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Bridge over Troubled Water: Spelling Accuracy of Novel Phonemes in Arabic among Native Hebrew-Speaking Pupils in a Bilingual—Arabic-Hebrew—Elementary School

Un pont au-dessus d'une eau trouble : l'épellation de phonèmes arabes inconnus parmi des locuteurs natifs de l'hébreu dans une école élémentaire bilingue (hébreu-arabe)

גשר צר מאוד: איות פונמות לא מוכרות בערבית בקרב דוברי עברית כשפת אם בבית הספר היסודי הדו-לשוני (ערבית-עברית)

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Introduction¹

- ¹ Two core issues are at the heart of this paper. The first deals with bilingual education; the second refers to the acquisition of novel phonemes and phoneme-grapheme correspondences. Both are integrated in the pedagogical setting of a bilingual school in Israel.
- ² Although some encounter points as hospitals, shopping centers or sports, most Arabic and Hebrew populations in Israel have separate community life and live in separate cities and/or neighbourhoods. Further, under the control and supervision of the Ministry of Education, educational systems for Arabic and Hebrew speakers are also separate.² This separation has given rise to mutual hatred, fear, prejudice, distrust, and stereotyping of “the other.”³ Not a few Hebrew L1 pupils express hostility and

objections to learning Arabic, mostly during periods of political tension, so that teaching Arabic in the Hebrew-Jewish sector presents considerable challenges. This may also explain why most of studies conducted over the past twenty years in the Hebrew sector focus mainly on pupils' attitudes, and only a few explore the linguistic aspects.⁴

- 3 As a rule, education in Israel is divided into one system for Hebrew L1 speakers, and the second for Arabic L1 speakers. Hebrew and Arabic are both official languages in Israel, *de jure*; but the *de facto* hierarchy situates Hebrew as the majority language and Arabic as the minority language.⁵ Thus, while all Arabic schools are obliged to teach Hebrew as a second language from 2nd or 3rd grade, Hebrew schools do not have to teach Arabic. If they do so, it is either in order to "know the enemy"⁶ or as a cultural approach rather than a linguistic achievement, thereby maintaining the policy of segregation and preserving the general atmosphere of hostility and frustration. Obviously, this dichotomy reflects both the majority-minority conflict of the two populations as well as the language-power relationship.
- 4 However, a small nucleus of bilingual schools has been established in Israel, not merely for linguistic purposes. These Arabic-Hebrew schools have been established in an attempt to create practices of partnership between two nations that are in geopolitical and socio-historical conflict.⁷ Perhaps this is why studies in these schools have focused mainly on social and socio-political aspects—the ecology of the schools, the parents, teachers, and general pedagogy. The present study focuses on some of the linguistic elements and is intended to expand the general body of knowledge of the subject.

Arabic-Hebrew bilingual schools in Israel

- 5 Bilingual education in Israel has been promoted mostly by non-governmental organizations (NGOs) and by individuals. Wahat al-Salam/Neve Shalom was the first bilingual school, founded in 1984. Others were opened by the Hand-in-Hand Centre for Jewish-Arab Education in the Galilee, in Jerusalem and, in cooperation with the Bridge across the Wadi Fellowship, in Wadi Ara. Today, three more schools and kindergartens are operating in the Jezebel Valley, Be'er Sheva, and Haifa, and others are being considered by individuals and NGOs alike. All Arabic-Hebrew schools are recognized by the Ministry of Education, and the pupils learn according to the official Educational syllabus and textbooks.
- 6 These schools provide bilingual, bicultural and bi-national settings in which pupils learn *together* on a daily basis.⁸ They offer a setting for interaction between Arabic L1 and Hebrew L1 speakers, and for both languages to be taught on a relatively equal footing.⁹ Moreover, according to the cultural-cognitive model for bilingual education,¹⁰ Arabic and Hebrew L1 teachers work as a team, each class having Arabic and Hebrew L1 home teachers (mainly in the elementary grades). Also, most lessons are conducted by native teachers, each speaking and teaching his/her L1.¹¹ Efforts are made to enrol approximately equal numbers of Arabic and Hebrew speaking children and to emphasize the symmetry between the two languages.¹²
- 7 As stated earlier, previous studies of Arabic-Hebrew schools in Israel essentially focused on educational and social aspects of mutual learning, and the attitudes of the participants from both populations to their counterparts and the school system.¹³ These studies found positive attitudes towards self and others' identity.¹⁴ Shared

interests of Arab and Hebrew L1 partners in the framework of bilingual education have also developed mutual and positive attitudes towards others' language, culture and history.¹⁵ However, even in the bilingual setting, Hebrew is still the dominant language.¹⁶ Bilingual individuals are expected to speak two (or more) languages to some level of proficiency,¹⁷ but the Hebrew L1 students seemed to lack the proficiency needed for daily communication in Arabic even in the bilingual setting.¹⁸ A recent study conducted in bilingual schools focused on speed and accuracy in reading Arabic and Hebrew texts,¹⁹ but without reference to the pedagogical setting. Thus, it is the results of the current study that may shed light on the pedagogical model adopted by Neve Shalom/Wahat al-Salam during the years 2012-2014, and on its contribution to Arabic-Hebrew bilingualism.

The pedagogical setting of Neve Shalom/Wahat al-Salam

- 8 Generally speaking, there are two main pedagogical approaches to language instruction in the Arabic-Hebrew bilingual school. The first is the subject-based curriculum, imparting a language through a variety of subjects; the second is according to language learning (L1 & L2) methods (i.e. formal Arabic lessons, as well as Hebrew ones, are taught in all grades). Both approaches operate according to the "no translation" and "no separation" principle, to Arabic and Hebrew L1 learners alike. Thus, for the first option (the subject-based curriculum), two teachers, L1 Arabic and L1 Hebrew, would impart the lesson. For the second option (language learning method), two teachers with the same first language (AL1 or HL1) conduct the lessons, mainly in the lower grades. The intention is to establish both languages in the early years, so that only one teacher is required for the upper grades later on. What makes the second approach unique is the presence of two L1 teachers. This enables a mode of communication between the teachers (not all of the Hebrew-Jewish teachers speak Arabic). This is rather different from the "standard" classroom, in which communication (if any) is just between the teacher and the pupils (and/or the pupils themselves).
- 9 Regarding which is the more suitable model for the bilingual school: over the years, the Oasis of Peace School has implemented various bilingual teaching programmes in order to adopt the most satisfactory system for the school. Among them were different methods of language instruction, including a period of separate classes in Arabic and Hebrew as first and/or second language. This meant that, for part of the day, and mainly for language instruction, children learnt only or mostly together with other native-language speakers. This obviously reduced opportunities to hear and/or talk in the other language.
- 10 A few years ago, the school adopted what we defined as the "second model" for the First Grade, focusing on (i) the language of instruction ("no translation"), (ii) no separation between L1 Hebrew and Arabic native speaking children, and (iii) two native Arabic (or Hebrew) speaking teachers in the classroom. However, the school's pedagogy at the time of our study can be defined as a combined model of the two methods. For the last few years, pupils have been learning together in Arabic or Hebrew, developing their language skills using both L1 and L2 methods: *learning the language/s* and learning through direct instruction in both languages. Thus, the two models are interwoven to form a combination of content-based curricula and language learning-teaching.

Linguistic outcomes in bilingual education

- 11 There are linguistic advantages in bilingual education. However, for children who are only partially bilingual, different levels of second language proficiency were observed among different groups.²⁰ Other studies found different patterns of emerging phonological awareness for children whose languages were English and Spanish²¹ than that for children whose languages were English and Chinese.²² The researchers suggested that these differences were the outcome of the two languages spoken by the children. It had also been suggested that children who speak a second language with similar phonological structure and alphabetic orthographic systems to their native tongue may have some advantage over monolingual children when learning to read in their L1.²³ Common to all the studies examining various linguistic aspects, such as word awareness, syntactic awareness, and phonological awareness, advantages to bilinguals were observed in certain tasks, and disadvantages in other tasks. It should be borne in mind that various factors intervene in these processes of language acquisition, such as the cognitive stage of the child, the relation between the two languages, and the pupil's relative proficiency in each language.²⁴ However, strong bilingual education programmes²⁵ that actively promote learning of and in L1 and L2 facilitate language and literacy, and positively impact cognitive development.²⁶

Acquisition of novel phonemes and phoneme-grapheme correspondences

- 12 Over the years, studies have indicated that the phonological skill is a crucial precondition for reading at the beginner stage,²⁷ and in determining later reading ability in English,²⁸ as well as in other languages such as Dutch,²⁹ Spanish³⁰ and Portuguese.³¹ Other studies showed that phonological processing skills are imperative for becoming a skilled reader,³² specifically in alphabetic orthographies.³³ Studies from various languages, including Arabic,³⁴ Portuguese,³⁵ Chinese³⁶ and Japanese,³⁷ indicated that phonological processing is necessary for any form of visual information processing, including new word learning³⁸ and advanced language acquisition. Thus, in learning an additional language, it is highly important to explore the acquisition of novel phonemes—those that do not exist in one's native phonological system.

Arabic novel phonemes: acquisition among Hebrew L1 pupils

- 13 Recent studies of the acquisition of novel phonemes in Arabic among native Hebrew pupils in junior high schools in Israel indicated that native Hebrew pupils had extremely low proficiency in spelling, with no significant improvement even after four years of learning Arabic.³⁹ In addition, the results indicated a decrease in auditory discrimination proficiency of Arabic sounds over time. This is surprising since one could have expected that Arabic would be easily learned by native Hebrew speakers since both Hebrew and Arabic are Semitic languages and share linguistic similarities.⁴⁰ A possible explanation for these results was insufficient exposure to the language.⁴¹ On the average, pupils learn for 3-4 years, from seventh to ninth or tenth grade, three hours per week, i.e. some 90 hours per annum—a total of 360 hours in four years

of Arabic studies. In comparison, the European average for high-school learning of an additional language is 800 hours.⁴² Moreover, most of the Hebrew L1 Arabic teachers speak Hebrew during Arabic lessons due to inadequate Arabic proficiency.⁴³ Some teachers admitted to finding it difficult to pronounce novel Arabic phonemes, therefore avoiding use of Arabic during their lessons, or using it improperly.⁴⁴

- 14 However, none of the above-mentioned studies took place in a bilingual setting in which language acquisition occurs inside and outside the classroom, both formally and informally. This study explores the first stages of Arabic acquisition among native Hebrew pupils, focusing on phonological aspects and phoneme-grapheme correspondences of spelling of unfamiliar phonemes in Arabic in an Arabic-Hebrew school. It is the first of a series of studies focusing on linguistic outcomes in Arabic-Hebrew bilingual schools in Israel, and focuses specifically on guttural (/ħ/), uvular-velar (/q/ and /ʁ/), and emphatic (/ʕ/) phonemes.

Research questions

- 15 This study set out to explore the spelling accuracy of novel phonemes in Arabic among native Hebrew pupils learning in an Arabic-Hebrew school in second, third, and fourth grades. The research questions were:
- How accurate is the spelling of novel phonemes among native Hebrew-speaking pupils in an Arabic-Hebrew school in the elementary (2nd, 3rd, and 4th) grades?
 - What is the accurate-spelling level of four novel phonemes targeted for this study (guttural: /ħ/, uvular-velar: /q/ and /ʁ/, and emphatic: /ʕ/) among those pupils?

Methodology

- 16 Data were collected in Neve Shalom in June 2013. Although the study primarily focused on native Hebrew speakers, the tasks were also administered to their Arab L1 classmates by both researchers during a 45-minute lesson in each class. Within each grade (2nd, 3rd, and 4th grade), the order of administration was rotated in order to control for order effects that might result from each participant doing the tasks in the same order. All tasks were explained by the researcher. Permission for the study was obtained from the school administration.
- 17 Four tasks were developed for the study:
1. Real word recognition: This task comprised 20 word pairs in which the examinees were required to recognize correctly spelled words from pairs of words in which one word was spelled correctly and the other incorrectly. These pairs involved changing one letter in a word familiar to the pupils from the Arabic textbook. Construction of different word pairs was based on replacement of one letter which represents a novel phoneme (such as /ʕ/) with a similar phoneme in Arabic that also exists in Hebrew (such as /s/), for example /ʕawm/-/sawm/ [fast]. This taps into both phonological and orthographic processes: phonological representation, orthographic knowledge, and phoneme-grapheme correspondences. (Cronbach's Alpha: .82)
 2. Auditory discrimination of pseudo-words: this task comprised of 20 pairs of pseudo-words. Participants were required to listen to a pair of pseudo-words, decide whether they were the same or different, and circle their answer on an answer sheet. The pseudo-words were constructed by changing one phoneme from a familiar word. Construction of different word

pairs was based on pairs of sounds, in which one was a familiar phoneme from Hebrew and the other was a novel phoneme from Arabic, e.g. /wakad/, /waqad/. This is in order to focus the participant's attention on sound recognition without depending on lexical clues, and test their ability to distinguish between sounds that are phonemically similar without an orthographic confound. Each pair of words was heard only once. This taps into the quality of the phonological representation of specific tagged phonemes in the target language. The quality of phonological representations affects the construction of accurate phoneme-grapheme correspondences. (Cronbach's Alpha: .7)

3. Pronunciation discrimination of written pseudo-words: Participants were required to recognize the correct pronunciation of 20 written pseudo-words. For each written word, two pronunciations were heard; one correct and the other incorrect. Each pair was constructed by changing one novel phoneme for a similar phoneme in Arabic which also exists in Hebrew. For example, for the written pseudo-word صَرْب two pronunciations were read aloud: (/sarb/ and /ʃarb/). Participants were asked to mark the correct pronunciation on their answer sheet. Each pronunciation was heard once. This task is also comprised of pseudo-words in order to focus the participant's attention to sound recognition without depending on lexical clues, and taps into both phonological and orthographic processes: phonological representation, orthographic knowledge, and grapheme-phoneme correspondences. (Cronbach's Alpha: .83)
4. Spelling-to-sound correspondences of written pseudo-word pairs—this task consisted of 20 pairs of written pseudo-words. Participants heard one word from each pair, and were asked to mark on the answer sheet which of the words was read aloud. Construction of different written word pairs was based on pairs of sounds, in which one was a familiar phoneme from Hebrew and the other a novel phoneme from Arabic. For example, of the written word pair قَمَش (/qams/) and كَمَس (/kams/), only one was read aloud, and pronounced only once. This task taps into both phonological and orthographic processes: phonological representation, orthographic knowledge, and spelling-to-sound correspondences. (Cronbach's Alpha: .7)

Results

- 18 This study explored the spelling accuracy of novel phonemes in Arabic among 41 native Hebrew pupils learning in a bilingual Arabic-Hebrew elementary school in the second (N=13), the third (N=15), and the fourth grade (N=13), boys (N=26) and girls (N=15). Specifically, this study focused on guttural (/ħ/), uvular-velar (/q/ and /ʕ/), and emphatic (/ʕ/) novel phonemes.
- 19 The first question considered the overall accuracy of Arabic spelling among the native Hebrew-speaking participants. Table 1 presents descriptive statistics of performance across grades for all tasks for Hebrew L1 pupils. Table 2 presents descriptive statistics of performance among Arabic L1 pupils.

	2 nd grade M (SD)	3 rd grade M (SD)	4 th grade M (SD)
Real word recognition	74.61 (14.78)	78.37 (17.89)	66.53 (20.35)
Auditory discrimination of pseudo-words	81.62 (16.25)	77.77 (13.02)	81.19 (7.36)
Pronunciation of written pseudo-words	78.84 (24.41)	75.96 (20.70)	65.86 (17.97)

Spelling-to-sound correspondences of pseudo-words	83.21 (12.77)	74.12 (22.83)	72.02 (24.74)
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Descriptive Statistics: Mean Percentage Scores by Grade and Task—Hebrew L1 Pupils

	2 nd grade M (SD)	3 rd grade M (SD)	4 th grade M (SD)
Real word recognition	89.61 (5.18)	96.50 (5.29)	98.57 (2.34)
Auditory discrimination of pseudo-words	85.89 (13.53)	83.88 (16.86)	96.03 (6.69)
Pronunciation of written pseudo-words	93.27 (9.00)	95.62 (8.35)	94.64 (6.42)
Spelling-to-sound correspondences of pseudo-words	82.51 (14.11)	90.00 (15.12)	89.61 (16.28)

Descriptive statistics: Mean Percentage Scores by Grade and Task—Arabic L1 Pupils

- 20 Total mean score for Arabic L1 pupils = 91.34% (7.10). For the Hebrew L1 pupils the score was significantly lower - 75.84% (13.24). In order to explore the effect of mother tongue and grade on spelling accuracy, a series of repeated measure 3-way ANOVA analyses was made, with language and grade as between-subject factors, and task as within-subject factor. The results showed main effect for mother tongue $F(1,70) = 40.32$, $p < .001$, $\eta^2 = .37$, and two interactions: a) for mother tongue and grade $F(2,70) = 3.37$, $p = .04$, $\eta^2 = .09$. According to this interaction, the mean score of Arabic L1 pupils is significantly higher than that of Hebrew L1 pupils in 3rd and 4th grade, but not in Grade 2. b) Interaction between mother tongue and task $F(3,210) = 5.45$, $p = .001$, $\eta^2 = .07$, according to which the mean score for Arabic L1 pupils was significantly higher in all tasks except for auditory discrimination, in which no significant differences were found.
- 21 The second question examined accurate spelling of four novel phonemes targeted (guttural: /ħ/, uvular-velar: /q/ and /ʁ/, and emphatic: /ʕ/) at native Hebrew-speaking pupils in second, third, and fourth grade. Table 3 presents descriptive statistics of mean percentage scores for novel phonemes across tasks for Hebrew L1 pupils, and Table 4 presents descriptive statistics of mean percentage scores for novel phonemes across tasks among Arabic L1 pupils.

Table 3

	2 nd grade M (SD)	3 rd grade M (SD)	4 th grade M (SD)
Guttural (/ħ/)	84.61 (11.65)	81.07 (16.84)	71.04 (21.27)
Uvular-velar (/q/)	71.94 (17.67)	77.60 (11.69)	78.28 (13.66)
Uvular-velar (/ʁ/)	80.28 (15.69)	77.62 (13.36)	63.94 (15.12)
Emphatic (/ʕ/)	79.48 (16.87)	75.55 (14.40)	71.79 (14.44)

Descriptive Statistics: Mean Percentage Scores for Novel Phonemes across Grades—Hebrew L1 pupils

Table 4

	2 nd grade M (SD)	3 rd grade M (SD)	4 th grade M (SD)
Guttural (/ħ/)	87.33 (7.14)	94.11 (7.84)	96.63 (6.40)
Uvular-velar (/q/)	93.66 (6.98)	88.23 (10.00)	97.48 (4.44)
Uvular-velar (/ʁ/)	84.61 (12.66)	94.37 (6.87)	90.17 (9.07)
Emphatic (/ʕ/)	87.18 (8.80)	90.00 (7.20)	97.14 (5.03)

Descriptive Statistics: Mean Percentage Scores for Novel Phonemes across Grades—Arabic L1 pupils

- 22 To explore the effect of mother tongue and grade/age on spelling accuracy of novel phonemes, a series of repeated measure 3-way ANOVA analyses with language and grade as between-subject factors, and phonemes as within-subject factor was performed. The results showed main effect for phonemes $F(3,72) = 3.01, p = .031, \eta^2 = .04$, and for language $F(1,72) = 3.86, p = .026, \eta^2 = .097$, as well as an interaction for phoneme, mother tongue and grade $F(6,72) = 3.92, p = .001, \eta^2 = .09$. Post hoc Bonferroni analysis indicated that native Arabic pupils spelled significantly better than their native Hebrew counterparts in regard to: 1. Novel phoneme /ħ/ in fourth grade. 2. Novel phonemes /ʁ/ and /ʕ/ in third and fourth grades. 3. Novel phoneme /q/ in second and fourth grades. Post hoc Bonferroni analysis also indicated that spelling accuracy of novel phonemes /ħ/ and /ʁ/ was significantly lower for native Hebrew pupils in the fourth grade than in the second grade. Total mean scores for phoneme /q/ (of both groups) were significantly higher than for /ʁ/ in the fourth grade.

Discussion

- 23 The results among native Hebrew pupils show a spelling accuracy mean score of approximately 76% for all tasks in all grades. These results are encouraging. Previous studies conducted by Fragman & Russak (2010) and Russak & Fragman (2014) among native Hebrew pupils learning in a standard Hebrew junior high school found extremely low mean scores for spelling accuracy of novel phonemes in Arabic, ranging from 19% in the 8th and 9th grades to 25% in the 10th grade; and an even lower mean score for general spelling accuracy of first-year words (11%). Moreover, while the results for real-word recognition were approximately 66% from 8th to 10th Hebrew L1 grades, the results, using the identical words in the current study, were 75% for Hebrew L1 second graders of Neve Shalom. In addition, among Hebrew L1 pupils learning in a non-bilingual setting, it was found that scores for auditory discrimination decreased in the tenth grade, after four years of Arabic studies.⁴⁵ One possible explanation suggested by the researchers was the limited exposure to Arabic—only three hours per week from seventh to tenth grade, which is inadequate for meaningful learning of Arabic among Hebrew L1 pupils. However, the fact that scores for auditory discrimination decreased over time suggested that number of hours of exposure to Arabic was not the only factor that affected the low scores of the pupils. Another possible explanation referred to insufficient teacher training. It appeared that most teachers for Arabic in Hebrew schools were (and still are) Hebrew L1 speakers, who admitted being unable to correctly pronounce some of the novel phonemes in Arabic,

and lack the competence of speaking Arabic, therefore they conduct their lessons in Hebrew. This fact suggests that Hebrew L1 pupils learning Arabic as a second/foreign language in the general educational system are hardly exposed to Arabic even during Arabic lessons as a result of poor teacher competence and training. The results of Donitsa-Schmidt *et al.* (2004), which found no improvement in spoken Arabic vernacular proficiency among Hebrew L1 pupils from 4th to 6th grades also indicated insufficient exposure to Arabic (two hours per week), but also referred to the lack of pedagogical mentoring for Arabic teachers, who were not trained to teach spoken Arabic professionally, and did not know how to make the discussion work.⁴⁶ Therefore, most of the pedagogical activities were intuitively implemented by the teachers from one lesson to the other.⁴⁷ The results of another study⁴⁸ among native Hebrew students learning Arabic for academic purposes at a university also supported this notion, indicating significant improvement in oral language performance towards the end of the second year only after specific pedagogical activities for improving listening skills were introduced by the academic staff in the second year of the Arabic Studies programme. In other words, as much as length of exposure is a fundamental factor in the study of an additional language, much attention must also be paid to teacher training and to various aspects of instruction and pedagogical activities during second/foreign language lessons in order to develop specific skills meaningfully.

- 24 Studies of children who are only partially bilingual (like those in the present study) have revealed different levels of second language proficiency among different groups.⁴⁹ However, researchers agree that strong bilingual education programmes⁵⁰ that actively promote learning *of* and *in* L1 and L2 is a prime education setting which facilitates language and literacy and positively influences cognitive development.⁵¹ Therefore, it seems that the explanation for the high scores of the native Hebrew pupils, mainly of the 2nd grade (who are still at the initial stages of language acquisition), stems not merely from the number of hours of exposure to Arabic, but from something much deeper. Being the first of a series of studies focusing on linguistic outcomes in Arabic-Hebrew bilingual setting in Israel, with limited number of participants, it is difficult to point out one factor only that affected the linguistic proficiency of the pupils. Therefore, we assume that the high scores for spelling accuracy of novel phonemes in the current study reflect a combination of several factors upon which the unique model of Neve Shalom is based, i.e. full mutual learning of Arabic and Hebrew L1 pupils in all lessons, and learning both languages, from 1st grade, without translation. The system appears to also have a major effect in regard to acquisition of novel phonemes.
- 25 Furthermore, the results of this study have found no significant difference in spelling accuracy for the four novel phonemes among Hebrew L1 pupils in the 2nd grade. This suggests that the pedagogical model of Neve Shalom enabled a successful linguistic foundation for the 2nd grade pupils involved in this study. In addition, our results also suggest that early exposure to Arabic in the appropriate bilingual setting—as described above—can also enhance linguistic knowledge.
- 26 It should be noted, that the results for spelling accuracy among the Arabic L1 pupils are even higher than those reported in previous studies.⁵² This may also indicate that children who learn an additional language with similar phonological structure and alphabetic orthographic system to their native tongue may have an advantage over their monolingual counterparts in L1 acquisition.⁵³ It also reinforces the significance of

the Neve Shalom model in promoting good relationships between Arabic and Hebrew L1 speakers in Israel⁵⁴ and improves spelling accuracy of novel phonemes in Arabic for Hebrew and Arabic L1 pupils alike.

- 27 It is our belief that native Hebrew speakers should be exposed to Arabic from an early age, in order to acquire equal proficiency in both languages, apart from the socio-political and educational aspects.⁵⁵ The characteristics of bilingual settings should be explored in greater depth in order to consolidate models for L1-L2 learning for Arabic-Hebrew populations to become native-like. The State of Israel, rooted in Middle Eastern cultures, should strive for mutual learning of Arabic and Hebrew. This would reflect the multicultural Israeli society on one hand and embody the intention of bilingual education in Israel on the other.

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NOTES

1. The authors gratefully acknowledge the generosity and kindness of all members of the Neve Shalom/Wahat al-Salam/Oasis of Peace School, who enabled us to conduct our study.
2. MOR-SOMMERFELD, 2009.
3. FEUERVERGER, 2001.
4. FRAGMAN, 2014; FRAGMAN & RUSSAK, 2010; RUSSAK & FRAGMAN, 2014.
5. Majority-minority language relationships in Israel are complicated: Hebrew is the majority language in Israel, but Arabic is the majority language of the Middle East where Hebrew is considered a minority language.
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18. BEKERMANN & HORENCZYK, 2004.
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23. BIALYSTOK, MAJUMDER & MARTIN, 2003.
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25. BAKER, 2011.
26. BRISK & PROCTOR, 2012.
27. LIBERMAN & LIBERMAN, 1990.
28. EHRI, 1993.
29. PATEL, SNOWLING & JONG, 2004.
30. DENTON *et al.*, 2000; DURGUNOGLU, NAGY & HANCIN-BHATT, 1993.
31. DEFIOR, MARTOS & CARY, 2002.
32. JONG & VAN DER LEIJ, 2002; PERFETTI, 2013.
33. YOPP, 1988; TREIMAN, 1992; DURGUNOGLU *et al.*, 1993; McBRIDE-CHANG, 1998.
34. ABU RABIA & TAHA, 2004, 2006; BENTIN & IBRAHIM, 1996; EVIATAR, IBRAHIM & GANAYIM, 2004; IBRAHIM & EVIATAR, 2009, 2012; IBRAHIM, EVIATAR & AHARON-PEREZ, 2002, 2007; SAIEGH-HADDAD, 2003, 2004, 2005, 2007.
35. DA FONTOURA & SIEGEL, 1995.
36. HO & BRYANT, 1999; LI *et al.*, 2002; SO & SIEGEL, 1997; ZHANG & PERFETTI, 1993.
37. KUHARA-KOJIMA *et al.*, 1996.
38. HAMADA & KODA, 2008.
39. RUSSAK & FRAGMAN, 2014.
40. SHIMRON, 2006.
41. RUSSAK & FRAGMAN, 2014.
42. BERGENTOFT, 1994.
43. UHLMANN, 2011.
44. RUSSAK & FRAGMAN, 2014.
45. RUSSAK & FRAGMAN, 2014.
46. UR, 1981.
47. DONITSA-SCHMIDT *et al.*, 2004.
48. FRAGMAN, 2014.
49. BIALYSTOK, 2001.
50. BAKER, 2011.

51. BRISK & PROCTOR, 2012.
 52. ABU RABIA & TAHA, 2006.
 53. BIALYSTOK, MAJUMDER & MARTIN, 2003.
 54. MOR-SOMMERFELD, 2002; BEKERMANN & MAOZ, 2005; SIEGEL & ABU RABIA, 2005; STEPHAN *et al.*, 2004; ZEMBYLAS & BEKERMANN, 2011.
 55. MOR-SOMMERFELD, 2007.
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ABSTRACTS

Previous studies of the Neve Shalom/Wahat al-Salam/Oasis of Peace Bilingual School have focused mainly on the socio-cultural and political aspects of the school. The current study explores spelling accuracy of novel phonemes. Four tasks were created for the 2nd-4th grades for the purpose of this study, all dealing with phonemic aspects and phoneme-grapheme correspondences. Compared with the poor results of previous studies dealing with spelling accuracy among Hebrew L1 pupils in non-bilingual settings, the results of the current study show significantly higher scores in all grades for all the tasks. It is assumed that the most significant factor affecting higher scores as of the second grade is the unique pedagogical setting implemented at Neve Shalom a few years ago. It advocates mutual learning of L1/L2 pupils mentored by L1 teachers without translation and without separate lessons for Hebrew and Arabic speakers, as had been previously accepted at Neve Shalom, and still is in other Arabic-Hebrew settings in Israel. The results of the current study may also indicate that early exposure to Arabic in a bilingual setting also enhances linguistic knowledge.

Les recherches antérieures menées à l'école élémentaire bilingue de Neve-Shalom avaient comme principal objectif l'étude des aspects socio-culturels et politiques de cette école. Cette recherche-ci a examiné l'épellation de phonèmes arabes inconnus parmi des locuteurs natifs de l'hébreu. L'étude comprenait quatre tâches destinées aux élèves de CE1-CM1, permettant d'examiner différents aspects du savoir phonémique et des relations graphème-phonème. En comparaison de recherches semblables au sein de locuteurs natifs de l'hébreu dans des écoles unilingues, les résultats dans cette étude étaient meilleurs dans les quatre tâches. Nous formulons l'hypothèse que la raison principale de ces excellents résultats serait à attribuer à la pédagogie unique de l'école bilingue à cette époque. Les principes de cette pédagogie étaient : un enseignement commun par une enseignante arabophone et une autre hébreophone dans chaque classe, à chaque cours, sans traduction et sans cours de langue distincts (comme cela se pratique habituellement dans la plupart des écoles bilingues). Les résultats de l'étude semblent révéler l'importance de l'exposition précoce à l'arabe dans un environnement bilingue comme moyen de renforcement du savoir linguistique des élèves.

מחקרים קודמים שנעשו בבית הספר הדו-לשוני נזה שלום התמקדו בהיבטים סוציו-תרבותיים ופוליטיים בעיקר. המחקר הנוכחי בדק את סוגיית האיות של פונמות בערבית לא מוכרות בקרב דוברי עברית. המחקר כלל ארבע מטלות שיועדו לתלמידי כיתות ב'-ד', לבדיקת היבטים שונים של ידע פונמי וקשרי גרפמה-פונמה. לעומת מחקרים דומים בקרב דוברי עברית כשפת אם בבתי ספר שאינם דו-לשוניים, התוצאות במחקר זה היו גבוהות יותר באופן מובהק בכל המטלות. החוקרים משערים שהגורם המשמעותי ביותר שתורם להישגים גבוהים אלה היה הפדגוגיה הבית ספרית הייחודית שננקטה באותה עת בבית הספר. עיקרי התפיסה היו: הוראה משותפת של מורות דוברות עברית וערבית בכל כיתה, בכל שיעור, ללא תרגום, וללא שיעורי שפה נפרדים (כפי שמקובל במרבית בתי הספר הדו-לשוניים). ממצאי המחקר עשויים להצביע על חשיבות החשיפה המוקדמת לערבית בסביבה דו-לשונית כאמצעי לחיזוק הידע הלשוני של התלמידים.

INDEX

Mots-clés: École bilingue, épellation, arabe comme LV2

Keywords: Bilingual School, spelling accuracy, Arabic as a second language

בית ספר דו-לשוני, איות, ערבית כשפה שנייה **מילות מפתח:**

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