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DEVELOPING AND VALIDATING AN INSTRUMENT TO ASSESS READING READINESS IN EGYPTIAN KINDERGARTNERS

M.A. THESIS

RANDA SAAD AWAD

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DEVELOPING AND VALIDATING AN INSTRUMENT TO
ASSESS READING READINESS IN EGYPTIAN
KINDERGARTNERS

A Thesis Submitted to
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In Partial Fulfillment of the Requirements for
the Degree of Master of Arts in TEFL

By
Randa Saad Awad
June, 2003
DEVELOPING AND VALIDATING AN INSTRUMENT TO ASSESS READING READINESS IN EGYPTIAN KINDERGARTNERS

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To the Department of Teaching English as a Foreign Language

June, 2003

in partial fulfillment of the requirements for

The degree of Master of Arts

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ABSTRACT

Reading is a fundamental skill which all children need to acquire. Some youngsters struggle to learn to read. Research has shown that if children with reading difficulties are identified at an early age, preferably before grade 1, then the reasons behind their problem may be identified and an early intervention program implemented. In order to achieve early identification of reading problems, instruments have been developed for assessing individual abilities and skills in a number of countries, although not in Egypt. The purpose of this study was to develop a valid and reliable instrument to assess reading readiness in Egyptian kindergartners.

Based on the literature review and the examination of English reading readiness instruments, an Arabic instrument (The Egyptian Reading Readiness Screening Profile, ERRSP) was developed and used in the present study. The ERRSP included the following sub-tests: print awareness, rapid letter naming, letter sound association, phonological awareness and orthographic processing.

The ERRSP was administered to 60 Egyptian students at the end of their second year of kindergarten along with an English instrument (the Phonological Awareness Test, PAT) and an Arabic word reading test (AWRT). In addition, each classroom teacher rated the overall reading ability of each student on a 20-point scale. The students’ scores on the ERRSP were correlated with their reading scores on the AWRT and with their teacher rating to determine the diagnostic validity of the ERRSP. The ERRSP correlated significantly with AWRT (.72, p<.01) and with the teacher rating (.61, p<.01). Furthermore, ERRSP correlated significantly with PAT (.60, p<.01).
In addition, several regression analyses were carried out. The results of the regression analyses revealed that rapid letter naming, phonological awareness, print awareness and orthographic processing contributed significantly to the variation in the reading scores on AWRT.

The research findings are compared to those of previous studies. The conclusions, limitations and suggestions for future research are discussed.
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Chapter I

INTRODUCTION

1.1. Importance of Reading

Reading is a fundamental skill which all children need to acquire. Reading acquisition influences children's success in school, their academic careers, and eventually their adult lives. If young learners manage to decode words and understand meaning from text, it is a first step in a long journey of learning and acquiring knowledge. The importance of reading can be summarized by saying that it stimulates thinking, shapes the mind, develops the intellect and allows for mental growth.

Unfortunately, not all children become successful readers. Some youngsters struggle to learn to read. There are poor readers in almost every classroom. Teachers have repeatedly observed that poor readers tend to be frustrated and have low self-esteem, which may lead to withdrawal from others or disruptive behavior. According to Dr. Reid Lyon, chief of the Child Development and Behavior Branch at the U.S. National Institute of Child Health and Human Development (Schwab Foundation for Learning, 1999), young children with reading problems may experience embarrassment especially as they compare themselves with their classmates. This may cause a decrease in their motivation and self-confidence. Some of those children drop out of school and very few (2%) go to college (Schwab Foundation for Learning, 1999).

1.2. The Need for Early Identification and Intervention

Can anything be done to help those who are struggling to learn to read eventually become good readers? Research has shown that if children with reading difficulties are identified at an early age, preferably before grade one, then the reasons behind their problem may be diagnosed and an early intervention program implemented (Felton & Pepper 1995). Experts (e.g.,
Noujaim, personal communication, March 15, 2002, see p. 25) have also said that if a learner’s problem is diagnosed early enough, it will need less time and money to remedy the difficulty. If a child’s need is recognized before grade one, for example, it may take an average of six to twelve months to teach him how to read, using intensive instruction and possibly individual tutoring (Noujaim, personal communication, March 15, 2002). However, if a youngster’s reading difficulty is not detected or dealt with until grade three, for example, it may take several years, and of course more resources to build up his skills and bring him up to the required reading level (Denton, 2000).

1.3. Availability of Standardized Assessment Tools

In order to achieve early identification of reading problems, instruments have been developed for assessing individual abilities and skills. There are many standardized American and British tests available to assess reading readiness skills. These include:

- The Phonological Awareness Test (PAT) (Robertson & Salter, 1997)
- Yopp-Singer Test of Phoneme Segmentation (Yopp 1995)
- Rapid Letter Naming DIBELS (Good & Kaminski, 1996)
- Lindamood Auditory Conceptualization Test (Lindamood, 1979)

Some of these tests are used to assess Egyptian children who are struggling to learn to read English (B. Noujaim, personal communication, March 15, 2002). However, these English tests are norm-referenced according to American or British standards. Moreover, these tests cannot be used with the vast majority of Egyptian children who have minimal exposure to the English language in their preschool years. Thus, there is a need for an assessment tool in Arabic, the native language of Egyptian children, to test their reading readiness skills.

A review of the available literature revealed that instruments designed to assess reading ability have been developed and validated in different cultures using the native language of
subjects. In Brazil, three instruments were designed to measure reading and writing ability among Brazilian first graders in Portuguese, their native language (Oliviera, 1996). In Spain, a new Spanish-language reading assessment battery for children in the second and third cycles of primary education has been developed to assess the main components of the processing system involved in reading (Lopez-Higes, Rubio, Villoria, Mayoral, 2001). In Mexico, an instrument for evaluating learning problems in early primary school children was constructed and validated in Spanish (Caballero-Borja, 1988).

A preliminary search of specialized centers in Egypt as well as a search on the internet have not revealed any standardized Arabic instrument available to assess reading readiness in Egyptian children.

1.4. Goals of the Study:

The purpose of this study is to develop a valid and reliable instrument which can be used to identify Egyptian kindergarten children at risk for learning to read. Since there is currently no standardized Arabic instrument developed for use in pedagogic contexts, this assessment tool would be of particular importance in diagnosing potential reading problems in young Arabic-speaking children who have low levels of preschool exposure to English and who will learn English as a foreign language in primary school.
Chapter II
Review of Literature

2.1. Introduction

While searching for studies about reading readiness and how it is measured in young children, the present researcher explored the following databases: Academic Search Premier, Academic Search Elite, ERIC and Psychinfo (from 1975-2002). The search terms used were 'reading readiness', 'reading skills', 'phonological awareness', 'phonological awareness and reading ability', 'phonological awareness and bilingualism', 'transfer of reading skills', 'reading assessment instruments', and 'instrument validity'. The internet was also searched to find instruments developed to measure reading readiness.

One of the criteria used in selecting articles was peer review. Another criterion was sample size. In applying the second criterion, case studies were excluded since it is difficult to generalize their findings. A third criterion was age of subjects. This meant studies that involved college students, high school students or adolescents were not selected since the focus of this study is reading readiness in kindergartners. A fourth criterion was adherence to the purpose of the present study. For that reason, studies focusing on children with severe handicaps, such as Down Syndrome or blindness, were not included since these are not within the scope of this study. However, articles that examined phonological awareness in relation to reading success or failure as well as studies involving young bilingual children were included in the review.

Since the purpose of this study is to assess reading readiness in kindergartners, this literature review will first identify basic reading readiness skills. These include print awareness, fluency, letter sound knowledge, orthographic processing and phonological awareness. Then the difference between phonological awareness and phonemic awareness will be examined. Following that, a meta-analysis showing the effect of phonemic awareness instruction on reading
skills will be reviewed. Then studies that show phonological awareness as a predictor of reading ability are examined, followed by a study that sheds light on phonological awareness as a predictor of reading in both first and second languages. The transfer of reading skills from a first to a second language is then reviewed. A significant study of Moroccan children which shows that Arabic word decoding skill predicts French reading ability will be reviewed. Finally, instruments measuring phonological awareness are examined.

2.2. Skills Needed for Reading Acquisition

How do children learn to read? Extensive research has been done on this topic, and five basic skills in early reading acquisition have been identified.

2.2.1. **Print awareness** is the ability of the child to realize that words are made up of strings of letters and print of strings of words (Adams, 1990). In her book, *Beginning to Read: Thinking and Learning about Print*, Adams explains that print awareness is the foundation upon which orthographic and phonological skills are established. The author further states that children's scores on print awareness tests predict their reading achievement. Print awareness tests assess whether a child can recognize that text, not pictures, carries a message, that print has a direction (e.g. from left to right in English and right to left in Arabic), and that print maps spoken words, one by one (Adams, 1990).

2.2.2. **Fluency** in kindergartners is their ability to name colors, objects or letters rapidly and effortlessly (Felton, 1992). In a longitudinal study carried out by Felton, a sample of 221 English L1 kindergarten children (102 females, 119 males) were assessed by tests that included:
a. **Phonological Awareness measures**

Those included identifying the initial sounds of words, final sounds, rhyming, a syllable counting test, and the Lindamood Auditory Conceptualization Test (Lindamood & Lindamood, 1979).

b. **Phonological Coding in Lexical Access**

In this measure, the child was required to name each item (color, object, letter or number) displayed as rapidly as possible. The Rapid Automatized Naming Test (Denckla & Rudel, 1976) was used.

c. **Phonological Coding in Working Memory**

Short-term memory is tested by asking the student to repeat a sequence of four words. Words chosen could be rhyming or non-rhyming.

In grade 3, the students' reading skills were measured using the California Achievement Test that included a vocabulary and comprehension subtests. The kindergarten tests correlated significantly with four of the phonological awareness measures and all of the rapid naming measures (a and b, described above). More specifically, rapid naming of letters, general ability and discrimination of initial sounds within words were important factors in the prediction of reading ability.

2.2.3. **Letter sound knowledge** refers to the association of each individual symbol with the sound it produces (Adams, 1990). According to Adams, programs that use letter-to-sound correspondences in teaching L1 reading yield higher achievement in word reading and spelling in the early grades, and especially among slower students. Summarizing the effect of 38 studies, The National Reading Panel (2000) found that using the phonics approach (which trains children to associate sounds with letters) in teaching reading has a highly positive effect on children from kindergarten through
sixth grade, including children with reading difficulties. When phonics instruction was implemented, kindergartners improved in their ability to decode and spell. First graders' ability to comprehend text was also enhanced. Current practices do not advocate a program devoted solely to phonics, however.

2.2.4. Orthographic processing in preschoolers is their ability to match visually similar sequences of letters and numerals accurately (Badian, 2001). Orthographic processing measures have been found to predict reading ability. For example, a longitudinal study conducted by Badian (2001), examined the role of phonological and orthographic processing in predicting reading success. Ninety-six children took an orthographic test as preschoolers, along with two measures of phonological awareness (syllable segmentation and rhyme detection) in mid-kindergarten. In grade one, reading comprehension and word study skills were measured. In grades three and seven, reading vocabulary and reading comprehension were measured. In grade 7, a spelling test was administered to the students. Two aims of the study were to find out whether phonological measures administered during kindergarten were useful predictors of later reading, and whether orthographic skills predicted later reading comprehension. With earlier reading level, preschool verbal IQ and age, and verbal memory controlled, both syllable segmentation and rhyme detection added significant variance to grade 1 word reading. However, neither phonological measure could account for variance in reading at grades 3 and 7. According to Badian, the orthographic measure added to the variance in reading ability in grade 1 and also to reading vocabulary and reading comprehension at grades 3 and 7.

2.2.5. Phonological awareness (PA) is the ability of a child to discriminate and manipulate speech sounds of a language (Lane, Pullen, Eisele, & Jordan, 2002). PA is
revealed by such abilities as hearing separate words in speech, isolating initial and final phonemes, and segmenting words into individual phonemes (Allen, 2002). When children have a problem processing phonological information, they are unable to learn how to relate letters of the alphabet to the sounds of language (Behrmann, 2000).

Although basic, each of the reading readiness skills represents a complex set of sub-skills. The most complex is the last, PA, which has also been the subject of much research (Adams, 1990).

2.3. Differentiating between Phonological Awareness and Phonemic Awareness

It is important to differentiate between phonological awareness and phonemic awareness. **Phonological awareness** is a much broader term and includes phonemic awareness. Lane et al. (2002) divided phonological awareness into four levels:

1. **Word level.** Children are able to segment sentences they hear into individual words.

2. **Syllable level.** Children can segment words into syllables.

3. **Onset and rime level.** The syllable consists of two parts: the onset and rime. The onset consists of the consonant sounds that precede the vowel. The rime consists of the vowel and any consonant sounds that come after it. At this phonological level, children can differentiate between onset and rime. Onset and rime analysis tasks are more sophisticated than the syllable level task.

4. **Phoneme level.** Children can segment words into separate phonemes. The phonemic level is the most sophisticated level of phonological awareness. At this level, children can also isolate individual phonemes, blend phonemes to make a word, complete a word by providing the missing phoneme and delete the first or last sound in a word.
Phonemic awareness is described as the ability to manipulate phonemes, the smallest meaningful unit of sound in spoken language (Lane et al., 2002). For example, if children hear the word 'bat', they can segment the word into three phonemes /b/, /a/ and /t/. When demonstrating their word manipulation skill, a child can delete /t/ from /b/, /a/, /t/, and add /d/ to make a new word 'bad'. Also, a child can substitute /m/ for /b/ and make another word 'mat'. Deleting and substituting phonemes is more complex than segmenting a sentence into words that make up that sentence (Good & Kaminski, 2001).

2.4. The Effect of Phonemic Awareness Instruction on Reading Skills

To show the effect of phonemic awareness instruction on reading and spelling skills, a quantitative meta-analysis of 52 experimental studies was conducted by the U.S. National Reading Panel (Ehri et al., 2001). Studies selected included those that used phonemic awareness instruction with students, that had a control group receiving non-phonemic awareness instruction or no special instruction, and that measured the effect of phonemic awareness instruction on reading achievement. The age of participants in the different studies ranged from preschool to sixth grade. Normally progressing readers, at-risk readers as well as disabled readers were included. Instruction was conducted in the subjects' native languages which included not only English but also Danish, Dutch, Finnish, German, Hebrew, Norwegian, Spanish and Swedish. In the different studies, teachers, researchers or computers administered instruction to children individually, in small groups or in larger groups.

The following tasks were used in these studies to measure and improve children's phonemic awareness through teaching and practice:

- Phoneme isolation, which means identifying individual sounds in a given word.
- Phoneme identity, which requires identifying similar phonemes in 2 given words.
• *Phoneme categorization*, which requires identifying the word with the sound that does not belong in a given set of words.

• *Phoneme blending*, which means making a word from a sequence of sounds.

• *Phoneme segmentation*, which requires breaking a word into its individual sounds.

• *Phoneme deletion*, which means deleting the first or last sound in an orally presented word.

Several of the studies included in the meta-analysis measured the impact of phonemic awareness instruction on various types of word reading, while some other studies measured its impact on reading comprehension. The results of the meta-analysis revealed that phonemic awareness instruction had a significant positive impact on reading and spelling. The phonemic awareness instruction positively affected word reading and reading comprehension. Phonemic awareness instruction helped disabled readers, at-risk readers and normally developing readers. Preschoolers, kindergartners and first graders all benefited from the instruction. Children from different socioeconomic classes were also helped by phonemic awareness instruction.

**2.5. Phonological Awareness Measures as Predictors of Reading Ability**

After conducting three longitudinal studies, Wesseling and Reitsma (2001) confirmed that individual differences in vocabulary and phonological awareness have an important role in predicting the development of reading skills in young children. Twenty nine Dutch kindergarten children with a mean age of 6 years and 1 month participated in the first study. In their second year of kindergarten, the children sat for eight tests. The tests measured letter sound correspondences, visual word identification, receptive vocabulary and phonemic awareness. In grade one, the children were given a word decoding test and a phonemic awareness test. The results showed that individual differences in kindergarten phonemic
awareness contributed to the variance in reading ability in grade 1. The second study replicated the first one and a larger sample of sixty-two second year kindergarten children participated. Since the findings from study 2 did not confirm the results from the first study, a third longitudinal study was conducted. Forty-two first year kindergarten children participated with an average age of 5 years and 1 month. They were tested before the end of their first year of kindergarten, before the second year of kindergarten and six months into grade 1. The results of the final study confirmed that measures of nonword repetition, phonemic awareness and vocabulary knowledge in kindergarten can predict reading ability and phonological awareness in grade 1.

Phonological awareness has been found to predict reading ability not just in an alphabetic writing system, but also in a logographic writing system such as Chinese. In a study done by Huang and Hanley (1997), the relationship between phonological awareness, visual skills and reading was examined. Forty Chinese children from Taiwan participated in the study. The children were enrolled in first grade in a primary school in Taiwan. The subjects (18 boys, 22 girls, with an average age of 6.48 years) were tested on three different occasions using a phonological awareness tasks battery, a visual skills test, an IQ test, a vocabulary test and a reading test. The first testing session was during the first two weeks of the school year before formal reading instruction had started. The second testing session was ten weeks later after the students had completed instruction in Zhu-Yin-Fu-Hao, which is an alphabetic script that children in Taiwan learn before learning Chinese characters. The third testing session was at the end of the first school year.

The researchers correlated the results of the reading test with the results of the phonological tasks battery, the IQ test, the visual skills test and the vocabulary test. Their findings included the following:
At the first testing session, the strongest correlation was between one of the phonological awareness tasks (the phoneme deletion test) and Chinese reading. The correlation between reading and the visual skills was not significant.

At the second testing session, all of the phonological awareness tasks correlated significantly with reading ability. Reading correlated significantly with visual skills and IQ as well.

At the third testing session, most of the tests correlated significantly with reading ability.

These results reveal a strong correlation between the phonological scores and reading Chinese. Since phonological awareness measures before any instruction had started correlated with reading ability after one school year, then phonological tasks can be said to be predictive of reading ability in Chinese.

Phonological abilities not only predict reading achievement for monolingual children, but also for multilingual students. Fifty five kindergarten children (27 girls, 28 boys) from an international school in Geneva, Switzerland, participated in a longitudinal study conducted by Muter and Diethelm (2001). The children came from multilingual backgrounds and were studying English in school. Twenty-two were English L1, 28 were non-English L1 and 5 were of mixed L1 where English was one of the languages spoken at home. The English L1 students came from British, American, South African and Australian backgrounds. The non-English L1 children came from French, Yugoslavian, Turkish, Spanish, Japanese, Italian, Hungarian, Russian and Dutch backgrounds. The children were assessed twice. The first testing point was during the second term of the kindergarten year. The second testing occurred one year later, in the second term of Grade 1. At both the first and second testing times, the students were administered four phonological awareness subtests: Rhyme Detection, Rhyme Production, Word Completion and Phoneme Deletion.
They also took a speech rate test and a test of alphabet letter knowledge. In kindergarten and Grade 1, the children were given vocabulary tests. Finally, at the second testing time, a word reading test was administered. A correlation among the results of each measure was carried out.

The results revealed that Phoneme Completion, a measure of phonological awareness, and Letter Knowledge administered in kindergarten correlated most highly with reading in Grade 1. Phoneme Deletion, Vocabulary, and Letter Knowledge administered in Grade 1 had the highest correlation with reading in the same year. Moreover, segmentation ability, a phonological measure, contributed to the concurrent reading ability at Grade 1. Letter knowledge and segmentation ability measured in kindergarten were significant predictors of reading ability in Grade 1. The result of this study indicate that phonological abilities predict both concurrent and later reading ability in a multilingual sample.

Phonological awareness predicts not only reading in a first language, but also in a second language. In a study done by McBride-Chang and Kail (2002), 190 kindergartners in Hong Kong and 128 kindergartners and grade one students in the USA, were tested on four constructs: phonological awareness, speeded naming, visual spatial skill and processing speed. The study tested whether predictors of early reading were similar for Hong Kong Chinese children learning to read Chinese and American children who were learning to read English. The study also compared Chinese children learning to read English as a second language and American children learning to read English as a first language. In both Hong Kong and the US, reading skills had the strongest correlation with phonological tasks such as syllable deletion, naming and letter sound knowledge. Also, the pattern of correlates of reading skills was similar for reading in English and Chinese for Hong Kong children.

It is important to note here that the basic unit in written Chinese is a character which represents both a morpheme and a syllable (McBride-Chang & Kail, 2002). In written
English the basic unit of reading is the letter which represents a phoneme. "Phonological awareness involves mapping an oral referent to a written symbol, whether the symbol represents a morpheme, syllable, as in Chinese, or a phoneme, as in English" (McBride-Chang & Kail, 2002, p.1403).

Despite the differences in cultural expectations, language backgrounds and orthographies to be learnt, the above study has shown that there are similarities in the early phases of reading acquisition across languages. It has also revealed that phonological awareness is essential for reading development in a first and a second language. Across groups in the McBride-Chang & Kail study, the strongest predictor of reading was phonological awareness.

Phonological awareness skills may also be transferred from a first to a second language. In a study done by August, Calderon and Carlo (2002), the transfer of reading skills from Spanish to English was examined. One hundred and fifty one students participated in the study. Twenty-four students were English monolinguals, forty-three were Spanish-English bilinguals in English-only instruction, and eighty-four were Spanish-English bilinguals in Spanish-only instruction. Of those 84, 34 participated in all-English instruction at the beginning of third grade. Data were collected at the end of second grade, the beginning of third grade and the end of third grade. At both the end of second grade and beginning of third grade, all students except the monolinguals were tested in both Spanish and English. At the end of third grade, students were tested in English only to determine which Spanish skills tested at the end of second grade could predict English performance at the end of third grade. The researchers developed three tests, with Spanish and English versions. The measures were a spelling test (a measure of phonological awareness), a phonemic segmentation task, and a letter, word and pseudoword naming task (a measure of orthographic skill). These measures were administered at end of grade two and end of grade
A subset of the Woodcock-Johnson Achievement Test was used to assess reading comprehension in English. A subtest of the Woodcock-Munoz Achievement test was used to assess Spanish skills (August et al., 2002). The results showed that the performance of students on various Spanish sub-tests such as phonemic awareness, letter identification, and fluency in letter and word identification, at the end of grade two, were reliable predictors of English performance on similar tasks in English at the end of grade three.

Similarly, Arabic word decoding skill was shown to predict French reading ability in a 5-year longitudinal study conducted by Wagner, Spratt and Ezzaki (1989). One hundred and sixty six seven-year-old Moroccan children from rural areas, enrolled in first primary, participated in the study. The children's mother tongue was either Arabic or Berber. The subjects were divided into four comparison groups: Quranic preschooled Arabic-speaking, Quranic preschooled Berber-speaking, nonpreschooled Arabic-speaking, and nonpreschooled Berber speaking.

Arabic reading tests based on school curricula were constructed for the purposes of the above study. The children were tested at the end of grade one and in grades three and five. The tests measured skills ranging from beginning reading knowledge to paragraph comprehension. They included the following subtests:

- **Letter knowledge test**

  This test measured the child's knowledge of Arabic orthography.

  It consisted of 4 subtests:

  a. Recognition of a written letter to be chosen from two displayed symbols.

  b. Recognition of two configurations of the same letter, given that Arabic symbols are written differently depending on position in a word.

  c. Identification of a given letter.
d. Voicing of a written letter.

- **Word decoding test**
  This measure was administered in grades one and three only. It required a child to read aloud a series of Arabic words.

- **Word Picture Matching test**
  The child was shown a series of pictures. For every picture, the student is given three or four written words to choose from. The word chosen should name the picture. This test was administered in years one, three and five.

- **Sentence Maze test**
  This test was given in grades three and five. A number of sentences were written each with a missing word. The student had to choose from a list of four words the best word to fill in the blanks.

- **Paragraph Comprehension test**
  The child was asked to read a series of paragraphs and then answer multiple-choice questions of fact and inference following each paragraph.

- **French tests**
  All students in grade three were assessed on French reading tests. The French tests were similar to the Arabic tests except for the letter knowledge task which was replaced by a letter recognition task. The students were tested in French to examine the relationship between first and second literacy acquisition.

  Data analyses showed that Arabic word decoding skill was the best predictor of beginning French reading ability. This supports the hypothesis that there is a transfer of alphabetic decoding, even across highly contrasting orthographies.

  In summary, this review of literature on reading readiness revealed that there are key factors in the prediction of reading ability. These include rapid naming of letters,
orthographic processing, letter sound knowledge and phonological awareness measures (Badian, 2001; Felton, 1992; Wesseling & Reitsma, 2001). Studies have also shown that there are similarities in the early phases of reading acquisition across languages. Moreover, phonological awareness is essential for reading development in a first and second language (McBride-Chang & Kail, 2002). More specifically, in a study among Moroccan children, Arabic word decoding skill was found to be a predictor of beginning French reading ability (Wagner, Spratt & Ezzaki, 1989).

2.6. Instruments Measuring Phonological Awareness

Since the goal of this study is to craft an instrument to assess reading readiness, tools measuring English reading readiness skills were examined. After carefully analyzing 10 instruments and their subtests, the following results were revealed (a summary is included in Table 1).

1. Phonological awareness was assessed by all instruments using some of the following measures: rhyming, segmentation, isolation of initial and final phonemes, blending of phonemes and onset and rime, deletion of initial and final phonemes, and matching words that started or ended with the same phoneme.

   a. Rhyming included:

      i. Discrimination: The child is asked to tell if two words are rhyming or not.

      ii. Production: The child is asked to provide a rhyming word to another word he hears.

   b. Segmentation

   The child is required to segment:

      i. Sentences (say how many words can be heard in a given sentence).
### TABLE 2.1: TABLE OF INSTRUMENTS

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Subtests</th>
<th>Letter Sound Knowledge</th>
<th>Orthographic Processing</th>
<th>Print Awareness</th>
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PAT (The Phonological Awareness Test); IAPA (Informal Assessment of Phonological Awareness); YOPP-SIN (YOPP-SINGGER Test of Phoneme Segmentation); DIBELS (Dynamic Indicators of Basic Early Literacy Skills); GRRST (Get Ready to Read Screening Tool); GRADE (Group Reading Assessment and Diagnostic Evaluation); MAT-7 (Metropolitan Achievement Tests-7th Edition); READS (Reading Evaluation, Assessment and Diagnostic System); WDRB (Woodcock Diagnostic Reading Battery); STRR (Slosson Test of Reading Readiness).
ii. Syllables (say how many syllables can be heard in a given word).

iii. Phonemes (say how many phonemes can be heard in a given word or say the sounds that can be heard in a spoken word like mop).

c. Isolation

i. The examiner says a word and the student is required to say what the initial sound in the word is.

ii. Identifying the final sound in an orally presented word.

iii. Identifying the medial sound in an orally presented word.

According to Robertson and Salter (1997), this task may not be appropriate for most five-year-olds.

d. Deletion

i. Compounds and syllables

The examiner says: "I'm going to ask you to say a word and then to say it again without one of its parts. Say mailbox.

Student says mailbox. Now say it again, but don't say box.

The student says mail.

ii. Phonemes

The child deletes the first sound of an orally presented word.

e. Blending includes:

i. Blending individual phonemes

The examiner says the sounds of a word. The child listens to the sounds and puts them together to make a word.

ii. Blending onset and rime.
f. Matching

The student matches two words based on beginning or ending sound.

2. Letter Sound Knowledge was assessed by six instruments. In this test, the child is shown some letters and says the sound that each letter represents.

3. Four instruments measured Orthographic Processing. In this test, the examiner dictates some words to the child or the child points to one of four stimuli that exactly matches the target item.

4. Print awareness was assessed by three instruments. In this test, the child is asked to point to the cover page of a book, the back of a book, where reading starts on any given page, the direction of print and the end of the story.

5. Fluency was included in one instrument. For kindergartners, fluency with text is measured by what is called rapid letter naming (Good & Kaminski, 2001). The students are presented with upper and lower case letters and are asked to name as many letters as they can in one minute.

Based on the findings included in the literature review and the examination of the English reading readiness instruments, the following subtests were selected for inclusion in the instrument whose design will be the chief focus of this study.

- Phonological awareness measures:
  a. Segmentation of sentences and phonemes
  b. Isolation of initial and final phonemes

- Letter sound knowledge

- Orthographic processing

- Print awareness

- Fluency

Although fluency was included in only one instrument, it was adapted in
the instrument of this study. This is due to the reason that in the literature, rapid letter naming, a measure of fluency, was found to predict reading ability (Felton, 1992; Manis, Seidenberg & Doi, 1999; Schatschneider et al., 2002).

2.7. Conclusions

After reviewing the literature, it can be concluded that rapid naming of letters, orthographic processing, letter sound knowledge and phonological awareness measures are important factors in the prediction of reading ability (Badian, 2001; Felton, 1992; Wesseling & Reitsma, 2001). Studies have also shown that phonological awareness predicts reading in a first and second language (McBride-Chang & Kail, 2002). Moreover, phonological abilities predict reading achievement not only for monolingual but also for multilingual students (Muter & Diethelm, 2001). In addition, phonological awareness skills may be transferred from a first to a second language. Finally, the examination of English reading readiness instruments revealed that measures of phonological awareness, letter sound knowledge, print awareness, orthographic processing and fluency have been used to assess reading readiness in kindergartners.
Chapter III
Research Questions and Methodology

3.1. Research Questions

As noted above, the review of literature revealed several factors which have been found to predict reading ability. These factors were also used to measure reading readiness skills in English instruments included in Table 2.1. Based on these findings, the investigator will attempt to answer the following questions:

1. What factors used for identifying potential reading problems among L1 English kindergartners can be used to identify potential reading problems in L1 Arabic Egyptian kindergartners?

2. How will the results obtained by KG students on an instrument measuring Arabic reading difficulties correlate with the scores obtained by these KG students on an Arabic word reading test?

3. How will results obtained by Egyptian KG students on an instrument measuring Arabic reading difficulties correlate with the results obtained by the same KG students on an instrument measuring English reading difficulties?
3.2. Theoretical Definitions of Key Constructs

a. Print Awareness

According to Adams (1990), this is the awareness that children develop when they realize that words are made of strings of letters, and print, of strings of words.

b. Fluency

Fluency in kindergartners is their ability to name colors, objects or letters rapidly and effortlessly (Felton, 1992).

c. Letter Sound Knowledge

Letter sound association is the ability of a child to associate a letter with the sound it produces (Adams, 1990).

d. Orthographic Processing

Orthographic processing is the ability to discriminate accurately among visual sequences or patterns of letters and numerals (Badian, 2001).

e. Phonological Awareness

Phonological awareness is the ability to recognize the number and order of sounds in spoken words (Lane et al., 2002).

3.3 Operational Definitions of Key Constructs

a. Print Awareness

Print awareness will measure the ability of the child to recognize the cover page of a book, the title of the book, where reading starts on any page, the beginning and the end of any sentence, how many words are in a given sentence and the end of the story.
b. Fluency

Rapid letter naming will be used as a measure of fluency. Rapid letter naming will be assessed as the number of letters a child can identify by name in 30 seconds (Fuchs et al., 2002).

c. Letter Sound Knowledge

In letter sound knowledge, the child will be asked to identify the correct sounds of a list of given symbols (Robertson & Salter, 1997).

d. Orthographic Processing

The child will match visually similar patterns of letters and numerals (Badian, 2001).

e. Phonological Awareness

Phonological awareness measures will include segmentation and sound isolation (Robertson & Salter, 1997). In segmentation, the child will be asked to segment sentences and phonemes. In isolation, the child will isolate initial and final phonemes.

3.4. Development of the instrument

In order to decide on which constructs to include in the design of the tool, the investigator reviewed previous work, examined previously developed tools, consulted with experts in the field and pilot tested an initial draft of the instrument.

3.4.1. Review of literature

After reviewing the literature, five constructs were identified as the best predictors of reading ability: phonological awareness, rapid letter naming, letter sound association, orthographic processing and print awareness (Adams, 1990; August et al., 2002; Badian, 2001; Felton, 1992; Lane et al., 2002).
3.4.2. Use of previous instruments

Based on a thorough search of the Southwest Educational Development Laboratory (SEDL) reading assessment database for grades K-2, 10 instruments measuring reading readiness were selected. Selection of the tools was based on two criteria: the applicability of the instrument to the purpose of this study and recommendations by specialists. These 10 instruments are:

- Dynamic Indicators of Basic Early Literacy (DIBELS)
- Get Ready to Read Screening Tool (GRRST)
- Group Reading Assessment and Diagnostic Evaluation (GRADE)
- Informal Assessment of Phonological Awareness (IAPA)
- Metropolitan Achievement Tests- 7th Edition (MAT-7)
- The Phonological Awareness Test (PAT)
- Reading Evaluation, Assessment and Diagnostic System (READS)
- Slosson Test of Reading Readiness (STTR)
- Woodcock Diagnostic Reading Battery (WDRB)
- YOPP-SINGER Test of Phoneme Segmentation

3.4.3. Consultations with experts in the field

I contacted the Learning Resource Center (LRC) in Maadi, a center that uses American and British standardized tests to assess bilingual Egyptian children who are suspected of having some type of learning disability. Then, I met with Mrs. Beth Noujaim, Head of the Professional Services in LRC who is an experienced LD specialist. Mrs. Noujaim has been living in Egypt for over twenty years and has specialized in the assessment of children with reading and learning difficulties at Cairo American College (CAC), and at
the Community Services Associations (CSA) for a total of eight years. She also established the LRC six years ago. After examining and identifying reading readiness skills relevant to the Arabic language, we adapted and created a series of Arabic subtests.

Following that, I interviewed an experienced Arabic teacher who taught first graders for ten years in Baby Home School in Zamalek. Later she taught first, second and third grades for another four years in New Ramses College in Abbassia. Another interview was held with an experienced Arabic teacher who teaches Arabic as a foreign language to adults in the International Language Institute (ILI) in Mohandessin. The purpose of the interviews was to clarify two issues that Mrs. Noujaim, as an English speaker, had doubts about: the number of phonemes present in the word كتب (kataba) and whether the articles in Arabic are considered as separate words or as part of the nouns they describe. Both Arabic teachers confirmed that if any Egyptian child is asked how many sounds he/she can hear in the word كتب (kataba), the answer will be three sounds. As for articles, they both explained that for English speakers, articles are separate. However, in Arabic, the articles, or more precisely the identification markers, are considered part of the nouns they accompany. It should be noted here that the word (kataba) كتب consists of three consonant sounds and three short vowel sounds. However, the children at this age were taught that this word is composed of three letter sounds.
3.4.4. Pilot testing the instrument

A pilot test was carried out in a private school in El Kobba district where the language of instruction is primarily Arabic. Nine kindergarten boys and girls, aged five to six years, were assessed individually by the researcher. Each assessment lasted approximately fifteen minutes. This study was carried out so that the researcher could get feedback from the students and become aware of any challenges in the administration of the tool.

After completing the pilot study, the following adjustments were made to the instrument:

- **Print Awareness Test**

  After analyzing the data obtained from the pilot study, it was found that Section B of the Print Awareness Test negatively correlated with other subtests and with the total scores. This section was therefore deleted from the test. An orthographic processing test was added to the instrument in its place.

- **Initial Sound Isolation**

  The children tended to visualize the word they heard, then utter the name, not the sound, of the letter. Five or six demonstrations needed to be given to the children until they comprehended the required response.

- **Letter Sound Association**

  Some students understood the concept of letter sound association once they were given several examples, and were able to complete the test. Others found it difficult to grasp the concept. Possible difficulties will be dealt with by providing the students with five or six illustrations and examples.
3.4.5. Description of the new instrument: The Egyptian Reading Readiness Screening Profile

In order to test for reading readiness skills, five subtests were included in the instrument:

a. **Print Awareness Test** (6 items)

The child is asked to point to:
- The cover page of a book
- The back of the book
- Where reading starts on any given page
- The direction of print (from right to left)
- The words, one by one, as he/she hears them being read
- The end of the story

b. **Rapid Letter Naming Test** (30 items)

The student is shown rows of 30 letters on a page. He/she is asked to name as many letters as he/she can in 30 seconds. The score comprises the total number of letters identified in the time allowed.

c. **Letter Sound Association Test** (10 items)

The child is asked to say the sound that each letter makes.

d. **Phonological Awareness Test** (40 items)

This part of the instrument has four sections:

i. **Initial Sound Isolation**

The student is asked to identify the beginning sound in each word (10 items).

ii. **Final Sound Isolation**

The student is asked to identify the ending sound in each word (10 items).
items).

**iii. Sentence Segmentation**

On each item the student hears a sentence in Modern Standard Arabic at normal speed. He is asked to clap one time for each word heard (10 items).

**iv. Phoneme Segmentation**

The student is asked to say the number of phonemes he hears in an orally presented word (10 items).

**e. Orthographic Processing Test** (10 items)

The child points to the one of four stimuli that exactly matches the target item at the right of the row.

3.5. Administration of the Instrument

**3.5.1. Participants**

A random sample of 60 Egyptian kindergarten boys and girls aged 6 years who are completing their KG2 at New Ramses College comprised the subjects. The Kindergarten Department at their school has adopted the Montessori Method of Education. Classrooms are student-oriented with learning centers full of hands-on materials to teach English, Arabic, Math, Science and Geography. There are four KG2 classes of thirty students each. A teacher and an assistant teacher are assigned to each class. Lessons are demonstrated individually to each child by the teacher and some concepts are presented in small groups. The instruction of Arabic and English reading relies heavily on phonics. Sight words are also taught through flash cards.
3.5.2. Instruments

In addition to the ERRSP (described in detail above), participants took the Phonological Awareness Test (PAT, Robertson & Salter, 1997) and an Arabic Word Reading Test (AWRT). The PAT, which is a published test for L1 English children has been used by specialists to assess Egyptian children struggling to learn to read English (B. Noujaim, personal communication, March 15, 2002).

The PAT consists of 7 sections, including:

- Discrimination and production of rhyming words
- Segmentation of sentences, syllables and phonemes
- Isolation of initial, final and medial sounds in words
- Deletion of compounds, syllables and initial phonemes from words
- Substitution of the middle vowel
- Letter sound knowledge
- Decoding

Segmentation, isolation, letter sound knowledge and decoding were selected and administered to the participants in this study. The sections selected were those that corresponded to sections in the Arabic instrument (ERRSP).

The AWRT consisted of eight Arabic words selected by the current investigator. The main criterion for selection was that the children would not have previously encountered these words. The investigator consulted the KG2 Arabic teachers to make sure the words included are appropriate and probably unfamiliar to the children.

3.5.3. Data Collection Procedures

The researcher and four qualified assistants tested 60 students twice, once using the PAT and again using the ERRSP and the AWRT. ERRSP and PAT
testing sessions lasted 15 minutes each. The AWRT lasted an additional 5 minutes. Thus, a total of 40 minutes was needed to assess each student. A total of forty hours were used to complete the data collection.

The examiners visited the classrooms prior to the administration of the tool to establish rapport with the children. All tests were administered to the students individually in a quiet room in the school. Each day, a specified number of children were examined, using the ERRSP, AWRT and the PAT. The order of administration was changed each day, to take into account any possible effects of test order. However, the same examiner administered the Arabic and English instruments within a given day. There was a break between sessions, in order to take into account any possible fatigue effects. The scores of the students were recorded on scoring sheets to be analyzed.

3.5.4. Data Analysis

a. Classical Test Theory was used in the item analysis. The difficulty and the discrimination index of each item was calculated. The correlation of each item with its own subtest and with other subtests in ERRSP was computed. In addition, each item was correlated with the total scores on ERRSP, on AWRT and on PAT.

b. A correlation of the total scores on the ERRSP and the AWRT were carried out to establish the diagnostic validity of the new instrument.

c. The mean, standard deviation and reliability of each subtest were computed. Furthermore, each subtest was correlated with the total scores on ERRSP, AWRT and PAT. A regression analysis between the subtests included in ERRSP and AWRT was carried out to determine the contribution of each subtest to the total correlation with AWRT.
Chapter IV

Results

4.1. Introduction

The goal of the present study was to develop a valid and reliable Arabic instrument to measure reading readiness in Egyptian kindergartners (KG). The following research questions were investigated:

1. What factors used for identifying potential reading problems among L1 English kindergartners can be used to identify potential reading problems in L1 Arabic Egyptian kindergartners?

2. How will the results obtained by KG students on an instrument measuring Arabic reading difficulties correlate with the scores obtained by these KG students on an Arabic word reading test?

3. How will results obtained by Egyptian KG students on an instrument measuring Arabic reading difficulties correlate with the results obtained by the same KG students on an instrument measuring English reading difficulties?

Based on the literature review and the examination of English reading readiness instruments, an Arabic instrument (The Egyptian Reading Readiness Screening Profile, ERRSP) was developed and used in the present study. Five sub-tests were selected for inclusion in the instrument:

1. Print awareness

2. Rapid letter naming

3. Letter sound association

4. Phonological awareness

5. Orthographic processing.
The ERRSP was administered to 60 Egyptian students at the end of their second year of kindergarten along with an English instrument (the Phonological Awareness Test, PAT) and an Arabic word reading test (AWRT). In addition, each classroom teacher rated the overall reading ability of each student on a 20-point scale.

The scores of the students on the three instruments were analyzed to establish the reliability of the three tests and sub-tests included in ERRSP and PAT. The mean and standard deviation of each test and sub-test were obtained. Since these showed that the items on the ERRSP and AWRT were easy for the majority of these subjects, the skewness of each item, sub-test and total test was examined. Tables 1, 2 and 4 in Appendix B show which items and subtotals are negatively (or positively) skewed to a greater than expected extent (equal to or greater than +1 or -1). Since skewness indicates non-normal distribution, a non-parametric correlation coefficient (Spearman) was used. (Histograms showing the shape of the distribution of each sub-test and total test are found in Appendix C). When computing the reliability of sub-tests and total tests, the Kuder-Richardson-20 estimate was used for all cases except for rapid letter naming when KR-21 was used. The Spearman-Brown prophecy formula was applied to determine the reliability of the sub-tests with 10 or fewer items. The results from this formula estimate reliability if the number of items were to be doubled or tripled, with the new items having characteristics similar to the existing ones.

An item analysis was carried out for both ERRSP and AWRT. The facility index was obtained by dividing the sum of each item by the total number of students, i.e. by using the average score of the item (Nitko, 2001). The discrimination index of each item was obtained by comprising a group of high scorers (scores at or above 1SD, N=11) and one of low scorers (scores at or below -1SD, N=10) on the overall
ERRSP. Then the percentage correct for each item for each group was compared (% correct high scorers minus % correct low scorers for each item) (Nitko, 2001). Responses to each item were correlated with the total of the sub-test, other sub-tests, and the total scores of ERRSP, AWRT and PAT. (Results of the item analysis are contained in Table 4 in Appendix B).

The students' scores on the sub-tests were correlated with their total scores on ERRSP to determine the internal consistency of the ERRSP. The scores on the sub-tests were also correlated with the scores on AWRT to determine the correlation of students' performance on each sub-test with reading ability as indicated by the reading score. In addition, the scores on the sub-tests were correlated with PAT to determine the correlation of each Arabic sub-test with the students' performance on the English instrument (PAT).

Furthermore, several multiple regression analyses were carried out. In the first regression analysis, AWRT was used as a dependent variable, and sub-tests included in ERRSP as independent variables. The first analysis was carried out to determine the contribution of each of the Arabic sub-tests to the correlation with reading scores on AWRT. The second regression analysis was run to ascertain of the contribution of the Arabic sub-tests to AWRT when letter sound association was dropped. In the third regression analysis, AWRT was used as a dependent variable and total ERRSP and PAT as independent variables. The third analysis was carried out to determine how much of the variation in the reading scores could be accounted for by the ERRSP and PAT. In the fourth regression analysis, teacher rating was used as a dependent variable and total ERRSP and PAT as independent variables. The fourth regression analysis was carried out to determine how much of the variation in the teacher rating could be accounted for by the students' performance on ERRSP and PAT. (Results of
the regression analyses are found in Tables 5A, 5B, 6, 7 and 8 in Appendix B).

The results of the reliability analysis and item analysis of the instruments and their sub-tests together with the results of the correlation matrices will help in answering the research questions. Interpretations and conclusions will be discussed in Chapter 5. This chapter will be divided into two parts. The first part will include an analysis of sub-tests included in the Arabic instrument (ERRSP) and their correlation with the total scores on ERRSP. The second part will present an analysis of the correlation between Arabic and English instruments. (Copies of the instruments are found in Appendix A).

4.2. Analysis of sub-tests in ERRSP

4.2.1. Print Awareness Sub-test

In this 6 item sub-test, the children were asked to point to the title of a book, the back of the book, the direction of print and the end of the story. The mean was 5.2, the standard deviation was .90, skewness was -1.31 and the reliability estimate (KR-20) was .32. Since this sub-test had only 6 items, the Spearman-Brown prophecy formula was applied to determine the reliability of the sub-test if the number of items was tripled to 18. The reliability of the sub-test increased to .59 (Table 1 in Appendix B).

Item Analysis

As shown in Table 4 in Appendix B, facility values of the individual items ranged from .63 to 1.00. Discrimination values ranged from .00 to .70. Item 4 which required the children to determine direction of print had a facility index of 1.00 and a discrimination index of .00, since all the children gave the correct response. Item 5, which required the children to map speech to written words, had a facility index of .63
and a discrimination index of .70. This item correlated negatively (r = -.01) with its own sub-test. When item 5 was deleted, the reliability of print awareness increased. The negative relationship between this item and its sub-test may be related to the fact that other items in the sub-test were mainly measuring book-handling skills (e.g., locating the title of the book, the back of the book, and the end of the story), while item 5 measured other aspects of print awareness. For further development of the instrument, item 5 may be deleted.

Print Awareness (including item 5) correlated significantly with the total scores (minus print awareness) on ERRSP (.45, p<.01).

4.2.2. Rapid Letter Naming Sub-test

This sub-test consisted of one polytemous item. The students were given a total of 30 letters to name. The score was the total number of letters each child could name in 30 seconds. The mean was 23.18, the standard deviation was 5.44, the skewness was -.36 and the reliability estimate (KR-21) was .85. The facility index was .77 while the discrimination index was .73. This sub-test had the highest discrimination index of the 5 sub-tests in the ERRSP. Scores were significantly correlated with letter sound association (r = .53, p <.01) and print awareness (r = .36, p<.01). It also correlated significantly with the total scores (minus rapid letter naming) on ERRSP (r = .44, p<.01).

4.2.3. Letter Sound Association Sub-test

This sub-test consisted of 10 items. The students were asked to say the sounds of 10 letters. The mean was 9.23, the standard deviation was 1.32, the skewness was -2.14 and the reliability estimate (KR-20) was .68. The Spearman-Brown estimate for
a 20-item subtest was .81.

*Item Analysis*

Facility values ranged from .85 to .98. Discrimination values ranged from .00 to .60.

Correlation of item 3.3 with the total sub-test is .04. This item had a slight negative correlation with the total scores on ERRSP ($r = -.09$). Correlation of item 3.8 with the total sub-test is .03. Item 3.3 and 3.8 have a discrimination index of .00. When items 3.3 and 3.8 were deleted, and the reliability of their total sub-test recomputed, reliability of their sub-test, letter sound association, increased from .68 to .72. For further development of the instrument, these two items would need to be revised.

4.2.4. Phonological Awareness Sub-tests

This section consisted of 4 sub-tests, each with 10 items. Thus, a total of 40 items were included in the phonological awareness sub-test. The mean was 32.63, the standard deviation was 3.61 and the reliability estimate (KR-21) was .74. The phonological awareness sub-tests were: isolation of initial phonemes, isolation of final phonemes, sentence segmentation and phoneme segmentation.

*a. Isolation of initial phonemes.*

This sub-test included 10 items. The children were asked to isolate the sound of initial phonemes in 10 orally presented words. This sub-test had a mean of 9.77, a standard deviation of .59, a skewness of -2.92 and a reliability estimate (KR-20) of .46. The Spearman-Brown estimate for a sub-test was .72.
Item Analysis

Items 1, 2, 3, 8 and 10 had a facility index of 1.00 and a discrimination index of .00. Items 4, 6, 7 and 9 had a facility index of .98 and discrimination index of .10. The results reveal that isolating initial phonemes was an easy task for the students in this study. This may be due to the fact that the age of the participants, which ranged from 68 months (5 years, 8 months) to 88 months (7 years, 4 months), tends to be higher than usual for second year kindergartners. This sub-test may be more appropriate for five-year-olds.

b. Isolation of final phonemes

This sub-test included 10 items. The participants were asked to isolate the final sound of 10 orally presented words. The sub-test had a mean of 8.72, a standard deviation of 2.07, a skewness of -2.45 and a reliability estimate (KR-20) of .82. Spearman-Brown estimate when the items were doubled was .90.

Item Analysis

The facility values of the individual items ranged from .83 to .92. The discrimination values ranged from .30 to .50. Correlations between individual items and their total sub-test ranged from .28 to .72. Statistically significant correlation values between individual items and total ERRSP scores ranged from r = .28 (p < .05) to r = .53 (p < .01).

c. Sentence segmentation

This sub-test consisted of 10 items. The children were asked to segment sentences they heard into individual words. The sub-test had a mean of 8.52, a standard deviation of 1.94, a skewness of -1.57 and a reliability estimate (KR-20) of .76. Spearman-Brown estimate with twice the number of items was .86.
Item Analysis

The facility values of items ranged from .68 to .95 and the discrimination values ranged from .10 to 50. Item 3 is the only item in the sub-test to have a significant correlation with other sub-tests. The items on this sub-test may need further investigation and research.

d. Phoneme segmentation

This sub-test included 10 items in which children were asked to segment orally presented words into phonemes. The sub-test had a mean of 5.62, a standard deviation of 1.29 and a reliability estimate (KR-20) of .37.

Item Analysis

Items 1, 2, 3, 4 and 5 had facility values of .91, .95, .85, .90 and .95, respectively. Their discrimination values ranged from .10 to .20. Items 6, 7, 8, 9 and 10 had facility values of .37, .27, .32, .05 and .05, respectively. Their discrimination values ranged from .00 to .26. The first five items were three-letter root words, while the second five items were four and five-letter derivatives. While segmenting three-letter words was easy for these children, segmenting four and five-letter words was not an easy task for the students in this study. This difference may stem from a number of reasons. First, it might be a developmental cause in that children of this age cannot segment four or five-letter words in general. Second, the difficulty of the task could be due to their confusion between root words and their derivatives. A third reason, which was observed by the researcher and was also reported by two of the examiners, could be that the children in items 6 to 10 were segmenting syllables instead of phonemes.

When the sub-test was divided into two parts and the reliability estimate of each part was calculated separately, the reliability estimate (KR-20) of part 1 was .69.
and the reliability estimate (KR-20) of part 2 was .72. Spearman-Brown estimates when the number of items was tripled was .87 for part 1 and .89 for part 2. The skewness of part 1 was -2.44 and the skewness of part 2 was 1.00. It is probable that the second part of the sub-test may need to be changed. A choice of other three and four-letter-words can be implemented.

4.2.5. Orthographic Processing Sub-test

This sub-test included 10 items. The students were asked to point to the one of four stimuli that matched the target item at the right of the row. The mean was 8.53, the standard deviation was 1.26, the skewness was -.16 and the reliability estimate (KR-20) was .31, while the Spearman-Brown estimate when the number of items was doubled was .47.

Item Analysis

The facility values of the individual items ranged from .63 to .95. The discrimination indices ranged from -.18 to .41. The individual items' correlation with the total sub-test ranged from -.05 to .28. Item 7 correlated positively with print awareness (r = .28, p<.05). Correlation of individual items with the total scores on the ERRSP ranged from r = -.15 to r = .27 (p<.05). Negatively discriminating items will be deleted.

Orthographic processing correlated significantly with the total ERRSP (r = .26, p<.05).

Total ERRSP

Total ERRSP scores had a mean of 78.78 (out of a possible 96, or 82.06%), a standard deviation of 9.04, a skewness of -.80 and a reliability estimate of .79. The reliability estimates (KR-20) of the sub-tests included in ERRSP ranged from .31 to .85. Spearman-Brown estimates ranged from .47 to .90. The most reliable sub-tests
were rapid letter naming (.85), isolation of final phonemes (.82), sentence segmentation (.76) and total phonological awareness (.74).

The correlation between sub-tests included in ERRSP and total ERRSP scores ranged from $r = .26$, $p < .05$ to $r = .54$, $p < .01$. Letter sound association had the strongest correlation with total ERRSP scores ($r = .54$, $p < .01$), followed by print awareness ($r = .45$, $p < .01$), then rapid letter naming ($r = .44$, $p < .01$). (Details are found in Table 4.1 below).

Table 4.1: Correlation Between Subtests in ERRSP and Total ERRSP

<table>
<thead>
<tr>
<th>Name of Subtest</th>
<th>Correlation with Total ERRSP</th>
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</thead>
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<tr>
<td>Letter Sound Knowledge</td>
<td>.54 **</td>
</tr>
<tr>
<td>Print Awareness</td>
<td>.45 **</td>
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<tr>
<td>Rapid Letter Naming</td>
<td>.44 **</td>
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<td>Phonological Awareness</td>
<td>.29 **</td>
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<tr>
<td>Orthographic Processing</td>
<td>.26 *</td>
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</table>

* $p < .05$  ** $p < .01$

4.3. An Analysis of the Correlation between Arabic and English Instruments

Before discussing the correlation between ERRSP, AWRT and PAT, a brief description of the AWRT and its results will be presented (the detailed item analysis is found in Table 4 in Appendix B). Then a summary of the results on PAT will be reported (the detailed results are contained in Table 2 in Appendix B).
4.3.1. The Arabic Word Reading Test (AWRT)

This test was developed for the present study. It included 8 items. The children were presented with 7 three-letter-words and 1 four-letter word to decode. The test had a mean of 6.23, a standard deviation of 2.07, a skewness of -1.10 and a reliability estimate (KR-20) of .80. The Spearman-Brown estimate when the number of items was doubled was .92.

*Item Analysis*

The facility values of the individual items ranged from .55 to .85. The discrimination indices ranged from .11 to .81.

To validate this test, students were rated by their Arabic language teachers on a 20-point scale to evaluate their overall Arabic reading competence. The teacher ratings were correlated with scores on AWRT. The teacher evaluation correlated significantly with AWRT (.61, p<.01). (Details are found in Table 3 in Appendix B).

As shown in Histogram 2 in Appendix C, scores on AWRT are negatively skewed (-1.10). This implies that the test was easy for most students. However, this test needs to be administered to a more heterogeneous sample before a final conclusion about its level of difficulty is reached.

4.3.2. The Phonological Awareness Test (PAT)

PAT is a published test standardized for American children. Specialists in the Learning Resource Center (Maadi) have used PAT to assess young Egyptian students who are struggling to read in English. This is the first time that PAT was administered to Egyptian kindergartners who attend a private language school. The
test was administered individually to students, to assess their reading readiness skills.

The reliability estimate of the total scores on PAT was .90. The reliability of the sub-tests included in PAT ranged from .22 to .89. The most reliable sub-tests were the total decoding of VC and CVC words (.89), the total letter sound association (.79) and the total isolation (.71).

4.3.2.1. Segmentation

i. Sentence segmentation

This sub-test included 10 items. The students were asked to segment sentences into words. The mean was 7.33, the standard deviation was 1.78, the skewness was -.56 and the reliability estimate (KR-20) was .56. This sub-test compares to sentence segmentation in ERRSP which had a mean of 8.52, a standard deviation of 1.94 and a reliability estimate of .76.

ii. Syllable segmentation

This sub-test included 10 items. The children were asked to segment orally presented words into syllables. The mean was 4.52, the standard deviation was 1.67, the skewness was .25 and the reliability estimate was .22.

iii. Phoneme segmentation

This sub-test included 10 items. The students were asked to segment orally presented words into phonemes. The mean was 3.17, the standard deviation was 1.63, the skewness was .55 and the reliability estimate was .57. This sub-test compares to phoneme segmentation in ERRSP, which had a mean of 5.62, a standard deviation of 1.29 and a reliability estimate of .37.
4.3.2.2. Isolation

i. Isolation of initial phonemes

This sub-test included 10 items. The children were asked to isolate the sound of initial phonemes in orally presented words. The mean was 9.6, the standard deviation was .67, the skewness was -2.14 and the reliability estimate was .25. This sub-test compares with isolation of initial phonemes in ERRSP, which had a mean of 9.77, a standard deviation of .59, a skewness of -2.92 and a reliability estimate of .46. Isolation of initial phonemes was an easy task for participants in this study.

ii. Isolation of final phonemes

This sub-test included 10 items. The children were asked to isolate the sound of final phonemes in orally presented words. The mean was 8.95, the standard deviation was 1.36, the skewness was -1.33 and the reliability estimate was .57. This sub-test compares with the isolation of final phonemes in ERRSP which had a mean of 8.72, a standard deviation of 2.07, a skewness of -2.45 and a reliability estimate of .82.

iii. Isolation of medial phonemes

This sub-test included 10 items. The children were asked to isolate the sound of medial phonemes in orally presented words. The mean was 5.37, the standard deviation was 2.16, the skewness was -.59 and the reliability estimate was .70.

4.3.2.3. Letter Sound Association

This section consisted of two sub-tests:

i. Consonants

The students were asked to say the sounds of 20 consonants. The mean was
18.32, the standard deviation was 1.77, the skewness was -1.28 and the reliability estimate was .61.

**ii. Short and long vowels**

This sub-test included 10 items. The children were asked to say the sounds of short and long vowels. The mean was 7.17, the standard deviation was 2.53, the skewness was -.64 and reliability estimate was .79.

### 4.3.2.4. Decoding

Decoding included two sub-tests:

**i. Decoding VC words.**

This sub-test consisted of 10 items. The participants were given two letter VC words to read. The mean was 6.73, the standard deviation was 2.58, the skewness was -.78 and the reliability estimate was .77.

**ii. Decoding CVC words**

This sub-test consisted of 10 items. The children were given CVC words to read. The mean was 6.00, the standard deviation was 2.85, the skewness was -.44 and the reliability estimate was .81.

### 4.3.3. Correlation between ERRSP and AWRT

The total scores on ERRSP correlated significantly with the total scores on AWRT (r = .72, p < .01). Results of the correlation of sub-tests in ERRSP and total AWRT are found in Table 1 in Appendix B.

### 4.3.4. Correlation between ERRSP and PAT

The total scores on ERRSP correlated significantly with the total scores on PAT
Results of the correlation of sub-tests in ERRSP and total PAT are found in Table 1 in Appendix B. Results of correlations of sub-tests in ERRSP and sub-tests in PAT are found in Tables 9 and 10 in Appendix B.

4.3.5. Regression Analyses

Several regression analyses were carried out. The first regression analysis was run to find out how much of the variation in the reading scores on AWRT could be accounted for by the sub-tests in ERRSP. The reading scores on AWRT was the dependent variable, and the five sub-tests included in ERRSP were the independent variables. The results revealed the following: rapid letter naming had the highest significant contribution to the reading scores (Beta=.47, \( p<.001 \)). It was followed by total phonological awareness (Beta=.20, \( p<.05 \)). Orthographic processing also contributed significantly to the reading scores (Beta=.18, \( p<.05 \)). Print awareness (Beta=.18) and letter sound association (Beta=.12) did not contribute significantly to the reading scores. Adjusted \( R^2 = .63 \).

Another regression analysis was run after dropping letter sound association and regressing the remaining sub-tests onto AWRT. The results revealed that rapid letter naming, phonological awareness, orthographic processing and print awareness all contributed significantly to the reading scores on AWRT. Adjusted \( R^2 = .62 \) (Details are found in Table 5B in Appendix B).

The third regression analysis was carried out to determine how much of the variation in the reading scores on AWRT could be accounted for by the ERRSP and PAT. AWRT was the dependent variable and the total scores on ERRSP and PAT were the independent variables. The results were as follows: Adjusted \( R^2 = .63 \). ERRSP contributed significantly to the variation in the reading scores.
(Beta=.78, p<.001); PAT did not contribute significantly to the variation in the reading scores (Beta=.04).

The fourth regression analysis was carried out to determine how much of the variation in teacher rating could be accounted for by the students’ performance on ERRSP and PAT. The dependent variable was teacher rating and the independent variables were the students’ total scores on ERRSP and PAT. The results were as follows: Adjusted $R^2 = .50$. The students’ scores on ERRSP contributed significantly to the variation in the reading scores on AWRT (Beta=.68, p< .001); PAT did not contribute to the variation in the reading scores on AWRT. (Results of the regression analyses are found in Tables 5A, 5B, 6, 7 and 8 in Appendix B).

4.4. Summary

The ERRSP had a reliability estimate (KR-20) of .79. The most reliable sub-tests were rapid letter naming (.85) and total phonological awareness (.74). Letter sound association had a reliability estimate of .68; print awareness had a reliability estimate of .32, and orthographic processing had a reliability estimate of .31.

The total scores on ERRSP correlated significantly with the scores obtained by students on AWRT ($r = .72, p<.01$). Furthermore, the results of the regression analyses showed that rapid letter naming contributed the most to the variation in the reading scores on AWRT. It was followed by total phonological awareness, orthographic processing, then print awareness.

The total scores on ERRSP correlated significantly with the total scores on PAT ($r = .60, p<.01$). The total scores on ERRSP correlated significantly with the teacher rating ($r = .61, p<.01$).
The above results answer the questions investigated in the present study. First, the scores obtained by students on the Egyptian Reading Readiness Screening Profile (ERRSP) correlate significantly with their scores on AWRT. Second, rapid letter naming, followed by phonological awareness, orthographic processing and print awareness can be used to identify potential Arabic reading problems in Egyptian kindergartners. This finding is supported by the fact that all of these factors contribute significantly to the variation in the reading scores on the Arabic Word Reading Test (AWRT). The students’ scores on ERRSP correlate to a lesser extent with their scores on PAT (r =.60, p<.01), which is probably due to differences between Arabic and English.
Chapter V
Discussion

5.1. Introduction

The focus of this study was the development of a valid and reliable instrument to assess reading readiness in Egyptian kindergartners (KG). The research questions investigated in the present study were:

1. What factors used for identifying potential reading problems among L1 English kindergartners can be used to identify potential reading problems in L1 Arabic Egyptian kindergartners?

2. How will the results obtained by KG students on an instrument measuring Arabic reading difficulties correlate with the scores obtained by these KG students on an Arabic word reading test?

3. How will results obtained by Egyptian KG students on an instrument measuring Arabic reading difficulties correlate with the results obtained by the same KG students on an instrument measuring English reading difficulties?

Based on the literature review and the examination of English reading readiness instruments, an Arabic instrument (ERRSP) was crafted and used in the present study. The ERRSP included the following sub-tests:

1. Print awareness
2. Rapid letter naming
3. Letter sound association
4. Phonological awareness
5. Orthographic processing
The ERRSP was used along with an English instrument (the Phonological Awareness Test, PAT) and an Arabic word reading test (AWRT) designed for this study. The three instruments were administered to 60 Egyptian children at the end of their second year of kindergarten. The results were analyzed and reported in Chapter 4. The results were also used to answer the research questions. In this chapter, an interpretation of these results will be presented, followed by the conclusions, limitations and suggestions for future research.

5.2. Interpretations

The results on the ERRSP and its sub-tests will be discussed and compared to previous research.

5.2.1. The Egyptian Reading Readiness Screening Profile (ERRSP)

The total scores on ERRSP correlated significantly with the total scores on the Arabic Word Reading Test (AWRT). The students' scores on ERRSP correlated with their reading ability. ERRSP explains 51.8% of the variance in the reading scores on AWRT. ERRSP also correlated with the teacher rating. ERRSP explains 37.2% of the variance in teacher rating. This implies that ERRSP could be potentially used as a diagnostic instrument to identify potential reading problems in Egyptian kindergartners.

5.2.1.1. Print awareness

Print awareness correlated significantly with AWRT (r = .43, p < .01). This is in line with the literature. In her book, *Beginning to Read: Thinking and Learning about Print*, Adams (1990) explains that print awareness is the foundation upon which
orthographic and phonological skills are established. The author further states that children's scores on print awareness tests predict their reading achievement.

In this study, the scores of the students on the print awareness sub-test were negatively skewed. The relative ease with which the children answered may be due to the fact that the age of individuals in the sample, which ranged from 68 months (5 years, 8 months) to 88 months (7 years, 4 months), was somewhat higher than usual for second year kindergartners in Egyptian private language schools. Their high level of performance may be due to the type of Arabic reading instruction received by those students in their second year of kindergarten.

The results of the first regression analysis showed that print awareness did not contribute significantly to the variation in the reading scores on AWRT. This may be due to the fact that item 5 in print awareness subtest correlated negatively with the rest of the items on the subtest. When item 5 was deleted, and print awareness regressed onto AWRT, it was found that print awareness without item 5 contributes significantly to the reading scores on AWRT. For further development of the instrument, item 5 needs to be revised.

5.2.1.2. Rapid Letter naming

This sub-test had the highest reliability of all sub-tests in the instrument (.85). It also had the highest correlation with AWRT (r =.64, p<.01). The results of the regression analyses revealed that rapid letter naming made the highest contribution of all ERRSP sub-tests to AWRT. This implies that rapid letter naming is the subtest of ERRSP which is the most indicative of reading ability for these children. Similarly, rapid naming of letters and digits by first graders predicted later reading ability in a study by Manis, Seidenberg and Doi (1999). According to these researchers, the
relation between naming speed and reading acquisition is strong enough that the participants' performance on rapid naming tasks is sometimes used to identify some groups of dyslexic readers. In another study by Felton (1992), rapid naming of letters by kindergartners was found to be an important factor in the prediction of later reading ability. Based on the results and the mentioned studies, rapid letter naming subtest should be kept in the instrument.

5.2.1.3. Letter sound association

This sub-test had a reliability coefficient (KR-20) of .68. It had the highest significant correlation with the total ERRSP ($r = .54$, $p < .01$). However, it did not contribute significantly to the regression of ERRSP sub-tests with AWRT. These findings are not expected, that letter sound association would correlate the least of all sub-tests with the ability of the children to read words. As reported by the National Reading Panel (2000), incorporating letter sound knowledge in reading instruction has a highly positive influence on children from kindergarten to sixth grade. The results of a meta analysis reported by the National Reading Panel revealed that systematic phonics instruction helps children, especially those with reading difficulties, in the process of learning to read. From the researcher's own experience, using the phonics approach, which emphasizes letter sound association, is effective in teaching reading to young children.

In this sub-test, the facility values of items ranged from .85 to .98, indicating that saying the sounds of letters was an easy task for the students in this study. This is probably due to the fact that Arabic reading instruction in their school relies heavily on phonics. The children are taught the sounds in addition to the names of letters in their first year of kindergarten. It has to be noted here that if this instrument were used in
other schools where the names of letters rather than the sounds are taught, the sub-test would probably be quite challenging.

5.2.1.4. Phonological awareness

Total phonological awareness had a reliability coefficient of .74. It correlated significantly with the total scores on ERRSP ($r = .29$, $p < .01$) and AWRT ($r = .42$, $p < .01$). In addition, total phonological awareness was the second highest contributor of all ERRSP sub-tests to the Arabic word reading test (AWRT). Total phonological awareness also correlated significantly with PAT ($r = .60$, $p < .01$). This is not surprising since PAT is a test of phonological awareness. Thus, phonological awareness correlated significantly with reading ability for these subjects. This finding is in line with previous research. In previous studies, phonological awareness predicted reading ability (Wesseling & Reitsma, 2001). In a study by McBride-Chang & Kail (2002), phonological awareness predicted reading in a first and second language. In another study by Muter & Diethelm (2001), phonological awareness predicted reading ability among multilingual children.

Phonological awareness in the ERRSP has 4 sub-tests: isolation of initial phonemes, isolation of final phonemes, sentence segmentation and phoneme segmentation.

a. Isolation of initial phonemes

This sub-test had a reliability coefficient of .46. It correlated significantly with AWRT ($r = .27$, $p < .05$). Isolation of initial phonemes had the highest skewness (-2.92) of all sub-tests. The results reveal that isolating initial phonemes was the easiest task for the students in this study. This may be due to the fact that the age of the participants, which ranged from 68 months (5 years, 8 months) to 88 months (7
years, 4 months), is somewhat higher than usual for second year kindergartners.

This sub-test may be more appropriate for five-year-olds.

b. *Isolation of final phonemes*

This sub-test had the highest reliability coefficient of all the phonological awareness sub-tests (.82). It correlated significantly with AWRT (.32, p<.01). The facility values of the individual items ranged from .83 to .92. The discrimination values ranged from .30 to .50. Isolating final phonemes was more challenging to the students than isolating initial phonemes which was expected since children learn to isolate initial phonemes before final phonemes. This sub-test will be kept in the instrument.

c. *Sentence segmentation*

This sub-test had a reliability of .76. It did not correlate significantly with AWRT. The individual items did not show any significant correlation with the total scores on ERRSP. Item 3 was the only item that correlated significantly with letter sound association (.42, p<.01). Items 5 and 9 had negative correlation with the total scores on AWRT (-.11, -.07). The items on this sub-test need further investigation and revision.

d. *Phoneme segmentation*

This sub-test included 10 items. The participants were asked to segment orally presented words into phonemes. The first five items represented words selected from three-letter roots while the second five items were four and five-letter derivatives. While segmenting three-letter-words was easy for these children, segmenting four and five-letter-words was not an easy task for the students in this study. This difference in difficulty might be due to three reasons. First, it might be developmental in that children of this age cannot segment four or five-letter-
words in general. Second, the difficulty of the task could be due to their confusion between root words and their derivatives, which are key features of Arabic. A third reason, which was observed by the researcher and was also reported by two of the examiners, could be that the children in items 6 to 10 segmented syllables instead of phonemes. This sub-test may also need further study in order to ascertain why the second set of items were so difficult for these subjects, compared to the first.

5.2.1.5. Orthographic processing

This sub-test had a relatively low reliability coefficient of .31. This low value may be due to the following reason. The researcher observed some children attempting to read the words they were required to visually match. That is, instead of discriminating visually between the given words, they engaged in decoding. The words displayed were not familiar or easy words for them to read. This may explain the inconsistency in the children's performance on this task.

In the literature, orthographic processing was found to predict reading ability (Badian, 2001). Similarly, in this study, orthographic processing correlated significantly with the Arabic word reading test (.35, p<.01). It also contributed significantly to the variation in the reading scores on AWRT. As would be expected, this sub-test did not correlate significantly with PAT, since recognizing Arabic orthography would not be closely related to English phonological awareness. This subtest will be kept in the instrument.

5.2.2. Arabic Word Reading Test

The Arabic word reading test consisted of 8 three and four-letter-words for the
children to read. It had a reliability coefficient of .80, which indicates that it is a reliable test, with good internal consistency. The total test correlated highly with the total scores obtained on ERRSP (.72, p<.01).

It is important to note here that more items need to be added to the test to make it more reliable. The test was negatively skewed indicating its ease. However, it needs to be used with a more heterogeneous sample before reaching a conclusion about its level of difficulty.

5.3. Conclusions

From the above interpretations, the following conclusions may be reached.

First, the Egyptian Reading Readiness screening profile (ERRSP) is a reliable instrument with some potential for use as a diagnostic tool. This potential could be improved through follow-up studies (cf. Section 5.5, below). The instrument may be used to diagnose possible reading problems in Egyptian kindergartners. By alerting parents and teachers to the possible reading difficulties that youngsters may encounter, intervention could then take place at an early age.

Second, the Arabic Word Reading Test had the strongest correlation with rapid letter naming. This implies that teachers may need to emphasize the names of letters to young children to help them attain fluency. Fluency in letter naming, in turn, will help young readers in the task of decoding.

Third, AWRT correlated significantly with phonological awareness. Adequate training in phonological awareness may be necessary in teaching young children how to read Arabic.

Fourth, AWRT correlated highly with print awareness. Parents and teachers need to be aware of the importance of early exposure to books for their
youngsters. When children handle books and recognize that print has meaning, this enhances their future reading ability.

5.4. Limitations

Two limitations in this study are the specialized examiners and sample selection. In this study, the researcher and four examiners tested the children. The examiners had specialized training in assessing young children at LRC or were experienced and well-trained kindergarten teachers. Thus one would expect some differences between the examiners and typical classroom teachers. In applying this instrument in the future in Arabic public and private schools, training the classroom teachers would be essential for effective use of the instrument.

As for sample selection, the kindergartners participating in this study were from a private language school, where English is taught from the first year of kindergarten. One would expect to find differences in instructional methods, in the quality of teaching and in students' responses between private and public schools in Egypt. Thus, the findings of this study cannot be generalized to all Egyptian kindergartners.

5.5. Suggestions for future research

There are a number of possible suggestions for future research, three of which will be mentioned here. The first suggestion concerns the further development and application of the ERRSP. Several individual items included in some of the sub-tests, such as sentence segmentation and phoneme segmentation, need further investigation in order to be improved.
The second one is to replicate this study with a more heterogeneous sample. Egyptian kindergartners who are enrolled in public or private Arabic schools would comprise the subjects of these replication studies. Such research could shed more light on the characteristics and needs of the majority of young Egyptian pre-readers.

Now that an instrument is available, the third suggestion is to carry out a longitudinal study where the ERRSP is administered in kindergarten and then the reading abilities of learners measured over 2 or 3 years. This could help establish the predictive validity of the instrument.
REFERENCES


Appendix A

INSTRUMENTS
دليل المدرس

الاختبار الأول:

السؤال

الدرجة

الإجابة الصحيحة

1. اكتب اسم الكتب

2. أين ظهر الكتب

3. من أين بدأ قراءة الصفحة الأولى

4. أين آفك الكلام

5. ضع برك على كل كلمة تسمعها

6. أين نهاية القصة

المجموع

في حالة إذا ما أجاب الطلاب إجابة غير صحيحة، أرجو تدوينها

الاختبار الثاني: اختبار سرعة تعريف أسماء الحروف

إرشادات للمدرس:

قل للطلاب: "أنت ترى بعض الحروف. قل في اسم كل الحروف. في حالة عدم معرفة أي اسم سأقوله لك، استعد!" 10 كلمة في 30 فصل.

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التعبير الثالث: اختبار تمييز أصوات الحروف

"قل ل صوت كل حرف مثال: د بقول د / ح بقول ح"/

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المجموع: 10
الاختبار الرابع: اختبار تمييز أصوات الحروف في الكلمات المسموعة

أ. تمييز صوت الحرف الأول في الكلمة

"سأقول لك كلمة وأنت تقول لي صوت أول حرف في الكلمة"
الأمثلة: الصوت الأول في باب هو/ب/ ؟ في موز هو/م/ .......
السؤال: ما هو صوت الحرف الأول في كلمة؟......

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<tr>
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<tr>
<td>2. لبن</td>
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<td>9. شجرة</td>
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</tr>
<tr>
<td>10. كتاب</td>
<td>ك/</td>
</tr>
</tbody>
</table>

المجموع:......

ب. تمييز صوت الحرف الأخير في الكلمة

"سأقول لك كلمة وأنت تقول لي صوت آخر حرف في الكلمة"
الأمثلة: لن/ن/، هرم/م/......
السؤال: ما هو صوت الحرف الأخير في كلمة؟................

<table>
<thead>
<tr>
<th>الكلمة</th>
<th>الإجابة الصحيحة</th>
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<th>الإجابة الصحيحة</th>
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<td>صفق 3 مرات</td>
<td>2. أحمد كتب الدروس</td>
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<td>صفق 3 مرات</td>
<td>3. الكتاب على المكتب</td>
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<td>صفق 3 مرات</td>
<td>4. القصة مع الوالد</td>
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<td>صفر/1</td>
<td>صفق 4 مرات</td>
<td>5. منى نامت على السرير</td>
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<td>صفر/1</td>
<td>صفق 4 مرات</td>
<td>6. سمير أكل نفحة كبيرة</td>
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<td>صفق 4 مرات</td>
<td>7. ركبتنا الجمل عند الأهرام</td>
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<td>صفق 4 مرات</td>
<td>8. تطير الفراشة فوق الزروع</td>
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<td>9. جرت القطة وراء الفار</td>
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<td>صفق 4 مرات</td>
<td>10. أنا أحب التوت الأحمر</td>
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المجموع: 10/10

ج. تقسيم الجملة إلى كلمات

صفق مرة واحدة لكل كلمة تسمعها في الجملة.
الأمثلة: هذه بنت: صفق مرتين; القطة تشرب اللبن: صفق 3 مرات
5. تقسم الكلمات إلى حروف.


المجموعة: 

الإجابة الصحيحة

الكلمة

الدرجة

صفر

1. جلس/ج-ل-س/

2. أكل/أ-ك-ل/

3. ذهب/ذ-ه-ب/

4. زرع/ز-ر-ع/

5. ليس/ل-ب-س/

6. ذهبت/ذ-ه-ب-ت/

7. عمت/ع-م-ت/

8. شربت/ش-ر-ب-ت/

9. ذهبنا/ذ-ه-ب-ن-ناً/

10. لنالا/ل-ع-ب-ن-اً/

المثال: علم عمل علم مع

الدرجة

الخيارات

الكلمة

1. سور، سوق، سمر

2. جميل، جمال، عمل

الاختبار الخامس: اختبار الهجاء

يجب إعطاء الدرجة للتعليم بعد أن ينتهي من التدريب بأكمله.

ضع خطًا تحت الكلمة المماثلة لكلمة المكتوبة في أول السطر.
3. بنت بنت ثبت
4. مركب مكرر نركب مركب
5. عصير مصير يطير عصير
6. جناح نجاح جناح نباح
7. القطار القطار القطة القطار
8. سيارة سيارة سنارة صفارة
9. الأهرام الأهرام أهرام الأهرام
10. الفاكهة الفواكه فاكهة الفاكهة

المجموع: 10
اخبار القراءة

اقرأ الكلمات الآتية:

1. ركب
2. أسد
3. شجرة
4. فتح
5. أكل
6. عمل
7. ترك
8. هرب
Table 1: Statistics for Total ERRSP, Sub-tests and AWRT

<table>
<thead>
<tr>
<th>Name of Test / Subtest</th>
<th>No. of Items/ Total Score</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skewness</th>
<th>Reliability¹ (Spearman Brown²)</th>
<th>Correlation w/ Total ERRSP</th>
<th>Correlation w/ AWRT</th>
<th>Correlation w/ PAT</th>
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<td>.90</td>
<td>-1.31</td>
<td>.32 (.59)</td>
<td>.45 **</td>
<td>.43 **</td>
<td>.40 **</td>
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<td>A 2: Rapid Letter Naming</td>
<td>30</td>
<td>23.18</td>
<td>5.44</td>
<td>-.36</td>
<td>.85</td>
<td>.44 **</td>
<td>.64 **</td>
<td>.38 **</td>
</tr>
<tr>
<td>A 3: Letter Sound Association</td>
<td>10</td>
<td>9.23</td>
<td>1.32</td>
<td>-2.14</td>
<td>.68 (.81)</td>
<td>.54 **</td>
<td>.48 **</td>
<td>.25 **</td>
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<tr>
<td>A 4 A: Isolation (initial)</td>
<td>10</td>
<td>9.77</td>
<td>.59</td>
<td>-2.92</td>
<td>.46 (.72)</td>
<td>.27</td>
<td>.27 *</td>
<td>.39 **</td>
</tr>
<tr>
<td>A 4 B: Isolation (final)</td>
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<td>8.72</td>
<td>2.07</td>
<td>-2.45</td>
<td>.82 (.90)</td>
<td>.32 *</td>
<td>.32 *</td>
<td>.23 **</td>
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<tr>
<td>A 4 C: Sentence Segmentation</td>
<td>10</td>
<td>8.52</td>
<td>1.94</td>
<td>-1.57</td>
<td>.76 (.86)</td>
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<td>1.05</td>
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<td>.69 (.87)</td>
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<td>.11</td>
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<td>.14</td>
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<td>Total A 4: Phonological</td>
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<td>9.14</td>
<td>1.00</td>
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<td>Awareness</td>
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<td>A 5: Orthographic Processing</td>
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<td>9.04</td>
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<td>.72 **</td>
<td>.72 **</td>
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<td>AWRT: Arabic Word Reading Test</td>
<td>8</td>
<td>6.23</td>
<td>2.07</td>
<td>-1.10</td>
<td>.80 (.92)</td>
<td>.72 **</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05   ** p < .01

¹ KR-20 reliability estimate was used for all cases except A2 (Rapid Letter Naming) and Teacher Evaluation 1 & 2, when KR-21 estimates were used.

² Spearman Brown formula (shown in parentheses) was applied to estimate reliability for subtests with 10 or fewer items (2 times length, except for A1, A4A, A4D1, A4D2 which were 3 times length)
Table 2: Statistics for Total PAT and subtests

<table>
<thead>
<tr>
<th>Name of Test / Subtest</th>
<th>No. of Items/ Total Score</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skewness</th>
<th>Reliability&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Correlation w/ Total ERRSP</th>
<th>Correlation w/ AWRT</th>
<th>Correlation w/ PAT</th>
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<tbody>
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<tr>
<td>E 1 A: Sentence Segmentation</td>
<td>10</td>
<td>7.33</td>
<td>1.78</td>
<td>-.56</td>
<td>.56</td>
<td>.27*</td>
<td>.18</td>
<td>.48**</td>
</tr>
<tr>
<td>E 1 B: Syllable Segmentation</td>
<td>10</td>
<td>4.52</td>
<td>1.67</td>
<td>.25</td>
<td>.22</td>
<td>.07</td>
<td>-.02</td>
<td>.07</td>
</tr>
<tr>
<td>E 1 C: Phoneme Segment.</td>
<td>10</td>
<td>3.17</td>
<td>1.63</td>
<td>.55</td>
<td>.57</td>
<td>.33**</td>
<td>.33**</td>
<td>.48**</td>
</tr>
<tr>
<td>E 1 Tot: Segmentation</td>
<td>30</td>
<td>15.02</td>
<td>3.36</td>
<td>.05</td>
<td>.57</td>
<td>.34**</td>
<td>.29*</td>
<td>.50**</td>
</tr>
<tr>
<td>E 2 A: Isolation (initial)</td>
<td>10</td>
<td>9.60</td>
<td>.67</td>
<td>2.14</td>
<td>.25</td>
<td>.41**</td>
<td>.24</td>
<td>.55**</td>
</tr>
<tr>
<td>E 2 B: Isolation (final)</td>
<td>10</td>
<td>8.95</td>
<td>1.36</td>
<td>-1.33</td>
<td>.57</td>
<td>.38**</td>
<td>-.12</td>
<td>.00</td>
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<tr>
<td>E 2 C: Isolation (medial)</td>
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<td>5.37</td>
<td>2.16</td>
<td>- .59</td>
<td>.70</td>
<td>.30*</td>
<td>.26*</td>
<td>.52**</td>
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<td>E 2 Tot: Isolation</td>
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<td>23.92</td>
<td>3.08</td>
<td>- .68</td>
<td>.71</td>
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<td>.28*</td>
<td>.60**</td>
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<tr>
<td>E 3 A: Letter Sound Association (consonants)</td>
<td>20</td>
<td>18.32</td>
<td>1.77</td>
<td>-1.28</td>
<td>.61</td>
<td>.52**</td>
<td>.39**</td>
<td>.51**</td>
</tr>
<tr>
<td>E 3 B: LSA (vowels)</td>
<td>10</td>
<td>7.17</td>
<td>2.53</td>
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<td>.79</td>
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<td>E 3 Tot: LSA</td>
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<td>.57**</td>
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<tr>
<td>E 4 A: Decoding (VC words)</td>
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<td>6.73</td>
<td>2.58</td>
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<td>.77</td>
<td>.55**</td>
<td>.42**</td>
<td>.73**</td>
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<tr>
<td>E 4 B: Decoding (CVC words)</td>
<td>10</td>
<td>6.00</td>
<td>2.85</td>
<td>-.44</td>
<td>.81</td>
<td>.44**</td>
<td>.34**</td>
<td>.71**</td>
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<td>E 4 Tot</td>
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<td>12.73</td>
<td>5.18</td>
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<td>.89</td>
<td>.52**</td>
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<td><strong>Total PAT</strong></td>
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Table 3. Teacher Evaluation

<table>
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<th>Name of Test / Subtest</th>
<th>No. of Items/ Total Score</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skewness</th>
<th>Reliability&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Correlation w/ Total ERRSP</th>
<th>Correlation w/ AWRT</th>
<th>Correlation w/ PAT</th>
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<td>.61**</td>
<td>.37*</td>
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</tbody>
</table>

<sup>3</sup> KR-20 reliability estimate was used for all cases except A2 (Rapid Letter Naming) and Teacher Evaluation 1 & 2, when KR-21 estimates were used.
Table 4. Results of Item Analysis for ERRSP & AWRT

<table>
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<tr>
<th>Item</th>
<th>Facility</th>
<th>Discrimination</th>
<th>Skewness</th>
<th>Corr w/ own subtest</th>
<th>Sig. Corr w/ other subtests</th>
<th>Corr w/ ERRSP Total</th>
<th>Corr w/ AWRT</th>
<th>Corr w/ PAT Total</th>
</tr>
</thead>
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<tr>
<td><strong>Section 1: Print Awareness</strong></td>
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<td></td>
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<tr>
<td>A 1-1</td>
<td>.85</td>
<td>.31</td>
<td>-2.01</td>
<td>.21</td>
<td>A2 .26 *</td>
<td>A3 .27 *</td>
<td>.38 **</td>
<td>.24</td>
</tr>
<tr>
<td>A 1-2</td>
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<td>.30</td>
<td>-4.24</td>
<td>.37</td>
<td>A4C .31 *</td>
<td>A4 .30 *</td>
<td>.38 **</td>
<td>.36 **</td>
</tr>
<tr>
<td>A 1-3</td>
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<td>.23</td>
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<td>A 1-4</td>
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<td>.70</td>
<td>-.57</td>
<td>-.01</td>
<td>A2 .34 **</td>
<td>A4B .27 *</td>
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<td>.34 **</td>
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<td>.14</td>
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<td>.10</td>
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<td><strong>Section 2: Rapid Naming of Letters</strong></td>
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<td>A1 .36 **</td>
<td>A3 .53 **</td>
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<td>.64 **</td>
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<td><strong>Section 3: Letter Sound Association</strong></td>
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<td>A4C .27 *</td>
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<td>-2.01</td>
<td>.59</td>
<td>A2 .46 **</td>
<td>A4C .34 **</td>
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<td>A4B .29 *</td>
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<td>.59</td>
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<td>A4A .46 **</td>
<td>A4B .29 *</td>
<td>A4 .30 *</td>
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<tr>
<td>A 3-6</td>
<td>.95</td>
<td>.30</td>
<td>-4.24</td>
<td>.58</td>
<td>A4A .35 **</td>
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<td>A4B .28 *</td>
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<td>.41 **</td>
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<td>Item</td>
<td>Facility</td>
<td>Discrimination</td>
<td>Skewness</td>
<td>Corr w/ own subtest</td>
<td>Sig. Corr w/ other subtests</td>
<td>Corr w/ ERRSP Total</td>
<td>Corr w/ AWRT</td>
<td>Corr w/ PAT Total</td>
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**Section 4: Phonological Awareness**

**Section 4 A: Isolating Initial Sounds**

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<tr>
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<td></td>
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<td>A4B .25 *</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>A4 .33 *</td>
<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>A5 .32 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.83</td>
<td>.50</td>
<td>-1.84</td>
<td>.51</td>
<td>A2 .50 **</td>
<td>.47 **</td>
<td>.17</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A3 .31 *</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>.72</td>
<td>.80</td>
<td>-.99</td>
<td>.61</td>
<td>A1 .38 **</td>
<td>.59 **</td>
<td>.32 *</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Facility</td>
<td>Discrimination</td>
<td>Skewness</td>
<td>Corr w/ own subtest</td>
<td>Sig. Corr w/ other subtests</td>
<td>Corr w/ ERRSP Total</td>
<td>Corr w/ AWRT Total</td>
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</tr>
<tr>
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<td>----------</td>
<td>----------------</td>
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<tr>
<td>5</td>
<td>.80</td>
<td>.70</td>
<td>-1.54</td>
<td>.61</td>
<td>A2 .56 **&lt;br&gt; A3 .28 *&lt;br&gt; A4B .32 *&lt;br&gt; A4 .33 *</td>
<td>.47 **</td>
<td>.25</td>
<td></td>
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<tr>
<td>6</td>
<td>.85</td>
<td>.50</td>
<td>-2.01</td>
<td>.57</td>
<td>A1 .40 **&lt;br&gt; A2 .37 **&lt;br&gt; A3 .33 **&lt;br&gt; A4 .26 *&lt;br&gt; A5 .28 *</td>
<td>.48 **</td>
<td>.24</td>
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<td>7</td>
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<td>.81</td>
<td>-.21</td>
<td>.55</td>
<td>A1 .31 *&lt;br&gt; A2 .38 **&lt;br&gt; A3 .27 *&lt;br&gt; A4A .32 *&lt;br&gt; A4D1 .26 *&lt;br&gt; A4 .30 *&lt;br&gt; A5 .30 *</td>
<td>.45 **</td>
<td>.31</td>
<td></td>
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<td>8</td>
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<td>.11</td>
<td>-1.84</td>
<td>.18</td>
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<td>.22</td>
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Table 5A – Regression Analysis:

AWRT Dependent Variable, 5 ERRSP Subtests Independent Variables

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<th>SUBTEST</th>
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<th>t</th>
<th>Sig.</th>
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<tbody>
<tr>
<td>Print Awareness</td>
<td>.184</td>
<td>1.916</td>
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<tr>
<td>Rapid Letter Naming</td>
<td>.466</td>
<td>4.948</td>
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<tr>
<td>Letter Sound Association</td>
<td>.125</td>
<td>1.303</td>
<td>.198</td>
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<tr>
<td>Phonological Awareness</td>
<td>.202</td>
<td>2.161</td>
<td>.035</td>
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<tr>
<td>Orthographic Processing</td>
<td>.178</td>
<td>2.112</td>
<td>.039</td>
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Table 5B – Regression Analysis:

AWRT Dependent Variable, 4 ERRSP Subtests Independent Variables

<table>
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<th>Sig.</th>
</tr>
</thead>
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<tr>
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<td>.046</td>
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<tr>
<td>Rapid Letter Naming</td>
<td>.510</td>
<td>5.764</td>
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<tr>
<td>Phonological Awareness</td>
<td>.237</td>
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<td>.011</td>
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<tr>
<td>Orthographic Processing</td>
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<td>2.084</td>
<td>.042</td>
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Table 6 – Regression Analysis:

AWRT Dependent Variable, 5 ERRSP Subtests
(with 4 Phonological Awareness Subtests) Independent Variables

<table>
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<tr>
<th>SUBTEST</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
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</thead>
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<tr>
<td>(Constant)</td>
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<td>-2.598</td>
<td>.012</td>
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<tr>
<td>Print Awareness</td>
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<tr>
<td>Letter Sound Association</td>
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<td>1.374</td>
<td>.176</td>
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<td>Initial Isolation</td>
<td>.026</td>
<td>.274</td>
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<td>Final Isolation</td>
<td>.091</td>
<td>.930</td>
<td>.357</td>
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<tr>
<td>Sentence Segmentation</td>
<td>.081</td>
<td>.968</td>
<td>.338</td>
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<td>Phoneme Segmentation 1</td>
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<td>-.011</td>
<td>.991</td>
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<td>Phoneme Segmentation 2</td>
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<tr>
<td>Orthographic Processing</td>
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### Table 7 – Regression Analysis:

AWRT Dependent Variable, ERRSP & PAT Independent Variables

<table>
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<th>Sig.</th>
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<tr>
<td></td>
<td>Beta</td>
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<td>ERRSP</td>
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<td>7.80</td>
<td>.00</td>
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<tr>
<td>PAT</td>
<td>.04</td>
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<td>.71</td>
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### Table 8 – Regression Analysis:

Teacher Rating Dependent Variable, ERRSP & PAT Independent Variables

<table>
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<th>t</th>
<th>Sig.</th>
</tr>
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<td></td>
<td>Beta</td>
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<tr>
<td>ERRSP</td>
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<td>5.883</td>
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<tr>
<td>PAT</td>
<td>.072</td>
<td>.629</td>
<td>.532</td>
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Table 9: Correlations Between Subtest Totals in ERRSP and Subtest Totals in PAT

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<tr>
<th></th>
<th>A1TOT</th>
<th>AQ_2</th>
<th>A3TOT</th>
<th>A4TOTAL</th>
<th>A5TOTAL</th>
<th>E1TOTAL</th>
<th>E2TOTAL</th>
<th>E3TOTAL</th>
<th>E4TOTAL</th>
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</thead>
<tbody>
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<td>A1TOT</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>A3TOT</td>
<td>.22</td>
<td>.53**</td>
<td>1.000</td>
<td></td>
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<td></td>
</tr>
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<td>A4TOTAL</td>
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<td>.24</td>
<td>.35**</td>
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<td>.10</td>
<td>.07</td>
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<td>E1TOTAL</td>
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<td>.20</td>
<td>.14</td>
<td>.34**</td>
<td>.01</td>
<td>1.000</td>
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<td>.13</td>
<td>.19</td>
<td>.42**</td>
<td>-.02</td>
<td>.52**</td>
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<td>E3TOTAL</td>
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<td>.39**</td>
<td>.27*</td>
<td>.40**</td>
<td>.23</td>
<td>.33**</td>
<td>.40**</td>
<td>1.000</td>
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<tr>
<td>E4TOTAL</td>
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<td>.38**</td>
<td>.21</td>
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<td>.15</td>
<td>.33**</td>
<td>.38**</td>
<td>.58**</td>
<td>1.000</td>
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</table>

* p < .05  ** p < .01
Table 10: Correlations Between Subtests in ERRSP and Subtests in PAT

|       | A1TOT | A2TOT | A4TOT | A4ATOT | A4CTOT | A4D1 | A4D2 | A4TOT | E1AYOT | E1D1 | E1D2 | E1TOT | E2AYOT | E2D1 | E2D2 | E2TOT | E3AYOT | E3D1 | E3D2 | E3TOT | E4AYOT | E4D1 | E4D2 | E4TOT | E5AYOT | E5D1 | E5D2 | E5TOT | E6AYOT | E6D1 | E6D2 | E6TOT | E7AYOT | E7D1 | E7D2 | E7TOT | E8AYOT | E8D1 | E8D2 | E8TOT | E9AYOT | E9D1 | E9D2 | E9TOT | E10AYOT | E10D1 | E10D2 | E10TOT | E11AYOT | E11D1 | E11D2 | E11TOT | E12AYOT | E12D1 | E12D2 | E12TOT | E13AYOT | E13D1 | E13D2 | E13TOT | E14AYOT | E14D1 | E14D2 | E14TOT | E15AYOT | E15D1 | E15D2 | E15TOT | E16AYOT | E16D1 | E16D2 | E16TOT | E17AYOT | E17D1 | E17D2 | E17TOT | E18AYOT | E18D1 | E18D2 | E18TOT | E19AYOT | E19D1 | E19D2 | E19TOT | E20AYOT | E20D1 | E20D2 | E20TOT | E21AYOT | E21D1 | E21D2 | E21TOT | E22AYOT | E22D1 | E22D2 | E22TOT | E23AYOT | E23D1 | E23D2 | E23TOT | E24AYOT | E24D1 | E24D2 | E24TOT | E25AYOT | E25D1 | E25D2 | E25TOT | E26AYOT | E26D1 | E26D2 | E26TOT | E27AYOT | E27D1 | E27D2 | E27TOT | E28AYOT | E28D1 | E28D2 | E28TOT | E29AYOT | E29D1 | E29D2 | E29TOT | E30AYOT | E30D1 | E30D2 | E30TOT | E31AYOT | E31D1 | E31D2 | E31TOT | E32AYOT | E32D1 | E32D2 | E32TOT | E33AYOT | E33D1 | E33D2 | E33TOT | E34AYOT | E34D1 | E34D2 | E34TOT | E35AYOT | E35D1 | E35D2 | E35TOT | E36AYOT | E36D1 | E36D2 | E36TOT | E37AYOT | E37D1 | E37D2 | E37TOT | E38AYOT | E38D1 | E38D2 | E38TOT | E39AYOT | E39D1 | E39D2 | E39TOT | E40AYOT | E40D1 | E40D2 | E40TOT | E41AYOT | E41D1 | E41D2 | E41TOT | E42AYOT | E42D1 | E42D2 | E42TOT | E43AYOT | E43D1 | E43D2 | E43TOT | E44AYOT | E44D1 | E44D2 | E44TOT | E45AYOT | E45D1 | E45D2 | E45TOT | E46AYOT | E46D1 | E46D2 | E46TOT | E47AYOT | E47D1 | E47D2 | E47TOT | E48AYOT | E48D1 | E48D2 | E48TOT | E49AYOT | E49D1 | E49D2 | E49TOT | E50AYOT | E50D1 | E50D2 | E50TOT | E51AYOT | E51D1 | E51D2 | E51TOT | E52AYOT | E52D1 | E52D2 | E52TOT | E53AYOT | E53D1 | E53D2 | E53TOT | E54AYOT | E54D1 | E54D2 | E54TOT | E55AYOT | E55D1 | E55D2 | E55TOT | E56AYOT | E56D1 | E56D2 | E56TOT | E57AYOT | E57D1 | E57D2 | E57TOT | E58AYOT | E58D1 | E58D2 | E58TOT | E59AYOT | E59D1 | E59D2 | E59TOT | E60AYOT | E60D1 | E60D2 | E60TOT | E61AYOT | E61D1 | E61D2 | E61TOT | E62AYOT | E62D1 | E62D2 | E62TOT | E63AYOT | E63D1 | E63D2 | E63TOT | E64AYOT | E64D1 | E64D2 | E64TOT | E65AYOT | E65D1 | E65D2 | E65TOT | E66AYOT | E66D1 | E66D2 | E66TOT | E67AYOT | E67D1 | E67D2 | E67TOT | E68AYOT | E68D1 | E68D2 | E68TOT | E69AYOT | E69D1 | E69D2 | E69TOT | E70AYOT | E70D1 | E70D2 | E70TOT | E71AYOT | E71D1 | E71D2 | E71TOT | E72AYOT | E72D1 | E72D2 | E72TOT | E73AYOT | E73D1 | E73D2 | E73TOT | E74AYOT | E74D1 | E74D2 | E74TOT | E75AYOT | E75D1 | E75D2 | E75TOT | E76AYOT | E76D1 | E76D2 | E76TOT | E77AYOT | E77D1 | E77D2 | E77TOT | E78AYOT | E78D1 | E78D2 | E78TOT | E79AYOT | E79D1 | E79D2 | E79TOT | E80AYOT | E80D1 | E80D2 | E80TOT | E81AYOT | E81D1 | E81D2 | E81TOT | E82AYOT | E82D1 | E82D2 | E82TOT | E83AYOT | E83D1 | E83D2 | E83TOT | E84AYOT | E84D1 | E84D2 | E84TOT | E85AYOT | E85D1 | E85D2 | E85TOT | E86AYOT | E86D1 | E86D2 | E86TOT | E87AYOT | E87D1 | E87D2 | E87TOT | E88AYOT | E88D1 | E88D2 | E88TOT | E89AYOT | E89D1 | E89D2 | E89TOT | E90AYOT | E90D1 | E90D2 | E90TOT | E91AYOT | E91D1 | E91D2 | E91TOT | E92AYOT | E92D1 | E92D2 | E92TOT | E93AYOT | E93D1 | E93D2 | E93TOT | E94AYOT | E94D1 | E94D2 | E94TOT | E95AYOT | E95D1 | E95D2 | E95TOT | E96AYOT | E96D1 | E96D2 | E96TOT | E97AYOT | E97D1 | E97D2 | E97TOT | E98AYOT | E98D1 | E98D2 | E98TOT | E99AYOT | E99D1 | E99D2 | E99TOT | 0.359(**) | 0.283(*) | 0.135 | 0.113 | 0.286(*) | 0.327(*) | 0.060 | 0.163 | 0.381(**) | 0.148 | 0.014 | 0.351(**) | 0.299(*) | 0.292(*) | 0.304(*) | 0.353(**) | 0.533(**) | 0.200 | 0.070 | 0.237 | 0.237 | 0.100 | 0.034 | 0.165 | 0.009 | 0.073 | 0.274(*) | 0.311(*) | 0.390(**) | 0.390(**) | 0.336(**) | 0.205 | 0.136 | 0.084 | 0.354(**) | 0.098 | 0.086 | 0.048 | 0.084 | 0.108 | -0.033 | -0.224 | -0.157 | 0.317(*) | 0.266(*) | 0.160 | 0.480(**) | 0.163 | 0.057 | 0.459(**) | 0.454(**) | 0.094 | 0.213 | 0.301(*) | -0.023 | -0.283(*) | 0.317(*) | 0.457(**) | 0.242 | 0.218 | 0.345(**) | 0.313(*) | 0.012 | 0.678(**) | 0.051 | 0.286(*) | 0.209 | 0.197 | 0.310(*) | 0.038 | 0.450(**) | 0.091 | 0.338(**) | 0.058 | 0.055

82
<table>
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<th>Variable</th>
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<th>AQ2</th>
<th>AQ3TOT</th>
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<th>AQ4TOT</th>
<th>AQ5TOT</th>
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<th>AQ8TOT</th>
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<th>AQ9TOT</th>
<th>AQ10TOT</th>
<th>AQ10TOT</th>
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<td>-0.205</td>
<td>0.594(**)</td>
<td>-0.039</td>
<td>0.112</td>
<td>-0.192</td>
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<td>0.126</td>
<td>0.046</td>
<td>0.051</td>
<td>0.035</td>
<td>0.438(**)</td>
</tr>
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<td>A4C2</td>
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<td>0.163</td>
<td>0.313(*)</td>
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<td>1.000</td>
<td>0.333(**)</td>
<td>0.436(**)</td>
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<td>0.203</td>
<td>0.213</td>
<td>0.047</td>
<td>0.089</td>
<td>0.092</td>
<td>0.257(*)</td>
<td>0.205</td>
<td>0.163</td>
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<td>0.057</td>
<td>-0.012</td>
<td>-0.205</td>
<td>0.333(**)</td>
<td>1.000</td>
<td>0.203</td>
<td>0.112</td>
<td>0.036</td>
<td>0.018</td>
<td>0.263(*)</td>
<td>0.250</td>
<td>0.027</td>
<td>0.181</td>
<td>0.022</td>
<td>-0.010</td>
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<td>0.594(**)</td>
<td>0.436(**)</td>
<td>0.203</td>
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<td>0.331(**)</td>
<td>0.069</td>
<td>0.292(*)</td>
<td>0.460(**)</td>
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<td>0.357(**)</td>
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<td>0.486(**)</td>
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<td>0.051</td>
<td>-0.039</td>
<td>0.018</td>
<td>0.112</td>
<td>0.070</td>
<td>1.000</td>
<td>-0.016</td>
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<td>A3TOT</td>
<td>A4ATOT</td>
<td>A5BTOT</td>
<td>A6CTOT</td>
<td>A7DTL</td>
<td>A8DT2</td>
<td>A9TOTAL</td>
<td>A10TOTAL</td>
<td>E1ATOT</td>
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** Correlation is significant at the .01 level (2-tailed).
* Correlation is significant at the .05 level (2-tailed).
Appendix C

Graphs
HISTOGRAM 1

Egyptian Reading Readiness Screening Profile

HISTOGRAM 2

Arabic Word Reading Test

Horizontal axis= Scores, Vertical axis= No. of Students
HISTOGRAM 3
ERRSP- PRINT AWARENESS

HISTOGRAM 4
ERRSP- RAPID LETTER NAMING

Horizontal axis= Scores, Vertical axis= No. of Students
HISTOGRAM 5
ERRSP-LETTER SOUND KNOWLEDGE

HISTOGRAM 6
ERRSP-PHONOLOGICAL AWARENESS

Horizontal axis= Scores, Vertical axis= No. of Students
HISTOGRAM 7

ERRSP- ORTHOGRAPHIC PROCESSING

HISTOGRAM 8

THE PHONOLOGICAL AWARENESS TEST
(English)

Horizontal axis= Scores, Vertical axis= No. of Students
HISTOGRAM 9
PAT-SEGMENTATION

HISTOGRAM 10
PAT-ISOLATION

Horizontal axis= Scores, Vertical axis= No. of Students
HISTOGRAM 11
PAT-GRAPHEMES

HISTOGRAM 12
PAT-DECODING

Horizontal axis= Scores, Vertical axis= No. of Students
HISTOGRAM 13

TEACHER RATING

Std. Dev = 2.70
Mean = 16.3
N = 60.00