

THE RELATIONSHIP BETWEEN LETTER FLUENCY MEASURES AND ARABIC GPA

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This study investigated two widely-used early literacy skill's indicators in reflecting growth in first-grade language achievement skills. It compared two curriculum-based assessments of letter knowledge: Letter Naming Fluency (LNF) and Letter Sound Fluency (LSF) in the Arabic language. A sample of 125 first-grade students, 100 average readers and 25 with reading difficulties, was recruited from two public primary schools in Jordan. These students were administered both assessments 18 times, one each week, during the second half of the first grade. Students' progress for both measures was followed. Although students' LNF progress was higher than LSF, still LSF had a higher correlation with Arabic language achievement than LNF at the end of the first grade. Furthermore, students who were struggling with reading scored significantly lower on Arabic CBM LNF and LSF probes than their peers without disabilities. Implications for Arabic language learning and assessment are discussed.

The Relationship Between Letter Fluency Measures and Arabic GPA

Underachievement in reading is a well-documented and persistent problem. For example in the U.S.A, the National Center for Educational Statistics (NCES; National Center for Educational Statistics, 2007) reported that during the 2005–2006 school year, 36% of all fourth grade students scored below the *basic level* in reading. Furthermore, the National Reading Panel (NRP; National Institute of Child Health and Human Development [NICHD], 2000) indicated that at least 20% of children demonstrated reading deficits before the third grade. Early identification and intervention of children who are at risk for reading problems is critical to the prevention of reading problems. For students at risk for later reading problems, high-quality instruction, delivered early, can reduce later reading failure (e.g., Simmons et al., 2008; Torgesen et al., 1999).

Response to Intervention (RTI) has been generally defined as a practice for providing high-quality instruction and intervention matched to student needs, while using student level of performance and rate of growth for making educational decisions (Batsche et al., 2006). In the area of reading, RTI models provide a framework for implementing early, intensive intervention in kindergarten and first grade to prevent reading problems and improve reading outcomes for at risk students (Al Otaiba & Torgesen, 2007; Vellutino, Scanlon, & Zhang, 2007). RTI models typically utilize a process of universal screening, in which all students are assessed to determine those at risk for later failure. In addition, student progress is monitored over time to assess the impact of instruction, determine when instructional changes should be made, and evaluate whether more intensive instruction is needed. Clearly, the measurement tools used for RTI must provide reliable and valid data for making these decisions. The RTI has commonly utilized curriculum-based measurement (CBM) for decision making. The CBM was originally developed to provide special educators with brief, standardized assessments for use in evaluating student progress toward individual academic goals (Deno, 2003). Major work in extending CBM procedures downward to early literacy measurement was accomplished through the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2007), a set of fluency-based indicators designed to measure foundational skills of reading.

The first grade represents a critical time period when a child integrates pre- and early literacy skills toward becoming a reader. Screening in early first grade should accurately identify students at risk for failing to develop skills in accurate and fluent word recognition and reading connected text, which are crucial for reading success in later grades. However, reading skills in the fall are still in an embryonic state and reading connected text is generally not expected. Several types of measures have been studied

for first grade reading screening, such as accuracy and fluency in naming letters and letter sounds, identifying sounds in words or phonemic segmenting or blending, and accuracy and fluency in reading words or pseudo-words (for a review see Johnson, Jenkins, Petscher, & Catts, 2009; Perney, Morris, & Carter, 1997). Measures such as Letter Naming Fluency (LNF) and Letter Sound Fluency (LSF) are used widely in first grade through web-based applications such as the Dynamic Indicators of Basic Early Literacy Skills (DIBELS, Good & Kaminski, 2007). LNF assesses skills in letter knowledge and fluency in identifying the letters of the alphabet. LSF is a measure designed to assess skills in knowledge and fluency in identifying the letters sounds of the alphabet. The LNF and LSF measures have demonstrated validity in predicting future reading skills (Catts, Petscher, Schatschneider, Sittner Bridges, & Mendoza, 2009; Goffreda & DiPerna, 2010; Johnson et al., 2009; Nelson, 2008).

The score for the LNF represents the number of letters a child can name correctly within one minute using a random listing of upper- and lowercase forms. The LNF involves recognizing and naming the letters in a short period of time, which shows mastery and rapidity in letter recognition (Foulin, 2005). Knowing letter names accurately and fluently explains significant amounts of variance in later reading ability (Richey, 2004; Richey & Speece, 2006). It should be noted that letter-naming fluency is distinguished from the Rapid Automatized Naming letters task (RAN; Wolf & Denckla, 2005; Wolf & Bowers, 1999) as the RAN letter task uses a few presumably known, frequently occurring letters (i.e., five letters) whereas LNF measures use many exemplars (i.e., all the letters of the alphabet) (Speece, Mills, Ritchey, & Hillman, 2003).

The LSF assesses letter sound knowledge by asking children to identify the sound of an isolated letter. Typically, letters are arranged in random order and students produce letter sounds for one minute. LSF has an evidence of reliability coefficients in the .80 to .90 range for alternate-forms reliability and test-retest in kindergarten and first grade and concurrent and predictive criterion-related validity coefficients in the .50 to .90 range with word reading (Elliott, Lee, & Tollefson, 2001; Fuchs & Fuchs, 2004; Speece & Case, 2001). In addition, a substantial body of research has demonstrated that skills that are related to mapping sounds to letters (i.e., phonological awareness) play critical roles in learning to read and write in languages with alphabetic writing systems (e.g., Adams, 1990; Ehri, 1998). A positive relationship between phonological awareness and literacy skills has been found for kindergartners to third grade students (Carrillo, 1994; Vernon & Ferreiro, 1999).

Some researchers suggested that knowing letter names accurately and fluently explain significant amounts of variance in later reading ability (Richey, 2004; Richey & Speece, 2006). Furthermore, other researchers proposed that knowing letter names is a better predictor of later reading than knowing letter sounds because learning letter names helps children acquire letter sounds since many letter names contain the letter sounds (Share, 2004; Treiman, Tincoff, Rodriguez, Mousaki & Francis 1998). On the other hand, not all researchers agree on the importance of learning the names of the letters in learning to read. The DIBELS research team argued that teaching letter knowledge is not an important instructional goal. It's not that instructing in letter knowledge is harmful, but rather that it may not be an important goal in teaching reading. They stressed that children need to associate the sounds with letters, and may not need to know the letter names, for reading (DIBELS, Good & Kaminski, 2007). However, empirical studies that investigated the specific role of letter-name or sound knowledge in predicting Arabic literacy acquisition are sparse. Because of the importance of letter knowledge in the early phases of reading acquisition, the development of a CBM that assesses performance in this aspect of reading is warranted. Furthermore, English LNF and LSF need to be validated across other languages and cultures to spread the benefit of this type of early assessment across the world. This study was intended to investigate the use of CBM LNF and LSF in Arabic language in Jordan.

Arabic Early Reading in the Jordanian Curriculum

The Arabic language has an alphabetic writing system; letters in written words represent sounds in spoken words. The awareness that letters represent the sounds in spoken words is called the alphabetic principle. One of the basic steps in learning the alphabetic principle is recognizing and naming the letters of the alphabet. Children will also have to learn the sounds in words (phonemic awareness) and the letters that represent those sounds. Although some of the letter names in Arabic provide cues for letter sounds, most of the letter names differ significantly from its sounds. Arabic is an alphabetic language with 28 letters, written in a joined fashion from right to left (Abu Rabia & Siegel, 2002). All letters are consonants except three long vowels. Another three short vowels (diacritics) do exist in the form of separate diacriticals, but not as independent graphemes. When any of these diacritics appear on certain letters, it gives the letter a completely different sound; for example, the letter *b* could have any one of the

sounds /ba/, /bi/, or /bu/. If the same letter *b* comes in a word where it does not need a vowel, its sound will be *eb*. Therefore, when these diacritics or short vowels appear in the Arabic script they show a high degree of regularity and the students can read by predicting the sound of the letters. However, in most modern and printed Arabic texts (grade four and above) vowel signs are not given, therefore reading relies more on the context rather than spelling. Thus, the Arabic script becomes more irregular (Abu-Rabia, 2002; Abu-Rabia & Siegel, 2002).

The Arabic script is written in a cursive fashion where letters are joined in print and in hand writing. Also, letters change their shapes according to their placement in the word (at the beginning, middle, end or basic). In other words, each individual letter has multiple forms or shapes, according to its position in the word. Many letters, furthermore, have similar graphemes but their phonemes are completely different. The Arabic alphabet consists of letters with twenty one having grapheme similarity with at least one or two letters (Breznitz, 2004). The combination of these graphical features of the Arabic language creates certain difficulties in learning and teaching reading skills.

In the first-grade Jordanian curriculum, the teaching of reading focuses on word recognition techniques. As the letter sounds form the foundation of word recognition in Arabic, the textbook is organized to include several lessons purposefully planned to teach every particular letter. Learning a certain letter includes learning its sound and various shapes then blending it with long vowels and letters in order to make syllables and words, and segmenting syllabus in order to deconstruct these same sounds and letters. By the end of the first grade, it is expected that students would know all of the letters and their sounds, their various shapes and how to read simple words by analyzing them into their smaller components (syllables and letters).

Significance of the Study

It is important to have a reliable means of identifying students who are at-risk of failure as soon as difficulties arise. As discussed earlier, for students at risk for later reading problems, high-quality instruction, delivered early, can reduce later reading failure (e.g., Simmons et al., 2008; Torgesen et al., 1999). Large-scale reading screening requires measures that are (a) brief and efficient, (b) indicate the skills important for the grade level in which they are used, and (c) predict later achievement. All these psychometric traits exist in English CBM and need to be investigated across other languages, specifically, Arabic language.

The DIBELS LNF and LSF are standardized, individually administered tests that provide a measure of risk. Students are considered at risk for difficulty achieving the early literacy benchmark goals if they perform in the lowest 20% of students in their district. That is, below the 20th percentile using local district norms. Students are considered at some risk if they perform between the 20th and 40th percentile using local norms. Students are considered at low risk if they perform above the 40th percentile using local norms (AIMSweb, 2007).

Although CBM procedures may be more racially and culturally neutral than traditional norm-referenced tests (Galagan, 1985; Shinn, 1989), to date and to the best of the author's knowledge, no studies in the Arab world have been conducted to examine the validity of the CBM procedures when used to assess LNF and LSF in Arabic. Arabic schools are in need of an empirically-based assessment tool to predict reading progress. For example, CBM LNF and LSF are rarely used by teachers or psychologists in Jordan (Al-Natour, AlKhamra, & Al-Smadi, 2008). Teachers in Jordan and Arab world are in need of efficient measures to identify young students who are not making adequate progress in learning to read.

Purposes of the Study

The purpose of this study is to explore the applicability of the CBM LNF and LSF in the Arabic language. This study investigated the CBM LNF and LSF measures and the degree to which they reflected students' growth towards Arabic language achievement during the second semester of the first grade. It was hypothesized that LSF would predict Arabic language achievement better than LNF because rapid processing of grapheme-phoneme codes would indicate a greater depth of knowledge of the alphabetic principal. This study addressed following questions:

Study Question 1: What are the growth trajectories of LNF and LSF for average readers of the first grade students in Jordan?

Study Question 2: What are the growth trajectories of LNF and LSF for struggling readers of the first grade students in Jordan?

Study Question 3: What is the relationship between the Arabic CBM letter fluency measures (LNF and LSF) and Arabic Language Grade Point Average among average readers?

Method

Participants and Setting

A total sample of 125 first grade students, 100 average readers and 25 with reading difficulties, participated in this study. Students with reading difficulties were identified by resource room teachers based on their performance in the first semester of the first grade. All participants were administered the Arabic CBM LNF and LSF probes. Participants were recruited from two public primary schools in the southern region of Jordan. The age range of the students was 75-86 months with a mean of 82.03 and SD = 3.95, of these students 63 were females and 62 were males. The participants were selected from a larger set of students (419) who were assessed to meet the requirements for inclusion in the study: intelligence within the average range, native speakers of Arabic, no noted emotional or behavioral disorders, no noted attention disorders, and no sensory impairments. Consent for participation was obtained from the participants and their parents or guardians. Two qualified examiners who have a degree in childhood education were trained to administer and score the Arabic CBM LNF and LSF. These teachers worked in two different public primary schools in a college town of Jordan. During the data collection, the author had weekly updates and discussions with the examiners team to address the crucial points in the Arabic CBM LNF and LSF administration and then provide feedback.

Measures

Arabic CBM LNF and LSF probes. Twenty four different but equivalent probes that consisted of all Arabic letters were used to monitor students' progress in naming letters throughout the 18 weeks of measurement. Each probe consisted of 110 letters with four shapes (at the beginning, middle, end or basic) arranged on a page. Students are asked to point to each letter and name it as quickly as they can, reading across the rows. The score for LNF represents the number of letters a child can name correctly within one minute. Three base line data were administered in the first and last week of assessment and the median score was used to represent the most reliable data of the students' performance. Identical procedures were used for Arabic CBM LSF probes.

Both the LNF and LSF probes are adapted from the work of Kaminski & Good in 1998. In addition, all probes were given to university's instructors and teachers in the field to judge the appropriateness of the letters frequencies and format. Their suggestions were taken into consideration in making the final version of the probes. All probes were administered individually. Two copies of the sheet were prepared. The students had a copy of the Arabic CBM LNF or LSF sheet in front of her or him, and the teacher had a copy of the Arabic CBM LNF or LSF sheet to write on, a timer, a pencil, and the directions for administration. If a student incorrectly named a letter or did not respond within three seconds of a letter presentation, the student was asked to try the next letter. A letter was considered unknown if the student did not correctly identify a letter or sound within three seconds on the two assessments.

Translating the CBM LNF and LSF instructions into Arabic language.

The researcher used appropriate translation procedures (Brislin, 1986) prior to administer Arabic CBM LNF and LSF to a sample of Jordanian students. First, two native speakers of Arabic, who were also fluent in English, independently translated the Arabic CBM LNF and LSF instructions into Arabic. Second, a back translation of the Arabic version into English by a bilingual resident of the United States who is fluent in both English and Arabic languages was conducted. Third, all translators reached a reconciliation of the forward-backward translations. Finally, a pre-test was conducted with a convenience sample of 20 first grade students to assess the ease of comprehension, possible ambiguities, and alternative administration wording.

The Arabic language Grade Point Average (Arabic GPA). By the end of the second semester of the academic year 2011, all participants of this study were tested by their schools to measure their Arabic language skills. A100-point (the final grade) that represented each student's general skill in Arabic was provided to the researcher by the teachers. The Jordanian Arabic test focused mainly on three basic literacy skills: reading comprehension, writing, and spelling. The Arabic GPA is a numeric average of all grades achieved in classes at a given school semester. The purpose of GPA is to provide a barometer as to overall performance of a student in his or her classes, as well as create a system that allows for comparisons between students, and a class ranking system. In the Jordanian educational system, students are ordered and assigned a numerical rank against their peers based on their GPA, starting with number 100 for the student with the highest GPA and 0 for students with the lowest GPA. The rubric for Arabic

GPA is excellent (90-100), very good (80-89), good (70-79), satisfactory (60-69), minimal pass (50-59), and failure (< 50).

Procedural and Inter-rater Reliabilities. Instruments that have adequate reliability will measure true if they yield the same scores across different examiners. Instruments that have poor reliability will usually yield markedly different scores when administered by different people. Two types of reliability were investigated in this study: procedural and inter-rater reliabilities. To ensure consistency of testing administration across Arabic CBM probes, the teachers read from scripts and used timers. The fidelity of testing administration was tested by using a detailed checklist to ensure each test was administered as it was intended and described in the manuals of CBM testing (Hosp, Hosp, & Howell, 2007). Procedural reliability was obtained during 100% of testing sessions with an average reliability of 100 percent. The teachers scored each Arabic CBM probe and entered the data into an excel sheet. The researcher checked randomly 25% of the scoring sheets. The average inter-rater reliability of scoring fidelity data was 99% (range 98%-100%). In terms of data entry reliability, all of the excel data (100%) were checked against the paper scores and all discrepancies were resolved by examining the original protocols. In addition, the researcher had weekly updates and discussions with the teachers to address the crucial points of administering the probes.

Results

Descriptive Data Analysis

Tables 1 and 2 present the descriptive analysis including the means, standard deviations, and percentile ranks that represent the average performance of all study measures among students with and without reading difficulties by the end of the academic semester. This descriptive information was helpful in understanding the data and making initial inferences on the differences between Arabic CBM LNF and LSF among the two study groups. The contents of the table demonstrate that students' performance in Arabic CBM LNF was higher than their performance in Arabic CBM LSF. In addition, students with reading difficulties perform in the lowest 20th percentile of average reader norms.

Descriptive statistics also allowed providing visual graphs that facilitated more convenient presentation of the data. Figures 1 and 2 display the average weekly performance of Arabic CBM LNF and LSF across the 18 weeks for average readers. Students with average reading ability progressed on their Arabic CBM LNF skill from 36.82 Letter Names Correct Per Minute (LNC) on the first probe to 42.91 by the last week of the semester. The estimated growth rate was .33 LNC per week. Their progress in Arabic CBM LSF skill was from 24.83 Letter Sounds Correct Per Minute (LSC) on the first probe to 30.63 by the last week of the semester. The estimated growth rate was .32 LSC per week. Figure 3 displays the average weekly performance of Arabic CBM LNF and LSF across the 18 weeks for students with reading difficulties. Students with reading difficulties progressed on their Arabic CBM LNF skill from 20.5 LNC on the first probe to 24.21 by the last week of the semester. The estimated growth rate was .20 LNC per week. Their progress in Arabic CBM LSF skill was from 13.33 LSC on the first probe to 19.79 by the last week of the semester. The estimated growth rate was .35 LSC per week.

The Relationship Between Letter Fluency Measures and Arabic GPA

The Kolmogorov-Smirnov statistic was performed to test the hypothesis that the data were normally distributed for average readers. The data displayed normal distributions for all study measures $D(100)$. The statistics ranged from .12 to .18; all statistics were not significant ($p > 0.05$). Slightly lower performances (positively skewed distributions) were detected in the distributions. To improve the shape of the distributions, the responses of outliers whose scores were ± 2 SD or more from the group mean were replaced by a value equal to the next highest non-outlier-score plus 1 unit of measurement (Tabachnick & Fidell, 2001). Then, criterion-related validity was investigated by conducting Pearson product moment correlations between letter fluency measures and Arabic GPA. Arabic CBM LSF was significantly correlated with the Arabic GPA, $r = .68, p < .01$ (two-tailed), and the Arabic CBM LNF was also correlated, but with less magnitude, with the Arabic GPA, $r = .20, p < .05$ (two-tailed).

Discussion

The overarching purpose of this study was to investigate the role of Arabic LNF and LSF in predicting first grade Arabic language GPA for Jordanian students. It also aimed to examine variation growth trajectories of LNF and LSF among first grade students with and without reading difficulties in the second semester of the academic year of 2011. The findings indicate that both resulting coefficients of procedural and inter-rater reliabilities for Arabic CBM LNF and LSF were very high. These findings

mirror reliability coefficients for CBM LNF and LSF presented in previous research (Elliott et al., 2001; Fuchs & Fuchs, 2004; Speece & Case, 2001).

Other interesting finding that compared to the CBM LNF and LSF from AIMS web (2007), Jordanian students read fewer number of letter names and sounds per minute than American norms. This can be attributed to the fact that speed reading of letter names and sounds are a new practice for them. In addition, some characteristics of the Arabic system may result in a great difficulty for children reading Arabic. Most of these factors or characteristics are related

Table 1. Descriptive information of average Arabic CBM LNF, LSF, and Arabic GPA performance by average readers

Measure	Range	Mean	Standard Deviation	Percentile	
Arabic CBM LNF	26-52	40.03	5.77	90%	48.10
				75%	43.20
				50%	40.20
				40%	36.20
				20%	30.20
Arabic CBM LSF	15-46	28.06	7.93	90%	39.13
				75%	29.23
				50%	27.23
				40%	25.23
				20%	20.23
Arabic GPA	64-95	77.06	8.14	90%	89.90
				75%	80.75
				50%	78.00
				40%	75.00
				20%	70.00

Note. Number of Students = 100, CBM = Curriculum Based Measurement, LNF = Letter Naming Fluency, LSF = Letter Sound Fluency, GPA = Grade Point Average.

Table 2. Descriptive information of average Arabic CBM LNF, LSF, and Arabic GPA performance by students with reading difficulties

Group	Range	Mean	Standard Deviation	Percentile	
Arabic CBM LNF	12-35	22.29	5.43	90%	29.40
				75%	26.00
				50%	21.00
				40%	19.40
				20%	18.00
Arabic CBM LSF	10-29	16.58	5.17	90%	27.80
				75%	18.00
				50%	15.00
				40%	14.00
				20%	12.13
Arabic GPA	51-77	67.88	7.67	90%	75.80
				75%	73.00
				50%	70.00
				40%	69.00
				20%	60.00

Note. Number of Students = 25, CBM = Curriculum Based Measurement, LNF = Letter Naming Fluency, LSF = Letter Sound Fluency, GPA = Grade Point Average.

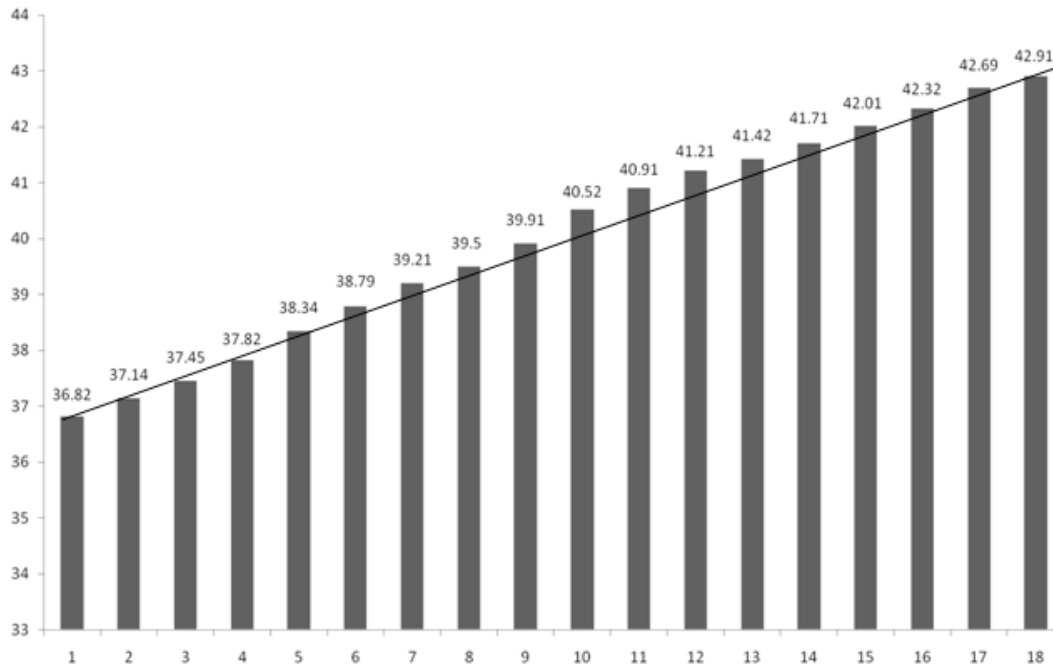


Figure 1 Graphic display of the weekly mean performance of average readers on Letter Naming Fluency measure reported in Letter Names Correct Per Minute

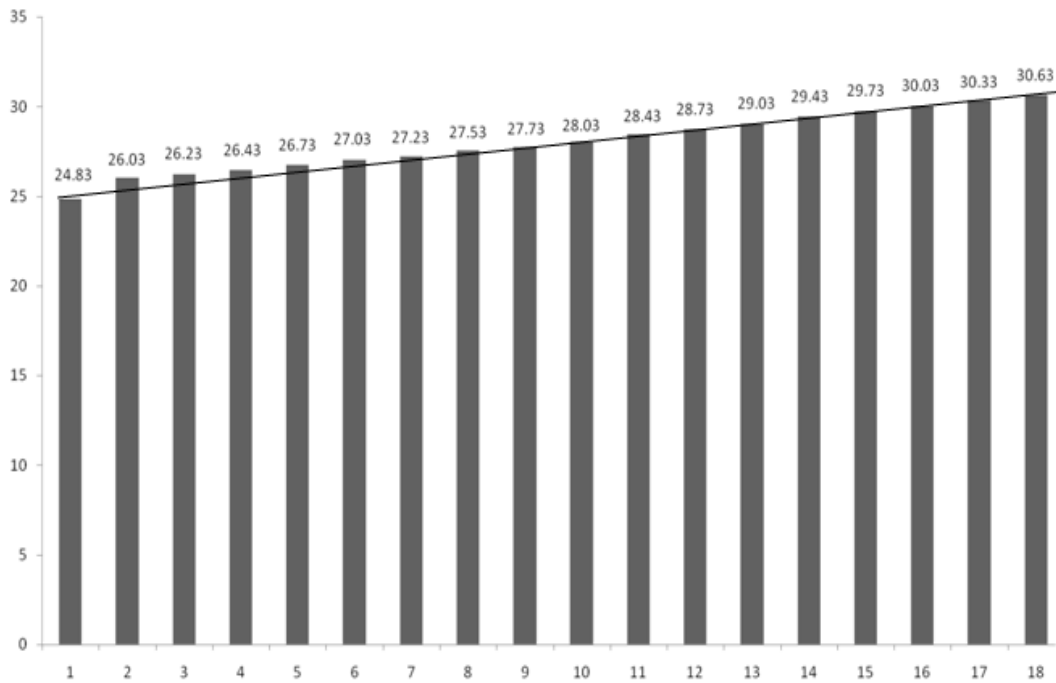


Figure 2. Graphic display of the weekly mean performance of average readers on Letter Sound Fluency measure reported in Letter Sounds Correct Per Minute

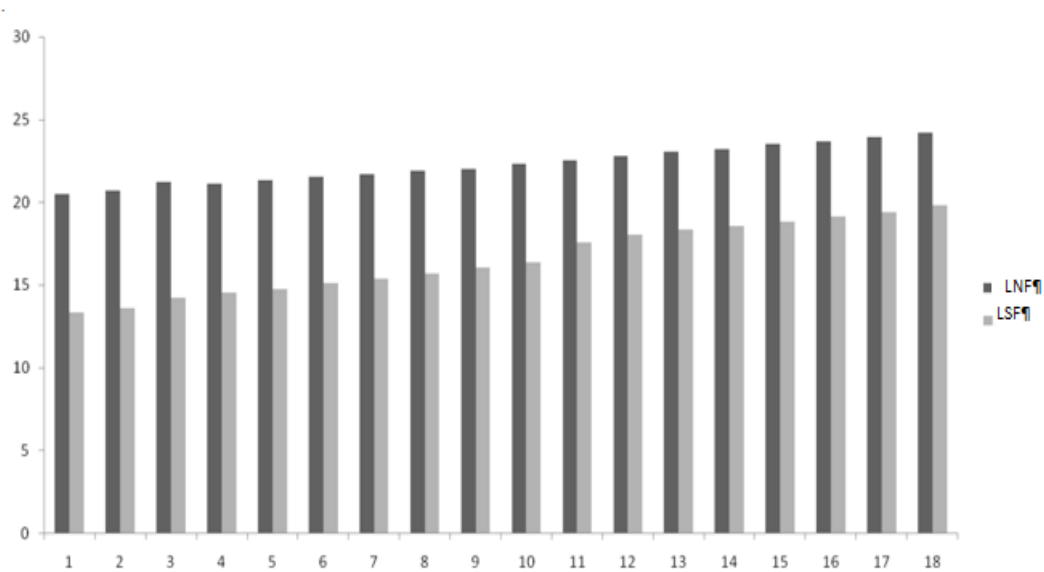


Figure 3. Graphic display of the weekly mean performance of students with reading difficulties on Letter Naming Fluency (LNF) and Letter

Sound Fluency (LSF) measures to the orthographic features of Arabic language (for review see Abu-Rabia, 2002; Abu-Rabia & Siegel, 2002; Breznitz, 2004). As noted in the introduction section, in Arabic script the correct form of a particular letter can vary depending on its position in a word. Letters have four different forms (at the beginning, middle, end or basic). Additionally, many groups of different Arabic letters are strikingly similar in shape. Consequently, this orthographic feature may reduce the distinctiveness and hence, the recognition of Arabic letters or sounds and the acquisition of letter–sound rules may be slowed if the letter recognition itself is acquired slowly.

With regard to students with reading difficulties, descriptive data make it clear that growth rate is greater among students with average reading ability than for those with reading difficulties. Students with reading difficulties perform in the lowest 20th percentile of average reader norms. This finding suggests that Arabic CBM letter fluency measures can discriminate between those students with and without Arabic language problems. It seems that both measures may be used for identifying students who are at risk for reading failure with different accuracy based on the correlation with Arabic Language GPA.

As was hypothesized, although students' LNF progress was higher than LSF, still LSF had a higher correlation with Arabic language achievement than LNF at the end of the first grade. This can be justified by the fact that most of the Arabic letters have names that differed significantly from its sounds. For example, /alif/ is the letter name while the letter sound is /a/. Rapid processing of grapheme–phoneme codes would indicate a great depth of knowledge of the alphabetic principal than just focusing on letter names only. Contradictory to this finding, some researchers suggested that knowing letter names is a better predictor of later reading than knowing letter sounds because learning letter names helps children acquire letter sounds since many letter names contain the letter sounds (Share, 2004; Treiman et al., 1998). On the other hand, studies have failed to show that teaching letter names to students enhances their reading ability (e.g., Ehri, 1998) and, in fact, have demonstrated that successful learning of letter–sound correspondences that leads to reading acquisition can occur without knowledge of letter names (Bruck, Genesee, & Caravolas, 1997; Mann & Wimmer, 2002).

Limitations, Implications, and Future Research

Although the results of this study are promising, and suggest a potential new tool to examine and predict reading in Arabic, the study has several limitations. This study was conducted with a small sample size of the first grade students. Future studies should replicate this research with larger samples across multiple grades. Also, data were collected for 18 school weeks, whereas a typical school year spans 36 to 38 weeks. It would be useful to know how an estimated growth rates change over an entire school year. Although Arabic GPA cannot be considered a standardized assessment due to the certain degree of subjective judgment that teachers should made about students reading ability, the use of it was imperative in this study since no standardized assessment was existed in Arabic to be used for the

purpose of the study. Despite the limitations, the outcomes of this study have substantial implications for future practice and research of assessment of reading in Arabic and for the educational system in Jordan.

The results of this study indicated that Arabic CBM LSF can be used to inform language outcome that includes reading for students in the first grade. This study suggests that existing Arabic CBM LSF measure may be adequate for universal screening as long as multiple probes are collected per occasion to rank and identify students who will struggle in reading. Research has shown that early literacy skills are strong predictors of later reading failure. Identifying students who are at risk for reading failure can help educators prevent reading problems before they start. The results of this study suggest that Arabic CBM LSF can be used to predict Arabic language GPA by the end of the first grade. However, the instructional utility of LSF continues to be unclear as LSF is not intended to directly measure those skills, but rather, is considered to be a general indicator of risk for later reading difficulty. More research is still needed on the LNF and LSF and its corresponding instructional implications regarding Arabic language skills development.

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