Both these forms could be called ‘regular’ and therefore read through GPC rule application. A failure to link the correct spelling and meaning together indicates a failure in the orthographic route: as found in surface dyslexia.

The results showed an error rate of 40% for beginners in translating or explaining meanings of the homophones, and 50% on reading them aloud, i.e. mispronunciations. Advanced learners’ error rates were 29% for translation or explanation and 43% for reading aloud. Al Sulaimani takes these results to indicate a deficit in the orthographic recognition store of the Arabic learners, i.e., they are unfamiliar with English spelling. He states that the non-establishment of orthographic recognition knowledge makes the subjects unable to use the direct visual route properly in both reading and comprehending words. As a result, subjects rely heavily on phonological representations to access meanings.

Al Sulaimani compares the performance of his Arab subjects – both elementary and advanced, with Developmental Surface Dyslexics who, as outlined in Chapter 2, cannot read via the orthographic route. What is very surprising from his studies is the similarity in results obtained from beginner and advanced subjects, the only difference being that beginners made more errors. It is odd that the advanced group of Arabic learners still rely heavily on the phonological route in reading and lack specific knowledge of English orthography. This finding will be discussed in more detail in a later section. The lack of progress in reading development between the lower and upper groups does seem to concur with Al Sulaimani’s theory of similarities between the performance of surface dyslexics and Arab learners of ESL. A fundamental question here has to be: Why should an entire linguistic group perform in a manner similar to native speakers of English with a congenital cognitive processing disability?
3.5.4. Performance on dictated spelling tasks.

The focus of Al Sulaimani’s next experiment was the spelling of homophones and low frequency words in context. He claims that his previous experiments had shown to a certain extent that the irregularity of the English spelling system caused problems for Arab learners, which led to errors similar to those made by surface dyslexics, indicating a deficit in the orthographic route in reading. He mentions that it is common to find native speakers who are good readers but poor spellers, and vice versa. Al Sulaimani suggests that the Arabs’ poor abilities to distinguish and read aloud homophones may be a result of their poor spelling ability, not specifically a reading deficit. Therefore, his next experiments set out “to find out whether the subjects of the previous experiments showed reading and comprehension confusion in both homophonous and non-homophonous words because they were poor spellers who could not distinguish the spellings of different words, or not” (p 251).

The words tested were selected from the list used in the previous homophone reading experiments, and some additional low frequency words were also included. In total, 30 words were used: 12 regular (six low and six high frequency) and 12 irregular (six low and six high frequency), and six homophonous words. The homophonous words were included in order to test the reaction of the subjects when confronted with a word which could be spelled in two different ways. As no context was given for the homophones, subjects were asked merely to write the first spelling that they thought of on hearing this type of stimulus. The rationale for this was to find out which of the pair was most easily recalled, and therefore most frequently used by subjects.

3.5.4.1. Phonetic spelling errors.

The beginners misspelled 50% of the stimulus words and Al Şulaimani classed half of the errors as phonetic misspellings. The advanced learners misspelled 33% of the stimulus words, of which 41% were classed as phonetic errors. Phonetic misspellings are a common feature of the writing of surface dysgraphics. However, Al Sulaimani’s data conflicts with the findings of the corpus of spelling errors presented in chapter 1, where only 2.7% constituted true phonetic equivalents. Examination of some of the errors classified as phonetic by Al Sulaimani shows that not all of them can really be classed as such. For example:
Target word. | Accepted phonetic misspelling.
---|---
Circuit | curcit, curcut, sircut, surket, circit, cerket.
Trough | trugh, chrough, troaf, traf, trof, traph, truff, thorough, throft, traugh, troth.
Barge | balg, parge.
Trout | traut, troute, trought, trawte, chrout, trawt.
Horse | hours, hors, house.

Were the misspellings classified under stricter guidelines, the figure for phonetic error may well be considerable less.

3.5.4.2. Graphemic confusion.

Al Sulaimani suggests that the errors indicate a certain amount of graphemic confusion, i.e. the spelling PARGE for *barge* would indicate the writer is unsure of the exact sound associated with the letters ‘b’ and ‘p’. Coltheart, Masterson, Byng, Prior and Riddoch (1983) cited graphemic confusion as being a feature of surface dyslexia – and presumably surface dysgraphia too. This confusion appears to involve both consonants and vowels in the misspellings. Graphemic confusion would help account for the high number of misspellings which are not, strictly speaking, phonetic in nature, and may indicate that subjects have not yet mastered alphabetic spelling skills. According to Frith’s (1985) model of reading and spelling development, alphabetic spelling skills act as the pacemaker for alphabetic reading skills, so if the spelling skills have not been mastered, we cannot expect the reading skills to have been either.

According to Frith’s model, alphabetic reading and spelling strategies precede orthographic strategies. Considerable practice at reading is necessary for a learner to move from an alphabetic strategy to an orthographic one. Once orthographic reading skill has been acquired, orthographic spelling skill will follow on. We can see then, that the methodology for this experiment is in itself, at fault. Al Sulaimani states that it is common to find native speakers who are good readers but poor spellers, and vice versa (p. 251) however, according to Frith this isn’t the case. Frith (1980) states that certain combinations of reading and spelling ability are possible: good readers/ good spellers, good readers/ poor spellers, poor readers/ poor spellers, but not poor readers/ good spellers. Therefore Al Sulaimani’s underlying presumption that his
subjects may spell well via the orthographic route, but not read well via this route, cannot be the case.

Subsequent research has indicated that rather than being solely a third stage of reading, orthographic word recognition skills for specific words are present in young children quite early on in their reading development (Ellis, 1997). We may ask then, why has an advanced learner of English, currently researching a PhD, not been able to acquire orthographic reading skills?

Al Sulaimani’s theory is that the script and orthographic structure of Arabic, which he classes as ‘highly regular,’ is in part to blame for Arab learners’ regularisation of irregular words in reading and spelling. In terms of reading, he says that when subjects came across unknown words, they tended to regularise the pronunciation. This finding is not unusual; native speakers, coming across an unknown word would tend to either read it by analogy to a known word with similar spelling, or read it according to grapheme-phoneme correspondence rules, which is what Al Sulaimani’s Arab subjects have done. However, as mentioned in Chapter 1, there are only about 500 words in English which can be classed as truly irregular, and these represent about 3% of everyday English (Crystal, 1995), so it stands to reason that Arabs will not encounter unknown irregular words very often. Gough, Juel & Griffith (1992) have estimated there to be around 500 rules of spelling in English, and that English orthography on the whole does not apply an arbitrary and irregular system. It would seem more plausible that Arab learners have not yet learned the many rules applicable to English orthography, and that they struggle to read words they do not know, not because these words are spelled irregularly, but because they don’t know the particular rule for pronunciation.

In certain English words containing a silent letter, pronunciation of these letters has become very common in the speech of Arabic learners. In fact, many of their English teachers in high schools, nearly all of whom are Arabic native speakers, will pronounce these silent letters, which doesn’t provide a very good role model for learners. It may well be that Arabic learners are unaware that certain letters are silent, as they only ever hear the words with these letters pronounced. In that case, such read aloud data cannot be said to represent errors similar to surface dyslexia in native speakers as these are subjects who have undoubtedly heard the word pronounced.
correctly many times, but who have difficulty equating its spoken and written forms. In the 12 years I have taught English in the Gulf countries, I have heard silent consonants in the middle of a word, such as ‘b’ and ‘t’ in bombing and castle, pronounced many times in the speech of Arabic learners. However, I have never heard a silent letter which occurs at the beginning of a word, such as knife, pronounced. This difference indicates that the silent letters in certain words have been accepted as pronounceable, but others haven’t. Future studies focusing on the reading of irregular words must therefore take into account the typical pronunciation of these words in certain countries. If generalisations are to be made regarding pronunciation of silent letters in reading, only words where the letters are not pronounced in speech, should be used.

3.6. Comments on the studies reported in this chapter.


Large scale testing of a homogenous group of subjects is often difficult to achieve. Al Hazemi was able to test large groups of KAMA cadets and his research therefore gives us a good overall idea of the vocabulary levels of elementary Arabic learners from Saudi Arabia. However, the studies of Ryan and Al Sulaimani used the available groups of Arabic learners living in the United Kingdom at the time. In doing so, they introduced a number of variables which may have affected the results of their experiments. Ryan doesn’t mention the nationalities of her group of Arabic speaking subjects, and Al Sulaimani states that his came from a variety of countries, but didn’t include any who spoke French. It is important to standardise the selection of subjects for four reasons:

3.6.1.1. Knowledge of additional languages.

It is important that subjects do not speak (or read) languages other than Arabic and English, as the influence of a third language may in some way contaminate their response to tests.

Holes (1995) mentions that in some Arabic speaking countries, Arabic is by no means the only or even the first language of some sections of the population:
In the countries of North Africa, mainly Morocco and Algeria, and to a much smaller extent, Tunisia and Libya - there are scattered but large minorities, several million strong, whose mother tongue is one of a large number of Berber dialects, which are only distantly related to Arabic. As a result of more than a century of French colonisation, some are trilingual in Arabic, Berber and French. In the mountains of northern Iraq there are several hundred thousand native speakers of Kurdish, an Indo-European language related to Persian. In southern Sudan, the indigenous population speaks a variety of mainly Bantu languages, quite unrelated to Arabic. In the ‘heartland’ areas of the Arabian peninsula there are small pockets of speakers of other Semitic languages.

(Holes, 1995: 1-2.)

He goes on to say that Arabic may be classed as the first language of a number of peoples who live in countries where it is not the official language, for example in areas of Turkey, Iran, Afghanistan, Uzbekistan and the Sahara region of Africa. It becomes clear that to classify someone as an ‘Arabic speaker’ doesn’t really tell us much at all. If we are to control for outside influences, i.e. the influence of knowledge of other languages, then it is imperative that a homogenous group of Arabic L1 speakers, who have no knowledge of additional languages, are used in the experiments.

3.6.1.2. Standardisation of English language level.

Al Sulaimani used two groups of Arabic speaking subjects: his elementary group were selected from students at a diplomatic school for Arab children in London, and his advanced group were all post-graduate students at London University, studying a diverse range of subjects. It is clear that his subjects were of a wide range of ages, and their English language competence probably varied widely as well. None of the subjects were objectively tested for their level of English. There are two reasons why it is important to use subjects of the same language level. The first is that it is difficult to design a test to accommodate different language levels: some subjects may find the test too hard, whilst others find it very easy. The second reason relates to interpretation of the results: when conducting tests of reading psychology, it is difficult to compare scores obtained by subjects of different levels.
3.6.1.3. Previous English language education.

Making generalisations about why reading and spelling errors have occurred and why they may persist, is easier if you are able to confidently state that all subjects under went the same initial education programme. As Ministries of Education tend to standardise the curriculum and teaching methods used in Arab countries, it is more likely that subjects will have undergone the same initial education in English if they come from the same country.

3.6.1.4. Environmental influence.

The environment that a learner lives in can greatly affect his language learning. In some Arab countries (or cities) such as Dubai, Muscat, Bahrain, Egypt and Kuwait City, English has become a second language and is widely used in business, tourism and higher education. In other countries such as the interior of Oman or Yemen, English is taught as a foreign language in schools, but is rarely used outside this context. It would be expected that the learner who lives in an environment rich in English language would develop a better command of it, and in a shorter time. If subjects from both types of environment are used in the same experiment, the results may show a greater than normal spread of scores, making generalisations difficult. Al Sulaimani mentions that some of his subjects had been in the UK for a very short time – in one case, only seven days, whilst others had lived there for many years. Again, by not controlling this factor, he has introduced a variable which has undoubtedly affected his results.

3.6.2. Testing recognition of words in isolation.

Al Hazemi and Al Sulaimani tested only isolated word recognition, although as Al Sulaimani admits, this is more difficult than recognising words presented in context. In isolation, no semantic field has been activated, unlike words presented in context, which makes it more difficult for words to be recognised. As a result, a regular rather than an irregular pronunciation may be activated – even for irregular words. For example, the word pint may be read as /pɪnt/. Van Orden, Johnston & Hale (1988) proposed that all words read in isolation are read via the phonological route. However, Coltheart and Coltheart (1997) dispute this, stating that irregular words
such as *pint* are not mispronounced by adult readers. Language proficiency, and more specifically word familiarity, may be the key here. A proficient adult reader with well-developed orthographic reading skills may recognise *pint* in isolation and pronounce it correctly; whereas a less proficient reader – one for whom the word is not frequently encountered, may know its meaning, but not recognise the word in isolation. He would therefore resort to a regular pronunciation in accordance with other members of the orthographic group: *hint, mint, stint, lint*. Therefore, when used with less than proficient second language learners, tests of isolated word recognition cannot be relied upon to give results which will necessarily indicate a failure of the orthographic route in reading.

3.6.3. **Choice of word stimuli.**

The word stimuli used by Al Sulaimani were taken from the experiments of Coltheart *et al* (1983) and were of very low frequency, for example: *dachshund, oppugn, pumice, schism, gabardine*. Although these words may well have been known by Coltheart *et al's* subjects, Al Sulaimani’s subjects were second language learners, some of whom had only been in the U.K. for a short time, it is very likely that they would not have been exposed to these words before. The studies of Al Hazemi showed that elementary Arabic learners possessed English vocabularies of around 1000 words. Many of the words used by Al Sulaimani do not occur even at the 3000 word level, so there is very little chance a learner possessing a vocabulary of 1000 would know them. If reading tests had been devised which used words known to subjects, the results may well have been different. A major reason for assuming that Arab subjects behaved in a manner similar to surface dyslexics, was that they tended to regularise irregular words when reading aloud. However, if an irregular word was unknown to a reader, he would tend to pronounce it according to its letters and orthography, as he would have no indication that the spelling was in fact, irregular.

3.6.4. **Evidence for a phonological bias in reading and spelling.**

Al Hazemi, Al Sulaimani and Ryan each presumed there to be a phonological bias in the reading and spelling performance of Arab learners. Ryan has stated that Arab learners misrecognise words with a similar consonantal structure when presented in context, as these words act like homophones to them. Good orthographic reading
skills are necessary to distinguish homophones – especially if the pair are both of regular spelling, eg: pane/ pain. Ryan’s theory indicates that Arabs rely heavily on the phonological route in reading.

Al Hazemi suggested that they misrecognised imaginary words as real on the basis of a phonological similarity to another word. However, his account appears slightly confused as many of the imaginary words he used appear to bear more orthographic than phonological similarity to existing words.

As the focus of Al Sulaimani’s research was to demonstrate similarities between surface dyslexics and Arab learners of English, his experiments were designed to indicate a weakness in orthographic processing and reliance on phonological strategies in reading and spelling. He reports that subjects made high numbers of ‘phonetic’ spelling errors – over half of the errors made by beginner and advanced subjects were so-classified. However, this may be compared with the spelling error data presented in the chapter 1 corpus, where only 2.7% qualified as truly phonetic.

Bosman & Van Orden (1997) state that a commonly accepted definition of phonetically accurate spelling errors is that “the error pattern can be pronounced identically to the intended word using grapheme-to-phoneme correspondence rules” (page 175). They give the example KLINTON as being a phonetically accurate attempt to spell Clinton, but state that PLINTON would not be classed as such. It may be that many of the spelling errors made by Al Sulaimani’s subjects were ‘phonetically similar’ to the target word, but could not actually be classed as pseudo-homophones. In order to be able to make a phonetically accurate spelling error, a writer must possess very good knowledge of phoneme-grapheme correspondences and orthographic conventions of the language. Al Sulaimani accepts that the spelling errors show a certain amount of graphemic confusion, which would account for the many spellings which are not strictly speaking, phonetic equivalents of the target word. This ties in with the idea expressed by Ryan, that words with similar spellings appear to be mistaken. If graphemic confusion is present, it indicates that subjects are not altogether familiar with GPC rule application in English: something which remains to be tested with Arab learners of English.
3.6.5. Lack of awareness of vowels in reading.

Ryan and Meara (1991) found that Arab learners did not notice when vowels had been systematically removed from words, indicating that vowels did not play a significant part in word recognition for them. This theory was further supported by experiments carried out by Ryan (1993) which showed that they mistook words in context, if the word provided had the same consonantal structure to the target word. Proficient readers of English have been found to fixate on all the letters of a word in order to recognise it. Rayner, Foorman, Perfetti, Pesetsky and Seidenberg (2001) state that all letters in a word need to be processed in order for the reader to build a specific representation of the word that can be accessed quickly and accurately. The fact that Arabs are unsure of the particular vowels which occur in words, and have difficulty in spotting when they have been removed, indicates that they do not possess good orthographic – or phonological reading skills. Al Sulaimani proposed that Arab learners had poor orthographic reading skills, but much of the data uncovered in the studies reviewed in this chapter indicates that neither the orthographic nor the phonological route is operating effectively. However, further experiments need to be carried out to be absolutely clear that this is the case.

3.6.6. Similarity of errors to those made by developmental surface dyslexics.

In the case of R.B, the 10 year old developmental surface dyslexic reported by Temple (1997) who was discussed in chapter 2, 23% of her reading errors involved an accurate regularisation of irregularly spelled words, eg: anchor → /əntʃər/. R.B. also made many other errors which were not classic regularisations, but which nevertheless for the most part, conformed to the application of a rule-based reading system, for example: break → /brek/ or teach → /teɪʃ/. Twenty-four percent of her reading errors were visual paralexias, where the response shared at least 50% of the letters in common with the stimulus. Al Sulaimani’s read-aloud test data conforms to this pattern and can be said to indicate a strong similarity between the errors made by developmental surface dyslexics and Arab learners of English.

In terms of spelling, Temple reports that 52% of R.B’s spelling errors were phonologically plausible, eg: fire → FIER, engine → ENGEN, orchestra →
ORKESTRER, whistle → WISLE. Although not all the misspellings classified as 'phonologically plausible' are given in Temple (1997), from the examples she has selected it would appear that a stricter criterion for inclusion in this category has been adopted. Al Sulaimani’s figure of 50% phonetic spelling errors would probably be much lower if he had adopted stricter guidelines for inclusion. In this case, his subjects would have performed less-well than surface dyslexics, in terms of rule-based spelling assembly.

Temple reports that 11% of R.B.’s spelling errors involved an incorrect vowel, and 20% involved consonant errors or combinations of other error categories. The figure for vowel error in the chapter 1 corpus was much higher than this: 83%. However, direct comparison between the results of each study is difficult as errors have been analysed in different ways. In Temple’s study, the 11% vowel error related to the errors remaining, after the 52% phonetically plausible errors had been taken out; in chapter 1, the figure 83% refers to vowel errors in the entire corpus. Nevertheless, even taking these factors into account, it would still appear that Arab learners made more vowel-related errors than the developmental surface dyslexic.

Despite the issues raised above, it is apparent that, as Al Sulaimani has suggested, Arab learners make a considerable number of errors which are similar to those made by native speaking developmental surface dyslexics. It is also important to note specific differences in the types of error made by these two groups. Namely, that Arabs make more vowel-related errors in reading and spelling, and have a less-good grasp of phoneme-grapheme correspondence rules, which has been demonstrated in reading and spelling performance.

3.6.7. Effects of L1 (Arabic) orthography.

Ryan (1993) and Ryan and Meara (1991) suggest that the reliance on consonants for word recognition that has been observed with Arab learners may be connected to the morphological system of Arabic, which relies heavily on consonant structure for meaning. Al Sulaimani suggests that the lack of written vowels in Arabic may also have contributed to their word recognition problems in English. However, this theory appears to be inconsistent with his experimental claims that Arab learners display similar characteristics to surface dyslexics - surface dyslexia is a failure of the
orthographic route in reading, but any orthography which does not include vowels (i.e. a consonantal alphabet) would have to rely heavily on the orthographic route as spellings would provide an incomplete phonological representation.

Al Sulaimani states that Arab learners experience great difficulty with certain features of English spelling: silent letters, homophones, poly-morphemic words, differences in meaning caused by stress and different pronunciations accorded to the same letter depending on its position within a word. In short, he blames the reading and spelling problems on the diverse nature of English orthography, compared to the more regular system of Arabic. This assumption raises some important questions: is Arabic orthography regular? In what ways does reading in English differ from reading in Arabic, and can these differences account for the reading and spelling errors? The nature of Arabic orthography, morphology and the reading and spelling skills it requires, will be further investigated in Chapter 4. The possibility of a transfer of reading skill from L1 to L2 will also be explored.

3.7. Conclusion.

The studies reported in this chapter have shown that Arab learners of English make a variety of reading errors:

- Regularising the pronunciation of irregular words in read aloud tasks.
- Confusing homophones in context.
- Relying heavily on the consonantal structure of a word to access its meaning.
- Lack of awareness of vowels in word recognition.
- Misrecognising words when presented orally and in written form.
- Mistaking imaginary words for real words.

Although these studies have provided a pretty comprehensive account of the reading deficiencies of Arab students, they have not provided any conclusive evidence as to why the errors occur in such large numbers in a single linguistic group. Suggested explanations of previous researchers (Al Sulaimani, 1990; Ryan, 1993; Ryan & Meara, 1991) have focused on differences in script and direction of writing, differences in the orthographic structure of Arabic and English and morphological distinctions between the two languages. It was also suggested that Arab learners'
reading behaviour was similar to that of native speaking surface dyslexics, in particular the developmental form, which affects beginning readers. Al Hazemi (1993) pointed out that the Arabs’ errors in word recognition resembled those made by poor native English speaking readers in tests conducted by Anderson & Freebody (1983). Could it be that Arab learners are just poor readers and spellers, in the same way that many native speakers are? If this is the case, we must ask why so many of them fail to grasp the skills necessary to become literate in English.

One of the main criticisms of the above studies related to the selection of subjects and the failure to control for variables which might have affected performance. Another criticism related to the level of language proficiency of the subjects: in many cases it was too low to make the results of tests generalisable to Arab learners as a whole. Therefore, the experiments reported in the remainder of this thesis take account of the following points in selecting subjects:

- Subjects must be from the same linguistic environment, i.e. all Arabic speakers from the same country, in order to rule out possible influences from knowledge of other languages.
- They must have had the same educational background in English, prior to testing.
- They must be of approximately the same age, as comparing the performance on reading tests of young children and university students may not be valid.
- They must be of the same sex. In the Arab world, cultural restrictions mean that women have less opportunity to practice English outside the classroom than men. In order to minimise this variable, all subjects should be a homogenous group.
- They must be of a moderately high level of language proficiency, for example, between intermediate and advanced. Several of the experiments reported in this chapter used low level learners who had low levels of vocabulary knowledge. In such cases it is difficult to test word recognition skills as subjects do not know the target words.
- All subjects must be of approximately the same language level.

Chapter 2 raised the question of whether Arabs’ errors might be due to a developmental lag. Spelling errors recorded in Chapter 1 suggested that the learners might be either at Stage 2B (alphabetic) or 3A (orthographic) of Frith’s model.
Although the review of existing research into Arabs’ reading errors hasn’t provided an answer to this question, it has suggested two areas for further experimentation:

1. The studies of Al Sulaimani indicate graphemic confusion in reading and spelling. The corpus of spelling errors reported in Chapter 1 also showed instances of graphemic confusion. Graphemic confusion may be caused by a deficit in orthographic processing (as in surface dyslexia), or by lack of knowledge of GPC rule application which would lead to a failure at the alphabetic stage of word recognition and spelling. Arab learners’ knowledge of GPC rules and English spelling conventions remains to be discretely tested. Experimental research in this area will be reported in Chapter 5.

2. The silent reading “Homophone Discrimination Test” conducted by Ryan (1993) provided interesting insights into word recognition problems of Arabs. However, as Ryan’s test involved a small sample of low intermediate learners, quite possibly from a variety of countries, these results cannot be generalised. A replication of this experiment, using a larger group of subjects with a higher level of English language competence, might yield different results. Such an experiment will be reported in chapter 6.

In Fig. 3.1. a flow chart is given to indicate the direction for continuation of research in this thesis. There are two lines of enquiry. One is that suggested by Al Sulaimani (1990) and Ryan (1993), that Arab learners suffer from an impairment to the orthographic route in reading and spelling as a direct result of differences between L1 and L2 orthography and the subsequent cognitive processing of each. The other line of enquiry suggests that it may not simply be the orthographic route which has failed, but that Arab learners may not be able to alphabetically decode well either. Before experimentation in this area can be discussed, it is first necessary to ascertain the feasibility of the former claim: that differences in the processing of Arabic and English orthography have led to the reading and spelling errors. Chapter 4 investigates this issue.
Fig 3.1 Flow chart indicating direction for continuation of research.

The black line represents the experimental findings of existing research into errors made by Arabs, and the suggested causes. The red line, an alternative explanation, based upon the theory that both alphabetic and orthographic routes may be affected. It is the intention of this thesis to follow-up both lines of enquiry, in order to ascertain which offers a more plausible explanation for the errors.

Cause of reading and spelling errors


Situation: Arab learners have good phonological reading and spelling skills, but have entirely failed to acquire orthographic skills:

Errors thought to resemble those made by Developmental Surface Dyslexics.

Suggested cause: Differences between L1 & L2 orthography. This issue will be investigated in chapter 4.

Prognosis: Reading and spelling will not improve. Learners must rely on compensatory strategies for reading and spelling in English.

Orthographic and phonological routes affected. Further experiments will be reported in chapters 5 & 6.

Situation: If both routes are not operating properly:

Errors likely to be due to a failure to acquire Frith’s stage 3A (orthographic reading), because stage 2B (alphabetic reading & spelling) hasn’t been fully mastered either.

Suggested cause: Inadequate initial instruction in reading and spelling, coupled with lack of practice in these areas. This possible cause will be investigated in chapter 7.

Prognosis: Learners may improve in time with extensive practice. Situation can be prevented in future by changing initial instruction methods and giving greater practice in order to build high quality lexical representations necessary for word recognition and spelling.
Chapter 4.

L1 reading and spelling processes as the cause of L2 errors.

Al Hazemi (1993), Al Sulaimani (1990), Ryan (1993) and Ryan and Meara (1991) have suggested that the reading and spelling errors they found with Arab learners were due to use of “a skill more appropriately deployed in the L1” (Ryan, 1993). To what extent is this a feasible suggestion? Unfortunately this is not a well-documented area of research. As Comeau, Cormier, Grandmaiton and Lacroix (1999) put it: “few researchers investigating biliteracy have focused on the fundamental cognitive processes involved and on the possibility of cross-language transfer of these processes.”

The proposal put forward by Al Hazemi and others, assumes that Arabic and English will be read in fundamentally different ways, and that any transfer of skill from L1 to L2 will have a negative effect. This chapter presents four areas of contrast between L1 and L2: phonology, direction of script, grapheme-phoneme rules and orthographic depth in order to assess the feasibility of cross-linguistic influences. Subsequently, a review of research on bilingual literacy will be presented, and conclusions will be drawn as to the feasibility of the suggestions put forward by Al Hazemi, Al Sulaimani, Ryan and Ryan and Meara.

4.1. Differences in phonology of L1 and L2.

Ibrahim (1978) suggested that one reason for the spelling errors made by Arab ESL learners was differences in the phonology of Arabic and English. He states that Arabs find it difficult to discriminate between some vowel sounds of English which do not occur in Arabic, and as a result, may write a semantically wrong word, for example HALL for whole, or COAST for cost. This inability to discriminate between sounds implies a deficit in phonological awareness in the L2. Comeau et. al. (1999) investigated the relationship of children’s phonological awareness in L1 French, to their reading in L2 English. The authors concluded from their studies that phonological awareness skills transfer across alphabetic languages. It therefore seems unlikely that differences in phonology between L1 and L2 could be the cause of reading and spelling errors in the L2. If a learner is able to alphabetically decode
words, and has good orthographic recognition skills, he should not mistake semantically different lexical items.

4.2. Transfer of phoneme-grapheme correspondence rules from L1 to L2.

James et. al. (1993), mentioned in Chapter 1, investigated the transfer of phoneme-grapheme correspondence rules from L1 to L2, using Welsh/English bilingual children. They concluded that this transfer was a very real phenomenon, but would only occur if both L1 and L2 shared the same alphabet. As this is not the case with Arabic and English, we can rule out a transfer at this level.

4.3. Direction of script.

Ryan and Meara (1991) suggest that it would not be surprising to find Arab learners scanning English words “rather differently” to the usual left to right pattern of native English speakers, as a result of familiarity in reading Arabic, which is written from right to left. This raises the question of whether differences in the direction of script between L1 and L2 can influence how a reader processes words. Randall (1991) carried out an experiment to investigate whether familiarity with a left to right script would affect the eye scanning patterns when reading arrays of Arabic letters, from right to left. His subjects were Malay/English bilinguals whom he describes as being fluent readers in both languages. Malay is an interesting language as it has two written forms: the more common orthography uses the English alphabet, and Jawi, uses the Arabic alphabet. Randall says that all his subjects were familiar with both scripts. He expected to find a left-to-right bias in the reading of Arabic letter arrays, as a result of subjects’ familiarity with processing both English words and Malay words written in the usual English alphabet. However, his results did not show the expected left-to-right influence when Arabic letters were being read. Randall’s results indicate that the direction of script of the L1 does not influence the direction letter arrays are likely to be processed in by an L2 reader.
4.4. The orthographic depth hypothesis and transfer of reading skills from L1 to L2.

As mentioned in Chapter 1, an orthography that represents its phonology following regular grapheme-phoneme correspondences is called a shallow orthography (e.g. Spanish, Italian). Because of the transparent relationships between spelling and pronunciation, the phonological information of a word in a shallow orthography can be easily recovered from its spelling, resulting in the extensive use of phonological recoding, even at a prelexical level. In a deep orthography, on the other hand, there is a more complex relation of spelling to phonology (e.g. English, Hebrew, Chinese). In such an orthography, readers are more dependent on orthographic information than phonological when processing text, because an accurate phonological representation of a word cannot easily be generated from the spelling. The Orthographic Depth Hypothesis (Frost, Katz and Bentin, 1987) proposes that differences in orthographic depth between languages lead to word processing differences; in a shallow orthography, phonological information is dominantly used in word recognition whereas a deep orthography encourages the reader to process words via orthographic information. In other words, the ODH proposes that the variation in the relationships between phonology and morphology determines the type of information dominantly used in word recognition.

In assessing the effect of a possible transfer of reading skills from L1 Arabic to L2 English, we must first compare word recognition procedures in both orthographies. In order to do this, we must assess the orthographic depth and regularity of Arabic. The word recognition strategies of skilled readers of English were reviewed in Chapter 2.

4.4.1. The structure of written Arabic.

Arabic is a Semitic language, in the same family as Hebrew and Amharic. Unlike Hebrew, it is a diglossic language, having three forms: Classical Arabic (CLA), the language of the Qu’uran; Modern Standard Arabic (MSA), which is universally used in the Arab world for formal communication and writing (with the exception of some local newspapers), teaching in schools and higher education, prayers in the mosque and other public occasions; and the colloquial spoken dialects of Arabic which have
no written forms. The spoken dialect in a particular region is the native language of all native speakers of Arabic in that region. It should also be noted that MSA is not spoken as a native dialect by any Arab.

Ibrahim, Eviatar and Aharon-Peretz (2002) describe the relationship between MSA and colloquial Arabic:

Although sharing a limited subgroup of words, the two forms are phonologically, morphologically and syntactically somewhat different. For example, certain vowels, (such as e and o) exist in spoken Arabic but not in literary Arabic; In spoken Arabic words may begin with two consecutive consonants, or with a consonant and a “schwa,” whereas this is illegal in literary Arabic. The two forms utilise different inflections (such as plural markings) and different insertion rules for function words, and the two forms have different word order constraints in sentence structure.

(Ibrahim et al. 2002: 323)

Wightwick and Gaafar (1990) state that in MSA word order follows the VSO pattern, but in colloquial spoken Arabic it is more usual to adopt an SVO pattern. It is clear therefore, that there are quite substantial differences between the two forms of Arabic. This diglossic situation puts additional strain on young learners at school, most of whom will not have encountered MSA before, and will be required not only to learn this new form of Arabic, but to read and write it as well.

In modern Arabic the three short vowels (fatta, dumma, kisra), are not written, and the two long vowels which are written (waw ُ and yaa ُُ), may also function as consonants. The alif (ا), although written, cannot be pronounced without the inclusion of a short vowel: either fatta or kisra, and is therefore given honorary consonant status. These letters are referred to as the *matres lectionis*. Semitic languages therefore, are described as having *consonantal alphabets*. The omission of vowels and reliance on consonants has led to the situation where Arabic contains a great many homographs, words with the same spelling, but different meaning. This issue will be covered in more detail in section 4.4.7.

Arabic differs from the other Semitic languages in that it is cursive, whereas Hebrew and Amharic are not. The direction of the script is from right to left, and punctuation is not normally used.
The graphological system used by Arabic is more systematic than the somewhat arbitrary one used by English. In Arabic, closely related sounds are represented by similar graphemes, for example:

<table>
<thead>
<tr>
<th>Sound</th>
<th>Arabic letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>/d/</td>
<td>د</td>
</tr>
<tr>
<td>/ð/</td>
<td>ذ</td>
</tr>
<tr>
<td>/r/</td>
<td>ر</td>
</tr>
<tr>
<td>/z/</td>
<td>ز</td>
</tr>
</tbody>
</table>

In Arabic therefore, several letters may share the same basic form. What distinguishes them from each other are the dots – the number, position or absence of these. For example, these five letters share the same basic shape:

\[ ب (b) ی (y) ن (n) ث (t) (th) \]

Thus, precise use of the dots is vital as they constitute the sole distinguishing feature (Azzam, 1990). Of the 28 letters, 15 are dotted: 10 have one dot, three have 2 dots and two have 3 dots. The remaining letters are undotted (See Appendix 4.1. for a complete table of the Arabic alphabet). The diacritical marks used to represent vowels are not normally used in modern handwriting and printing, except in the case of children’s books, dictionaries and the Qu’uran. Azzam (1990: 7) mentions that the vowel diacritics are used for teaching young children to read as they “not only provide phonological cues, but also act as vowels and have grammatical functions. For example, they are used as endings in the inflexion of nouns, to indicate the mood of verbs and to help the reader determine whether the word is a noun or a verb.”

Typically, the diacritics are divided into short vowels, orthographic signs and grammatical signs. Azzam describes them as such:
1. **Short vowels:**

   **kisra** – a short stroke or diagonal below the letter (eg: ّ /ti:/)

   **fatta** – a short diagonal above the letter (eg: ٌ /tæ/)

   **dumma** – a shape like a comma, placed above the letter (eg: ٍ /tu:/)

   **madda** – a wavy line representing the long vowel /æ/ written above the alif.
   It is the fusion of a hamza (glottal stop) and the alif. (١)

2. **Orthographic signs:**

   **sukkun** – a small circle placed above the letter, indicating the absence of a vowel and a closed syllable.

   **shadda** – a miniature ‘w’ written above the letter, indicating the gemination (doubling) of the consonant. Instead of doubling the letter, it is written with a shadda above it.

3. **Grammatical signs:**

   These are called **tanwin** and mark the nominative, genitive and accusative for indefinite nouns and adjectives: =

   (Azzam, 1990: 7 - 8)

Although there are no capital letters as such, the graphemes may take on a different form, depending on their placement within a word. Of the 28 letters of the alphabet, 22 are represented by different shapes. These letters may have four different shapes,
depending on whether they are initial, medial, final or follow an unconnecting letter.

For example, the phoneme /h/ is represented by the following graphemes:

<table>
<thead>
<tr>
<th>Unconnected</th>
<th>final</th>
<th>medial</th>
<th>initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>ʾ</td>
<td>ʾ</td>
<td>ʾ</td>
</tr>
</tbody>
</table>

Fig. 4.1. Graphemic representations of the letter ħa in Arabic.

Arabic morphology, like that of the other Semitic languages, relies on a triconsonantal root system. Awde and Samano explain this:

Almost every word in the language is ultimately derived from one or another ‘root’ (usually a verb) that represents a general, and often quite neutral concept of an action or state of being. Usually this root consists of three letters. By making changes to these letters, the original root concept is refined and altered. There are many ways to make these changes: letters are added to the beginning of the root or tacked on at the end; the vowels between the consonants of the root are changed; extra consonants are inserted into the middle of the root; syllables are appended at the end. Each of these changes produces a new word – and a new meaning: meanings seem literally to grow out of the root like branches of a tree. But the original basic idea of the root persists, in one way or another.

(Awde & Samano, 1986: 15)

Awde and Samano give an example using the root consonants ‘k-t-b’. These letters appear in the same order in the following semantically related words:

<table>
<thead>
<tr>
<th>Arabic word</th>
<th>Meaning.</th>
</tr>
</thead>
<tbody>
<tr>
<td>kataba</td>
<td>to write</td>
</tr>
<tr>
<td>kattaba</td>
<td>to make someone write</td>
</tr>
<tr>
<td>takaatata</td>
<td>to write to each other, correspond</td>
</tr>
<tr>
<td>istaktaba</td>
<td>to dictate</td>
</tr>
<tr>
<td>kitaab</td>
<td>book</td>
</tr>
<tr>
<td>maktab</td>
<td>office</td>
</tr>
<tr>
<td>maktaba</td>
<td>library (also bookstore)</td>
</tr>
<tr>
<td>kaatib</td>
<td>clerk</td>
</tr>
<tr>
<td>miktaab</td>
<td>typewriter</td>
</tr>
<tr>
<td>mukaatata</td>
<td>correspondence</td>
</tr>
<tr>
<td>mukaatib</td>
<td>correspondent, reporter</td>
</tr>
<tr>
<td>muktatib</td>
<td>subscriber</td>
</tr>
</tbody>
</table>
kutubii  bookseller
kutayyib  booklet
maktuub  written (or letter)

Share and Levin (1999) state that the entire Hebrew lexicon – estimated to be some 50,000 – 100,000 words, is based on approximately 2,000 roots. We may assume that a similar situation exists with regard to Arabic.

It will be noticed that Arabic morphology builds the subject pronoun onto the verb, so the example ‘takaataba’ – to correspond, includes the prefix ‘ta’ – meaning you. ‘Istaktaba’ – to dictate, includes a double prefix: ‘i’ – meaning I, and ‘ta’ – meaning you (‘I write[ to] you’)

4.4.2. Reading in Arabic.

Al Sulaimani (1990) attributes much of the blame for the reading and spelling errors made by his subjects to differences between English and Arabic orthography. He states that Arab learners experience great difficulty with certain features of English spelling: silent letters, homophones, polymorphemic words, differences in meaning caused by stress and different pronunciations accorded to the same letter depending on its position within a word. In short, he blames the reading and spelling problems on the diverse nature of English orthography, compared to the more regular system of Arabic. This assumption raises some important questions: is Arabic orthography regular? Are regular orthographies read in a different way to irregular orthographies? Are all regular orthographies shallow, or can an orthography be regular and at the same time, deep? What skills are involved in reading in Arabic?

4.4.3. A deep or shallow orthography?

In order to answer the first question, it is necessary to review the definition of deep and shallow orthographies which was given in chapter 1, and the criteria used to determine which category a language fell into. Two criteria emerged as being important in classifying an orthography as shallow:
1. That regular phoneme-grapheme correspondences were used; i.e. that the same letters were used consistently to represent the sounds of the language.
2. That each sound was represented by a single grapheme.

There are two characteristics of Arabic orthography which must be considered in assessing whether it meets these criteria. The first is that Arabic consistently uses the same graphemes to represent phonemes, unlike English. Whereas in English, a word with the same sound can be spelled in a variety of different ways, eg: read, reed, Reid, this cannot happen with Arabic. Therefore, we can assume that the first condition mentioned above has been met: that Arabic has a regular orthography. However, not every phoneme is represented by a grapheme, as modern Arabic handwriting and printing do not write the short vowels. Thus it becomes clear that in this situation, the second criteria mentioned above cannot be met. It would appear then, that Arabic orthography may be termed regular, but deep.

As mentioned in section 4.4.1. above, grapheme-phoneme correspondences in Arabic are quite complex, with similar graphemes representing quite different phonemes, and different graphemes representing the same phoneme (Ibrahim, Eviatar & Aharon-Peretz, 2002). So although Arabic can be classed as a regular orthography, it still uses a somewhat complex system of phoneme-grapheme correspondences. It would appear then, that Arabic orthography seems to have more in common with English than with regular orthographies such as Spanish and Italian, which do not use different versions of graphemes, and which consistently represent each phoneme with a single grapheme.

4.4.4. Effects of orthographic structure on word recognition and spelling in Arabic.

Al Sulaimani’s hypothesis leads us to question how Arabic is read and spelled, and in particular the following issues:

1. How do children learn to read Arabic?
2. What effect does the lack of vowels have on word recognition?
3. How does a reader cope with the homograph phenomenon?
4. What kinds of spelling mistakes do children make?
5. In what ways are reading and spelling in Arabic similar to English, and in what ways are they different? Can these differences affect the way in which learners of English as a second language read and spell words?

These questions will be dealt with in the remainder of this chapter, and finally, a conclusion will be drawn on the basis of the information reported. Unfortunately there is currently a lack of published research in the area of reading and spelling in Arabic. More research has been done with Hebrew, but the relevance of this to any investigation of Arabic, is questionable. Abu Rabia (1997), Berent and Frost (1997) and Ibrahim et. al. (2002) assert that there are considerable differences between the two languages in terms of phonology, vocabulary and orthography, which render invalid any generalisation of the cognitive processes involved in the reading and spelling of each.

4.4.5. Learning to read in Arabic.

Azzam (1990) mentions that children are first taught to read through the use of pointed Arabic (i.e. written Arabic which includes the vowel diacritics), which serves as an exact graphemic representation of the spoken language, and is therefore thought to be easier for them to learn to decode. My own observations of Grades 1 and 2 Arabic reading classes show that the teaching of elementary Arabic literacy follows a phonics-based approach, where children are taught the sounds of letters and vowel markers. In class, the teacher will ask children to read aloud a consonant letter with a vowel marker attached, eg:

<table>
<thead>
<tr>
<th>Arabic letters</th>
<th>pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>د</td>
<td>/dæ/</td>
</tr>
<tr>
<td>د</td>
<td>/de/</td>
</tr>
<tr>
<td>د</td>
<td>/du:/</td>
</tr>
</tbody>
</table>

Then she will produce a word which includes one of these letter combinations, eg:

/ðæftæər/ (notebook) and ask children to read this aloud.
Once the sounds represented by letters and diacritical markers have been learned, children are able to read whole words through a process of serial decoding. This system also allows children to correctly read aloud previously unseen words – something not always possible in English.

As several of the graphemes have similar shapes, children are exposed to tasks which help them build up mental representations of the various letter forms representing different sounds. Distinguishing between similar looking letters will be very important to them in developing high-quality visual images of words in the future. Appendix 4.2. gives an example of such an activity. This task has been taken from the Oman Ministry of Education Grade 1 Arabic reading book, used by six year olds. Children are given three words – presented with vowel markers, and asked to read each and say which one refers to the given picture. It will be noticed that the words include graphemes of similar shape but different sound. Once the pronunciation has been retrieved – through a process of serial decoding, the meaning can be identified and the correct picture chosen. This type of activity helps familiarise learners with grapheme-phoneme correspondences, and also to begin the process of developing visual images of words, by looking at words which may differ only in one consonant.

Appendix 4.3. shows another task from the same page of the Arabic reading book. In this task learners are asked to write the vowel ‘dumma’ (ʼ) above the coloured letter in each word. Dumma represents the sound /u:/, /u/ or /a/. Learners are subsequently instructed to read the word aloud. As will be seen from the appendix, without the vowel some of the words have no meaning, although they can still be pronounced. This activity helps to illustrate the importance of a single short vowel, in distinguishing between a non-word and a word with meaning.

When children are familiar with the spelling of a particular word, for example, when it has been read in class several times over a period of about two weeks, the teacher will present the word unpointed, on a flashcard. The use of flashcards, commonly referred to as Look and Say methodology, lends itself very well to the teaching of reading in Arabic. Whereas, in teaching reading in English, it usually precedes any phonics instruction, in Arabic, due to the nature of the orthography, it will follow phonics instruction.
It becomes clear then, that the purpose of using flashcards in teaching reading in English and Arabic is very different. In English it supports Frith’s (1985) first stage of reading – logographic recognition, but in Arabic it is used to support the third stage – orthographic recognition. Thus in English, flashcard use equates to symbol recognition; in Arabic it supports the more sophisticated whole-word recognition process.

4.4.6. Learning to spell in Arabic.

Azzam (1990) conducted a study of the reading and spelling errors made by young children in L1 Arabic. From this study, we can learn about the sources of difficulty experienced by beginners, and thus about the processes involved in learning to spell in Arabic. The subjects of Azzam’s study were 150 native Arabic-speaking children aged from six to eleven (Grades 2 – 6), of a variety of nationalities. All children were enrolled in the same private school in Abu Dhabi. There were 30 students in each grade: 15 girls and 15 boys.

Both the reading and spelling tests used the same material: 25 sentences taken from the set textbook used with each grade. The spelling tests consisted of dictations where children were instructed to write down the entire sentence. Fifty target words, graded in terms of difficulty, were embedded in the 25 sentences. In grading the words, Azzam took the following into account: the point in the curriculum at which the word was introduced, the frequency of occurrence of the word, the likelihood the word was “in the child’s bank of vocabulary”, word length, the characteristics of the word (e.g: short versus long vowel sounds, soft versus hard sounds, the hamza, the letter ‘t’, the tanwin⁵, stress, regularity of the spelling/ pronunciation versus irregularity, etc.) and the grammatical structures: these must be the same as the ones found in the children’s reading textbooks. The materials differed for each grade level, but Azzam says that “attempts were made to assure that the test materials were

⁵ Although Azzam does not explain why the hamza, tanwin and letter ‘t’ should be focused on when examining children’s spellings, it seems most likely to me that it is for the following reasons: 1. Hamza (़) and tanwin (◌) being unconnected symbols which are written above the usual line of graphemes, might easily be omitted by young children. 2. The letter ‘t’ (ٕ) contains two dots. It might easily be confused with the letter ‘n’ which contains one dot, and the letter ‘th’ which contains three.
comparable by including examples of all aspects and characteristics of the Arabic script in each of the lists” (Azzam, 1990: 73).

It should be noted that learning to spell in Arabic never involves writing the short vowel diacritics – children and adults alike only ever write the consonantal form of a word. In this respect, learning to read and write are quite different. This has implications for the word recognition and spelling processes: whereas in English it is easier to read a word than to spell it, in Arabic it is easier to spell than to read a word.

The spelling errors made by each child were coded by category. Azzam reports that the coding system “was derived from an analysis of the Arabic script, and from the types of errors children might be expected to make, and from error patterns that have been observed in English” (p. 73). The second criterion of the coding system derives from previous research into spelling difficulties in Arabic. The categories used for coding spelling errors were:

1. Sequencing of letters, diacritics, hamza, stress and dots.
2. Additions of letters, diacritics, hamza, stress and dots.
3. Omissions of letters, hamza and dots. Omission of diacritics and the stress symbol were excluded in spelling as students are not required by their teachers to include these in their writing.
4. Reversals of letters and diacritics, and inversions of letters, diacritics, hamza and dots.
5. Incorrect sound-symbol association of vowels, consonants, soft and hard consonants and hamza.
6. Inappropriate sound-symbol association relating to context sensitive rules of the soft ‘alif’ (أ versus أ), hamza and tanwin.
7. Wrong segmentation within the word.
8. Directionality on page in terms of angle of dots and diacritics, where on page child starts writing and mirror writing.
9. Miscellaneous errors: created new letter or diacritic, position of diacritics, dots, and/or hamza, and ambiguous letter choice, eg: ض for ط.
10. Guessing words: word spelled differed greatly from the presented word.

(Azzam, 1990: 75 – 76)

The results showed that 39% of target words were misspelled, with a range of 8% to 82% over the five grades. Category 4, reversals and inversions, recorded very few errors: only 10 words out of a possible total of 7,500 contained this type of error. The
largest categories of errors overall were additions and omissions of letters, followed by errors involving the dots attached to certain letters. It would appear from Azzam’s results that developmental spelling errors are largely caused by a writer confusing graphemes of similar appearance – particularly those which are distinguished from each other by the number of dots above or below them. This of course, would lead to non-phonetic spelling errors.

Treiman (1993) found that young American children’s spelling errors tended to preserve the sound content of the word, but it was the children’s lack of knowledge of spelling conventions of English which lead to unconventional (though legitimate) spellings. In contrast to this, we see from Azzam’s study that Arabic children’s errors tend to involve writing an incorrect letter as a result of their confusing graphemes with similar shapes but different numbers of dots above or below them. The regularity of the Arabic spelling system means that children have very few rules to learn. Once they have learned the phoneme-grapheme correspondences and the different graphemic shapes used to represent a letter depending on its position in a word, they should be able to spell almost any word as long as they have good phonemic awareness. Thus the big difference between learning to spell in English and Arabic would appear to be memory. Due to the large number of spelling rules in English, good memory skills are essential; however, the regularity of PGCs in Arabic means that remembering the spellings of individual words isn’t as necessary: words can be spelled accurately by assembling their sound-symbol correspondences.

4.4.7. Skilled reading in Arabic.

Two issues arising from the nature of Arabic orthography lead to word recognition difficulties:

1. As a result of omitting the short vowels, written Arabic is a partial representation of the phonology, i.e. an exact pronunciation cannot be retrieved solely from the spelling.
2. This situation also means that Arabic contains many homographs: words which look the same, but have different pronunciations and meanings.
According to Abu Rabia (1997), almost every third word in a passage can be a homograph – noun, verb or conjunction, representing several meanings. The regularity of the correspondences between phonemes and graphemes means that Arabic is indeed much easier to spell than English. However, the partial phonology and the quantity of homographs mean that word recognition is very much more difficult than in English. Some examples of homographs in Arabic are:

<table>
<thead>
<tr>
<th>Arabic</th>
<th>pronunciation</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>عود</td>
<td>/u:d/</td>
<td>musical instrument</td>
</tr>
<tr>
<td>عود</td>
<td>/u:d/</td>
<td>incense</td>
</tr>
<tr>
<td>عود</td>
<td>/u:d/</td>
<td>a tree branch</td>
</tr>
<tr>
<td>برد</td>
<td>/bɑːrəd/</td>
<td>cold</td>
</tr>
<tr>
<td>برف</td>
<td>/bɑːræd/</td>
<td>snow</td>
</tr>
<tr>
<td>كتاب</td>
<td>/kʊːtuːb/</td>
<td>books</td>
</tr>
<tr>
<td>كتاب</td>
<td>/kætaːbæː/</td>
<td>to write</td>
</tr>
<tr>
<td>ذهب</td>
<td>/ðæhæbæː/</td>
<td>went</td>
</tr>
<tr>
<td>ذهب</td>
<td>/ðæhæb/</td>
<td>gold</td>
</tr>
</tbody>
</table>

* these are homophones as well as homographs.

N.B. The vowel diacritics would not normally be written. They have been provided in the above examples so that different pronunciations of homographs can be appreciated.

According to Abu Rabia (1997) context plays a far greater role in reading in Arabic than it does in reading in English. In English, poor readers rely on contextual clues to aid word recognition (Stanovich, 1980) whereas good readers are able to recognise words on the basis of their highly developed phonological and orthographic reading skills, and rely little on contextual clues (Rayner et. al, 2001). Abu Rabia’s argument is that due to the lack of visual and phonological information, sufficient to enable word recognition to occur solely on the basis of the individual printed word, a skilled reader of Arabic will be one who is best able to utilise contextual clues to help him identify words.
In order to test this hypothesis, Abu Rabia carried out an experiment using 109 10th grade Arab children from central Israel. He divided the participants into skilled and poor readers on the basis of an initial read-aloud test, which contained 100 vowelised Arabic words. Participants who scored 50 or more were considered skilled readers (n = 70), and those who scored 45 or less were considered poor readers (n = 39). There were 31 additional participants whose scores fell between 46 – 49, and they were dropped from the study.

The test involved reading aloud four narrative texts taken from a book of Arabic short stories (experiment 1), and four articles taken from an Arabic daily newspaper (experiment 2). As the results obtained from both experiments were very similar, only the first experiment will be reviewed here. Each Arabic short story was adjusted to a length of 100 words, and each of the four stories was presented in a different reading condition:

1. As a vowelised narrative text.
2. As an unvowelised narrative text.
3. Words from the text were scrambled and presented as a vowelised isolated word naming list.
4. Words from the text were scrambled and presented as an unvowelised isolated word naming list.

(In the case of experiment 2: the newspaper articles were also adjusted to a length of 100 words and presented in the same four reading conditions as the narrative texts.)

Subjects were asked to read each text aloud, and reading accuracy was assessed according to the following criteria:

Scoring the vowelised and unvowelised reading texts was by considering all diacritics in the vowelised text and considering all the absent diacritics in the unvowelised text. If the participant did not pronounce the word correctly but it was nevertheless still semantically acceptable, the answer was still considered wrong. Each word in the text was meant to be read exactly the way it is written with full vowelisation. However, scoring the unvowed isolated words was less strict regarding reading with full consideration of diacritics. The participants were permitted to pronounce the vowel of the last consonant in a word in any acceptable way in Arabic. The missing vowels on the other letters had to be pronounced accurately.

(Abu Rabia, 1997: 71)
The results showed that both good and poor readers were able to pronounce words with greater accuracy when they were presented with vowels, and with greater accuracy when they were presented in context as opposed to isolation. Abu Rabia reports his results as follows:

A 2 (skilled/poor reader) x 4 (reading conditions) MANOVA was conducted. The MANOVA revealed a main effect for group [F(1,1070 = 362.87; p < .001]. There was also a main effect for context [F(1,107) = 494.89; p < .001] and a significant interaction of reader’s level, by context [F(1,107) = 76.47; p < .001]. This means that context helped poor as well as skilled readers to improve their reading. However, the skilled readers benefited more from the context.

A 2 x 2 breakdown MANOVA of these reading conditions also showed a significant effect for vowels [F(1,107) = 1056.41; p < .001] and a significant interaction of level of reader by vowels [F(1,107) = 72.67; p < .001]. Namely, both types of readers were assisted by the vowels in reading narrative texts and isolated words. There was also a significant interaction of context x vowels [F(1,107) = 649.91; p < .001]. That is, when students read words without context, vowels were a good facilitator.

(Abu Rabia, 1997: 72 – 73)

Abu Rabia’s results show that in contrast to English, skilled readers of Arabic benefit most from using context to recognise words – poor readers also benefited, but not to the same degree. His results also show that the inclusion of the short vowel diacritics aids recognition when words are presented in isolation and in context. However, it should be noted that Abu Rabia’s experiments focussed on reading accuracy, not speed of word recognition. By including the vowel diacritics, a reader is encouraged to rely on phonological processing as opposed to orthographic. Phonological decoding, as a method of recognising words, is a much slower process, and as such we wouldn’t expect skilled readers of any language to use this method when reading familiar words (Akamatsu, 2002). Unfortunately I am not aware of any study which specifically compares the speed of recognition of vowelised and unvowelised Arabic words presented in context.

We may conclude that unpointed Arabic (the form of writing usually encountered) is indeed a deep orthography and in agreement with the Orthographic Depth Hypothesis, words need to be recognised orthographically. Alphabetic decoding is
limited due to the lack of written vowels. An additional feature of reading in Arabic is the necessity of syntactic and semantic parsing in order to identify words; word identification in isolation is much more difficult. Stanovich (1980) concluded that reliance on contextual clues for word identification in English slows down the reading process, and puts additional strain on attentional capacities which would be better employed elsewhere. Although to-date there has been no research into the speed of identification of unpointed Arabic words presented in context, it would appear that reading in Arabic is a more complex and time-consuming process than reading in English.

How do these features of reading in Arabic affect Al Sulaimani’s claim that it is a feature of L1 processing which is making it difficult for learners to acquire ESL reading skills?

4.5. L2 reading errors as a result of L1 reading processes.

A central argument in the theory that L2 reading and spelling errors are caused by differences in reading and spelling processes used in L1 and L2 rests with the idea that different orthographies are not read in the same way. The transfer theory supported by Al Hazemi, Al Sulaimani and Ryan implies that Arab learners will transfer reading skills based on alphabetic decoding. However, as we have seen in the previous section, Arabic does not lend itself to alphabetic decoding as the writing system uses only consonants. At this stage we can see that there is some doubt associated with the notion of a transfer of reading skill.

A study carried out by Akamatsu (2002) provides further evidence that it is not a difference in word recognition strategies used by L1 and L2 that is responsible for the errors. In contrast to the ODH, Akamatsu proposes that fluent readers of all orthographies, whether deep or shallow, process words in the same way, i.e. through fast, automatic visual recognition. Phonological recoding is slower, and as such would not be used by proficient readers when encountering familiar words. Therefore we would expect all fluent L1 readers to have good orthographic recognition skills, and if the notion of transfer of skill between L1 and L2 is applicable, to demonstrate good orthographic recognition skills in the L2 as well. In
fact, far from exerting a negative effect on L2 reading, the transfer of fluent, i.e. orthographic reading skills, from L1 could be seen as a positive element.

Akamatsu carried out a study to test the possible effects of L1 orthographic features on word recognition in English as a second language. His experiment set out to test the hypothesis that L2 readers with different L1 orthographic backgrounds will demonstrate word recognition procedures in English which are similar to those used in the L1. His study used ESL readers with different L1 orthographic backgrounds: Chinese (logography), Japanese (logography and syllabary) and Farsi (alphabet).

If L1 orthography exerts an influence on how readers process words in the L2, we would expect to find that:

Chinese and Japanese participants ... show less facilitating effects of the availability of phonological information within a word that Iranian participants (Farsi L1). Moreover, if readers of a deep orthography exclusively use visual mediation for lexical access, and if such word-recognition procedures are transferred to L2 reading, then Chinese and Japanese participants should show no regularity effects in processing either high-frequency or low-frequency words.

(Akamatsu, 2002: 121)

Akamatsu’s subjects (17 Chinese, 16 Japanese, 15 Iranian) were all skilled readers in both their L1 and in L2 English. He states that they had all obtained scores of between 80 – 100% correct in the vocabulary and reading comprehension sections of the TOEFL test. Although he does not give details of their overall individual scores, from the information he gives it seems probable that overall scores would have been high, perhaps putting them in the rank of ‘advanced’ learners.

The test consisted of a word naming task, with 40 high-frequency and 40 low-frequency monosyllabic English words. For each frequency type there were 20 regular and 20 exception words. Subjects were given eight practice and 40 test trials. During each test trial, 10 stimulus items were randomly chosen from each of the four categories (i.e. high-frequency regular and exception and low-frequency and exception) and presented to subjects on computer screen. Participants were asked to read each stimulus word as quickly and as accurately as possible. In analysing data,
only reaction times of correct responses were used. The results showed that in processing high-frequency words, all the ESL groups recognised exception words as quickly as regular words; low-frequency exception words, in contrast, took longer to recognise than low-frequency regular words. These findings are in accordance with results of similar experiments conducted with native speakers of English (Harley, 1998).

Although the experimental evidence strongly suggests that all fluent readers of English—whether L1 or L2, process words in the same way, the reasons for this are open to debate. Either the notion of a transfer of reading skill from L1 to L2 is not applicable: good readers of English, whether it is their first or second language, will develop similar word processing skills. Or, as Akamatsu proposes, all orthographies are read in a similar way, so fluent readers should not display any differences in processing languages.

According to Akamatsu’s argument, fluent reading in all orthographies relies on fast, automatic word recognition processes, and this is no exception for Arabic. In fact, according to Akamatsu, readers of an L1 alphabetic language have an advantage over readers of a language such as Chinese, in that they are already familiar with phonological decoding skills. Whilst fluent reading of unpointed Arabic does not lend itself to decoding, children’s reading of pointed Arabic (which does include the vowels) is an excellent introduction to alphabetic reading principles. It would appear that readers of L1 Arabic should be good readers of English as a second language, not poor readers, as the reading skills they have acquired in their first language are very similar to those needed in the second language. So what has gone wrong?

Perhaps one reason might be that the participants in Akamatsu’s study were all fluent readers in their first language and in English, whereas the subjects used by Al Hazemi, Al Sulaimani and Ryan on the other hand, are described as being of ‘elementary’ or ‘intermediate’ English language competence. As such, they would probably have had lower vocabulary levels and lesser reading abilities. It may well be the case that these learners are still in a developmental stage of learning to read and spell in English—as outlined in Chapter 2. When they become more fluent, and have acquired all the stages of Frith’s (1985) model, they will perform in a manner
similar to native speakers of English. Until this happens, they will continue to
demonstrate poor word recognition abilities.

4.6. Ease of learning GPC rules used by L1 and L2.

So far, the research has indicated that if the notion of a transfer of reading skill from
L1 to L2 is applicable, it should be beneficial, not detrimental, as both Arabic and
English rely on visual word recognition. However, this proposed transfer focuses
purely on orthographic reading skills – the endpoint of skilled reading. Could
differences in acquisition of reading skills at the alphabetic stage affect learning to
read in L2 English? Al Sulaimani specifically states that it is the fact that Arabic
employs regularity in grapheme-phoneme correspondences, as opposed to English
which often doesn’t, which causes the problem.

To my knowledge, there is no available published research which compares the ease
of learning to read in Arabic and English. However, Gholamain and Geva (1999)
carried out a study comparing concurrent literacy development in English and
Persian. The subjects of their study were 70 Canadian immigrant children who were
in Grades 1-5 and learning to read concurrently in English (L1) and Persian (L2).
The authors found that orthography can indeed determine the ease of acquisition of
alphabetic decoding skills (these were acquired faster in L2 Persian than in L1
English, due to the regular PGCs used in Persian) but that skilled reading in both L1
and L2 depended on individual differences in the underlying cognitive and linguistic
factors. These were cited as being verbal working memory and rapid automatised
word-naming: skills which the authors maintain are necessary for efficient reading in
all languages.

4.7. Effect of L1 spelling strategies on spelling in L2.

The orthographic depth hypothesis relates to reading but not to spelling. The reason
for this is that regularly spelled words in an alphabetic language will be spelled via a
process of phoneme-grapheme assembly. Irregular words in a deep alphabetic
orthography, and all words in a logographic orthography such as Chinese or Japanese
Kanji, will be spelled according to sight word knowledge, as described in Chapter 2.
It has been suggested that skilled reading in all orthographies relies heavily on visual
word recognition, however, the process of spelling is very much dictated by the type of orthography: whether alphabetic or logographic. In such a situation, it is more likely that L1 spelling processes may have an effect on L2 performance. This theory was investigated by Wang and Geva (2003).

Reading and spelling in an alphabetic language involves phonological awareness of the language, whereas reading and spelling in a logographic orthography such as Chinese, relies heavily on visual memory of characters. Wang and Geva argue that if the phonological awareness required for reading English has not been developed, Chinese readers “make use of their L1 literacy experience and rely on a visual whole-word strategy” (Wang and Geva, 2003: 5). The authors further explain that Chinese ESL readers “demonstrate a strong lexicality effect in reading and spelling English words and experience difficulty in processing novel English pseudowords. However [they] reveal an advantage in processing visual-orthographic information in written words or letter strings, even when phonological information is not accessible from these stimuli” (Wang and Geva, 2003: 5).

Their rationale for assuming that phonological awareness of English is not developed when children are taught to read and spell at school is that they are often taught through rote memorisation of whole words – the same technique that is used to teach reading and spelling in Chinese. Children therefore grow up without having acquired alphabetic decoding or spelling skills. Wang and Geva hypothesised that Chinese children would experience more difficulty in alphabetic spelling than native English children, but less difficulty in lexical spelling, resulting from a transfer of L1 spelling skills.

To test this hypothesis, the authors analysed the spelling performance of 30 Cantonese Chinese children who were learning English as a second language, and compared it to that of 33 native English speaking children. They used a non-word spelling test to test the children’s knowledge of phoneme-grapheme correspondences, and a conventional spelling test to test children’s knowledge of actual spellings. The Chinese ESL children showed poorer performance in the spelling to dictation of non-words, than the English L1 children. The differences between real word and non-word spelling performances for the Chinese children was significantly greater than for the English children. Moreover, the Chinese children
outperformed their L1 counterparts in a confrontation spelling task of orthographically legitimate and illegitimate letter strings. The authors report that, in line with the advantage in spelling visually presented materials, the difference between spelling performance on legitimate and illegitimate letter strings for the Chinese children was significantly smaller than that for the L1 children.

It is clear that Wang and Geva’s hypothesis is correct: an L1 which is spelled via whole-word recall may subsequently affect a learner’s ability to utilise alphabetic spelling skills in an L2. The crucial element of Wang and Geva’s argument appears to be the role of spelling instruction: the children in their study had not been taught to read or spell in English through phonic principles. This had undoubtedly affected the results. It would be interesting to compare two groups of Chinese L1 learners: one group who had been specifically taught alphabetic skills, and the other who had been taught to read and spell through the whole-word approach, as Wang and Geva’s children had. We would expect the children who had learned through alphabetic methods to demonstrate better phonographic spelling skills than those who had been taught to spell via the whole-word method.

The implication of this study is that Arab learners of English have an advantage over Chinese learners as their L1 uses an alphabetic orthography, and should therefore be better at spelling via phoneme-grapheme correspondences than through whole-word retrieval. Evidence from Chapter 1’s corpus of spelling errors shows that this isn’t the case: only 2.7% of errors could be classified as truly phonic in nature, which implies that they haven’t got a good grasp of alphabetic spelling principles. An important question is raised at this point: Arabic is undoubtedly an alphabetic language, but is it spelled through a process of letter-by-letter assembly? My observations of Grades 1 and 2 Arabic classes showed that children are taught to read through phonics, but they are not taught to spell this way. When learning to spell, children do not ever write the short vowels – this would be unnecessary knowledge for the future as short vowels are rarely written in modern Arabic. Instead, a whole-word spelling technique is used: once they can read them, children copy whole words from the board and memorise these spellings. This would seem to indicate that although Arabic is an alphabetic language, the orthography dictates that words may be spelled either through letter-by-letter assembly, or via whole-word retrieval.
It is undeniably the case that phoneme-grapheme correspondences in Arabic are easier to learn than in English, as they are regular, whereas in English they are often not. This implies that learning the spellings of words is easier than in English as a particular sound is always represented by the same letter. The effect of having an L1 which uses regular correspondences, when learning an L2 which has many irregular correspondences, might mean that unless particular emphasis is put on the learning of individual spellings, students will fail to acquire them. According to Wang and Geva’s theory, Arabs should have good phonological spelling abilities, but this is not what we have seen in Chapter 1. It may well be that the Arab learners in question were not specifically taught letter-sound correspondences in English, as was the case with Wang and Geva’s Chinese learners, and not enough emphasis was placed on the diversity of spelling patterns – leading to poor word-specific images.

4.8. Implications and feasibility of the cross-linguistic transfer theory proposed by Al Sulaimani (1990).

The focus of this chapter, the feasibility of Al Sulaimani’s (1990) assertion that irregularly spelled English words cause mispronunciations and errors in word recognition, has two main implications:

Firstly, it implies that readers are not employing orthographic word recognition skills, but are relying on alphabetic decoding when reading in English. If this is found to be the case, it could be for two reasons. One is that readers have not come across the words before, and therefore their lexicons do not contain orthographic images of these particular words. Alternatively, it could be because Arab learners are unskilled readers, lacking in the practice necessary to move from the alphabetic stage of reading to an orthographic one. This implication will be specifically tested in subsequent chapters.

Secondly, by proposing that Arab learners are transferring a skill from the L1 to the L2, Al Sulaimani’s assertion implies that Arabic is read through a process of letter-by-letter decoding, and does not take into account the necessity for orthographic processing skills. It therefore seems clear that we can rule out Al Sulaimani’s claim that Arab ESL learners’ reading problems are a direct result of differences in the orthography of the L1 and L2.
Al Sulaimani’s response implies that subjects rely heavily on the alphabetic route in spelling as well as reading. According to Frith’s (1985) model, alphabetic spelling precedes alphabetic reading, and only when both skills have been mastered, can a learner start to develop orthographic images for words. Despite Al Sulaimani’s assertion that over half of the spelling errors made by both beginners and advanced subjects in his experiments were phonetic in nature, the fact that many of them varied in their pronunciation to that of the target word (eg: trough spelled as TRUFF, TRAPH) indicates that subjects have not mastered alphabetic spelling principles fully. This factor would also account for their lack of skill in terms of orthographic recall.

4.9. Conclusion.

The orthographic depth hypothesis states that all deep orthographies will be read in the same way. This theory has been taken one step further (Akamatsu, 2002) in suggesting that skilled reading in all languages involves visual word recognition. As such, we would not expect to find differences in the reading strategies of skilled readers in their L1 and L2. It has been shown that whilst Arabic has a regular system of PGC rules, it is nevertheless a deep orthography as it does not write short vowels and uses different graphemic forms depending on their position in the word. Skilled reading in Arabic therefore requires high quality lexical representations of words as in English. It has been shown that children learn to read pointed Arabic through alphabetic decoding methods, and as such, should be thoroughly familiar with the system of reading and spelling via PGC rules. As a result, any transfer of reading skill from L1 to L2 should be beneficial not detrimental to learning to read in English.

With spelling the situation is somewhat different though, as the orthographic depth hypothesis is not applicable – logographic orthographies are spelled through whole word visual images, whereas many words in alphabetic orthographies are spelled by assembling phoneme-grapheme correspondences. As Wang and Geva (2003) showed, L1 spelling strategies can have an effect on L2 spelling performance, especially if children have not been taught to spell through alphabetic methods. Although there is currently a dearth of research into cognitive processing in spelling
Arabic, we may assume that as it is an alphabetic language which uses regular phoneme-grapheme correspondences, making sound-to-spelling easier, words can be spelled via either phono-graphic assembly or whole-word recall. As such, Arab learners should be familiar with alphabetic spelling skills, and according to Wang and Geva’s hypothesis, this familiarity should have transferred to their spelling in English. Contrary to this expectation, chapter 1’s corpus showed only 2.7% of misspellings were true phonetic equivalents. The Arab learners’ spelling performance can be compared to that of the Chinese ESL children: they appear to lack alphabetic spelling skills. In the case of the Chinese children, Wang and Geva suggest that it is as a result of their not being specifically taught to read and spell via phonic principles. Could the same be true for the Arab learners?

A flow chart indicating two possible causes for the reading and spelling errors made by Arab ESL learners was given at the end of chapter 3. The cause suggested by previous researchers (Al Hazemi, 1993; Al Sulaimani, 1990; Ryan, 1993) was an inappropriate transfer of L1 reading and spelling skill. This chapter has shown that far from having a negative effect on their ESL reading and spelling, any transfer from Arabic should have had a positive effect. A positive effect would have meant that reading errors did not occur in English. If L1 spelling processes had been applied to spelling in English, the misspellings should have contained many more phonologically-plausible errors. As we saw in chapter 1, this wasn’t the case. As such, we can rule out this line of inquiry. An alternative hypothesis, which will be investigated in chapter 7, is that the errors have been caused through a combination of inadequate instruction in schools and a lack of reading and spelling practice.
Chapter 5.

A test for phonological decoding ability.

5.1. Introduction.

Knowledge of phoneme-grapheme correspondence rules is of fundamental importance in learning to read. In the training study of Bradley & Bryant (1983) which was reviewed in chapter 2, the learning of letter-sound relationships emerged as an important variable in children’s later reading skill. Children who had received letter-sound training made greater gains in subsequent reading and spelling development, than children who hadn’t received the training. Only when this skill has been mastered, can orthographic recognition operate effectively. Letter-by-letter decoding skills are not only used by beginning readers, they are also one of the methods by which experienced readers sound out unfamiliar words. Knowing the sounds which are associated with the symbols in an alphabetic language is therefore a skill which must be mastered for effective reading.

Previous researchers (Al Hazemi, 1993; Ryan, 1993; Ryan & Meara, 1991; Al Sulaimani, 1990) indicated that Arab learners suffer from some kind of word recognition problem, but they have not been able to specify exactly what this is. Ryan (1993; Ryan & Meara, 1991) showed that word recognition problems involved vowels, Al Hazemi (1993) found Arab learners unable to distinguish real words from invented ones, whilst Al Sulaimani (1990) and Ryan (1993) suggest that their reading and spelling errors resemble those made by Developmental Surface Dyslexics, i.e. a failure of the orthographic route.

Doubts were raised in chapters 3 and 4 concerning the theories of Al Sulaimani and Ryan. The implication of these theories is that the errors are caused by malfunction of the orthographic route, but that the phonological route is operating normally in both reading and spelling. The spelling error corpus analysed in chapter 1 showed that only 2.7% of misspellings could be classified as “truly phonetic” in nature. In native English-speaking spellers by far the greatest proportion of errors fall into this category. The fact that Arabs’ errors do not conform to this pattern suggests that they may not have a good grasp of phoneme-grapheme correspondence rules. According
to Frith’s (1985) model, alphabetic spelling (Stage 2A) is acquired before alphabetic reading (Stage 2B). Therefore if Arabs cannot spell via the alphabetic route, as indicated by the chapter 1 misspellings, they should also experience difficulty in reading via the alphabetic route.

A commonly-used test of alphabetic skills is the non-word reading test. If non-words are constructed of novel letter strings, the test represents a pure assessment of phonological decoding skills as non-words cannot be ‘recognised’ visually, and therefore the orthographic route will not be in use. A non-word reading test would indicate if Arabs’ spelling problems stemmed from an inability to ‘sound out’ words phoneme by phoneme as they spelled them, and to apply phoneme-grapheme correspondence (PGC) rules. If Arab learners are behaving in a manner similar to Developmental Surface Dyslexics, they should be able to read non-words without difficulty. If, on the other hand, it is the alphabetic route which is weak, then they will not read non-words easily.

Chapter 2 reported that phonological reading skills, along with visual word recognition, are responsible for proficiency in reading English texts. It therefore seemed applicable to compare the results of the non-word reading test, i.e. a subject’s phonological decoding skill, with their performance on reading comprehension tests. It was reasoned that the subjects with higher comprehension scores would also score higher on the non-word test.

5.2. Method.

5.2.1. The non-word reading test.

5.2.1.1. Item construction.

Chapter 2 reported an experiment carried out by Goswami, Gombert and Fraca de Barrera (1998), in which children of between seven and nine years old were tested on their reading of two types of non-word. The first type, which I shall call GPC rule-based, contained legitimate letter sequences but did not look like words. They could be read by assembling grapheme-phoneme correspondences and blending the sounds so that the word might be pronounced. The second type contained spellings which
were based on existing words and could be read by analogy to these words. I shall call these analogous non-words.

The non-words used by Goswami et. al. varied in length from four to seven graphemes, and included complex bigrams to represent diphthongs, eg: FAISH, FAIP, ZOIP and some items, the pronunciation of which could involve double vowels in the middle, eg: SHOAB, SHOIZ. However, it was decided that diphthongs would not be used in the non-word test for Arab learners, and neither would complex double vowels such as in the non-word SHOAB. I felt that using items with such constructions would inevitably make the test more difficult for subjects, and would perhaps not give such a clear picture of their alphabetic decoding abilities. However, I decided not to restrict non-word length to mono or bisyllabic items, and therefore included some analogous non-words with multiple syllables and many graphemes. It was reasoned that as subjects were university undergraduates and regularly read long words, they should be able to read the longer non-words by a combination of analogy and grapheme-phoneme conversion.

For this non-word test it was decided to use mainly words of the DAIK construction. This decision was reached for two reasons. Firstly, as the purpose of this non-word reading test was to see if subjects could utilize letter-by-letter decoding skills (i.e. the phonological route), asking them to read words such as DAKE would not have shown this. Words of the DAIK construction must be read via the phonological route as they have no lexical entries. However, words such as DAKE will be read by analogy to words with similar orthography. According to Ehri (1998), reading by analogy requires input from the lexical store, although to a certain extent this will also include phoneme-grapheme knowledge. This is concurrent with the findings of Goswami mentioned in chapter 2, that young children read non-words with rhyming patterns faster than words without. Automatic processing, or reading via the lexical route, would be much faster than letter-by-letter decoding - reading via the phonological route. Thus testing reading of words such as DAKE will not show adequately whether the phonological route is being utilized to its full extent. Temple’s (1997) study of J.E, the developmental phonological dyslexic mentioned in chapter 2, showed that she had built up a massive lexical store of words to compensate for her inability to read via the phonological route. It therefore becomes
clear that readers may develop compensatory strategies for a failure in the phonological route.

The second reason for using DAIK words is that previous research has indicated that in experiments involving the presentation of words in isolation, Arabs fail to recognize when a letter has been changed or deleted from an existing word. The results of a Yes/No Vocabulary Knowledge test conducted by Al Hazemi (1993) showed that Arabs frequently not only failed to recognize familiar words, but would ‘recognise’ a non-word with similar construction to a real word. Ryan & Meara (1991) found that Arabs failed to recognise when vowels had been systematically deleted from words.

The findings of both Ryan & Meara and Al Hazemi with regard to word recognition problems of Arabs, imply that if a non-word test were constructed entirely of real words with one or two letters substituted, subjects might well fail to recognize this and read them as if they were actual words. If this is true, we might find that non-word number 16. CHICORATE is read as chocolate.

It was decided that the majority of the non-words should be of the GPC type (n = 39), as this would indicate phonological reading ability, and that a small proportion should be based on reading by analogy (n = 9). It was decided to restrict the analogous non-words to under 20% of the total number as the main focus of the experiment was to test subjects’ phonological reading skills. A comparison of the results of reading abilities on both types of non-word would indicate whether subjects were able to utilize visual reading strategies in pronouncing non-words, or were dependent on letter-by-letter decoding. GPC rule-based non-words were selected from lists given in Reid (1998: 73).

The non-words used to test analogous reading were: BALDRY, SUCTORIFICE, WATCHORN, CHICORATE, HERMANTIC, FUMICANT, DEMAINNE, PARTICIPLINE and ADLAMATE. These items were selected from lists complied by Rob Waring and John Shillaw, for use as ‘distractors’ on the Yes/ No vocabulary test. They were therefore designed to look like real words. Most of the words had been constructed by putting a commonly used suffix on to a regularly spelled “front half” of a word, eg: PARTICIPLINE = participate + trampoline, Caroline, canine.
etc. It will be noted that the letter 'i' can be pronounced in two different ways in these examples; therefore both pronunciations have been accepted for the non-word. Table 5.1 lists the analogous non-words and accepted pronunciations based on words with similar spelling in the New Shorter Oxford English Dictionary (1993). Note that the pronunciations listed in Table 5.1 are the analogous ones. Some non-words could also be read by assembling grapheme-phoneme correspondences. For example, BALDRY can be read as /bældrɪ:/, FUMICANT can be read as /fʌmɪkænt/ and WATCHORN can be read as /wætʃɔrn/. These pronunciations were not marked as incorrect. However, to distinguish them from the correct analogous readings, in Appendix 5.12. (Pronunciation of analogous non-words by Arab subjects), they have been colour-coded differently.

Reading accuracy was recorded but reading speed was not. Reading speed was not measured as it was not considered to be an important factor in testing the hypotheses. Non-words used in the study, and the accepted pronunciations are listed in Appendix 5.1.; phonetic symbols used in the transcriptions are included in Appendix 5.2.
<table>
<thead>
<tr>
<th>Analogous word</th>
<th>Analogous pronunciation</th>
<th>Words from NSOEUD with similar spelling and pronunciation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BALDRY</td>
<td>/bɔ:ldri:/</td>
<td>bald balderdash</td>
</tr>
<tr>
<td>10. SUCTORIFICE</td>
<td>/saktɔrɪfɪs/</td>
<td>sector, suction, suffice, orifice mice, pumice.</td>
</tr>
<tr>
<td>11. WATCHORN</td>
<td>/ˈwɒtʃɔrn/, /ˈwɒtʃərn/</td>
<td>watch + horn, watch ornament, born</td>
</tr>
<tr>
<td>16. CHICORATE</td>
<td>/ˈtʃɪkəret/, /ˈtʃɪkəret/</td>
<td>chocolate, chicken decorate, considerate.</td>
</tr>
<tr>
<td>17. HEMANTIC</td>
<td>/həmæntɪk/</td>
<td>hermit, frantic, antic</td>
</tr>
<tr>
<td>24. FUMICANT</td>
<td>/ˈfjuːmənt/</td>
<td>fumigate, fume, Canterbury, canter, canteen.</td>
</tr>
<tr>
<td>29. DEMAINÉ</td>
<td>/dəˈmeɪn/, /dɪˈmeɪn/</td>
<td>demand, domain, Romaine (lettuce), Maine (USA), ‘de’ as a prefix, eg: decongestant.</td>
</tr>
<tr>
<td>38. PARTICIPLINE</td>
<td>/ˈpærtsɪplɪn/</td>
<td>participate, participle, trampoline, Caroline discipline.</td>
</tr>
<tr>
<td>40. ADLAMATE</td>
<td>/ˈædləmət/</td>
<td>advertisement, advocate, participate, approximate</td>
</tr>
</tbody>
</table>

Table 5.1. Accepted pronunciations of analogous non-words.

5.2.2. Reading comprehension tests.

As mentioned in chapter 2, phonological reading skills are considered to be the single most important determiner of reading proficiency in English. It was therefore decided to compare Arab learners’ reading proficiency and phonological decoding skills. Reading proficiency was assessed by means of three comprehension tests, which were administered to the class as a whole, over a period of three weeks prior to the non-word test. An average score for the three tests was obtained for each subject. Tests (see appendices 5.3, 5.4. and 5.5.) were supplied by colleagues from
the English Language Centre at Zayed University. These tests conformed to the standard format for reading comprehension, used by the ELC's testing unit: a format that subjects were familiar with. Word frequency counts and Flesch Kincaid readability scores for each test are given in appendices 5.6. and 5.7.

5.2.3. Hypotheses.

The experiment set out to test the following hypotheses:

1. Analogous non-words will be read with greater accuracy than GPC-based non-words.
2. Errors in reading non-words will be more likely to involve vowels than consonants.
3. Readers with good comprehension scores will also score higher on the non-word reading test.

5.2.4. Ordering of items.

The non-words ranged in terms of difficulty: some were single syllable three letter items, for example: JID, WEX. Others were more complex and involved two syllables: JEFUM, NIMEP. The analogous words consisted of two to four syllables: BALD, SUCTORIFICE. However, unlike many graded non-word reading tests, this test did not start with the easiest items and progress to the most difficult, as it was thought this would prove demotivating for subjects. If an item thought to be easier, for example number 41. LOND and number 42. BRANT, appeared from time to time throughout the test, this would act as a factor in motivating subjects to continue and not give up.

5.2.5. Subjects.

Subjects were 31 Emirati female university students\(^6\) aged 19 – 21, studying on a foundations language programme. These students had learned English as a foreign

\(^6\) The original number of subjects was 32. However, subject E2 was absent on the day of the non-word reading test and it was not possible to record her at a later date. Therefore subject E2 has been dropped entirely from the study.
language at government schools for nine years, at the rate of one 40 minute lesson per day, and subsequently at Zayed University in Dubai for two years. Their exposure to the English language at university had been intense: of the eight hours of instruction they received each day, seven would be either an English lesson, or a content subject delivered in English. Overall, it could reasonably be stated that all the subjects had been exposed to a great deal of English. Despite this however, they could not be described as proficient readers or spellers.

All subjects had taken the TOEFL examination and received scores of between 480 and 523. The TOEFL, an American language proficiency test usually administered prior to applying for a university place, is entirely based on multiple choice questions with four answers. The highest possible score is 800, and if the 25% guesswork factor is taken into account, the lowest score should be 200. Most US universities ask for a score of 500 or more for under-graduate entry. The scores obtained by the Zayed University students therefore, were exceptionally low and as a result these students were required to undertake a two year intensive English language programme before being admitted to their undergraduate studies courses. Students were not re-tested on the TOEFL exam for financial reasons, but the English Language Centre’s testing unit estimated that they be of a level equal to a score of 500 after their two years on intensive study.

Subject ‘S’ experienced great difficulty with the non-word test: her final score for correct readings was 10.4%; far lower than any other subject. Due to the degree of incorrectness of her responses, it became too difficult to calculate the number of vowel and consonant errors she made. This subject was not considered to be typical and it was thought her extremely high error scores would have distorted the overall picture, had they been included. Her scores were included in the Pearson correlation of reading comprehension and non-word test scores, but not in the analysis of error types. This meant that scores from a total of 30 subjects were used in assessing vowel / consonant error differences and GPC rule-based and analogous non-word reading accuracy.
5.2.6. Procedure.

Subjects sat alone in a room with the tester, a cassette recorder, laptop computer and microphone. The tester explained that they would be required to read aloud non-words from slides on power point, taking as much time as they needed, before pressing the space bar to move to the next slide. Subjects were instructed to start when ready, and to make an attempt at each item, even if they found it difficult. They were informed that they were taking part in the tester's own research into the reading problems that Arabs often experience with English. Firstly, they were given four example non-words to read: WEXAP, HAST, SNID and GRONK. This was to ensure that everyone who took part was familiar with the procedure before they started. Throughout the test, if a subject could not read a word, she was encouraged to guess.

The tester sat near the subject but not so close as to become a distraction, in order to monitor the equipment. Subjects were required to hold the microphone in one hand, and use the other to press the space bar on the laptop to move to the next word. A cassette recorder positioned behind the laptop recorded their reading. The slide show had been set up so that after each word had been read and the space bar pressed to move to the next slide, a loud 'ding' was heard. This was added to enable the tester to identify instances when a subject experienced difficulty with a non-word to the extent that it could not be read at all, and instances when the space bar was accidentally pressed twice in quick succession, thus skipping a word in the process.

5.3. Data analysis and scoring procedure.

As the main purpose of this non-word reading test was to measure Arab subjects' abilities to apply letter by letter decoding skills (reading via the phonological route) and skills of reading by analogy, caution had to be exerted in penalising pronunciation errors caused by the nature of Arabic phonology. Studies have shown that the differing phonology of Arabic and English often contributes to pronunciation problems for Arabic learners. Appendix 5.8. details phonological differences between English and Arabic and appendices 5.9. and 5.10, areas of contrast which are likely to give rise to oral or aural problems for learners of ESL.
The issue of when to penalize the inaccurate pronunciation of a phoneme, especially if it could be attributed to differences in phonology between the L1 and English (i.e. 'foreign accent'), is a difficult one. However, as the purpose of this reading task was to test subjects' decoding skills, not their pronunciation of particular phonemes in English, it was decided that "if the phoneme substitution was apparent and consistent in the individual subject's speech (idiolect)" that any such errors would not be counted as mistakes (M. Snowling, 2002, personal communication). Therefore, if a pronunciation error arose as a direct result of phonological differences between L1 and L2, and this phoneme substitution was applied consistently by that individual, it was not counted as an error in the scoring. Word-stress was not taken into account when scoring the readings, as long as it was consistent with the realisation of the vowels which go with it.

The scoring procedure was divided into three stages:

Firstly, an overall correctness score was obtained for each subject, based on one point being awarded for each correctly pronounced item (Snowling, Stothard & McLean, 1996). For example, item number 14: NIMEP was pronounced /ni:mep/ or /ni:p/ by some subjects. This pronunciation would score a zero as it differs from the accepted one: /ni:mep/. This method gave a total possible score of 48. A subject's total score provided an indication of their proficiency in terms of decoding skill.

Secondly, scores on the non-word reading test were correlated with the average scores of the reading comprehension tests. This gave an indication as to whether decoding abilities, as measured by the non-word reading test, were an accurate indication of a subject's reading ability.

Thirdly, errors were classified into the following categories:

a) Vowel error.
b) Consonant error.
c) Phoneme inversion.
d) GPC rule based non-words vs. non-words read by analogy.

An error was classified as vowel or consonant-related when the correct vowel or consonant sound was substituted with an incorrect one. In the example given above for scoring item number 14: NIMEP, the two mispronunciation errors given constitute vowel error. An example of consonant error would be if the item were pronounced /nɪmp/. Where a mispronunciation involved both vowel and consonant errors, for example /nɪmp/, these errors were counted individually. A phoneme inversion might be /nɪper/. 

5.4. Results.

Overall scores for non-word and reading comprehension tests are given in Table 5.2. A Pearson correlation of reading comprehension and non-word reading scores gave a significant result: \[ r = 0.362, N = 31, p < .05 \text{ (1-tailed)} \].

5.4.1. Error types: vowel, consonant or phoneme inversion.

More errors were recorded reading vowels than consonants. The mean number of vowel errors was 15.1 (65% of total number of errors), the mean number of consonant errors was 6.4 (28%) and the mean number of phoneme inversions was 1.5 (7%). These proportions are shown in diagrammatic form in Fig.5.1. The number of vowel, consonant and phoneme inversion errors made by each subject is given in Appendix 5.11. Table 5.3. gives the vowel and consonant error figures as percentages of the total possible, i.e. a possible total of 87 vowel errors and 183 consonant errors could have been made\(^7\). A t-test showed that there were significantly more vowel errors than consonant: \[ t = 8.064, df = 59, p < .01 \].

---

\(^7\) These figures have been calculated on the basis of the number of phonemes pronounced in each acceptable reading. In the case of items number 11. (WATCHORN), 17. (HERMANTIC) and 24. (FUMICANT), the acceptable pronunciations differ in the number of consonant phonemes. For these items, the lowest number of consonant phonemes possible in an accepted reading was used as the basis for the calculation. In this way it was guaranteed that a subject with a score of 100% correct readings, i.e. no errors at all, would also score a zero for vowel and consonant errors.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Non-word reading test score (percentage)</th>
<th>Reading comprehension (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>65</td>
<td>78.6</td>
</tr>
<tr>
<td>B</td>
<td>56</td>
<td>61</td>
</tr>
<tr>
<td>C</td>
<td>77</td>
<td>67</td>
</tr>
<tr>
<td>D</td>
<td>79</td>
<td>80</td>
</tr>
<tr>
<td>E</td>
<td>77</td>
<td>76.3</td>
</tr>
<tr>
<td>F</td>
<td>60.4</td>
<td>86.3</td>
</tr>
<tr>
<td>G</td>
<td>65</td>
<td>68.6</td>
</tr>
<tr>
<td>H</td>
<td>41.6</td>
<td>53.6</td>
</tr>
<tr>
<td>I</td>
<td>75</td>
<td>53.6</td>
</tr>
<tr>
<td>J</td>
<td>52</td>
<td>73</td>
</tr>
<tr>
<td>K</td>
<td>58.3</td>
<td>51</td>
</tr>
<tr>
<td>L</td>
<td>72.9</td>
<td>56.3</td>
</tr>
<tr>
<td>M</td>
<td>56</td>
<td>46.3</td>
</tr>
<tr>
<td>N</td>
<td>77</td>
<td>61.6</td>
</tr>
<tr>
<td>O</td>
<td>54.1</td>
<td>51.3</td>
</tr>
<tr>
<td>P</td>
<td>47.9</td>
<td>51</td>
</tr>
<tr>
<td>Q</td>
<td>75</td>
<td>74.3</td>
</tr>
<tr>
<td>R</td>
<td>65</td>
<td>62.3</td>
</tr>
<tr>
<td>S</td>
<td>10.4</td>
<td>51</td>
</tr>
<tr>
<td>T</td>
<td>60.4</td>
<td>52.6</td>
</tr>
<tr>
<td>U</td>
<td>70.8</td>
<td>63</td>
</tr>
<tr>
<td>V</td>
<td>50</td>
<td>65.6</td>
</tr>
<tr>
<td>W</td>
<td>54.1</td>
<td>70.3</td>
</tr>
<tr>
<td>X</td>
<td>79</td>
<td>63.3</td>
</tr>
<tr>
<td>Y</td>
<td>62.5</td>
<td>54.6</td>
</tr>
<tr>
<td>Z</td>
<td>65</td>
<td>56.6</td>
</tr>
<tr>
<td>A2</td>
<td>72.9</td>
<td>79.6</td>
</tr>
<tr>
<td>B2</td>
<td>72.9</td>
<td>67.6</td>
</tr>
<tr>
<td>C2</td>
<td>60.4</td>
<td>77.6</td>
</tr>
<tr>
<td>D2</td>
<td>52</td>
<td>49.3</td>
</tr>
<tr>
<td>F2</td>
<td>75</td>
<td>50.3</td>
</tr>
</tbody>
</table>

Mean: 62.5%  63%
SD: 14.21  11.16
Range: 68.6  40

Table 5.2. Non-word reading test scores and reading comprehension scores.
Fig. 5.1. Diagrammatic representation of error-types on non-word reading task.

1 = vowel error, 2 = consonant error, 3 = phoneme inversion.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Vowel errors made (as %)</th>
<th>Consonant errors made (as %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>14.9</td>
<td>6.5</td>
</tr>
<tr>
<td>B</td>
<td>25.2</td>
<td>4.3</td>
</tr>
<tr>
<td>C</td>
<td>10.3</td>
<td>0.5</td>
</tr>
<tr>
<td>D</td>
<td>9.1</td>
<td>2.1</td>
</tr>
<tr>
<td>E</td>
<td>11.4</td>
<td>0.5</td>
</tr>
<tr>
<td>F</td>
<td>22.9</td>
<td>1</td>
</tr>
<tr>
<td>G</td>
<td>18.3</td>
<td>1</td>
</tr>
<tr>
<td>H</td>
<td>22.9</td>
<td>6</td>
</tr>
<tr>
<td>I</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>J</td>
<td>21.8</td>
<td>5.4</td>
</tr>
<tr>
<td>K</td>
<td>16</td>
<td>3.8</td>
</tr>
<tr>
<td>L</td>
<td>11.4</td>
<td>3.8</td>
</tr>
<tr>
<td>M</td>
<td>17.2</td>
<td>8.1</td>
</tr>
<tr>
<td>N</td>
<td>12.6</td>
<td>2.7</td>
</tr>
<tr>
<td>O</td>
<td>25.2</td>
<td>2.7</td>
</tr>
<tr>
<td>P</td>
<td>27.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Q</td>
<td>11.4</td>
<td>3.8</td>
</tr>
<tr>
<td>R</td>
<td>18.3</td>
<td>1.6</td>
</tr>
<tr>
<td>T</td>
<td>18.3</td>
<td>2.7</td>
</tr>
<tr>
<td>U</td>
<td>16</td>
<td>2.1</td>
</tr>
<tr>
<td>V</td>
<td>22.9</td>
<td>10.3</td>
</tr>
<tr>
<td>W</td>
<td>24.1</td>
<td>3.8</td>
</tr>
<tr>
<td>X</td>
<td>12.6</td>
<td>0.5</td>
</tr>
<tr>
<td>Y</td>
<td>18.3</td>
<td>3.8</td>
</tr>
<tr>
<td>Z</td>
<td>20.6</td>
<td>2.7</td>
</tr>
<tr>
<td>A2</td>
<td>10.3</td>
<td>4.9</td>
</tr>
<tr>
<td>B2</td>
<td>14.9</td>
<td>3.2</td>
</tr>
<tr>
<td>C2</td>
<td>14.9</td>
<td>4.3</td>
</tr>
<tr>
<td>D2</td>
<td>24.1</td>
<td>5.4</td>
</tr>
<tr>
<td>F2</td>
<td>10.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Mean.</td>
<td>10.3</td>
<td>1.5</td>
</tr>
<tr>
<td>St. Dev.</td>
<td>8.10</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Table 5.3. Non-word reading test: vowel and consonant errors made by each subject.

5.4.2. Comparison of error rates on reading GPC rule based and analogous non-words.

A comparison of reading accuracy on the two types of non-word showed that proportionately, slightly more GPC- rule-based items were read correctly (see Table 5.4.). It should be noted that in comparing the reading accuracy of the two types of non-word, the sum total of correct readings for the group was used. Each non-word read correctly scored 1 point, giving possible totals of 1170 for GPC rule-based and 270 for analogous non-words. A ‘t-test comparing correct readings of each type of non-word did not record a significant difference.
Appendix 5.12. lists the full set of responses given by 30 subjects on reading the nine analogous non-words.

<table>
<thead>
<tr>
<th>Type of non-word</th>
<th>Number of items of this type.</th>
<th>Total possible correct readings of this type.</th>
<th>Actual number of correct readings of this type.</th>
<th>Actual number as %.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPC rule-based</td>
<td>39</td>
<td>1170</td>
<td>766</td>
<td>65.5%</td>
</tr>
<tr>
<td>Analogous</td>
<td>9</td>
<td>270</td>
<td>153</td>
<td>57%</td>
</tr>
</tbody>
</table>

Table 5.4. Comparison of reading accuracy on the two types of non-word.

5.5. Discussion.

The results gave a mean score of 64.9% for non-word reading. This figure is quite low considering the highest individual score was 79%. The wide range of scores (68.6) indicates that whilst some subjects were able to read the non-words with little difficulty, others experienced great difficulty in reading them. Therefore we may surmise that the test was well-pitched for the subjects' reading level. Many of the non-words used in the test were short, monosyllabic and easy to pronounce. Despite this, the Arab learners made quite a lot of errors overall. It is therefore possible to conclude that they did not perform as well on this test as we would normally expect university undergraduates or students who had been learning English for 11 years, to.

5.5.1. Discussion of the hypotheses.

5.5.1.1. Hypothesis 1: Analogous non-words will be read with greater accuracy than GPC-based non-words.

Goswami, Gombert & Fraca de Barrera (1998) showed that young American children read non-words constructed by analogy to real words better than non-words which had to be read by assembling GPCs. It was therefore expected that Arab
learners would score higher on analogous non-word reading. However, a comparison of the scores for correct reading of both types of non-word was not significant.

Once again, vowels were found to be the major cause of mis-readings. A t-test comparing numbers of vowel and consonant errors gave highly significant results: \[ t = 6.989, \text{df} = 29, p<.01 \]. A Pearson correlation also gave highly significant results: \[ r = .469, n = 30, p<.01 \text{ (2-tailed)} \], indicating that readers who made fewer vowel errors also made fewer consonant errors, and readers who made more vowel errors also made more consonant errors.

Total number of vowels in the 9 analogous non-words: 780
Number of vowel errors: 105 (13.4%)
SD vowels: 7.26
Total number of consonants in the 9 analogous non-words: 1260
Number of consonant errors: 67 (5.3%)
SD consonants: 3.58

Table 5.5. Lists the frequency of error type: vowel, consonant or phoneme inversion, made in reading each of the nine analogous non-words.

<table>
<thead>
<tr>
<th>Non-word</th>
<th>Number of correct analogous pronunciations.</th>
<th>Consonant error</th>
<th>Vowel error</th>
<th>Phoneme inversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>BALDRY</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SUCTORIFICE</td>
<td>9</td>
<td>19</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>WATCHORN</td>
<td>15</td>
<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>CHICORATE</td>
<td>11</td>
<td>12</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td>HERMANTIC</td>
<td>17</td>
<td>2</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>FUMICANT</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>DEMAINE</td>
<td>18</td>
<td>4</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>PARTICILINE</td>
<td>17</td>
<td>15</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>ADLAMATE</td>
<td>22</td>
<td>2</td>
<td>11</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5.5. Correct readings and errors on analogous non-words.
SUCTORIFICE recorded the highest number of reading errors (21), followed by CHICORATE (19), FUMICANT (18), HERMANTIC and PARTICIPLINE (13 each), DEMAINNE (12), BALDREY and ADLAMATE (7 each) and WATCHORN (6). Although a Pearson correlation of the number of letters in an item and the number of reading errors recorded was not significant, generally speaking, the longer items recorded more errors. The exceptions appear to be CHICORATE and FUMICANT, which recorded high numbers of errors despite having only an average number of letters. (The average number of letters is 8.6). These two items recorded the most vowel errors also. These two non-words contain three vowels each, which is quite a high number compared to most of the other non-words, which contain between one and four. SUCTORIFICE contains four vowels and also scored a high number of errors, but PARTICIPLINE, which also contains four vowels, scored a lower number of errors. We may therefore wonder what it was about the structure of SUCTORIFICE, FUMICANT and CHICORATE that caused such difficulty in reading.

By far the most complicated error occurred on SUCTORIFICE: subject W read it as /skɔrtəɾifɛiks/. In fact it was only because this subject pronounced the word slowly that I was able to transcribe it at all! This reading (see Fig. 5.2.) was scored as 2 consonant errors, 2 vowel errors and one phoneme inversion.

![Diagram](image)

**Fig. 5.2. Error classification of SUCTORIFICE, as read by subject W.**
Subject W’s reading of this item suggests strongly that she was not able to read it by analogy to any other words. The phoneme inversion suggests blending problems. The missing vowel and additional consonants could be caused by short-term memory overload. If a subject is struggling to alphabetically decode a word, i.e. to read it letter by letter, she may easily forget which letters she has just pronounced, and therefore struggles to blend them with the following letter-sounds. Her pronunciation of the final three letters, ICE as /eɪks/, also suggests she is not familiar with the spelling pattern ‘ice’ as in mice.

It was assumed that these nine non-words would be pronounced in accordance with similarly-spelled existing words. However, in many cases, this did not happen. For example, item number 1: BALDRY was pronounced /bældrɪ:/ by 21 subjects, /bælædri:/ by four subjects, /blædri:/ by three and /bɔːldrɪ:/ by only two. Whilst the pronunciation /bældrɪ:/ was not counted as an error, the lexicality effect on non-words would dictate that BALDTRY be pronounced in accordance with bald, however, only two of the 30 subjects did this. This is a surprising finding, given that bald is a relatively high-frequency word, and as a teacher of English to this group of students, I know that all the subjects are familiar with this word.

WATCHORN allowed for several different pronunciations, but the first syllable could only be pronounced in two ways: by analogy to the word watch /wɒtʃ/, or by assembling GPCs /wətʃ/. Again, it was assumed that as all subjects knew the word watch, they would pronounce the non-word in accordance with it. This time, 15 subjects read the word by analogy, 9 read it by assembling GPCs and 6 misread it. We may ask why more subjects read WATCHORN by analogy than BALDTRY. It may well be that the word watch is more frequently used by the students at Zayed University than the word bald, and as a result, its orthographic representation is more firmly established in their lexicons.

The most frequent error in reading HERMANTIC was an epenthetic vowel. Epenthetic vowels accounted for 9 of the 16 errors in reading this word. In one case, the additional vowel occurred at the start of the word: /heremæntɪk/, however, in
the other eight cases it occurred at the end, between the N and the T, resulting in a pronunciation such as /hɔrnænətɪk/. Kharma & Hajjaj (1989) state that consonant clusters are often difficult for Arabs to pronounce, leading to the insertion of an additional vowel, for example, the word spring is often pronounced as /sɪprɪŋ/.

However, in HERMANTIC the additional vowel has been placed between two syllables. As this non-word follows the same CVC syllable structure as most words in Arabic, it was not considered that this would pose a problem for readers. In any case, the addition of the vowel appears to be merely a pronunciation problem: its inclusion would be unlikely to affect word recognition processes if this were a real word.

Most errors in reading SUCTORIFICE involved the final ‘ICE’. In 14 out of the 30 cases, it was pronounced as /k/ or /ks/. Knowing when to pronounce a letter ‘c’ as /k/ and when to pronounce it as /s/ is discussed in more detail in section 5.5.2.2. as it is connected with knowledge of orthographic conventions of the language.

There were few errors in pronouncing the first syllable in SUCTORIFICE. Only seven subjects failed to read it as /sʌk/. Those that did mispronounce it, made an error with the vowel. An observation of all the mispronunciations indicates that errors generally did not occur in the first syllable. Most of the errors seem to occur in central syllables, with the exception of SUCTORIFICE, as described above. It may be that as subjects were reading the non-words largely by grapheme-phoneme correspondences, and not by analogy to other words, the process became rather complicated with some of the longer items, making the recognition of letters, pronunciation of sounds and blending with other sounds, very difficult.

In PARTICIPLINE, the major error was pronouncing the letter ‘c’ as a /k/, which accounted for 12 of the 26 errors made on this word. This issue is further discussed in section 5.5.2.2. The last syllable of PARTICIPLINE could be pronounced in three ways: /lærn/ as in Caroline, /lɪ:rn/ as in trampoline or Vaseline, or /lərn/ as in discipline. Of the three pronunciations, the first one was adopted by 13 subjects, the second by two and the third by 13 also. Only two readers made an error in reading the final syllable. The high number of subjects who chose to read this non-word as if it had the word line embedded in it, and the equally high number who appear to have
read it by analogy to discipline, indicates that Arab learners can in fact, read non-words by analogy, even though they didn’t do this with BALDRY. We may wonder therefore, why similar results were not found with BALDRY. Could it be that the ‘word effect’ is strongest if the embedded word occurs at the end of a non-word as opposed to the beginning?

Seven of the nine analogous non-words actually contain an embedded word as the final syllable. With embedded words, only one pronunciation is acceptable, i.e. that of the real word. Table 5.6. gives instances of the correct pronunciation of each of these seven embedded words.

<table>
<thead>
<tr>
<th>Non-word</th>
<th>Embedded word</th>
<th>Pronunciation</th>
<th>No. of subjects who pronounced NW in accordance with this embedded word.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BALDRY</td>
<td>dry</td>
<td>/drət/</td>
<td>0</td>
</tr>
<tr>
<td>SUCTORIFICE</td>
<td>orifice</td>
<td>/əˈrɪfɪs/</td>
<td>10</td>
</tr>
<tr>
<td>WATCHORN</td>
<td>horn</td>
<td>/hɔːrn/ or /hɔːn/</td>
<td>20</td>
</tr>
<tr>
<td>CHICORATE</td>
<td>rate</td>
<td>/reɪt/</td>
<td>13</td>
</tr>
<tr>
<td>DEMAINÉ</td>
<td>Maine*</td>
<td>/meɪn/</td>
<td>23</td>
</tr>
<tr>
<td>PARTICIPLE</td>
<td>line</td>
<td>/laɪn/</td>
<td>13</td>
</tr>
<tr>
<td>ADLAMATE</td>
<td>mate</td>
<td>/meɪt/</td>
<td>23</td>
</tr>
</tbody>
</table>

*Denotes a proper noun.

Table 5.6. Correct pronunciations of ‘embedded words’ in non-words.

According to these figures, it does look as if the endings of words are more easily read by analogy than the beginnings. However, it must be remembered that some of the embedded words are of irregular spelling, i.e., bald, dry, watch. In these cases, if read by analogy, the non-word can only be pronounced according to the exact pronunciation of this one lexical item. However, the other embedded words are of regular spelling, i.e. there is more than one word in existence with this spelling/pronunciation. Therefore the likelihood of a non-word in the second category being correctly pronounced, increases. The fact that nobody read the second syllable of BALDRY as dry is a positive indication that they have orthographic
knowledge of English. There are no words in English which end with the letters ‘dry’ and are pronounced as /drə/1. These three letters at the end of a word are normally pronounced /driː/, as in heraldry, husbandry, tawdry.

The picture actually becomes more complex, the more these readings are investigated. From the analysis of correct pronunciations of analogous non-words, it would appear that in some cases Arab learners read well by analogy, for instance the high number of subjects who pronounced the first syllable of WATCHORN as /wɒtʃ/. However, in other cases, the learners failed to recognise a common spelling pattern, for example ICE at the end of SUCTORIFICE, pronouncing it as /ɪk/ or /ɪks/. These results suggest that their orthographic recognition skills are not very well developed. However, these findings, and the fact that reading scores on the two types of non-word were not significantly different, may have been affected by the choice of non-word stimuli.

It may have been that the analogous non-words were more difficult to read than the GPC rule-based ones as they were longer in length. The non-words used by Goswami et. al. (1998), both analogous and GPC-based, were all mono or bisyllabic, and the maximum word length was seven graphemes. By contrast, in the Arab non-word reading test, the longest analogous item was PARTICIPLINE with 12 graphemes and four syllables. Reading this item involved pronouncing eleven phonemes. In contrast, the maximum number of phonemes to be pronounced in Goswami et. al.'s experiment, was six (e.g. PILVERR, PERLEM, LARVOLL). My justification for including items of a longer length was that subjects were undergraduates at an English-medium university, as opposed to the young children in the Goswami et. al. study. As such, I reasoned, they would be accustomed to reading long words in English, and should be able to pronounce the longer non-words accordingly.

It does in fact appear that there is a design problem with the analogous stimuli: in order to do the job of setting up opportunities for analogy in the intended way, these items needed to be longer than the GPC rule-based ones. Although it might seem that the easy, and foreseeable, solution was to make the non-analogous items as long as the analogous ones, this in itself would have introduced a problem. The nature of
English morphological structure means that the longer a word is, the more likely it is to contain substrands that resemble morphemes, and these morphemes are the most consistent basis for decisions about analogous reading. Thus, for instance, it is the recognition of ‘-ant’ as a common morphological ending in English, that leads a native speaker reader to prefer to pronounce FUMICANT as /fju:ˌmɪkənt/ rather than /fju:mɪkənt/. It follows that it would be difficult to extend the length of the non-analogous items without turning them into analogous ones.

By dealing with percentage errors against total possible errors (in terms of the actual opportunities for errors, which are greater in a longer string) the length effect has been adequately handled. However, there is no way of avoiding the potential for a reader simply to find a longer item more – or less- difficult to tackle than a shorter item. The sheer length of an unrecognisable letter-string could be off-putting. On the other hand, a longer item that can be broken into syllables might be more manageable than a single syllable item with many letters, like SWEMP or DWILK. Given this unknown, the small number of items in the analogous set, and the difficulty in drawing a clean line between what is, or could be, read by analogy and what is not, or could not be, it is unsafe to draw any firm conclusions from this subsidiary investigation of the main test. Given the absence of any statistically significant difference between the nine analogous words and the rest, we can, at least, work with reasonable confidence with the stimulus set as a whole, assuming a reasonable level of homogeneity.

5.5.1.2. Hypothesis 2: Vowels will cause more problems than consonants.

The fact that far more errors involved vowels than consonants leads us to ask:

- Why are there so many vowel-related errors?
- What particular significance do vowels have in written English?
- Why are more errors made in spelling vowels than in reading them?
- Are vowel errors made by native speakers as well as Arab learners of English?

We may assume that there were a greater number of vowel-related spelling errors due to the fact that it is easier to read English than it is to spell it, particularly with
respect to the vowels. Chapter 2 outlined reasons why word recognition in English is
easier than spelling and as a result, why orthographic spelling skills are acquired later
than orthographic reading skills. This point is particularly relevant if we consider the
role of the five vowel graphemes in English. These letters, either singly or in pairs,
are used to represent the 20 vowels sounds of the language. For example, the word
bean can only be read in one way: /biːn/, however it may be spelled as bean or been.
In order to know which spelling is correct, a writer has to rely on his orthographic
knowledge. This may answer the question as to why spelling vowels is more difficult
than reading them, but it still leaves the question of why so many of the errors
involve vowels, and whether other groups of learners make similar errors.

A Pearson correlation of the reading comprehension scores and correct readings of
vowels on the two types of non-word was not significant. It is therefore possible to
conclude that the better readers did not make fewer vowel errors. This indicates that
in the case of these Arab learners, reading proficiency is not necessarily an indication
of ability to correctly read vowels.

One explanation for the greater difficulty experienced in reading vowels as compared
to consonants might be the fact that Arabic has so few compared to English. As
noted by Kharma & Hajjaj (1989) and Mitchell & Hassan (1989) it is the vowels
rather than the consonants of English which give problems in pronunciation. The
lack of familiarity with some English phonemes may well have led to an inability to
distinguish between closely-related sounds and therefore to produce the correct one
in response when presented with a grapheme or grapheme combination. However,
after undergoing nine years of English instruction at school and two years at
university - and being taught in English for up to seven hours a day during this
period, as well as living in a bilingual environment, it would be expected that
learners would have acquired the ability to distinguish these sounds in English - if
not to produce them very accurately. The errors on the non-word reading test indicate
that the problem is more severe than just L1-influenced pronunciation: subjects often
could not remember which vowel of a distinct pair corresponded to a certain
grapheme. For example, pronouncing DRAMEP as /drɪmɛp/ indicates the reader did
not know the sound corresponding to a stressed letter ‘a’.
However, if Arabs have not been taught these correspondences, this gives further weight to the argument that it is precisely because there are so many vowel-related phoneme-grapheme combinations in English, that they will be confusing if not explicitly taught. Rayner et al. (2001) estimate there are approximately 500 rules of spelling in English, and that it is impossible for children to acquire all of these through print exposure alone. Successful mastery of Stages 2A and 2B of Frith's model requires instruction in phonics; without this, it is unlikely a child will master alphabetic reading and spelling. This raises the question of how Arab learners of English are taught reading, spelling and pronunciation in the initial stages at primary school, and whether there is a focus on letter-sound relationships, i.e. phonics. These questions will be addressed in chapter 7.

5.5.1.3. Hypothesis 3: Readers with good comprehension scores will also score higher on the non-word reading test.

The correlation is consistent with the hypothesis that good readers will also have good phonological reading skills \( r = 0.362, N = 31, p < .05 \) (1-tailed). This is in line with the findings of Stanovich (1980), that good native English speaking readers possess good phonological reading skills whilst poor native speaking readers have poor phonological reading skills, and depend more on contextual clues for word recognition. Good phonological and orthographic skills mean a reader is able to recognise words on this basis alone, freeing-up attentional capacities for comprehending and interacting with the text. Poor readers, who have poor phonological decoding skills will rely on contextual clues to tell them what a word might be, and as the results of Anderson and Freebody's (1983) study showed, might choose to recognise the word as one which is phonemically or visually similar to the target word.

We may ask: How does this work in practice? What are the differences in non-word reading ability between good readers and poor readers? A closer look at the performance of the subjects who scored highest and lowest on the reading comprehension tests and NW tests gave the following information:

**Highest reading comp. score:** Subject F (86.3%) NW score: 60.4% (joint 18\textsuperscript{th} position within the group)
Lowest reading comp. score: Subject D2 (49.3%) NW score: 52 (joint 26th position within the group)

Highest NW reading score: Subjects D & X (79%) RC scores: 80% & 63.3% respectively.

Although the correlation between RC and NW test scores for the group was significant, from these subjects’ individual scores, there does not appear to be much of a pattern. However, an examination of their individual abilities to read analagous or GPC based non-words may give an insight into how they read.

Subject F, who scored highest on the reading comprehension tests, made only two errors in reading the analagous non-words: a vowel error in CHICORATE and a consonant error in PARTICIPLE. She read WATCHORN by analogy to the word *watch*, but pronounced BALDRY by assembling GPCs. Her readings of GPC non-words were not so good: she read 22 of the 39 items correctly (56%). From the data, it would appear that this subject has better word recognition abilities, but weaker skills in assembling GPCs. This might account, in part, for her better reading comprehension abilities. However, if she finds it difficult to ‘sound out’ unknown words letter-by-letter, as her readings of the GPC based non-words indicate, she is going to have trouble in pronouncing new words she encounters in a text. As mentioned in chapter 2, phonological reading abilities are not just relied upon by young developing readers, skilled readers also rely upon them in order to pronounce a previously-unseen word, which will not have a lexical entry.

Of the subjects who did best in NW reading, D scored an error in three of the analagous non-words (2 vowel errors in CHICORATE, 1 vowel error in HERMANTIC and 1 consonant error in FUMICANT). She read WATCHORN by analogy, but BALDRY by assembling GPCs. Comparatively, her reading of the GPC rule-based non-words was better: She read 32 items correctly, giving her a score of 82% for GPC based non-words. This subject’s reading comprehension score was 80%, which put her in second place within the group. From the results, this subject appears to have better phonological reading abilities than most of the group, which means she will be able to ‘sound out’ any new words she encounters, as an aid to retrieving the meaning. The data suggests that she may not have as large a
vocabulary, nor be as familiar with word spellings as some of the other subjects. This is indicated by the fact that she did not read BALDTRY by analogy to bald, and she does not appear to know the rule of the magic ‘e’: that the preceding vowel is lengthened when the letter ‘e’ is added to a word of CVC construction such as the final syllable in CHICORATE. She is also one of only five subjects who pronounced the first vowel in FUMICANT as /fʌm/, which indicates GP decoding, as opposed to those subjects who pronounced it /fjuːm/ and appear to have read it by analogy to fumigate. However, she does display a rudimentary knowledge of English orthography: her pronunciation of FUMICANT, /fʌmɪsænt/ shows that she is familiar with the fact that sometimes the letter ‘c’ can be pronounced /s/. However, she has not yet learned that this rule is only applicable when the letter ‘c’ is followed by the letters ‘e’, ‘i’ or ‘y’.

Subject X scored joint highest place in the non-word reading (79%), but only 63.3% in the reading comprehension, putting her in 14th place within the group. Of the nine analogous non-words, she misread four of them. She correctly read WATCHORN by analogy to watch, but read BALDTRY by assembling GPCs. Her reading of the GPC based non-words was much better: she correctly read 33 of these items (85%). From the data, it appears that subject X reads in a similar manner to subject D, i.e. both are good ‘decoders’ and can sound out unknown words letter-by-letter. Subject X’s weaker performance on the analogous non-words suggests that she too may have lesser vocabulary knowledge and may be less familiar with English spelling patterns. Although there appears to be a similarity in the way in which subjects D and X read the non-words, the fact that their reading comprehension scores are quite different obviously raises other questions. Subject D is a much better reader, but ultimately, this non-word reading test cannot tell us why this is. Further testing of these two individuals, in the areas of reading comprehension and vocabulary knowledge, would be necessary in order to determine why one is a better reader than the other, but both appear to have similar phonological reading skills. However, this is outside the scope of the current study.

Subject D2 scored lowest on the reading comprehension tests (49.3%) and also very low on the non-word reading test (52%, joint 26th position within the group). This subject misread five of the analogous non-words, making six vowel errors, three
consonant errors and one phoneme inversion on these items. She read 21 of the 39 GPC based non-words correctly (54%). Her pronunciations of individual phonemes in the GPC based non-words indicates that she is not sure of the sounds associated with many of the letters. For example, she pronounces TWUD as /twaɪd/, RUDALG as /redɛldʒ/ and DWUZIT as /dwaɪtʃ/. Her mispronunciations involve consonants (n= 11) as well as vowels (n= 21). It may be that she is still in the early stages of learning to read in English, although this seems unlikely, given that she has received nine years of English instruction at school, two years at university and lives in a bilingual Arabic/English society. It could also be the case that she is what Reid (1998: 79) describes as a ‘globally less effective reader’. According to Reid, these learners experience difficulty with reading comprehension, listening, verbal memory, non-word reading, segmentation, blending, sight reading and sight spelling as well as other things. If this is the case, we would expect the difficulties to affect Arabic as well as English. Again, however, further investigation in this area is outside the scope of the current study.

From this analysis, it would appear that some of the subjects are good readers (as measured on the reading comprehension tests) because they have better orthographic recognition skills. Other readers may be lacking in these skills but are better decoders, i.e. they can sound out an unknown word letter-by-letter. Although no clear explanation of how the better readers recognise words has arisen, it does seem that perhaps both systems can contribute to becoming a good reader. Baron and Strawson (1976) termed these Chinese and Phoenician readers: one has a preference for reading visually, the other for reading phonologically. Although Frith’s model doesn’t allow for this: according to the model, alphabetic skills must be mastered before orthographic, this may not in fact, be the case. This issue is further discussed in section 5.5.4.

5.5.2. Discussion of additional findings.

5.5.2.1. Pronouncing non-words as real words.

The results obtained by Al Hazemi (1993) in the Yes/No vocabulary tests had indicated that Arab learners frequently mistook imaginary words for real words,
particularly if the consonantal structure of the imaginary word resembled that of an existing word. Al Hazemi found that 50% of subjects thought that WETAR was a word - presumably ‘water’. It was therefore suggested that item 16, CHICORATE would be read as ‘chocolate’ by a number of subjects. In fact none of the subjects mis-pronounced CHICORATE in this way. However, 33. PRINALT yielded some unusual results: one subject pronounced it as ‘printer’, one as ‘printalt’ and two as ‘print’. The word printer is of very high frequency at Zayed University as each student and staff member has a laptop computer, and each classroom a printer. Students word process and print all their work for teachers and lecturers to correct. It therefore seems likely that the similarity in orthography of PRINALT and printer has influenced the pronunciation of these four subjects.

The far lesser number of subjects pronouncing non-words as real words in this study, compared to Al Hazemi’s may be due to the difference in their levels of English. Al Hazemi describes his subjects as elementary, however the subjects in this non-word experiment were estimated to be at a TOEFL level of 500, which would indicate they are somewhere between intermediate and upper intermediate. This difference in language proficiency would account for their greater word familiarity. On the other hand, it may be that Al Hazemi’s subjects were actively looking for ‘words’, as opposed to the subjects here, who were trying to pronounce strings of letters which they had been told were not words.

5.5.2.2. Subjects’ knowledge of English spelling conventions.

A finding of this study appears to be that subjects have poor knowledge of the spelling conventions of English. Item 3 JID was pronounced correctly by 12 subjects, as /jæd/ by one, /jæd/ by one, /jiːd/ by one, /jæɪd/ by one and /jæɪd/ by 15 subjects. The latter pronunciation would have only been possible if the non-word had been spelled JIDE, and would therefore be pronounced as a rhyme of hide, bride, side, ride, tide etc. Subjects appear to be unfamiliar with the rule, often referred to as the “magic e” which dictates that if an ‘e’ is added to the end of a word, it has the effect of transforming the preceding vowel into its (historical) ‘long’ counterpart.

Table 5.7. gives the instances where the letter ‘c’ in a non-word was mispronounced. English orthography dictates that when the letter ‘c’ is followed by ‘e’, ‘i’ or ‘y’ it
sounds /s/; however, when it is followed by 'a', 'o' or 'u' it sounds /k/. Native speakers of English would know this instinctively, however the high number of errors made in reading items 10: SUCTORIFICE and 38: PARTICIPLINE indicate that the Arab learners were not familiar with this rule.

<table>
<thead>
<tr>
<th>Item number</th>
<th>Non-word</th>
<th>Correct pronunciation of letter 'c'</th>
<th>Substituted pronunciation</th>
<th>Number of subjects who made this error</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>sugtorifige</td>
<td>1. /k/ 2. /s/</td>
<td>1. /s/ 2. /k/</td>
<td>1. 0 2. 14.</td>
</tr>
<tr>
<td>16</td>
<td>chicorate</td>
<td>1. /ʧ/ 2. /k/</td>
<td>1. /k/ 2. /s/</td>
<td>1. 1 2. 0</td>
</tr>
<tr>
<td>17</td>
<td>hermintic</td>
<td>/k/ /s/</td>
<td>/s/ /k/</td>
<td>0</td>
</tr>
<tr>
<td>21</td>
<td>grovin</td>
<td>/k/ /s/</td>
<td>/s/ /k/</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>fumicant</td>
<td>/k/ /s/</td>
<td>/s/ /k/</td>
<td>5</td>
</tr>
<tr>
<td>32</td>
<td>grulk</td>
<td>/k/ /s/</td>
<td>/s/ /k/</td>
<td>5</td>
</tr>
<tr>
<td>36</td>
<td>grogamp</td>
<td>/k/ /s/</td>
<td>/s/ /k/</td>
<td>1</td>
</tr>
<tr>
<td>38</td>
<td>particpline</td>
<td>/s/ /k/</td>
<td>/k/ /s/</td>
<td>12</td>
</tr>
<tr>
<td>45</td>
<td>cogat</td>
<td>/k/ /s/</td>
<td>/s/ /k/</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 5.7. Errors in reading the letter 'c'.

Only one subject (E) read all the analogous words correctly. Her reading score was one of the highest: 77% correct pronunciations (her errors were ten vowel, one consonant error and two phoneme inversions) putting her in joint second place within the group. She scored 76.3% in overall reading comprehension, putting her in fifth place in the group. The results obtained by this subject indicate that there is a link between her reading proficiency, decoding ability and analogous reading capacity. However, this link was not found to exist for the majority of subjects: a Pearson correlation of reading comprehension scores and analogous non-word reading scores was not significant.

The findings of this study with regard to reading by analogy and poor knowledge of orthographic conventions raise the issue of how the visual route in reading is operating for Arab learners. The results of the test indicate that Arab learners can
read fairly well, albeit not perfectly, by the phonological route. However, they do not seem able to match new word forms with similar, known forms, and thus derive a pronunciation. The process of reading by analogy appears to be further hampered by their lack of knowledge of the rules of English orthography.

5.5.3. Non-word reading test and native English speaking skilled readers.

Given the disappointing result of this particular test: the finding that Arab subjects did not read the analogous non-words more fluently than the GPC rule-based ones, it was decided to run the test with ten native English-speaking skilled readers, to see if there was any measurable difference between their readings of the two types of non-words. If these skilled readers also found it harder to pronounce the analogous non-words, then it would be a fair assumption to say that word length may have contributed to the poor performance of the Arab subjects. The skilled readers were academics working at the University of Brunei Darussalam, male and were aged between 49 and 65. All had a PhD and held the rank of Professor, Associate Professor or Senior Lecturer. Specific details on each of these subjects are given in Table 5.8. When testing the academics, the same procedure was followed as with the Arab subjects (see section 5.2.4.). Before the reading, no explanation was given of what the test aimed to measure. This was strictly adhered to so that it would not influence the results. However, discussion of the non-words and how they had been constructed, was allowed after the reading had been completed.

<table>
<thead>
<tr>
<th>Subject number.</th>
<th>Age</th>
<th>Rank</th>
<th>Faculty</th>
<th>Nationality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60</td>
<td>Professor</td>
<td>Education</td>
<td>Australian</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
<td>Assoc. Prof.</td>
<td>Education</td>
<td>British</td>
</tr>
<tr>
<td>3</td>
<td>56</td>
<td>Senior lecturer</td>
<td>Education</td>
<td>British</td>
</tr>
<tr>
<td>4</td>
<td>58</td>
<td>Assoc. Prof.</td>
<td>Education</td>
<td>British</td>
</tr>
<tr>
<td>5</td>
<td>52</td>
<td>Assoc. Prof.</td>
<td>Education</td>
<td>Australian</td>
</tr>
<tr>
<td>6</td>
<td>64</td>
<td>Assoc. Prof.</td>
<td>Education</td>
<td>British</td>
</tr>
<tr>
<td>7</td>
<td>49</td>
<td>Assoc. Prof.</td>
<td>Institute of Medicine</td>
<td>British</td>
</tr>
<tr>
<td>8</td>
<td>60</td>
<td>Senior lecturer</td>
<td>Education</td>
<td>British</td>
</tr>
<tr>
<td>9</td>
<td>65</td>
<td>Assoc. Prof.</td>
<td>Education</td>
<td>Irish</td>
</tr>
<tr>
<td>10</td>
<td>55</td>
<td>Senior lecturer</td>
<td>Language Centre</td>
<td>British</td>
</tr>
</tbody>
</table>

Table 5.8. Native English-speaking skilled readers.
Overall, the skilled readers did very well in their reading of both types of non-words. Only one error was recorded in reading the analogous non-words: subject 2 read FUMICANT as /fuːmɪkənt/. This gave a group reading score of 98.8% correct for analogous non-words. The complete set of analogous non-word readings for the group is given in Appendix 5.13. Two errors were recorded in reading the GPC rule-based non-words: subjects 2 and 9 read BAMOSP as /bærnɒps/, a phoneme-inversion error. This gave a total correct response of 99.5% for GPC rule-based non-words. No consonant errors were recorded, therefore the score for correct readings of consonants was 100%. In terms of vowel error, only the previously mentioned error in reading FUMICANT was recorded. This gives a total vowel error score of 99.8%. T-tests comparing vowel versus consonant readings and analogous versus GPC rule-based non-words, were not statistically significant.

The academic subjects show that it is possible to score 100% on this non-word reading test, if you are a skilled reader. This is not a very surprising finding, but what is more interesting, is the observation and oral feedback from the test. As this test was not timed with either the Arab ESL learners or the academics, the results do not show whether someone who read an item correctly actually experienced a degree of difficulty in doing so. My observations of the academics showed that this was exactly what happened. Subjects 2 and 9 experienced more difficulty than the others, taking longer to read each item and often staring at the non-word for a good few seconds before reading it aloud. In both cases, the hesitations between items got longer as the test progressed. It has to be stressed that as this delay was not measured, it was purely an observation at the time of the test. The other eight readers didn’t appear to have any difficulty in reading the non-words: both analogous and GPC-based were read quickly and fluently. Feedback from the academics subsequent to the reading is interesting. Subject 9, who appeared to have difficulty in reading a number of the non-words, although he only made one error (a phoneme-inversion on BAMOSP), said that he thought some of the words “looked like words” and that these were easier to read. When asked for specific examples, he gave BALDRY, CHICORATE, HERMANTIC and DEMAINÉ. Others, he said, “looked as if they had been computer-generated” and were more difficult to read, as “they are unusual
and I haven’t seen them before.” Asked for examples, he gave BAMOSP, DWUZET, SWEMP, CROGAMP, DWILK and COGAT. This subject’s response seems to reinforce the hypothesis that it is easier to read non-words that are constructed using familiar spelling patterns, than those which are not. Although no measurable difference was recorded between analogous and GPC rule-based non-words, observation of the academics while they read the words, and their subsequent feedback indicates that this is in fact the case.

This experiment provides overwhelming evidence that an ‘analogous’ non-word will be pronounced in accordance with the word(s) that it bears most resemblance to. Further support for this theory comes from subject 5, who offered a detailed explanation of how he had read the non-words:

I wasn’t sure what you were looking for... I wondered if you weren’t looking for people getting clues out of words they already know. Because some of these words could be words that, that exist. BALDRY – I didn’t read it /bældrɪ:/, I read it /bɔːldrɪ/ because it looks like the word ‘bald’, or maybe some other word that I’ve read sometime. Particularly words like SUCTORIFICE – I see ‘orifice’ in there. WATCHORN looks like a Thai word, KEM looks like a Malay word, CHICORATE obviously looks like a word, HERMANCTIC looks like a word, DWUZET .... well, I don’t know. FUMICANT looks like a word, reminds me of ‘fumigate’, so I didn’t read it /fʌmɪkænt/, I read it /fuːmɪknt/. FONEMP might come from linguistics, so I didn’t read it /fɒnɛmp/, I read it /faʊnɛmp/, like phoneme I suppose. GUPONT, I didn’t read it /ɡaːpont/. DEMAIN, I didn’t read it /dɛmɪn/, I read it as ‘domain’, ‘domain’ .... D-O-M-A-I-N. Er,... and so on and so forth. GLATONG could be a Malay word. DWILK, ...... no that’s pretty straight forward. ADLAMATE for example. I could have read it /ædlæmæt / or /ædlæmætti:/ PARTICIPLE ...... there’s another one, so there’s quite a few words ...... particularly PARTICIPLE and FUMICANT.... See, I can remember them? I can remember them. SUCTORIFICE and ...... I can remember them because they’re words that look like real words.

The results, observations and oral feedback from the academics show that skilled readers will pronounce an analogous non-word in accordance with the word(s) it reminds them of. It now becomes more likely that the Arabs scored poorly on the analogous non-words as, in many cases, they could not recall a similarly-spelled word at the time of reading. I have used this phrase specifically as I know from my two years of teaching this particular group of Arabs, they know the words bald and watch and can use them productively in speaking and writing. However, I cannot be
sure that they know other words related to the analogous items such as *fumigate*, *hermit*, *frantic*, *suffice*, *advocate* etc. It may well be that in order to read a word by analogy to another, one must be a very proficient reader. Merely knowing the word it is supposed to be pronounced in accordance with, isn’t enough.

In chapter 2 the question of exactly when a child would start to utilise skills of reading by analogy, was raised. According to Harley’s (1998) model (Fig. 2.3.), non-semantic reading (or reading by analogy) requires recognition of the graphemes and visual input from the lexicon, before the pronunciation can be retrieved. As I can be fairly sure that the Arab subjects do know the words *bald* and *watch*, and I also know that they recognise the letters of the English alphabet, it would seem that Harley’s criteria have been met. However, this does not answer the question of when exactly this reading skill begins to be used. Reading-by-analogy experiments have tended to focus on young children and their ability to substitute the onset and read the rime in accordance with a known word, eg: DAKE read by analogy to *cake*. As far as I am aware, no research has focused on the ability to read longer words by analogy. It may well be that a reader has to be extremely proficient to be able to read any complex word by analogy. If he is struggling at the GPC level, he may not be able to access the lexicon as an aid to pronouncing parts of words. This would appear to summarise the problems experienced by the Arab learners.

5.6. Conclusion.

It was hypothesised that non-words which could be read by analogy to existing words would be read with greater accuracy by Arab learners, than non-words which had to be read by assembling grapheme-phoneme correspondences. Although the GPC based non-words scored slightly higher overall, the difference in scores from the two types of non-word was not found to be statistically significant. However, this result might have been affected by word-length, as most of the analogous non-words were longer and contained more syllables. The results also suggest that Arab learners have poor knowledge of English orthographic conventions, which indicates underdeveloped orthographic reading skills. According to Frith’s (1985) model, this is to be expected, given that subjects demonstrated difficulty in alphabetic reading.
A second hypothesis proposed that vowels would present more difficulty than consonants, as most of the spelling errors in the chapter 1 corpus had involved vowels. This hypothesis was shown to be correct. A third hypothesis proposing that good readers would have good phonological reading abilities, as is the case with native speakers, was supported by the data. From these findings, we may conclude that poor Arab readers have poor phonological decoding skills, and that most Arab learners at Intermediate level have weak skills in this area.

The finding that Arab learners appear to have under-developed alphabetic reading skills casts doubt on previous theories which compared their errors to those made by Developmental Surface Dyslexics. As none of the previous studies had explicitly tested alphabetic decoding skills, we may wonder why these researchers automatically assumed the problem lay only with orthographic processing.

In conclusion, the results of the non-word reading test raise two issues:

1. According to Frith’s (1985) model, if alphabetic reading skills haven’t been mastered, orthographic skills shouldn’t have been either. It is therefore proposed to explore this theory next.

2. We may question why alphabetic reading skills are weak, given that subjects have studied English for a total of 11 years. As the theory of an inappropriate reliance on an L1 reading skill (as suggested by Al Sulaimani, 1990 & Ryan, 1993) has been ruled out, we may question whether the problem lies with the initial instruction that children receive in English literacy.

Chapter 6 explores the first point, and chapter 7 presents a study of the methods used to teach initial literacy in Ministry of Education schools in the United Arab Emirates.
Chapter 6.

A test of visual word recognition.

6.1. Introduction.

One of the findings of the non-word reading test reported in chapter 5 was that Arab learners were less sure about the pronunciation of written vowels as opposed to consonants. In Frith's (1985) model of reading and spelling development, alphabetic spelling (stage 2A) acts as the pacemaker for alphabetic reading (stage 2B). In other words, alphabetic spelling must occur before alphabetic reading skills can be acquired. The fact that few truly 'phonetic' spelling errors were recorded in chapter 1's corpus suggested that alphabetic spelling hadn't really been mastered yet by this group of learners. Another group of Arab learners, the subjects of chapter 5's non-word reading test, experienced difficulty in reading via the alphabetic route. Frith's model predicts that orthographic reading skills (stage 3A) cannot be fully acquired until the alphabetic skills have been mastered. We would therefore expect Arab learners to display difficulty in reading via the orthographic route.

Ryan (1993) found that Arabic speaking subjects easily confused words with a similar consonant structure which were distinguished only by the vowel pattern. She suggested that Arabic speakers were not sufficiently aware of the role played by vowels in English word structure. "The consequence is that for them, pairs such as must/most; below/bowl; train/torn; step/stop behave like homophones, just as reign and rain do to a native speaker" (Ryan, 1993: 208). Discriminating between genuine homophones, such as boy and buoy, involves orthographic recognition of words – failure of this route in reading results in surface dyslexia.

In order to test her proposal, she carried out what she termed "a homophone discrimination test," (reported in chapter 3) where subjects were required to identify and
correct wrong words in sentences. (N.B. In a later version (Ryan, 1997) she refers to the test as a “word discrimination test”: a more appropriate title, considering the words in question are not actually homophones, but involve discriminating between words with different vowels.) She used three groups of elementary ESL learners as subjects: one group of Arabic speakers, one group of learners whose L1 used a non-Roman alphabet, and a group of learners whose L1 used a Roman alphabet. Her results showed clearly that the Arabic speakers scored much lower than the other groups, i.e. they were less able to spot and subsequently correct a wrong word, and made more false corrections. It is clear from Ryan’s results that the elementary learners she tested displayed difficulty in reading via the orthographic route.

It was decided that this experiment would be worth replicating with Arabic subjects of a higher level of English language competence. This would enable us to see whether the errors in word recognition were part of a developmental phase, in which case we would expect them to become increasingly fewer as the reader became more proficient. If this theory was shown to be correct, we could be fairly confident that many Arab learners suffer from a developmental lag in reading and spelling. The severity of the lag would be determined by their level of English language competence. As shown in chapter 1, some learners may not have acquired alphabetic spelling (stage 2A of Frith’s model) whilst others, as shown in chapter 5, may not have fully acquired alphabetic reading skills (stage 2B). Should learners demonstrate mis-recognition of words in the current experiment, it would indicate they have under-developed orthographic reading skills (stage 3A).


Ryan’s “homophone discrimination test” is one of a battery of three tests she administered with the aim of comparing the performance of Arab learners of English to that of two other groups of EFL learners. Ryan’s earlier research, and that of Al Sulaimani (1990) had indicated clear similarities between the errors made by Arab EFL students and native speaking surface dyslexics. Ryan hypothesised that if the Arab learners were indeed behaving like developmental surface dyslexics, they would score
lower on the tests of dictated spelling, reading aloud and homophone discrimination in silent reading – all tests that surface dyslexics have been found to perform poorly on.

The battery of tests was run in two stages: an initial run where scores of three separate groups of learners were compared (described in chapter 3 of this thesis); and a longitudinal study of three subjects: two Arabic speakers and one Farsi speaker, over a period of three months. In the first run of the tests, Arabs scored lower than the other two groups of EFL learners, on all three tests. Ryan’s hypothesis was that if the Arab subjects were behaving like developmental surface dyslexics, their performance on the tests would improve as their English language skills became more proficient. Ryan bases much of this experiment on the work of Masterson (1983): one of the earliest pieces of published research in the area. Today, the condition known as Developmental Surface Dyslexia is accepted as being a congenital neuropsychological disorder which is a permanent impairment of the orthographic route in reading and spelling (Temple, 1997). However, 20 years ago less was known about developmental forms of dyslexia, and it may well have been confused with the early reading difficulties suffered by some normal children, which may be overcome in time. (A more accurate hypothesis would therefore have been to propose that there would not be any measurable improvement in the scores of the Arabic subjects over the three month period as their reading and spelling errors are not connected to language competence, in the same way that the errors of developmental dyslexics are not.)

To test her hypothesis, Ryan set up a longitudinal study of three subjects: two at elementary level and one at intermediate. Each subject was given the same versions of the tests, regardless of their language level. They were re-tested after they had undergone three months of English language instruction at University College, Swansea.

Ryan purposely selected two Arab subjects and one Farsi speaker, so that performance could be compared between speakers of these two languages. Her rationale for this was the theory that Arabs’ reading errors stemmed from a difference in the morphological structure of English and Arabic, not alphabetic differences. As Farsi uses the same alphabet as Arabic, but does not have the same morphological structure (i.e. the tri-
consonantal root system), it would provide an ideal comparison. Ryan proposed that if there proved to be a difference in the development of these two subjects, she would be in a stronger position to claim that the word recognition problems of Arabic speakers derive from the structure of the L1 rather than the script itself. Overall scores of each subject in all three tests can be seen in Table 6.1. below. It should be noted that Ryan does not provide any inferential statistics for these results, making it difficult to gauge whether her hypotheses are in fact borne out.

<table>
<thead>
<tr>
<th>Subject 1: elementary Arabic speaker</th>
<th>Subject 2: elementary Farsi speaker</th>
<th>Subject 3: advanced Arabic speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read aloud</td>
<td>spelling</td>
<td>Word discrimination</td>
</tr>
<tr>
<td>At start</td>
<td>26.6</td>
<td>53.3</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.3</td>
<td>41.6</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21.6</td>
<td>43.3</td>
</tr>
<tr>
<td></td>
<td>62.5</td>
<td></td>
</tr>
<tr>
<td>After 3 months</td>
<td>21.6</td>
<td>53.3</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>62.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>67.5</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.1. Mean % errors in three tasks (Ryan, 1993: 228).

As already noted in chapter 3, there are some problems with Ryan’s experimental design. In particular, the sample size is very small, and the period between the measurements was very short. However, there are some points of major interest. While the Farsi speaker, the least proficient of the three, improved on all tests in the way one might predict of any learner during a period of intensive instruction, the two Arab learners behaved much more erratically: subject 1 improved on the read aloud test, stayed the same on the spelling test but did worse on the word discrimination test; subject 2 improved marginally on the read aloud test, but did worse in the two other tests. Since this is counter-intuitive with regard to general learning patterns, but in line with the specific observation that Arab learners have peculiar problems with spelling and word discrimination, Ryan’s results are intriguing, and worthy of further exploration. For this reason, it was decided to run a modified version of the word
discrimination test, adhering to the subject selection criteria outlined in the conclusion to chapter 3.

6.3. Method.

6.3.1. The hypotheses.

The experiment sought to test the following hypotheses:

1. Non-native speakers of English would score lower than native speakers on this test of word discrimination, indicating that reading proficiency is linked to language competence and reading experience within the language.

2. Arab learners would make more errors than other ESL learners (in this case, Spanish).

3. Arabs with a higher level of English language proficiency would gain higher scores than those with less proficiency.

6.3.2. Subjects.

In Ryan’s second run of the word discrimination test, her Arabic speaking subjects are described as being of “low-intermediate level” in English. It seems possible that these learners were of too elementary a level to know many of the words being tested. As a result they were unable to either spot that the words were inappropriate, or to supply a correct alternative. The current study therefore used easier words and subjects of a higher level of English.

In all, four groups of subjects were used in the study:

Arab 1:
22 Arabic-speaking Omani males, consisting of 16 final year undergraduates, studying on B.Sc. and B.Eng. courses at Sultan Qaboos University, Muscat, and 6 ‘A’ level students studying in the U.K. All had achieved IELTS scores of band 6.0 or above.
Arab 2.

These were the 32 female foundations programme students at Zayed University, Dubai, who were the subjects in chapter 5's non-word reading test. All had scored between 480 and 525 on the TOEFL test, and as such, were believed to be of a lower level in English than Arab 1 subjects.

Spanish.

20 Spanish students (11 male and 9 female) who were studying for the UCLES Advanced English Exam at the time of the word discrimination test. All students subsequently passed the exam.

English.

20 native English speaking final year female BA undergraduates, studying for a degree in English Language and Literature. Subjects in this group were currently taking the Psycholinguistics module.

It will be noted that Arab 1 subjects were all male, and Arab 2 female. Due to restrictions on educating men and women together in many Gulf countries, it was not possible to test mixed groups at each level. The U.K. undergraduates were also entirely female as only women had signed up to take the module in Psycholinguistics: the course where native speaker data was collected. However, gender was not thought to be an issue which would bias results.

It was judged that the Arab (1) and Spanish students were of a similar level of English language ability, based on the following information supplied by the University of Cambridge Local Examinations Syndicate:
Someone with a pass grade at CAE (Cambridge Advanced English exam) would be expected to achieve a band score of approximately 6.0/6.5 in IELTS. Most universities which recognise CAE and an IELTS score of 6.0 or above also accept a TOEFL score of 550.

Debbie Howden, UCLES (personal communication, 2003.)

It was judged that the Arab (2) group were of a lower level to the Arab (1) group, based on the following comparison of TOEFL and IELTS scores (1998) supplied by the University of Sheffield English Language Teaching Centre:

<table>
<thead>
<tr>
<th>TOEFL score</th>
<th>IELTS equivalent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>7.0</td>
</tr>
<tr>
<td>575</td>
<td>6.5</td>
</tr>
<tr>
<td>550</td>
<td>6.0</td>
</tr>
<tr>
<td>525</td>
<td>5.5</td>
</tr>
<tr>
<td>500</td>
<td>5.0</td>
</tr>
<tr>
<td>475</td>
<td>4.5</td>
</tr>
</tbody>
</table>

As Arab (2) TOEFL scores fell between 480 and 525, this presumes their IELTS level would be between 4.5 and 5.5: lower than that of the Arab (1) group. All Arabic subjects spoke Arabic as their first language. None spoke French, or any other European language.

The purpose of including two groups of Arab subjects was so that their scores could be compared in order to test the hypothesis: *Arabs with a higher level of English language proficiency would gain higher scores than those with less proficiency.* It was expected that the university students (Arab 1) would have a higher reading level than the foundations students (Arab 2). Although both groups had studied English for approximately the same amount of time, Arab 1 subjects possessed higher levels of English language, as measured by the comparison of each group’s scores on TOEFL and IELTS tests. Both these tests are paper-based and rely heavily on a testee’s reading ability in order to understand the question. Even in the listening section, subjects are required to read the questions. It is therefore very likely that subjects who scored higher
in terms of language proficiency on these tests, also possessed better reading skills. It was also considered likely that the Arab 1 group had been required to read more textbooks for their courses, and these books may well have been written at a more difficult level. Although all words in the test would be very familiar to both groups, it was hypothesised that the greater reading capacity of the Arab 1 group would give them greater word recognition skills.

6.3.3. The word discrimination test.

The test consisted of 60 sentences: 40 containing a semantically inappropriate word, and 20 correct sentences. The test is given in Appendix 6.1, answers in Appendix 6.2. Ryan’s (1993) original test was used as the basis for the new test, although some modifications were made to the vocabulary. Ryan based her test on words taken from Thorndike and Lorge’s (1944) *Teacher’s word book of 30,000 words*, using the ‘A’ category. Nation (1990) compares this to his 2,000 word level. However, reading through the items indicated to me that some of the words may not have been known to Arabic students studying in the Gulf, and so modification of the sentences was necessary. Al Hazemi (1993) found that most Arab learners of English who were not studying in the U.K, possessed vocabulary levels of under 1000 words, and it was therefore decided to base the tests on Nation’s (1990) 1000 word list.

As vocabulary is not the only factor which determines whether a text is easy to read, the Flesch Kincaid readability levels test was applied to all 60 sentences, and gave the following results:

Flesch Reading Ease score = 95.6.
Flesch Kincaid Reading Grade = 1.6
Number of words = 492
Average number of words per sentence = 6.9
Average characters per word = 3.8
The Flesch Reading Ease is a score between 1 – 100, with a higher score indicating easier readability; thus a score of 95.6 indicates an easy text. The Flesch Kincaid Reading Grade Level is a score which converts the Reading Ease score to a US grade-school level (between 1 – 12). Texts graded at level 1.6 would be read by native speaking American children aged six or seven. It was therefore expected that the sentence structure would not in itself create problems for readers. If problems did occur, they would be with word recognition, not with understanding the text.

The structure of each wrong word closely resembles the target word, particularly with respect to consonants, for example: broad/bread. Of the 487 words used in sentences, 426 were taken from Nation’s 1000 word level. The remaining 61 words were judged to be of high frequency in the Gulf countries, and were used to make interesting sentences without undermining comprehension. For example, the word baker appears at Nation’s 1000 word level, but my 12 years teaching experience in the Gulf indicated to me that it was rarely used in this part of the world; whereas the word bakery was frequently used. Bakery does not appear at the 3000 word level in Nation’s lists and we can therefore assume it has infrequent usage in western English. However, in the Arab countries, bakeries are frequently encountered – it is the place to buy bread, rather than at the supermarket. The word bakery can be clearly seen written in English and Arabic on the outside. Subjects were required to underline the wrong words and supply a semantically and syntactically appropriate alternative, if possible, eg:

    bread

* Can you get some broad if you are going to the bakery?

6.3.4. Scoring procedure.

When scoring results, Ryan ignored the 20 correct sentences and gave one mark for each identification and subsequent correction of a wrong word. Thus, the highest possible score obtainable was 40. However, this scoring mechanism doesn’t truly reflect a subject’s performance as misidentifications are not penalised. Therefore in the present study, one mark was allocated for each wrong word that was underlined and a suitable
substitute provided. A further mark was allocated each time one of the 20 correct sentences was either ticked, or left blank — indicating that the testee found nothing wrong with it. This gave a maximum possible score of 60, and a lowest possible score of zero. If a wrong word was underlined but no substitute word was written, no mark would be given for that item.

When scoring the papers, marks were given for any semantically and syntactically appropriate alternative word. In most cases however, sentences had been constructed in a manner whereby there was only one appropriate substitution for each wrong word. As this was a test of word recognition, a misspelled substitute word was marked as wrong.

6.4. Results.

The overall results are given below in Table 6.2. Individual scores from each group are given in Appendix 6.3.

<table>
<thead>
<tr>
<th></th>
<th>Arab 1</th>
<th>Arab 2</th>
<th>Spanish.</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of subjects.</td>
<td>22</td>
<td>32</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Total score for Group.</td>
<td>987</td>
<td>1099</td>
<td>1038</td>
<td>1190</td>
</tr>
<tr>
<td>Mean score (out of 60)</td>
<td>44.9 (75%)</td>
<td>34.3 (57%)</td>
<td>51.9 (86.5%)</td>
<td>59.5 (99%)</td>
</tr>
<tr>
<td>Range of scores.</td>
<td>26</td>
<td>35</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>SD.</td>
<td>6.71</td>
<td>9.37</td>
<td>6.87</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Table 6.2. Results of word discrimination test.

Instances where a word in one of the 20 correct sentences was thought to be wrong, and subsequently corrected are given in table 6.3. Individual scores are given in appendix 6.4.
<table>
<thead>
<tr>
<th></th>
<th>Arab 1</th>
<th>Arab 2</th>
<th>Spanish</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of correct sentences thought to contain a wrong word by each group.</td>
<td>72</td>
<td>242</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>Mean incorrect response per subject.</td>
<td>3.27 (16%)</td>
<td>7.5 (37.5%)</td>
<td>1.35 (7%)</td>
<td>0</td>
</tr>
<tr>
<td>Range of incorrect responses per group.</td>
<td>8</td>
<td>17</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>SD.</td>
<td>2.37</td>
<td>3.99</td>
<td>1.13</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 6.3. Correct sentences wrongly identified by each group.

6.4.1. Tests of the hypotheses.

Hypothesis 1: Non-native speakers of English would score lower than native speakers on this test of word discrimination.

T-tests confirmed the above hypothesis, giving a highly significant result in each case: Spanish : English \( [t = -4.908, \text{ df } = 19.5, p < .01, \text{ one-tailed}] \); Arab 1: English \( [t = -10.136, \text{ df } = 21.7, p < .01, \text{ one-tailed}] \). N.B. Raw scores were converted to percentages in order to run the t-tests. However, these results appear to be unreliable due to the lack of variation within the scores of the native speakers. Therefore Mann Whitney U tests were run, comparing:

(1) the scores of native English speakers (n = 20) and the three groups of non-native speakers (n = 74). The results were highly significant: \( [U = 3.5, N1 = 20, N2 = 74, p = 0.000] \).

(2) the scores of Spanish learners (the NNS group who performed best on the test) and NS. Again, the result was highly significant: \( [U = 3.5, N1 = 20, N2 = 20, p = 0.000] \).
Hypothesis 2: Arab learners would make more errors than Spanish.

As expected, the Arab 1 subjects made significantly more errors than the Spanish learners \([t = -3.356, df = 40, p < .05, \text{one-tailed}]\).

Hypothesis 3: Arabs with a higher level of English language proficiency would gain higher scores than those with less proficiency.

A t-test comparing scores of Arab 1 and Arab 2 subject groups gave a highly significant result: \([t = 4.533, df = 52, p < .01, \text{one tailed}]\). This result clearly shows that word recognition skills were better in learners with greater English language proficiency.

6.5. Discussion.

All three hypotheses were borne out in this experiment, and statistical tests gave highly significant results in most cases. It therefore becomes clear that Arab students in general do not possess as good word recognition skills as other learners of English, and that Arab learners who have had greater exposure to written English will possess better word recognition skills.

In terms of the range of scores obtained by the NNS, Arab 1 and Spanish were similar – a range of 26 points for the Arabs, and 23 for the Spanish, out of a possible total of 60. However, the range of scores obtained by the lower level Arab group was far higher: 35. This indicates that at the lower levels of English language competence, word recognition skills may vary considerably from one learner to another.

6.5.1. Analysis of a sample of test items.

The responses given by each subject group to six sentences containing a wrong word were analysed and classified according to whether:
• the wrong word had been correctly identified
• a correct substitution (correctly spelled) had been given
• an incorrect substitution had been given
• the wrong word had been underlined, but no alternative suggested
• a word in the sentence, other than the wrong word, had been underlined
• the sentence had been either ticked or left blank indicating that the subject thought it was correct.

The data is presented in Tables 6.4., 6.5., 6.6. and 6.7. on pages 175 – 178. One thing that is immediately evident, is the high number of misspellings given by both groups of Arab learners, but in particular the Arab 1 group, compared to answers received from the Spanish group. Several of these suggested alternatives would have been correct, had they been correctly spelled. Many of the misspellings resemble those in chapter 1’s corpus: i.e. they are not exact phonetic equivalents. For example, the suggested alternative word laugh was spelled as LUGH, LAUGHT, LAFE, LAUPH, LAKE, LAGH and LOUGH. Only one truly phonetic equivalent was given: LAF. It could be argued that LUGH, LAUPH and LAGH are early attempts at orthographic spelling. LAUPH is especially interesting as the writer has correctly recalled the first three letters, has realised that this is not a regularly spelled word, and has remembered that the letters ‘ph’ can be pronounced /f/ in English, and given these instead of the correct ‘gh’.

By contrast, the Arab 2 group did not give as many misspelled items, but underlined more ‘other (correct) words’ in the sentences. This indicates two things: firstly, that they did not know many of the wrong words and merely guessed them to be correct in the context. Secondly, that their weaker reading abilities meant they could not understand some of the syntax, causing them to underline some grammatical elements of the sentence which were correct. Results obtained from the Spanish group show that their vocabulary knowledge was higher, with few incorrect substitution words given. Spellings were also much more accurate with this group. Errors made by the native speakers will be discussed in section 6.5.4.
6.5.2. What do the results indicate about orthographic recognition skills of Arabic learners?

The results of this experiment confirm that as alphabetic decoding skill has not been successfully mastered by the Arab 2 group, they experience difficulty in reading via the orthographic route. From the overall scores obtained by the more advanced Arab group, it appears that they do not have fully developed orthographic reading skills either. It would have been interesting to run the non-word reading test (reported in chapter 5) with the more advanced Arab 1 group, to see if they too experienced any difficulty in GPC rule application. Unfortunately this was not possible due to logistical constraints at the time. However, had the experiment been run, it would have been expected that the Arab 1 group would score higher on non-word reading than the Arab 2 group, but that their alphabetic decoding skills would not be perfect.

We may assume then, that orthographic recognition skills of both groups of Arab learners are still in a stage of development. This raises the question of how orthographic images develop, and what stages are involved in the process. According to Frith’s (1985) model, there are two stages of orthographic recognition: stage 3A where “orthographic knowledge is presumed to be weak – sufficient to be used in recognizing words” and stage 3B where orthographic representations are “now precise enough to be useful for spelling.” Frith goes on to say that these images are “internally represented as abstract letter strings” which must be “exact in terms of their letter-by-letter detail” for skilled reading and spelling. However, Frith does not provide any details of how the transition from letter by letter decoding to visual recognition of whole words occurs.

One explanation, provided by Stuart and Coltheart (1988), is that beginning readers at first use partial orthographic recognition units which include strong consonant letters from word and syllable boundaries. They explain that this is because in English consonants have more regular and consistent mappings to letters than do vowels. After a child has located the consonants in the letter string, any remaining graphemes must be vowels. They give an example using the word *night*: 

168
The child's recognition unit will be n...t. Meeting the word in context, which allows it to be recognised as 'night' rather than 'nut' or 'net' or 'not', to name but a few, the child can infer that all those letters which are not the n or the t must represent the /at/. This leads to the conclusion that igh is one way of writing the sound /at/, and that this pattern is used in the word 'night'.

(Stuart & Coltheart, 1988: 174)

In the word discrimination test reported here, most of the incorrect words shared the same initial letter and consonant structure as the target word. Ryan (1993) hypothesised that Arab learners were relying on consonants for word recognition, and this was borne out by her tests of low level learners. The current study suggests that for many of the intermediate learners, this is still the case. It looks very much as if Arab learners of both low and higher levels of English language are reading with "partial orthographic recognition units", in the way suggested by Stuart & Coltheart (1988).

6.5.3. Reliance on contextual clues for word recognition.

The previous section described the probable nature of orthographic images used by Arab learners for word identification. In chapter 5, the non-word reading test showed that Arab learners were not completely familiar with the GPC conventions of English, indicating that they would not be able to phonologically decode words with 100% accuracy. When a learner possesses incomplete orthographic and phonological knowledge about a word, it is likely that he will be forced to use contextual clues to help him identify words. The results of the Word Discrimination test described in this chapter indicate that this is probably what has happened. By focusing on the meaning of the sentence, subjects have been able to identify words through a process of semantic and syntactic parsing. Individual words would have been recognised on the basis of these clues, together with the partial orthography suggested by Stuart & Coltheart (1988).

As mentioned in chapter 2, reading comprehension involves the lower level processes of word identification, and higher level processes of text comprehension. At the higher level, good readers of English have been found to make use of contextual information to facilitate comprehension (Stanovich & Stanovich, 1999). However, at the lower level of
word recognition, good readers are characterised by their use of the phonological and orthographic properties of a word, rather than a reliance on contextual clues. Poor readers on the other hand, usually have weak phonological and orthographic skills and so rely on contextual clues to a greater extent for word recognition (Stanovich, 1980).

Stuart & Coltheart’s (1988) theory of incomplete orthographic images ties in with Stanovich’s (1980) claim that native speaking children who are poor readers tend to use contextual clues rather than a word’s phonological or orthographic properties, as an aid to word recognition. As Arab learners are poor readers with under-developed word recognition skills, it is probable that reading a sentence which contains a wrong word will involve the process described following this example sentence:

*I live about a meal from the university.*

Firstly, they will recognise words by salient features. Stuart and Coltheart suggest that these salient features might be the initial and final consonants – in this case, the letters ‘m’ and ‘l’. As the reader has poor orthographic knowledge of the word, he will probably be unsure of any other letters that appear in the word. His weak alphabetic reading skills will not help him to pronounce a word like ‘meal’ either. However, he will be fairly confident that the letters ‘m’ and ‘l’ appear in this order, in the target word: *mile*. Syntactic parsing indicates that the word must be a noun – as it is preceded by a determiner, and semantic parsing indicates that the word must be one of distance. He sees the letters ‘m’ and ‘l’ and jumps to the conclusion that the written word must be *mile*, which is correct in this sentence. As a result, he does nothing – he accepts the sentence as being correct. This scenario provides a possible situation whereby Arabs are relying heavily on contextual clues to aid their poor word recognition skills. Assuming that this is in fact what is happening, and the practice is generalised to other reading texts, the implications could be dire. Can we be sure they are ‘reading’ what is printed on the page?

It appears as if Arab learners are again behaving in a manner characterised by poor native speaking readers of English. If this is the case, we might expect their reading
performance to improve with correct instruction and adequate practice (Rayner et. al. 2001). However, if they are behaving in a manner similar to Developmental Surface Dyslexics, we would not expect their performance to improve.

6.5.4. Incorrect identification of the 20 correct sentences.

The high number of instances where an Arab subject has wrongly identified a correct word as being incorrect are very disturbing: there were 72 instances of this with the advanced Arab group (mean $n = 3.27$), and 242 with the lower level group (mean $n = 7.56$). Individual scores show that every subject in the lower level group misidentified at least one of the 20 correct sentences, although the range of errors was very wide: from 1 to 18. When the figures are compared to those made by other groups: 27 instances in total with the Spanish and none with the native speakers, the Arab figures do seem incredibly high. As reported in chapter 3, Al Hazemi (1993) also found many instances where Arab learners had mistaken well-known words for something else. As his study was primarily concerned with measuring the vocabulary knowledge level of his subjects, he was thrown into a quandary: were the errors in word recognition due to poor vocabulary knowledge, or poor word recognition skills?

Assuming that all words are known to a reader, misidentification of a correct word is arguably a more serious issue than a failure to spot a wrong word in a sentence. According to Rayner et. al. (2001: 49), skilled readers fixate on about two thirds of the words in a text; words that are skipped are typically “highly predictable from the preceding context”. It could be argued that the less-than-perfect scores of the native speakers in this experiment (99%), who were all skilled readers, can be largely attributed to the fact that they missed, or skipped some of the wrong words in the sentences. The two exceptions to this are sentences 16 and 18, where incorrect changes were made to the sentences (see section 6.5.1.). These incorrect changes, made by native speakers who it was assumed, were skilled readers, are difficult to explain.

The process by which a reader fixates on a word and decides that it is wrong in a particular sentence context involves word recognition skills, lexical access and the conscious decision to reject the item. If this is the process followed by the Arabs, we
may conclude that they do indeed suffer extreme problems in word recognition – particularly the lower level learners.

6.5.5. Vocabulary knowledge, word recognition and reading practice.

Although every effort was taken to avoid using vocabulary which would be unfamiliar to subjects, these measures may not have been sufficient. It may well be the case that frequency of use of certain words differs in the West and in the Gulf. If this is the case, it would certainly have affected subjects' knowledge of the words being tested. Further research needs to be done in the area of vocabulary frequency levels in countries where English is spoken as a second language. Although assessing vocabulary frequency levels is outside the scope of the current study, an assessment of the relationship between vocabulary knowledge, word recognition and reading ability is of importance.

Knowing the meanings and spellings of words is of paramount importance to reading, although it is possible for a reader to guess the meanings of a few unknown words he may encounter in a text. Teachers on university EAP courses are often advised to train students in strategies for guessing the meanings of words in context, as this is seen as being an important element of L2 academic success (Jordan, 1997). However, if the sheer number of unknown words is too high, reading the text will become too difficult and a learner will probably either give up, or misinterpret the text in his attempts to guess meanings. It becomes clear then, that possession of a wide vocabulary is essential for skilled reading.

Al Hazemi (1993) reported in chapter 3, found that most of the Arabic learners he tested had very low levels of vocabulary. Nation (1990) estimates that a native speaking undergraduate student possesses a vocabulary of about 20,000 words. Bearing this figure in mind, we can see that Al Hazemi's post-graduate students, with vocabularies of between 1400 – 2800 were at a serious disadvantage and would undoubtedly have found studying in English very difficult. But why are the vocabulary levels of Arab learners so low? How is vocabulary learned?
Nation (1990) states that vocabulary learning can be either direct, i.e. specifically taught, or indirect – sometimes referred to as ‘incidental,’ whereby new words are learned through reading. Due to the amount of vocabulary involved and the complexity of learning, it is usually not possible for a language course to teach all of the vocabulary required to read authentic texts with ease (Nation, 1990). Extensive reading and repeated encounters with new words will therefore help to build a reader’s vocabulary.

As mentioned in chapter 2, Rayner et. al. (2001) emphasise the importance of reading practice in developing accurate representations of a word’s orthographic image, and in increasing the speed of word identification – ultimately leading to reading fluency. Despite being of relatively proficient English language ability, if Arab students do not engage in reading to the same extent as other groups of learners, their word recognition skills may not be as well developed. We can see then, that a lack of reading practice may account for poor word recognition skills and also the low levels of vocabulary possessed by Arab learners of English.

6.6. Conclusion.

The findings reported in this chapter show clearly that Arab learners experience more problems with word recognition than other ESL students. The results of the Word Discrimination Test indicate a failure in the orthographic route in reading, which concurs with earlier studies carried out by Al Sulaimani (1990) and Ryan (1993). The combined failure of both the alphabetic route (as described in chapter 5) and the orthographic route is a strong indication that Arab learners are behaving like under-developed native speaker readers, and therefore rely on strategies similar to those used by poor readers, by way of compensation.

The difference in performance between the two Arab groups indicates that reading practice improves word recognition skills. This improvement differentiates the Arab learners from Developmental Surface Dyslexics, who would show the same initial patterns but would not improve over time. The fact that their word recognition skills improve over time, indicates that the Arabs suffer from some kind of ‘developmental
lag'. Were they behaving in a manner similar to Developmental Surface Dyslexics, as suggested in the previous studies of Al Sulaimani and Ryan, there would have been no difference in the results of the Arab 1 and Arab 2 groups in the Word Discrimination Test.

We may ask what has caused these indicators of poor reading skill. Having been brought up in a bilingual community and under going 11 years of English language instruction, why aren’t the Arabs subjects of chapters 5 and 6 better readers? One reason suggested by Ryan (1993) and Al Sulaimani (1990) was the differing orthographic systems of Arabic and English. However, an analysis of the effects of L1 orthography on second language reading and spelling in chapter 4 ruled out this line of enquiry as a possible cause of the errors. A further explanation for Arab learners’ under-developed reading skills in English might be a failure at the level of initial education - in the primary schools. This issue will be investigated in chapter 7.
Table 6.4. Responses Given by Arab 1 Group (n = 22) In Six Sample Sentences

<table>
<thead>
<tr>
<th>Sentence</th>
<th>No. of Subjects</th>
<th>No. of Subjects Given Correct Substitution</th>
<th>No. of Subjects Given Incorrect Substitution</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>(was)</td>
<td>2</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>17</td>
</tr>
</tbody>
</table>

SubjectLib was not included in the analysis as it is a filler sentence.
<table>
<thead>
<tr>
<th>Subject thinks it is</th>
<th>Sentence underlined</th>
<th>alternative</th>
<th>No. of subjects who</th>
<th>No. of subjects who</th>
<th>Incorrect substitute</th>
<th>No. of subjects who</th>
<th>Incorrect substitute</th>
<th>No. of subjects who</th>
<th>Correct substitute</th>
<th>No. of subjects who</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (almost)</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4 (heavily was)</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 6: Responses given by Spanish group (n = 20) in six sample sentences.

<table>
<thead>
<tr>
<th>No.</th>
<th>Mean</th>
<th>Sentence</th>
<th>Alternative</th>
<th>Incorrect Substitution</th>
<th>Incorrect Substitution</th>
<th>Incorrect Substitution</th>
<th>Incorrect Substitution</th>
<th>Incorrect Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subject indicates the number of subjects who gave this response.
Table 6.7. Responses given by English NS group (n = 20) in six sample sentences.

<table>
<thead>
<tr>
<th>Mean</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>leer</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Followed</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Than</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Build</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Subject thinks it is sentence correct (correct words in the blank, indicating sentence either liked or alternative didn't succeed in understanding word but understood word but "words given" correct substitute incorrect substitute No of subjects who No of subjects who No of subjects who No of subjects who No of subjects who No of subjects who No of subjects who No of subjects who No of subjects who No of subjects who
Chapter 7.

The teaching of English literacy in U.A.E. government schools: the teachers, syllabus and methodologies.

7.1. Introduction.

The corpus of spelling errors analysed in chapter 1 and the experiments carried out in chapters 5 and 6 have shown Arabs in general to have poor reading and poor spelling abilities in English. The non-word reading test reported in chapter 5 showed that Arab learners had not fully mastered alphabetic reading principles, which was to be expected, given that they appeared not to have mastered alphabetic spelling principles either. It seems that, in order to acquire alphabetic spelling and reading skills (stages 2A and 2B of Frith’s (1985) model), a learner must receive specific instruction in phoneme-grapheme correspondence rules used in English. It is estimated that there are approximately 500 spelling rules in English (see chapter 1) and that without this instruction, some researchers believe that these will not be mastered (Rayner et. al., 2001). One of the aims of the current study is to find out what methods of teaching these correspondences are used in government primary schools in the U.A.E.

The Word Discrimination Test reported in chapter 6 showed that Arab learners experienced difficulty in identifying a wrong word presented in context, when it had similar spelling to the target word. This difficulty indicates a failure of the orthographic route in reading (stage 3A). According to Frith’s model, extensive reading practice is necessary for a learner to progress from the alphabetic stage to the orthographic stage. Therefore, a second aim of the current chapter is to find out the extent of reading practice that is given to school children in the U.A.E. and to determine whether it is likely to be sufficient to develop good reading skills. Thus, the focus of this chapter is to discover the extent to which the education system may have contributed to the many reading and spelling errors made by Arab learners of English.
It was hoped that the data collected in the study would indicate whether appropriate methods were being used in the teaching of English literacy, and whether learners appeared to be benefitting from the approach. The study took place over a period of six months, and consisted of three elements: an analysis of the syllabus and textbooks, the classroom methods used by teachers and the opinions of those working in the UAE educational system. The study is reported in section 7.3., after a brief description of the main methods for teaching reading.

7.2. Methods of teaching reading in English.

As the focus of this thesis is word recognition and spelling, the current study of initial literacy teaching methods is centred around the teaching of basic word recognition skills. The two main methods used in this field, in the rest of the world, are Look and Say and Phonics teaching, although others exist such as the Language Experience Approach, where children start reading and writing at the sentence level, using their own experience as the topic of texts (Cameron, 2001). However, as Cameron points out, while this method “starts children reading and writing through meaningful word and sentence-level work, there will also need to be, at some point, a focus on letter-sound relationships” (p 148). All reading methods, therefore, can be said to rely on some form of instruction in word recognition, whether this is based on whole-word visual techniques, or breaking words down into letters and ‘sounding them out’.

Amongst educators, opinions are divided over the issue of whether to teach children to read in English by the “whole word recognition” approach (often referred to as Look and Say) or by teaching the letter sounds – a phonics based approach. Proponents of either method fiercely defend their point of view. According to Upward (1992) both approaches are perceived to have drawbacks: a bottom-up phonic approach cannot account for the mismatch between spelling and pronunciation present in many English words. A top-down visual approach may lead to an inability to read or write unfamiliar words. The fact is that reading English requires a person to have an ability in both areas, and research has shown that proficient readers continue to use both strategies (Rayner et. al., 2001). It is therefore important for a reader to develop good visual images of words as an aid to lexical access. However, if we consider Frith’s three stages in the acquisition
of the reading process, alphabetic principles must be acquired before orthographic, indicating that it is important to develop children's phonemic awareness of words. The answer would seem to be to incorporate both methods when teaching early literacy. This study aims to find out which methods are currently being practised in the UAE government schools, and if their approach appears to be successful.

7.2.1. The Look and Say method.

The Look and Say method starts with children looking at whole words on flashcards, which are shown quickly (sometimes literally 'flashed' in front of their eyes) to encourage rapid whole word recognition. Cameron (2001: 148) describes the technique:

A child will begin with five or six very common words, such as 'mummy' and 'likes'. The child practises saying the word when he sees the card, and once the first five or six are mastered, moves onto the next set. Once the child has about 15 words, very simple books are introduced that only use the known words. The child then reads the books at that level to the teacher, one or two pages a day, and practises alone.

The popular Ladybird series of children's books is an example of texts that were developed to be read through whole word recognition techniques.

The theory behind the Look and Say method of teaching reading in Grade 1 is that it equates with Frith's first stage of the reading acquisition process: logographic recognition. Children recognize words as a series of letters in sequence, without recourse to phonology. However, as mentioned in chapter 2, this stage lasts a very short time: only until children have been introduced to the alphabet. Several researchers (e.g. Rack, Hulme, Snowling and Wightman, 1994; Stuart and Coltheart, 1988) have found that phonological skills play a role in children's reading from the very start, indicating that logographic recognition may only exist in the earliest stages of pre-literate children. Rack et. al. found that although children in the logographic stage did not possess grapheme-phoneme decoding abilities as measured by non-word reading, nevertheless they were apparently learning to make direct print-sound associations and in this way were "influenced by the phonological relationship between the sounds of the letters and
the pronunciation of the spoken word,” (1994: 57). Use of the Look and Say method has been found to prolong the logographic stage in young children (Ellis, 1997), therefore if teachers decide to use flashcards to promote word recognition, this method should only be used for a short period, and preferably in conjunction with phonics instruction.

7.2.2. Phonics teaching methods.

Phonics teaching, in contrast to the Look and Say approach, focuses on sounds and the letters that can be used to represent them, building literacy skills from the bottom up. Cameron (2001: 149) describes the process:

The usual way [of teaching phonics] involves showing children the sounds of the different letters in the alphabet, then how letters can be combined … Phonics teaching works if it directs children’s attention to letter-sound level features of English and helps children make the mental connections between letters and sounds. It can be very dry, boring and demotivating, if done in isolation, so it is probably preferable to incorporate five or ten minutes of concentrated phonics work inside other activities. Phonics work can be integrated into story reading, sentence writing activities, songs and rhymes, when vocabulary is being presented or recycled, and in stages of oral tasks.

Proponents of phonics-based approaches argue that as children are developing an awareness of letter-sound relationships very early on, it is essential that they are the focus of reading instruction in class. The main disadvantage, as Cameron (2001) has highlighted above, is that intensive phonics teaching on its own can be very boring for children. As such, it is essential that the method is incorporated into other language-related tasks. Full and accurate acquisition of stages 2A and 2B of Frith’s (1985) model depends on explicit instruction in the often complex rules of grapheme-phoneme correspondence used in the English language (Rayner et. al., 2001). Therefore, it can be seen that phonics instruction plays a very important role in developing literacy skills. The acquisition of alphabetic reading skills is considered to be of such importance in UK primary schools that the National Curriculum has made it a requirement that children are taught how to use phonics (Graham and Kelly, 2000).
7.3. The study.

7.3.1. Aims of the study.

Broadly speaking, the aims of this study were to explore the teaching methodology, in theory and practice, of certain areas of English language teaching in Ministry of Education primary schools in the United Arab Emirates, and to investigate the anticipated learning outcomes as a result. It was not possible to test children's performance in these areas at different stages in the educational cycle, therefore conclusions drawn as to the effectiveness of the teaching methods and materials are done so purely on the basis of established educational research, and comparison with practices followed in U.K. primary schools.

The study consisted of three elements:

1. Observations of elementary literacy lessons in Arabic and English.
2. Interviews with primary English teachers, schools inspectors (referred to as 'supervisors' in the U.A.E.) and British teacher trainers with several years experience in the U.A.E. and Oman.
3. Analysis of the Ministry of Education's textbook series "English for the Emirates", the existing nine volumes of which comprise the syllabus. There is no separate published syllabus.

Within the three areas of study, a number of sub-issues to be investigated with regard to the teaching of English in the U.A.E. arose:

2. The development of alphabetic principles in reading, phoneme-grapheme correspondences and rime knowledge.
3. The development of whole word reading skills – and knowledge of English orthography.

4. The amount and scope of practice given in extensive reading, reading aloud, reading for pleasure, in groups etc., i.e. the variety of techniques available for teaching and giving practice in reading within the primary and secondary school system.

7.3.2. The state educational system in the United Arab Emirates.

The Ministry of Education in the UAE is a relatively young organization, having been established only 30 years ago. Before this, little standardization in education existed, and no national syllabus, textbooks or examinations. The development of the education system in the U.A.E. can be divided into three phases:

1. From 1905 – 1953 mainly traditional Koranic schools existed, financed partly by philanthropists and partly by student fees. Basic Maths, Arabic literacy and knowledge of the Koran were taught. Memory and the ability to recite verses from the Koran were of paramount importance. The depth to which each subject was studied depended largely on the ability of the teacher or “Mutaawa”, and the availability of books.

2. From 1953 – 1971 educational missions from countries such as Kuwait, Qatar, Egypt, Jordan, Saudi Arabia and Great Britain set up schools in the UAE. Each mission brought its own curriculum, teachers and textbooks and therefore little standardization existed between them. English language, art and PE were added to the curriculum at some schools. Students attending these schools were mainly male and enrollments grew slowly.

3. In 1971 the joining of the Trucial States and creation of the United Arab Emirates made a unified Ministry of Education possible with a standardized curriculum for primary and secondary teaching, and free schooling available for all UAE nationals. Student enrolments grew rapidly and English language classes
were added to the general curriculum. Girls were encouraged to attend and in 1977 the UAE university at Al Ain opened, giving free tuition at higher levels also (Bel Fekih, 1993).

There are currently 668 government schools and 400 private schools in the country (UAE Forever, 2001), employing over 34,500 teaching and administrative staff. While U.A.E. nationals are eligible to send their children to the Ministry of Education’s schools, children of the many expatriates in the country (currently 66% of the population as a whole, and 90% of the population of Dubai) must attend private schools. Private schools are usually orientated towards international examinations (‘A’ levels or International Baccalaureate) and do not follow the same curriculum as the government schools. In government schools Arabic is the language of instruction in all subjects except English, and all teachers are Arabs. All the Arab learners tested in this thesis had attended government schools.

English as a foreign language is currently taught in the government primary and secondary schools throughout the system. Prior to 1996 English instruction was introduced in Grade 4 (at age 9), however today it is taught from Grade 1 (age 6). The curriculum provides a 40 minute English lesson five days a week for the duration of the 12 year programme. In 1990 the Ministry of Education commissioned a series of textbooks “English for the Emirates” – a pupil’s book, workbook and teacher’s book for each level, which form the syllabus for instruction throughout the 12 year period. Teaching guidelines are given in the Teacher’s books and the Teacher’s Guide.

7.3.3. Method.

7.3.3.1. Interviews.

Four primary and two secondary teachers, four supervisors and three trainers were interviewed. Interviews were conducted individually with trainers and supervisors C and D. Supervisors A and B were interviewed together. Teachers E, F and K were

---

8 Since this study was completed, the Ministry of Education has brought out books 10 – 12 in the series. The old book 9 which was previously used by Grade 12 students, is now used by Grade 9.
interviewed individually and teachers G, H and J were interviewed as a group. Although it would have been preferable to interview each person separately, this was not always possible due to time constraints. Interviews lasted about 30 minutes each, and questions focused on the techniques used for teaching elementary literacy, spelling and pronunciation: techniques used by teachers, the methods prescribed by the Ministry of Education, the textbooks "English for the Emirates" and any other materials or course books being used. All interviews were recorded, subsequently analysed for content and main points summarized (see Appendices 7.4, 7.5 & 7.6). The questions used in the interviews are included in Appendices 7.1, 7.2 and 7.3.

7.3.3.2. Observations.

Two government primary schools were used in the study and a number of teachers of English literacy at Grades 1 and 2 (children aged 6 and 7) were observed. Observations took place over a three month period. The schools were chosen for several reasons:

- They were both currently being used by Zayed University’s Educational Department for student teaching practices, and were therefore amenable to Zayed University staff observing classes and interviewing teachers. Some of the older, more traditional schools were reluctant to allow observations of their staff, and staff themselves did not appear happy with the prospect.

- One of the schools was following the traditional government syllabus, using the Ministry’s textbooks and teachers were following the Ministry’s teaching guidelines. The other was a “Model School” and had developed its own syllabus, was using four additional textbooks to supplement the Ministry’s books and teachers had developed their own instructional methods. A comparison between the two schools therefore looked worthwhile.

It should be noted that Model Schools are showpiece schools for dignitaries and visitors to come and see in action. They are more progressive than the standard government
schools, tend to have the better teachers, and are allowed to deviate from the ministry's set textbooks. All Model Schools in the U.A.E. are currently in the primary sector. They are few in number: Dubai has two, Sharjah one, Al Ain two and Abu Dhabi five. When these figures are compared with the total number of government schools in the country (668), it can be seen that they represent a very small proportion indeed.

All teachers observed were Arab nationals, from a variety of countries: Syria, Jordan, Egypt, Palestine as well as the United Arab Emirates. As already mentioned, most government schools in the U.A.E. teach in blocks of 40 minutes; however, the second school in the study was an exception: lessons lasted for 50 minutes. Pupils received one lesson in English language and one lesson in Arabic language each day. Observations took place one day a week over a period of three months. Efforts were made to observe different classes being taught by the respective teachers, however, it should be noted that as both schools were quite small, there were only two classes of girls and two classes of boys at each Grade.

The observations followed the format of detached/structured observation (Gillham, 2000) for the most part, although from time to time the teacher requested assistance in correcting children's written work, or asked the children to ask the researcher a question. During observations, notes were taken of everything that happened with regard to reading and writing activities and any focus on pronunciation: what the teacher said, what she did and what she wrote on the board. The children’s role in the lesson was also recorded in the same detail. Observation criteria focused on several points:

1. The classrooms.
2. The teachers.
3. The learners.
4. Length and frequency of lessons.
5. Content of observed lessons.
6. What the teacher’s role was – what she did, what she expected of children.
7. What the learners’ role was – what they did.
8. Types of activity conducted while I was in the room, and the aims of these. Were the aims met?
9. Did the children appear to enjoy the lesson – were they actively engaging in it?
10. What methods of teaching reading, spelling and pronunciation were used by the teacher?
11. Did she use supplementary materials?
12. How did the range of activities used compare with those used in British primary schools (according to a study reported by Wragg, Wragg, Haynes and Chamberlin, 1998)?

All data was recorded by hand in a notebook.

7.3.3.3. Textbook analysis.

The Ministry's textbooks "English for the Emirates" – student's book, workbook and teacher's book together with a teacher's guide, form the syllabus. No separate syllabus exists, nor any exhaustive list of forms and functions to be taught at each level.

The teacher's guides are divided into three stages: Primary, covering Grades 1 – 3; Preparatory, covering Grades 4 – 6; Lower secondary, covering Grades 7 – 9; and Upper secondary, covering Grades 10 – 12. These guides contain information on how to plan a lesson, give examples of activities or games that can be played, advice on the teacher's use of Arabic in the English class, a general history of English teaching methods, notes (and prescribed methods) on teaching reading, writing, speaking & listening, ways of introducing new vocabulary and questioning techniques to be employed in the classroom. Each is a slim volume containing 70 odd pages of large typeface, and serves as more of a teaching handbook than a guide to the syllabus. However, this and the coursebooks serve as the syllabus for the English language curriculum used throughout the 12 year educational period.

In this part of the study, the content of lessons and prescribed role for the teacher was analysed in relation to commonly accepted principles of teaching elementary literacy in English. Materials were also analysed for their ability to support the learning objectives of a lesson. Conclusions were drawn as to the effectiveness of the material and methods
of using it, in developing reading skills in English. Examples of activities provided by the textbooks are included in Appendices 7.7 – 7.13.

In the analysis of textbooks, material presented in students’ books along with teaching directives presented in teachers’ books and teachers’ guides was examined, with the following aims:

1. To find out what methods of teaching reading and spelling are advocated by the Ministry of Education.
2. To find out if the materials and activity types support the methodology advocated by the Ministry.
3. To find out if sufficient material is presented to enable learners to master reading and spelling in English.
4. To assess whether the methods used in the UAE, and the materials available, are appropriate for successful learning of reading and spelling in English.

Some pages from the coursebooks which were considered to be representative of materials and methods, and which are relevant to the aims of the study have been included in Appendices 7.7. – 7.13. and will be commented on in section 7.4.1.3.

7.4. Findings and discussion.

Briefly summarized, the findings of the study were as follows. The findings have been further explained in the context they occurred in sections 7.4.1.1 to 7.4.1.3.

- The Ministry of Education in the UAE prescribes the Look and Say method of teaching basic literacy, to the exclusion of all other methods. Teacher’s guides specifically instruct teachers not to break words down into syllables or to teach letter sounds.
- Government textbooks (English for the Emirates) for the early grades follow this methodology.
Most teachers followed the prescribed methods, although a few had supplemented them.

Reasons given for teachers’ not supplementing textbooks or developing other literacy teaching techniques included the rigid time constraints imposed by the syllabus, and many teachers’ reluctance to do anything which might not be ‘appreciated’ or understood by their supervisor.

Textbooks provide few reading activities and most tasks focus on reading a text followed by comprehension questions.

Teachers, trainers and supervisors considered the textbooks in use at the higher levels to provide insufficient reading practice. Both length and topic matter of texts were criticized.

A sample reading text selected at random from book 9 (used by Grade 12, age 18, Arab students at the time of the study) contained 260 words and scored 5.6 on the Flesch Kincaid readability levels test. (According to F.K. grade levels, this text could be read by a nine or ten year old American child.)

Some teachers considered their students to have poor reading and spelling abilities. Supervisors and trainers often cited teachers’ own poor English as a reason for this.

Pronunciation is not explicitly taught.

7.4.1. Interviews.

7.4.1.1. Methods used in teaching literacy.

In response to questions 4 –14, which concerned the methods commonly used to teach basic literacy, most of the interviewees said that in the UAE, the Look and Say method was dominant in government schools. Of the four primary teachers interviewed, two said they used this method exclusively, whilst the other two reported that they used it alongside some phonics teaching. Supervisors reported that most of the teachers they observed were using only this method. When asked why there was a preference for this
method in the UAE, teachers, supervisors and trainers all responded that it had been
prescribed by the Ministry of Education. Supervisor B explained how the method
operated in practice:

Usually they [the teachers] show the whole word, ‘cat’ on the flashcard. They
pronounce it “cat” – and maybe say it a few times. They will keep it for a few
seconds – so the children memorise it. Then the teacher will say “repeat after
me” – usually the whole class, and then individually. And then the teacher will
ask them to spell it with her: “C A T” and then the students will spell the letters.
They don’t get any practice at writing the word at this stage, that comes later;
although it depends on the teacher.

Teacher J said that when new words were introduced, children were only expected to
read and say the word. However, the technique could be modified with more frequently
used words: the teacher may show words on flashcards, ask students to read them out
loud, then hide the card and ask someone to either spell it out loud or write it on the
board.

When asked about the flashcards, the primary teachers said that these were supplied by
the Ministry and came with the Teacher’s books. Key vocabulary from each unit would
feature on the cards, which were laminated for long life. However, they said that the
Teacher’s books were very difficult to get hold of, and two teachers said many teachers
they knew did not have access to one at all. Teachers all said that in time cards would
get lost or too damaged to use and it was the responsibility of each teacher to make
substitutes.

When asked if they considered the flashcard method alone to be effective in teaching
children to read, two of the primary teachers responded that they weren’t sure and two
said no. The two teachers who responded no said that they had begun to teach their
Grade 1 and 2 students that letters had sounds and words could be read by sounding out
letters individually. One teacher in particular said that she had taught children to read
words in two different ways, depending on whether they were regularly or irregularly
spelled – she referred to the latter category as ‘tricky words’.
Supervisors and trainers, however, thought that the majority of teachers only used the method specified by the Ministry of Education. Supervisor B mentioned that some of her teachers had requested materials which utilized phonics based approaches, and a few had asked for training courses. However, Supervisors B, C and D felt that many of the older teachers were nervous of any new teaching methods: they had used the Look and Say method exclusively for years, and in fact it was the method whereby many of them had, themselves, learned to read in primary schools. Trainers reiterated this response.

When asked her opinion of this method of teaching reading, supervisor D said:

I always say [to my teachers] the problem, for example, we see .... We learn by looking, yes? But how long is it going to stay in our minds, in the memory? That’s why after three months of summer vacation they come – and when you ask them to read something, maybe four or five of the whole class might remember – the rest of the class they don’t remember – they cannot read it.

Trainers L and M said that many teachers continued to use only the materials and methods suggested by the Ministry because they were “afraid” of their supervisors, and were reluctant to try anything new for fear they got into trouble. A second reason was that many government teachers had been taught in their own countries by exactly these methods, as was the case with the supervisors, and were therefore reluctant to move away from them. A third reason they gave was that in their opinion, many teachers had poor English themselves and did not have either the ability or the confidence to work independently of the highly structured syllabus and teaching methods prescribed by the Ministry. This reason was also cited as a factor in students’ poor abilities in English. Trainer L said:

Many teachers just don’t have very good English themselves – they don’t get much practice in reading English, their spelling and grammar are often poor too. I have seen them write bad grammar or spelling mistakes on the board. The kids then copy this into their books.

Only one teacher said she asked her students to read aloud: teacher K. She said that her students were encouraged to read to each other – paired reading, as well as reading aloud in class. Other teachers said that children found this a difficult activity and did not enjoy it. They said that an audio cassette was provided with each Teacher’s book; students
would follow silently in their books as they listened to the text on tape. Supervisors A and D said that some teachers resorted to using the cassette because they did not feel confident enough in their pronunciation to read from the book themselves.

When asked if they thought today’s school students were good at reading in English, all except one teacher said no. Supervisors said that they believed that the standard of reading had fallen since they learned to read at school. When asked where they considered the problem to lie, supervisor D said:

The students don’t really read: you’ve seen the secondary books, do you call that reading? I mean, reading has to be something with more meaning. For example, 26 years ago when I was at school we had supplementary reading – that was real reading. Read a book and discuss: we don’t have these things today.

7.4.1.2. Opinions of the course books.

When asked about the reading materials provided in English for the Emirates, the two secondary teachers said that they did not consider them to provide enough practice. They said students were asked to read only a short paragraph or two and then to answer a few very simple comprehension questions. They said that in their day they had read “many story books” and discussed “science topics and things we read about.” Only two of the primary school teachers (G and J) said they were satisfied with the reading material presented. Teachers E, H and K said they supplemented English for the Emirates with additional materials. Teachers E and H said they did this “occasionally” as there was “not too much time”, whilst teacher K hardly used the government textbook at all. As previously mentioned, teacher K taught at a Model School and as such, was exempt from the rigorous adherence to syllabus, methods and textbooks that other government teachers were subjected to.

None of the supervisors interviewed were happy with English for the Emirates. Supervisor C, who works in Abu Dhabi’s Model Schools said that her teachers had chosen to adopt another book: the commercially produced Parade (Salazar & Zanatta, 2000) as a supplement to the Ministry books. The other three supervisors however, did
not work in Model Schools and therefore did not have the liberty of changing the prescribed textbooks. Supervisors believed that the coursebooks did not provide enough reading practice at the higher levels, and the methodology used for teaching initial reading skills had not been successful. Supervisor D mentioned that there were very few tasks specifically geared towards developing reading skills such as skimming, scanning, guessing word meanings in context or speed reading.

Trainer N said that the old system of teaching English in Omani primary schools had been similar to that currently practised in the UAE. He said that the Oman Ministry of Education had recently changed their syllabus, teaching methodology and coursebooks with regard to primary English. Under the new system, children focused on learning only spoken English for the first three years of school, then in Grade 4 would be introduced to written English. He believed the reason for the change to be that children found it confusing to be presented with two orthographic systems simultaneously in Grade 1.

7.4.1.3. Methods of teaching spelling and pronunciation.

All teachers except K said that English spelling was a problem for their students; in fact it was a problem for all Arabs. They said that unlike Arabic, English was not a “phonetic language” and had few patterns. Although the ministry advises teachers to play spelling games with their classes (Teacher’s Guide for the Preparatory Cycle, pages 28 – 29) few teachers appeared to do so. When asked about spelling games, only teacher K said she used anything other than “Hangman” and “dictations.” According to the supervisors, these dictations constituted spelling tests, not games. Teacher K listed some inventive games which could be used to practise spelling, such as the “fishing game” where four children came out to the front of the class and were given rods with Velcro attachments at the end. They had to ‘catch’ as many letters from a pile as they could, in an allotted time. The winner would be the child with the most correctly spelled words at the end. When asked if the Ministry ran workshops to demonstrate what they meant by “spelling games”, all teachers said no.
Teachers said that they asked students to repeat words after them, as an aid to pronunciation. Sometimes the children said the word individually, sometimes as a class. They had no experience of using language laboratories which are often used for pronunciation practice in language schools. Teachers F, G and J said they had never used ‘phonemic discrimination’ or ‘minimal pairs’ exercises. Teachers E and H said they had heard of pronunciation games, but when asked to explain they merely mentioned activities aimed at promoting general speaking practice. Supervisors and trainers agreed that most teachers used drills to practice pronunciation, and said they had not seen any other activities. Trainers raised the point that drills were not meant to be used for pronunciation practice, but for reinforcing certain structures.

7.4.2. Observations of English lessons.

7.4.2.1. The schools.

Six teachers were observed, four from school 1, the more traditional school (teachers G, H, J & M), and two from school 2 – the model school which had moved away from the Ministry of Education’s rigorous syllabus and sole reliance upon the English for the Emirates series (teachers K & L). Both schools taught only Grades 1 and 2 (ages 6-8), boys and girls were taught separately in school 1 and in mixed classes in school 2. Numbers did not exceed 20 in a class at either school. The only exception to this was if a teacher was absent from work at school 1. The children from her class would be distributed amongst other classes for the day. This would result in an additional four or five children in other classes. As previously mentioned, school 1’s lessons lasted for the usual 40 minutes, whereas at school 2 they lasted for 50 minutes. Students received one lesson in English a day at each school. English was taught as a foreign language at both schools: its use was restricted to the designated English lesson; all other subjects were taught in Arabic.

School 2 had introduced a policy amongst its five English teachers: they only ever used English to communicate with children, inside and outside the classroom despite the fact that one teacher was Egyptian, the other four UAE nationals and all spoke Arabic. This procedure worked very well in practice: observations of children in the lunch hall
revealed that they only spoke in English to the English teachers. The language restriction did not appear to hamper their communication with these teachers either. They spoke often to them. It was noticeable at this school that children’s use of English was more fluent than at school 1, and they were more confident in speaking it.

It was decided to observe lessons of teacher K, interviewed in section 7.4.1. as she taught at school 2 and had raised some interesting issues with regard to her teaching practices and lesson activities. One other teacher from school 2 was selected at random to be observed (teacher L). Teachers G, H and J from school 1 who were interviewed and teacher M, who was not interviewed, were chosen for observations.

7.4.2.2. Methods of teaching reading.

The use of flashcards was observed with all teachers, although not in every lesson. Teacher G (school 1), worked simultaneously on getting Grade 1 children to read words connected with family members and clothing. This vocabulary was being recycled, and had been taught in previous lessons. She held up pictures of items of clothing and asked the class “What’s this?” The picture was then magnetically stuck to the whiteboard. After all vocabulary had been named orally, she brought out flashcards and asked which child could read out each. If a child didn’t read it correctly, she asked another to try. After initial reading of the card, children were drilled in unison with the word: “Say after me: trousers …. trousers …. trousers”. Finally cards were presented again, in a different order, and children asked to read aloud before a child was chosen to put it under the correct picture. Not all children got it right: for example, one boy put the word grandmother under the picture of a skirt.

Many of the lessons observed involved children reading aloud from flashcards, after the teacher had read the word first. However, there was no real indication in the early lessons that they were recognizing the letters or spellings – merely repeating verbally what the teacher had said. Subsequent jumbling of the cards and re-presenting them in a new order confirmed this: several children struggled to read them without help from the teacher. This was very evident with one activity: the words socks, shorts, T-shirt, ball, bag, teddy, dolls and cars were written on the board, and children given a worksheet
with corresponding words. They had to listen to a tape and tick each word if they heard it read aloud. Plenty of errors occurred if the words were not read aloud in the same order as they were written on the paper. One boy ticked “dress” instead of “teddy”. However, this was an activity in one of the first lessons to be observed. By the end of the three month observation period, children’s reading seemed to have improved greatly and they read this vocabulary more easily.

Teacher K, at school 2 employed a variety of media in teaching reading. She utilized visual word recognition practice, with rhyming word practice, music, pictures, audio books and even video clips. In one lesson she played a story on cassette about a shark with a fin, a grin and a nasty skin. She showed children a picture of a mean looking shark and pointed out the fin, the grin and the nasty skin. She had copied large scale pictures from the story book accompanying the tape, and showed these to the class as the story progressed. Music accompanied the reading and the children were mesmerized. There was constant repetition of the words fin, grin and skin throughout the reading. At the end the teacher asked some basic comprehension questions, then moved onto the rhyming words. She wrote several words with the same structure on the board: thin, grin, fin, skin, pin, bin – children were asked to supply as many more rhyming words as they could. In order to do this, children scanned the classroom walls looking for similar spelling patterns. It should be mentioned that this teacher had put together an amazing classroom: all walls and even the door were covered in flashcards with words written on them. In some places words had been grouped semantically: for example words for clothing or family members, in other places they had been grouped together if they produced the same sounds. The back of the door contained many exception words that children had been introduced to.

The tape was played a second time, but on this reading the rhyming words had been omitted. Children had to choose the correct word from the board and read it out loud at the appropriate moment in the story. The girls in the class appeared to be more attentive, the boys were restless and kept getting up from their seats. Finally the teacher put all rhyming words on the board, and asked children to come out individually and demonstrate “I hate that grin” or “this is my skin” or “I’m thin.”
In all teacher K’s activities, children showed a lot of initiative. They worked hard scanning classroom walls for rhyming words, demonstrating meanings of words or reading vocabulary from the board when completing worksheets. This level of interest or independence was not visible in any of the lessons observed at school 1.

Teacher L, at school 2, said that when she initially introduced words to children in grade 1, she drew their attention to graphic features of the letters: tall ones, short ones and letters with tails. She said that this helped them to visualize words more accurately. If a child was asked to spell a word such as ‘boy’ and could not remember the final letter, she would prompt him by reminding him that it was a ‘tail letter’.

Teacher K, at school 2, had taught children to use different principles to read phonetically regular and exception words. She had introduced letter sounds for regularly spelled words, and used hand gestures to describe letter sounds. This technique was observed in class: to indicate the letter ‘i’ she patted her head, for the letter ‘u’ children pounded their clenched fists one on top of the other. The teacher wrote the words ‘cat’ and ‘bat’ on the board and asked “What’s the vowel here?” Children responded by linking two fingers together. In this way she had drawn attention to the pronunciation of words and made learning letter sounds fun for the children. Children were prompted to read irregularly spelled words by reminding them that it was a “tricky word”. Presumably this would activate those words in the lexicon with irregular spellings.

Teacher M at school 1 was attempting to get children to recognize letter sounds, although this was not on the syllabus. She wrote the letters ‘ar’ on the board and asked the class to pronounce them. The response wasn’t very good – perhaps because these letters didn’t form a recognizable word, and children were slightly unsure of how to pronounce them. Then the teacher wrote ‘arm’ on the board and the reading response was much better. She then presented other words (or non-words) with the same grapheme-phoneme correspondences: ‘car’ ‘dar’ ‘dark’ ‘par’ ‘park’. Individual letters were picked out, for example ‘p’ and children were asked to sound them out. This they did without difficulty.
7.4.2.3. Reading for pleasure and other reading related activities.

When asked about reading for pleasure, the teachers from school 2 described the "Reading Room". This room did not have desks, but rather comfy seating and cushions, lights could be dimmed and the teacher could read to children. The room also contained a video so that excerpts of a film could be shown, to enhance the story. A reading progress chart for each child had been stuck on to the walls, so that children (and their parents) could view a child’s progress at a glance. The charts contained a picture of the child and listed all the mini story books they had read that year. As these were graded (from the Oxford Reading Tree, Hunt & Brychta, 1999 - 2003) it was easy to see which children not only read most, but could cope with more difficult material.

Teachers from school 1 said there was a school library and children sometimes went there with teachers to prepare for a project. It was mainly used for science lessons and most books were in Arabic. The school did not possess graded readers or large sized story books for the teacher to read to the class. One teacher said that sometimes she brought in her seven year old son’s books to read to the class, but most teachers said there just wasn’t the time: covering the syllabus was their main objective and took most of the lesson.

7.4.2.4. Teachers’ use of L1 in English lessons.

Three of the four teachers at school 1 were observed speaking Arabic in class to children during English lessons. It must be said that this usually occurred when a class of boys was being particularly rowdy and disruptive. When asked about this afterwards, one teacher said that she found the boys did not respond so well if told to be quiet in English, and it was therefore better to shout in Arabic. Another said that the children’s English wasn’t good enough to understand being disciplined. Arabic wasn’t spoken as much in girls’ lessons, but was observed on a few occasions when children didn’t understand. Teachers said that they tried to use English at all times, and provided pictures of key vocabulary so that students wouldn’t require translations.
7.4.3. Analysis of English course books.

The coursebook series includes a Teacher’s book, pupil’s book and workbook for each level. In Grades 1 and 2 the pupil’s books and workbooks focus on getting learners to recognize and spell familiar words and to tell the time and count in the target language. In Grade 3 however, the pupil’s book focuses more on reading while the workbook aims to develop grammar and vocabulary knowledge. This theme continues throughout the series. None of the books give any listening practice other than the cassettes which verbalise the reading texts, and no pronunciation practice is given either.

Under the heading “Teaching the reading skill” on page 33, Teachers Book 1 states:

Reading is very limited in Primary 1. Pupils are introduced to the shapes of letters [all small letters and capital A, H, B, I, M, G, N, Y, A, (sic) S, L, E] numbers and words which they have already encountered orally. Reading begins with letter/ number/ word recognition by means of flashcards. The important ones are supplied in the Teacher’s pack, but many teachers like to make more of their own.

The course uses many approaches to the teaching of reading, but in Primary 1 the Look and Say or whole word approach is dominant. This approach requires pupils to learn the shape of a word as a whole: they do not break it down into the sounds of the individual letters. This has proved to be the most successful introduction for Arabs – speakers of a language that is written phonetically.

An examination of English for the Emirates books 1 and 2 shows that this method of teaching word recognition is being practised. Book 1 page 88 (see Appendix 7.7.) shows six words where one or two letters in each have been omitted: a box, a book, a radio, a clock, a ball and a board. These words do not come from the same semantic group, neither do they have orthographic-pronunciation similarity. However, children would have been introduced to them in previous lessons and would be expected to know them aurally. The teacher would probably have shown the flashcards again, immediately before the children are asked to write to reinforce their memory of spellings. Children would then be asked to complete spellings by remembering letter sequences they have seen on flashcards.

200
On page 97 book 1, exercise B: *Play the spelling race and write* (see Appendix 7.8.) requires children to remember spellings for the words *car, girl, radio, bag* and *book* without any help. If we remember the previous example, on page 88 children were asked to spell *radio* and *book* with some help. It would be assumed that by the time they have reached page 97 they have learned the spellings of these (and other) words, and do not need prompting.

Exercise C on the same page (see Appendix 7.8.) asks children to read down a column of words, looking out for the one which is not semantically connected to the others. None of the words have orthographic-phonemic similarity and therefore children will be expected to recognize them from their letter sequences. It would be assumed that this was achieved through the teacher’s use of flashcards in previous lessons.

In book 2, page 6 (see Appendix 7.9.) five objects are pictured: ball, bag, rubber, car and box. The first letter of each word is missing and children are asked to complete spellings and match each word with the correct picture. These words have been recycled from Grade 1, and the activity aims to see if children have remembered spellings. This is another typical example of an activity which utilizes Look and Say methodology: the words do not share rime similarity, although three of them begin with the letter ‘b’. However, they are all words which would be in everyday usage in a primary school, and can therefore be readily taught and learned by children. They would initially have been learned from reading flashcards, and then perhaps copied into children’s books. As onset recognition occurs first and is a key trigger in lexical access, it is reasonable to assume learners would find it easier to supply a missing first letter as opposed to one which occurs later in a word.

Typical activities for training learners to develop a good visual imagery for spellings include words with jumbled letters: learners are asked to unscramble them to spell a familiar word, and crossword type tasks, where the initial letter is given, plus empty boxes for the other letters and learners must complete the spellings. Book 2 gives several examples of both these task types (see Appendices 7.10. and 7.11.).
Thus we can see that the textbooks do follow the Ministry's directives and that only Look and Say methods of promoting word recognition skill in the early grades, exist. A thorough investigation of books 1 and 2 shows that the examples given above are representative of the method of teaching reading throughout the book: no other method is used. A complaint often voiced by the supervisors interviewed was that at the higher levels the textbooks did not provide sufficient reading practice, or aim to develop specific reading skills. Examples of reading texts from books 7 and 9 used by students aged 15 and 17 respectively, will now be investigated in relation to these claims.

*Traditional sports* taken from Book 7, which is currently used by students of 15 years old, requires students to read short texts on camel racing and falconry – which are very well known pastimes in the UAE, and answer three questions afterwards. Text one is 45 words long, text two 64. Appendix 7.12. shows this page taken from a male UAE student's book. This student, after 7 years of schooling in the subject has little confidence in his ability to read and understand even a short passage such as this, without translating every word into his mother tongue. This page was shown to the two secondary teachers interviewed in section 7.4.1. and when asked if it was usual to find this amount of translation into Arabic in a student’s book, teacher F replied “yes”, and teacher E replied “sometimes”. This student may have been an exceptional case, but if not the picture regarding students’ reading abilities in the secondary school is bleak.

Book 9, currently the final volume in the series, which would therefore be used by students of 17 or 18 years old, gives 40 reading texts of varying length, each followed by short-answer questions. Each text introduces new vocabulary as well as recycling words students already know. Unit 4 lesson 1 on pages 42-43 (see Appendix 7.13.) gives a reading text about the history of the Olympic Games. This text, at 261 words is of average length compared to others in the book. When run through programs to assess readability level and Nation's word frequency levels, the following data was obtained:

Average number of words per sentence = 14.5
Average characters per word = 4.3
Total number of sentences = 18
Number of passive sentences = 0

202
The Flesch Kincaid Grade Level indicates the reading level of a particular text, based on the abilities of native English speaking Americans. The readability scale runs from levels 1 to 12, so a score of 5.6 represents a fairly easy text. Certain features, such as inclusion of passive sentences and word length will increase the Flesch Kincaid level considerably. However, the average word length in this text is only 4.3 letters, and there are no passive sentences.

The book instructs students to “listen, read and answer the questions” – the teacher will play a tape of the text read aloud by a native speaker. Students are not asked to do this themselves or to read silently. Post-reading questions ask students to write the correct name beside a picture of each sport mentioned in the pentathlon; in conjunction with the teacher to list up to 10 Olympic sports; and to name some famous athletes from the UAE and other countries and say what sports they played. No questions are given which might test comprehension of the passage, or require students to guess meanings of unknown vocabulary – other than the five pentathlon sports. There is no focus on skimming for gist, or scanning for a specific piece of information. It is debatable whether such a text and the questions which are supplied would really develop a student’s reading skills to the level demanded by an English medium university, which is what many of the students are aiming for.

Although Teacher’s book 1 states that at “primary 1 the Look and Say method is dominant” and that English for the Emirates uses “many approaches for the teaching of reading” no other method of teaching word pronunciation, or of developing reading skills is mentioned in subsequent books, until we reach the final year of schooling. Teacher’s book 9 (2000) suggests that teachers might want to break a word down into
syllables to aid pronunciation, but does not provide lessons specifically geared towards this, leaving it up to the teacher to develop the topic. The two secondary teachers interviewed in section 7.4.1. said that they did ask their students to break words into syllables, but it is important to remember that these were exceptional teachers who regularly attended training workshops run by TESOL Arabia. They had a good command of English and were open to new teaching ideas. As supervisors and trainers have said, many teachers do not fall into this category.

7.5. Conclusion.

The findings of this small scale study have indicated quite strongly that the methods currently being used to teach ESL reading and spelling in the U.A.E. are not ideal and may well have contributed to the problems experienced by mature Arab learners. In the following chapter, the evidence provided by this educational study will be weighed up against the findings of the previous experimental chapters, in order to ascertain the relevance of this claim.
Chapter 8.

Conclusion.

8.1. The problem.

This research study set out with the aim of discovering why Arab learners of ESL experience such difficulty with English spelling. It subsequently became apparent that it wasn’t only spellings that caused the problem: this group of learners were prone to reading errors too. Previous research (Al Sulaimani, 1990; Ryan, 1993) had compared the reading and spelling errors to those made by Developmental Surface Dyslexics, implying that while the phonological route remained intact, the orthographic route in reading and spelling was not functioning properly.

8.2. Research into Arabs' spelling errors.

Developmental Surface Dyslexia is explained by Frith’s (1985) model as being the failure to move from the alphabetic to the orthographic stage in reading and spelling. An arrest at stage 2 (alphabetic) means that a sufferer should be able to apply phoneme-grapheme correspondence rules in spelling, but may often misspell words which are irregular or which employ a less-frequently used rule. Misspellings made by Developmental Surface Dyslexics usually preserve the phonological properties of the target word, and can be classified as pseudo-homophones. Although data collected in a previous study (Al Sulaimani, 1990) did seem to bear out this phenomenon, my own experience of teaching Arab learners was that their spelling errors did not preserve the sound-properties of the target word. To assess whether this was in fact the case, an analysis of a corpus of spelling errors collected from technical writing reports, was carried out.

The results of this analysis (reported in chapter 1) showed that only 2.7% of misspellings could be accurately classified as ‘truly phonetic’ in nature. Phonetic misspellings constitute the most common type of spelling error made by native speakers (Bosman & Van Orden, 1997). It therefore becomes apparent that misspellings made by this group
of Arab learners differ markedly from those made by native English-speaking normal spellers, and those made by Developmental Surface Dyslexics. One other finding which came to light was that the vast majority of the errors involved vowels: inversions, substitutions, omissions or additions. These findings were in stark contrast to those of Al Sulaimani, and served as the basis for further investigations into ESL reading and spelling processes.

As mentioned in section 3.5.4., Al Sulaimani used spelling tests to collect his data, and the actual words used were from Coltheart et al.’s (1983) study of Surface Dyslexia. It is likely that many of the words were unknown to subjects, and therefore had to be spelled via PGC rules. This would account for the large number of phonetic spellings, as opposed to orthographic spellings. As Al Sulaimani’s subjects made many more phonetically plausible spelling errors than the Omani subjects, whose errors appear in chapter 1, the implication is that they possessed better alphabetic spelling skills. But is this really the case? Chapter 3 highlighted the fact that Al Sulaimani’s criteria for categorising a misspelling as phonetic was somewhat more lenient than my own. I had rigorously adhered to Bosman and Van Orden’s (1997) definition, as outlined in chapter 1. As Al Sulaimani doesn’t provide the entire corpus of spellings, it isn’t possible to check whether, given stricter classification guidelines, fewer errors would appear to be ‘phonetic’.

However, there is another possible reason for the higher incidence of phonetic misspellings. Some young children given excessive phonics teaching when learning to read, have been found to “bark at print”. Barking at print occurs when a child reads aloud by alphabetically decoding each word, sounding it out letter-by-letter. The reading is slow, painful to listen to, and the text is usually read without meaning as the child does not recognise the words. These children can often spell words very well via alphabetic principles, but insufficient reading practice on real books means that they lack orthographic reading and spelling skills. The fact that Al Sulaimani’s subjects appear to have good alphabetic spelling and reading skills, implies that they have been exposed to a great deal of phonics instruction. However, I am inclined to reject this as a possible explanation as my own research into methods of teaching ESL reading and spelling in the U.A.E. showed that phonics teaching was not used. Conversations with Saudi
friends, students and a text book writer confirm that phonic teaching isn’t used in Saudi Arabia either.

8.3. A previously suggested cause of Arabs’ errors.

Previous researchers have suggested that the reading and spelling errors may be due to differences in the way that English and Arabic writing are processed. Unfortunately there is currently a lack of published research into how word recognition and spelling occur in Arabic. Nevertheless, chapter 4 presented a review of how one could imagine these processes to occur, given the nature of the orthography. Research into second language reading and spelling using speakers of first languages other than Arabic has shown that L1 orthography, and consequently how words are read and spelled, can affect how less-skilled learners processes words in English. If a learner’s first language uses a logographic writing system, this will make reading and spelling in English, via alphabetic principles, more difficult for him unless he has been specifically taught along these lines. However, if his L1 uses an alphabetic writing system, he should have the advantage of knowing how to equate sounds with letters and thus build up representations of words. In this respect, it would appear that Arabs should find learning to read English as a second language easier to master than Chinese or Japanese students.

Research presented in chapter 4 showed that Arabic was a complex language to read, despite using regular phoneme-grapheme correspondences. Because of the partial phonological representations of words, the result of omitting short vowels in writing, the situation arises where several words may have the same spelling: homographs, and their meaning can only be understood when they are presented in context. Like English, Arabic can be described as having a *deep orthography*, where pronunciation is not always directly recoverable from a word’s spelling. Therefore like English, reading in Arabic depends to a large extent on orthographic reading skills. If reading skills are transferable from the L1 to the L2, we would expect a positive effect from the experience of learning to process Arabic words when learning English as a second language, not a negative one. It can be seen at this stage that the transfer theory as an explanation for the reading and spelling errors, is flawed. Akamatsu (2002) showed that skilled ESL readers, no matter what their first language, possess good orthographic
reading skills in the L2. These studies raised the question of why the Gulf Arab learners who were tested in the course of the present study – and those tested by other researchers (Al Hazemi, 1993; Al Sulaimani, 1990; Ryan, 1993 and Ryan & Meara, 1991) - should have had such poor reading and spelling skills.

8.4. Experiments conducted in the current study.

8.4.1. Testing alphabetic reading skills.

Before any conclusion could be reached regarding the cause of the errors, it was necessary to discover exactly where the problem lay. The spelling errors presented in chapter 1 strongly suggested that alphabetic reading and spelling skills may not have been fully acquired; that learners were not totally familiar with phoneme-grapheme correspondences used in English. In chapter 5, a non-word reading test showed that this was the case — the university undergraduates used in the test experienced difficulty in reading many of the items. A greater proportion of the errors were found to involve reading vowels as opposed to consonants, in line with the spelling errors recorded in chapter 1. The non-word reading test also showed that Arab learners were not familiar with common spelling patterns used in English, mispronouncing these as a result. It was hypothesised that the better readers in the group (as measured on reading comprehension tests) would perform better on the non-word test than the poor readers, indicating that they had better phonological decoding skills. This hypothesis was shown to be correct, indicating that possession of good phonological decoding skills, which is an attribute of good native speaker readers, is also an attribute of good Arab ESL readers.

8.4.2. Testing orthographic reading skills.

According to Frith’s (1985) model, if a learner hasn’t mastered the alphabetic route in reading and spelling, he shouldn’t be able to read via the orthographic route either. Previous research – reviewed in chapter 3, had shown this to be the case. However, most of the studies had used learners with very low levels of English language competence. It was hypothesised that if the same test was run with Arab students of a higher level, the results would show marked improvement in orthographic reading ability. In chapter 6,
an experiment based on one carried out by Ryan (1993) was used, where a semantically wrong word is put into a sentence in place of another word which has similar orthographic structure. If a reader has good orthographic reading skills, he will immediately spot the wrong word, whereas if he has poor skills, he may mistake the wrong word for the target. Two groups of Arab learners were used in the study: one at Intermediate, and one at Upper Intermediate level. Both groups demonstrated a weakness in orthographic reading skills when their performance was compared to that of groups of Spanish learners and native speakers. The results also showed a significant difference in the performance of the two Arab groups, indicating that the reading problems were due to a developmental lag, and would improve in time, as learners’ English and reading skills became more proficient.

8.5. What the experimental research presented in this thesis has shown.

Chapter 2 raised the question of whether Arab learners might be at Stage 2A (alphabetic spelling), 2B (alphabetic reading) or 3A (orthographic reading) of Frith’s model. The lack of phonetic misspellings in the corpus initially indicated that they might be at Stage 2A, but reading skills still had to be tested. The non-word reading test, reported in chapter 5, showed that alphabetic reading skills hadn’t been fully mastered, and the Word Discrimination Test reported in chapter 6, showed that Arab learners lacked orthographic reading skills too. In response to the question of which stage of Frith’s model Arab learners may be at, it is fair to say that because three different groups of subjects were used in the experiments of this research study, it is not possible to generalise findings to one specific ‘stage’. It is very likely that each group was at a different stage, and that individual members of each group were themselves at different stages of reading and spelling development. What has become clear, is that all Arab learners who were encountered in the course of this study, suffered from some kind of developmental lag in reading and spelling, be this at the alphabetic or orthographic stage. It is probably fairer to say that they had not arrested at a particular stage, as is the case with Developmental Dyslexics, but had failed to fully master stages as they progressed.
The question which then arose was: Why have Arab learners failed to effectively master reading and spelling via both routes? Possible negative effects from L1 orthographic processing had been ruled out, so could it therefore be due to the way they had been taught in primary and secondary schools? Chapter 7 presented a survey of methods used to teach English in the government schools of the UAE. This survey involved interviewing teachers, trainers and schools inspectors (called ‘supervisors’ in the UAE), observing Grades 1 and 2 literacy classes at two schools and an analysis of the Ministry of Education’s textbook series: English for the Emirates. This was a small-scale survey, but it did serve to highlight the inherent problems in the teaching methods currently used.

8.6. A study of the methods used to teach reading and spelling in U.A.E. government primary schools.

8.6.1. Methods of teaching reading.

It is important to distinguish between methods of teaching reading and the cognitive processes involved in reading. Both are important in the study of the acquisition of reading skills, and the object of this study was to investigate the teaching methods in relation to their ability to aid the development of cognitive skills necessary for reading.

According to Ehri (1998) learning to read involves learning to decipher print and comprehending the meaning of print. These broad skills are achieved through word recognition, and Ehri mentions at least five ways in which this can occur:

1. By assembling letters into a blend of sounds, referred to as decoding.
2. By pronouncing and blending familiar spelling patterns, a more advanced form of decoding.
3. By retrieving sight words from memory.
4. By analogizing words already known by sight.
5. By using context clues to predict words.

(Ehri, 1998: 7)

As a reader becomes more proficient, he will need to learn to utilise all five methods of recognising words. Any reading scheme must therefore attempt to help learners master
each of these skills. The experiments reported in chapters 5 and 6 showed that Arab learners on the whole experienced some difficulty in using methods 1-4 above. It should be noted that method 5, using context clues to predict words, refers to predicting the meanings of unknown words, i.e. words a reader hasn’t seen before and probably doesn’t know the meaning of either. This should not be confused with the heavy reliance on contextual clues to aid recognition of familiar words, which the Arab learners demonstrated in the Word Discrimination Test.

8.6.1.1. Methods of teaching reading in UAE schools.

The Ministry of Education in its Teacher’s Guide advises teachers to use the Look and Say method of teaching reading, and not to attempt to break words down into component parts or to teach letter sounds. Reliance on this as the sole method of teaching reading in the early grades was evident from the data: Textbooks provided activities geared towards reinforcing whole word recognition, interviews revealed that most teachers used this method and rarely deviated from the textbooks by using supplementary materials or introducing phonics based approaches. Observations indicated that all teachers used flashcards as a means of getting children to focus on recognizing words, and only teachers from the Model School (school 2) incorporated spelling, rhyming and letter sounding activities into their reading lessons.

The Look and Say method of teaching reading is recognized as being useful for beginning readers. However, Wragg, Wragg, Haynes and Chamberlin (1998) found in their study of 35 primary teachers in England, almost all teachers of young learners used phonics in their classes but the Look and Say technique was used less frequently, and was more likely to occur in Reception and Year 1 classes. They report the active teaching of sight vocabulary in fewer than a third of classes observed, and none of the teachers studied said they used it as the sole method of teaching reading. In contrast to this, the U.A.E. Ministry of Education advises teachers to use this method alone at Grade 1, as the irregular spellings of English would confuse early readers if phonics-based approaches were introduced.
The Ministry of Education states that “the use of flashcard should continue until the end of book 3” (Teacher’s Guide for the Preparatory Cycle, page 55), by which time a child will be eight or nine years old, and have been learning to read English for three years. The Ministry does not explain why flashcard use should be prolonged at the expense of phonics instruction, but one possible reason has arisen. In chapter 4 I mentioned that my observations of Arabic Grades 1 and 2 literacy classes9 had shown that teachers regularly used flashcards, but that this method was used to support the later orthographic recognition stage. It seems possible that the curriculum designers in the Ministry of Education have assumed that as English has a deep orthography like Arabic, the same methods of teaching literacy will benefit both languages. However, this does not explain why phonics approaches are adopted in the early stages of Arabic literacy teaching (as detailed in chapter 4), but not at all in English.

A complication of the UAE syllabus is that although it professes to use “many approaches to the teaching of reading,” in the early stages only Look and Say is evident, while in the later books only short simple texts followed by a few comprehension questions are given: little attempt is made to teach discrete reading skills such as skimming and scanning or guessing word meanings in context. Book 9 recommends that teachers break words down into syllables as an aid to reading, but at no point in the syllabus is the teaching of phonics advised.

Reading aloud, either individually to an adult, to the class, in groups, ERIC (Everyone Reads In Class) or peer-reading is a useful activity for reinforcing the links between sound units of words and their written form. It also allows teachers to observe difficulties with reading which may be experienced by individual learners (Goodman, 1973). In the study conducted by Wragg et. al, all teachers used some form of this technique with their students. Observations and interviews revealed that in the UAE reading aloud only focuses on single words or isolated sentences, not whole stories, and that infrequent practice is given.

---

9 Observations of Arabic classes were carried out in the same two schools which were used for the English teaching observations reported in the current study. The analysis of Arabic teaching methods formed a separate investigation from the English language study. Arabic observations were carried out with the aim of discovering which methods were used in the teaching of early literacy.
In chapter 1's spelling error corpus, it was noted that Arab learners made few phonologically accurate spelling errors, indicating that perhaps they were unsure of alphabetic spelling conventions. Alphabetic spelling emerges at Stage 2A of Frith's model, and so it was argued that if they could not spell via alphabetic principles, Arab learners should not be able to read by alphabetic principles either, as this occurs at the later Stage 2B. This hypothesis was shown to be correct in chapter 5's non-word reading test. The lack of practice in reading aloud given in the schools, and in teaching phonic knowledge may have contributed to learners' failure to fully master alphabetic reading and spelling skills.

For many native-speaking English children, reading processes are acquired naturally after initial instruction, through extensive reading. At school, children are encouraged to borrow books to read at home, then report on the content to the class in a future lesson. Parents buy books for their children, and reading is regarded as a pleasurable activity. Unfortunately the concept of "reading for pleasure" does not occur in the UAE government schools. Wragg et. al. (1998) found that English primary teachers used a variety of activities in their lessons, all aimed at making reading fun, as well as developing skills. The two teachers observed at school 2 in the chapter 7 study used a variety of activities geared towards making reading a fun activity, but they would appear to be an exception. Interviews with supervisors and trainers indicated that most teachers did not deviate from the material presented in the textbooks. Observations at school 1 confirmed that no reading for pleasure activities took place, and children were not assigned time to choose a book to read quietly on their own. Under these conditions, it is unlikely children would develop reading skills independently; there would be little motivation to persevere with what is regarded as a difficult activity.

8.6.2. The teaching of pronunciation.

Goswami (1997: 139) suggests that dyslexic children "may be delayed or handicapped in developing high quality phonological representations" of words, and that this may impede the reading process. It follows that by not being explicitly taught pronunciation of English words, Arab learners may easily acquire an incorrect pronunciation, which would also lead to deficits in the phonological representation. (If we refer to the
textbook, observation and interview data, it is apparent that the only form of 'pronunciation practice' that learners received was drilling – as a class or individually. Drilling is not a means of teaching or improving pronunciation, rather it is used to reinforce structures which are to be learned as wholes, e.g. "How are you?" "I'm fine thank you.") If we assume that a phonological representation will be matched with an orthographic form, i.e. a spoken and a written form of the same word, problems will occur at stages 2 and 3 if the learner has acquired a wrong pronunciation. He will find it more difficult to acquire alphabetic principles of reading and spelling if the 'form' of the word he is trying to use is incorrect, and this will subsequently affect his ability to form orthographic images of the word.

An example of a spelling error caused by an inadequate phonological representation can be seen in the writing of a second year student at Zayed University, who wrote boat instead of bought. When asked about this she replied that both words sounded the same to her, and she had chosen the wrong form. She said that she was aware of the other spelling, but in her exam had just "forgotten" it. This instance indicates the student had not mastered stage 3B of Frith's model adequately: although she was aware of the correct form (stage 3A – orthographic reading), she could not recall it in spelling (stage 3B). According to Frith, progress from stage 3A to 3B requires a great deal of practice in writing a word in order to permanently fix its spelling in the mental lexicon.

In chapter 1, 9.7% of the misspellings constituted "real word errors," where a misspelling actually took on the form of another word, for example: RETAINS for returns, STEAL RULER for steel ruler, SOCK for souk, WITHER for weather and TOW for two. The question was asked: What induces a writer to write a word that is semantically unrelated, but which has a similar orthographic structure to the target word? And, would similar errors occur in reading as well as spelling? The answer to the second question appears to be yes, because in chapter 6's Word Discrimination Test, Arab learners did in fact accept one word in place of another. With regard to the first part of the question, it is my feeling that these real word errors are caused by a combination of:
• Poor phonemic discrimination: learners may not actually be able to hear the difference between some sounds,
• Poor knowledge of phoneme-grapheme conventions, i.e. poor alphabetic skills,
• And poor orthographic reading and spelling skills, which mean that word forms are stored incompletely, possibly as Frith (1980) says, by initial and final letters, consonants and letters representing strong sounds at syllable boundaries.

Poor phonological discriminatory skills are clearly not entirely able to account for the variety of reading and spelling errors we find in Arabs’ English, but they may account for a part of them. Practice in discriminating phonemes, such as in minimal pairs exercises which focus attention on sound quality distinctions within words, would help alleviate spelling and word recognition problems caused by ignorance of a word’s phonology. Practice in reading aloud would help learners develop alphabetic skills, and to reinforce their memory of orthographical word forms and their spoken equivalents. Unfortunately neither of these activities were widely used in the UAE.

8.6.3. The teaching of spelling.

Frith (1980) states that reading may proceed on the basis of full or partial cues. Spelling on the other hand is dependent on full cues, as the example of the student who misspelled bought as boat, showed: although she knew both spellings, and could recognise both words when reading, she was unable to recall the correct form when writing. Partial cues may involve knowledge of some salient feature of a word (stage 3A), but full cues would involve knowing the identity and position of all the letters of a word (stage 3B). By this we can understand that reading does not establish a full orthographic description of the word in the lexicon, however spelling does. Knowledge of a word’s spelling therefore can be seen as an aid to the development of the ‘full cues’ necessary for accurate word recognition. Knowledge of full cues would also enable a writer to detect a misspelling (Funnell, 1992) thus helping himself to acquire better spelling ability.
Although the Ministry of Education advises teachers to use a variety of spelling games, most of the teachers interviewed said they didn’t know of anything other than Hangman or ‘dictations’. These dictations, reported supervisors and trainers, were no more than spelling tests. The Ministry, in its Teacher’s Guide for the Preparatory Cycle (page 29) gives an example of the type of spelling game which can be played:

“Give pupils some of these anagrams to work out in a group:

1. A huge cat. It is yellow and black. (rtgie)
2. You can drink tea here. (face)
3. You go to it when you are ill. (Ipihtosa)”

However, this is the only spelling game suggested, and most teachers appeared to be unaware of it anyway. Graham and Kelly (1999) provide many examples of spelling games which can be used to develop phonic knowledge as well as to increase children’s confidence in spelling, e.g. Hangman, Boggle, Shannon’s Game and Scrabble. These games focus on word-building techniques, encouraging children to ‘sound out’ words as they write them. The Ministry’s anagram game on the other hand, encourages whole-word retrieval of spellings from the lexicon, and would therefore only work with words which are already very well-known to children. Class observations indicated that children did in fact learn spellings from flashcards as wholes, the Look, Cover, Write, Check procedure.

Teachers did not appear to focus on spelling to any great degree in lessons, and supervisors said that many teachers did not consider spelling errors to be of major concern in students’ work as they could “understand what the student had meant to write.” The lack of importance attached to correct spelling may well have filtered down from the Ministry, who state “spelling interference is not felt to be the problem it once was” (Teacher’s Guide for the Preparatory Cycle, page 39), but give no details about why this should be. It would appear that in not focusing on spellings and not giving sufficient practice to learners, teachers are depriving their students of an opportunity to develop reading as well as spelling skills. In the Word Discrimination Test reported in chapter 6, Arab learners demonstrated an inability to spot a wrong word in context. This
experiment shows that they may well be reading by what Frith terms ‘partial cues’ and this may be due in part to the lack of emphasis placed on spelling at school.

8.6.4. Learning to read English and Arabic in Grade 1.

A question raised by the chapter 7 study concerned the simultaneous introduction of two orthographies at Grade 1. Is it possible that this presents additional difficulties for young learners? Trainer N mentioned that the Oman Ministry of Education had recently changed their syllabus and textbooks so that children would be taught to read in Arabic for the first three years, and learn only spoken English during this time. It was hoped that by allowing children to get to grips with one orthography at a time, this would lessen the cognitive demands on the child. It was suggested by Al Sulaimani (1990) and Ryan (1993), reported in chapter 3, that knowledge of Arabic orthography had contributed to the reading and spelling errors in English. In chapter 4 this theory was rejected on the grounds that similarities between Arabic and English (both alphabetic languages, both ‘deep orthographies’) should have made it easier for children to learn English, not more difficult. However, many of the studies of L2 reading focus on skilled reading by adults, not the development of reading strategies in two languages simultaneously. Young children are developing cognitively at the same time they are learning to read and write, and whilst they may be fluent in the L1, will almost certainly not be in the L2. These additional demands placed on the developing cognitive system may slow down the process of acquisition, and inadvertently cause errors to be made while children are learning the ‘rules’ of each system.

8.7. Exposure to English and the effects of living in a bilingual community.

Geva and Siegel (2000) found that Israeli children learning to read in Hebrew and English simultaneously developed word recognition skills with relative ease, even in the absence of sufficient oral language skills. We may wonder why Hebrew children learn to read in two languages concurrently without problems, when Arab learners do not. One reason may be the educational policies of the learners’ community: if learners live in a bilingual community where English is widely used and is the medium for most school subjects, they should have sufficient exposure to the target language and practice with its
use, to acquire it without difficulty. However, with insufficient exposure or practice, language skills will probably not arise to the same degree of proficiency.

In the United Arab Emirates, 66% of the population (and 90% of the population of Dubai) are expatriates, coming from a wide range of countries and speaking a variety of languages. The U.A.E. classifies itself as a bilingual country: the officially recognized languages being Arabic and English, the latter having been adopted as the second language due to its international status. Arabic remains the language of government, the Sharia courts and primary and secondary education, but English is used in commerce and higher education. Educational policy dictates that all subjects at school are taught in Arabic, with the exception of English. This contrasts starkly with Singapore, another multilingual community, where the Ministry of Education requires that all children learn English as their L1, and one of the other three official languages as a mother tongue or L2 in school (Liow, 1999). In Singapore English has become the most important language for children’s literacy skills although it is still in many cases the second or third language for oral communication.

The United Arab Emirates, despite being a bilingual country requires all primary and secondary school subjects to be taught in Arabic, often by teachers with little or no command of English. Most children therefore only receive one 40 minute lesson in English each day – a total of 3:20 hours per week. This may well be insufficient to develop the English language skills needed to function in a bilingual community. It would appear that the attainment level in English reached by most students after graduating from high school is insufficient for their future needs. This situation has quite likely arisen from the current educational system: the syllabus, textbooks, teaching methods and the teachers themselves, who were frequently considered by the supervisors and trainers interviewed, to have poor English skills.

The chapter 7 study has shown that the textbooks provide insufficient reading practice at the higher levels to support students’ future needs in English such as embarking on a university course. The sample reading text selected from book 9 which would be used by final year students aged 17 or 18, contained only 261 words and had a Flesch Kincaid reading level of 5.6. When students enter degree programmes at Zayed University in
Dubai or Abu Dhabi, they are required to read texts at grade 12. Clearly they are ill prepared for the task, and subsequently must spend up to two years in a Foundation programme. On entering this programme students are required to begin reading texts with an FK grade of 8 or more. After a year they will have progressed to reading texts of grade 10 to 12. Unfortunately the speed of progress appears too fast for several, and they do not really achieve the standard required. This situation might have been averted if the school system had provided them with a detailed reading syllabus which provided for the many complex reading skills to be mastered in English, textbooks that required a higher level of reading and teachers who were able to perform well at this level.

8.8. **Summary of the findings of the educational study.**

Does the study provide sufficient evidence to suggest that educational practices in the UAE might have contributed to students’ many reading and spelling problems in English? Several issues were raised in connection with this question, and the answer is probably that the current educational system has not helped students sufficiently, but it cannot be held wholly responsible. Insufficient practice in reading and writing English, and the general feeling that learning correct spelling isn’t important, have also contributed to the problems.

We have seen that progression through each stage of Frith’s model involves active learning of the next process – this learning will depend on instruction and materials presented by the teacher: mastery of each stage can only occur with sufficient input. The educational study has shown that inadequate input is being provided, particularly with regard to the acquisition of alphabetic reading and spelling skills. A more diverse approach to the teaching of reading which focuses on a variety of methods, activities and task types would undoubtedly help improve reading and spelling skills. This in turn might help to improve students’ interest in reading: if motivation were increased, performance would probably improve also. Students at the higher levels need to be stretched more, they need more challenging and longer texts, and again a variety of task types aimed at developing reading sub-skills.
8.9. Frith’s (1985) model and the findings of the present study.

The findings of this research study have raise some questions about the applicability of Frith’s model to ‘normal’ readers and second language learners. Frith’s model was originally devised to explain different types of developmental dyslexia and dysgraphia. Frith describes these in terms of being an arrest at the various stages of the model, leading to a failure at the next stage. However, does the model adequately explain reading and spelling acquisition by non-dyslexic readers and spellers? And can it account for reading and spelling development in a second language?

8.9.1. Applicability of Frith’s model to learners of English as a second language.

Any model which is designed to portray L1 processing or developmental sequences, must be evaluated carefully before assuming that the same processes, or sequences, are used by second language learners. Liow (1999) questioned the applicability of Frith’s model to the reading development of L2 learners, particularly those learners whose L1 did not have an alphabetic orthography. Her studies of Singaporean children with L1 Chinese, showed that being exposed to the logographic script of their L1 in school was “more likely to enhance whole-word look-say strategies and direct route reading than non-lexical phonological processing, thereby prolonging (or favouring) Frith’s logographic stage for reading indefinitely” in L2 English (Liow, 1999: 200). Liow found that Singaporean children with L1 Malay (a shallow orthography) were taught to read in their L1 through the use of methods which explicitly taught grapheme-phoneme correspondences, and “although some of the correspondences are different, this [was] likely to enhance phonemic awareness in English, and facilitate an early shift to non-lexical alphabetic processing, thus making the logographic stage either redundant or very short-lived” (p. 200).

In the light of Liow’s findings, can Frith’s model be said to apply to Arabs, and if so, with what modifications? As chapter 4 outlined, Arabic is an alphabetic orthography with regular grapheme-phoneme correspondences, however, because it does not write the short vowels, may be termed ‘deep’ and readers must develop good orthographic recognition skills – as is the case with English. Chapter 4 outlined the method whereby
children are taught to read in Arabic: firstly by learning sound-symbol correspondences, then through the use of flashcards which show words spelled with 'pointed' Arabic, (so children can learn alphabetic decoding principles) and finally, with words written in 'unpointed' Arabic, so learners can develop orthographic recognition skills. The stages of reading development in Arabic, therefore, appear to be roughly similar to the stages in English.

Spelling in Arabic is a different matter though. Because the orthography uses regular correspondences, words can be spelled simply by recalling each consonant phoneme in sequence, and writing its graphemic representation. This process would equate to stage 2A of Frith’s model. Due to the regularity of the orthography, it is possible that an orthographic spelling stage does not exist in Arabic, and so spelling development ends at stage 2.

Thus, the applicability of Frith’s model to L2 learners, seems to depend on their L1 orthography. If their L1 uses a logographic script, such as Chinese, transfers of skill from L1 to L2 mean the model is probably not representative of how L2 English reading and spelling development occurs in these learners. On the other hand, if their L1 is alphabetic, then the model should represent the stages of their development. However, an important factor appears to be whether the L1 shares the same alphabet and correspondences as English. If it does, children will proceed much faster to the alphabetic stage. If it doesn’t, and particularly if these learners have not received adequate instruction in GPC rules, as seems to be the case with Arab learners, they may possibly be held up at the pre-alphabetic stage. The fact that so many of chapter 1’s spelling errors do not preserve the phonological properties of the word seems to indicate that this is what has happened.

8.9.2. Applicability of Frith’s model to non-dyslexic readers.

Some readers who are not dyslexic may nevertheless experience certain difficulties in reading and spelling. These are what Reid (1998: 79) describes as “globally less effective readers.” Chapter 5 drew attention to the non-word reading performance of some Arab learners, which suggested that they might fall into this category.
Experiments carried out in the current thesis showed that in many cases, Arab subjects classified as having similar English language levels and reading comprehension abilities, actually had quite different abilities in terms of their alphabetic and orthographic reading skills. This implies that there may be 'fuzzy boundaries' to the stages of Frith's model, and that readers may progress to a later stage without having fully mastered an earlier one. According to the model, this isn't possible, as each stage must be 'acquired' first before a reader or speller can move to the next. Frith does not specify explicitly what she means by 'acquired', and it may be, for example, that basic alphabetic principles have to be learned, but not with 100% accuracy, in order to move to the orthographic stage.

Frith (1985: 306-7) states that her model "leaves open the possibilities of how the initially acquired strategies are continued in skilled reading". She goes on to say that "they may be available at all times, such that in case of need, a reader can "fall back" on earlier strategies. On the other hand, once the orthographic strategy has become established, the previous strategies might be less accessible: it is possible that they cannot be used later without special retraining or in special (e.g. experimental) circumstances." Given that Frith's model is now 20 years old, and represents an early attempt to define how reading and spelling development occurs, it is understandable that these questions are unanswered in the literature of the time. Today, it is generally acknowledged that skilled readers retain their good alphabetic reading abilities, whilst possessing good orthographic skills at the same time. However, although a reader might possess good alphabetic reading skills, it is possible that his preference will be for reading orthographically.

Baron and Strawson (1976) described readers of English as being 'Chinese' or 'Phoenician,' depending on whether they were better at reading orthographically or phonologically. In the current study, evidence for this was found with academic skilled readers, in the non-word reading test. Although all subjects managed to read the entire set of non-words, it became evident that two of them found the GPC based items more difficult to read than the analogous non-words. This difficulty, although not marked by error, was apparent from the long hesitations before they read many of the non-words. These subjects appear to be what Baron and Strawson would call 'Chinese' readers.
Other members of the group read both types of non-word equally well. Frith's model assumes that all readers behave in the same way, and that development of the skills is dependent upon 'mastery' of each stage in sequence. Experimental research findings presented in this thesis suggest that in fact, this may not be the case. Readers appear to perform as individuals, some having better alphabetic reading skills and some better orthographic reading skills.

8.10. Recommendations of this study.

8.10.1. Further research.

The educational study presented in chapter 7 has shown that a major cause of the reading and spelling errors made by Arab ESL learners is inappropriate instruction in the schools and insufficient reading practice. However, this was a small scale study and focussed only on the situation in the United Arab Emirates. Whilst some anecdotal evidence was provided to support the notion that similar educational practices occurred throughout the Gulf region, ultimately, no research was carried out in these countries. In order to generalise the findings of this study to all Gulf Arab nationals, it will be necessary to carry out a more thorough investigation of educational practices in other countries.

8.10.2. Development of ESL teaching policies.

The educational situation could be rectified by training teachers how to teach phonics, putting a greater emphasis on the necessity for correct spelling, giving extensive reading practice followed by more demanding tasks and by introducing a series of coursebooks which truly reflect the English language needs of learners in a bilingual environment. Such a move would necessitate re-training teachers, which would be a big task in itself. There is evidence that change is currently underway, though. In 1998, the Ministry of Education in Oman in conjunction with Leeds University, began a programme to upgrade all primary school teachers to degree level. This programme involved introducing teachers to methods of teaching reading such as phonics. In the year 2000 the Curriculum Development Department, Oman, started introducing a new course of
textbooks, *English for Me*, at the rate of one new book a year. *English for Me* aims to support the teaching methods currently taught under the Leeds University programme. It is to be hoped that other Gulf countries will effect this kind of change in the future.
Appendix 1.1.

**Samples of each error category recorded in the preliminary study of spelling errors.**

**Single errors.**

<table>
<thead>
<tr>
<th>Error type.</th>
<th>Target word.</th>
<th>Misspelling.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vowel substitution (wrong vowel in a word)</td>
<td>Family</td>
<td>Famely</td>
</tr>
<tr>
<td></td>
<td>Difficult</td>
<td>Difficult</td>
</tr>
<tr>
<td></td>
<td>Steel ruler</td>
<td>Steal ruler</td>
</tr>
<tr>
<td></td>
<td>Drilled</td>
<td>Drillid</td>
</tr>
<tr>
<td></td>
<td>Animals</td>
<td>Anemals</td>
</tr>
<tr>
<td></td>
<td>material</td>
<td>material</td>
</tr>
<tr>
<td>Vowel omission.</td>
<td>Supermarket</td>
<td>Suprmarket</td>
</tr>
<tr>
<td></td>
<td>One</td>
<td>On</td>
</tr>
<tr>
<td></td>
<td>Dangerous</td>
<td>Dangerous</td>
</tr>
<tr>
<td></td>
<td>Simple</td>
<td>Smple</td>
</tr>
<tr>
<td></td>
<td>Plastic</td>
<td>Plstic</td>
</tr>
<tr>
<td></td>
<td>Apparatus</td>
<td>Appartus</td>
</tr>
<tr>
<td>Mis-ordering of vowels (All vowels present but may be placed in wrong position within the word)</td>
<td>Nice</td>
<td>Ince</td>
</tr>
<tr>
<td></td>
<td>Holiday</td>
<td>Holiday</td>
</tr>
<tr>
<td></td>
<td>Famous</td>
<td>Famuos</td>
</tr>
<tr>
<td></td>
<td>Because</td>
<td>Beacuse</td>
</tr>
<tr>
<td></td>
<td>Palm</td>
<td>Plam</td>
</tr>
<tr>
<td></td>
<td>Crocodile clips</td>
<td>Crocodile clips</td>
</tr>
<tr>
<td>Additional vowel. (Extra vowel inserted in a word)</td>
<td>Heavy</td>
<td>Heavy</td>
</tr>
<tr>
<td></td>
<td>Cylindrical</td>
<td>Cylindrical</td>
</tr>
<tr>
<td></td>
<td>Lines</td>
<td>Leines</td>
</tr>
<tr>
<td></td>
<td>These</td>
<td>Thease</td>
</tr>
<tr>
<td></td>
<td>Types</td>
<td>Tetypes</td>
</tr>
<tr>
<td></td>
<td>Silver</td>
<td>Silever</td>
</tr>
<tr>
<td>Consonant error.</td>
<td>Shopkeepers</td>
<td>Shopkebers</td>
</tr>
<tr>
<td></td>
<td>Job description</td>
<td>Jop description</td>
</tr>
<tr>
<td></td>
<td>Big</td>
<td>Bigg</td>
</tr>
<tr>
<td></td>
<td>Cylinder</td>
<td>Syllerider</td>
</tr>
<tr>
<td></td>
<td>First</td>
<td>Firs</td>
</tr>
<tr>
<td></td>
<td>Plastic</td>
<td>Plastic</td>
</tr>
</tbody>
</table>
### Appendix 1.1. (2)

#### Combination errors.

<table>
<thead>
<tr>
<th>Error type.</th>
<th>Target word.</th>
<th>Misspelling.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional vowel + missing vowel.</td>
<td>Smooth</td>
<td>Somthe</td>
</tr>
<tr>
<td></td>
<td>Circuit</td>
<td>Circute</td>
</tr>
<tr>
<td></td>
<td>Displacement can</td>
<td>Displacment cane</td>
</tr>
<tr>
<td></td>
<td>History</td>
<td>Histry</td>
</tr>
<tr>
<td>Additional vowel + wrong vowel.</td>
<td>Famous</td>
<td>Faumoes</td>
</tr>
<tr>
<td></td>
<td>Country</td>
<td>Cantery</td>
</tr>
<tr>
<td></td>
<td>Returns</td>
<td>Retains</td>
</tr>
<tr>
<td></td>
<td>Install</td>
<td>Instole</td>
</tr>
<tr>
<td>Additional vowel + mis-ordered vowel.</td>
<td>Flux</td>
<td>Flaxu</td>
</tr>
<tr>
<td></td>
<td>Screw</td>
<td>secrow</td>
</tr>
<tr>
<td></td>
<td>Bulb</td>
<td>bolub</td>
</tr>
<tr>
<td>Missing vowel + wrong vowel.</td>
<td>Chocolate</td>
<td>Chaclate</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>Gvnamnt</td>
</tr>
<tr>
<td></td>
<td>Special</td>
<td>Spical</td>
</tr>
<tr>
<td></td>
<td>Careful</td>
<td>Curfal</td>
</tr>
<tr>
<td>Missing vowel + mis-ordered vowel.</td>
<td>People</td>
<td>Pepol</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>Tempreture</td>
</tr>
<tr>
<td></td>
<td>Vernier caliper</td>
<td>Veriner cliper</td>
</tr>
<tr>
<td></td>
<td>Generate</td>
<td>Genreat</td>
</tr>
<tr>
<td>Wrong vowel + mis-ordered vowel.</td>
<td>Roots</td>
<td>Rotes</td>
</tr>
<tr>
<td></td>
<td>Separated</td>
<td>Sepreated</td>
</tr>
<tr>
<td></td>
<td>Nails</td>
<td>Niels</td>
</tr>
<tr>
<td>Consonant error + additional vowel.</td>
<td>Scriber</td>
<td>Scraiper</td>
</tr>
<tr>
<td></td>
<td>Explode</td>
<td>Explorate</td>
</tr>
<tr>
<td>Consonant error + missing vowel.</td>
<td>Useful</td>
<td>Usfull</td>
</tr>
<tr>
<td></td>
<td>Describe</td>
<td>Descrip</td>
</tr>
<tr>
<td></td>
<td>Following</td>
<td>flowing</td>
</tr>
<tr>
<td></td>
<td>Soldering grease</td>
<td>soldering gress</td>
</tr>
<tr>
<td>Consonant error + wrong vowel.</td>
<td>Humidity</td>
<td>Dumedity</td>
</tr>
<tr>
<td></td>
<td>Shopkeepers</td>
<td>Shopkeabers</td>
</tr>
<tr>
<td></td>
<td>To keep</td>
<td>To keabt</td>
</tr>
<tr>
<td></td>
<td>Ground</td>
<td>Grawnd</td>
</tr>
<tr>
<td>Consonant error + mis-ordered vowels.</td>
<td>Handle</td>
<td>Handell</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td>Lnehgt</td>
</tr>
<tr>
<td></td>
<td>Was plotted</td>
<td>Was polted</td>
</tr>
<tr>
<td></td>
<td>Variations</td>
<td>Ravaitions</td>
</tr>
</tbody>
</table>
Appendix 1.1. (3)

Complex errors.

<table>
<thead>
<tr>
<th>Error type.</th>
<th>Target word.</th>
<th>Misspelling.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complex.</td>
<td>Battinah (area of Oman)</td>
<td>Patena</td>
</tr>
<tr>
<td></td>
<td>Returned back</td>
<td>Retairend pack</td>
</tr>
<tr>
<td></td>
<td>Special plastic basket</td>
<td>Splastic pasckit</td>
</tr>
<tr>
<td></td>
<td>Careful</td>
<td>Carffle</td>
</tr>
<tr>
<td></td>
<td>Vernier caliper</td>
<td>Burny calkar</td>
</tr>
<tr>
<td></td>
<td>Hacksaw</td>
<td>Hceswe</td>
</tr>
<tr>
<td></td>
<td>Nails</td>
<td>Niddles</td>
</tr>
<tr>
<td></td>
<td>Galvenise</td>
<td>Gollvinaise</td>
</tr>
<tr>
<td></td>
<td>Comments</td>
<td>Commenduse</td>
</tr>
</tbody>
</table>
Appendix 1.2.

Classifying word spellings as regular or irregular.

English orthography owes much of its inconsistency related to the pronunciation of a word, to derivational factors. Imported foreign words, which may be pronounced according to spellings in their language of origin, often take on a different pronunciation in English; eg: *yacht*, a word of Dutch origin, is pronounced in Dutch according to the way it is spelled: /jækt/ but pronounced /jɔt/ in English. In some words the inclusion of a letters seems to have no purpose, eg: the ‘a’ in *health*. However, if we consider the relationship in meaning between this word and *heal*, where ‘ea’ is pronounced /iː/, it becomes apparent that semantic origin plays an important role in many spellings. However, when assessing whether words were of regular or irregular spelling I did not take semantic origin into account, even though a relationship in spellings can often aid word recognition.

Many linguists believe there are in fact a number of regularities in the English spelling system, but that they are often relatively complex (Crystal, 1995; Treiman, 1998). In determining whether a word was of regular or irregular spelling, I considered three things:

1. Did the spelling follow a rule as such?
2. Was the word a member of a group of words which shared similarity in spelling and pronunciation?
3. Did the word have direct phoneme-grapheme correspondences?
4. In the case of digraphs and trigraphs, were they used consistently to represent the same pronunciation?

When considering spelling rules, sometimes a word can appear to be affected by two conflicting rules at the same time. For example, Treiman (1998) mentions the following rule: *e* is added after what would otherwise be a final *v* or *u*, as in *give* and *glue* – even though this addition doesn’t appear to have any effect on pronunciation. However, despite this rule I have classified *give* as irregular, as it is also a member of a large group of similarly spelled words which are pronounced differently – as detailed below. Regularity, according to Crystal (1995), implies the existence of a rule which can generate large numbers of words correctly. In the case of *give*, the latter rule appeared to account for more spellings, and was therefore judged to be of more relevance to the word’s status.

Another rule could be said to be that when a suffix beginning with *e*, *i* or *y* is added to a word ending in *c*, a *k* is normally inserted after the *c* as in *picnicking* or *trafficking*. As words ending in ‘ic’ are not common in English – being of Italian origin, there are no exceptions. A somewhat simpler rule is that of the ‘magic e’ which lengthens the preceding vowel: eg: *rat* and *rate*; a rule which would appear to be applied consistently. However, most rules have exceptions, and it is the exception cases which I have deemed to constitute irregular spellings.
Words belonging to groups of similar spelling usually have similar pronunciation, eg: mint, hint, stint, tint, pinto however pint is the exception. In this case, pint would be classified as an irregularly spelled word. In the same way, give is not pronounced in accordance with other members of the group sharing a common spelling pattern: hive, jive, Clive, dive, five, strive – live is an exception as it can be pronounced either way, depending on whether it is being used as an adjective or verb. If a word was judged to be a member of the larger group where a common pattern of spelling and pronunciation was evident, then this was taken to represent regular orthography. If on the other hand, the words such as give, live and pint appeared to be in the minority, they were judged to be irregular.

Instances of the inclusion of a silent letter were also judged to be irregular. For example: castle, plumber, knife, almond, palm tree. The word sign would be classified as irregularly spelled as its pronunciation does not include the letter g, even though it derives from the same source as signature where the g is pronounced. Signature has been classified as regular as it belongs to a family of words where 'ture' is pronounced in a similar way, eg: nature, stature, ligature.

Words were also judged to be irregular where there was no direct relationship between phonemes and graphemes, eg: one, two and who. If a digraph was consistently used to represent the same phoneme, eg ch /ʃ/, th /ð/ or /θ/ and sh /ʃ/, this constituted a regular spelling. If for example, the digraph was used to represent a differing pronunciation from the norm, this was judged to be irregular eg: chaos, chasm, thyme, chiropodist, psychology, chemist.
## Appendix : 4.1 Chart of Arabic letters (Holes, 1995).

<table>
<thead>
<tr>
<th>name of letter</th>
<th>SHAPE</th>
<th>with preceding letter</th>
<th>with following letter</th>
<th>with both</th>
<th>symbol in transcription</th>
</tr>
</thead>
<tbody>
<tr>
<td>?alif</td>
<td>ا</td>
<td></td>
<td></td>
<td></td>
<td>(vowel length)</td>
</tr>
<tr>
<td>ba:?</td>
<td>ب</td>
<td></td>
<td></td>
<td></td>
<td>b</td>
</tr>
<tr>
<td>ta:?</td>
<td>ث</td>
<td></td>
<td></td>
<td></td>
<td>t</td>
</tr>
<tr>
<td>qa:?</td>
<td>ق</td>
<td></td>
<td></td>
<td></td>
<td>ئ</td>
</tr>
<tr>
<td>je:m</td>
<td>ج</td>
<td></td>
<td></td>
<td></td>
<td>ج</td>
</tr>
<tr>
<td>ha:?</td>
<td>ح</td>
<td></td>
<td></td>
<td></td>
<td>ح</td>
</tr>
<tr>
<td>xa:?</td>
<td>خ</td>
<td></td>
<td></td>
<td></td>
<td>خ</td>
</tr>
<tr>
<td>da:l</td>
<td>د</td>
<td></td>
<td></td>
<td></td>
<td>د</td>
</tr>
<tr>
<td>dal</td>
<td>ذ</td>
<td></td>
<td></td>
<td></td>
<td>ذ</td>
</tr>
<tr>
<td>ra:?</td>
<td>ر</td>
<td></td>
<td></td>
<td></td>
<td>ر</td>
</tr>
<tr>
<td>za:?</td>
<td>ز</td>
<td></td>
<td></td>
<td></td>
<td>ز</td>
</tr>
<tr>
<td>sin</td>
<td>س</td>
<td></td>
<td></td>
<td></td>
<td>س</td>
</tr>
<tr>
<td>shin</td>
<td>ش</td>
<td></td>
<td></td>
<td></td>
<td>ش</td>
</tr>
<tr>
<td>sa:d</td>
<td>ض</td>
<td></td>
<td></td>
<td></td>
<td>ض</td>
</tr>
<tr>
<td>da:d</td>
<td>ط</td>
<td></td>
<td></td>
<td></td>
<td>ط</td>
</tr>
<tr>
<td>fa:?</td>
<td>ظ</td>
<td></td>
<td></td>
<td></td>
<td>ظ</td>
</tr>
<tr>
<td>qa:f</td>
<td>؟</td>
<td></td>
<td></td>
<td></td>
<td>؟</td>
</tr>
<tr>
<td>ka:f</td>
<td>ك</td>
<td></td>
<td></td>
<td></td>
<td>ك</td>
</tr>
<tr>
<td>lam</td>
<td>ل</td>
<td></td>
<td></td>
<td></td>
<td>ل</td>
</tr>
<tr>
<td>mi:m</td>
<td>م</td>
<td></td>
<td></td>
<td></td>
<td>م</td>
</tr>
<tr>
<td>nu:n</td>
<td>ن</td>
<td></td>
<td></td>
<td></td>
<td>ن</td>
</tr>
<tr>
<td>ha:?</td>
<td>ه</td>
<td></td>
<td></td>
<td></td>
<td>ه</td>
</tr>
<tr>
<td>wa: w</td>
<td>و</td>
<td></td>
<td></td>
<td></td>
<td>و (vowel length)</td>
</tr>
<tr>
<td>ya: ?</td>
<td>ي</td>
<td></td>
<td></td>
<td></td>
<td>ي (vowel length)</td>
</tr>
</tbody>
</table>

Apart from the standard letters there are a number of other letters which are sometimes used to represent sounds which Modern Standard Arabic does not have, and which are used in some parts of the Arab World to represent dialectal Arabic sounds or borrowings from other languages. In the Gulf, for example, one sometimes sees:

\[
\begin{align*}
\text{ف} = /p/ \\
\text{ج} = /\text{kf}/ \\
\text{گ} = /g/ 
\end{align*}
\]
2 - أضع دائرة حول الكلمة التي تدل على الصورة:

(Put a circle around the word which refers to the picture.)

أمَطارٍ  أَحْجَارٍ  أَشْجَارٍ
/aermaer/  /aehdzaer/  /aefdzaer/ (rains) (stones) (trees)

شَبَكٍ  أَسْمَاكٍ  أَسْلَاَكٍ
/jebak/  /aesmak/  /eelsaak/ (nets) (fish) (wires)

جَمَلٌ  حَبْلٌ  جَبَلٌ
/dzamnal/  /haebel/  /dzaebael/ (camel) (washing line) (mountain)

3 - أضع الضمائر فوق الحروف الملونة، ثم أقرأ:

مَحَمَدٍ  سَعَدَتْ  عَطْلَةً

Ministry of Education, Sultanate of Oman.
Grade 1 Arabic reading book, page 26.
Appendix 4.3.

(Put ‘dumma’ above the coloured letter in each word and read it aloud.)

A  عطّلة
B  ساعدت
C  محمد

Pronunciation and meaning with 'dumma'.

a) /œuːtlæh/ (holiday)
b) /sæˈædtuː/ (I helped you)
c) /mɒhæmd/ (the prophet Mohammed)

Pronunciation and meaning without 'dumma'.

/œtlæh/ (no meaning)

/she, he or they helped you)

/mhæmd/ (no meaning)

Ministry of Education, Sultanate of Oman.
Grade 1 Arabic reading book, page 26.
### Appendix 5.1.

**Non-word reading test: List of items and accepted pronunciation.**

<table>
<thead>
<tr>
<th>Non-word</th>
<th>Accepted pronunciation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. baldry</td>
<td>/baldri/ /buldri/ /bɔːldri/</td>
</tr>
<tr>
<td>2. wex</td>
<td>/weks/</td>
</tr>
<tr>
<td>3. jid</td>
<td>/dʒid/</td>
</tr>
<tr>
<td>4. snep</td>
<td>/snep/</td>
</tr>
<tr>
<td>5. grap</td>
<td>/grap/</td>
</tr>
<tr>
<td>6. plonad</td>
<td>/plonad/ /pleunad/</td>
</tr>
<tr>
<td>7. fomp</td>
<td>/fomp/</td>
</tr>
<tr>
<td>8. twud</td>
<td>/twʌd/</td>
</tr>
<tr>
<td>9. mabup</td>
<td>/mabʌp/</td>
</tr>
<tr>
<td>10. suctorifice</td>
<td>/sʌktərifɪs/ /sʌktərifais/</td>
</tr>
<tr>
<td>11. watchorn</td>
<td>/wɔtʃɔːn/ /wɔtʃɔrn/ /wɔtʃɪn/ /wɔtʃhɔrn/</td>
</tr>
<tr>
<td>12. kem</td>
<td>/kɛm/</td>
</tr>
<tr>
<td>13. yupog</td>
<td>/jupɔg/</td>
</tr>
<tr>
<td>14. nimep</td>
<td>/nimɛp/</td>
</tr>
<tr>
<td>15. jefum</td>
<td>/dʒɛfʌm/ /dʒɛfum/ /dʒɛfʊm/ /dʒɛfəm/</td>
</tr>
<tr>
<td>16. chicorate</td>
<td>/tʃɪkəreɪt/ /tʃɪkəreɪt/ /tʃɪkərət/</td>
</tr>
<tr>
<td>17. hermantic</td>
<td>/hɛmɑntɪk/ /hɛmɑntɪk/ /hɛrmɑntɪk/</td>
</tr>
</tbody>
</table>

233
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18. dramep</td>
<td>/dramep/</td>
</tr>
<tr>
<td>19. flegom</td>
<td>/flegom/</td>
</tr>
<tr>
<td>20. bletud</td>
<td>/bletʌd/ /bletəd/ /bletuːd/</td>
</tr>
<tr>
<td>21. crovin</td>
<td>/krəvɪn/ /krəvin/</td>
</tr>
<tr>
<td>22. dwuzet</td>
<td>/dwuːζɪt/ /dwəzɪt/ /dwuːζɛt/ /dwəzɛt/</td>
</tr>
<tr>
<td>23. bamosp</td>
<td>/bamosp/</td>
</tr>
<tr>
<td>24. fumicant</td>
<td>/fuːmɪkɪnt/ /fuːmɪkant/</td>
</tr>
<tr>
<td>25. rudalg</td>
<td>/ruːdalg/ /rʌdalg/</td>
</tr>
<tr>
<td>26. fonemp</td>
<td>/fəʊnɛmp/ /fonemp/</td>
</tr>
<tr>
<td>27. vadipt</td>
<td>/vadipt/</td>
</tr>
<tr>
<td>28. gupont</td>
<td>/ɡuːpɒnt/ /ɡʌpɒnt/</td>
</tr>
<tr>
<td>29. demaine</td>
<td>/diːmeɪn/ /dəmeɪn/ /diːmeɪn/</td>
</tr>
<tr>
<td>30. kalomp</td>
<td>/kalomp/</td>
</tr>
<tr>
<td>31. swemp</td>
<td>/swɛmp/</td>
</tr>
<tr>
<td>32. crulk</td>
<td>/krʌlk/</td>
</tr>
<tr>
<td>33. prinalt</td>
<td>/prɪnalt/ /prɪnɔlt/</td>
</tr>
<tr>
<td>34. frekont</td>
<td>/frɛkɔnt/</td>
</tr>
<tr>
<td>35. glatong</td>
<td>/ɡlætɔŋ/</td>
</tr>
<tr>
<td>36. crogamp</td>
<td>/krɔɡamp/ /krəugamp/</td>
</tr>
<tr>
<td>37. rilt</td>
<td>/rɪlt/</td>
</tr>
</tbody>
</table>
38. particlone /partiŋlən/ /partiŋlən/ /partiŋlən/
39. wilp /wilp/
40. adlamate /adləmeɪt/ /adləmeɪt/ /adləmeɪt/
41. lond /lɔnd/
42. brant /brant/
43. dwilk /dwɪlk/
44. plog /plog/
45. cogat /kɔɡæt/ /kəʊɡæt/
46. brafeld /brafeld/
47. glund /glʌnd/
48. twing /twɪŋ/
Appendix 5.2.

**Phonetic transcription symbols used in the text.**

IPA symbols used to represent the ‘BBC accent’ of English or ‘Received Pronunciation’ (RP). Taken from Roach (2001).

**Vowels.**

/ɪ/