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L1 AND L2 PROFICIENCY IN HEBREW-ENGLISH ADOLESCENT LEARNERS

The idea that linguistic abilities in a first and a second or foreign language are intimately related has been around for a long time. Much research has been devoted to the question of transfer of language properties from L1 into L2, querying the external and internal conditions under which knowledge of a first language would impact on learners' knowledge and use of a second language (Jarvis, 2000). A relevant question in this respect is to what extent learners' native-language skills and abilities play a role in their L2 learning and proficiency (Geva & Verhoeven, 2000; Rubin, 1987). The current chapter explores this question in comparing spoken and written language skills in Hebrew as L1 and in English as L2 in junior highschool students independently assessed as poor and good readers respectively in English as a foreign language.

We begin with a review of current psycholinguistic theories regarding quantitative and qualitative lexical development in both speech and writing as a crucial factor in L1 acquisition and development, and especially between vocabulary size and reading comprehension (Ameel, Malt & Storms, 2008; Wesche & Paribakht, 1996). A dominant theory about the

growth of the lexicon is The Lexical Restructuring Model, according to which phonological awareness is based on the quality of phonological representations (Metsala & Walley, 1998). Lexical representations are initially holistic and become more specified over a long period, while acquiring finer phonemic distinctions under the pressure of the growing and changing mental lexicon (Gruenenfelder & Pisoni, 2009). In the early preschool and school years, print and phonological awareness and vocabulary size are already related (Garlock, Walley, & Metsala, 2001); with the advent and consolidation of literacy, the lexicon of school children increases exponentially through exposure to the written texts (Verhoeven, van Leeuwe & Vermeer, 2011). Streamlined and automatic word decoding is a desirable attainment at this stage, leading to the reading fluency that is essential for the development of vocabulary and reading comprehension (Stanovich, 2000). Correct word decoding also provides learners with feedback on the phonological structure of words and their relationships to orthographic representations, a critical self-teaching device that platforms learning new words (Share, 2004).

In this context, the concept of lexical quality (Perfetti & Hart, 2001) is hypothesized to directly affect reading comprehension, and is critical to the current study. Lexical quality refers to thorough, precise and extensive knowledge of a word's lexical representation and all its facets - orthographic, phonological, grammatical and semantic (Perfetti, 2007;

Perfetti & Hart, 2001; Perfetti, Landi & Oakhill, 2005). Research shows that reading comprehension in children and adults is indeed platformed by the quality of lexical representations in this broad sense (Verhoeven & van Leeuwe, 2008, 2009).

It thus makes sense to assume that this relationship between lexical and grammatical knowledge and reading / writing ability should apply to learning and mastering a second or foreign language, given that the necessary skills in both cases are linguistic (Chenoweth & Hayes, 2001; Dörnyei, 2005; Durgunoğlu, 2002). This assumption has been taken up by two different hypotheses. One is Cummins' Interdependence Hypothesis in bilingualism, claiming that L2 language and literacy skills are dependent in part on L1 literacy abilities, so that language skills will transfer from L1 to L2 given sufficient exposure to the L2 and motivation to learn the language (Cummins, 1979, 1984; Verhoeven, 1994).

From a different perspective, and more pertinent to the current endeavor, is Sparks' LCDH (the Linguistic Coding Differences Hypothesis), proposing that learning L1 and L2 is based on basic and shared language learning mechanisms (Sparks & Ganschow, 1993). Recent work shows that indeed language-related variables are the most robust predictors of L2 proficiency, so that high proficiency L2 learners are in possession of stronger L1 skills and L2 aptitude than average and low-proficiency L2 learners (Sparks, Patton, Ganschow & Humbach, 2009). Such aptitude differences emerge

early on in gradeschool (Meschyan & Hernandez, 2002) and continue to be related to L2 proficiency and achievement in high school. Older learners in high school and college who achieve higher levels of L2 proficiency continue to exhibit stronger L1 skills, especially phonological processing skills (Kormos & Sáfár, 2008; Palladino & Ferrari, 2008) than L2 learners who exhibit lower levels of L2 proficiency and achievement (Geva, Wade-Wolley & Shany, 1997; Sparks et al, 1998). L1 skills are strongly related to L2 reading comprehension, as the LCDH would predict (Koda, 2007; Prior, in press). For example, Proctor et al (2006) showed the impact of L1 (Spanish) vocabulary knowledge on L2 reading comprehension (English), and, importantly, that fluent L2 readers benefit more from L1 vocabulary knowledge than less fluent readers.

As the current study examines language skills in Hebrew-speaking students learning English as a foreign language, it is important to note research by Kahn-Horwitz, Shimron & Sparks (2005, 2006). Framed in the Linguistic Coding Differences Hypothesis (LCDH), these studies examined weak vs. strong beginner EFL readers. The main finding was that the EFL linguistic skills that differentiated reading ability in English were knowledge of English vocabulary together with Hebrew L1 word reading and vocabulary knowledge. Thus, students who were weak in English reading comprehension had poorer Hebrew word reading and Hebrew phonological awareness.

Against this background, the study described in this chapter focuses on the relationship between L1 (Hebrew) and L2 (English) poor and strong EFL readers from a somewhat different perspective, examining in depth knowledge of Hebrew-specific constructions and of English vocabulary and morpho-syntax formally taught in school. The idea was to see whether those students defined as 'poor readers' are in fact poor language learners. This would be apparent in two contexts: one, lexical and grammatical knowledge in both spoken and written English, and two, Hebrew proficiency typically acquired in school age. Given the literature cited above, we predicted (1) that good readers should do better than poor readers on both spoken and written English tasks; (2) that both groups should show grade level effects in both languages; and (3) linguistic proficiency in Hebrew as L1 would be closely linked to success in acquiring English as a foreign language.

METHOD

Secondary schools in Israel places English learners in learning groups based on language proficiency, as tested at key points of time (beginning and end of year). The current study explored proficiency of Hebrew as L1 and English as L2 in students who had been placed in strong and weak English study groups, termed 'good' and 'weak' respectively. Student placement was determined based on bi-monthly assessment tests conducted by the classroom English teachers.

Participants. Four groups of students participated in this study: Two groups of 7th graders (12-13 year olds) – 14 good readers and 11 poor readers respectively; and two groups of 9th graders (14-15 year olds) – 14 good readers and 15 poor readers respectively. All participants attended the same school in a high-SES suburb of Tel Aviv. They were all native speakers of Hebrew with no other language spoken at home, and none of them had been diagnosed with language or emotional impairment. They had no physical impediments such as hearing or vision impairment.

Instruments and procedure. To examine their native Hebrew and English L2 proficiency, participants were administered two sets of tests assessing spoken and written aspects of these two languages. All tasks were presented in the same order, with the English tasks preceding the Hebrew tasks so as to ensure students' maximal concentration. The English tasks were designed to meet the requirements of foreign English teaching in 7th grade. The Hebrew tasks had been designed for testing age-appropriate native Hebrew knowledge in adolescence (Ravid, 2004; Ravid & Avidor, 1998). Students were tested individually by the second author in the month of April in a quiet room at their school. Each test was preceded by an explanation and two training examples. The first set of tests consisted of spoken English tasks, followed by the first part of the Hebrew tasks. The second set was administered two weeks later. It consisted of the written English tasks

followed by the second part of the Hebrew tasks. For the spoken English tasks, each participant was given earphones to ensure optimal hearing.

The English tasks. The idea behind the English tasks was to determine whether students classified as 'poor readers' were indeed poor readers or poor language learners in general. Thus the tasks consisted of a spoken set and a written set. The tasks were geared towards 7th grade level, and they were administered to both groups of participants – 7th and 9th graders. The English tasks were constructed by the second author, an English school teacher highly familiar with the requirements of English as L2 for junior highschool in Israel, and by the first author, linguist and developmental psycholinguist.

I Spoken English tasks

1. *Confrontational naming.* Participants were asked to name a set of 20 cards with pictures of objects such as *camera, horse, ship* or *keys*. The second author recorded the responses on a designated form.
2. *Word order.* Participants heard a set of 12 pre-recorded sentences read by a native English speaker. Some of them had correct word order (e.g., *the dog came into the room*) and others had incorrect word order (e.g., *a good job have I*). There were no other errors in the sentences. The student was asked to judge whether each sentence was correct. Her responses were marked on a designated form.

3. *English grammar.* Participants heard a set of 16 pre-recorded sentences read by a native English speaker. Some of them were grammatically correct (e.g., *she has a good friend*) and others had incorrect word order (e.g., *My father isn't smoke cigars*). The grammatical errors did not involve word order. The student was asked to judge whether each sentence was correct. Her responses were marked on a designated form.
4. *Oral reading.* Participants were recorded reading aloud a simple text in English, comprising 9 sentences in 84 words. Their reading was scored as detailed below.

II Written English tasks

1. *Naming.* Participants were presented with the same set of 20 cards with pictures of objects and asked to match each picture with its written name from an additional set of cards with object names (e.g., match the card with the word *camera* to the picture of a camera).
2. *Word order.* Participants were presented with a written list of the same 12 sentences, some of which with correct word order and others with incorrect word order. The student was asked to mark next to each sentence whether it was correct.
3. *English grammar.* Participants were presented with a written list of the same 16 sentences, some of which were grammatical and some

were not. The student was asked to mark next to each sentence whether it was correct.

4. *Reading comprehension.* Students were asked to read a short and linguistically simple text of about 130 words in English and to answer a set of four reading comprehension questions about it. Questions and answers were in Hebrew so as not to add a second level of difficulty and assessment.

The Hebrew tasks. Hebrew tasks tested lexical and morpho-syntactic abilities typically developing in young adolescence so as to determine whether 'poor readers' had also lower proficiency in their mother tongue. All task items had been tested before on same-age populations in several different studies (Ravid, 2004, 2006; Ravid & Avidor, 1998; Schiff, Ravid & Levy-Shimon, 2011). In addition, the tasks included a short cloze passage which tested reading comprehension by the ability to retrieve missing words of different lexical categories (Brown, 1983). None of the tasks directly tested material taught in school in the Hebrew Language Arts curriculum.

1. *Emotions task.* Participants were asked to name 20 sensations and emotions by abstract Hebrew nominal morphologically related to given verbs and adjectives. For example, *mi she-sameáx yesh lo hargasha shel... **simxa*** 'a person who is happy has a feeling of... **happiness**' (correct response in bold).

1. *Passive task.* Participants were asked to change six active sentences into passive ones, e.g., *dan hexbi et ha-kadur ba-argaz* → *ha-kadur huxba ba-argaz (al yedey dan)* 'Dan hid the ball in the crate → the ball was hidden in crate (by Dan)'.
2. *Optional morphology* (two tasks). Participants were asked (1) to transform 12 bound forms into analytic ones (e.g., write out the full form of the verb *re'itiv* 'I-saw-him') and (2) vice versa (e.g., write *ha-armon shela* 'her palace' in one word *armona*).
3. *Machine task.* Participants were asked to name the action performed by a hypothetical machine by producing the action nominal morphologically related to a given verb in a compound (20 items). For example, *eyx tikra le-mexona she-sogéret dvarim? mexonat-...sgira* 'what would you call a machine that **closes** things? A **closing** machine'.
4. *Lexical derivation.* Participants were asked to select the correct form of the nominal out of two possibilities derived from the same root (Seroussi, 2004). For example, *ha-xole huxash le-beyt xolim leaxar she-ibed et ha-hakara / hekerut* 'the patient was rushed to hospital after having lost **consciousness** / **acquaintance**' (both derived in Hebrew from the same root).
5. *Cloze.* Participants were asked to complete 11 missing words in a 180-word text about domestic cats. For example, *ha-xatulim xayim*

shlosh-esre to arba-esre _____ (*shanim*) 'cats live thirteen to fourteen _____ (years).'

Scoring. Scoring scales were developed by the two authors to assess the accuracy of the English tasks. For the Hebrew tasks we used scoring scales which had been used in previous studies cited above. All responses were checked separately by the two authors who consequently compared their scoring. Agreement between the two scorers reached 95%. The reading and reading comprehension tasks were scored by two more teachers using the same scales and agreement reached 91%. Below we detail the scoring scales for the English and Hebrew tasks.

Scoring scales - English

Spoken tasks.

1. *Confrontational naming.* Each item received a 0-2 score, with 0 assigned to no response or to a clearly erroneous response (e.g., *picture* for *camera*). The score of 1 was assigned to a partial response, e.g., *shoe* for *shoes*. The score of 2 was assigned to a correct response.
2. *Word order.* Each item received a 0-1 score, with 0 assigned to no response or to an erroneous response, 1 to a correct response.
3. *English grammar.* Each item received a 0-1 score, with 0 assigned to no response or to an erroneous response, 1 to a correct response.

4. *Oral reading.* Each sentence out of the 9 comprising the text received a 0-3 score. 0 was assigned to no reading, 1 to non-fluent reading with many errors, 2 to less fluent reading with some errors, and 3 to fluent and accurate reading.

Written tasks.

1. *Naming.* Each item received a 0-1 score, with 0 assigned to no response or to an erroneous response, 1 to a correct response.
2. *Word order.* Each item received a 0-1 score, with 0 assigned to no response or to an erroneous response, 1 to a correct response.
3. *English grammar.* Each item received a 0-1 score, with 0 assigned to no response or to an erroneous response, 1 to a correct response.
4. *Reading comprehension.* The four questions and responses to them were in Hebrew. Hebrew errors were not taken into account in scoring the answers. Each answer received a 0-3 score. A score of 0 was assigned to no response, an irrelevant or erroneous response, for example, on defining Erez's problem (on which the response should focus on his TV addiction) as *'he has just one friend named Gil and he's busy all day'* or *'Erez cannot get along with his friends'*. A score of 1 was assigned to a very partial response, e.g., when asked to tell who Sasha is and what is his relation to Erez, responding only about the second part (*he is Gil's friend*). A score of 2 was assigned to a partial, almost accurate response, e.g., in response to the question

about the differences between Gil and Erez, saying that Gil has many hobbies without mentioning any of them or that Erez is addicted to TV. A score of 3 was assigned to a correct response.

Scoring scales - Hebrew

1. *Emotions task*. Each item was scored on a 0-3 scale, with 0 assigned to no or irrelevant response, 1 to a root-related response which does not name an emotion by abstract nominal, 2 to an abstract nominal with the correct root but with an erroneous pattern or suffix, and 3 to a correct response containing all correct components.
2. *Passive task*. Each item was scored on a 0-2 scale, with 0 assigned to no or irrelevant response, 1 to a root- or pattern-related response which does not produce a correct passive form, and 2 to a correct passive form.
3. *Optional morphology* (two tasks). Each item was scored on a 0-3 scale, with 0 assigned to no response, 1 to a partial response which makes use of one of the morphological components, 2 to an almost correct response with a small error, and 3 to a correct response containing all correct components.
4. *Machine task*. Each item was scored on a 0-3 scale, with 0 assigned to no or irrelevant response, 1 to a root-related response which does not name an action nominal, 2 to an abstract nominal with the

correct root but an erroneous pattern or suffix, and 3 to a correct response containing all correct components.

5. *Lexical derivation*. Each item was scored on a 0-1 scale, with 0 assigned to erroneous responses and 1 to correct responses.
6. *Cloze*. Each slot was scored on a 0-2 scale, with 0 assigned to no response, 1 to an entry which is close to the correct response, and 2 to a correct response.

In analyzing participants' responses we converted the scoring scales to percentages so as to enable various comparisons. Most of the analyses we present here are *strict*, that is, taking into account only the highest score on each scale. When relevant, we also present *lenient* analyses of the mean on the whole scale. All effects and interactions reported were significant at least at the .05 level.

RESULTS

General comparisons

We start by comparing the overall results across all English and Hebrew tests. Given the great variety between English and Hebrew tasks, this is a lenient analysis which uses the mean on each scale rather than the strictly correct response. Table 1 presents this comparison.

PLEASE INSERT TABLE 1 ABOUT HERE

A three-way ANOVA of grade [2: 7th grade, 9th grade] x reading group [2: poor readers, good readers] x language [2: Hebrew L1, English L2] was performed on the data in Table 1. The following effects emerged: Grade ($F(1,50)=46.78, p<.001$): 9th graders did better ($M=81.24\%$) than 7th graders ($M=69.03\%$); Reading group ($F(1,50)=245.66, p<.001$): Good readers did better ($M=89.12\%$) than poor readers ($M=61.15\%$); and Language ($F(1,50)=18.5, p<.001$): Participants did better on Hebrew, their native tongue ($M=77.78\%$) than on English as L2 ($M=72.49\%$). In addition, three two-way interactions emerged: Grade x language ($F(1,50)=14.21, p<.001$) (Figure 1), Reading group x language ($F(1,50)=45.61, p<.001$) (Figure 2), and Grade x reading group ($F(1,50)=19.94, p<.001$) (Figure 3).

PLEASE INSERT FIGURE 1, FIGURE 2 AND FIGURE 3 ABOUT HERE

Figure 1 shows that the Hebrew advantage comes in fact from 7th grade - across the board 7th graders do better on Hebrew than on English, but this gap closes in 9th grade, and while general improvement in Hebrew is small (about 5%), improvement on English tasks is larger (15%). Figure 2 shows another facet of the interface of participant classification with the languages under investigation: While good readers do well on both Hebrew and English, poor readers do much worse on both languages, with over 20% difference in the Hebrew scores and close to 30% difference in the English scores. Finally, according to Figure 3, there is very little improvement on

the English tasks from 7th to 9th grade in the good readers' group, whereas the poor readers make a 20% improvement on these tasks.

English L2 tasks

Naming tasks

PLEASE INSERT TABLE 2 ABOUT HERE

Recall that we had two naming tasks – one oral (confrontational naming) and one written (match picture to label). Table 2 presents the results of the strict score analysis on these tasks. A three-way ANOVA of grade [2: 7th grade, 9th grade] x reading group [2: poor readers, good readers] x modality [2: speech, writing] was performed on the data in Table 2. The following effects emerged: Grade ($F(1,50)=23.86$, $p<.001$): 9th graders did better ($M=79.1\%$) than 7th graders ($M=62.6\%$); Reading group ($F(1,50)=130.32$, $p<.001$): Good readers did better ($M=90.18\%$) than poor readers ($M=51.48\%$); and Modality ($F(1,50)=18.5$, $p<.001$): Participants did better in the written modality ($M=82.44\%$) than in the spoken modality ($M=59.22\%$). In addition, two two-way interactions emerged: Reading group x modality ($F(1,50)=8.79$, $p<.001$) (Figure 4), and Grade x reading group ($F(1,50)=9.57$, $p<.001$) (Figure 5).

PLEASE INSERT FIGURES 4 AND 5 ABOUT HERE

Figure 4 shows that the lexical advantage for the written modality – or, rather, the disadvantage for the oral modality – comes more from poor readers, where the modality difference is close to 30%, while in the good readers it approaches 20%. According to Figure 5, good readers make a small improvement on naming from 7th to 9th grade, whereas poor readers gain close to 30%.

Word order

PLEASE INSERT TABLE 3 ABOUT HERE

Recall that we had two word order judgment tasks – one oral and one written. Table 3 presents the results of the strict score analysis on these tasks. A three-way ANOVA of grade [2: 7th grade, 9th grade] x reading group [2: poor readers, good readers] x modality [2: speech, writing] was performed on the data in Table 2. The following effects emerged: Grade ($F(1,50)=13.72, p<.001$): 9th graders did better ($M=86.12\%$) than 7th graders ($M=74.89\%$); and Reading group ($F(1,50)=100.24, p<.001$): Good readers did better ($M=95.68\%$) than poor readers ($M=65.33\%$). There was no effect for modality, i.e., spoken and written tasks did not differ. One two-way interaction of grade x reading group ($F(1,50)=11.62, p<.001$) emerged (Figure 6).

PLEASE INSERT FIGURE 6 ABOUT HERE

According to Figure 6, improvement on judgment of word order is about 25% in the poor readers' group, while good readers maintain their ceiling scores in both grades.

Grammar

PLEASE INSERT TABLE 4 ABOUT HERE

Recall that we had two grammar judgment tasks – one oral and one written. Table 4 presents the results of the strict score analysis on these tasks. A three-way ANOVA of grade [2: 7th grade, 9th grade] x reading group [2: poor readers, good readers] x modality [2: speech, writing] was performed on the data in Table 4. The following effects emerged: Grade ($F(1,50)=25.51, p<.001$): 9th graders did better ($M=77.18\%$) than 7th graders ($M=61.22\%$); Reading group ($F(1,50)=123.28, p<.001$): Good readers did better ($M=86.73\%$) than poor readers ($M=51.67\%$); and Modality ($F(1,50)=11.65, p<.001$): Participants did better in the written modality ($M=72.95\%$) than in the spoken modality ($M=65.45\%$). There emerged one two-way interaction of grade x reading group ($F(1,50)=7.78, p<.001$) (Figure 7).

PLEASE INSERT FIGURE 7 ABOUT HERE

Figure 7 indicates that as in naming and word order judgment, good readers make a small improvement from 7th to 9th grade, whereas poor readers gain over 20%.

Oral reading

PLEASE INSERT TABLE 5 ABOUT HERE

Table 5 presents the results of the lenient score analysis on oral reading. A two-way ANOVA of grade [2: 7th grade, 9th grade] x reading group [2: poor readers, good readers] was performed on the data in Table 5. The following effects emerged: Grade ($F(1,50)=50.85, p<.001$): 9th graders did better ($M=87.76\%$) than 7th graders ($M=66.14\%$); and Reading group ($F(1,50)=149.05, p<.001$): Good readers did better ($M=95.46\%$) than poor readers ($M=58.44\%$). There was a two-way interaction of grade x reading group ($F(1,50)=33.71, p<.001$) (Figure 8).

PLEASE INSERT FIGURE 8 ABOUT HERE

Here, too, good readers maintain their ceiling scores across both grades, while poor readers make an immense improvement of about 40%.

Reading comprehension

PLEASE INSERT TABLE 6 ABOUT HERE

Table 6 presents the results of the lenient score analysis on reading comprehension. A two-way ANOVA of grade [2: 7th grade, 9th grade] x reading group [2: poor readers, good readers] was performed on the data in Table 6. The following effects emerged: Grade ($F(1,50)=15.52, p<.001$): 9th graders did better ($M=64.88\%$) than 7th graders ($M=41.42\%$); and Reading

group ($F(1,50)=49.53, p<.001$): Good readers did better ($M=74.11\%$) than poor readers ($M=32.2\%$). There emerged a two-way interaction of grade x reading group ($F(1,50)=4.16, p<.001$) (Figure 9).

PLEASE INSERT FIGURE 9 ABOUT HERE

While reading comprehension scores are low for both groups, good readers make a small improvement of about 10% from 7th to 9th grade, while poor readers make a 40% gain.

Hebrew L1 tasks

Results of all Hebrew tasks (strict analysis) are presented in Table 7.

PLEASE INSERT TABLE 7 ABOUT HERE

Two-way ANOVAs of grade [2: 7th grade, 9th grade] x reading group [2: poor readers, good readers] were performed on each of the rows in Table 7.

Below we list results for each of the tasks.

Emotions task. Grade ($F(1,50)=8.81, p<.001$): 9th graders did better ($M=72.44\%$) than 7th graders ($M=59.76\%$); Reading group ($F(1,50)=28.46, p<.001$): Good readers did better ($M=77.5\%$) than poor readers ($M=54.7\%$).

No interactions were found.

Passive task. Grade ($F(1,50)=5.14, p<.001$): 9th graders did better ($M=85.99\%$) than 7th graders ($M=59.76\%$); Reading group ($F(1,50)=30.0,$

$p < .001$): Good readers did better ($M = 94.05\%$) than poor readers ($M = 66.57\%$). No interactions were found.

Optional morphology task: Bound → analytic structure. Reading group ($F(1,50) = 7.52$, $p < .001$): Good readers did better ($M = 80.06\%$) than poor readers ($M = 66.79\%$). There was no effect for Grade, and no interactions were found.

Optional morphology task: Analytic → bound structure. Reading group ($F(1,50) = 19.26$, $p < .001$): Good readers did better ($M = 67.09\%$) than poor readers ($M = 47.23\%$). There was no effect for Grade, and no interactions were found.

Machine task. Grade ($F(1,50) = 8.19$, $p < .001$): 9th graders did better ($M = 68.02\%$) than 7th graders ($M = 55.29\%$); Reading group ($F(1,50) = 20.74$, $p < .001$): Good readers did better ($M = 71.79\%$) than poor readers ($M = 51.53\%$). No interactions were found.

Lexical derivation task. Reading group ($F(1,50) = 10.96$, $p < .001$): Good readers did better ($M = 92.86\%$) than poor readers ($M = 82.09\%$). There was no effect for Grade, and no interactions were found.

Cloze task. Reading group ($F(1,50) = 81.44$, $p < .001$): Good readers did better ($M = 75.59\%$) than poor readers ($M = 34.01\%$). There was no effect for Grade, and no interactions were found.

DISCUSSION

This study set out to examine the relationship between proficiency in L2 and L1 in young Hebrew-speaking adolescents classified into two groups according to their reading skill in English L2 (as assessed by their teachers). We hypothesized that students classified as 'poor readers' in English L2 were actually poor language learners with reduced linguistic aptitudes or abilities, which should be manifested not only in their reading skills in English L2 but also in their grammatical and lexical abilities in English as well as in their native tongue. To this end, we tested study participants on both English as L2 and native Hebrew, focusing mostly on lexical and grammatical grade-appropriate knowledge. While not a correlational study, it examined the L1-L2 proficiency relationship by probing into language abilities required in English as taught in school and those attested as typical of native Hebrew development and literacy acquisition in adolescence. In general, Hebrew L1 skills outdid English L2 proficiency, however the interactions in Figure 1 and 2 clearly show that this difference derives from the younger age group, on the one hand, and the poor reader group, on the other. Good readers and 9th graders, in contrast, do as well on age-appropriate requirements in both languages.

English as L2

To illuminate the question of whether so-called 'poor reader' participants were actually poor language learners, we designed four tasks, three of which

were identical, where the written version administered after the spoken version with 2-week interval between them. The two reading tasks investigated fluent oral reading and reading comprehension respectively. The lexical, grammatical and oral reading tasks yielded better results than the reading comprehension task, with good readers reaching almost ceiling and poor readers making excellent gains across junior highschool. Our interpretation of these results is that the more basic vocabulary and grammar skills constitute the platform for the more integrative and cognitively demanding reading comprehension ability, which was difficult even for 9th grade good readers.

Lexicon and grammar. Two main findings emerged on the three English tasks presented in both oral and written forms - naming, word order, and grammar. First, and almost self-evidently, good readers (or, if we may at this early point in the discussion already call them 'good language learners') were already at ceiling or close to it on these tasks. This is first and foremost because the three tasks target 7th-grade level vocabulary and grammatical material, which have obviously already been mastered by the stronger students. The group of poor readers makes good progress on those tasks, reaching between 30-40% improvement by 9th grade. However, given the grade level target of these three tasks and their 9th grade placement as poor readers, this indicates a lag in learning English as L2 which cannot be attributed to reading only.

Second, two of the three tasks (naming and grammar) showed a clear advantage for the *written* presentation of these materials for both reading groups and across the two grades tested. Naming narrowed down this effect in the interaction (Figure 4) which seems at first glance counter-intuitive when applied to the poor reading group: How is it possible that poor readers actually do better on the same test in writing than orally? And how is it possible that the advantage for writing is even greater for poor readers? Where is the hypothesized advantage for the spoken modality that does not require reading skills?

There are several explanations available. The simplest is that the spoken tests preceded the written ones, and thus, despite the two-week interval, students were able to build upon their initial spoken encounter with the spoken task so as to improve the written one. If so, this is good news again, as it points the way towards a pedagogical path to improving poor readers' L2 skills by first presenting them with an oral version of the same task. However, it is really doubtful whether poor readers, especially in 7th grade, were really able to make positive use of this double exposure and hold the test materials in their memory. It might rather be the case that the spoken versions were problematic for poor language learners in two ways, which writing could ameliorate. One was the fact that the oral naming task was in fact harder as it required confrontational naming, i.e., retrieving the correct label for the picture upon request; in contrast, the written task required

matching pictures with labels. Since there was an identical number of pictures and labels, this task was made even easier since even poor reading skills could help in partially identifying the label and matching it to the picture. From another perspective, spoken sentences may have been more difficult to judge since they were pronounced by a native English speaker and had to be retained in memory for judgment. In contrast, the stable and phonology-neutral writing modality reduced participants' need to rely on short-term memory in judging the grammaticality of sentences. To sum up this part, while 9th grade poor readers only manage to catch up with the 7th grade vocabulary and grammar used in this study, the good news is that the written modality is a robust hitching post to their skills. At least according to our results, writing should not be discarded in favor of oral skills in the English L2 class.

Reading. English L2 reading was tested in this study in two ways – in the oral reading of a short text and through reading comprehension questions on another text. The oral reading text was very short (84 words) and appropriate for the reading level of 7th grade English as L2 in Israel. The idea behind oral reading is that it requires attention to prosody, that is acting as the ‘voice’ of the text author by overtly producing the covert intonation patterns of the text and using various supra-segmental devices to help the listener make sense of the text being read. Prosody and fluency are linked in the creation of meaningful units by information processing in long textual

segments (Ravid & Apel-Mashraki, 2007; Samuels, 2002). Research suggests that the prosodic structure of texts is more accessible to fluent and skilled than to weak or novice readers (Faulkner & Levy, 1999; Paleologos & Brabham, 2011). The oral reading task yielded similar ceiling results in the good reader group as the vocabulary and grammatical tasks, showing that their ability to identify words and parse simple sentences in a short and easy text about learning to drive was excellent. However, even the lenient analysis based on a mean of the scoring scale (rather than the best performance) on each sentence was very low, below 40%, in the poor reader 7th graders. Despite the immense gain made by 9th grade poor readers, the gap with good readers is far from closed, and it seems that much work is needed for them to reach the desired prosodic reading level.

Reading comprehension is a different story in this study. Recall that the text was again short, simple, and appropriate for the reading level of 7th graders learning English as L2 in Israel. The scoring of the responses was lenient, that is, taking into account the mean on the scale rather than the absolutely correct response. Moreover, all questions and responses on the text were in Hebrew, so as not to introduce another level of difficulty, and thus indicated comprehension of the English test without being required to actually produce an English text and with no assessment of the Hebrew involved. Nevertheless, even the good readers reached about 70% in 7th grade, with only a 10% gain by 9th grade; whereas 7th poor readers simply could not

handle this task, while 9th grade poor readers reached 50% on this very non-demanding scoring. This reflects (inter alia) the fact that only four out of the 11 7th grade poor readers actually performed the reading task despite being urged to do so, while all 9th grade poor readers did so, except for one student.

This is very strong indication that text comprehension, the hallmark of reading literacy, is sadly lacking in this group. How to explain these results? Beyond the obvious inability of poor readers to tackle the integrative requirements of text comprehension, the answer may partially lie in the text itself. The text selected for this study was structurally simple. It consisted of short sentences with few connectives, and it was all in present tense. From a discourse point of view, it involved familiar activities in young adolescents – watching TV, playing games, having friends and hobbies. It also had only three protagonists – the narrator, Erez, his friend Gil and Gil's friend Sasha. The text's difficulty lay first in understanding the critical word *addict* in the first line, which is the basis for responding to the first question "What is Erez's problem?" -- although its meaning can easily be inferred from the paragraph in which it appears. Moreover, all other questions demand making inferences about the characteristics of the other protagonists and the relationship between them, which hinges on their attitude to watching TV. In other words, the results of this study, especially among the poor English readers, may be due to their general difficulty in text comprehension, and

especially in making inferences (Kintsch, 1988). This is indicated by the high level of accuracy and elaboration apparent in the Hebrew responses by 9th grade good readers, and much less so in younger and less able English readers.

Summary. Our predictions were confirmed. Both oral and written tasks targeting 7th grade English L2 proved quite easy for both 7th and 9th grade good readers, with consequent little gains made across junior highschool. They however proved difficult for poor readers, and although there were considerable gains by 9th grade, the gap in knowledge of English L2 between the two reading groups remained open. The most difficult task for all groups was reading comprehension, indicating the importance of frequent exposure of foreign language learners to various kinds of texts as early as possible.

Hebrew as L1

The Hebrew tasks yielded a different picture, which nonetheless confirmed our predictions regarding the close and tight relationship between L1 and L2 proficiency. The tasks selected for this study had all been tested and analyzed previously in similar-age populations (see a review in Ravid, 2004). None of them tested material learned formally in school as part of the Hebrew Language Arts curriculum.

The tasks were all presented in writing. Three of them involved derived abstract nominals, a class of nouns that emerges in native Hebrew only in young adolescence (Ravid, 2006; Ravid & Avidor, 1998; Ravid & Berman, 2010): The emotions task, the machine task, and lexical derivation. The first two required the active formation of derived nominals such as *fear*, *embarrassment*, *enjoyment*, and *regret*; *repeating*, *coughing*, *dancing*, *cursing* and *fishing*. The last task of the trio required selecting one of two morphonominal options in a sentential context such as *gimla* 'pension' vs. *gmila* 'weaning'. Another task tested the formation of a passive voice sentence from an active one, again a skill which is a late acquisition in Hebrew (Ravid, 2004). Two more tasks focused on optional bound morphology. One required forming an analytic structure out of a bound one, and another the reverse, that is, changing an analytic structure into a bound one. Finally, the integrative task required of the students was to fill in a cloze test in Hebrew about the domestic cat.

The Hebrew tasks showed no interactions, meaning all effects were simple and were not affected by other variables. Findings thus point to reading group on English as L2 and grade level as the two important factors in explaining performance on the Hebrew tasks. The most important finding across of the Hebrew tasks was the fact that good EFL readers performed significantly better than the poor readers. The group differences usually ranged between 30-40% with two outliers. The easiest lexical derivation

task, which only required the choice of one of two words, only showed a difference of 10% between the two reading groups, whereas the hardest task (the cloze), which required text comprehension and lexical retrieval, showed a gap of over 40%. This robust finding clearly demonstrates the validity of our hypotheses regarding the tight link between age-appropriate language and literacy abilities in one's native tongue on the one hand, and proficiency in L2, on the other. It is clear that the language-learning abilities that underlie easy and efficient lexical and morpho-syntactic learning in Hebrew enable word retrieval in a textual context. These same abilities support learning English as a foreign language and are very helpful in meeting the demands of integrative text comprehension in English as L2. Obviously, strategies and skills such as syntactic parsing and bridging information gaps in texts as well as a rich vocabulary are an excellent basis for making one's way in both a first and a second language.

Grade effects were not as robust as reading group. Recall in this context that we did not test material taught in school (or even explicitly part of the school curriculum) but rather morpho-syntactic domains that research has shown to develop within this age / schooling slot. 9th graders did better only on three of the tasks: they showed improvement in the retrieval of emotion nouns, action nominals, and the formation of passive structures. Derived nominals (emotions and actions) reached at most only about 3/4 accuracy, in line with previous studies (e.g., Ravid & Avidor, 1998; Seroussi, 2004)

which indicate that this is a very late acquisition in Hebrew, requiring familiarity with a broad set of morphological structures and lexical items. Passive voice showed a 25% gain by 9th grade, again in line with the literature, due to the relative rarity of passive structures and the abundance of other agent-demoting structures in Hebrew available from early on (Berman, 1980, 1990).

Four tasks did not show gains with grade level. The lexical derivation task had close to ceiling scores in the good readers, while the poor readers did not lag much behind. This is a good sign indicating that when required to choose the correct derived nominal in a supportive context, even poor language learners do not do too badly. Derived nominals occupy a crucial vocabulary site in Hebrew which requires abstraction abilities and which also supports academic writing (Berman & Ravid, 2008); thus contrastive selection within a context might point the way to a good learning strategy.

Two other tasks with no grade effect tested optional morphology, requiring exposure to and experience with syntactic and morpho-syntactic structures expressing the possession relation in nouns and accusative argument structure in verbs. Comprehension, i.e., taking apart a bound form and changing it into a syntactic structure, was easier than production, i.e., changing a syntactic form into a single word with a bound suffix: The mean score of the poor readers on the former was the same as that of the good readers on the latter. The good readers made no gains on these tasks across

junior highschool, whereas the poor readers made little gains on them. It seems that literacy and language proficiency, both underlying the classification into reading group, were a more important variable than the cognitive and linguistic growth expressed by grade level.

A final task which did not differentiate between grade levels was the cloze task. The younger, and to a large extent, also the older poor readers (ranging 28% and 40% respective) left out many empty slots. They found it extremely difficult to produce the correct word to fill in even slots that seemed easy enough such as *family* in 'the _____ of cats', while adjectives such as *flexible* in describing the cat's arching spine entailed many errors. The good readers performed much better than the poor readers, but they showed little gain across junior highschool. Their mean scores in 7th and 9th grades were similar to their scores on English reading comprehension, suggesting a common ground of integrative text abilities which might need several more years of schooling and development to achieve ceiling.

Summary. Performance on all Hebrew tasks was heavily affected by reading group, explicitly linking poor readers in English to lower scores on all Hebrew tasks. Grade level was significant only where actual learning was taking place across early adolescence, as in the case of derived abstract nominal and passive voice construction.

Conclusion

We set out to explore to what extent learners' native-language proficiency plays a role in their L2 proficiency in comparing language skills in Hebrew as L1 and in English as L2 in junior highschool students assessed as poor and good readers in EFL. Clear and conclusive evidence derived from the findings of both parts of this study – the English L2 part and the Hebrew L1 part – indicate that this is indeed the case. Both Cummins' Interdependence Hypothesis in bilingualism (Cummins, 1979, 1984; Verhoeven, 1994) and Sparks' Linguistic Coding Differences Hypothesis (Sparks & Ganschow, 1993) are appropriate as explanatory platforms for these results.

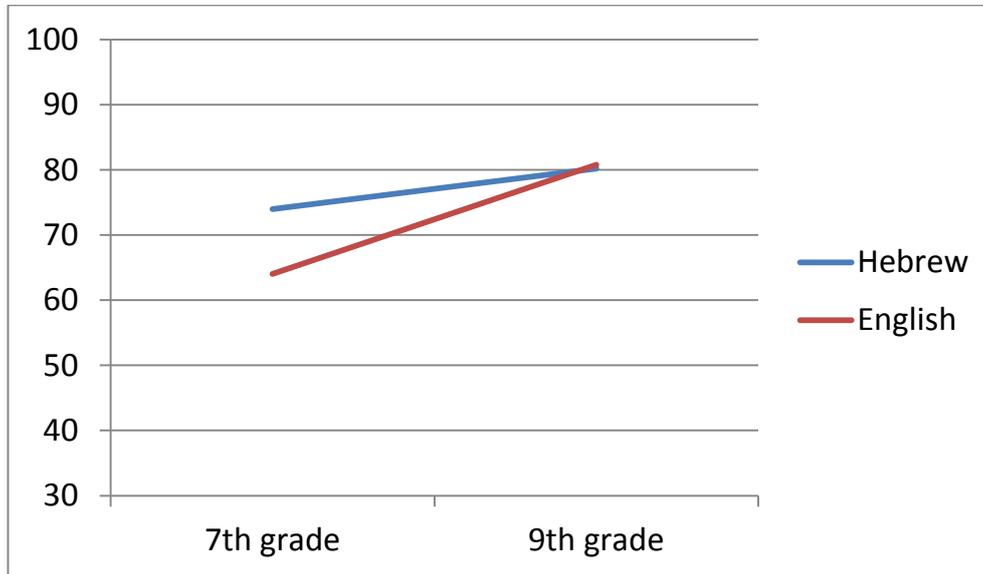


Figure 1. Interaction of grade and language on the lenient score of all tasks

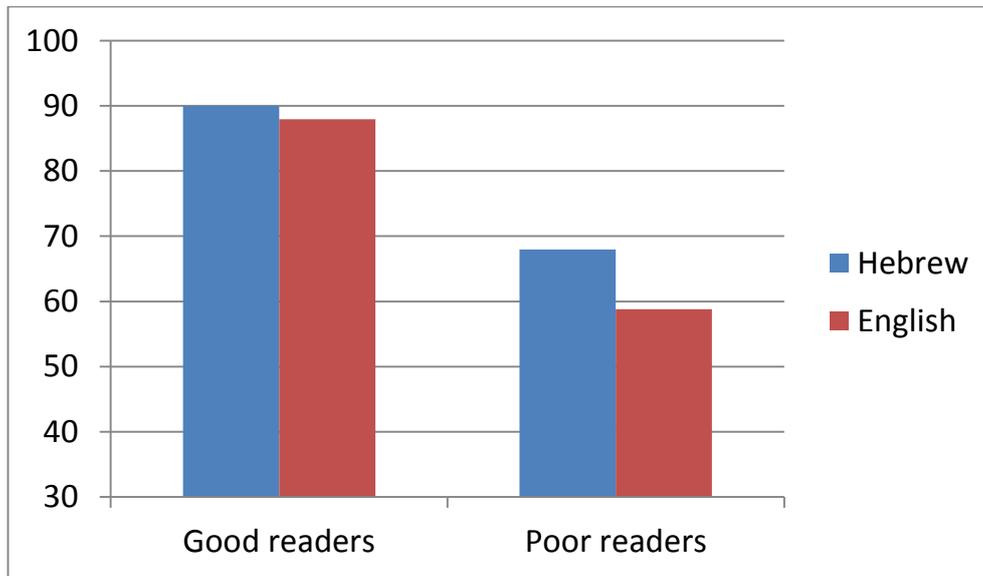


Figure 2. Interaction of reading group and language on the lenient score of all tasks

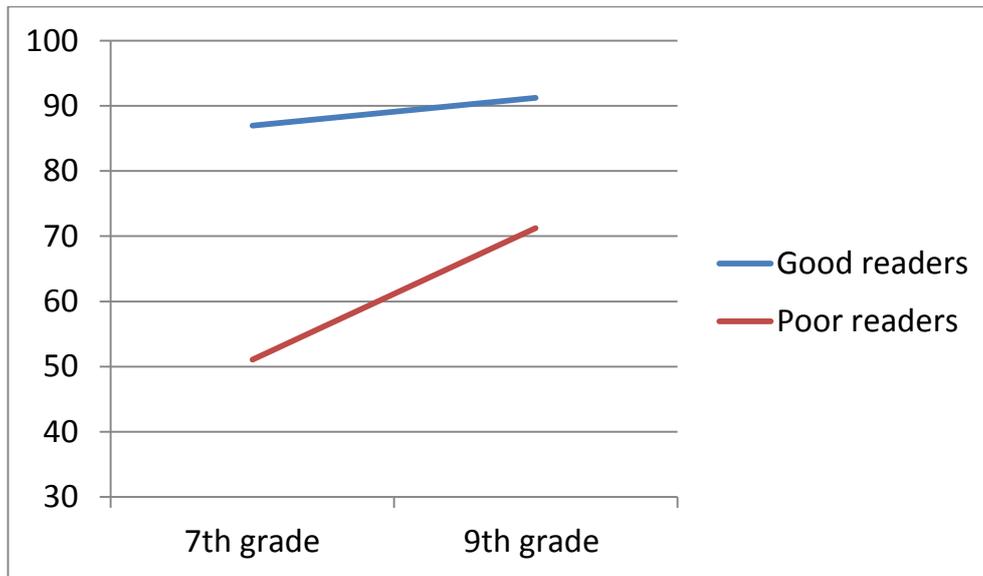


Figure 3. Interaction of grade and reading group on the lenient score of all tasks

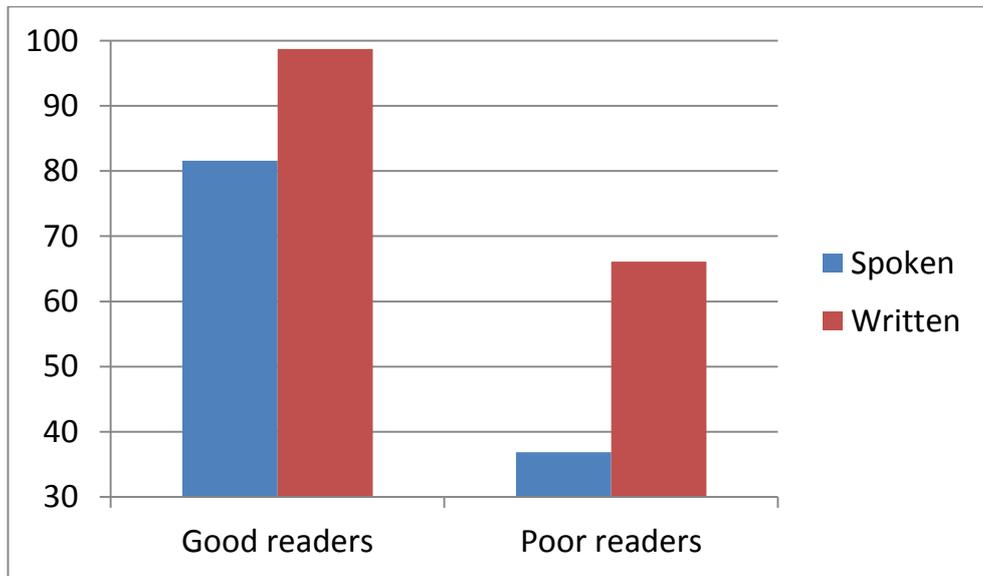


Figure 4. Interaction of reading group and modality on English L2 naming (strict analysis)

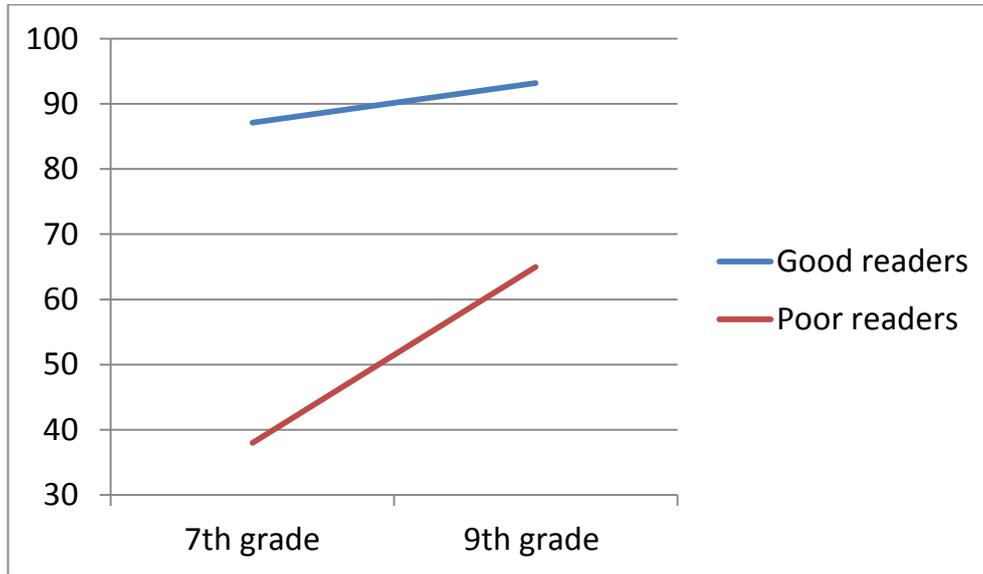


Figure 5. Interaction of grade and reading group on English L2 naming (strict analysis)

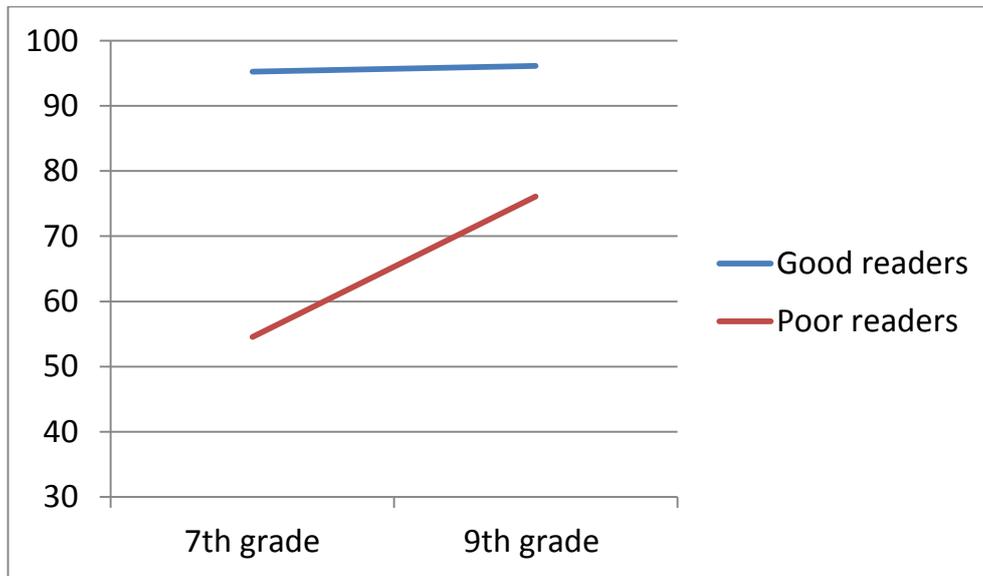


Figure 6. Interaction of grade and reading group on English L2 word order (strict analysis)

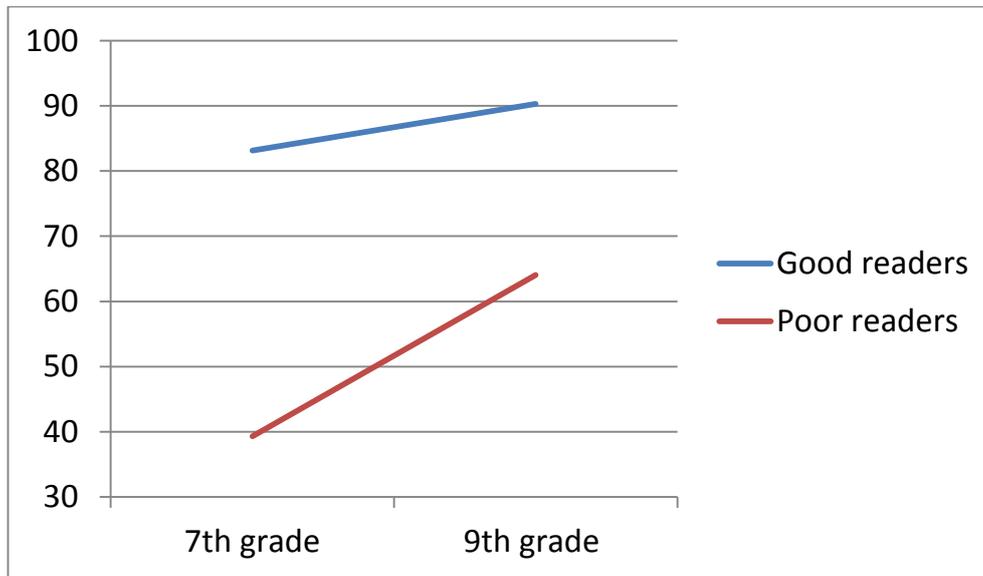


Figure 7. Interaction of grade and reading group on English L2 grammar (strict analysis)

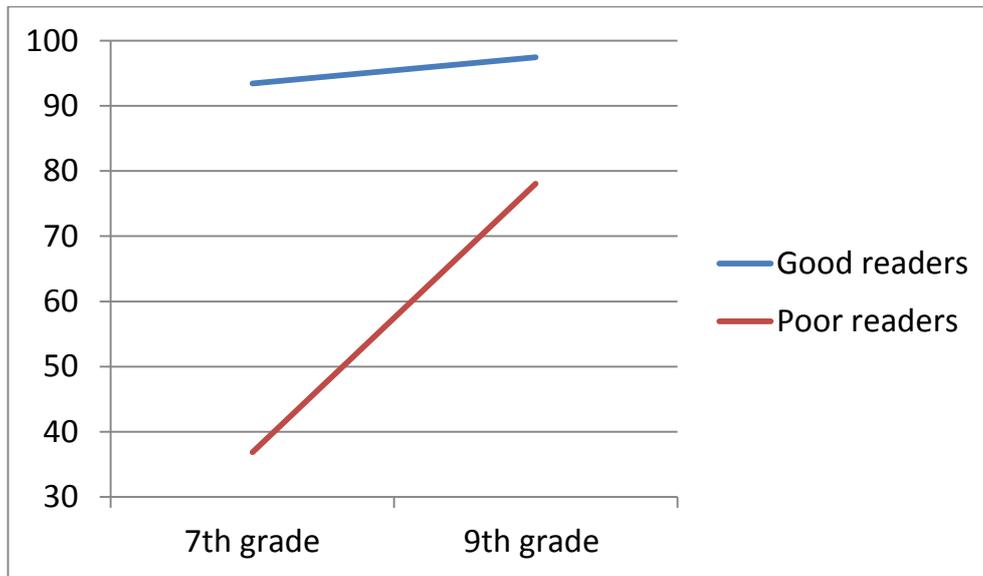


Figure 8. Interaction of grade and reading group on English L2 oral reading (lenient analysis)

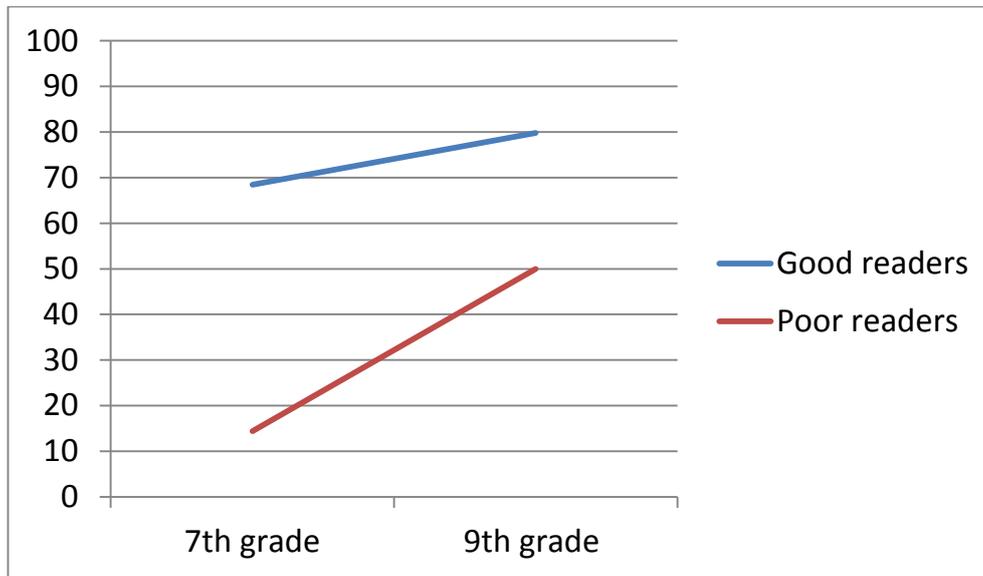


Figure 9. Interaction of grade and reading group on English L2 reading comprehension (lenient analysis)

Grade	7 th graders		9 th graders	
Reading group	Good readers	Poor readers	Good readers	Poor readers
English tasks	88.34 (3.24)	39.79 (13.91)	92.93 (5.16)	68.9 (8.37)
Hebrew tasks	85.67 (5.78)	63.33 (10.23)	89.56 (4.88)	73.54 (8.72)

Table 1. Mean percentages and standard deviations of *lenient* scores (means on scales) of all English and all Hebrew tasks, by grade and reading group

Grade	7 th graders		9 th graders	
Reading group	Good readers	Poor readers	Good readers	Poor readers
Oral naming	75.00 (23.86)	25.00 (12.25)	88.21 (11.7)	48.67 (12.17)
Written label to picture	99.28 (2.67)	50.91 (17.29)	98.21 (6.68)	81.33 (17.87)

Table 2. Mean percentages and standard deviations of *strict* scores (only correct responses) of English naming tasks, by modality, grade, and reading group

Grade	7 th graders		9 th graders	
Reading group	Good readers	Poor readers	Good readers	Poor readers
Oral word order	94.64 (9.01)	53.03 (18.36)	92.86 (8.56)	75.0 (16.67)
Written word order	95.83 (5.42)	56.06 (20.78)	99.4 (2.23)	77.22 (15.58)

Table 3. Mean percentages and standard deviations of *strict* scores (only correct responses) of English word order tasks, by modality, grade, and reading group

Grade	7 th graders		9 th graders	
Reading group	Good readers	Poor readers	Good readers	Poor readers
Oral grammar	81.12 (12.08)	33.12 (22.65)	84.69 (12.79)	62.86 (9.43)
Written grammar	85.2 (11.01)	45.45 (19.24)	95.92 (7.78)	65.24 (15.24)

Table 4. Mean percentages and standard deviations of *strict* scores (only correct responses) of English grammar tasks, by modality, grade, and reading group

Grade	7 th graders		9 th graders	
Reading group	Good readers	Poor readers	Good readers	Poor readers
	93.45 (4.82)	38.82 (22.84)	97.47 (2.03)	78.05 (6.24)

Table 5. Mean percentages and standard deviations of *strict* scores (only correct responses) of English oral reading, by grade and reading group

Grade	7 th graders		9 th graders	
Reading group	Good readers	Poor readers	Good readers	Poor readers
	68.45 (20.97)	14.39 (23.6)	79.76 (20.07)	50.00 (22.49)

Table 6. Mean percentages and standard deviations of *strict* scores (only correct responses) of English reading comprehension, by grade and reading group

Grade	7 th graders		9 th graders	
	Good readers	Poor readers	Good readers	Poor readers
Emotions	71.78 (16.59)	47.73 (13.67)	83.21 (12.34)	61.67 (18.39)
Passive Voice	91.67 (8.65)	57.57 (25.12)	96.43 (7.1)	75.55 (25.09)
Mrph Bn → Al	80.36 (20.04)	61.36 (15.93)	79.76 (15.58)	72.22 (18.27)
Mrph Al → Bn	66.84 (13.02)	43.51 (17.34)	67.35 (15.01)	50.95 (19.81)
Machine	67.86 (10.32)	42.73 (20.17)	75.71 (11.41)	60.33 (20.74)
Lexical deriv	91.43 (9.49)	78.18 (18.34)	94.28 (6.46)	86.0 (11.83)
Cloze	73.81 (12.6)	28.03 (23.05)	77.38 (12.84)	40.0 (18.15)

Table 7. Mean percentages and standard deviations of *strict* scores (only correct responses) of all Hebrew tasks, by grade and reading group [note that the Optional morphology task is split here into two subparts]

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