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Article in *Journal of Behavioral Education* · January 2005

DOI: 10.1007/s10864-005-2705-x

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Mnemonics Strategy Development: Improving Alphabetic Understanding In Turkish Students, At Risk for Failure in EFL Settings

Ulviye Sener, M.A.¹ and Phillip, J. Belfiore, Ph.D.^{2,3}

The purpose of this study is to investigate the effects of integrated mnemonics on consonant letter naming and consonant sound production for three 4th grade Turkish students, at-risk for failure in an English-as-a-Foreign-Language (EFL) classroom. Mnemonic picture cards, where the target consonant letter was embedded as an integral part of the picture, were developed (e.g., the letter C as the clock, the letter D as the drum). Results showed that (a) all three students reached mastery on consonant letter naming, and (b) all three students showed marked improvement for consonant sound production, with one student reaching mastery. Letter-sound correspondence performance remained near instructional levels one week post-intervention. Generalization data showed students could produce some words that began and ended with consonant sounds, once consonant letter-sound correspondence was mastered.

KEY WORDS: mnemonics; EFL; alphabetic understanding; urban education; international education.

Faced with an alphabetic script, a child's level of alphabetic and phonemic awareness upon entering school may be the single most powerful determinant of the success or failure s/he will experience in learning to read (Adams, 1990; Smith, Simmons, & Kameenui, 1998). More specifically, Adams (1990) suggests understanding that letters have a relationship with sounds in words (i.e., a one-to-one letter-sound correspondence) is foundational to the successful beginning reader. Literature in the language field reveals there is a strong correlation between letter-sound correspondence and phonological awareness in understanding the

¹Anadolu University, Eskisehir, Turkey.

²Mercyhurst College in the Department of Special Education.

³Correspondence should be addressed to Phillip, J. Belfiore, Education Division, Mercyhurst College, 501 East 38th St., Erie, PA 16546; e-mail: belfiore@mercyhurst.edu.

alphabetic principle (Adams, 1990; Smith et al., 1998; Stahl, Duffy-Hester, & Stahl, 1998). To learn the alphabetic principle, Gunn, Biglan, Smolkowski, and Ary (2000) suggest children must first understand that the sounds paired with letters are the same sounds they hear in speech. At the primary level, effective instruction in decoding and understanding that words have initial sounds begins with letter-sound correspondence. This then sets the stage for phonemic skills such as rhyming, initial/final sounds, segmentation, blending, and sound-to-word matching, as well as the first step in spelling mastery (Baer & Templeton, 1998; Stahl et al., 1998).

In English-as-a-Second-Language (ESL) and English-as-a-Foreign-Language (EFL) programs, letter-sound correspondence and phonemic awareness are also vital elements in early success in English language reading. Considering the language needs of EFL/ESL students, Williams (1995) suggests that phonemic awareness, although not critical for speaking and understanding spoken language is essential when learning to read. In other words, phonemic awareness is an essential prerequisite for the development of reading skills, in both first and foreign/second language. Primary grade level EFL/ESL learners must acquire an adequate cross-language phonology to compensate for the lack of first language competency, and then acquire the phonemic awareness necessary to read English (Jannuzi, 1998). This perspective suggests that primary level ESL/EFL students need to receive sufficient input and practice of phonological and alphabetic awareness, which encourages students reading readiness skills and reading development in English. As Ganschow and Sparks (1995) have reported, students who demonstrate difficulties in foreign language learning, have most difficulty with the phonological/orthographic “code” of language (i.e., letter-sound correspondence). This difficulty with language codes for the students, at-risk for failure in EFL/ESL learning has been described by Sparks and Ganschow (1991) as a linguistic coding deficit hypothesis.

One strategy that has demonstrated effectiveness in the acquisition of letter-sound correspondence has been mnemonics. Numerous studies have shown the effectiveness of mnemonics over more “traditional” drill and practice procedures (e.g. Mastropieri & Scruggs, 1998; Scruggs & Mastropieri, 1989). Mnemonic instruction is a technique used for increasing both initial learning acquisition and long-term retention of important information. Using mnemonic techniques provides teachers not only with necessary information to present, but also effective strategies required by students to learn and retrieve this information, which will enable them to establish a concrete link to their previous knowledge (Mastropieri & Scruggs, 1991). Mnemonic strategy is defined as a systematic procedure in which the unknown, target stimulus is integrated into the more easily discriminated known stimuli (Pressley, Levin, & Delaney, 1982). Belfiore and colleagues (Fulk, Loman, & Belfiore, 1997; Agramonte & Belfiore, 2002) have developed an imbedded mnemonics strategy in which the target stimulus (i.e., the letter) is fully integrated into the mnemonic (e.g., the letter *K* was the part of a Kite). Results of

the imbedded mnemonics strategy demonstrated an increase in both letter naming and corresponding letter-sound production (Fulk et al., 1997; Agramonte & Belfiore, 2002).

The purpose of the present study is to expand the work of Agramonte & Belfiore (2002) by (a) addressing the English language needs of Turkish elementary grade students at risk of failure in EFL coursework, (b) targeting a Turkish urban school setting, and (c) assessing the impact of the mnemonics strategy on the production of new words beginning and ending with the sound of the target letter.

METHODS

Participants and Settings

Three 4th grade primary public school students, attending an urban public school participated in this study. Turkish Primary education schools provide eight-year compulsory education, grades 1 through 8. Pre-Primary education includes the optional education of children who are under the age of compulsory Primary education (The Ministry of National Education Report, 2003). The participants in this study had not attended Pre-Primary education. Although all the participants in this study demonstrated academic difficulties, including difficulties in native language literacy skills, they were not identified for special education services. The 4th grade level was targeted because English language teaching in Turkish primary schools begins at this grade level. In the 1st, 2nd, and 3rd grades, intensive literacy methods in the students' native language (Turkish) are employed, including guided reading, group reading, and journal writing. In the 4th grade, students begin second language English instruction, outside of their regular classroom curriculum. English lessons are four hours per week. The English language teachers in this study referred the three students because they were at-risk for failure in the EFL class. Specifically, each student referred for this study (a) was unable to recognize letters and unable to produce the corresponding letter sounds, (b) demonstrated a continual lack of progress in the EFL class as reported by the English language teacher, and (c) had not been exposed to mnemonic instruction prior to this study. The study was conducted in the reading room, under the guidance of an English language teacher.

Dependent and Independent Measures

The primary dependent measure was the number of lower case consonant letters named when the flashcard was shown (e.g., after seeing the flashcard with S, the student says /S/). A second dependent measure was the number of correct

consonant sounds produced after stating the letter (e.g., after seeing the flashcard with S, and saying /S/, the student says /Ss/). Whereas the sounds between English and Turkish consonants are very different, the consonants of the English alphabet are visually similar to the Turkish alphabet, with the exceptions that the Turkish alphabet has no equivalence to the English consonants X, W, Q. A third dependent measure was included to test generalization. Once during the baseline and once during the maintenance phase each student was asked to name words, which began and ended with the sound of the target letter [e.g., after seeing the flashcard with S, saying /S/ and the sound as /Ss/, the student says “sun” (beginning /Ss/ sound), then “bus” (ending /Ss/ sound)]. If the word said was the picture represented on the mnemonic flashcard, it was acknowledged as correct, but not scored for generalization

The independent variable was a mnemonics strategy in which each lower case consonant letter was fully integrated into a student-known picture as an essential part of that picture (e.g. the letter /C/ was drawn as part of a clock face, and the letter /D/ was drawn into the side of a drum). The classroom teacher created all mnemonic flashcards. Individual consonant flashcards (8 cm × 10 cm) were used as the integrated mnemonic.

Data Collection and Experimental Design

Prior to the data collection, the first author obtained permission from school administration and parents, and discussed procedures with the English language teacher. During baseline, the teacher and a graduate student collected session data on the first and second dependent variables (consonant letter naming and consonant sound production) in the afternoon sessions (2:30 pm). The teacher presented all 21 consonant letter flashcards in each session. During the intervention phase, the integrated mnemonic flashcard strategy was implemented in the morning sessions (10:00 am), and students were assessed in the afternoon (2:30 pm). The generalization data was collected once during baseline and once during maintenance for each student.

Design

A multiple baseline-across-students design was used to demonstrate the effectiveness of mnemonics strategy. The intervention was withdrawn when the student reached the mastery level of 90% (19/21), correctly naming consonant letters in two of three afternoon assessment sessions. When mastery was reached by the first student, intervention was introduced to the second student, and maintenance sessions were conducted one week post intervention for the first student. When mastery was reached by the second student, intervention was introduced to

the third student while maintenance sessions were conducted with the second student one week post intervention. The multiple baseline design helped researchers observe the impact of mnemonics strategy on each student, by sequentially introducing intervention to each student, and noting intervention and no-intervention data within and across students.

Procedures

Baseline

Before the baseline phase, in order to introduce the assessment procedures, the letter card /O/ was presented first, and each student was asked to name the letter and then produce the letter sound. The letter /O/ was used because it was not a member of the target set. Once students mastered the procedures with the /O/ card, baseline was begun. During the baseline phase, 21 lowercase consonant letters, prepared on 8 cm × 10 cm index cards, were shown to the students in a random order. Teacher feedback at the end of each consonant and at the end of the session was “Thanks” or “OK” Feedback was not specific on accuracy of response, but for continued participation in the baseline assessment. Student responses, correct or incorrect, were recorded on a data sheet, and the number of correct responses was calculated and graphed.

Intervention

Before intervention, so as to introduce the mnemonics strategy to students, a sample integrated mnemonics card using the letter /O/ was practiced. The letter /O/ was integrated into the face of an octopus, and was highlighted with a 4 mm thick black stroke, whereas the remainder of the picture was drawn with a thin black line approximately 1 mm. The /O/ card containing the integrated mnemonics picture was presented individually to the students. The practice procedure was (a) place the card on the table in front of the student, (b) say “this is the octopus, the letter /O/; it says /au/,” (c) ask the student “What is the picture? What is the letter? What does it say?” and (d) wait for the correct repeated response given by the student (e.g., student says “octopus, /O/, /au/”). After students mastered the /O/ practice flashcard, intervention began. During intervention, the 21 integrated mnemonic consonant letter flashcards were presented randomly, one time each, as described in the above steps a. through d. As with the letter /O/ practice flashcard, the consonant cards also embedded the letter into a known picture. The feedback after the presentation of each letter and at the end of each session was similar to that during the baseline phase (“Thanks” or “OK”).

Maintenance and Generalization

Maintenance data were collected on all 21 consonant flashcards at 1-week post intervention. Maintenance procedures were similar to those carried out during the baseline assessment phase, using the same letter flashcards. Generalization data were collected once during baseline and once during maintenance. During generalization, each student was asked to name words that began and ended with the sound of the target letter (e.g., the words begin or end with /S/ sound). Only the words that were not included as mnemonic flashcards were counted as correct.

INTER-OBSERVER AGREEMENT AND PROCEDURAL INTEGRITY

Agreement was assessed through the use of a second observer independently observing 35% of the sessions across baseline and intervention, equally distributed across the three students. Percentage of agreement was calculated by dividing the number of agreements plus disagreements, then multiplying by 100 (Barlow & Hersen, 1984). Interobserver agreement for letter recognition ranged from 92%–100% ($X = 96\%$), for letter sound production ranged from 98%–100% ($X = 99\%$), and for generalization words ranged from 98%–100% ($X = 99\%$).

Procedural integrity was monitored by a second observer during 25% of the all sessions. Integrity was assessed for initial session prompt, presentation prompts, trial feedback, and session feedback. Procedural integrity was 100% across all session components.

RESULTS

Baseline data on the number of letters named correctly for Semra, Ahmet, and Sinan averaged 11.0 (range 10–12), 4.8 (range 4–6), and 2.0 (range 0–3), respectively. With the introduction of the mnemonics flashcards, the average letter names said correctly increased for Semra, Ahmet, and Sinan, with an average of 19.0 (range 15–21), 17.6 (range 8–21), and 11.5 (range 4–19). Semra required 4 sessions of intervention to reach mastery (19/21), on 2 of 3 sessions), while Ahmet required 12 intervention sessions, and Sinan required 13 intervention sessions.

Baseline data on the number of letter sounds said correctly for Semra, Ahmet, and Sinan averaged 8.3 (range 7–9), 4.2 (4–5), and 1.0 (range 0–2), respectively. With the introduction of the mnemonics flashcards, the average letter names said correctly increased for Semra, Ahmet, and Sinan, showing an average of 15.5 (range 11–21), 12.0 (range 6–16) and 5.0 (range 1–9), respectively. Figure 1 displays the students' correct responses of consonant letter naming and consonant sound production.

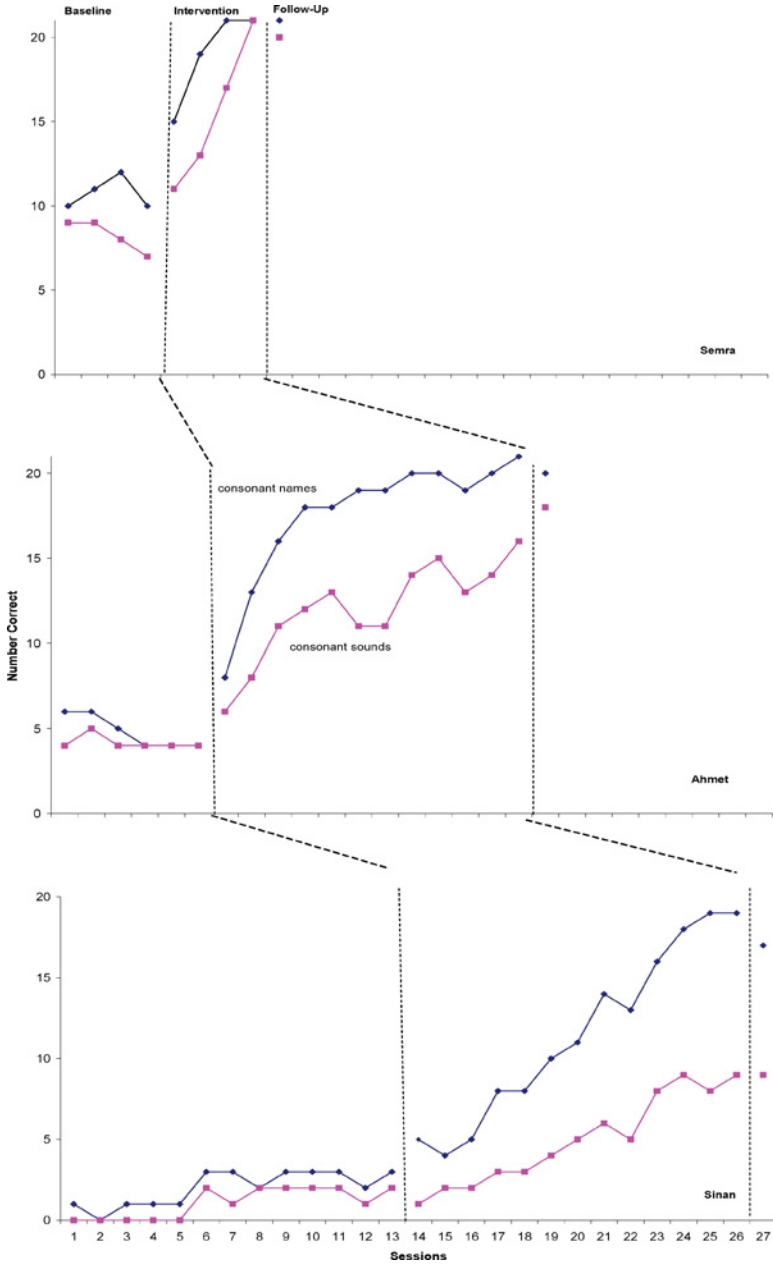


Fig. 1. Using a multiple baseline design across three students, diamonds represent number of consonant names spoken correctly and squares represent the number of consonant sounds spoken correctly.

Maintenance and Generalization

Maintenance data collected at 1-week following the termination of formal instruction showed Semra maintained performance at mastery levels, with 21/21 consonant names and 20/21 consonant sounds said correctly. During maintenance, Ahmet's performance was 20/21 consonant names and 18/21 consonant sounds said correctly. Sinan's maintenance performance showed 17/21 consonant names and 8/21 consonant sounds correct. Generalization data were collected once during the baseline and once during maintenance for each student. Pre-test generalization showed none of the three students could produce any words beginning with or ending with the target consonant letters. One week following the end of intervention Semra recited 6 words beginning with the target consonant /F(2)/H/B/C/P/, and 2 words ending with that consonant /S/T/. Ahmet recited 5 words with the beginning target consonant /K/F/S/G/T/, and 2 words ending with that consonant /D/S/. Sinan recited 1 word beginning with the target consonant /K/, yet no words ending with that consonant.

DISCUSSION

According to the Turkish Constitution (1982), the state's constitutional duty is to provide free primary education, as well as to supplement and aid private and corporate initiatives. All public school funding comes from the state through the Ministry of National Education. Within the Turkish education system, children who have special learning difficulties (such as dyslexia, specific learning disability), other than visual, mental, hearing and physical disabilities, are served by separate private institutions not available to local education agencies. Currently, students in the free primary public education system demonstrating risk for academic failure, but not identified for special services, as is the case for the three students in this study, often repeat grades or drop out completely due to the lack of special education services, supplemental academic resources, and/or effective learning strategies. In the Turkish public education system success in school for at-risk students is often a matter of chance and availability, rather than the result of careful assessment, planning, instruction, and evaluation (Sari, 2000).

To break the cycle of students' learning failure, the awareness in Turkey regarding the special education and specific learning disabilities should improve with the support of the governments' education programs. A more daunting challenge is to create awareness and develop systematic strategies for non-special education students failing public education. One step is to provide resources and professional development for teachers, administrators, and families on research-based, best academic practices easily assessable to public classroom teacher use.

To this end, results from the study have important pedagogical implications for general classroom practice. The ease of construction, implementation, and evaluation make using a phonics mnemonics strategy very practical for

EFL (a) students not having success in early phonics/phonemic awareness, and (b) classroom teachers looking for effective phonics/phonemic practices. Specifically for the EFL classroom, mnemonic strategies, as implemented in this study, begin to build a collection of research-based best practices that will benefit students not able to access special services, but identified “at-risk” for failure in Turkish public education. In the United States, teachers and researchers reported that mnemonics were especially appropriate for children who often have difficulty across all academic subject areas (Mastropieri & Scruggs, 1991), and specifically in the area of alphabetic understanding (Agramonte & Belfiore, 2002; Fulk et al., 1997). In addition, mnemonic strategies have shown more effectiveness in content acquisition than more traditional instructional procedures (Scruggs & Mastropieri, 1992). Results presented in this study show generality of that success for Turkish students at risk for failure in urban EFL/ESL classrooms as well.

Teachers using a simple alphabetic screening of letter-sound correspondence (i.e. the baseline flashcard procedure in this study) can identify students at-risk for failure in EFL programs. Student identified as “at-risk” following alphabetic screening, would be targeted for phonics mnemonic instruction in the classroom. This simple, classroom-based assessment-instruction protocol increases the likelihood for early EFL reading success, and may minimize grade repeating, and/or later school drop out.

One reason for the effectiveness of the phonics mnemonics used here may have been stimuli integration. Stimuli integration is one characteristic of mnemonics distinct from traditional phonics cards or alphabet letter cards. In the phonics mnemonics condition, the letter must form an integral part of the picture. In more traditional phonics cards or letter cards the letter is either placed with or within the picture (for example, a /b/ printed on, or below, a picture of a bus), or the letter is the only stimulus on the card. In the case of the phonics card, the letter and the picture become 2 separate stimuli, with only the letter, which is unknown, being the targeted response. In fact, the picture may serve as a distraction for the student when asked to recall the letter name or letter sound during assessment. But when the letter forms a necessary part of the picture, it becomes difficult to recall the letter without also visualizing the picture that accompanied it (Mastropieri & Scruggs, 1991). In essence, the letter and the picture, once integrated, become one stimulus constructed of two integrated elements, picture and letter. During assessment, following mnemonics instruction, when the student is asked to name the letter, s/he visualizes the letter-picture as one, using the known element (picture) to aid in recall of the unknown element (letter). In addition, when the picture (known) is recited by the student, the initial sound cues recall to the individual letter sound (unknown). In this study, it appears that the known stimulus (mnemonics picture) fostered the learning of unknown stimuli (consonant letter naming and consonant sound production) for the three EFL students. The phonics mnemonics picture card served as one stimulus, letter and picture, resulting in an increase in performance in letter-sound correspondence.

In addition to the increase in consonant letter-sound acquisition, students began to show increases in phonemic skills (i.e., initial sound generalization) as well. Researchers and educators cannot only target alphabetic mastery. Once students master letter-sound correspondence, educators and researcher must evaluate the students' ability to link letter names and sounds to sounds in words. In this study, students began to generalize the letter-sound knowledge to initial and end sound placement in words. In a way, phoneme identity was taught by using a visual prompt, so that when the student saw and mastered the letter /s/ and the sound /Ss/ when integrated into the picture of "snake," they could also produce "school" and "dress" when asked to give words that began and ended with the sound just identified. Associating letter sounds with sounds in words, and then to new words, is the first step to beginning reading (Adams, 1990).

LIMITATIONS AND FUTURE RESEARCH

Belfiore and colleagues have demonstrated the success of this phonics mnemonics within an English first school setting. This study showed similar results in an EFL/ESL school setting, but because we targeted only three students in a 4th grade EFL classroom in Turkey, further research with different grade level, subject level, and countries EFL programs are warranted to note generalized effects. A second limitation of mnemonics is the potential difficulty of accessing mnemonics material. Traditional alphabet flashcards are more commercially available than mnemonics flashcards. Mastropieri and Scruggs (1991) list several suggestions to teachers, such as (a) pictures do not have to be artistic to be effective, picture recognition by students is the critical feature, (b) teachers who cannot draw can develop mnemonic pictures using cutouts from magazines, stick figures, or cut-paste from internet sites, and (c) teachers can ask students to draw mnemonic pictures. In this study the teacher indicated little difficulty in creating the flashcards.

The above-mentioned results of the current study and the following constraints should prompt future mnemonics research in other academic areas within the Turkish education system. But more importantly, this study provides a systematic research model to evaluate research-based academic strategies in an applied setting. Instituting such an applied research model must be expanded within the Turkish public education system to further assist those students in need of academic support, but not qualifying for special education services. The result of such an applied research agenda for Turkish public education will only benefit all involved, promoting educational success for all students.

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