JSLHR

Research Article

The Role of Emergent Bilingualism in the Development of Morphological Awareness in Arabic and Hebrew

Mila Schwartz,[a] Haitham Taha,[b] Hanan Assad,[c] Ferdos Khamaisi,[a] and Zohar Eviatar[a]

Purpose: The purpose of the present study was to investigate the role of dual language development and cross-linguistic influence on morphological awareness in young bilinguals' first language (L1) and second language (L2). We examined whether (a) the bilingual children (L1/L2 Arabic and L1/L2 Hebrew) precede their monolingual Hebrew- or Arabic-speaking peers in L1 and L2 morphological awareness, and (b) 1 Semitic language (Arabic) has cross-linguistic influence on another Semitic language (Hebrew) in morphological awareness.
Method: The study sample comprised 93 six-year-old children. The bilinguals had attended bilingual Hebrew–Arabic kindergartens for 1 academic year and were divided into 2 groups: home language Hebrew (L1) and home language Arabic (L1). These groups were compared to age-matched monolingual Hebrew speakers and monolingual Arabic speakers. We used nonwords similar in structure to familiar words in both target languages, representing 6 inflectional morphological categories.
Results: L1 Arabic and L1 Hebrew bilinguals performed significantly better than Arabic- and Hebrew-speaking monolinguals in the respective languages. Differences were not found between the bilingual groups. We found evidence of cross-linguistic transfer of morphological awareness from Arabic to Hebrew in 2 categories–bound possessives and dual number–probably because these categories are more salient in Palestinian Spoken Arabic than in Hebrew.
Conclusions: We conclude that children with even an initial exposure to L2 reveal acceleration of sensitivity to word structure in both of their languages. We suggest that this is due to the fact that two Semitic languages, Arabic and Hebrew, share a common core of linguistic features, together with favorable contextual factors and instructional factors.

The purpose of the present study was to investigate the role of dual language development and cross-linguistic influence on morphological awareness in both first language (L1) and second language (L2) of kindergarteners who are emergent Hebrew–Arabic and Arabic–Hebrew bilinguals. Previous studies have suggested that at an early age, young dual-language learners are more sensitive to the phonemic structure (e.g., Bialystok, Majumder, & Martin, 2003; Bruck & Genesee, 1995) and to the arbitrary nature of words (e.g., Ben Zeev, 1977; Eviatar & Ibrahim, 2000) than monolinguals. Thus, the effects of knowing more than one language have been documented on the extremes of linguistic knowledge: the basic building blocks of speech perception on one hand, and very abstract knowledge about the nature of words on the other hand. Our focus is on linguistic knowledge that is more at the center of this continuum–morphological awareness. As detailed below, this type of linguistic skill underlies the development of both semantic and syntactic abilities. To our knowledge, this has not been the focus of previous research on dual language acquisition; the goal of the present research is to begin to explore how early exposure to more than one language affects this crucial skill.

Morphology provides one of the organizing principles of the mental lexicon (Aitchinson, 2001). Processes of morphological analysis underlie lexical growth in preschool and schoolchildren. A considerable proportion of the words that children know are acquired through morphological form-to-meaning mappings (Anglin, 1993). *Morphological awareness* is considered as a kind of metalinguistic awareness skill, which entails the ability to reflect on and manipulate morphemes, the smallest meaningful units in words (Kuo & Anderson, 2006). Although a growing body of research indicates a positive effect of morphological awareness

[a]Oranim Academic College of Education, Israel
[b]Sakhnin College, Israel
[c]University of Haifa, Israel
Correspondence to Mila Schwartz: milasch@bgu.ac.il

Editor: Rhea Paul
Associate Editor: Elizabeth Kay-Raining Bird
Received December 31, 2014
Revision received June 17, 2015
Accepted December 31, 2015
DOI: 10.1044/2016_JSLHR-L-14-0363

Disclosure: *The authors have declared that no competing interests existed at the time of publication.*

on vocabulary knowledge, literacy acquisition, spelling, and reading comprehension (Kieffer & Lesaux, 2012; Lam, Chen, Geva, Luo, & Li, 2011; Nagy, Berninger, & Abbott, 2006; Sparks & Deacon, 2015), the focus of the present research is on oral morphological awareness. This is for two reasons: First, the diglossic situation of Arabic, as described below, complicates the relationship between oral and written language (e.g., Ibrahim, Eviatar, & Aharon-Peretz, 2007; Saiegh-Haddad, 2003); second, our sample participants are in kindergarten, and in Israel, reading is not explicitly taught until first grade.

Thus, as described above, it has been documented that early bilingualism facilitates phonological ability and word knowledge, but direct examination of the effects of bilingualism on morphological awareness is rare in the literature. Therefore, in this study, we examined kindergarteners' awareness of inflectional morphemes. *Inflectional morphemes* are meaningful word units (prefixes, suffixes, and endings) that denote different grammatical categories (e.g., cases, verb tense, gender, plural, comparison, possessiveness). We concentrated on inflectional rather than on derivational morphology, because it has been shown, across several languages (e.g., Berman, 1985; Kuo & Anderson, 2006; Slobin, 1985), that children develop inflectional morphology skills earlier than derivational morphology, and we want to be sure that we can catch the process as it is occurring. According to Slobin (2001), inflectional morphemes are "prototypical grammatical morphemes…affixed to content words…general in meaning, phonologically reduced, and not etymologically transparent" (p. 413). These morphemes mark the grammatical relations of a word within larger structures and are characterized by semantic regularity, predictability, high token frequency, and obligatory applicability (Bybee, 1985).

Early Bilingualism and Metalinguistic Awareness

As mentioned above, children who are exposed to more than one language at an early age have been found to be more sensitive to the phonemic structure of words and to the arbitrary nature of words than age-matched monolinguals (e.g., Ben Zeev, 1977; Bialystok et al., 2003; Bruck & Genesee, 1995). These bilinguals have been characterized as having higher levels of metalinguistic awareness than monolinguals. It has been suggested that multiple language exposure attracts the attention of children to language structure. For example, Bruck and Genesee (1995) found an advantage among the English–French bilinguals in onset-rime segmentation as compared to English-speaking monolinguals in kindergarten. They suggested that bilingualism seems to provide a type of "contrastive linguistic instruction which leads bilingual children to compare and analyze the structural aspects of language in more advanced ways than monolinguals" (p. 308). However, it may be the case that language typology affects the manifestation of metalinguistic abilities: Bialystok et al. (2003) investigated the development of phonological awareness among two groups of bilingual kindergarten and Grade 2 children and a monolingual control group. The bilingual advantage was observed on a phoneme segmentation task for Spanish–English bilinguals, but not for Chinese–English bilinguals. We will return to this point.

Morphological Awareness Among Monolingual and Bilingual Children

One of the first studies on young monolingual children's awareness of inflectional morphology was carried out by Berko (1958) with participants between 4 and 7 years old. The tasks in this study used pseudowords that were similar to real words in English to investigate English inflectional morphology. The children were asked to produce the English plurals, verb tenses, possessives, derivations, and compounds of the nonwords. For instance, the child was shown a picture of a bird and was told that it is a *wug*, and then asked to say the word that refers to two and not one *wug* (i.e., the correct response is *two wug-s*). The results of Berko's study indicate that young children possess knowledge of inflectional categories and can already use them with novel words. Following this, we constructed a measure of identification of diverse inflectional grammar forms in Arabic and Hebrew that was based on nonwords to examine children's morphological awareness. This was done for two reasons. We used a *receptive language task* (identification) rather than a *productive language task*, because our participants are emergent bilinguals who have been exposed to their L2 for less than 9 months. Given that comprehension tends to precede production, we are interested in the earliest differences in sensitivity between bilinguals and monolinguals. We used nonwords in order to bypass variability in lexical knowledge among our groups, allowing us to examine morphological abilities, without the influence of semantic knowledge.

We do not know of any study that has directly compared morphological awareness in spoken language between bilingual and monolingual young children. In the context of bilingual development, Geva and Shafman (2010) focused on the emergence of morphological awareness in an L2. They used a longitudinal design with English-speaking first and second graders in Canada whose exposure to Hebrew L2 was relatively restricted (only 1–2 years in a school context for 2.5 hr per day) and not supported by their home environment. Morphological awareness in Hebrew (L2) was examined using both real-word and nonword inflection identification and an expressive real-word analogy task. The most important finding of this study was that the emergent bilinguals demonstrated an increasing awareness of morphological inflections in L2 across time, together with an ability to recognize and to manipulate them. This ability to utilize analogies and apply morphological rules was evident even when the children's lexical knowledge in L2 was rather limited and their languages came from different typological families (English is an Indo-European language, and Hebrew is a Semitic language). In this context, Saiegh-Haddad and Geva (2008) have argued that the extent of L1–L2 cross-linguistic influence might be dependent on the degree of their typological proximity.

In the current study, we compared the effects of emergent bilingualism on the development of morphological awareness in two typologically close Semitic languages: Hebrew and Arabic (Berman, 1981). Our participants were native speakers of Arabic and of Hebrew who attended a bilingual kindergarten. This allowed us to test the effects of initial exposure to both Arabic and Hebrew as L2 on the development of morphological awareness for specific domains of inflectional morphology in these two Semitic languages. In the following section, we will briefly address relevant typological characteristics of Arabic and Hebrew.

Brief Description of Inflectional Morphology in Arabic and Hebrew and Its Acquisition

Arabic is the definitive case of *diglossia* (Ferguson, 1959). The spoken form (Spoken Arabic) consists of a group of vernaculars, which differ among geographical locations, and is the native language of all Arabic speakers. It currently has no written form. Modern Standard Arabic is the literary form, is used all over the Arabic-speaking world, and is learned in school. This situation affects language development and use among Arabic speakers and has recently received much attention (e.g., Saiegh-Haddad & Joshi, 2014). The children in the current study were exposed to the dialect of Palestinian Spoken Arabic in their kindergartens; our stimuli were constructed on the basis of this dialect, and no literary forms were used.

Both Arabic and Hebrew are Semitic languages and share many characteristics (Berman, 1981; Ravid, 2003; Shimron, 2003). In both, the most common feature of morphology is the root and template form. We examined six grammatical categories that exist in both languages: gender, number (single/plural), dual number, bound possessives, past tenses, and present tenses. These categories were chosen because they are the main inflectional morphological categories characterizing both Arabic and Hebrew. Below we briefly discuss these categories in the two languages with regard to nouns and verbs.

Nouns

In both languages, nouns are inflected for gender and number. More specifically, all nouns in Arabic and Hebrew belong to one of two grammatical genders. In Hebrew, masculine singular nouns are typically unmarked (e.g., *sefer* [book]), whereas feminine singular nouns are usually identified by the suffixes *−ah, −et*, or *−it* (e.g., *sapah* [couch], *rakevet* [train], *zavit* [angle]). In general, masculine nouns are typically pluralized with the masculine plural suffix *−im* (e.g., *sfarim* [books]), and feminine nouns are usually pluralized with the feminine plural suffix *–ot*, which replaces the singular feminine identifier (e.g., *sap−ot* [couches], *rakav−ot* [trains], *zaviy−ot* [angles]). Berman (1985) stated that, between the ages of 2 and 3 years old, Hebrew-speaking children can productively use the plural number on nouns, which are characterized by regular suffixation. In general, the first plural suffix is the masculine *−im*.

In Arabic, as in Hebrew, masculine singular nouns are unmarked (e.g., *walad* [boy]), whereas feminine singular nouns are marked by the suffixes *–a* or *–e* or *aj* (e.g., *gazar −a* [carrot], *ward−e* [flower], *kub−aj*, [cup]). However, in contrast to Hebrew, which distinguishes only between singular and plural noun forms, Arabic has inflections for singular, plural, dual, and collective nouns (Ravid & Farah, 1999, 2009; Saiegh-Haddad, Hadieh, & Ravid, 2012). There are two pluralization mechanisms for nominal forms: "sound" concatenated plural on the one hand and so-called "broken" nonconcatenated plural on the other hand (Wright, 1975). The sound masculine plural suffixes in Palestinian Spoken Arabic is *–i:n* (e.g., *m'alm-i:n* [teachers], MASCULINE), and the feminine suffix in both Palestinian Spoken Arabic and Modern Standard Arabic is *–a:t* (e.g., *m'alm-a:t* [teachers], FEMININE). The second pluralization mechanism is referred to as *broken plurals*, which involves an internal modification of the singular stem (e.g., *walad* [child], MASCULINE, *–wla:d* [children], MASCULINE. FEMININE) in Palestinian Spoken Arabic. Ravid and Farah (1999, 2009) have shown that sound feminine plurals are learned early on, and that children reach mastery by age 3 years. Sound masculine and broken plurals were found to be acquired later and more gradually and were still being acquired among 5 year olds (Ravid & Farah, 2009).

Verbs

In both languages, verbs are richly inflected for tense, person, gender, and number. Both languages have a three-way tense system, including past, present, and future. Finite verbs must agree with their subject in gender, number, and in past and future tenses for person. The inflectional categories are marked either by the addition of stem-external affixes (prefixes and suffixes), typically for gender, number, and person (e.g., in Hebrew: *holex* [is walking], MASCULINE. SINGLE; *holéx−et* [is walking], FEMININE.SINGLE; *haláx−ti* [walked], 1st SG.) and in Palestinian Spoken Arabic: *bimši* [is walking], MASCULINE.SINGLE; *btimši* [is walking], FEMININE.SINGLE; *l'ib-et* [played], 1st SINGLE). In addition, the inflectional category can be marked by stem-internal vowel changes or reduction marking tense (e.g., *in* Hebrew *h**a**l**a**x* [walked] vs. *h**o**l**e**x* [is walking], and in Palestinian Spoken Arabic ***miši*** [walked] vs. *bimši* [is walking]).

In both languages, the intensive acquisition of the verb system begins at age 2 years (Berman, 1985; Omar, 1973). By the age of 3 years, children are able to produce the prime grammatical categories of the verb system and to differentiate between tenses−the present, past, and future (Berman, 1981; Isaaq, 2010). In both Hebrew and Arabic, future tense acquisition is relatively later than present and past and continues to develop throughout elementary school (Berman, 1985). For this reason, the children's awareness of the future tense marking was not included in this study.

Differences Between Arabic and Hebrew in Bound Possessive and Dual Number

We had specific hypotheses about the categories of dual number and bound possessives because they are

characterized by asymmetry in development. In spite of many similarities presented above, these two grammatical categories develop differently in Arabic and in Hebrew. Both Arabic and Hebrew include bound possessives as a grammatical category. In both languages, noun bound-possessive forms are constructed by attaching a bound suffix to the noun's lexical stem (e.g., *beit–i* [house-of-me = my house]). This suffix incorporates the possessive particle with the pronoun form and marks the number, gender, and person of the possessor (Schiff et al., 2011). Both Hebrew and Arabic share several bound suffixes (e.g., the suffix *–i* denoting singular and first person, in Hebrew *axot–i*, in Arabic *oxt–i* [sister-of-me = my sister]; suffix *–o* denoting singular, masculine, and third person, in Hebrew *tik–o*, in Arabic *shantit–o* [bag-of-him = his bag]). However, Hebrew has another way to express possession, using unbound possessives, namely, the usage of the possessive particle *shel* [of] with the pronoun form as in *ha–tik shel–i* [the-bag of-me = my bag]. This form of possessive marking does not exist in Arabic. It is important to note that the frequency of use and rate of acquisition of the possessive forms are different in the two languages. In Hebrew, the bound possessive forms are rare in spoken language and are acquired later, after onset of literacy acquisition at age 6 years and after exposure to formal written registers (Berman, 1985; Levin et al., 2001). At the same time, in Palestinian Spoken Arabic, the use of the bound possessive forms appears as early as 2 years old and characterizes everyday child speech production (Isaaq, 2010).

The second grammatical category that develops in different ways in Arabic and Hebrew is dual number. This category specifies two of what the noun base designates. In both languages, the dual number is presented (e.g., in Hebrew, *yad–ayim* [hand], DUAL; in Palestinian Spoken Arabic *walad–e:n* [boy], DUAL). However, the dual form in Hebrew is used productively only for words that naturally come in pairs and are not used in the plural except in rhetoric, such as body parts (eyes, ears), for time spans (day, week, etc.), and clothes (Berman, 1981). Thus, children are infrequently exposed to this form and are not able to use it productively. At the same time, in Spoken Arabic, this category constitutes a separate inflectional system and is widely used to mark nouns where two of anything is used.

To conclude, although both the Semitic languages have many common grammatical characteristics, there is asymmetry in the development of bound-possessive and dual-number forms. This asymmetry will be discussed in the following section in light of the linguistic acceleration hypothesis.

Linguistic Acceleration

The last two decades have seen a growing body of data showing cross-linguistic influences in diverse morpho-syntactic domains (for a detailed review see Serratrice, 2013). There are three characteristics of possible cross-linguistic influence: First, the domain in which this influence takes place is one where two languages "overlap at the surface level" (Hulk & Müller, 2000; Müller & Hulk, 2001); second, the typological proximity of the two languages is high (Zdorenko & Paradis, 2007, 2008); and third, the age of acquisition of particular linguistic knowledge in the two languages known by the young bilingual differs (Paradis, Crago, & Genesee, 2005/2006).

Most relevant to us, it has been show that when a grammatical structure is acquired at an earlier age in one of the child's languages, the counterpart structure in the other language also emerges earlier in acquisition (Kupisch, 2005; Paradis, Crago, Genesee, & Rice, 2003; Paradis & Genesee, 1996). In the current study, we expected that the asymmetry in the development of bound possessive and dual number forms in Palestinian Spoken Arabic and in Hebrew, together with the higher salience of these categories in Palestinian Spoken Arabic, would have cross-linguistic influence and accelerate their acquisition by (L1) Hebrew-speaking children.

The Present Study

In our study, we focused on two sequential emergent bilingual groups. All of our bilingual children were in the advanced stages of acquiring their L1 (either Arabic or Hebrew). We tested them toward the end of the first year in kindergarten, where they were first systematically exposed (for approximately 9 months) to the other language, and compared them to two monolingual groups (Arabic speakers and Hebrew speakers).

The first question examined in this study was whether the emergent bilingual children (Arabic as L1/L2 and Hebrew as L1/L2) will outperform their monolingual Hebrew- or Arabic-speaking peers in morphological awareness in L1 and L2. On the basis of Berko's (1958) method of examining morphological awareness among kindergarteners, we presented our participants with nonwords that were similar in structure to familiar words, to assess their morphological awareness. However, differently from Berko's method, we asked the children to identify the correct morphological form rather than to produce it. The nonwords represented six main inflectional morphological categories characterizing both languages: gender, number (single/plural), dual number, bound possessives, past tenses, and present tenses. Given the previous report that early emergent bilinguals showed relatively high sensitivity to L2 morphological categories (Geva & Shafman, 2010), we predicted that bilingual children would show an advantage in morphological awareness over monolingual children, even after less than 1 year of L2 exposure in school.

The second research question was whether there is cross-linguistic influence of Arabic on Hebrew in categories such as bound possessives and dual number. We predicted that bilingual children speaking Hebrew (L1) would outperform their monolingual Hebrew-speaking peers in these two categories in Hebrew, because of their prominence in Arabic. In addition, we predicted that the bilingual children speaking Arabic (L1) would outperform their bilingual (L1) Hebrew-speaking peers in these two categories in both

target languages, whereas these groups will perform comparably on the other four categories (gender, number [single/plural], past tense, and present tense) in both languages.

Method

Participants

A sample of 93 typically developing 5 and 6-year-old children participated in the study. The sample included two monolingual and two emergent bilingual groups: 26 (L1) Hebrew-speaking children from monolingual kindergartens; 24 (L1) Arabic-speaking children from monolingual kindergartens; 18 (L1) Hebrew-speaking children from bilingual kindergartens (hereafter [L1] Hebrew-speaking bilinguals); and 24 (L1) Arabic-speaking children from bilingual kindergartens (hereafter [L1] Arabic-speaking bilinguals). Children with developmental problems were not included in the sample.

The monolingual Hebrew-speaking and Arabic-speaking children were selected from five kindergartens from midlevel socioeconomic neighborhoods in the north of Israel. All emergent bilingual children were recruited from three Hebrew–Arabic bilingual kindergartens. The bilingual kindergartens were established around 10 years ago in Israel by the Center for Bilingual Education and were an integral part of the bilingual schools. The teaching staff in these kindergartens represent both communities, Arab and Jewish, equally, with each class having two classroom teachers—one Arab and one Jewish. The languages are used concurrently and are not separated by time or by space. Each teacher is responsible for her native language, and in the flow of the daily routine, it is not really possible to separate out the use of the two languages. Code switching occurs because the Arabic speaking teachers are balanced bilinguals and the Hebrew-speaking teachers have a basic knowledge of Arabic. The main objective of this dual language program is to increase intergroup communicative competence and cultural awareness. Achieving a balance between the two languages is critical because it is the key to students' integration within the classroom. However, due to the discrepancy in the status of majority and minority languages, this is not easy. Thus, as was reported by Schwartz and Asli (2014), both the Arabic-speaking and the Hebrew-speaking teachers run an explicit language policy aimed to promote the social status of the Arabic language and thus use it somewhat more than they use Hebrew. The teachers share the educational tasks, responsibilities, and teaching in each class. The children spend 8 hr per day (from 8 a.m. to 4 p.m.), and 4 hr a day for one additional day a week in the schools. Thus, exposure to both languages was relatively intensive. Regarding language policy, these settings aimed to challenge the segregated monolingual and monocultural education system in Israel and adopted the two-way program of dual language development aimed to increase intergroup communicative competence and cultural awareness (Freeman, 2007).

Participant selection was conducted in two stages. First, consent for the children's participation in the study was given by parents. The consent forms were obtained through direct communication with parents during parent–teacher meetings in the middle of the academic year. All parents were asked to complete the consent form with a brief questionnaire. The questionnaire included information about the child's sociocultural background (parents' education), the child's birthday, whether there were any problems with language acquisition, and the child's age at onset of preschool education (all of the children had gone to monolingual preschools from approximately age 2 years). The parents were asked about their language practices at home regarding communication with their children (language/s used in parent–child conversations). All of the parents of the bilinguals with Arabic as L1 reported that the children were exposed to Hebrew at home (mostly via television), whereas none of the parents of the bilinguals with Hebrew as L1 reported exposure to Arabic at home (for more details about L2 input at home in this population, see Schwartz, Moin, & Klayle, 2013). In addition, the Arabic-speaking parents were asked questions concerning patterns of their children's exposure to the two varieties of Arabic: Spoken Arabic and Modern Standard Arabic. There were no significant differences in overall use of the two varieties of Arabic between the monolingual and bilingual native Arabic speakers. Table 1 shows selected participant characteristics.

On the basis of the parents' reports, we selected monolingual children who met the exclusionary criteria of monolingual development at home and at school (apart from Arabic-speaking children's nonsystematic exposure to Modern Standard Arabic), and the bilingual children who were emergent sequential bilinguals. No children with developmental delay in language acquisition were included in the sample.

It can be seen from Table 1 that no differences were found in parental education between the monolingual groups and between the bilingual groups. However, parents who chose to send their children to bilingual schools had slightly but significantly more years of education than parents who did not, irrespective of whether their L1 was Hebrew or Arabic. Therefore, all of the results were analyzed with parental education as a covariate.

Materials

Morphological Awareness Test

The Morphological Awareness Test (Schwartz, Khamaisi, Taha, & Eviatar, 2013; after Berko, 1958, and Shatil, 1995) was developed especially for this study. The stimuli were constructed by using nonexistent triconsonantal roots that conform to the phonotactic constraints of each language and inserting these roots into existing word forms according to the morphological patterns of each language. The test in both languages, Arabic and Hebrew, included 36 pairs of nonwords that represent the six target grammar categories (gender, number [single/plural], dual number, bound possessives, past tenses, and present tenses). Each category was measured by six items (see Appendixes 1–2). All of the 36 items in each test were ordered randomly.

Table 1. Background variables on the participants, presented in *M* (*SD*).

Group variables	Monolingual Hebrew (L1) *n* = 26	Monolingual Arabic (L1) *n* = 24	Bilingual Hebrew (L1) *n* = 18	Bilingual Arabic (L1) *n* = 25	*F*/χ2
Age (months)	70.77 (3.75)	71.33 (3.24)	71.33 (3.20)	71.15 (3.43)	0.14
Gender (boys:girls)	13:13	12:13	7:11	17:8	4.01
Mother's education (in years)	14.3^{b} (2.13)	13.7^{b} (1.9)	15.9^{a} (1.6)	15.4^{a} (2.0)	5.98***
Father's education (in years)	13.7^{b} (2.17)	13.2^{b} (1.85)	16.2^{a} (2.51)	15.3^{a} (2.39)	7.91***

Note. Different superscripts (a, b) indicate a statistically significant difference between the groups; groups sharing a common superscript do not differ significantly.

***$p < .001$.

All of the children who performed the test in each language received the same random order. Internal consistencies of the Hebrew and Arabic versions of this task were $\alpha = .71$, and $\alpha = .82$, respectively.

A pilot in both target languages was conducted with three children from the bilingual kindergartens and three children from the monolingual kindergartens who were not included in the study sample. The purpose of the pilot was to see how children coped with the test and its instructions. At the end of the pilot session, certain items to which all participants had responded incorrectly were excluded from the test. In addition, on the basis of the children's questions and comments, we clarified, extended, and simplified the test instructions. Then, four judges—speech therapists and linguists in Arabic and Hebrew—rated the test items for similarity with the morphological and phonotactic characteristics of words in Arabic and Hebrew. For the Hebrew stimuli, there was initially 90% agreement, so three items were changed, and for the Arabic stimuli, there was initially 88% agreement, so five items were changed, such that there was 100% agreement among the judges for the final list in both languages.

Procedure

The data were collected in each kindergarten at the end of the academic year (during June 2013). At this time, the emergent bilingual children had received 9 months of exposure to L2 in addition to their L1. Participants were tested individually in a quiet room at their schools. The data reported below were collected together with tests of phonological awareness and fast-mapping abilities, which are reported elsewhere (Eviatar, Taha, Cohen, & Schwartz, 2016). To reduce testing pressure, the bilingual children were tested in two separate sessions, one for each language, each lasting approximately 20 min. The order of test language (Arabic vs. Hebrew first) was counterbalanced across the bilingual children. At each data collection time, the emergent bilingual children were assessed in L1 or L2, with a 2-week break between the sessions. The testing of the monolingual participants took place at the same period of time as the assessment of the emergent bilingual children. On all tests in each target language, children were given examples and feedback before testing. The instructions for each testing session were given in the child's L1. The child was told, "Listen to the pair of funny words I will say to you now, and repeat them after me." The child was then asked to identify the word that suits a particular category (e.g., in Arabic: which word, *sagir/sgir–e*, refers to a girl, and in Hebrew, which word *kahaš/kahš–á* refers to a girl. The research testers were master's degree students with an academic background in child education. Native Hebrew and Arabic speakers administered the tasks in Hebrew and in Arabic, respectively.

Results

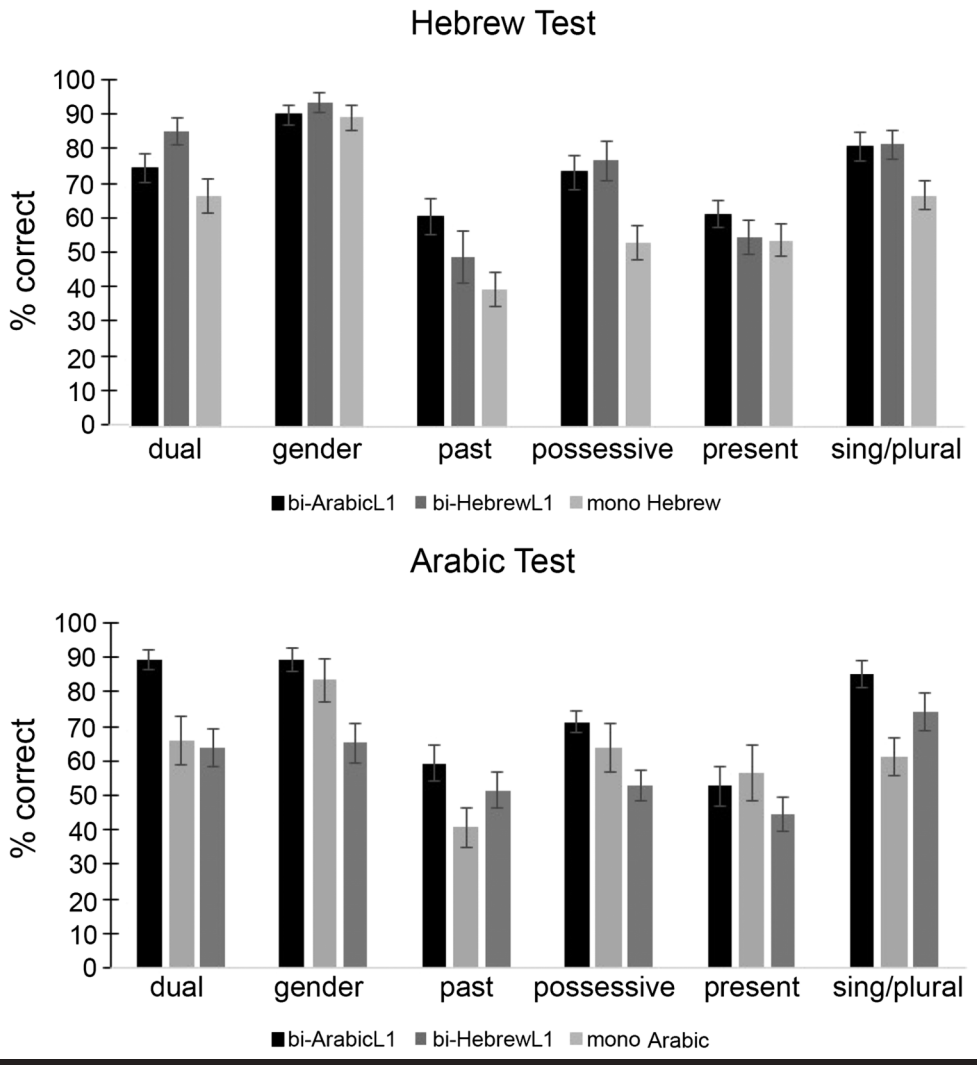
As mentioned above, there was a significant difference in parental education between the monolingual and bilingual groups. Although none of our children came from low socioeconomic status homes, and although the majority of the parents in both groups had at least some college education, and all had completed high school, we attempted to control for this difference. First of all, we examined whether there is a relationship between parental education and the scores on our morphology tests. The results showed that in both languages, the correlation between the scores of the children and parental education was not significant (Hebrew test $r = .15$; Arabic test $r = .21$). In addition, as mentioned above, we computed all of our comparisons using parental education as a covariate, such that the differences we reported are all beyond those explained by this factor.

For each language, we performed a mixed 3×6 generalized linear model analysis with group (bilingual groups with Arabic as L1/L2 and Hebrew as L1/L2) and the appropriate monolingual group for each language (Hebrew speakers for the analysis of scores on the Hebrew test, and Arabic speakers on the scores of the Arabic test) as a between-subjects factor, and morphological category (gender, number [single/plural], dual number, bound possessives, past tenses, and present tenses) as a within-subjects factor. The percentage of correct responses in each category (out of six) was the dependent variable.

Hebrew Task

This analysis compared the performance of the two bilingual groups and the monolingual Hebrew speakers. The

Figure 1. Top Panel: Performance of the two bilingual groups and the monolingual Hebrew speakers in each of the six morphological categories in the Hebrew test. Significant differences between the groups are listed in Table 2. Error bars are standard errors. Bottom Panel: Performance of the two bilingual groups and the monolingual Arabic speakers in each of the six morphological categories in the Arabic test. Significant differences between the groups are listed in Table 3. Error bars are standard errors.



overall analysis revealed a small but significant interaction between group and category, $F(10, 330) = 1.85$, $p = .05$, $\eta_p^2 = .05$. This pattern can be seen in the top panel of Figure 1. The main effect of category was significant, $F(5, 330) = 36.27$, $p < .0001$, $\eta_p^2 = .35$. The main effect of group was also significant, $F(2, 65) = 6.73$, $p = .002$, $\eta_p^2 = .17$.

It can be seen in the top panel of Figure 1 that the groups patterned differently for the different morphological tasks. Therefore, planned comparisons of the effects of group for each type of morphological category were performed. For each category, the simple main effect of group was computed, and then planned pairwise comparisons were computed between the three groups, using the general linear model with parental education as a covariate. The statistical results are presented in Table 2. It can be seen for the gender and present tense categories, all of the groups performed similarly, much better in the gender task than in the present tense (reflecting differences in acquisitional timelines). For the bound possessive and singular/plural categories, the bilingual groups did not differ from each other, and both outperformed the monolingual Hebrew speakers. In the dual number category, among Hebrew speakers, the bilinguals outperformed the monolinguals, whereas Arabic speakers did not differ from either of the native Hebrew-speaking groups.

To summarize, in the test of morphological awareness in Hebrew, the bilingual groups performed equivalently and better than monolingual Hebrew speakers in the singular/plural and bound possessive categories. Among the native Hebrew speakers, the bilinguals also performed better than monolinguals in the dual number category. It is important to note that the bilinguals with Arabic as L1

Table 2. Effects of group in each morphological category in the Hebrew test.

Groups	Dual number	Gender	Past tense	Present tense	Bound possessive	Singular/plural
Main effect of group						
$F(2, 65)$	3.87	ns	3.80	ns	6.42	4.17
p	.026	.45	.027	.414	.003	.02
η_p^2	.11		.10		.16	.12
Bilinguals (L1 Arabic vs. L1 Hebrew) (1, 40)	ns	ns	ns	ns	ns	ns
p	.09	.29	.25	.28	.38	.92
Bilinguals L1 Hebrew vs. Hebrew monolinguals						
$F(1, 42)$	3.88	ns	ns	ns	8.82	7.13
p	.05	.43	.23	.48	.005	.01
η_p^2	.086				.18	.15
Bilinguals L1 Arabic vs. Hebrew monolinguals						
$F(1, 48)$	ns	ns	6.68		7.94	6.33
p	.35	.93	.01	.41	.007	.015
η_p^2			.12		.14	.12

Note. Parental education was used a covariate in all comparisons. ns = p value not significant.

always performed as well or better than the monolingual Hebrew speakers.

Arabic Task

This analysis compared the performance of the two bilingual groups and the monolingual Arabic speakers, using parental education as a covariate. The overall analysis revealed a significant interaction of group by category, $F(10, 320) = 2.84$, $p < .005$, $\eta_p^2 = .08$. This pattern can be seen in the bottom panel of Figure 1. The main effect of category was significant, $F(5, 320) = 22.67$, $p < .0001$, $\eta_p^2 = .26$, as was the main effect of group, $F(2, 63) = 5.95$, $p < .005$, $\eta_p^2 = .16$.

As for the Hebrew test, we computed pairwise comparisons to examine the differences between the groups in each of the morphological tasks. These results are presented in Table 3. It can be seen that in the dual number and past tense categories, the bilinguals whose L1 is Arabic performed better than the other two groups, whereas bilinguals whose home language is Hebrew performed equivalently to the monolingual Arabic speakers. In the gender and bound possessive categories, native Arabic-speaking bilinguals performed better than the native Arabic-speaking monolinguals, whereas the bilinguals with Hebrew as L1 performed in between these groups, not differing significantly from either one. In the present tense condition, the bilingual groups did not differ from each other and neither did the two groups of children whose home language was Arabic. The bilinguals with Hebrew as L1 performed better than the monolingual Arabic speakers. In the singular/plural categories, the children whose home language was Arabic (both bi- and monolingual) performed better than the children whose home language was Hebrew.

Table 3. Effects of group in each morphological category in the Arabic test.

Groups	Dual number	Gender	Past tense	Present tense	Bound possessives	Singular/plural
Main effect of group						
$F(2, 65)$	7.36	5.35	3.41	ns	4.29	7.13
p	.001	.007	.039	.367	.018	.002
η_p^2	.19	.15	.10		.12	.18
Bilinguals (L1 Arabic vs. L1 Hebrew)						
$F(1, 40)$	9.85	ns	6.29	ns	ns	15.83
p	.003	.43	.016	.58	.39	.0003
η_p^2	.20		.14			.28
Bilinguals L1 Arabic vs. Arabic monolinguals						
$F(1, 46)$	7.74	9.42	ns	ns	10.59	ns
p	.007	<.004	.77	.31	.002	.56
η_p^2	.14	.17			.19	
Bilinguals L1 Hebrew vs. Arabic monolinguals						
$F(1, 39)$	ns	ns	ns	5.63	ns	6.03
p	.94	.108	.09	.02	.21	.018
η_p^2				.13		.13

Note. Parental education was used as a covariate in all of the comparisons. ns = p value not significant.

To summarize, the bilingual groups performed equivalently in three out of the six categories. Among the children with Arabic as L1, bilinguals outperformed the monolinguals also in three out of the six categories. Bilinguals with Hebrew as L1 performed as well or better than the monolingual native Arabic speakers in all the categories except for the singular/plural items.

Effects of Language

To explore the effects of language experience and of the languages themselves, we computed two separate analyses. The first compared the two bilingual groups in both of their languages. This three-way analysis used group (bilingual groups with Arabic as L1/L2 and Hebrew as L1/L2) as a between-subjects factor and test language (Hebrew vs. Arabic) and morphological category as within-subjects factors. The generalized linear model analysis revealed a small but significant three-way interaction, $F(5, 205) = 3.23$, $p < .01$, $\eta_p^2 = .07$. As shown in Tables 2 and 3, this is because the bilingual groups did not differ in their performance in the Hebrew test in any morphological category (see Table 2), whereas in the Arabic test, native Arabic speakers scored higher than native Hebrew speakers in the dual number, past tense, and singular/plural tasks (see Table 3). The two-way interaction of group and test language was also significant, $F(1, 205) = 5.27$, $p < .05$, $\eta_p^2 = .11$, because the bilinguals with Arabic as L1 performed equivalently in the two languages (Arabic $M = 74.55\%$, $SD = 25.37$; Hebrew $M = 73.44\%$, $SD = 23.10$), whereas the bilinguals with Hebrew as L1 performed better on the Hebrew test ($M = 73.46\%$, $SD = 26.58$) than on the Arabic test ($M = 61.88\%$, $SD = 30.15$). The main effect of morphological category was also significant, $F(5, 205) = 16.91$, $p < .0001$, $\eta_p^2 = .29$. Last, the main effects of language and group were not significant ($p > .05$).

The second analysis compared the two monolingual groups, each performing in their native language. This 2 × 6 mixed analysis revealed a significant two-way interaction, $F(5, 240) = 4.33$, $p < .001$, $\eta_p^2 = .08$, and a significant main effect of category, $F(5, 240) = 17.31$, $p < .0001$, $\eta_p^2 = .26$. The main effect of group was not significant, $p > .6$. It can be seen in Figure 2 that these effects were due only to differences between the groups in the gender and past tense categories. In the gender category, the difference between the groups was significant, $F(1, 47) = 11.36$, $p < .001$, $\eta_p^2 = .19$. In the past tense category, it was marginal, $p = .08$. Differences in all of the other categories were not significant.

Discussion

The aim of the present study was to contribute to the existing research in the domain of morphological awareness. We predicted that morphological awareness can be applied cross-linguistically. This cross-linguistic influence might be in the form of acceleration of morphological awareness and might be related to the typological proximity between the languages.

Our first research question asked whether young emergent bilinguals would show better performance than monolinguals in both Hebrew and Arabic. We found that emergent sequential bilinguals with Arabic as L1 or with Hebrew as L1 performed significantly better than Hebrew-speaking monolinguals on a morphological awareness task in Hebrew, whereas the two bilingual groups did not differ from each other. In the Arabic test, among children for whom Arabic is L1, the bilinguals outperformed the monolinguals overall. The bilingual children with Hebrew as L1 performed as well as monolingual Arabic speakers in five out of the six morphological categories. Our two bilingual groups interestingly differed in that the children whose home language was Arabic performed equivalently in their two languages, whereas children whose home language was Hebrew performed better in their home language than in their second language.

Our second research question focused specifically on two grammatical categories that are frequent in Arabic and infrequent in Hebrew (bound possessive and dual number). We found evidence for cross-linguistic influence of morphological awareness from Arabic to Hebrew in these two morphological categories. All of these findings are discussed in detail below.

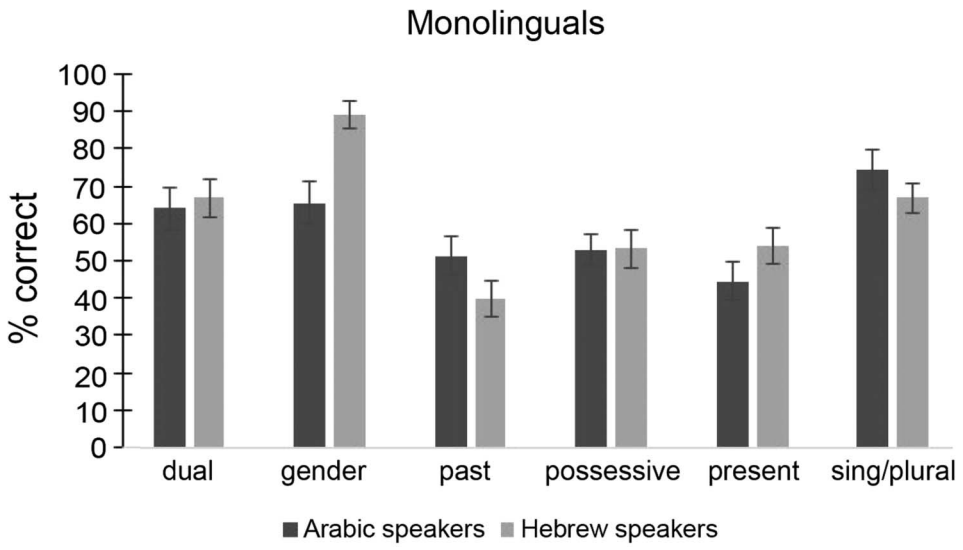
First Research Question: The Bilingual Advantage in Morphological Awareness

It has been suggested that being more or less equally proficient in both languages is a critical condition for gaining from the advantages of bilingualism (Cummins, 1976; Peal & Lambert, 1962). In fact, Cummins (1976) claimed that there exists a critical threshold of L1 and L2 ability that must be achieved before the positive effects of bilingualism can be perceived. As can be seen, our data are not consistent with this claim because we report evidence of the bilingual advantage in the case of young emergent bilinguals whose L2 competence is still quite low and who cannot be considered as "balanced bilinguals." How can we integrate this finding with these previous claims? We believe that the answer includes the interaction of major factors that affect the development of morphological awareness: the linguistic relationship between the languages, in terms of linguistic typology, and the psycho/sociolinguistic contexts in which the two languages interact.

Language Typology

As detailed in the Introduction, there is a relatively high degree of proximity in grammatical structure between the two target Semitic languages and even complete overlap in some grammatical inflections, such as the similar suffixation of bound possessives (i.e., *–i* for first person or *–o* for third person MASCULINE, and zero suffix of masculine singular nouns, whereas feminine singular nouns are marked by the suffix *–a*). These similarities between the languages might flag the attention of the children to the parsing of words into separate morphemes, thus facilitating their ability to compare and analyze word structure in more advanced

Figure 2. Comparison of the two monolingual groups in their performance of the morphological task. Each group performed in their native language. Error bars are standard errors.



ways than their monolingual peers. This explanation is consistent with the research by Lauchlan, Parisi, and Fadda (2012). In their two samples, the Scottish Gaelic–English bilinguals were relatively more balanced than the Sardinian–Italian bilinguals. However, both groups revealed the bilingual advantage. It may be that, similarly to our case, the typological proximity of Sardinian and Italian compensated for relatively lower levels of balance in language ability.

The hypothesis that language proximity can facilitate cross-linguistic morphological awareness is supported also by a paper by Snyder and Barzilay (2008), who reported an account of computer learning, in the context of a bilingual or monolingual environment. The study used a nonparametric Bayesian model that simulated morpheme segmentations of 6,139 parallel short phrases in Arabic, Hebrew, Aramaic, and English, as well as identification of the cross-language morpheme patterns. It is of interest that the authors reported that learning morphological models of two languages simultaneously (a simulation of bilingual acquisition) was more efficient than learning each language separately (a simulation of monolingual acquisition). Most important for the point that we are making here is that this higher efficiency was more striking between two similar languages (e.g., Hebrew and Arabic) than when the languages belonged to different typologies (e.g., Hebrew and English).

This effect of language typology has been reported previously, in the realm of phonological awareness. Bialystok et al. (2003) reported a bilingual advantage in a sample of children who knew two relatively similar languages, Spanish and English, but no such advantage in a sample of children who knew typologically distant languages such as Chinese and English.

Psycho/Sociolinguistic Contexts

We assume that the context of bilingual education might also play a facilitating role and therefore contribute to the bilingual advantage. Recent research on children's metatalk and language play in L2-immersion classrooms has shown that grammatical features of L2 are made more salient as a result of joyful language play or metatalk during peer interaction (Broner & Tarone, 2001; Cekaite & Aronsson, 2005). In this context, Broner and Tarone (2001) noted that "the emotional excitement that comes with language play may simply make the L2 discourse more noticeable, and thus more memorable" (p. 375).

In addition, we assumed that the specific language strategies applied within bilingual kindergartens might promote our children's awareness of word structure. In particular, in the target Hebrew–Arabic bilingual kindergartens, Schwartz and Asli (2014) found that the bilingual teachers frequently stressed cognates to stimulate the children's ability for development of *cross-linguistic awareness*. This is defined as the ability to compare explicitly between the target languages and the ability to identify similarities and differences between the languages (Jessner, 2006). The teachers focused on cognates and highlighted similar roots of words in L1 and L2, and therefore, the shared origin of the Hebrew and Arabic languages. In addition, the teachers addressed structural similarities and differences between words in Arabic and Hebrew. This teachers' mediation might promote the bilinguals with Hebrew as L1 awareness of the bound possessive forms in Hebrew.

Effects of Home Language

We found asymmetry of the bilingual advantage in the two bilingual groups. As shown in Figure 2, on the Hebrew test, children with Arabic as L1 performed as well as children with Hebrew as L1. However, on the Arabic test, children for whom Arabic is L1 performed significantly better than children for whom Arabic is L2. This asymmetry

might be explained from both psycholinguistic and sociolinguistic perspectives. From a psycholinguistic perspective, these results might be interpreted regarding the degree of grammar complexity in Arabic versus Hebrew, as mentioned in the Introduction. Although Hebrew and Arabic utilize similar morphological processes in word formation (Ravid, 2003; Shimron, 2003), some domains of Hebrew inflectional morphology are less complex than Arabic inflectional morphology, as shown in the case of numbers and pluralization (Ravid & Farah, 1999). This relatively higher degree of grammar complexity might favor the (L1) Arabic-speaking emergent bilinguals' awareness of basic inflectional morphological rules and enhance their ability to recognize the grammatical morphemes that mark Hebrew inflections. The bilinguals with Hebrew as L1 are relatively less exposed to complex morphology, and thus do not have this additional source of knowledge. This kind of asymmetry has been reported for phonological awareness by Loizou and Stuart (2003), who showed that L1 complexity can affect metalinguistic awareness in L2. They found a bilingual enhancement effect on phonological awareness tasks when bilingual (Greek [L1]–English [L2]) 5-year-old children were exposed to an L2 (English), which is phonologically simpler than Greek.

From a sociolinguistic perspective, the asymmetry might be attributed to relatively higher levels of exposure of Arabic-speaking children to Hebrew, which is the majority language of the country, than the exposure of Hebrew-speaking children to Arabic, which is a minority language in the country (Amara, 2002). This argument is supported by a recent study by Schwartz, Moin, and Klayle (2013), who examined this same population and asked parents about the multicultural effects of the bilingual environment on the children. The Arabic-speaking parents reported that their children watched more television in Hebrew, whereas the Hebrew-speaking parents did not report more exposure to Arabic at home.

Second Research Question: A Scrutiny of Morphological Domains and Evidence of Acceleration

We hypothesized that we would see cross-linguistic facilitation in the two cases in which Arabic morphology is more complex than Hebrew morphology (duality and bound possessive). Our data support this hypothesis and show that exposure to Arabic accelerates the Hebrew development of Hebrew-speaking children. We attribute this pattern of data to the higher saliency and frequency of use of the target grammatical morphemes in Palestinian Spoken Arabic than in Hebrew. In our case, the direction of influence is from the nondominant language to L1. Thus, we attribute this effect to the typological proximity between the languages and the saliency of morphological elements in the metalinguistic awareness of the children. This finding converges with the report by Hulk and Müller (2000), who showed cross-linguistic influences in both directions. Our data also support the acceleration hypothesis of Paradis and Genesee (1996). Paradis and Genesee (1996) suggested three potential outcomes of linguistic interaction in bilingual development: delay, facilitation/acceleration, or transfer. The evidence for the acceleration hypothesis was found in the morpho-syntactic domain (Kupisch, 2005; Paradis & Genesee, 1996). Thus, Paradis and Genesee (1996) reported an accelerating effect of the earlier acquired English pronoun system on acquisition among bilingual French–English-speaking children with specific language impairment. Our data extending the findings to the domain of inflectional morphology and to two less studied languages: Arabic and Hebrew.

Although we did not predict this, in the Hebrew test, we also found that both bilingual groups showed superiority over the monolinguals in the single/plural number category. We suggest that this may be due to the overall complexity of number categories in Arabic. In contrast to Hebrew, which distinguishes only between singular and plural nouns, Arabic has inflections for singular, plural, dual, and collective nouns (Ravid & Farah, 1999, 2009; Saiegh-Haddad et al., 2012). There are two pluralization mechanisms for nominal forms: sound concatenated plural on the one hand and so-called broken nonconcatenated plural on the other (Wright, 1975). This added complexity may have made these morphemes more salient in Hebrew for our emergent bilinguals and supported more accurate performance on our test.

Conclusions, Limitations, and Further Research Directions

The most important implication of our findings is that children with even an initial (although intensive) exposure to a second language reveal acceleration of sensitivity to word structure in both of their languages. Thus, even though they spend fewer hours of the day using their home language, they still show an advantage over monolingual children. To be specific, we have shown that close contact between two Semitic languages, Arabic and Hebrew, during one academic year, resulted in better performance in a test of morphological awareness than monolinguals in L1 and in some categories of L2. We suggest that this is because the languages share a common core of linguistic features, together with favorable contextual factors (bilingual kindergarten) and instructional factors (e.g., stressing similarity between the languages in kindergartens).

This similarity between the languages can also be seen as a limitation of our study because we do not know whether the facilitation effect of dual language development can be ascribed to the role of the bilingualism per se, or to the role of typological proximity and partial structural overlap in a specific language dyad. The current study cannot provide the answer because to examine this question directly, one would focus on language dyads with and without typological and genetic proximity (e.g., Arabic and Hebrew vs. Russian and Hebrew). This is being studied now in our lab.

A second limitation is that we have not looked at the possible field application of this bilingual advantage in

morphological awareness—namely whether this advantage would have a possible effect on literacy acquisition, spelling, and reading comprehension in L1 and L2 (Lam et al., 2011; Nagy et al., 2006). We are currently in the process of examining the course of literacy acquisition in first grade among the kindergarteners who were tested in the present study.

The third limitation of our study is the lack of an independent measure of language ability in L1. Although none of the children were diagnosed with any developmental language disorder or even slowness, we cannot rule out the possibility that children of parents who send them to a bilingual school may have arrived in kindergarten with higher linguistic abilities than children of parents who did not. This characteristic of the population we study is always a possible confound, even when nonverbal abilities are equated between the groups.

To summarize, our findings converge with others that have shown that being exposed to another language in childhood can result in advantages in linguistic skills in both L2 and L1. This has previously been shown in phonological awareness and in awareness to the arbitrary nature of words, and we have extended this finding to morphological awareness in two typologically related languages. Our results also support the hypothesis that cross-language influence tends to occur for linguistic aspects that are asymmetrical in complexity between the languages—going from the more complex to the less complex language. Last, we have shown that high proficiency in both languages in not necessary for this advantage to be seen.

Acknowledgments

Our grateful thanks go to the Director of Educational Programs, Center for Jewish-Arab Education in Israel "Hand in Hand," Dr. Inas Deeb, and to the School Principal of the Bridge over the Wadi (Gesher al HaWadi), Dr. Hasan Agbaria, and the School Principal of the Jerusalem School, Nadia Kinani. We would also like to thank the teachers in the kindergartens, for their unlimited support and fruitful collaboration, and the children for their active participation.

References

Aitchinson, J. (2001). *Language change: Progress or decay?.* Cambridge, United Kingdom: Cambridge University Press

Amara, M. (2002). The place of Arabic in Israel. *International Journal of the Sociology of Language, 158,* 53–68.

Anglin, J. M. (1993). Knowing versus learning words. *Monographs of the Society for Research in Child Development, 58,* 176–186.

Ben Zeev, S. (1977). The influence of bilingualism on cognitive strategy and cognitive development. *Child Development, 48,* 1009–1018.

Berko, J. (1958). The child's learning of English morphology. *Word, 14,* 150–177.

Berman, R. A. (1981). Language development and language knowledge: Evidence from the acquisition of Hebrew morphophonology. *Journal of Child Language, 8,* 609–626.

Berman, R. A. (1985). Acquisition of Hebrew. In D. I. Slobin (Ed.), *The crosslinguistic study of language acquisition* (pp. 255–371). Hillsdale, NJ: Erlbaum.

Bialystok, E., Majumder, S., & Martin, M. M. (2003). Developing phonological awareness: Is there a bilingual advantage? *Applied Psycholinguistics, 24,* 27–44.

Broner, M., & Tarone, E. (2001). Is it fun? Language play in a fifth-grade Spanish immersion classroom. *The Modern Language Journal, 85,* 364–379.

Bruck, M., & Genesee, F. (1995). Phonological awareness in young second language learners. *Journal of Child Language, 22,* 307–324.

Bybee, J. (1985). *Morphology: A study of the relation between meaning and form*. Amsterdam, the Netherlands: John Benjamins.

Cekaite, A., & Aronsson, K. (2005). Language play, a collaborative resource in children's L2 learning. *Applied Linguistics, 26,* 169–191.

Cummins, J. (1976). The influence of bilingualism on cognitive growth: A synthesis of research findings and explanatory hypothesis. *Working Papers on Bilingualism, 9,* 1–43.

Eviatar, Z., & Ibrahim, R. (2000). Bilingual is as bilingual does: Metalinguistic abilities of Arabic-speaking children. *Applied Psycholinguistics, 21,* 451–471.

Eviatar, Z., Taha, H., Cohen, V., & Schwartz, M. (2016). *Word learning by young sequential bilinguals: Fast mapping in Arabic and Hebrew.* Manuscript submitted for publication.

Ferguson, C. A. (1959). Diglossia. *Word, 15,* 325–340.

Freeman, R. (2007). Reviewing the research on language education programs. In O. Garcia & C. Baker (Eds.), *Bilingual education: An introductory reader* (pp. 3–18). Clevedon, United Kingdom: Multilingual Matters.

Geva, E., & Shafman, D. (2010). Rudiments of inflectional morphology skills in emergent English–Hebrew biliterates. In D. Aram & O. Korat (Eds.), *Literacy development and enhancement across orthographies and cultures* (pp. 191–204). New York, NY: Springer.

Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition, 3,* 227–244.

Ibrahim, R., Eviatar, Z., & Aharon-Peretz, J. (2007). Metalinguistic awareness and reading performance: A cross-language comparison. *Journal of Psycholinguistic Research, 36*(4), 297–317.

Isaaq, R. (2010). *The development of lexical and morphological complexity in the language of a two-year old Arabic-speaking child* (Unpublished master's thesis). Tel Aviv University, Tel Aviv, Israel.

Jessner, U. (2006). *Linguistic awareness in multilinguals: Cognitive aspects of third language learning*. Edinburgh, Scotland: Edinburgh University Press.

Kieffer, M. J., & Lesaux, N. K. (2012). Development of morphological awareness and vocabulary knowledge in Spanish-speaking language minority learners: A parallel process latent growth curve model. *Applied Psycholinguistics, 33,* 23–54.

Kuo, L.-J., & Anderson, R. C. (2006). Morphological awareness and learning to read: A cross-language perspective. *Educational Psychologist, 41,* 161–180.

Kupisch, T. (2005). Acceleration in bilingual first language acquisition. In T. Gaerts, I. van Ginneken, & H. Jacobs (Eds.), *Romance languages and linguistic theory 2003: Selected papers from 'Going Romance'* 2003 (pp. 143–60). Amsterdam, the Netherlands: John Benjamins.

Lam, K., Chen, X., Geva, E., Luo, Y. C., & Li, H. (2012). The role of morphological awareness in reading achievement among young Chinese-speaking English language learners: A longitudinal study. *Reading and Writing, 25,* 1847–1872.

Lauchlan, F., Parisi, M., & Fadda, R. (2012). Bilingualism in Sardinia and Scotland: Exploring the cognitive benefits of speaking a "minority" language. *International Journal of Bilingualism, 17,* 43–56.

Levin, I., Ravid, D., & Rapaport, S. (2001). Morphology and spelling among Hebrew-speaking children: From kindergarten to first grade. *Journal of Child Language, 28,* 741–772.

Loizou, M., & Stuart, M. (2003). Phonological awareness in monolingual and bilingual English and Greek five-year-olds. *Journal of Research in Reading, 26,* 3–18.

Müller, N., & Hulk, A. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and Cognition, 4,* 1–21.

Nagy, W., Berninger, V., & Abbott, R. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle school students. *Journal of Educational Psychology, 98,* 134–147.

Omar, M. K. (1973). *The acquisition of Egyptian Arabic as a native language*. Washington, DC: Georgetown University Press.

Paradis, J., Crago, M., & Genesee, F. (2005/2006). Domain-general versus domain-specific accounts of specific language impairment: Evidence from bilingual children's acquisition of object pronouns. *Language Acquisition, 13,* 33–62.

Paradis, J., Crago, M., Genesee, F., & Rice, M. L. (2003). French-English bilingual children with SLI: How do they compare with their monolingual peers? *Journal of Speech, Language, and Hearing Research, 46,* 113–127.

Paradis, J., & Genesee, F. (1996). Syntactic acquisition in bilingual children: Autonomous or interdependent? *Studies in Second Language Acquisition, 18,* 1–25.

Peal, E., & Lambert, W. (1962). The relation of bilingualism to intelligence. *Psychological Monographs, 76,* 1–23.

Ravid, D. (2003). A developmental perspective on root perception in Hebrew and Palestinian Arabic. In J. Shimron (Ed.), *Language processing and acquisition in languages of Semitic, root-based morphology* (pp. 239–315). Amsterdam, the Netherlands: John Benjamins.

Ravid, D., & Farah, R. (1999). Learning about noun plurals in early Palestinian Arabic. *First Language, 19,* 187–206.

Ravid, D., & Farah, R. (2009). Noun plurals in early Palestinian Arabic: A longitudinal case study. In U. Stephany & M. D. Voeikova (Eds.), *Development of nominal inflection in first language acquisition: A cross-linguistic perspective* (pp. 411–432). Berlin, Germany: Mouton de Gruyter.

Saiegh-Haddad, E. (2003). Linguistic distance and initial reading acquisition. *Applied Psycholinguistics, 24,* 431–451.

Saiegh-Haddad, E., & Geva, E. (2008). Morphological awareness, phonological awareness, and reading in English-Arabic bilingual children. *Reading and Writing, 21,* 481–504.

Saiegh-Haddad, E., Hadieh, A., & Ravid, D. (2012). Acquiring noun plurals in Palestinian Arabic: Morphology, familiarity, and pattern frequency. *Language Learning, 62,* 1079–1109.

Saiegh-Haddad, E., & Joshi, R. M. (Eds.). (2014). *Handbook of Arabic literacy: Insights and perspectives*. New York, NY: Springer.

Schiff, R., Ravid, D., & Levy-Shimon, S. (2011). Children's command of plural and possessive marking on Hebrew nouns: A comparison of obligatory versus optional inflections. *Journal of Child Language, 38,* 433–454.

Schwartz, M., & Asli, A. (2014). Bilingual teachers' language strategies: The case of an Arabic–Hebrew kindergarten in Israel. *Teaching and Teacher Education, 38,* 22–32.

Schwartz, M., Khamaisi, F., Taha, H., & Eviatar, Z. (2013). *Morphological awareness test*. Unpublished test.

Schwartz, M., Moin, V., & Klayle, M. (2013). Parents' choice of a bilingual Hebrew–Arabic kindergarten for their children. In M. Schwartz & A. Verschik (Eds.), *Successful family language policy: Parents, children and educators in interaction* (pp. 23–51). New York, NY: Springer.

Serratrice, L. (2013). Cross-linguistic influence in bilingual development: Determinants and mechanisms. *Linguistic Approaches to Bilingualism, 3,* 3–25.

Shatil, E. (1995). *Predicting reading ability: Evidence for cognitive modularity* (Unpublished doctoral thesis). University of Haifa, Haifa, Israel.

Shimron, J. (2003). Semitic languages: Are they really root-based? In *Language processing and acquisition in languages of Semitic, root-based morphology* (pp. 1–28). Amsterdam, the Netherlands: John Benjamins.

Slobin, D. I. (1985). Why study language crosslinguistically? In *The crosslinguistic study of language acquisition, Volume 1: The data* (pp. 3–24). Hillsdale, NJ: Erlbaum.

Slobin, D. I. (2001). Form-function relations: How do children find out what they are? In M. Bowerman & S. Levinson (Eds.), *Language acquisition and conceptual development* (pp. 406–449). Cambridge, United Kingdom: Cambridge University Press.

Snyder, B., & Barzilay, R. (2008). Unsupervised multilingual learning for morphological segmentation. In *Proceedings of the Annual Conference of the Association for Computational Linguistics* (pp. 737–745). Columbus, OH: Association for Computational Linguistics.

Sparks, E., & Deacon, S. H. (2015). Morphological awareness and vocabulary acquisition: A longitudinal examination of their relationship in English-speaking children. *Applied Psycholinguist, 36,* 299–321.

Wright, W. (1975). *A grammar of the Arabic language* (3rd ed.). Cambridge, United Kingdom: Cambridge University Press.

Zdorenko, T., & Paradis, J. (2007). The role of the first language in child second language acquisition of articles. In A. Belikova (Ed.), *Proceedings of the Second Conference on Generative Approaches to Language Acquisition North America* (pp. 483–490). Somerville, MA: Cascadilla Proceedings Project.

Zdorenko, T., & Paradis, J. (2008). The acquisition of articles in child second language English: Fluctuation, transfer or Both? *Second Language Research, 24,* 227–250.