

Letter recognition and hand-copying skills of children: A comparative study of Dari and English alphabet letters

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Article Info	Abstract
<p>Research Article</p> <p>Received: 10 February 2023 Revised: 20 June 2023 Accepted: 21 June 2023</p> <p>Keywords: English and Dari alphabet, Letter recognition, Hand-copying, RAN, Preschoolers</p>	<p>The study comparatively examined the difficulty level in recognizing Dari and English alphabet letters and hand-copying skills among children. The study participants were pre-school children between four and five years old at the time of the study. The participants were administered a pretest, a class session, and a post-test. The data was analyzed by Rapid Automatized Naming (RAN), descriptive statistics, and a paired samples T-test. The study's findings showed no significant difference in letter recognition between English and Dari letters; however, there was a significant difference in the hand-copying test. Also, the study's results revealed that the shapes of the letters played an important role in hand-copying the alphabet letters, while it did not impact the letter recognition process.</p>

1. Introduction

Alphabet books were designed to teach and attract children's attention to the letters to help them learn the alphabet better, which is important for learning to read and write (Lonigan et al., 2013). There are some views regarding learning writing in children. It is believed that the experience of handwriting, in printing letters form, impacts significantly the early letter knowledge skills (Aram, 2006; Aram & Biron, 2004; Longcamp et al., 2005; Lonigan et al., 2011; Neumann, Hood, & Ford, 2013). In their study, Lonigan et al. (2011) asked children participants to write the letters and their names, and the experimental group displayed more expressive knowledge, print knowledge, and phonological awareness than the control groups. Zemlock et al. (2018) assert that comparing authentic handwriting with other sensorimotor interventions plays a vital role in displaying the impact of handwriting on emergent literacy.

To understand the formation behind the impact of handwriting on letter recognition, comparing handwriting to a non-active control condition is essential, as Li and James (2016) compared handwriting to a visual-only learning condition. Their study showed that the groups, who studied typed letter forms, learned less than those who studied handwritten forms either through tracing, viewing, or seeing during writing. Puranik et al. (2013) believe that the most difficult English letters for children to write are J, G, Q, and R. Thus, all the letters are not equally difficult or easy while writing. Zemlock et al. (2018) have indicated that practicing handwriting to learn symbols is more effective than exposure to them at the same time. Their study showed that children who practiced producing letters were better at letter recognition than their peers, who were exposed to the letters for the same amount of time but never produced the letters by hand. They further asserted that practicing numbers by hand can also improve subsequent letter recognition. According to Samuels (1970), there are similarities between learning to name the alphabet letters and learning to recognize names such as animals, flowers, airplanes, birds, and numerous other

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objects in our environment. He also labeled these letters as confusing: b, d, p, q, h, u, v, n, c, e, u, s, y, h, k, t, m, n, w, r, x, z, v, w, f, l, t, h, a, r, e, s, l, j, y, l.

As far as the authors are concerned, no study has examined preschoolers' recognition of Dari and English alphabet letters. The current study comparatively examines the difficulty level of recognition and hand-copying of English and Dari alphabet letters. In sections two and three, the authors discuss literature relevant to the study and present the methodology of the study. In section four, the authors present the study's results, followed by section five, in which the interpretation of the findings is presented. In section five, the conclusion and implications of the study are presented.

2. Literature review

Travers (1967) asserted that in symbolic and verbal learning, some of the information from the pre-perceptual field is chosen and kept in short-term memory. It is a stage in which selected data in short-term memory is transferred to long-term memory by being hooked up to earlier saved information stored in long-term memory. Learning the alphabet letters requires individuals to differentiate them visually. Children need not just a common discrimination training for naming the letters. Rather, visual discrimination training can assist the children in remembering the exclusive shapes of the alphabet letters. These features differentiate between identifiable and different letters (Samuels, 1970). NELP suggests significant correlations in post-reading abilities, including decoding, reading comprehension, and spelling, created by name-writing skills (National Early Literacy Panel, 2008). Previous writing abilities like uppercase, lowercase, and letters and words prevent upcoming reading problems (Snow et al., 1998). Gibson et al. and Dunn-Rankin's study show that letters (such as T) with angular intersections and gaps in their lines are common letters easily recognized (Dunn-Rankin, 1990; Gibson et al., 1962). In an experiment with children between 4 and 8 years old, Gibson et al. (1962) examined whether children could recognize the topological transformation of the letters. The results showed that the children could contrast the transformations that differentiated actual letters. Regarding gender, Puranik, and his colleagues stated that girls were better at writing letters correctly than boys (Puranik et al., 2013). Their study results complied with Berninger and Fuller (1992) study in which girls in elementary grades were better at remembering letters from orthographic memory for writing than boys.

Like experts, it is still unclear whether children only process a small part of letter forms (Dunn-Rankin, 1990; Fiset et al., 2008, 2009). The method by which children process letter forms predicts the ease of learning letters. Much practice is possibly needed before the critical dimensions of letter forms are stored in children's memory, and children instantly recognize a letter form by concentrating on the critical dimensions of the form (Both-de Vries & Bus, 2014). Also, the research among adults shows that expert readers identify letters by fixating only on small parts of the letter (Dunn-Rankin, 1990; Fiset et al., 2008). Fiset et al. (2008) used the so-called bubbles, a classification image technique, to investigate which areas of letters help most to recognize lower- and upper-case Arial letters. This task was conducted by covering a part of each of the letters with bubbles so that it was possible to test which features were essential for letter identification. The results showed that line terminations were the most critical features for letter identification. That is, "the inferior termination of the uppercase 'C' clearly allows the discrimination of this letter form from the uppercase letters 'G,' 'Q' and 'O', and is, in fact, sufficient for the correct identification of 'C'" (p. 1166). The areas described as distinct features by Dunn-Rankin (1990), are the lower quarter of most letters that attract few fixations, particularly when letters include ascending vertical lines like h and k. The study is similar to Gibson et al. (1962). The lower quarter of most letters involved few fixations, especially with letters including ascending verticals like 'h' and 'k.' The angular intersection of the letters appeared to be a unique feature for the letters 'x,' 'v,' and 'w.' For 'C,' fixation was placed close to the opening at the right side and included more of the letter's background than the letter itself. When letters have more than one distinctive feature, such as an angular intersection plus an ascending vertical in the letter 'k,' both areas can attract eye fixations (Both-de Vries & Bus, 2014).

Fixation, in the literature, is another factor in learning the alphabet letters. It was not yet revealed whether new readers identify letters by focusing on their unique features. It is a plausible assumption that children begin familiarizing themselves with the forms of letters at an early age if they grow up in a society where people are literate. The print is exposed to children continuously. The fixation duration will reduce if children are more familiar with the letter forms (Both-de Vries & Bus, 2014). According to Evans et al. (2009), about one-third (over 20%) of children's time is spent looking at letters.

One of the assessment methods in reading is Rapid Automatized Naming (RAN). Di Filippo et al. (2005) conducted their study's RAN test in two-step tasks. The first one asked the participants to name the items loudly,

and in the second task, the participants crossed out a specific stimulus, e.g., 9 digits naming every time they faced it. Their conclusion suggests that only the naming procedure was significantly correlated with reading. In another study, Goerge et al. (2013) suggest that reading and RAN were related due to their serial processing need. They said there was a considerable correlation between RAN and oral reading fluency. It is worth mentioning that co-curricular activities can also enhance the reading outcome in language acquisition (Titrek et al., 2016). During conducting RAN, naming speed can significantly affect learners' second language word recognition explanation (Geva & Wade-Woolley, 1998). Gholamain & Geva's (1999) concluded that speed naming and working memory in the Persian language are more stable predictors of word recognition than in English. Their study also showed that regardless of language proficiency and age, a robust explanatory framework for first and second-language basic reading abilities can be provided by considering the speed of letter naming and working memory. The relationship between the speed of naming and reading patterns remained consistent, while the relationship between such processes to comprehension became progressively marginal with reliance on higher-level cognitive processes (Bowers et al., 1988; Wolf et al., 1986).

Dari has 32 alphabet letters, many of which are shared by Arabic. It has a one-to-many sound-to-symbol correspondence. Sounds can own a lot of graphical representations. Thus, irrelevant semantic words created from these letters appear to be the same (Gholamin and Goa, 1999). The direction of Persian alphabet letters is from right to left (Khanlari, 1979). Therefore, there is no visual similarity between the Persian and Roman alphabet writing systems (Baluch, 1996). There are three long vowels in Dari /i/, /u/, and /a/. Each vowel is represented by six spoken vowels, a letter, and three short vowels, /e/, /o/, and /ae/. Lack of diacritics for short vowels usually does not create a problem for advanced readers because by using alternative sources of knowledge, they can read and interpret the words (Baluch & Besner, 1991; Rabia, 1997). The Dari language has a consistent graphemes-to-phonemes rule because every grapheme has a single pronunciation. However, the script in the Dari language is poly-graphic because more than one grapheme characterizes several phonemes. For instance, three various graphemes represent the /S/ phoneme, and four graphemes represent the /Z/ phoneme. There is a possibility that the relative contribution of phonological skill and orthographic skill may display different patterns in performing tasks since Dari does not preserve the same level of orthographic complexity for reading (less complex) and spelling (more complex). Dari's writing is expected to facilitate the use of grapheme-to-phoneme rules of adaption for young readers as do other consistent and regular texts. Meanwhile, learning visual vocabulary should be eased by effective phonological skills (Frith, 1985; Gough et al., 1992).

2. Methodology

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2.1. Context of the study

There are over 35 languages that are spoken in Afghanistan, where Dari, Pashto, and Uzbek have the most speakers. Dari and Pashto are the official languages of Afghanistan, and other languages, e.g., Uzbek, is considered the official language in places with the majority of speakers (Orfan, 2023; Afghanistan, 2004). Dari, as one of the varieties of Persian, dominates business, politics, and education in the country; therefore, it is considered as the lingua franca of Afghanistan (Central Intelligence Agency, 2019). In Tajikistan, Persian is the official language which is called Tajiki; however, it is renamed as Dari in Afghanistan in 1964, but still, it is commonly called Farsi (Persian) (Spooner, 2012). Dari is also the language of instruction at universities and schools in many parts of the country (Central Intelligence Agency, 2019; Coyle, 2014; David, 2014, Orfan & Seraj, 2022).

Dari alphabet has 32 letters whose traditional alphabetical order is shown below.

ا ب پ ت ث ج چ ح خ د ذ ر ز س ش ص ض ط ظ ع غ ف ق ک گ ل م ن و ه ی

There is always one sound for a letter in Dari. Unlike the English alphabet, two letters never combine to produce a single sound. For instance, the single sound /ʃ/ should be spelled using letters such as /sh/, /tio/, and /sio/... while it is /ش/ in Dari. On the other hand, four sounds are produced by more than one alphabet letter. For example, the letters producing /S/ sound are /ث/ /س/ and /ص/ in which the letter /س/ is used more often than the two other ones. Likewise, /ت/ and /ط/ produce the /t/ sound. Words with a /t/ sound are frequently spelled with /ت/

and are rarely spelled with / ط /. The /z/ sound can be spelled as / ز /, / ذ /, / ض / or / ظ / and / ز / is used more than others. / ه / and / ح / are used to produce the /h/ sound; both letters are almost used equally (Sultany, 1977).

English is learned and taught as a foreign language in Afghanistan, and it is one of the major courses at schools and at universities in Afghanistan (Arab & Orfan, 2023). English has four main areas of usage: to connect with people abroad, to study in other countries, in the media, and translate and interpretation (Coleman, 2019; Orfan, 2020). The English language use improved gradually after the Soviet Union withdrew from Afghanistan in 1989. Learning English became popular after the arrival of American troops and international organizations in the country in 2001 (Azami, 2009; Orfan, 2021). In addition, English plays a vital role in employment and academic career in higher education institutions.

2.2. Research design

A mixed approach was used to carry out this research. Descriptive and paired samples *T*-tests were used to analyze the data. Rapid Automatized Naming (RAN) test plus naming speed were observed as a measurement instrument. The participants were given a pre-test followed by training sessions and a post-test to observe their responses to 10 Dari and 10 English alphabet letters.

2.3. Participants

The participants of the study were 12 children, who were between 4 and 5 years old. They were living in Taloqan City, a northeastern city of Afghanistan, at the time of the study. Half of the respondents (6) were male. The respondents were speakers of the Dari language. The participants were preschool children not previously exposed to direct or indirect English or Dari alphabet letters. To ensure whether the participants were exposed to indirect alphabet learning, e.g., watching alphabet learning cartoon shows, a pre-test was applied in which two participants were disqualified for the study; they were not included. A consent letter regarding the children's participation was developed and signed by the participant's parents.

2.4. Data collection instrument

The literature review was conducted to arrange the research design. One of the factors to be considered regarding the teaching sessions was the attention span, whether to adjust the session for 10 minutes, 15 minutes, more or less. There were controversial opinions about this topic. Davis (1993) states that "...student attention during lectures tends to wane after approximately 10–15 minutes." Likewise, Wankat (2002) claims, "Although student attention rises at the beginning of a session, it reaches a lower point after 10–15 minutes. However, according to Bradbury (2016), the greatest variability in student attention arises not from the teaching format but from teacher differences. A teacher's responsibility is to enhance their teaching skills to provide a satisfying lecture experience for the students and rich content. Therefore, the teaching sessions for observation were set for 30 minutes and run by effective teaching methodology. Both English and Dari alphabet teaching sessions for letter recognition took place in the morning, half an hour after the participants had breakfast.

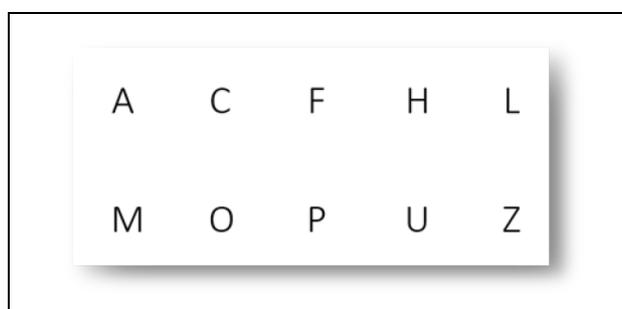


Figure 1. English uppercase letters selected for letter recognition and hand-copying tests

There was only one session per day to prevent the participants' boredom and keep them refreshed for the sessions. A Rapid Automatized Naming (RAN) test was applied to assess the participants' letter recognition. RAN is the ability to name visually presented familiar symbols such as objects, colors, digits, and letters as quickly as possible (Denckla, 1972). According to George et al. (2013), RAN is linked with reading because it involves oral production of the names of the stimuli and serial processing. To avoid confusion among the participants and achieve the best results, only one representation was selected out of the whole group of similar letters, such as

multi grapheme letters like /ش/, /ذ/, /چ/ or /ت/ or /ا/ . The same procedure was applied in English letters as well. Therefore, only one letter was selected for the observation, e.g., from C or G and Q or O (Dunn-Rankin, 1990). In addition, the most complicated letters for children like J, G, Q, and R (Puranik et al., 2013) were deselected in the list of letters for letter recognition and hand-copying test. After the letter recognition test, 10 English uppercase letters (Figure 1) and 10 Dari letters (Figure 2) were projected, and the participants were asked to hand-copy the letters. These are the letters chosen for the test.

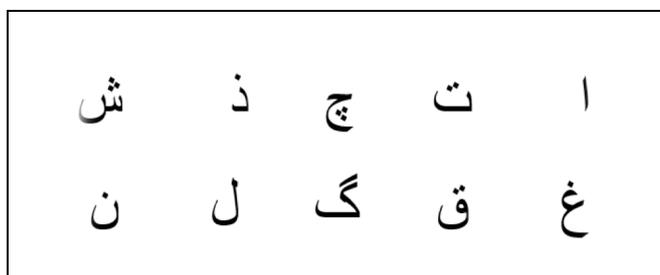


Figure 2. Dari letters selected for letter recognition and hand-copying tests

2.5. Data analysis

The researcher recorded the participants' responses to RAN for the letter recognition and hand-copying tests. Descriptive statistics determined the data's mean, frequency, and standard deviation. Also, a paired samples T-test was used to evaluate the significant difference between the participants' English and Dari letter recognition and hand-copying abilities. The tests were run in Statistical Package of Social Science (SPSS version 26.0).

3. Results

The participants (N=12) were given a pre-test on Dari and English letter recognition and Dari and English writing before conducting learning sessions. The pre-test results indicated that the participants had zero knowledge of Dari and English letters (Table 1).

Table 1. Results of the participants' pre-test

No	D.L.Re.R.T	E.L.Re.R.T	D.L.Wr.T	E.L.Wr.T
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0

*D.L.Re.R.T = Dari Letter Reading Recognition Test

*E.L.Re.R.T = English Letter Reading Recognition Test

*D.L.Wr.T = Dari Letter Writing Test

*E.L.Wr.T = English Letter Writing Test

The authors conducted learning sessions for the participants, and they were given posttest. As Table 2 shows, the teaching sessions significantly impacted children's learning of English and Dari alphabet letters. Furthermore, students' total score for the Dari RAN Test is 48, while it is 46 for the English RAN test, which is insignificant. On the other hand, the total score of the participants for the English hand copying test is 80, which is almost twofold of students' total score for the Dari hand copying test (47).

In addition, a paired samples T-test was conducted to compare the score of the Dari letter Rapid Automatized post-test and English letter Rapid Automatized post-test by the participants after participating in letter learning sessions. The result of the test showed that there was not a significant difference between the Dari letter Rapid

Automatized naming test (M=4.00, SD=1.53) and English letter Rapid Automatized naming test (M=3.83, SD=1.52); $t(22) = .518, p > 0.05$ (Table 3).

Table 2. Results of the participants' posttest

Participant No	D.L.RAN.T	E.L.RAN.T	D.L.HC.T	E.L.HC.T
1	5	4	0	3
2	4	2	2	5
3	3	4	9	10
4	4	5	3	5
5	8	7	4	6
6	3	3	5	5
7	3	2	4	7
8	5	6	5	10
9	4	3	3	7
10	3	4	6	10
11	4	3	4	8
12	2	3	2	4
Total	48	46	47	80

*D.L.RAN.T = Dari Letter Rapid Automatized Naming Test

*E.L.RAN.T = English Letter Rapid Automatized Naming Test

*D.L.HC.T = Dari Letter Hand Copying Test

*E.L.HC.T = English Letter Hand Copying Test

Table 3. Paired samples t-test results of Dari and English letters RAN test

Pair 1	RAN	Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
	DL.RAN.T - EL.RAN.T	0.167	1.115	0.322	0.518	11	0.615

* DL.RAN.T = Dari Letter Rapid Automatized Naming Test
 * EL.RAN.T = English Letter Rapid Automatized Naming Test

Table 4. Paired samples T-test results of Dari and English letters hand copying test

Pair 2	Hand Copying	Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
	D.L.HC.T - E.L.HC.T	2.75	1.422	0.411	-6.698	11	.000

Furthermore, the author conducted paired samples T-tests to determine the differences between the participants regarding Dari and English hand copying. The results showed that there was a significant difference between the Dari letter hand copying test (M=3.92, SD=2.27) and the English letter hand copying test (M=6.67, SD=2.42) conditions; $t(11) = -6.69, p < 0.05$ (Table 4).

4. Discussion

The study investigated preschool children's ability to recognize alphabet letters and hand-copying skills in two different languages, English and Dari – only uppercase letters were selected for the English alphabet. In other words, it compared the difficulty level of English and Dari alphabet letter learning among preschoolers in Afghanistan. The results of the study showed that there was not a significant difference in the recognition of Dari and English alphabet letters by preschool children.

Despite the Dari alphabet letter shapes look more complicated than English alphabet letters since there are several diacritics for a single letter, e.g., /ش/ which has three dots on its top, some are curved like /چ/ or some have extra parts such as /گ/, the participants could recognize both languages alphabet letters almost equally. Therefore,

this study suggests that preschoolers learn letter recognition of any alphabet letters equally regardless of their shapes, provided that equal teaching time is delivered for them.

Contrary to letter recognition results, the finding of the research suggested that there was a significant difference in the hand-copying test. The participants could copy the English alphabet letters more quickly and easily than the Dari alphabet. The reason for this can be the difficult shapes of the Dari alphabet letters. It was observed that the participants needed more time to copy the Dari alphabet letters than the English alphabet letters. Therefore, Dari letters require more concentration for children while being hand-copied. The study's results suggest that the more complex the alphabet letters are, the more difficult and time-consuming they will get for children. From this perspective, this study conforms with Dunn-Rankin's (1990) study, in which some letters are introduced as requiring a longer fixation time. The study also showed that there was not a significant difference between female and male preschoolers. This finding is inconsistent with Berninger & Fuller's (1992) and Puranik et al. (2013), whose study showed that girls achieved higher letter-writing scores than boys.

5. Conclusion

This study compared the difficulty level of alphabet letter recognition and hand-copying skills among children between two languages, English and Dari alphabet letters. The findings of the study suggested that there was a significant difference in hand copying tests. In other words, the participants could hand copy more English alphabet letters than Dari alphabet letters. In terms of letter recognition, the results of this study displayed that the participants recognized the alphabet letters in Dari and English almost equally. It can be concluded that the shapes and forms of the letters played a significant role in hand copying the alphabet letters, the more complicated the shapes and forms, the more complex the hand copying. However, the shapes and forms of letters did not impact the letter recognition. Since the present study compared English uppercase letters to Dari alphabet letters, comparing English lowercase letters to Dari alphabet letters, whether they act similarly or differently, remains an area requiring further research.

5.1. Implications

The study has implications for English instructors teaching English, mainly writing, to Dari-speaking children. They should understand that the English alphabet system and the Dari alphabet system are disparate. Comparing English alphabet letters to Dari alphabet letters should be avoided when teaching the English alphabet to Dari speakers. They should provide their students with more activities to help them learn English alphabet letters without comparing them to Dari letters. It also has implications for Dari instructors, teaching Dari to speakers of other languages, mainly English. They should understand that Dari, like Arabic, has a unique alphabet system whose letters have particular shapes and diacritics, which makes it hard for speakers of other languages to learn them. Therefore, they should use effective techniques to help students learn Dari letters. They should provide them with various writing activities to help them learn how to write the Dari alphabet letters.

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Author contribution statements

The authors contributed equally to the research design and implementation, analysis, and the manuscript's writing.

Disclosure statement

The authors reported no potential competing interest.

Ethics committee approval

This research has ethics committee approval from Takhar University with a 13/01/2021 date and 342 number. All responsibility belongs to the researchers. All parties were involved in the research of their own free will.