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Special Issue

Second Language Reading Acquisition in Languages with Different Writing Systems

Edited by

Dr. Annie Yixun Li, Dr. Adrian Pasquarella and Dr. Min Wang

MDPI

https://doi.org/10.3390/languages8020101

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Age, Experience and Language and Literacy Skills in English-Arabic Speaking Syrian Refugees

Alexandra Gottardo [1,*], Redab Al-Janaideh [2], Johanne Paradis [3], Adriana Soto-Corominas [4], Xi Chen [5] and Norah Amin [6]

[1] Psychology Department, Wilfrid Laurier University, 75 University Ave. W., Waterloo, ON N2L 3C5, Canada
[2] Research and Assessment, Centre for Leadership and Learning at YRDSB, Newmarket, ON L3Y 8E2, Canada; redab.aljanaideh@mail.utoronto.ca
[3] Department of Linguistics, University of Alberta, Edmonton, AB T6G 2E7, Canada; jparadis@ualberta.ca
[4] Applied Linguistics Department, Universitat Internacional de Catalunya, 08017 Barcelona, Spain; asotoc@uic.cat
[5] Applied Psychology and Human Development, University of Toronto, 252 Bloor St. W., Toronto, ON M5S 1V6, Canada; xi.chen.bumgardner@utoronto.ca
[6] Psychology, King Saud University, Riyad 36002, Saudi Arabia; n.a.amin3@gmail.com
* Correspondence: agottardo@wlu.ca

Abstract: Although age of acquisition (AoA) is frequently used when examining the endpoint of second language (L2) learning, it is rarely used to examine the initial phases of L2 acquisition. The present study provided a unique look at the role of AoA in early language and literacy acquisition in the L2 by a priori selecting two groups of Arabic-English speakers based on their ages, 6–8-year-olds (N = 43) and 9–13-year-olds (N = 53). These Syrian refugees were matched on English experience, having immigrated to Canada and having learned English for two years or less. Raw scores on language and literacy measures were compared across groups. The older group had higher scores on all first language (L1) variables. The groups did not differ on most L2 variables except for English word reading. Additionally, L1 and L2 variables were examined in relation to English word and pseudoword reading with different patterns of relations found for the two groups. For the younger group, phonological awareness and vocabulary were related to reading, while for the older group phonological awareness and morphological awareness were key predictors. These finding points to the unique relations among age, age of acquisition, L1 skills, and L2 language and literacy skills.

Keywords: reading; Arabic-English; second language

Citation: Gottardo, Alexandra, Redab Al-Janaideh, Johanne Paradis, Adriana Soto-Corominas, Xi Chen, and Norah Amin. 2023. Age, Experience and Language and Literacy Skills in English-Arabic Speaking Syrian Refugees. *Languages* 8: 101. https://doi.org/10.3390/languages8020101

Academic Editors: Annie Yixun Li, Adrian Pasquarella and Min Wang

Received: 19 July 2022
Revised: 20 March 2023
Accepted: 21 March 2023
Published: 3 April 2023

1. Introduction

Many factors are related to language and literacy development in second language (L2) learners (see Gottardo et al. 2021 for a review). Language and literacy acquisition in L2 learners is related to general experience with the L2 (Cummins 1991, 2008; Montrul and Foote 2014). In addition, learners' proficiencies in their first language (L1) and the specific L1 being spoken and read can have an impact on L2 acquisition (Branum-Martin et al. 2012; Melby-Lervag and Lervag 2011). Another documented source of variability in L2 acquisition is the age of acquisition (AoA) of the L2 (Birdsong 2006; Flege 1992; Flege et al. 1999; Paradis 2019). However, chronological age, AoA and grade/educational experience with a language as measured by the learner's current grade level are often confounded. Learners who are older have more experience with their L1 and often have more experience with their L2 than their younger counterparts. Other comparisons involve L2 learners who are the same age but have different ages of L2 acquisition and different levels of L2 exposure. These types of comparisons often ignore the confounds of L1 and L2 experience with AoA, where length of exposure might be as important as AoA (Paradis 2019). Additionally, L2 learners who immigrate during their school-age years (after age 6),

usually have some schooling in their L1 and might have exposure to their L2, in this case English, through English as a foreign language classes in their country of origin. Therefore, in most cases, it is not possible to separate a child's AoA and their experience with their L2.

Both L1 skills and L2 exposure are related to language and literacy skills, and cross-linguistic relations (Cummins 1981, 1991). The present study offers a unique opportunity to separate the effects of AoA from the amount of exposure to the L2 as measured by the length of time spent learning the L2 in an immersion context. This study examined variables related to English language and reading skills in children who are Syrian refugees and had immigrated to Canada approximately two years prior to participating in the study. The participants had similar lengths of exposure to English, their L2, as they all immigrated to Canada at approximately the same time and had begun to acquire English when they arrived in Canada. The participants all spoke the same L1 at home, Arabic, and were learning the same L2 at school, English. Two groups were purposively sampled based on age using a priori recruitment of younger (6–8 years) and older (9–13 years) sibling pairs. These sibling pairs had different levels of L1 exposure based on their age of arrival and amount of education in their L1 prior to immigrating. The younger and older groups had similar lengths of exposure to English. However, their specific educational experiences in English likely differed based on their grade placement. Learners in the early elementary grades (i.e., grades 1–3) are exposed to different curriculum and learning materials as compared to learners in the later elementary grades (i.e., grades 4–6).

1.1. Bilingualism

Bilingualism is broadly defined as knowing two languages (Bialystok 2010; Gottardo and Grant 2008; Valdés and Figueroa 1994). According to this definition, bilingualism occurs on a continuum ranging from low proficiency in the L2 to native-like or near native-like proficiency in the L2. It is apparent from the definitions that there is little agreement regarding the definition of bilingualism (Gottardo and Grant 2008). The present study used a broad definition of bilingualism and examined the role of age of acquisition in relation to L2 reading skills of learners with relatively low levels of L2 experience and proficiency. Although differences exist in the definitions of bilingualism, age of acquisition and length of exposure to a language are related to L2 oral language proficiency and are likely related to literacy skills.

1.2. Role of Experience and Age of Acquisition

The role of age-related effects has been examined extensively in research on second language acquisition (see Birdsong 2005; DeKeyser and Larson-Hall 2005; Johnson and Newport 1989). The role of language experience in L2 acquisition has been examined using multiple metrics including age of arrival and age of acquisition, as well as language dominance. Age of acquisition (AoA) refers to the age at which a learner becomes immersed in an L2 environment, where the L2 is the dominant societal language (Birdsong 2006). This phenomenon is often associated with immigrant learners or second-generation learners who had limited exposure to the societal language prior to schooling in the L2. AoA research often focuses on determining the upper limits of L2 attainment, based on acquiring the L2 milestones at different maturational levels (Birdsong 2006). This orientation examines the limits of native-like proficiency as measured by various indicators and the extent to which high levels of proficiency can occur in learners who acquire their L2 as adolescents or young adults (Birdsong 2006).[1] Research that incorporates behavioural data collected from L2 learners often compares "end state" L2 attainment across learners who acquired their L2 during childhood versus during adulthood. However, patterns of language acquisition in beginner L2 learners with different ages of acquisition are rarely examined.

Researchers have studied the role of AoA on the acquisition of various linguistic structures including L2 phonology, morphology, and syntax (Birdsong 2006; Bosch et al. 2019; Díaz et al. 2016; Flege et al. 1999; Ioup 2008; McDonald 2000; Paradis 2019). Research examines comprehensive effects of AoA on linguistic processing or oral language profi-

ciency (Hernandez and Li 2007; Saito 2015) or focuses on very specific linguistic structures (Birdsong and Molis 2001; DeKeyser 2012; Paradis et al. 2021; Schulz and Grimm 2019). For example, researchers have examined the role of AoA in discriminating native and non-native vowel and consonant speech sounds within and across languages in children and adults (Archila-Suerte et al. 2012; Flege et al. 1995, 1999; Hopp and Schmid 2013). The role of AoA was also studied in relation to neural architecture in three groups of bilingual young adults: bilinguals who had acquired their L2 prior to age 6, from ages 6 to 12 years, and after age 12 (Wei et al. 2015). AoA contributed uniquely to structural differences in neural architecture after proficiency and exposure were controlled (Wei et al. 2015). The above findings provide a deeper theoretical and neuro-linguistic understanding of the role of AoA. However, educators and practitioners are more often interested in findings related to the attainment of global language and literacy skills that address specific educational programming needs earlier in the L2 acquisition process. Additionally, the role of AoA has not been explicitly examined in Arabic-English learners.

Effects of Age Versus Experience

In most cases, AoA is commensurate with L2 experience. For example, if two groups of learners are the same age, then the group with the younger AoA will have more experience with the L2. Alternately, if AoA is held constant across groups, then years of experience with the languages and chronological age will differ. The current study examined the performance of two groups of Arabic-English learners selected based on having the same amount of L2 experience but different ages of acquisition. Specifically, this study compared younger and older Arabic-speaking, newcomer, refugee children from Syria who had been living in Canada for the same length of time, approximately two years.

As previously mentioned, it is challenging for researchers to separate AoA from experience (Paradis 2019). Research conducted with monolinguals has used innovative methods to examine age/maturation effects versus experience effects on cognitive and linguistic skills. The results of this research revealed expected and unexpected findings. For example, Morrison and colleagues used the arbitrary cut-off date for age of initial school enrollment as a "natural experiment" to examine influences of age and/or schooling on working memory, vocabulary, phonological awareness, letter knowledge and word reading skill (Morrison et al. 1995). Some results were intuitive, such as findings that letter-sound skills, phonological awareness and reading performance were related to formal instruction and were independent of age (Morrison et al. 1997; Skibbe et al. 2011). Somewhat surprisingly, the results also showed that growth of immediate memory skills in terms of tasks requiring memory recall and memory strategies are primarily a function of exposure to formal schooling in first grade (Morrison et al. 1995). In contrast, influences of schooling were not found for vocabulary knowledge or onset-rime segmentation (Christian et al. 2000). Matching learners on the amount of L2 experience while varying AoA can assist in separating the effects of these variables on skills often assumed to be related to schooling, such as word reading and vocabulary knowledge.

The present study selected two groups, younger and older sibling pairs, based on their AoA. The children were enrolled in English immersion settings with L2 reading experiences that differed by grade and ability (Chall 1983). The younger group was "learning to read" at school, consistent with their peers and commensurate with the goals of early elementary education. However, reading instruction in the later elementary grades and beyond focuses on "reading to learn" (Chall 1983), which resulted in different educational experiences. Although learners in the older group were beginning readers of English and still "learning to read", they were exposed to content area instruction and more difficult texts consistent with their assigned grade and classroom curriculum (e.g., science, social studies).

1.3. Relations among L1 and L2 Skills

Researchers studying L2 oral language and reading development have examined subskills that are significantly related across languages (See summaries by Durgunoğlu

2002; Geva and Wang 2001; Gottardo et al. 2021). It is expected that linguistic skills that are highly related across languages will be learned relatively easily in school and informal settings. For example, skills that are highly related across languages (e.g., phonological awareness) might require less explicit teaching, particularly if students have strong skills in their L1. In contrast, skills that require more time to acquire or require explicit instruction will be more difficult to learn. Less highly related skills, which do not transfer easily across languages, might also require explicit instruction (e.g., vocabulary). Explicit instruction of these skills might or might not be provided by schools.

Extensive research shows that phonological awareness skills are related across languages (see Branum-Martin et al. 2012; Melby-Lervag and Lervag 2011 for meta-analyses). Decoding skills are also related across languages with the strength of relations being affected by the similarity of the orthography or writing system. For example, greater relations are found if both languages are written using the same alphabet than languages written using different alphabetic writing systems (Gottardo et al. 2021; Melby-Lervag and Lervag 2011). Moderate relations are found between L1 and L2 morphological awareness in bilingual Arabic-English speakers (Saiegh-Haddad and Geva 2008). Vocabulary knowledge across languages is related to similarities based on linguistic typologies and roots and the presence of cognates across the languages spoken by bilinguals (Nagy et al. 1993; Pérez et al. 2010; Proctor and Mo 2009). Extensive research exists showing that L2 learners have lower vocabulary scores than monolingual speakers of a language, even if the bilingual learners are from high socioeconomic status (SES) backgrounds or have had several years of formal education in the L2 (Eilers et al. 2006; Farnia and Geva 2011; Oller et al. 2007). In terms of L2 vocabulary development, Cummins (1981, 2008) made the distinction between basic interpersonal communicative skills (BICS), which designate the language used in everyday communication, and cognitive academic language proficiency (CALP), which represents the language used for school instruction. These different types of vocabulary skills are likely acquired through different means/experiences, such as participating in casual conversations versus engaging with academic content.

Metalinguistic skills draw on common underlying proficiencies across languages (Koda 2008; Roehr-Brackin 2018). Although some researchers describe phonological awareness as a metalinguistic skill (Tunmer and Hoover 2017), its relatively early age of acquisition leads other researchers to suggest that phonological awareness measures sensitivity to linguistic structures rather than metalinguistic awareness (Anthony and Lonigan 2004; Gottardo et al. 1996). Other metalinguistic skills, such as morphological awareness, the awareness of morphological structures (Carlisle 2000; Kieffer and Lesaux 2012), and cognate awareness, the awareness of links between words with similar pronunciations and meanings, are related to age (Nagy 2007). Therefore, older learners with similar amounts of exposure to the L2 might show stronger interrelations between L1 and L2 morphological awareness and vocabulary skills than younger learners.

1.4. Linguistic Features of the Languages: Similarities and Differences between Arabic and English

The relationships between L1 and L2 oral language and literacy skills are influenced by the linguistic features of the languages being spoken and read. Given that the two languages included in the study differ in many ways, it is important to provide some key exemplars to compare and contrast English and Arabic. For example, one way that Arabic differs from English is that Arabic is characterized as a diglossia, a phenomenon where two varieties of a language are used by one group (Ferguson 1959). Arabic speakers use the oral form of Arabic, referred to as spoken Arabic, at home and in the community. They then learn and use Standard Arabic, also known as Modern Standard Arabic (MSA), at school and other formal settings such as written or formal communications. The participants in this study are from Syria and speak Levantine Arabic, which differs from MSA in terms of vocabulary, morphology, phonology and even syntax (Saiegh-Haddad and Schiff 2016). Upon entering school, these children often find the experience of learning MSA similar to learning a second or additional language.

Arabic and English do not share linguistic roots or linguistic typologies. English is a European language with multiple linguistic roots, while Arabic is a Semitic language. Therefore, in terms of vocabulary, English and Arabic share relatively few cognates, although loan words exist across the two languages.

In terms of writing systems, English uses the Roman alphabet with inconsistent grapheme-phoneme relations, which is characterized as a deep alphabetic orthography (Treiman and Kessler 2006). In contrast, Arabic is written using an impure abjad with long vowel markers (a pure abjad is a purely consonantal orthography) (Daniels 2017; Daniels and Bright 1996) and short vowels represented by diacritics. Arabic has voweled and unvoweled versions of the orthography, marked by the presence or absence of vowel diacritics. These representations of Arabic map onto shallow and deep orthographic versions of the language, respectively. Voweled Arabic is used in books for younger children and for the Quran, while unvoweled Arabic is used for texts read by older children and adults.

Arabic and English share several phonemes, 17 in total (e.g., /b/,/s/,/ʃ/,/t/) (Smart and Altorfer 2005). Arabic also includes phonemes that do not exist in English but are found in other European languages, as well as phonemes that are specific to Arabic and other Semitic languages. Acquisition of non-native phonemes is challenging and often requires extended experience with the language for adults and older children (Baker et al. 2002; Burnham 2003; Flege et al. 1995, 1999).

Arabic and English also differ in terms of morphology. English morphology is characterized by a simple concatenative morphology with inflectional and derivational morphemes as well as compound words. In contrast, Arabic is a highly inflected language, which uses a nonconcatentive root and pattern system as well as concatenative affixes as morphological markers (Abu-Rabia 2007; Schiff and Saiegh-Haddad 2018; Tibi et al. 2020). The nonlinear root and pattern system includes consonantal roots to which patterns are added using long and short vowels as well as other infixes. These root and pattern lexical unuts are comprised of bound morphemes that create morpho-syntactic and phonological words (Saiegh-Haddad 2013; Saiegh-Haddad and Henkin-Roitfarb 2014; Tibi and Kirby 2017). For example, the combination of the root (k/t/b) with different infixes results in words with different but related meanings. These related words can differ in terms of grammatical parts of speech. Arabic also uses linear morphological markers as inflectional markers, specifically prefixes or suffixes, to mark grammatical distinctions such as number, person, tense, gender, mood and voice (Abu-Rabia and Taha 2006; Schiff and Saiegh-Haddad 2018). Given the large number of differences between Arabic and English, it would not be surprising if refugee children, with no previous exposure to English and lower levels of schooling in their L1, would face challenges in learning English.

1.5. Special Issues Related to Refugee Status

In addition to common variables related to L2 acquisition in newcomers and second-generation immigrants learning English, refugees deal with unique factors that might be related to academic achievement. Refugee children and youth are more likely to experience trauma due to exposure to violence related to war (Fazel et al. 2012; Scharpf et al. 2021). The presence of violence can also have indirect effects on children whose parents experience post-traumatic stress disorder (PTSD) due to the effects of exposure to violence and other trauma associated with war (Eruyar et al. 2018; Reed et al. 2012; Scharpf et al. 2021).

Refugee children and youth are also more likely than other immigrants to experience interrupted schooling due to the dangers of war while residing in their country of origin (Scharpf et al. 2021; UNESCO 2022). Only about 50% of refugee children and youth are enrolled in school, with enrollment for preprimary grades at 42%, for primary grades at 68% and for secondary grades at 37% (UNHCR 2022). Refugee children are also likely to have fewer educational resources while living in refugee camps or in other temporary settings. Families often lack financial resources to pay for school fees, school supplies and/or uniforms if they live temporarily in transit in countries while awaiting permanent

resettlement in Canada or other countries (UNHCR 2022). Importantly, in some cases, children might live in transitional settings or refugee camps for long periods of time (e.g., several years) or even their entire childhoods. Finally, for Arabic-speaking refugee children, the challenges of interrupted schooling or lack of schooling are likely to have an impact on the children's familiarity with Modern Standard Arabic.

1.6. The Present Study

The main goal of this study is to examine the effects of AoA on variables related to L2 word reading performance when the amount of L2 experience was held constant. The children in this study were Arabic-English speaking Syrian refugees who had lived in Canada for two years. The present study deviated from the previous literature on AoA in several ways. First, both the younger and the older groups of participants were pre-adolescents or early adolescents ranging in age from 6 to 13 years of age. The two groups were selected a priori based on their ages, the grade in which they are enrolled and the concomitant literacy and academic expectations. The younger group, the 6- to 8-year-olds, were in the early elementary grades and learning basic literacy skills with their peers. The 9- to 13-year-olds in the older group were in the higher elementary grades where the focus of literacy instruction was on reading comprehension, which is used to acquire academic content. Age group comparisons were conducted on a range of oral language and literacy measures, in contrast to other studies where the focus was the in-depth measurement of specific linguistic constructs. In this study, the age groups had different ages of acquisition, but the same length of exposure to English, having immigrated within 2 years of participating in the study. Given the age and length of exposure to English by the learners, the present study examined and compared performance of children of different ages and ages of acquisition at the beginning of the L2 learning process to determine where similarities and differences occurred based on AoA.

The design of the study led to three key questions. Do the younger and older groups differ on raw scores on L1 and/or L2 measures? Older children were expected to have higher scores than younger children on all the measures. Do the younger and older groups show similarities and differences among cross-linguistic relations? Older children were expected to show greater cross-linguistic relations due to more developed metalinguistic skills. Do the younger and older groups show similarities and/or differences in the English and Arabic variables related to English word and pseudoword reading? Although group differences are expected, the exact nature of the differences is difficult to determine as these comparisons have not been conducted on similar samples.

2. Materials and Methods

2.1. Participants

The participants were 96 Arabic-English speaking children who were Syrian refugees. Participants were recruited through their schools or through community centres and refugee resettlement groups in Ontario, Canada. Families with multiple children within the appropriate age ranges, 6 to 8 years old and 9 to 13 years old, were recruited for the study. In most cases, two children from each family were selected, resulting in children from 50 families being tested. Children who differed by two or three years and who fell into the two predetermined age ranges, 6 to 8 years and 9 to 13 years, were selected if families had multiple children within the desired age ranges. The mean age of the participants was 113.8 months (SD = 23.6 mos). Participants included 49 girls (mean age 117.4 mos, SD = 24.4 mos) and 47 boys (mean age 110.0, SD = 22.5 mos). The mean age of arrival in Canada was 91.4 months (SD = 24.6 mos), and parents reported that the children had 17.8 months of experience with English (SD = 6.7 mos).

The sample was recruited based on belonging to one of two predetermined groups: younger children (N = 43), ages 6–8 years (Mage = 91.5 mos; SD = 11.0 mos) with 23 boys (Mage = 90.3 mos; SD = 11.0 mos) and 20 girls (Mage = 92.0 mos; SD = 11.0 mos) and older children (N = 53), ages 9–13 years (Mage = 131.9 mos, SD = 13.4 mos) with 24 boys

(Mage = 128.9 mos; SD = 11.3 mos) and 20 girls (Mage = 134.3 mos; SD = 14.7 mos). These age ranges were selected to reflect curriculum differences in the early elementary grades, 1 to 3, and the later elementary grades, 4 to 6. The groups differed significantly on age and age of arrival/acquisition, F (1,95) = 188.44, $p < 0.001$, $\eta^2 = 0.667$, respectively (See Table 1). Sibling pairs were selected to control for time in Canada and L1 and L2 influences of home environment. For example, parental education and family literacy factors such as exposure to L1 and L2 oral language and access to print are all factors related to language and literacy acquisition.

Table 1. Group comparisons on Arabic (L1) and English (L2) language and literacy skills between younger participants (N = 43) and older participants (N = 53).

Construct/Measure	Younger Group	Older Group	*F*-Value	*p*-Value	η^2
Age in months	91.51 (10.9)	131.85 (13.4)	250.90	$p < 0.001$	0.727
Age of arrival	69.16 (13.4)	109.43 (15.0)	188.44	$p < 0.001$	0.667
Length of exposure to English (months)	22.35 (8.3)	22.42 (8.6)	0.001	$p = 0.970$	0.000
English vocabulary	67.02 (21.8)	75.06 (25.0)	2.75	$p = 0.101$	0.028
English vocabulary (PPVT-IV SS)	65.98 (14.4)	48.30 (15.6)	32.98	$p < 0.001$	0.260
English word reading	25.65 (11.2)	36.23 (11.0)	21.61	$p < 0.001$	0.187
English pseudoword reading	10.09 (9.7)	14.68 (10.3)	4.99	$p = 0.028$	0.050
English phonological awareness	14.91 (9.2)	19.96 (8.6)	7.70	$p = 0.007$	0.076
English morphological awareness	3.12 (2.8)	4.55 (3.5)	4.66	$p = 0.033$	0.047
Arabic vocabulary	37.95 (12.0)	49.23 (10.2)	24.57	$p < 0.001$	0.207
Arabic word reading	9.79 (19.8)	40.38 (30.3)	32.48	$p < 0.001$	0.257
Arabic phonological awareness	9.07 (6.7)	13.28 (6.1)	10.42	$p = 0.002$	0.100
Arabic morphological production	18.02 (10.9)	35.32 (15.8)	37.18	$p < 0.001$	0.283

p-values ≤ 0.004 are statistically significant using a Bonferroni correction.

The parents were asked to report if the children had been in school prior to arriving in Canada. Sixty-six children had attended school prior to arriving in Canada while 30 of the children had not attended school prior to arriving in Canada. Sixteen of the 30 children were unlikely to be eligible to attend school prior to immigrating, as they had a mean age of 57.2 months upon arrival in Canada. However, 14 children would have been eligible for schooling, having a mean age of 90.1 months upon arrival in Canada. Even the children who had attended school prior to their arrival likely had interruptions in their schooling due to fleeing their homes, moving frequently and settling in temporary accommodations (e.g., refugee camps) while waiting to immigrate to Canada. Parents stated that their children had not been exposed to English prior to arriving in Canada. All but one child entered school immediately upon arriving in Canada, as schooling begins at age 4 in Ontario. Additionally, Arabic was the language of the home for all participants. At the time of testing, the children attended English immersion programs with English as a second language support in their local schools. Most of the children were enrolled in their age-appropriate grade.

2.2. Materials

Parallel language measures were administered in Arabic and English. Nonverbal reasoning performance was measured to control for general ability.

2.2.1. Word and Pseudoword Reading

In English

Word reading accuracy in English was measured using the Letter-Word Identification subtest of the Woodcock-Johnson III battery (WJIII; Woodcock et al. 2001). This standardized test included 76 items which were presented in increasing order of difficulty. The initial 16 test items required the children to identify letter names or point to letters that match the letter name presented orally by the examiner. For the remaining items, children were asked to read aloud sets of English words that gradually became more challenging (e.g., and, light, practice, knowledge). Testing was discontinued when the child made six consecutive errors on the words as per standardization procedures. The Cronbach's alpha from the manual was 0.95.

Pseudoword reading was measured using the Word Attack subtest of the Woodcock-Johnson III battery (WJIII; Woodcock et al. 2001). Children were told that they would be reading "made up words". Testing was discontinued when the child incorrectly read six consecutive pseudowords. The Cronbach's alpha from the manual was 0.91.

In Arabic

Arabic word reading accuracy was measured using an Arabic vowelized word reading test created by Tibi and Kirby (2017). This measure included 100 vowelized words (10 practice items, 90 test items). Because the task involved written Arabic, pronunciations were scored as correct if they represented MSA versions of the words. Feedback was provided for all practice items. The words represented different parts of speech (nouns, verbs or adjectives). The items increased in difficulty in terms of the number of syllables, phonological structure, and morphological complexity. The test was discontinued after ten consecutive errors as per standardization procedures. The Cronbach's alpha for this measure was 0.97.

2.2.2. Phonological Awareness

In English

Phonological awareness was measured with the Elision subtest of the Comprehensive Test of Phonological Processing (CTOPP-2; Wagner et al. 2013). This subtest consisted of 34 test items including syllables and phonemes (e.g., "say popcorn without saying corn" or "say meet without saying/t/"). Testing was discontinued after three consecutive errors. The Cronbach's alpha for this measure was 0.89.

In Arabic

An Arabic phonological awareness task was designed to be parallel to the English elision task (adapted from Tibi and Kirby 2017). This task included 26 items, six training items with feedback and 20 test items. Children listened to orally presented Arabic words, repeated the words and then deleted a syllable (3 items) or phoneme either in the initial, medial, or final position from the word (17 items) (e.g., "Say"/samaa/"sky" without/sa//maa/"water"). The test was discontinued after three consecutive errors. This oral measure was administered using MSA, although responses allowed for Levantine Arabic pronunciations. The Cronbach's alpha for this measure was 0.80.

2.2.3. Morphological Awareness

In English

The English morphological awareness task measured derivational awareness (adapted from Carlisle 2000). Items were presented orally and were selected to be suitable for younger children and beginner L2 learners. Children were required to produce a derived

word to complete a sentence (e.g., "Farm. My uncle is a _____. [farmer]". This test included 16 items. The Cronbach's alpha for this measure was some low but acceptable at 0.75.

In Arabic

The Morphological Production subtest of the Tests and Manual-Logat Elkaraa (Ibrahim et al. 2014) was administered to examine children's morphological awareness in Arabic. This task consisted of seven morphological roots (two practice items, five test items) derived from three letters. The test was administered orally. Each root was presented separately to the children. For each root, the child was asked to produce as many words as possible in one minute. The children's responses were audio-recorded and later transcribed. The words that were produced could be verbs or nouns (e.g., kitaab/ "book",/kutub/ "books",/maktab/ "desk",/kaatib/ "writer",/taktub/ "she writes",/yaktub/ "he writes", and/katabu/ "they wrote"). Correct responses had to be derived from the three-letter root that was presented. Roots were selected to permit the generation of multiple high-frequency words. As this subtest was an oral measure, it was administered in Levantine Arabic, the variety spoken in Syria. The Cronbach's alpha for this measure was 0.97.

2.2.4. Vocabulary

In English

The Peabody Picture Vocabulary Test, Fourth Edition, Form A (PPVT-IV; Dunn and Dunn 2007) was used to assess children's receptive vocabulary. The PPVT-IV test consists of 228 items. The children were asked to point to the picture from an array of four that represents the word that was provided orally by the examiner (e.g., point to the picture that shows jumping). The test was discontinued when the child made at least eight errors in a block of twelve items. The Cronbach's alpha from the manual was 0.97.

In Arabic

The Picture Vocabulary subtest of the Tests and Manual-Logat Elkaraa (Ibrahim et al. 2014) was administered to assess children's receptive vocabulary in Arabic. The test consisted of 73 items. The children were asked to point to the picture from an array of four that best illustrated the word provided orally by the examiner. The test was discontinued after eight consecutive errors. Vocabulary items were compatible with Levantine Arabic. The Cronbach's alpha for this measure was 0.86.

2.2.5. Nonverbal Reasoning

The Spatial Visualization and Reasoning by Analogy of the subtests of the Matrix Analogies Test were administered to measure nonverbal reasoning (Naglieri 1985). The children were asked to choose one of six pieces that best completed the given matrix pattern. Each subtest consisted of 16 items of increasing difficulty for a total of 32 items. Standardized instructions were provided in English with Arabic support and use of pointing as needed. Testing for each subtest was discontinued after four consecutive errors. The Cronbach's α was 0.87 for this test.

2.3. Procedures

Testing was conducted across two sessions on different days, a separate day for each language. Children were tested individually in their homes, schools, or community centres or in a room at the university. Testing was conducted by fluent or native speakers of each language. Parental consent forms and child assent statements were translated into Arabic and were obtained in accordance with CPA/APA guidelines. The research was approved by the university Research Ethics Board. Children were provided breaks throughout each session.

3. Results

The focus of this study was on age differences between two groups of Arabic-English speaking Syrian refugees who had similar immigration and environmental experiences. Therefore, the design of the study included purposeful sampling of two age groups of children belonging to the same families. The children had arrived in Canada with their families at the same time. Due to the focus of the analyses, similarities and differences on raw scores and patterns of relations were examined for the predetermined groups of younger and older children. Subsequently, correlational analyses and regression analyses were conducted separately for the a priori groups of younger and older siblings. The regression analyses examined English variables related to English word reading and English pseudoword reading as well as Arabic variables related to English word reading.

3.1. Comparison of Groups on Measures

A series of ANOVAs was conducted to examine and confirm that the groups selected a priori based on age differed on the variables in the study. As predicted, the groups differed on age and age of arrival with large effect sizes, confirming the expected differences (See Table 1). The groups differed on Arabic measures of word reading, phonological awareness and morphological awareness (See Table 1). The groups differed on the measures of English word reading. However, the groups did not differ on mean raw scores for the measure of English vocabulary. The groups had very low standard scores on the PPVT-IV (Dunn and Dunn 2007). Using a Bonferroni correction, $p \leq 0.004$, the groups did not differ on the English measures of pseudoword reading, morphological awareness and phonological awareness. Most effect sizes were in the medium to large range (See Table 1).

3.2. Relationships among Measures by Age Group

Given that the key comparisons focused on examining group differences based on age of acquisition, the Pearson bivariate correlations were calculated and reported separately for each age group. Age and age of arrival were highly correlated, $r = 0.940$, $p = <0.001$. The groups showed similarities and differences in patterns of relations among variables. Both groups showed similar patterns with English phonological awareness and morphological awareness being related to English word and pseudoword reading, rs = 0.477 to 0.793, ps < 0.001, for the younger group and rs = 0.289 to 0.728, ps < 0.05, for the older group (See Table 2). In contrast, the older group showed significant correlations for all English variables in relation to English vocabulary, while only English word reading and morphological awareness were significantly related to vocabulary for the younger group, $r = 0.571$, $p < 0.001$, and $r = 0.754$, $p < 0.001$, respectively (See Table 2). Similarly, within-language variables were related for the Arabic measures for both groups with correlations in the moderate to high range, rs = 0.466 to 0.774 (See Table 2).

Cross-linguistic variables were examined with similarities and differences noted for the two age groups. The word and pseudoword reading and phonological awareness variables were significantly correlated across languages for the younger group, rs = 0.413 to 0.739, ps < 0.01, and the older group, rs = 0.584 to 0.836, ps < 0.001. Cross-linguistic relations were not significant for the morphological awareness variables and the vocabulary variables for the younger group. However, cross-linguistic relations were found for the older group for morphological awareness, $r = 0.428$, $p = 0.001$ and vocabulary, $r = 0.320$, $p = 0.019$.

Table 2. Correlational matrix for language and literacy measures: Younger participants (N = 43) below the diagonal and older participants (N = 53) above the diagonal.

Measures	1	2	3	4	5	6	7	8	9	10
1.English vocabulary	1	0.524 **	0.321 *	0.289 *	0.624 **	0.320 *	0.278 *	0.305 *	0.157	0.202
2.English word reading	0.571 **	1	0.704 **	0.661 **	0.728 **	0.489 **	0.720 **	0.670 **	0.641 **	0.452 **
3.English pseudoword reading	0.263	0.782 **	1	0.613 **	0.520 **	0.442 **	0.584 **	0.596 **	0.544 **	0.273 *
4. English PA	0.261	0.793 **	0.763 **	1	0.410 **	0.476 **	0.604 **	0.836 **	0.462 **	0.414 **
5. English morphological awareness	0.754 **	0.679 **	0.477 **	0.507 **	1	0.524 **	0.462 **	0.310 *	0.428 **	0.360 **
6. Arabic vocabulary	0.101	0.477 **	0.331 *	0.572 **	0.232	1	0.649 **	0.466 **	0.631 **	0.443 **
7. Arabic word reading	−0.125	0.413 **	0.500 **	0.582 **	−0.054	0.498 **	1	0.702 **	0.747 **	0.455 **
8. Arabic PA	0.034	0.632 **	0.661 **	0.739 **	0.227	0.506 **	0.642 **	1	0.592 **	0.483 **
9. Arabic morphological production	0.120	0.735 **	0.780 **	0.821 **	0.290	0.553 **	0.712 **	0.774 **	1	0.320 *
10. MAT	0.140	0.310 *	0.201	0.412 **	0.019	0.308 *	0.226	0.356 *	0.364 *	1

* $p < 0.05$; ** $p < 0.01$.

3.3. English and Arabic Variables Related to English Word Reading

The following analyses examined the specific English and Arabic variables that were related to English word level reading. Standardized β weights, which are traditionally used to examine how much each independent variable is related to the dependent variable while other independent variables (IVs) are held constant, are reported. In addition, structure coefficients (rs), which show the relationship between a single observed predictor variable and predicted criterion scores independent of other IVs, are reported. Structure coefficients account for collinearity, which is important given that the linguistic variables used in this study are expected to be interrelated. The analyses include the common and unique variance explained by each of the independent variables. In keeping with the focus of examining differences based on age and age of acquisition, separate analyses were conducted to examine variables related to word reading in the younger and older groups.[2]

3.3.1. English Variables Related to English Word Reading

Nonverbal reasoning, phonological awareness, morphological awareness, and vocabulary were examined in each analysis as independent variables. Nonverbal reasoning was entered as a control variable in the first step, while the three linguistic variables were entered in the second step.

English Variables Related to Word Reading in Younger Children

A linear regression analysis was conducted to examine which variables were related to English word reading for the younger children. The four variables mentioned above explained a large proportion of the variance in word reading in this group, total $R^2 = 0.774$, F (4, 38) = 32.59, $p < 0.001$. For the younger group, both phonological awareness, $\beta = 0.662$, t (42) = 6.13, $p < 0.001$, $r_s = 0.901$, and vocabulary, $\beta = 0.324$, t (42) = 2.54, $p = 0.015$, $r_s = 0.647$, were related to English word reading (See Table 3). Although morphological awareness contributed a small and nonsignificant amount of unique variance, 0.3%, it contributed 45.9% common variance with the other three variables.

Table 3. Variables related to English word reading: Younger group (total $R^2 = 0.774$).

Step & Variables	r_s	Std. Error	β	*t*-Value	*p*-Value	Unique	Common
1. MAT	1.000	0.405	0.310	2.09 *	0.043	-	-
2. MAT	0.353	0.252	−0.010	−0.10	0.918	0.000	0.096
English PA	0.901	0.132	0.662	6.13 ***	<0.001	0.223	0.405
Eng MA	0.772	0.594	0.100	0.68	0.503	0.003	0.459
Eng vocab	0.647	0.066	0.324	2.54 *	0.015	0.038	0.287

* $p < 0.05$; *** $p < 0.001$.

English Variables Related to Word Reading in Older Children

A linear regression analysis was conducted to examine which variables were related to English word reading for the older children. The four variables explained a large proportion of the variance in word reading in this group, total $R^2 = 0.700$, F (4, 48) = 28.02, $p < 0.001$. For the older group, both phonological awareness, $\beta = 0.400$, t (52) = 4.38, $p < 0.001$, $r_s = 0.790$, and morphological awareness, $\beta = 0.469$, t (52) = 4.69, $p < 0.001$, $r_s = 0.870$, were related to English word reading (See Table 4). Although vocabulary knowledge contributed little unique variance, 0.6%, to English word reading for this group, it contributed, 26.9% common variance.

Table 4. Variables related to English word reading: Older group (total $R^2 = 0.700$).

Step & Variables	r_s	Std. Error	β	*t*-Value	*p*-Value	Unique	Common
1. MAT	1.000	0.223	0.452	3.62 ***	<0.001	-	-
2. MAT	0.540	0.159	0.098	1.10	0.277	0.008	0.197
English PA	0.790	0.116	0.400	4.38 ***	<0.001	0.120	0.317
Eng MA	0.870	0.337	0.469	4.31 ***	<0.001	0.116	0.414
Eng vocab	0.626	0.044	0.095	0.94	0.353	0.006	0.269

*** $p < 0.001$.

3.3.2. English Variables Related to English Pseudoword Reading

Separate analyses also were conducted to examine variables related to pseudoword reading in the younger and older group. Nonverbal reasoning, phonological awareness, morphological awareness, and vocabulary were examined in each analysis as independent variables. Nonverbal reasoning was entered as a control variable in the first step, while the three linguistic variables were entered in the second step.[3]

Variables Related to Pseudoword Reading in Younger Children

A linear regression analysis was conducted to examine which variables were related to English pseudoword reading for this younger group. The four variables explained a large proportion of the variance in pseudoword reading for this group, total $R^2 = 0.605$, $F_{(4, 38)} = 14.53$, $p < 0.001$. Only phonological awareness, $\beta = 0.773$, $t_{(42)} = 5.42$, $p < 0.001$, $r_s = 0.982$, was related to English pseudoword reading (See Table 5). Although morphological awareness contributed a small and nonsignificant amount of unique variance, 0.1%, it contributed 22.7% common variance.

Variables Related to Pseudoword Reading in Older Children

A linear regression analysis was conducted to examine which variables were related to English pseudoword reading for this older group. The four variables explained a significant proportion of the variance in pseudoword reading for this group, total $R^2 = 0.466$, $F_{(4, 48)} = 10.47$, $p < 0.001$. Both phonological awareness, $\beta = 0.500$, $t_{(52)} = 4.10$, $p < 0.001$, $r_s = 0.899$, and morphological awareness, $\beta = 0.357$, $t_{(52)} = 2.46$, $p = 0.018$, $r_s = 0.762$, were related to English pseudoword reading (See Table 6). Vocabulary contributed a small and nonsignificant amount of unique variance, 0.1%, and 10.2% common variance.

Table 5. Variables related to English pseudoword reading: Younger group (total $R^2 = 0.605$).

Step & Variables	r_s	Std. Error	β	*t*-Value	*p*-Value	Unique	Common
1. MAT	1.00	0.360	0.201	1.31	0.196	-	-
2. MAT	0.259	0.288	−0.123	−1.01	0.321	0.011	0.030
English PA	0.982	0.151	0.773	5.42 ***	<0.001	0.305	0.278
Eng MA	0.614	0.679	0.066	0.34	0.737	0.001	0.227
Eng vocab	0.339	0.075	0.029	0.17	0.863	0.000	0.069

*** $p < 0.001$.

Table 6. Variables related to English pseudoword reading: Older group (total $R^2 = 0.466$).

Step & Variables	r_s	Std. Error	β	*t*-Value	*p*-Value	Unique	Common
1. MAT	1.00	0.224	0.273	2.02 *	0.048	-	-
2. MAT	0.399	0.198	−0.056	1.10	0.642	0.002	0.072
English PA	0.899	0.145	0.500	4.10 ***	<0.001	0.187	0.189
Eng MA	0.762	0.419	0.357	2.46 *	0.018	0.067	0.203
Eng vocab	0.470	0.055	−0.036	−0.27	0.792	0.001	0.102

* $p < 0.05$; *** $p < 0.001$.

3.4. Arabic Variables Uniquely Related to English Word Reading

Separate analyses were conducted to examine which Arabic variables were related to English word reading in the younger and older group. Arabic vocabulary, phonological awareness, and morphological awareness were entered as the first step. For these cross-linguistic analyses, Arabic word reading was entered as the second step to determine if L1 reading was related to L2 reading in these groups.

3.4.1. Variables Related to Word Reading in Younger Children

A linear regression analysis was conducted to examine which Arabic variables were related to English word reading for the younger children. The four variables explained a relatively large proportion of the variance in word reading in these group, total $R^2 = 0.563$, $F_{(4, 38)} = 12.26$, $p < 0.001$. For this younger group, only Arabic morphological awareness, $\beta = 0.729$, $t_{(42)} = 3.77$, $p < 0.001$, $r_s = 0.955$, was related to English word reading (See Table 7). Arabic phonological awareness contributed a small and nonsignificant amount of unique variance, 1.5%, but contributed 38.4% common variance. Arabic word reading contributed a nonsignificant amount of variance to English word reading for the younger group (See Table 7).[4]

Table 7. Arabic variables related to English word reading: Younger group (total $R^2 = 0.563$).

Step & Variables	r_s	Std. Error	β	*t*-Value	*p*-Value	Unique	Common
1. Arabic vocab	0.639	0.095	0.072	0.55	0.588	0.005	0.222
Arabic MA	0.987	0.143	0.633	3.55 ***	0.001	0.124	0.417
Arabic PA	0.847	0.224	0.079	0.46	0.648	0.008	0.391
2. Arabic vocab	0.619	0.095	0.097	0.74	0.466	0.010	0.217
Arabic MA	0.955	0.154	0.729	3.77 ***	<0.001	0.160	0.381
Arabic PA	0.820	0.226	0.119	0.68	0.499	0.015	0.384
Arabic Word Reading	0.536	0.069	−0.197	−1.25	0.219	0.038	0.132

*** $p < 0.001$.

3.4.2. Variables Related to Word Reading in Older Children

A linear regression analysis was conducted to examine which Arabic variables were related to English word reading for the older children. The four variables explained a large proportion of the variance in word reading for this group, total $R^2 = 0.591$, $F_{(4, 48)} = 17.31$,

$p < 0.001$. For this older group, both Arabic phonological awareness and morphological awareness were related to English word reading in the first step (See Table 8). However, in the second step, only Arabic phonological awareness, $\beta = 0.273$, $t_{(52)} = 2.08$, $p = 0.043$, $r_s = 0.874$, and Arabic word reading, $\beta = 0.403$, $t_{(52)} = 2.41$, $p = 0.020$, $r_s = 0.940$, were related to English word reading. Arabic morphological awareness contributed a small and nonsignificant amount of unique variance, 1.5%, but 39.6% common variance.

Table 8. Arabic variables related to English word reading: Older group (total $R^2 = 0.591$).

Step & Variables	r_s	Std. Error	β	*t*-Value	*p*-Value	Unique	Common
1. Arabic vocab	0.663	0.129	0.097	0.77	0.446	0.003	0.236
Arabic MA	0.869	0.092	0.333	2.40 *	0.020	0.055	0.355
Arabic PA	0.909	0.210	0.420	3.46 ***	0.001	0.121	0.327
2. Arabic vocab	0.0638	0.130	0.001	0.01	0.996	0.000	0.239
Arabic MA	0.836	0.097	0.180	1.23	0.226	0.015	0.396
Arabic PA	0.874	0.227	0.273	2.08 *	0.043	0.044	0.404
Arabic Word Reading	0.940	0.058	0.403	2.41 *	0.020	0.044	0.475

* $p < 0.05$; *** $p < 0.001$.

4. Discussion

4.1. Group Similarities and Differences on Language and Literacy Variables

The main goals of this study were to examine similarities and differences between the two groups of L2 learners in terms of L1 and L2 language and literacy skills and the variables related to English word reading. The a priori design, which recruited younger and older sibling pairs, controlled for past and present L1 and L2 language experiences to the best of our ability. As predicted, group differences were found when comparing the two predetermined groups, younger children, ages 6 to 8 years, and older children, 9 to 13 years. Not surprisingly, the older children had higher scores on all the Arabic measures. Although the two groups differed on English word reading, they did not differ on mean raw scores for most of the English measures, including vocabulary, morphological awareness, pseudoword reading and phonological awareness. This lack of difference suggests that the English language experiences of these newcomer refugees were related to direct literacy instruction, but did not differ outside of school, for example, while at home and in the community. Additionally, any differences in experiences with oral language at school did not seem to translate to differences in raw scores on the standardized test of receptive vocabulary knowledge or the measure of morphological awareness. Lack of group differences in English phonological awareness and pseudoword reading likely are related to the lack of explicit, direct instruction in these skills, especially for the older group. In terms of oral language, it is likely that these newcomer children were in the initial stages on acquiring English and were still acquiring basic interpersonal communicative skills at the time of testing (Cummins 1981). This finding is corroborated by the very low standardized scores on the vocabulary measure for both groups. Therefore, neither group had likely acquired academic English skills commensurate with their grade/age level through interactions with persons or content in their regular classroom settings. Other researchers found consistently lower levels of L2 vocabulary for L2 learners (Farnia and Geva 2011). These differences are consistent across groups of participants from high and low SES backgrounds (Eilers et al. 2006; Lesaux et al. 2010). Previous research conducted with monolingual English speakers showed that home learning environment and family SES, but not school environment or teacher characteristics, were related to vocabulary scores (Connor et al. 2005). Therefore, the findings of this study suggest that approximately two years of schooling in Canada does not seem to result in significant differences in the English oral language skills of these groups of newcomers despite age differences.

Despite similarities across the two groups on performance on many of the English measures, the results of the correlational analyses suggest that the two groups showed potentially different mechanisms of L2 vocabulary learning. For the younger group, none of

the Arabic measures were related to scores on the English vocabulary measure, suggesting that these children did not use their knowledge of Arabic to learn English words. In contrast, for the older group, the Arabic language variables, specifically Arabic vocabulary knowledge, word reading, phonological awareness and morphological awareness, were related to parallel English measures. This pattern of results suggests that the older children were using their L1 skills and possibly metalinguistic skills to try to learn English (Koda 2008; Nagy et al. 1993; Nagy and Scott 2000). Only word reading and phonological awareness, lower-level skills that tend to be related across languages (Branum-Martin et al. 2012), were related across languages for the younger group. Therefore, although the two groups had similar scores on English measures, they might be learning English skills in different ways.

4.2. Variables Related to English Word Level Reading

4.2.1. Similarities in English Variables Related to English Word and Pseudoword Reading

The main goal of this study was to examine similarities and differences for variables related to English word and pseudoword reading for the two predetermined groups based on AoA. In terms of similar patterns of relationships, English phonological awareness was related to reading words and pseudowords for both groups. This result is not surprising, as phonological awareness is a core skill that is related to word reading and pseudoword reading in alphabetic languages for monolingual and bilingual learners (Branum-Martin et al. 2012; Castles and Coltheart 2004; Gottardo et al. 2021; Landerl et al. 2021; Melby-Lervag and Lervag 2011), especially for beginning readers of the language (Scarborough 2005). Despite being older and having better L1 skills, the older group relied on phonological awareness to read words and pseudowords in English, as they were still relatively unfamiliar with English reading. For the younger group, only phonological awareness was related to pseudoword reading. This finding indicates that these learners were limited to using simple grapheme-phoneme decoding to read these pseudowords (Ehri 2017).

4.2.2. Differences in English Variables Related to English Word and Pseudoword Reading

The groups differed in terms of variables related to word and pseudoword reading. For the younger group, English vocabulary knowledge was related to word reading in addition to phonological awareness. This finding has been reported in other research with young English L2 learners (Gottardo 2002). English has an opaque orthography that does not always allow for consistent letter-sound decoding of words (Treiman and Kessler 2006). In English, vocabulary knowledge facilitates the reading of irregular letter-sound patterns, such as "*one*" or '*yacht*', when letter-by-letter decoding results in imperfect matches with words in the reader's mental lexicon (Share 1995; Tunmer and Chapman 2012). Therefore, familiarity with English vocabulary provides another source of information when learners are decoding visually unfamiliar words for the first time. For native English speakers, most of the grade or age-appropriate texts read by beginning readers contain words that the children have encountered in their everyday conversations. Therefore, although they might use their vocabulary knowledge to determine the pronunciation of partially decoded words, there is little variability in the knowledge of these high frequency vocabulary items among native English speakers. However, variability in vocabulary knowledge is greater for L2 learners, even for relatively high frequency words, because these learners are relatively unfamiliar with vocabulary in English, their L2. Vocabulary knowledge, which assisted the younger group with partial phonological recoding of words, could not be used to read pseudowords (Share 1995), a finding that was consistent across the two groups (see above).

For the older group, morphological awareness was related to word and pseudoword reading scores. This different pattern suggests that these older learners are using metalinguistic knowledge of morphology to read words and pseudowords in English. For this group, the additional use of morphological awareness skills to read unfamiliar words is likely related to their sensitivity to and the salience of morphology in Arabic (Saiegh-Haddad 2013), which could lead to greater morphological awareness in English.

4.2.3. Arabic Measures Related to English Word Reading

The patterns are somewhat different for the effects of Arabic measures on English reading. Arabic morphological awareness was related to English word reading in the younger group and the older group, showing a consistent relationship across groups for these two variables. However, for the older group, Arabic morphological awareness was no longer related to English word reading when Arabic word reading was entered in the equation. In contrast, Arabic word reading was related to English word reading only for the older group. For this group, Arabic language skills, specifically Arabic morphological awareness, were subsumed under Arabic word reading, which explained a greater proportion of the variance in English word reading. Word reading likely was not related across languages for the younger children due to their low reading scores in Arabic, their L1. In addition, the Arabic word reading task was conducted solely using Modern Standard Arabic, which was likely less familiar to the younger learners who had received little or no schooling in Arabic. In contrast, the older group had higher Arabic word reading scores and, therefore, reading skills could transfer across languages. The findings are consistent with the linguistic interdependence hypothesis which suggests that L1 and L2 skills are interrelated if the learners have certain levels of proficiency in the L1 and L2 (Cummins 1991).

4.2.4. The Role of Morphological Awareness

The relationship between morphological awareness and word reading in these groups of Arabic-English speaking learners can be understood by considering Arabic's highly complex derivational morphology with its root and pattern system of infixes and affixes (Saiegh-Haddad 2013). Exposure to and use of a morphologically complex language could result in learners becoming more aware of morphology in their L1 and possibly their L2 (Ramirez et al. 2010; Saiegh-Haddad and Geva 2008). Given the importance of morphological processing and morphological awareness for written and oral Arabic, it is not surprising that learners who have some literacy skills in their L1, Arabic, will use those skills and knowledge of literacy to read their L2 (Saiegh-Haddad and Geva 2008). This relationship is supported by the results of the correlational analyses. For the older children, these skills were related across languages. In this case, metalinguistic skills, such as phonological and morphological awareness, initially were developed through their L1 language and literacy skills and then used to read their L2, English (Koda 2008). Although these learners had low scores on word reading in English, they used their metalinguistic skills to maximize their word and pseudoword reading performance.[5] Therefore, L1 and L2 morphological and phonological awareness should be considered and assessed as variables important for L2 reading for Arabic-English speakers.

Although both phonological awareness and morphological awareness are described as measures of metacognitive awareness, the actual "use" of these skills for word reading might differ across the age groups. For the younger children, English phonological awareness skills were related to word reading in English. Phonological awareness skills are acquired earlier than morphological awareness skills, and it is argued that they do not necessarily require metacognitive awareness (Anthony and Lonigan 2004; Gottardo et al. 1996; Turan and Gul 2008). Previous research has shown that with high quality instruction, L2 learners can acquire L2 phonological awareness and decoding skills even if their L2 oral language proficiency is well below grade level (Gersten and Baker 2000; Lesaux et al. 2007; Lesaux and Siegel 2003). The different patterns of results with the Arabic measures being more likely to be related to English word reading in the older group suggest greater use of metalinguistic awareness across languages in relation to word reading for this group (Koda 2008). This cross-linguistic facilitation of L2 skills was likely related to the literacy instruction in Arabic received by the older but not the younger group.

4.3. The Role of Age of Acquisition

The goal of the present study was to examine the role of AoA in relation to beginning L2 oral language and reading acquisition in two groups of Arabic-English speakers. In

addition to AoA, two key factors were identified that could play a role in relations among variables. One factor is likely related to AoA, and the other factor is related to the languages being learned, specifically Arabic and English. Related to AoA, the ability to read the L1 played an important role in acquiring L2 reading skills and influenced the relations between AoA and L2 reading acquisition. Therefore, being literate in an alphabetic L1 resulted in enhanced L2 skills in the older group who had acquired some L1 literacy prior to immigrating to Canada. In contrast, phonological awareness, a skill associated with early literacy, was related to reading in the younger and older groups, who were both beginning readers of English.

Additionally, language-specific factors in terms of the learners' L1 also might have had an impact on variables related to English reading, specifically morphological awareness in English was related to English word reading. The strong relationship between morphological awareness and word reading that was noted for the older group was likely due to the salience of morphology in Arabic and the group's greater language, literacy, and metalinguistic awareness in their L1. Arabic morphological awareness was also related to English word reading in the younger group, suggesting that because the younger group had fewer other skills to draw upon, morphological awareness was related to reading in this group of unskilled readers. The findings suggest the importance of considering AoA in conjunction with the learners' L1 as factors in L2 learning when L2 experience and exposure are controlled.

These immigrant newcomers, who are refugees, are unique in that they had no experience with English prior to arriving in Canada. The lack of English experience in addition to potentially lower L1 literacy skills due to interrupted schooling or impoverished school experiences in their L1 means that the results might not apply fully to other immigrant groups in Canada. For example, most children learning English as an L2 in Canada have had some exposure to English through interactions outside the home or through media (Westernoff 2014). Even children born outside Canada might have learned some English prior to immigrating. However, these Syrian refugee children also had some experiences common to Arabic speakers, including learning to read Arabic script and to speak a language with a highly inflected morphology. Additionally, children who had attended school in Syria had to learn two forms of the language, spoken Arabic and MSA.

4.4. Implications

The findings yielded by these comparisons across groups have potential implications for educators in terms of assessment and instruction. In terms of assessment, phonological awareness remains a key predictor of word reading in beginning readers of an alphabetic language, regardless of their age (Scarborough 2005). Additionally, the strong links between morphological awareness and reading in Arabic speakers suggests that assessments of L1 and/or L2 morphological awareness can be used to determine how the children can use their knowledge about language acquired in their L1 to read their L2. In terms of instruction, in addition to enhancing phonological awareness, educators can utilize Arabic-English-speaking children's knowledge of morphology to point out morphological patterns in English to facilitate reading development. These L1 skills can be leveraged to help learners to acquire L2 skills. The use of L1 skills in learning to read is particularly relevant for learners who are literate in their L1, as was found for the older group in this study. Finally, educators should be aware of and consider the unique experiences of refugees with interruptions to schooling when assessing and creating programs for these L2 learners.

4.5. Limitations

Although this study introduced controls not usually addressed in the research on L2 acquisition, it is not possible to control all aspects on which the groups could differ. For example, each group was exposed to different curricula based on the grades in which they were enrolled. Two years of exposure to literacy in the upper elementary grades seem to have a different effect on L2 skills than two years of literacy exposure in the lower

elementary grades. However, these different experiences did not translate to differences on the oral language measures used in this study.

5. Conclusions

Although AoA is considered an important variable when describing the endpoint of L2 learning, it is rarely used to examine the initial phases of second language acquisition. The participants in this study had been learning English in Canada for approximately two years and had no previous exposure to or instruction in English. The present study provided a unique look at the role of AoA in early language and literacy acquisition in the L2 in groups who differed on AoA but were matched on length of exposure to their L2. Raw scores on language and literacy measures were compared across groups. Additionally, L1 and L2 variables were examined in relation to L2 word and pseudoword reading. Not surprisingly the older group, ages 9 to 13 years, had higher scores on all L1 variables. However, surprisingly, the two groups did not differ on scores on several English oral language measures. Finally, the two groups showed different patterns of relations between L1 and L2 variables and English reading. These findings point to the unique relations among age, age of acquisition, and L1 and L2 oral language and literacy skills.

Author Contributions: Conceptualization, A.G., J.P. and X.C.; methodology, A.G., J.P., X.C. and N.A.; formal analysis, A.G.; investigation, R.A.-J., A.S.-C. and N.A.; data curation, R.A.-J. and A.S.-C.; writing, A.G.; project administration, J.P., X.C. and A.G.; funding acquisition, J.P., X.C. and A.G. All authors have read and agreed to the published version of the manuscript.

Funding: The research was funded by the Social Sciences and Humanities Research Council of Canada (Partnership Grant: principal investigator Ungar, co-investigators Chen and Paradis; Insight Development Grant: principal investigator Chen, co-investigators Paradis and Gottardo).

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Research Ethics Board of Wilfrid Laurier University (REB#5505).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Enquires regarding the data in this study should be addressed directly to A. Gottardo as it is not publicly available yet.

Conflicts of Interest: The authors declare no conflict of interest.

Notes

1 In contrast: research conducted with young children compares children who learn two languages at an early age. For example, simultaneous bilinguals who learn both languages before age 2 are compared to early bilinguals who acquire both languages by age 4 (DeHouwer 2012, 2021; Schulz and Grimm 2019).

2 Age was highly related to word reading when entered as the first step, $\beta = 0.560$, $t_{(95)} = 6.56$, $p < 0.001$, when the groups were combined. This value is consistent for all the regression analyses with word reading. However, the goal of the study was to compare the two age groups matched on length of exposure to English in Canada and linguistic experiences in the home as per the analyses reported in this paper.

3 Age was highly related to pseudoword reading when entered as the first step, $\beta = 0.337$, $t_{(95)} = 3.47$, $p < 0.001$, when the groups were combined. However, the goal of the study was to compare the two age groups.

4 The same pattern of results was found for the younger group when Arabic word reading was and was not included in the analyses in Table 7. The lack of a significant relationship between Arabic and English word reading is likely due to the very low scores on Arabic word reading for the younger group (See Table 1).

5 Similar findings using morphological awareness to compensate for weaker reading skills have been documented in monolingual English-speaking adults with dyslexia (Law et al. 2017).

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