

Depth of lexical knowledge among bilingual children: the impact of schooling

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Abstract The majority of studies examining the language and literacy skills of second generation immigrant bilingual children have focused on the breadth of lexical knowledge in populations with a low level of involvement in literacy activities. This study extends previous work in three ways. First, we focused on a sample of second generation immigrant bilingual children from favorable socio-cultural backgrounds. Second, we examined whether these children show lexical knowledge gaps in their second language on various measures of breadth and depth, as compared to their monolingual peers. Finally, we asked whether this gap tends to increase, remain stable, or decrease with formal schooling. Bilingual ($n = 70$) and monolingual ($n = 55$) children between the ages of 7 and 8 years were evaluated on measures of depth and breadth of lexical knowledge in the second language of the bilingual group. Both groups were tested twice: at the beginning of second grade and at the beginning of third grade. The findings indicate a significant gap between the target groups with respect to most measures of both depth and breadth at the beginning of second grade. However, after a year of schooling, the bilingual children showed significant progress in their lexical knowledge in their second language. The discussion addresses theoretical and clinical implications of these findings.

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Introduction

It is commonly accepted that lexical knowledge is an important factor in school success (Snow, 1990). Early gaps in expressive and receptive semantic development appear to have a strong effect on listening and reading comprehension, as well as on further academic progress. Language minority children live in homes where a language other than the socially dominant one is used. Often, these children enter school with limited lexical knowledge of the dominant second language (L2; e.g., Cobo-Lewis, Pearson, Eilers, & Umbel, 2002). Stoep and Verhoeven (2001) found that Turkish immigrants exhibited a smaller Dutch vocabulary size on receptive and productive vocabulary tests than their monolingual peers and that the gap between these groups tended to increase during elementary school. A cross-sectional study of children aged five to nine, conducted by Bialystok and Feng (as cited in Bialystok, 2009), reported a significant, consistent gap between bilinguals with various linguistic backgrounds and monolinguals at each age on the standardized Peabody Picture Vocabulary Test.

In sum, although much progress has been made in understanding the lexical development of bilingual immigrant children, the characterization of the specific semantic profile of bilingual immigrant children and how it changes with schooling is far from understood. This understanding is especially important, as most studies focusing on bilingual children's delay in L2 lexical knowledge have only addressed vocabulary size (i.e., the quantitative aspect or breadth of vocabulary) and not the depth of lexical knowledge, which limits the conclusions that can be drawn from them.

Given the limited literature on *breadth* and *depth* of vocabulary knowledge in immigrant children, three issues need to be clarified. First, what is lexical knowledge and how should we assess it in the L2? Second, what do we know about the L2 lexical knowledge of second generation immigrants from *enriched home literacy* and socio-cultural backgrounds compared to their monolingual peers? Third, what is the effect of time on the lexical knowledge of these children after intense exposure to an enriched language-based literacy curriculum with a focused emphasis on vocabulary development? This study will address these issues in second generation Russian-speaking immigrants from the Former Soviet Union (FSU) in Israel, characterized by a favorable socio-cultural background (relatively high level of parental education).

Lexical knowledge

Lexical knowledge, or knowing a word, implies knowing many things about the word—its literal meaning; the types of syntactic construction into which it is incorporated; the morphological options it offers; and a rich array of semantic

associates, for example, synonyms, antonyms, and hyponyms (see Nagy & Scott, 2000). Knowing the wealth of representations of the word entails *depth* of lexical knowledge (i.e., how well we know these words, or the qualitative aspects of word knowledge). In contrast, the *breadth* of lexical knowledge refers to the question of how many words we know. Research on L2 lexical knowledge has typically measured vocabulary breadth rather than depth (Wesche & Paribakht, 1996). At the same time, measuring breadth has been criticized and considered of limited value because it ignores the continuous nature of acquiring new words (Nagy, 1988). Verhallen and Schoonen (1993, 1998) claimed that focusing on the question of how many words have been acquired cannot provide data about the depth of word knowledge, which is more critical for the school curriculum. Elementary school children are involved mainly in activities that place demands on their expressive vocabularies, for example, answering open questions and participating in topical discussions. In this context, standard vocabulary test items, such as multiple-choice questions, have frequently been criticized because learners often choose the correct answer by process of elimination and have a 25% chance of guessing the correct answer from four alternatives (e.g., the Peabody test; Wesche & Paribakht, 1996). These tests do not allow children to demonstrate whether they know a word and therefore cannot extend our understanding of how well or how thoroughly a word has been acquired. Moreover, such tests fail to provide important information about the level of children's mastery of a word's sense relations. In light of this, the present study examined two important aspects of L2 vocabulary depth: (1) knowledge of meaning levels of a word (as measured by word description, word association, and antonym knowledge tasks), and (2) knowledge of vocabulary domains that constitute a challenge for second generation bilingual children.

Depth of lexical knowledge

Knowledge of a word's meaning levels

Knowledge of a word's meaning levels implies two fundamental types of sense relations (i.e., semantic relations between units of meaning), *paradigmatic* and *syntagmatic* (Cruse, 1986; Jakobson, 1971; Lyons, 1968). Paradigmatic relations are hierarchically vertical, such as superordination and subordination, and therefore reflect hierarchical relations between items. For example, the superordinate category *furniture* includes such subordinate-level (basic-level) categories as *chair*, *table*, *bed*, and so on. By contrast, syntagmatic sense relations represent horizontal relations between items by providing information concerning the object's appearance, location, or use (e.g., "A watermelon is sweet and tasty"—descriptive characteristic; or "A hammer is something to pound with"—functional description).

Within the paradigmatic sense relations, the basic-level concepts, in turn, can include subdivisions. For instance, the category *spoon* is subdivided into the subordinate-level categories *teaspoon*, *coffee spoon*, *soup spoon*, and so on. Another kind of lexical hierarchy is partonomic, a part-whole hierarchy (meronymy) as in the case of body parts (head-nose). In addition, paradigmatic sense relations are those that express a relationship between the meanings of words, for example, some

words are lexical opposites (antonyms): *hot–cold*, *clean–dirty*. At the same time, syntagmatic sense relations relate to the way in which words can and cannot be used together (see Kuczaj, 1999).

Paradigmatic sense relations are considered to be strongly related to the development of high order cognition skills, such as conceptualization, categorization, classification, and de-contextualization of word concepts, which improve with cumulative academic experience (Anglin, 1985; Ordóñez, Carlo, Snow, & McLaughlin, 2002; Verhallen & Schoonen, 1993, 1998). Syntagmatic sense relations reflect vocabulary richness by providing descriptive, associative, and metaphoric information about a variety of distinctive object attributes.

Snow (1990) hypothesized that if the acquisition of paradigmatic knowledge is closely related to academic experience, there would be no difference between native and non-native speakers who acquired English (L1/L2) word definitions in the same classrooms. However, the researcher expected that the children with fewer years of academic schooling in English than their monolingual counterparts might show lower performance on the definition task. In her cross-sectional research, Snow (1990) focused on quality of definition skills among two groups of second to fifth graders: children from English-speaking monolingual homes and children from bilingual homes with different levels of home exposure to the L2 and with different educational history in terms of length of exposure to English as the L2. The findings indicate that native English speakers produced more sophisticated formal definitions than their non-native classmates. In addition, as predicted, school exposure to English (L2) was found to be more crucial than home exposure in promoting performance on the definition task. Namely, schooling history in the L2 explained more variance in L2 word definition than the level of home L2 exposure and paradigmatic sense relations developed within the educational environment. All things considered, these results suggest that performance on definitions in the L2 is most strongly affected not by bilingualism per se, but by opportunities to practice this skill at school and by duration of schooling in the L2.

In sum, relatively few quantitative studies have directly investigated how well second generation immigrants acquire paradigmatic relations in the L2 compared to their monolingual peers (Verhallen & Schoonen, 1993; Vermeer, 2001), and those studies that have examined this question used limited measures of vocabulary knowledge.

Verhallen and Schoonen (1993) used only word definition for the evaluation of L2 vocabulary depth. Similarly, Vermeer (2001) employed only one measure of vocabulary depth, an association task. In addition, in both of these studies, the bilingual participants were children of Turkish immigrants with low SES from working class neighborhoods. These methodological constraints restrict the generalizability of the obtained data. Finally, these studies used cross-sectional designs, which limit our understanding of the possible effect of schooling on depth of L2 lexical knowledge among second generation immigrant children.

To enhance the construct validity of the research, the present study was designed to extend the variety of lexical measures that may be effective in assessing paradigmatic and syntagmatic sense relations of L2 vocabulary knowledge.

Knowledge of vocabulary domains

In addition to the knowledge of meaning levels of a word, the study addressed another important aspect of L2 vocabulary depth—L2 vocabulary domains, which constitute a challenge for second generation bilingual immigrant children (Oller & Pearson, 2002). One might assume that bilinguals have more experience in the L1 in domains related to their home environment (e.g., furniture, kitchen tools) and that the educational context, which exists entirely in the L2, favors exposure to curriculum-related concrete and abstract concepts in this language. The fact that bilingual children could reliably know some words in the L1 but not in the L2, and vice versa, may be attributable to the phenomenon of the *distributed characteristic of bilingual knowledge* described by Cobo-Lewis et al. (2002). In this phenomenon, the vocabulary knowledge of bilingual children does not always cross the language barrier and, therefore, might be distributed between the languages. As noted by Oller and Pearson (2002), this distributed characteristic is inherent in different life circumstances or contexts that usually require bilingual individuals to speak one language or the other. In this context, Pearson and Fernández (1994) proposed the ‘conceptual vocabulary’ notion, which refers to a combined vocabulary across languages. Based on this notion, it was found that conceptual vocabulary size for bilingual and monolingual children was comparable, even though vocabulary size in a single language was superior among the monolinguals (see however, Schaufeli, 1992, for contradicting results). This study extends previous studies on vocabulary domains to immigrant children from favorable socio-cultural backgrounds.

Socio-cultural background and L2 lexical knowledge

A major question regarding the link between lexical knowledge and bilingualism relates to whether or not we can assume the findings regarding lexical knowledge take into account the heterogeneity of second generation immigrant children with respect to socio-cultural background, language dominance and preference, sequence of exposure to both languages, and type of educational system in which they are enrolled.

In a recent meta-analysis, Lesaux and Geva (2006) concluded that a number of variables at the contextual level (e.g., parental education, home literacy, demographics) affect the second-language reading comprehension of language-minority students. In general, the more home literacy experiences and opportunities children have, the more likely they are to do well on literacy outcomes (Goldberg, Paradis, & Crago, 2008). In addition, research on the contribution of home practices has shown that the attitudes, literacy-related activities, and degree of linguistic sophistication that children are exposed to at home from an early age have a long-lasting impact on later academic achievement (August & Shanahan, 2006). Thus, a gap may exist between relatively low socioeconomic background of the immigrant parents and their education level and/or high estimation of the importance of academic progress of the second generation children in the host country. Goldberg, et al. (2008) showed that mothers’ education level was the most consistent predictor of 19 immigrant children’s vocabulary development in English.

This study focused on second generation Russian-speaking immigrants from the FSU to Israel. They are characterized by high education levels, representing an array of academic and white-collar professions. Approximately 60% of the FSU immigrants in the workforce have *academic* professions compared with 30% of the veteran population (Leshem & Lissak, 1999). At the same time, many individuals from this wave of immigration were obliged to seek alternative blue collar employment. Thus, one of the features of this wave of immigration is the discrepancy between the relatively low-middle socioeconomic status of the community and its high education level.

In general, the first generation of immigrants from the FSU in Israel is distinguished by relatively rapid and successful acquisition of Hebrew, the majority language, compared to other waves of immigration to the country (Olshtain & Kotik, 2000). In addition, it has been shown that the academic success of their children is a very important personal objective for these immigrants as parents, both in the country of origin and in Israel as the host country (Horowitz, 1986). Accordingly, one might conclude that these socio-cultural characteristics play a favorable role in the L2 lexical knowledge of the second generation immigrants.

The second generation of Russian-speaking immigrants are generally exposed to the L2 (Hebrew) as soon as they enter a kindergarten at ages two to three, with the result that Hebrew inevitably appears to be the socially and educationally dominant language (Schwartz, 2006). This research population has recently been defined as almost simultaneous or very early successive bilinguals, children who are first exposed to an L2 near to onset of the L1 and enrolled in L2-speaking educational institutions (see Meisel, 2008). Consequently, one might expect only a slight gap in knowledge of Hebrew vocabulary between young Russian-Hebrew speaking (RHS) bilinguals and Hebrew-speaking monolinguals.

Given these favorable socio-cultural and linguistic characteristics of the target research population, this study examines whether RHS bilinguals have significantly less depth of L2 lexical knowledge compared with their monolingual peers and, if so, whether the gap between the groups will be closed or at least diminished as the children progress in schooling (time effect) and exposure to a wide range of literacy activities at school. Our focus was on two data collection points: the beginning of the second grade, in October, after completion of basic literacy skill acquisition in Hebrew (Time I), and at the beginning of the third grade (Time II). We selected 7-year-old children (Time I) because this age allows an examination of the way bilingual children cope with L2 vocabulary testing, having recently acquired basic literacy skills in Hebrew (Share & Levin, 1999). The choice of the beginning of third grade as a second data collection point (Time II) is linked to intensive drilling in written texts and textbooks after the acquisition of basic literacy skills.

In addition, it is important to stress that the second grade is characterized by explicit instruction about text genres, vocabulary, discourse, and morphosyntactic structure of the Hebrew language within the framework of the recently implemented compulsory Ministry of Education program (The New Program of Language Education, Ministry of Education, 2003). Thus, we suggested that intensive exposure to the program and practice in independent reading from the second grade would produce fruitful ground for the participants' progress in lexical knowledge

from Time I to Time II, such that we could observe the effect of schooling. Accordingly, we expected that the children's progress between the two data collection points would provide evidence for the effect of schooling. The independent variable included in the research was a group factor (bilinguals vs. monolinguals). The dependent variable was Hebrew lexical knowledge at the two data collection points.

Research questions

Our specific research questions were as follows:

1. Do bilingual children differ from monolingual children in the breadth of lexical knowledge as measured by the PPVT?
2. Do bilingual children differ from monolingual children in the depth of lexical knowledge as measured by the word description, word association, vocabulary domain knowledge, and antonym knowledge tasks?
3. If so, what is the time effect (effect of schooling) on the differences in lexical knowledge between these two groups?

Method

Participants

The data were collected within the framework of a broader research project entitled *Language knowledge among second generation children of Russian-Jewish immigrants in Israel*. This study investigated L1 Russian and L2 Hebrew lexical knowledge and the factors affecting it among Israeli-born bilingual children beginning their primary education in Israel. A sample of 7–8-year-old bilingual and monolingual children participated in the study. Participants were tested twice on the same lexical knowledge measures, at two data collection points (Time I and Time II).

At Time I, 125 children (70 bilinguals and 55 monolinguals) participated, with a mean age of 7.2 (years, months). At Time II, six children (five bilinguals and one monolingual) were not tested because they changed their place of residence, leaving 119 participants. The higher dropout rate among bilinguals can be attributed to the tendency of RHS immigrants to change their place of residence more often than veteran Israeli citizens (Ben-Rafael et al., 2006). In the data analysis, we referred to the 119 participants at both data collection points.

Participants were selected from 12 elementary schools (24 classrooms) in northern Israel, including the city of Haifa and its suburbs, with a population of predominantly middle-lower socioeconomic status. The relatively large number of schools and classrooms enabled us to minimize school and teacher effects. In all the schools, Hebrew was the sole language of formal instruction and communication and the acquisition of English as a foreign language began in the third grade.

Participant selection was conducted in two stages. First, we obtained parental consent of approximately 70% of the students in these classes by communicating directly with both bilingual (Russian-Hebrew) and monolingual (Hebrew) parents during parent-teacher conferences at the beginning of the school year. The consent form for bilingual parents included questions concerning their date of arrival in Israel and their rating of language dominance at home. Parents were asked to state which language they used: only Russian, only Hebrew, or both Russian and Hebrew, with spouse and children. The reports show that parents preferred to use mainly Russian for communication with their family members. The consent form for monolingual parents included a question regarding whether any languages other than Hebrew were spoken at home. The information obtained shows that parents used only Hebrew in their communication with children. Both groups of parents were asked to state the number of years of their education.

Next, based on the information provided by parents and teachers, we selected two groups of participants: bilinguals and monolinguals, all characterized by the teachers as good readers. To check that all children from bilingual and monolingual comparison groups performed similarly on text reading measures (rate and accuracy, namely that all participants had acquired basic literacy skills), we conducted text reading screening tests (see description in “[Measures](#)” section) before beginning data collection. The bilingual participants, children of Russian-Jewish immigrants, met the following inclusion criteria: (1) speaking Russian as the first and dominant language at home; and (2) Israeli-born ($n = 65$) or having immigrated to Israel at least 5 years before the start of their schooling, that is, before the age of two ($n = 5$). All bilingual children were early successive bilinguals, exposed to the L2 Hebrew in Hebrew-speaking preschool programs from ages 1 to 3 years (Meisel, 2008). The duration of residence in Israel was relatively long among the immigrant families ($M = 11.6$; $SD = 3.93$).

Measures

Text reading and comprehension (Grinboim & Likhter, 1996). Participants were asked to read aloud a text consisting of 78 words at second-grade difficulty level. The test was conducted after the children acquired basic literacy skills, i.e., at the beginning of second grade (the first data collection point). After reading the text, children were asked to answer questions in two categories. The first category included two questions referring to details in the text. Each question received a maximum score according to the number of details asked (the highest being 7). The second category consisted of two questions regarding causal relations stated directly in the text. Scores were computed by allocating one point for each question answered correctly. The overall maximum score on this task was 9. Cronbach’s alpha, an indicator of the internal consistency of the test, was .67.

General cognitive ability: Raven’s colored matrices (Raven, Raven, & Court, 1998 sets A, B, and C). A colored version of a Raven’s Standard Progressive Matrices was used to measure nonverbal ability. Participants selected the correct missing part of a presented pattern. There were 36 trials of increasing difficulty. Following a detailed example, participants were asked to continue the task

independently and to write their answers on a separate page in accordance with the manual instructions. Raw scores were converted to a standardized score ($M = 100$, $SD = 15$). Split-half internal consistency coefficients reported in the literature exceed 0.90 (Raven, Raven, & Court, 1998).

Lexical knowledge

All lexical knowledge tests were administered to bilingual children in Hebrew (L2). Three frequently used tests were conducted: the Peabody Picture Vocabulary Test, Word Description, and Vocabulary Domain Knowledge (Nevo, 1979, Hebrew version; Rom & Moreg, 1999 after Richard & Hanner, 1985; Verhallen & Schoonen, 1993, Hebrew version). One test developed for the present study, Antonym Knowledge, was also administered (see details on development in the depth of vocabulary knowledge subsection). The administration of the tests was oral and all instructions were read by the researchers or research assistants.

Breadth of vocabulary knowledge. To measure the breadth of single word comprehension, the standardized version of the Peabody Picture Vocabulary Test (PPVT-R) was administered (Nevo, 1979, Hebrew version; after Dunn, 1965). In this test, the child is required to indicate which of four pictures best represents a word spoken by the examiner in accordance with the manual instructions ($M = 100$, $SD = 15$). Test–retest reliabilities for the Hebrew version are reported to be .70 and .84 (Aram & Biron, 2004).

Depth of vocabulary knowledge. (1) *Word description* (adapted from Rom and Moreg 1999; Verhallen & Schoonen, 1993; after Richard & Hanner, 1985). Children were given one of five high-frequency concrete nouns as stimulus words (watermelon, telephone, butterfly, bicycle, and bag) and asked to give as many dimensions of meaning as they could think of in answer to an open-ended prompt: “Tell me everything you know about the watermelon.” According to teacher reports, all children were familiar with the stimulus words. To cover all possible meaning dimensions, the children were asked to extend their description of the target word by answering stimulus questions. The aim of this setup was to elicit from the participants all possible word attributes. Questioning was based on the procedure described by Anglin (1985) and Vermeer (2001). The stimulus questions requested a formal definition, i.e., paradigmatic knowledge (e.g., “What is a watermelon?”), external features, i.e., syntagmatic knowledge (color, size and shape; “What does a watermelon usually look like?”), component parts, i.e., paradigmatic knowledge (“What does a watermelon usually contain?”), functional characteristics and use, i.e., syntagmatic knowledge (“What can you do with a watermelon?”), location and time, i.e., syntagmatic knowledge (“Where can you usually find a watermelon? In which season of the year do we usually eat watermelons?”), type and subtypes, i.e., paradigmatic knowledge (“Do you know of different kinds of watermelon?”), and material, i.e., syntagmatic knowledge (“What is a watermelon made of?”). In this way, it was possible to ask at least eight standard questions about each stimulus word. All reports were tape-recorded and transcribed.

Based on the models proposed by Ordóñez et al. (2002) and Verhallen and Schoonen (1993), we calculated the total score for all meaning aspects (*quantity* of knowledge) mentioned by participants, irrespective of the type of meaning aspect (i.e., summary of registered meanings). This measure was calculated by summing all scores assigned to all five words. The scores were calculated by allocating one point for each correct aspect of meaning described.

In addition, to analyze the word meanings expressed, two types of vocabulary knowledge, paradigmatic and syntagmatic, as well as their subsequent divisions, were coded and scored. This analysis was based on the model proposed by Verhallen and Schoonen (1993). For example, a child described a watermelon as “sweet, tasty, and round,” “can be cut into slices and eaten” (syntagmatic sense relations: descriptive information), “and is a fruit, has peel, seeds, juice” (paradigmatic sense relations: a superordinate and a part-whole hierarchy).

The word description measure included subcategories for *paradigmatic sense relations*, including: hierarchical dummy (empty superordinate), hierarchical taxonomical (empty superordinate), and hierarchical partonomic (part-whole relations).

Syntagmatic sense relations were examined by analyzing descriptive information about the object (size, shape, color, taste, location, function, use). Scores were calculated by allocating one point for each correct meaning aspect according to the model presented above.

(2) *Word association task* (Schwartz, Kozminsky, & Leikin, 2006). This semantic association task explores knowledge of syntagmatic meaning aspects. Children were given 45 s to name as many words as possible related to two stimulus words: *picnic* and *Purim*. The two stimulus words were presented orally: the first word, *picnic*, was chosen as a relatively culture-unbiased word strongly associated with family leisure time (i.e., home vocabulary such as picnic equipment, food, etc.). The second word, *Purim* (the Jewish holiday), was selected as a culture-specific word. The number of correct associations mentioned for each stimulus word was scored. For example, one child elicited the following six associations related to the stimulus *Purim*: masquerade, wearing of masks and costumes, *Oznei Haman* (“Haman’s ears”), Queen Esther and *mishloach manot* (“sending small packages of food to friends”).

(3) *Vocabulary domain knowledge* (adapted from Rom & Moreg 1999; after Richard & Hanner, 1985). This vocabulary domain task explores knowledge of paradigmatic sense relations. Participants were required to name three items for each vocabulary domain. The test consisted of 10 domains: musical instruments, holidays, jewelry, vehicles, flowers, furniture, electric tools, trees, home cleaning tools, and sewing tools. The domain of musical instruments, for example, elicited the following responses: drums, fiddle, and cymbals. Scores were calculated by allocating one point for each correct response. The maximum score was 30. Internal consistency was .77.

When bilingual participants had difficulty naming the required number of items for any domain in Hebrew (L2), they were allowed to complete the task in Russian (L1). This enabled us to explore the domains with which the young bilinguals were more familiar in their L1, and to present a challenge for them in either language in

accordance with the *distributed characteristic of bilingual knowledge* (Cobo-Lewis et al., 2002). The number of items added in either language in each domain was calculated.

(4) *Antonym knowledge* (Schwartz et al., 2006). This lexical-opposites task explores knowledge of paradigmatic sense relations. Children were shown 18 pairs of pictures. Each pair represented opposing features of the same object (e.g., a picture of a clean floor and a picture of a dirty floor). After presenting one feature of the object (e.g., “This man is strong,” “This building is new”), the children were asked to name the opposite feature of the object (e.g., “That man is weak,” “That building is old.”) To avoid ambiguity of the pictures in this test and ensure that children would have no difficulty understanding the test items (Verhoeven, 2007), we ran a pilot study with three bilingual and three monolingual children. In addition, two speech therapists were asked to judge the pictures. Based on the comments of the children and speech therapists, we replaced several pictures. Scores were calculated by allocating one point for each correct response. The maximum score was 18. Cronbach’s alpha was .76.

Bilingual children’s language practices at home: parents’ and children’s questionnaires

To collect data regarding language use in the bilingual group, we administered a short questionnaire to bilingual children and their parents. The children’s questionnaire requested information about their linguistic choice, use, and preference by domains and language uses: Russian only, Hebrew only, or both Russian and Hebrew, with father, mother, grandparents, siblings, and Russian-speaking friends. Two additional items provided data about the children’s best-known and favorite language.

The questionnaire was conducted in Russian to determine the extent of children’s communication abilities in Russian. As the issue of the participants’ proficiency in L1 Russian versus L2 Hebrew was not within the scope of the reported study, this point is not addressed in the present paper. Elsewhere, we report that the bilingual children in this sample seemed to be near balanced bilinguals with better lexical knowledge in Hebrew (L2) than in Russian (L1; Schwartz, Kozminsky, & Leikin, 2009).

The parents’ questionnaire requested information about the presence in the home of children’s literature in the target languages, whether they used to read to their child in Russian only, Hebrew only, or in both Russian and Hebrew, whether their child had learned to read Russian, and who exposed the child to Russian literacy (parents, grandparents, caregiver, or teacher within the framework of a community school).

Socioeconomic index of schools

We collected data on the socioeconomic (SE) index of each school involved in the study. This index is calculated by the Israeli Ministry of Education based on parents’ reports of their income, vocation, and occupation, and on a ranking of the

families' residential areas. The SE index is measured on a 10-point scale ranging from 1 to 10, with higher scores indicating lower SE index. In the present study, the SE index for the schools ranged from 4.2 to 7.4 ($M = 5.3$; $SD = 0.93$), showing that the SE index of the schools was average and indicating the average SES of the parents.

Procedure

Testing of both groups at each data collection point (Time I and Time II) was completed in one session lasting approximately 45 min. Each child was individually assessed in a quiet room. A native Hebrew speaker administered the tasks. Instructions were given in Hebrew. The questionnaire for bilingual children was administered by a native Russian speaker at Time I and took approximately 10 min to complete.

Results

Participants' background

The groups did not differ significantly with respect to gender distribution (Time I: $\chi^2_{(1)} = 0.07$, $p > 0.05$; Time II: $\chi^2_{(1)} = 0.38$, $p > 0.05$) or Raven measure [Time I: $F(1, 123) = 0.03$, $p > 0.05$; Time II: $F(1, 117) = 0.19$, $p > 0.05$].

There was a significant difference between the bilingual group and the monolingual group with respect to years of parental education [for the bilingual group: $M = 14.0$; $SD = 1.53$; for the monolingual group: $M = 13.1$; $SD = 1.62$; $F(1, 123) = 6.23$, $p < 0.05$].

Bilingual children's language practices at home: parents' and children's questionnaires

Table 1 summarizes the data obtained from the children's questionnaire.

As indicated in Table 1, while children reported frequent use of Russian (L1) with their parents and grandparents, some were more likely to communicate with their parents in Hebrew only. In addition, as expected, the children commonly used Hebrew with their siblings.

The questionnaire revealed that 61% of the parents stated that their children had been taught literacy in the L1 mostly by grandparents and within the framework of a community school.

It was further found that parents read to their children mainly in Russian and all listed relatively high numbers of titles of books recently read to the child ($M = 4.3$; $SD = 2.20$). At the same time, the parents noted that although they tended to read to the child in the L1, there was a rich choice of child-related literature in Hebrew (L2) at home and a relatively large number of recently purchased books ($M = 3.8$; $SD = 2.50$).

Table 1 Bilingual children's language practices at home (in percentage)

Domain	Hebrew	Russian	Hebrew and Russian
Talking to father	11	58	32
Talking to mother	13	53	34
Talking to grandparents	0	96	4
Talking to siblings	41	23	36
Talking to Russian-speaking friends at school	74	4	21
Talking to Russian-speaking friends outside of school	67	10	23
Watching TV	61	4	34
Listening to stories read by parents	10	70	19
Reading books	60	–	40
Best-known language	61	14	24
Favorite language	56	36	9

Screening tests

Text reading and comprehension

As expected, the reading accuracy and reading rate measures did not reveal statistically significant differences between the groups [accuracy (in percentage of success) for bilinguals: $M = 96.3$, $SD = 4.39$; and for monolinguals: $M = 96.7$, $SD = 4.35$; reading rate (in seconds) for bilinguals: $M = 94.2$, $SD = 37.54$; and for monolinguals: $M = 83.5$, $SD = 42.16$]. Thus, both groups showed near ceiling results on the reading accuracy measure.

However, bilinguals scored significantly lower on reading comprehension [percent of success for bilinguals: $M = 53.2$, $SD = 26.54$; and for monolinguals: $M = 63.4$, $SD = 22.50$; $F(1, 117) = 4.48$, $p < 0.05$].

Lexical knowledge tests

Table 2 summarizes the children's performance on all measures of lexical knowledge in Hebrew at the two data collection points. The table also presents Cohen's d values. Cohen's d was used as a measure of effect size [.20 being small, .50 medium, and .80 large (Cohen, 1992)]. The data indicate a clear tendency for bilinguals to close the gap with the monolinguals on all measures of lexical depth.

To test the effects of schooling (effect of time) and group on all measures of lexical knowledge, and interaction between time and group, we performed four separate ANOVAs (2×2) with repeated measures on the tests of lexical knowledge, and with one within-group variable (Time I and Time II) to verify a schooling effect and one between-group variable (bilinguals vs. monolinguals).

Table 2 Means and standard deviations of lexical knowledge measures in Hebrew (by time of testing)

Variables	Time I				Time II				
	Bilinguals		Monolinguals		Bilinguals		Monolinguals		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>Breadth of vocabulary knowledge</i>									
Vocabulary ^a (PPVT-R)	56.2 (10.67)	61.8 (7.58)	-3.26*	-.56	62.1 (9.74)	67.9 (7.43)	-3.60**	-.63	
<i>Depth of vocabulary knowledge</i>									
Word description ^b (raw score)	34.9 (9.45)	38.2 (7.82)	-2.04*	-.38	43.7 (13.74)	48.4 (11.81)	-1.97	-	
Word associations (picnic; raw score)	6.3 (3.46)	7.0 (2.65)	-1.32	-	7.8 (3.81)	8.1 (3.00)	-.37	-	
Word associations (Purim; raw score)	5.0 (2.64)	6.3 (2.90)	-2.76*	-	6.1 (2.86)	6.6 (3.10)	-.90	-	
Vocabulary domain knowledge	72.1 (18.70)	83.9 (12.16)	-4.27**	-.76	83.0 (10.77)	88.8 (8.86)	-3.09*	-.59	
Antonym knowledge	58.9 (18.95)	70.9 (14.74)	-3.87**	-.71	68.4 (12.80)	74.2 (9.84)	-2.73*	-.51	

* $p < .05$; ** $p < .001$

^a Percentage of success

^b Summary of registered meanings

Breadth of vocabulary knowledge

The analysis revealed significant main effects of time and group on the PPVT receptive vocabulary [$F(1, 117) = 56.57, p < 0.001$; $F(1, 117) = 14.30, p < 0.001$]. No interaction was detected between time and group.

Depth of vocabulary knowledge

Similar to results for the measures of breadth of vocabulary knowledge, there was a significant main effect of time, with both groups improving on all four measures of depth of lexical knowledge: word description (summary of registered meanings), $F(1, 117) = 77.17, p < 0.001$; word association (composite measure of the two stimulus words, *picnic* and *Purim*), $F(1, 117) = 8.69, p < 0.05$; vocabulary domain knowledge: $F(1, 117) = 33.08, p < 0.001$; and antonym knowledge, $F(1, 117) = 21.71, p < 0.01$.

Moreover, we found significant interactions between time and group on two out of four measures of the depth of lexical knowledge: vocabulary domain knowledge, $F(1, 117) = 7.22, p < 0.05$, and antonym knowledge, $F(1, 117) = 6.35, p < 0.05$. These interactions indicate accelerated progress of the bilingual group on the target measures, compared to the monolingual group.

At the same time, main effects of group were found for three measures of depth of lexical knowledge: word description (summary of registered meanings), $F(1, 117) = 5.31, p < 0.05$; vocabulary domain knowledge, $F(1, 117) = 21.22, p < 0.001$; and antonym knowledge, $F(1, 117) = 13.9, p < 0.001$, with monolinguals showing superiority over bilinguals.

Paradigmatic and syntagmatic subcategories of the word description measure. Table 3 presents the results of the children's performance on all subcategories of the word description measures at the two data collection points. The table also presents Cohen's d values.

The findings show that at both data collection points, the two groups performed similarly on two out of four measures of paradigmatic meaning aspects (hierarchical dummy and subordinates) and on one syntagmatic meaning aspect (descriptive information on target words). In addition, it could be clearly seen that the bilinguals closed the gap with the monolinguals on superordinate production at the second data collection point.

To investigate the effects of time and group on paradigmatic meaning aspects, we performed separate ANOVAs (2×2) with repeated measures on two paradigmatic subcategories of word description, which significantly distinguished between the groups at the first data collection point. The findings showed a significant main effect of time with both groups improving on two measures of word description: hierarchical taxonomical, $F(1, 117) = 11.75, p < 0.05$; and hierarchical partonomic, $F(1, 117) = 153.52, p < 0.001$. Furthermore, a main effect of group was found on only one measure of paradigmatic meaning relations: hierarchical partonomic, $F(1, 117) = 11.01, p < 0.001$. Finally, we did not find significant interactions between time and group on any one of the target measures.

Table 3 Means and standard deviations for paradigmatic and syntagmatic subcategories of the word description measures (by time of testing)

Variables	Time I			Time II		
	Bilinguals (n = 65)	Monolinguals (n = 54)	d	Bilinguals (n = 65)	Monolinguals (n = 54)	d
<i>Paradigmatic sense relations</i>						
Hierarchical dummy	18.9 (22.81)	16.7 (24.57)	0.50	36.3 (29.98)	42.6 (27.49)	-1.18
Hierarchical taxonomical (superordinate) ^a	36.0 (19.14)	44.7 (21.07)	-2.42*	46.8 (20.09)	48.5 (17.63)	-0.50
Hierarchical taxonomical (subordinate; raw scores)	4.6 (3.52)	5.1 (3.13)	-0.87	5.6 (4.10)	6.1 (3.48)	-0.66
Hierarchical partonomic (raw scores)	4.2 (2.38)	5.1 (2.86)	-2.05*	7.9 (3.37)	9.5 (2.92)	-2.84*
<i>Syntagmatic sense relations</i>						
Descriptive information (raw scores)	23.3 (5.31)	24.7 (4.56)	-1.53	27.1 (7.83)	29.2 (7.19)	-1.59

* $p < .05$; ** $p < .001$ ^a Percentage of success

Vocabulary domains. Detailed comparison of group performances on the vocabulary domain knowledge test revealed that bilinguals scored significantly lower on only three out of the 10 categories [trees, Time I: $F(1, 117) = 18.17$, $p < 0.001$; Time II: $F(1, 117) = 13.91$, $p < 0.001$; home cleaning tools, Time I: $F(1, 117) = 5.23$, $p < 0.05$; Time II: $F(1, 117) = 4.74$, $p < 0.05$; and sewing tools, Time I: $F(1, 117) = 20.33$, $p < 0.001$; Time II: $F(1, 117) = 32.32$, $p < 0.001$]. Finally, in six out of ten categories, there was nearly a ceiling effect for both comparison groups.

To test the effects of time and group on the vocabulary domains that significantly differentiated between the groups (knowledge of home cleaning tools and sewing tools), we performed three separate ANOVAs (2×2) with repeated measures on the tests of the target domains, and with one within-group variable (time) and one between-group variable (bilinguals vs. monolinguals). The analysis revealed a significant main effect of time, with both groups improving on the target measures: trees, $F(1, 117) = 5.59$, $p < 0.05$; home cleaning tools, $F(1, 117) = 9.28$, $p < 0.05$; and sewing tools, $F(1, 117) = 9.73$, $p < 0.05$. At the same time, the main effect of the group that was found on these measures indicates that the gap between the groups still remained: trees, $F(1, 117) = 33.30$, $p < 0.001$; home cleaning tools, $F(1, 117) = 42.46$, $p < 0.001$; and sewing tools, $F(1, 117) = 16.34$, $p < 0.001$. No interaction effects were detected between time and group.

After adding the words completed in Russian to the Hebrew items and obtaining the combined score (Hebrew + Russian), the monolinguals were still significantly superior in the tree and home cleaning tool categories (see Table 4) at the first data collection point.

Concerning the second data collection point, it can be seen that even after adding the words completed in the L1 (Hebrew + Russian), the gap between the groups still remained significant in all three target vocabulary domains.

Discussion

This study adds to the existing literature in three substantial ways. First, our bilingual participants exhibited differential performance on various aspects of word knowledge, supporting the notion that lexical knowledge is multidimensional and layered. Thus, when examining second language acquisition, multiple language measures should be used. Second, longitudinal data revealed that whereas many gaps were closed between bilinguals and their monolingual cohort in expressive language, gaps remained in depth of word knowledge. Understanding the specific patterns of growth over time is essential for understanding the role of schooling for the advancement of the L2. Third, the bilinguals in this sample showed many language strengths compared to other immigrant children acquiring L2 in the literature. Thus, these findings imply that second generation immigrant children cannot be characterized as a homogenous population. The background, home experiences, and parenting styles to which they have been exposed may influence the rate and quality of their L2 lexical knowledge acquisition. In this discussion, we will expand on each of these points.

Table 4 Mean percentages and standard deviations (in parentheses) of selected semantic categories in Hebrew for the bilingual group (before and after adding words in Russian to Hebrew words) and for the monolingual group (by time of testing)

Variables	Time I				Time II			
	Bilinguals (n = 65)		Monolinguals (n = 54)		Bilinguals (n = 65)		Monolinguals (n = 54)	
	Hebrew	Hebrew + Russian	Hebrew	Russian	Hebrew	Hebrew + Russian	Hebrew	Russian
Trees	55.2 (40.48)	56.7 (41.45)	83.0 (29.31)	83.0 (29.31)	68.2 (36.05)	68.2 (36.05)	87.0 (20.90)	87.0 (20.90)
Home cleaning tools	40.5 (29.43)	51.9 (34.35)	70.9 (31.46)	70.9 (31.46)	53.9 (32.11)	53.9 (32.11)	79.9 (26.43)	79.9 (26.43)
Sewing tools	44.8 (40.88)	52.4 (43.80)	64.9 (29.69)	64.9 (29.69)	52.3 (39.95)	52.3 (39.95)	77.2 (24.07)	77.2 (24.07)

t^1 , t value comparing bilinguals with monolinguals before adding words in Russian to Hebrew words; t^2 , t value comparing bilinguals with monolinguals after adding words in Russian to Hebrew words

* $p < .05$, ** $p < .001$

The importance of addressing the multidimensional nature of words in bilingual research

Linguists and philosophers have long theorized about the complexity of semantic knowledge. In his seventh letter, Plato (Wolf, 2007) conceptualized word knowledge as extending from the simple recognition of a name through familiarity with images and definitions to a deeper knowledge of the true meaning and essence of a concept. Certain parallels exist between Plato's views and those of researchers who suggest that word knowledge is composed of several quantitative stages and qualitative aspects. Perfetti and Hart (2002) suggested that the quality of lexical representation is composed of the reader's knowledge of the components of a given word, its meaning, and knowledge about word use, which combines meaning with pragmatic uses. A single measure of word breadth would not have captured the quality of the lexical representation of this group's vocabulary knowledge. Thus, while the bilinguals in this study exhibited persistent lags on the receptive task of breadth of lexical knowledge (as measured by single word comprehension on the PPVT) compared to the monolinguals, their pragmatic use and expressive knowledge of words was more closely matched with their monolingual classmates and showed significant gains over time. The PPVT as a receptive word comprehension task is not specific and asks the child to label very general objects. It may be that while the children have this core knowledge, their first inclination is to retrieve it in their mother tongue, and then due to the time constraint (5 s per answer), they receive lower scores than those expected based on their actual knowledge on this task in Hebrew. In addition, bilinguals in this study exhibited good knowledge of word form, as measured by their reading skills. However, as expected based on the simple view of reading process (Gough & Tunmer, 1986), their reading comprehension was lower than the monolinguals at the first data point and was probably compromised by their still relatively lower vocabulary skills. As reading comprehension data were not collected at the second data point, it is not known whether the significant gains in vocabulary translated into gains in comprehension (August, Carlo, Dressler, & Snow, 2005). Future studies should also focus on reading comprehension development in bilinguals (Lesaux, Koda, Siegel, & Shanahan, 2006).

In summary, findings from this study support the multidimensional nature of the word and the continuous nature of word learning (Nagy & Scott, 2000). The semantic knowledge of bilinguals in this study developed incrementally through varying stages of partial knowledge (i.e., recognizing a word in context, providing antonyms, listing family members) to being able to define the word fully. This indicates that a battery of measures that are more closely tied to the curriculum and everyday use would be more clinically and educationally relevant for this sample.

The effects of schooling on different aspects of word knowledge

This study is one of the first to follow the language development of bilingual children over time, breaking down word knowledge into syntagmatic and paradigmatic measures. Previous studies found that children first build syntagmatic

knowledge, and by age six to seven, reorganize their mental filing system, allowing a shift towards the construction of paradigmatic knowledge. This layered filing system underlies the ability to separate words from sentences, hence enabling hierarchical comparison and group inclusion and seclusion operations (Francis, 1972). Interestingly, this study demonstrates that the development of the second language follows the same syntagmatic-paradigmatic shift as in the case of monolingual development. Thus, although children showed culture-specific gaps on syntagmatic knowledge, most of the initial and persisting gaps were found more in paradigmatic knowledge.

Knowledge of a word's meaning levels

Syntagmatic sense relations: word description and word association tasks

From the beginning of schooling, the syntagmatic sense relations of bilinguals were very closely matched to those of their monolingual peers, especially when describing features of the culturally neutral stimulus (e.g., watermelon or butterfly) and culture-nonspecific stimulus (picnic). However, they entered school with specific gaps on a culture-specific stimulus word (Purim). As the existing gaps were in cultural schemata, the cultural schemata were acquired with schooling and the gap was closed (Droop & Verhoeven, 1998; García, 2000).

Paradigmatic sense relations: word description

Snow claimed that paradigmatic knowledge increases with classroom instruction (1990) and might be attributed to the development of high order cognition skills, such as conceptualization, categorization, and classification (Anglin, 1993). In fact, some studies have shown that older bilinguals may enhance paradigmatic organization of the semantic lexicon (Sheng, McGregor, & Marian, 2006). However, while schooling was critical for paradigmatic sense relation development for all the children in this sample, bilinguals took longer to acquire these relations. The bilinguals closed the gap with the monolinguals on superordinate production ("Butterfly is an insect," "Watermelon is a fruit") at the second data collection point.

Antonym knowledge

In addition, although the bilinguals did not close the gap on antonym knowledge as a kind of paradigmatic sense relation, they did show significant progress compared to the monolinguals (growth of 10% vs. 4% for monolinguals). The progress of bilinguals with respect to antonym knowledge is especially meaningful in the context of their lexical development in the L2. This is because antonyms present one of the most important semantic relations for expressing lexical devices by grading something as being *more than* or *less than* and by referring to *opposite* qualities, which is essential for comparison skills (Lyons, 1968, p. 460).

Knowledge of vocabulary domains

Similar to the bilinguals' uneven performance on word knowledge levels, they also exhibited strengths and challenges in their knowledge of vocabulary domains. Thus, despite their solid knowledge of most of these domains, persistent differences at both data points were found for three of the ten word families: trees, home cleaning tools, and sewing tools. While we found significant improvement on these semantic domains, the gap was not closed.

Interestingly, the *distributed characteristic of bilingual knowledge* (Cobo-Lewis et al., 2002; Pearson & Fernández, 1994) was not supported. Even in vocabulary domains activated primarily in the home environment, such as home cleaning tools (Cobo-Lewis et al., 2002), where the L1 was the dominant communication language, the children did not show significant knowledge in L1 vocabulary after calculating the combined score (Hebrew + Russian) of the bilinguals in these domains. The gap between the groups diminished only on sewing tools and only at the first data collection point. In addition, the study provided evidence of bilinguals' limited semantic knowledge in Hebrew and Russian (combined score) in the case of names of trees as a domain containing lexical items that refer both to educational (nature study) and leisure time (nature trips) contexts. Note, however, that although we did not find a significant interaction between time and group with respect to trees, the bilinguals showed numerical tendency for intensive progress in this domain (growth of 13% vs. 4% for monolinguals).

In this context, one might argue that the L2 testing situation could have negatively influenced the activation of L1 and L1 word retrieval, and as a result, the children did not show more extensive knowledge of target domains in Russian. However, as noted above, our bilingual children did not show superiority in the L1 even in the home cleaning tool and sewing tool domains when tested in Russian and Hebrew within separate sessions in the previous cross-sectional study (Schwartz, Kozminsky, & Leikin, 2009). We can also speculate that the distributed character of our bilinguals' vocabulary knowledge existed in early childhood and gradually declined with time, as their domain-specific learning and life experiences increased in the L2 and respectively decreased in their L1, since Hebrew became the dominant language of children's social life and education (see discussion in Oller, 2005).

These findings, however, should be interpreted with caution, as we used a relatively limited number of vocabulary domains in our assessment. Ten contexts of language experience constitute a very small sample of the vocabulary domains with which children are expected to be familiar at age seven. Future developmental studies should follow the path of vocabulary domains in both the L1 and the L2.

Heterogeneity of bilingual second generation immigration children

One of the central assumptions of the present research project was that the favorable sociocultural and linguistic conditions of the target research population would positively mediate their L2 lexical knowledge acquisition. This hypothesis was partially confirmed. On one hand, similar to previous data (Verhallen & Schoonen 1993), our findings confirmed the existence of a significant gap between the target

groups on most measures of lexical knowledge depth at the first data collection point. On the other hand, contrary to data reported by others (Bialystok, 2009; Stoep & Verhoeven, 2001), we did not find evidence of an increase in the gap between bilinguals and monolinguals between the two data collection points. Thus, even if exposure to literacy is in their L1 rather than the language used at school, children from highly literate backgrounds tend to progress further in school and close the gap, as opposed to language learners in their cohort who come from less literacy-privileged homes.

One of the major sources of heterogeneity among bilingual second generation immigrant children beyond the L1 and the L2 to which they are exposed, is family background. Related parental factors (parental education, level of L2 mastery, home literacy, the role that parents undertake in the *education enterprise* of their children, the cultural capital resources, the parents' ability to support academic progress) have also been consistently shown to be related to reading comprehension among minority students (Lesaux et al., 2006). Research primarily directed at early literacy development has shown the home environment to be an important factor for reading skill development. These studies have typically examined parental literacy levels, reading materials in the home, and parent reports of children's literacy behaviors (e.g., Saracho, 1997). Recently, researchers have attempted to include other measures of home literacy; for example, Sénéchal, LeFevre, Hudson, and Lawson (1996) found a positive correlation between the reading activities of individual parents and child language scores.

A literacy-rich home environment, as reported by Russian families in the survey for this study, characterizes the family setting of Russian immigrants around the world. Similar to other studies of this immigrant population, the parents of bilingual children in this sample reported very high levels of home literacy, as well as high education levels (higher than monolinguals; Leshem & Lissak, 1999).

With regard to heterogeneity of second generation immigration children, it is also important to address the possible impact of language interaction in the family milieu (parents, grandparents, siblings) and social milieu (friends, classmates, caregivers, educators; Spolsky, 2007). While Russian was the dominant language of parent-child communication in this study, this is not the case for communication between siblings. Hebrew was the preferred language of communication with Russian-speaking friends and siblings. In addition, the questionnaire revealed that most bilingual children considered Hebrew to be their strongest and preferred language.

Conclusion

In conclusion, the findings of this study shed light on the development of lexical knowledge in L2 immigrant families characterized by strong literacy home environments and support of academic development. These findings are in line with Louie's (2004) qualitative study of the Chinese immigrant community to the US. In this community, even parents with limited education and L2 language skills were deeply convinced of the importance of schooling and academic progress to

enhancing their children's opportunities in the US. In the same vein, Chen (2007) found that children of Chinese origin outperformed all other children in UK schools.

To complete the picture regarding the role of immigrant parent educational level, recent data of Goldberg et al. (2008) point out that immigrant mothers' education and home literacy in the L1 make a significant contribution to children's progress in the L2 vocabulary acquisition even within a relatively short period of their exposure to the L2. To conclude, it seems that immigrant children from highly educated families have a tendency to perform better in schools than children from families of less skilled workers (Portes & Rumbaut, 2001).

Thus, we need to be cautious when generalizing about the persistently growing gap between second generation immigrants and their monolingual peers on lexical knowledge measures in the L2 and give greater consideration to the socio-cultural background of immigrant families and its heterogeneity over and above their SES. Future research should also compare second generation RHS immigrants from favorable socio-cultural backgrounds with their peers from less favorable socio-cultural backgrounds with respect to the target measures explored in this study.

No single study can address all the issues related to exploring lexical knowledge in the L2 among young second generation immigrants, but the present study broadens the existing empirical database within the framework of multi-interval design and with regard to the multidimensional nature of words and socio-cultural background of second generation immigrants.

In sum, findings from this study suggest that socio-cultural background, which influences home literacy environment and attitudes towards schooling, affects not only reading comprehension (Katzir, Lesaux, & Kim, 2009), but also the rate and quality of lexical development.

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