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CT **Becoming a Literate Language
User:
Oral and Written Text Construction
Across Adolescence¹**

<CA>Ruth A. Berman and Dorit Ravid

A Introduction

This chapter considers how the language of literacy is acquired in the school years, taking into account lexical items, syntactic constructions, and entire texts. Its focus is on “linguistic literacy” (Ravid & Tolchinsky, 2002), in the sense of ready and informed access to an encyclopedic range of linguistic varieties (Langacker, 1991), ranging across different modalities (e.g., speech and writing), discourse genres (e.g., narrative and non-narrative, research, and journalism), registers of use (i.e., from literary or formal to everyday colloquial), and communicative functions (e.g., referential, interactive, entertaining).

Within this broad spectrum, we view written language as the core of literate language use, taking as a point of departure Olson’s view of literacy as “a set of social practices that exploit the affordances of writing for particular ends” (2006b, p. 177). True, command of both spoken as well as written language and the ability to move skillfully and flexibly between the two are hallmarks of linguistic literacy. Yet, the written mode of expression occupies a privileged cognitive position for maturely

literate individuals. As Chafe (1994) points out, writing represents a “special mode of consciousness,” one that is realized through Slobin’s (2003) “thinking for writing.” This involves the ability to control and shape the flow of information in discourse through linguistic means, while viewing the text as a whole (Strömqvist, Nordqvist, & Wengelin, 2004). Consequently, in constructing a piece of written language, what Chafe terms the “roving eye of consciousness” imposes cognitive demands on memory, executive functions, and top-down processing that are not readily met before adolescence (Steinberg, 2005). Current psycholinguistic studies of language development beyond early childhood reflect important changes in morpho-syntax, lexicon, and discourse (Berman, 2004a, 2007; Berman & Nir-Sagiv, 2007; Ravid, 2006a). We suggest that these could not have been achieved without the platform of written language.

Olson’s (1994) insight into the different strengths of speech and writing is particularly relevant in this connection. He pointed out that spoken language has expressive powers and illocutionary force that excel in conveying the sender’s communicative intent to the addressee, whereas writing (and reading) fosters explicit thought about language. A key motivation of this chapter is to provide developmental evidence for the prediction deriving from Olson’s model: that reflection on language is enabled by gaining command of written language and that, once learned, written language, in fact, takes over as a model for thinking about language in general. To this end, we move beyond writing as a notational system (i.e., Olson’s “script-as-

model”) to the domain of text construction, examining written language as a special style of discourse in later language development.

Our narrative revolves around three orthogonal motifs. First, it deals with text *production* – hence, with speaking and writing rather than listening and reading. Concern is with authentic texts constructed by nonexpert, ordinary language users rather than with edited texts produced by specialist writers, journalists, translators, and so forth. In developmental perspective, the texts that school-goers construct provide optimal hunting grounds for unveiling their linguistic abilities, in a period when command of written language is opening up new avenues to linguistic knowledge (Jisa, 2004a; Ong, 2002; Ravid & Zilberbuch, 2003a).

Second, we examine the “language of literacy” as reflected in different types of texts constructed by speaker-writers from middle childhood across adolescence. That is, our concern is with *later, school-age language*, as manifesting three major developments: an extended repertoire of linguistic items, categories, and constructions; new pathways for integrating formerly unrelated elements and systems into complex linguistic schemata and syntactic architectures; and more efficient and explicit modes for representing and thinking about language. Current research shows that in this period, language use diverges markedly from what has been observed for young children (Berman, 2004b, 2007; Nippold, 1998), although not yet reaching the level of educated adult usage (Jisa, 2004a,b; Ravid & Zilberbuch, 2003b). For example, derivational morphology plays an increasingly important role at the interface between vocabulary and syntax (Carlisle, 2000; Ravid, 2004a); vocabulary

is extended to allow for greater lexical diversity and semantically more specific encoding of concepts (Nippold, 2002; Seroussi, 2004; Strömqvist et al., 2002); and syntax relies increasingly on more marked, less frequent constructions such as passive voice, center-embedded clauses, and nonfinite subordination (Berman & Nir-Sagiv, 2007, in press-a; Friedman & Novogrotsky, 2004; Ravid & Saban, in press; Scott, 2004). These developments in school-age language knowledge go hand in hand with increased command of metalinguistic abilities and access to higher-order, nonliteral language (Ashkenazi & Ravid, 1998; Karmiloff-Smith, 1986; Nippold & Taylor, 2002; Tolchinsky, 2004).

A third motif is the inherent *interface of modality and genre*, in the present context – of speech versus writing and narratives versus expository discussions. Here, we aim to show that broadly speaking, modality affects the *how* and genre the *what* of text construction: modality will be more marked as a special style of communication in terms of *process* and genre as a special discourse style in terms of *product*. We hope to demonstrate how the modality/genre interface shapes the language of text construction by focusing on local linguistic expression in lexicon and grammar, including both clause-internal and clause-linking syntax.²

The basic methodology presented here for a range of studies in different languages elicited four text types (i.e., written and spoken, narrative and expository) from the same participants across different age groups: schoolchildren aged nine and ten and twelve and thirteen; sixteen- and seventeen-year-old high school students; and graduate-level university students. In an initial study (henceforth, Project I),

participants were asked to tell and write a story and also to give a talk and write a composition about violence in schools (Berman & Ravid, 1999, for Hebrew; Gayraud, 2000; Gayraud, Jisa, & Viguié, 1999, for French). In a subsequent cross-linguistic project (Project II), other participants in the same age groups were shown a short video clip depicting scenes of (unresolved) interpersonal conflict in a school setting and were then asked to tell a story and write a story and to give a talk or write a composition discussing the topic of interpersonal conflict or of “problems between people” (Berman, 2005a; Berman & Verhoeven, 2002a).³ This design allowed us to examine the modality/genre interface across carefully controlled conditions, and it has been extended with minor modifications to a range of populations in Hebrew.⁴ Because our motivations were research-oriented rather than primarily teaching goals (Macbeth, 2006), participants were not given explicit instructions on how to structure their texts or what kind of language to use.

We present major findings on developing text construction from middle childhood across adolescence that have emerged from studies of the two authors with their students and associates in the past decade – with details from English and Hebrew supplemented by data from other languages. The issue is considered from two interlocking perspectives: (1) the language used in oral and written texts produced in personal-experience narratives and expository discussions; and (2) the special nature of written language use in these two genres.

[A] The Language of Oral and Written Text Construction

As a point of departure, we take a key finding of our study of information density in spoken and written narratives produced by four age groups of school and university students in English and Hebrew (Ravid & Berman, 2006). Across the population, irrespective of age and language, the written texts contained 90 percent of novel, referentially informative material. In contrast, the spoken texts consisted in equal parts (i.e., 50 percent each) of novel information and ancillary, noninformative material – the latter in the form of reiterations, repetitions, repairs, and other disfluencies as well as pragmatic discourse markers. We concluded that what makes written language more informatively dense can be attributed, in part, at least, to the complex linguistic usage that it affords. The section that follows charts the units – lexical, syntactic, and discursive – that we analyzed in assessing discourse-embedded linguistic complexity.

Consider, first, the factor of *unit size* in monologic text construction. Linguists have largely neglected this apparently superficial facet of discourse performance as irrelevant to more abstract knowledge or linguistic competence. However, from a psycholinguistic, usage-based perspective (Bybee, 2006), surface phenomena are often indicative of underlying systematicity. For example, language acquisition research considers mean length of utterance (MLU) as a measure of early grammatical development in different languages (Brown, 1973; Dromi & Berman, 1982). In education, Loban's (1976) study of oral and written language of English-speaking children from kindergarten through high school showed that MLUs and mean length of sentences “increased slowly but steadily throughout the school years”

(Scott, 2004, p. 111). For current purposes, we consider units ranging from the entire text via syntactic constructions between and within clauses to words and morphemes.

Text length is measured in our studies by two units: number of words and number of clauses. The *word* – our basic lexical unit – is a fundamental and intuitively obvious building block of language, yet it defies simple definition and demarcation – particularly across different developmental phases and typologically different languages (Anderson, 1985; Strömqvist et al., 2002). For example, what constitutes a “word” is not necessarily the same in writing and in speech (Hebrew even has a special word *teva* [‘box’] for a written word). Consider the problem of English contracted forms like *I’ve* and *won’t*; or compounds that are written as single words in Dutch and German but not necessarily in English (cf. *ashtray*, *high-school*, *apple juice*); or the fact that in Hebrew, several grammatical items that correspond to words in European languages – like those meaning *the*, *that*, *in* – are written as part of the next word (Ravid, 2005). Accordingly, we specified ‘a word’ as any element separated by spaces in our transcription of both spoken and written materials in different languages.

Our basic unit of syntax is the *clause*, defined as “any unit that contains a unified predicate expressing a single situation” (Berman & Slobin, 1994, p. 660). The clause is similar to the simple sentence of traditional grammar, it is semantically and syntactically readily identifiable, and it has served as a robust unit of analysis for both oral and written narrative and expository texts across a wide range of languages (Berman & Verhoeven, 2002b). Text size in words and clauses is illustrated in (1)

and (2) from the following oral narratives of junior-high students in English and Hebrew, respectively, numbered by clauses.

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(1) *Oral Narrative of Seventh-Grade Girl* [eJ03fns]: 20 clauses, 143 words⁵

1. Um this one time I can remember
2. I think
3. it was like maybe two or three weeks ago
4. we were me and my sister were moving our room around
5. and um we have these thing these things
6. that are like these crate things
7. and we have our stuff in it
8. and she was helping me move mine
9. and I told her
10. not to break it
11. and we started to put it down
12. and she broke it
13. and it fell apart
14. and then I got mad at her
15. and I told her
16. she had to fix it
17. but she couldn't fix it good
18. so I was still mad at her
19. and then and then I finally put it back on

20. so it was ended

(2) Oral Narrative of Seventh-Grade Hebrew-Speaking Boy [hJ04mns]: 13 clauses, 88 words⁶

1. tov, eh kodem~kol eh stam eh hayiti be^ [/] be^ eyze kita daled, gimel mashu
2. . hayiti imm xaver sheli
3. az keilu ravnu imm eyze exad
4. ve^ ravnu ito
5. az asinu keilu alav eh xerem
6. ve^ az asinu
7. ve^ kol ha^ kita hayta alav xerem ve^ ze
8. ve^ hayom keilu axshav loh hayom keilu, lifney kama zman lifney <kama sha> [//] shana ulay kaxa hitxalnu lahakir oto
9. liyot xaverim shelo ve^ ze
10. amarnu
11. ma shave
12. ma'asher she^ niye be^ [/] be^ brogez ve^ ze
13. ma asinu be^ ze

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<TXT>Two main trends emerged for overall text length in mean number of words and of clauses per text. Developmentally, there is a consistent age-related rise, in line with the increase in text length documented for the oral narratives produced by preschoolers, schoolchildren, and adults in five different languages (Berman & Slobin, 1994, p. 31). This emerged clearly in different studies, including the

language-specific findings of Project I (Gayraud, 2000; Ravid, 2004b; Ravid & Levie, submitted) and also across all seven languages and in all four text types – narrative and expository, spoken and written – in Project II (Berman & Verhoeven, 2002b, p. 23). Moreover, a major difference in mean text size was found between the junior-high and high-school students. These findings were replicated in numerous other studies in Hebrew and Arabic (see endnote 2). Second, cross-modally, in both Projects I and II, in both English and Hebrew, and in all four age groups, the oral texts were typically longer than their written counterparts and the narratives than the expository texts.

However, raw measures of text length are insufficient as criteria of text quality (Berman & Nir-Sagiv, in press-b). Processing constraints may account for greater repetitiveness and more disfluencies – hence, greater length – in spoken texts (Ravid & Berman, 2006; Strömqvist et al., 2004), whereas factors of thematic content and global discourse structure may explain why narratives tend to be longer than expository texts (Berman & Katzenberger, 2004; Berman & Nir-Sagiv, 2007; Tolchinsky, Johanssen, & Zamora, 2002). Rather, what critically contributes to the quality of the language in monologic discourse is *linguistic richness*, which we define as lexical density and diversity combined with syntactic depth and complexity (Berman & Nir-Sagiv, 2007; Ravid, 2004b). To evaluate these facets of developing text construction, we typically analyze lexical and syntactic quality through two derived measures – number of elements per clause and proportion of items out of

total words – with syntactic connectivity specified by how clauses are packaged together in larger units.

Our point of departure for measuring syntactic complexity is number of words per clause – that is, mean clause length – also an apparently superficial criterion. However, words are not simply strung together linearly across a clause but rather are packaged into the syntactic units termed *phrases*. For example, the written narrative of a Californian high-school boy starts with the clause: *The conflict between [sic] an ex-friend of mine started in my senior year of high school*. The fifteen words in this clause group into the subject-noun phrase *the conflict between an ex-friend of mine*, the verb phrase *started*, and the adverbial phrase *in my senior year of high school*, with the subject consisting of a noun phrase and a prepositional phrase and the adverbial phrase consisting of two prepositional phrases – each with a preposition followed by a noun phrase (*between + an ex-friend of mine; in + my senior year; of + high school*). This shows how clause length in words and, hence, syntactic density are a function of both number of phrases and number of words per phrase. It also demonstrates that syntactic complexity is inseparable from information or content density: this one clause provides information about two protagonists and the place, time, and circumstances of the events that are about to unfold.

Developmentally, our findings for mean clause length are consistent with those for text size: in different languages and text types, number of words per clause rises as a function of age and schooling, most markedly in the two older age groups. This trend, too, is mediated by the factors of genre and modality but in the opposite

direction: clauses in written texts – most markedly in written expository texts – are typically longer than in narratives, and they are shortest in oral narratives. This is in line with our general finding that written language and expository discourse combine to create a favored habitat for rich and complex use of language. Moreover, in both English and Hebrew, this pattern is significant mainly from high-school age, indicative of a general spurt in text-embedded linguistic complexity from adolescence up (Berman & Nir-Sagiv, 2007; Ravid & Levie, submitted; Ravid & Zilberbuch, 2003b). Again, these trends are robust across different languages, populations, and methods of elicitation.

To illustrate, Figure 1 depicts mean clause length for different age groups and levels of schooling in four different types of texts, for Hebrew Project I data.

Insert Figure 1 about here

Figure 1 indicates that the distinction between written and spoken language is more marked in expository texts than in narratives. It also illustrates a typical range for mean clause length for different age groups and levels of schooling. Taken together, our findings clearly indicate that mean clause length constitutes a reliable developmental yardstick for one facet of linguistic complexity in text construction across the school years.

We move now to lexical measures, again starting with a seemingly surface criterion, *word length*. The factor of word length, measured by number of syllables, is widely used in distributionally oriented, corpus linguistics research (Riedemann,

1996; Wimmer & Altmann, 1996), and it has proved to be developmentally diagnostic of literacy levels when measured by number of letters per word in written language (Malvern, Richards, Chipere, & Durán, 2004). For present purposes, we defined word length in syllables to accommodate both written and spoken usage, as well as languages with different orthographies. Word length seems a particularly appropriate measure for a language with linearly analytical morphology like English, where longer words are not only rarer and more sophisticated but also structurally more complex in terms of their derivational morphology (e.g., Germanic *childishness, unforgiving*; Latinate *misinterpretation, comprehensible*). It is interesting that this appears to be the case for Hebrew, too, although it is a language with a richly synthetic morphology (Nir-Sagiv, 2005; Ravid, 2006b).

As another illustration, Figure 2 shows the development of word length measured by number of words of four or more syllables out of total words in the English sample of Project II.

Insert Figure 2 about here

Figure 2 shows clear developmental patterns across the variables of age, modality, and genre. Polysyllabic words are rare in the two younger groups across text types; they occur mainly from high school up and significantly more in the texts of adults. These patterns highlight a key motif of our entire enterprise: *the interface of modality and genre across development*. They reveal spoken narratives and written expository texts as two extremes, with written narratives and spoken expository texts clustering together between them. Thus, long words are rare in spoken narratives

even of adults, and they are most common in written expository texts, especially from high school up.

The notion of *lexical density* focuses on open-class lexical items or so-called content words (i.e., nouns, verbs, adjectives). These carry the burden of the referential information of any piece of discourse, and they are indispensable sites for constructing the phrases that comprise syntactic complexity (Ravid, 2004b). As such, the proportion of content words provides a more fine-tuned criterion of text-embedded linguistic complexity than surface length. In fact, two derived measures of lexical density, both as proportion of content words out of total words per text and number of content words per clause, yield consistent patterns across our database.

Figure 3 presents typical figures for age- and text-type patterns of lexical density, based on Hebrew Project I.

Insert Figure 3 about here

Across projects, and in both English and Hebrew, texts produced by older participants typically contain a higher proportion of content words than those of the younger age groups. In text type, expository texts have higher lexical density than the narratives produced by the same subjects across age groups, and written texts have higher density on average than their spoken counterparts (Bar-Ilan & Berman, 2007; Berman, Bar-Ilan, & Nir-Sagiv, in press; Ravid, 2004b, 2006a). These trends confirm earlier findings for the higher lexical density of written compared with spoken language, both in a comparable Swedish sample (Strömqvist et al., 2002) and in other

unrelated studies (Halliday, 1985; Ure, 1971). Overall, lexical density thus reveals similar trends across age groups, modality, and genre to what was shown by the more coarse-grained measures of mean clause and word length. Furthermore, in lexical density, the expository genre shows an age-related rise, whereas narratives manifest the same level of lexical density across speech and writing. This suggests that once students reach high school, expository discourse constitutes a more suitable means than narratives for evaluating lexical and syntactic abilities.

Another accepted measure of lexical development is that of *lexical diversity*. Thus, when measured by ratio of different word forms to total number of word tokens in a text, the entire database of Project II indicated a significant age-related increase in lexical diversity in different languages, most markedly between junior high and high school and in the expository genre (Berman & Verhoeven, 2002b, pp. 28–31). Here, we do not pursue the topic of lexical diversity in the accepted sense of “type-token ratio” because even the highly sophisticated VOC-D procedure (Malvern et al., 2004) relates to word types as different word *forms* rather than different lexemes or lemmas (e.g., the English *walk*, *walks*, *walked*, and *walking* are four word forms, whereas *walk(s)* as a verb and *walk(s)* yield two different lexemes). The latter criterion appears more relevant for cross-linguistic comparisons of both spoken and written usage, particularly in languages with a rich morphology like Hebrew and when evaluating text-embedded vocabulary use across adolescence and into adulthood.

We found it more rewarding to analyze each class of content words in a *context-sensitive*, functional perspective that captures changes in the lexicon across later language development and that ensures ecological validity within each word class in a given language. One such analysis involves a “*noun scale*” of semantic-pragmatic abstractness and categoriality. Originally devised as a ten-point scale for Hebrew (Ravid, 2006b), this was applied to English by a condensed, similarly motivated four-point scale (Berman, Bar-Ilan, & Nir-Sagiv, in press; **Berman & Nir-Sagiv, 2007**). At the lower end are (1) concrete objects and specific people (e.g., *John, a ball, flowers*); and (2) categorical nouns, roles and locations, and generic nouns (e.g., *a / every teacher, the city, people*); whereas the two higher levels include (3) nonabstract, high-register, or rare nouns (e.g., *rival, cult*); abstract but common terms like *fight* and *war*; and metaphorical extensions of concrete terms like *path to success, river of time*; and (4) nouns that are nonimageable, abstract, and low frequency (e.g., *relationship, lack, existence*).

Differences between level of noun abstractness as a function of age and level of literacy are illustrated by the following oral expository texts of three girls in grade school, junior high, and high school in (3), (4), and (5), respectively. All nouns are boldfaced and those ranked as more abstract, at Level 3 or 4, are underlined.

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(3) Oral Expository Text of Grade-School Girl [eG16fewd]

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[EXT] *I do not think **fighting** is good. You do not make **friends** that way. If you do not fight, you can have many many **friends**, but when you fight, you can hurt the **person's feelings** you are fighting with. You should always be nice and respectful to other **people**. And if you are not nice, you will end up not having any **friends**. That is why you should not fight.*

This quite typical expository text of a fourth-grade girl contains relatively few open-class items (i.e., twenty out of a total of seventy words) and only eight nouns in all, two of higher level semantics.

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(4) Oral Expository Text of Junior High School Girl [eJ18fewd]

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[EXT] *Some of the **conflicts** are related. Just because **people** have known each other for a long **time**, and about my **age** like they start like they're getting new **friends** and someone may not like those **friends** and so some of those **fights** like. **Fighting** can be a lot about that and like new **interests** that they haven't realized that they had and you know you aren't interested in them. That's one of the big **differences** and just a lot of **stuff** like that.*

The seventh-grade text in (4) contains relatively few open-class items (i.e., twenty-one out of eighty-two), but six of its ten nouns are semantically more abstract. The noun lexicon of the excerpt from an eleventh-grade text, in contrast, consists almost entirely of morphologically derived and semantically abstract, largely Latinate terms (Bar-Ilan & Berman, 2007).

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(5) First Part of Oral Expository Text of High School Girl [eH05few]

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[EXT] *I just think that **conflict** is just kind of a natural **part** of social **interaction** and that it often arises from **misunderstandings** or a **lack** of **acceptance** for **differences** between **people**. And how I personally have very low **tolerance** for other **people** you know creating a **conflict** with me because of a **misunderstanding** of me or because of some **difference** that I have. So I mean it's very often isn't a genuine **conflict**. Because it's just kind of like, I mean in my **view** I can only really relate to me personally. There are some other general **things** obviously in the **world** that go on. But I don't have enough **experience** with any of that **stuff**. But it's kind of like, if there looks like there's going to be a **conflict**, then I just end it before there's a **conflict**. And there doesn't need to be any sort of **relationship** really there.*

The texts in (3) to (5) differ markedly in nominalness in general and in the semantic level of the nouns they contain in particular. As can be expected, nominal abstractness increases as a function of age and level of literacy. Figure 4 illustrates the impact of modality on these patterns, by the relative number of abstract-derived nominals across later language development in the Hebrew database of Project II (Ravid, 2006a).

Insert Figure 4 about here

Noun abstractness, as a facet of text-embedded lexical sophistication, rises only gradually with age and schooling in spoken texts and shows a far steeper curve in writing. Again, markedly similar patterns are revealed for the two typologically distinct languages of English and Hebrew.

Number of *adjectives* per clause reveals similar trends in other facets of text-embedded lexical usage. There is an increase with age and schooling, more so in written than in spoken texts, more in expository than narrative texts, and specifically in the written expositories of eleventh-graders and adults. Because adjectives function primarily for noun modification, such an increase reflects richer and more informative text content. For example, an eleventh-grade girl writes in a narrative about a former friend, with adjectives underlined: *There was a scene of exaggerated jealousy which resulted in a verbal argument, a scathing argument, filled with reciprocal accusations and yelling.* Moreover, rich adjectival texture is typically grounded in complex nominal and syntactic structure because adjectives play a role in the construction of noun phrases, as discussed later. Another related facet of lexical density is revealed by the fact that the *category* (in this case, of adjectives) expands and diversifies along with an increase in usage of token members of the category. To date, relevant data on use of adjectives are available only for Hebrew; however, from what is known of vocabulary development across school age in general, similar patterns can be expected in English and other languages: an age-related increase, with more adjectives in written expository texts than elsewhere, in

the shape of, for example, sophisticated *-iy* suffixed, denominal adjectives in Hebrew and Latinate-based denominatives, such as *industrial* and *cooperative*, in English.

The features of text-embedded lexical usage reviewed so far apply similarly across different languages. Other aspects of lexical structure and content are more language-specific. One such property is the Germanic-Latinate divide of English vocabulary, which emerged as a critical factor in characterizing the role of linguistic register in developing literacy (Bar-Ilan & Berman, 2007). A Hebrew-specific facet of semantic and structural lexical diversity is use of the seven morphological verb patterns in Hebrew, the *binyan* “conjugation” system of Semitic grammars expressing semantic and syntactic alternations such as voice (i.e., active, middle, passive), causativeness, and transitivity in general (Berman, 1993). With age, Hebrew speaker-writers use a greater variety of different verb patterns for a larger range of semantic and syntactic functions. This is reflected, *inter alia*, by a shift to a more patient-oriented use of intransitive-, middle-, and passive-voice constructions (Alfi-Shabtai, 1999; Berman, 2002b), although for language-specific reasons, Hebrew speaker-writers, like their Spanish counterparts, rely on passive-voice constructions far less than in subject-requiring languages such as Dutch, English, and French (Jisa et al., 2002; Tolchinsky & Rosado, 2005). Again, in all these cases, the relevant forms emerge most prominently in written expository texts, from adolescence up.

To round out this comparison of oral and written texts across different ages and level of schooling, we note two syntactic criteria devised in the framework of

Project II: noun-phrase complexity and clause-linking connectivity. The internal structure and content of *noun phrases* provide a qualitative means of evaluating syntactic density. For example, the following relatively ‘heavy’ (i.e., long and structurally complex) noun phrases occur in the expository text written by a high-school boy, ranging from four to seven words in length, with head nouns underlined: *a result of insecurity, another source of conflict, many people in this world, close contact with someone unknown, their dominant status amongst a group, the other person’s point of view, students who are unfamiliar with another student, the relationships in which they are involved*. These noun phrases are heavy in the sense that they contain several layers of embedding (e.g., nouns inside of prepositional phrases or relative clauses) as well as different types of modifying expressions: adjectives, postnominal prepositional phrases, and relative clauses. Multidimensional analyses – including abstractness of head nouns; length in words; and number, type, and depth of modifiers – reveal that in different languages, the proportion of complex noun phrases increases primarily in the written language and in expository texts as a function of age, most markedly from high school up (Berman, 2005c; Ravid et al., 2002). These findings for syntactic complexity closely parallel the trends observed for text-embedded lexical development, indicating that the content lexicon provides an important underpinning for construction of syntax.

Regarding how clauses are packaged together in monologic discourse, we found clear qualitative differences between the two modalities. In written narratives, the majority of clauses inside a “clause package” (as defined in Berman & Nir-Sagiv,

in press-a), across age groups, and increasingly from high school up, are linked by conjunctions as semantically and syntactically conventional markers of different types of coordination and subordination. We take this to reflect development of the notion of ‘sentence’ as a viable unit of written language. In contrast, spoken texts make far greater use of segment-tagging “discourse markers” such as *and so*, *well*, *okay*, and *that’s it* that are utterance-initial rather than syntactically motivated (Berman, 1996; Ravid & Berman, 2006). By and large, the texts produced in speech reveal looser connectivity and rely more on thematic and discursive rather than strict syntactic linking of clauses. For example, compared with their written counterparts, they contain higher proportions of direct speech (i.e., syntactically nonmarked complement clauses), juxtaposed main clauses without overt marking between them, and parenthetical asides commenting on what has just been said or is about to be reported. Such constructions are illustrated in the excerpt from a graduate student’s oral narrative in (6), with clause boundaries marked by double square brackets.

[EXT] (6) *I threw... okay let me think of the story [Parenthetical]...] I asked her]] to put the thumbtacks in her drawer]] although I must have said it in a not so desirable tone]] and she shot back with]] “Don’t tell me]] what to do” [Direct Speech]. So # we um # hmmm, God what was it?]] We had a little bit of an argument about that]] and we... # something horrible, what did I say? [Parenthetical]]] Okay, so we had a little bit of an argument about that]], I didn’t like the way [Juxtaposed]]] she said that to me]].*

A quantitative outcome of this looser clustering of clauses in spoken narratives is that more clauses tend to be combined together in a single package compared with their written counterparts (Berman & Nir-Sagiv, 2006). Such contrasts between spoken versus written language highlight the importance of supplementing quantitative measures with functionally motivated qualitative criteria.

Across a range of measures, the factor of modality thus has the effect of promoting tighter, more cohesive organization in written texts. Both as a cause and a result of processing constraints, spoken texts are more ‘interactive’ and more communicatively oriented than their written counterparts, even when they are monologic, and therefore lacking in turn-taking as the hallmark of conversational interaction. Moreover, in linguistic expression, the constraints of online versus offline processing mean that compared with speech, writing allows for greater lexical and syntactic complexity and diversity. As Olson notes, among such “affordances,” “Writers draw on an enlarged vocabulary, a more formalized grammar, a more logically organized rhetorical structure” (2006a, p. 140).

However, these differences are always mediated by the factor of *genre* (in this case, narrative or expository discourse). Recall that we found the gap between spoken and written narratives to be less marked than between spoken and written expository discourse across development. We suggest that this is because in relating modality to genre, each genre imposes different demands on the speaker-writer. Constructing narratives is governed by an entrenched narrative schema that is internalized by early school age (Berman & Slobin, 1994; Hickmann, 2003). The major cognitive

challenge in producing narratives lies in the domain of psychological interpretation, and this is age-dependent rather than modality-dependent (Ravid & Berman, 2006). In contrast, expository discourse demands that novel ideas be logically organized and elaborated into coherent segments. This is particularly difficult in speech, when texts are produced online, without the offline benefits of reflection and reconsideration provided by writing. Consequently, both the achievements and the challenges of becoming “a literate language user” are most markedly evident in the interface between the expository genre of discourse and the written mode of expression.

[A] Written Language Use in Narrative and Expository Texts

In comparing oral and written language usage, our focus was largely on nominal elements of discourse. In considering the written style that students deploy in acquiring the language of literacy, we shift attention to the predicative components of discourse – mainly in the domains of tense, mood, and voice – where linguistic distinctiveness is more relevant to *cross-genre* than cross-modal considerations.

Studies in different languages demonstrate key differences in the temporal texture and organization of narrative compared with expository prose – differences to which even the youngest children in our sample were attentive (Berman & Katzenberger, 2004; Berman & Nir-Sagiv, 2004; Kupersmitt, 2006; Ragnarsdóttir, et al., 2002; Reilly, Zamora, & McGivern, 2005; Shalom, 2001). Narratives, by their very nature, are anchored in specific past events and these are typically expressed by past tense, which – in languages that mark grammatical aspect – may alternate across imperfective, progressive, and pluperfect aspect (Berman & Slobin, 1994).

Expository discourse is typically atemporal, anchored in generalized propositions in the timeless present or in projections on future contingencies in irrealis mood.

In consequence, narratives employ primarily dynamic verbs, with more stative propositions and generalizations dedicated to the interpretive or evaluative elements of the story. By contrast, expository texts make wide use of existential and copular constructions, relying heavily on middle and passive voice to express a patient-oriented rather than agent-oriented perspective (Berman & Nir-Sagiv, 2004; Jisa & Viguié, 2005; Tolchinsky & Rosado, 2005). At the same time, increasingly from high school up, writers use more nominalized constructions in formulating their narrative predications (Berman & Katzenberger, 2004; Ravid & Cahana-Amitay, 2005). The temporal texture of texts also becomes increasingly diversified with age because writers rely on more marked and more mixed types of aspectual categories, including past-progressive and past-perfect in languages like English and Spanish (Kupersmitt, 2006).

We noted previously that from as early as grade-school age, written texts are typically informatively denser and syntactically more tightly packaged than their oral counterparts. To this we now add the fact that they typically deploy *high-register* and quite formal means of linguistic expression, deploying what Blank (2002) terms “book language,” including, *inter alia*, reliance on “the literate lexicon” (Ravid, 2004a). The texts written by literate high school students are linguistically “marked” in the sense that they deploy less frequent, more sophisticated language in preference to more common everyday forms of expression. Examples include wider use of

passive and not only active voice; heavily complex noun phrases; and morphologically derived, low-frequency, high-register lexical items (in English – often Latinate).

Another major development, part of a more general, cognitively anchored shift around adolescence (Paus, 2005; Steinberg, 2005) that we characterize as a move “from dichotomy to divergence,” is the ability to move beyond rigidly genre-typical forms of expression in constructing monologic texts. For example, from high school up but not before, writers introduce timeless, “story-external” generalizations into their narratives and they may make reference to specific, past-tense events in their expository texts (Berman & Nir-Sagiv, 2004, 2007; Ravid & Berman, 2006).

High school students are also able to use language to express more cognitively distanced, knowledge-based attitudes to hypothetical contingencies, analogous to Bruner’s “subjunctivizing transformations...lexical and grammatical usages that highlight subjective states, attenuating circumstances, alternative possibilities” (1990, p. 53). This is reflected in the use of *modal expressions* (e.g., English *can, be able to*) in evaluating whether a given proposition or state of affairs is necessary, possible, or likely. This particular linguistic system provides an interesting meeting ground among cognition, semantics, lexicon, and syntax in developing written text construction. A series of studies in different languages (Kupersmitt, 2006; Reilly, Jisa, & Berman, 2002; Reilly et al., 2005) reveals that in this connection, too, the impact of genre is critical. Across languages, such expressions were far more common in expository texts as a genre that is anchored in

timeless generalizations about current states of affairs that are fleshed out and elaborated by commentary about desirable or possible future contingencies. This is illustrated in the opening paragraph of the essay of a Californian woman graduate student asked to discuss the topic of interpersonal conflict. Elements in (7) that express modal modifications of a proposition are underlined and the semantics of the modality are indicated in small caps.

[EXT] (7) *Conflict is a matter that I believe {BELIEF} needs to be handled {NECESSITY / OBLIGATORINESS} in a case by case manner. The manner in which people decide to {INTENTION} handle conflict needs to be {NECESSITY/OBLIG} thoughtfully considered, as the person or people with whom the conflict is with [sic] and the reasons for the conflict will warrant {DESIRABILITY} a different approach for different instances. Sometimes conflict will need to be {NECESSITY/OBLIG} addressed directly since it can harm {POSSIBILITY} an individual's well-being. It may cause {POSSIBILITY} damage emotionally and/or physically. In this case I believe {BELIEF} that the problem must be {NECESSITY} addressed. In other cases I believe {BELIEF} that it may be worked out {POSSIBILITY} within oneself. In this case I only advise it {DESIRABILITY}. If addressing {CONDITION} the conflict will cause {LIKELIHOOD/PREDICTION} additional problems and {PREDICTION+GAP} worsen the situation. Along these lines, addressing some conflicts may put {POSSIBILITY} an individual in danger and should simply be handled {ADVISABILITY} by shrugging it off and/or walking away.*

Nearly every clause in this excerpt modifies the neutral referential content it contains by expressing some kind of propositional attitude, relating to possible states of affairs, the circumstances attendant on them, the consequences that they might incur, and the author's thoughts and feelings about the decisions or actions that should be taken with respect to these contingencies. In structure, these expressions demonstrate the interaction between lexicon and syntax: in English, modal auxiliaries quite typically occur with passive-voice constructions – for example, *needs to be considered*, *must be addressed*, *may be worked out*, and *should be handled*. This excerpt also reflects what was found across languages and age groups for the lexicon–syntax interface and for inter-genre distinctiveness: in expository texts, such expressions typically co-occur with impersonal expletive pronouns (e.g., *it*) in a language like English or in subjectless impersonal constructions in Hebrew and Spanish; in narratives, they tend to be “agent-oriented,” relating to the protagonist's ability, needs, or desires rather than to the proposition as a whole.

This domain also revealed a clear *developmental shift* across different languages, again most marked from high school up. Nine- to twelve-year-olds – irrespective of whether they were writing in English, French, or Hebrew – typically relied largely on *deontic* types of modal expressions, which refers to prohibitions or prescriptions. In contrast, from adolescence up, writers shifted largely to *epistemic* modalities, relating to possible or probable future contingencies. These differences are clearly shown in the essays of two nine-year-olds – a girl in (8a) and a boy in (8b) – compared with those of eleventh-graders in (9).

[EXT] (8a) *I think people should discuss their problems or maybe even ask a grownup or someone older than yourself. And people really should get along I think people should treat everyone the same.*

[EXT] (8b) *I think people should stop using their hand and feet and start using their words and I think people should think before they act, and people should help people if in need instead of ignoring them.*

These fourth-graders, a girl (8a) and a boy (8b), both use the deontic modal *should* (in the sense of advising what is desirable, what people “ought to” do) across their texts. They express prescriptively normative, socially dictated attitudes to the topic of “problems between people.” Other deontic devices used by fourth-grade children in different languages in the sample express the prohibitive sense of “shouldn’t” or give voice to generalized judgmental evaluations – for example, that “problems are bad” or “fighting is not good” (as in example [3]).

In marked contrast, as illustrated in the adult excerpt in (7), older writers rely mainly on cognitively motivated epistemic modals to relate to possible or probable contingencies arising out of interpersonal conflict. This is shown in the underlined elements in the excerpts from eleventh-grade essays in (9): the first (9a) from a boy who starts by explaining why “high school is a focal point of conflict,” and the second (9b) from a girl who illustrates her discussion by two specific episodes from her personal experience (three dots represent passages not presented here).

EXT (9a) *Coming from a sheltered environment with the close supervision and intervention of parents and teachers, students are thrust into realization of the so called “real world,” where you must now make choices and resolve problems on your own. While you are never really on your own, this new freedom can give the overwhelming feeling of distancing yourself from your parents’ control. Students are exposed to many new people and begin to form social cliques or groups. These groups not only follow racial and ethnic lines but also the class bracket that they are placed in such as advanced or remedial. This can have an impact on people because of the exposure or lack of it or jealousy and envy.*

EXT (9b) *Conflict is opposing ideas or stances between two or people.*

EXT *In many ways it is a necessary part of life. On the other hand it can cause disruption and chaos in the relationships of those involved. When people have a difference of opinion, a conflict is usually the result.*

EXT *This is a good way for those differences to be put aside. For example, I recently started swimming under a new coach ...*

EXT *In that way conflict can be a good thing. The results were better than the situation that were achieved beforehand. In other cases, conflict can ruin a friendship. My friend was very close friends ... This is a situation in which conflict was a bad thing. If the conflict cannot be resolved, then the relationship will suffer ... In my case I avoid conflict at all costs, sometimes*

to the point where I void my own opinion in order to prevent a conflict. On the one hand, I very seldom argue with people, on the other hand, my ideas may go unheard ...

EXT *There is a happy medium somewhere, though. Hopefully someday I will realize when a conflict is necessary and use it intelligently, not as a fight but as a discussion to solve a common problem.*

Here, sixteen- and seventeen-year-old adolescents express their ideas from abstractly mentalistic, largely individual perspectives, couching their thoughts in epistemic terms that refer to eventualities that can, may, or will arise under given circumstances. They may use many of the same surface forms of language as younger children: in English, by means of the special grammaticized category of modal auxiliaries (e.g., *can, could, may, might, should, will*); in Hebrew or Spanish, by rather different types of constructions. However, even ‘basic’ modals expand semantically to acquire a range of different senses, so that *can* refers not only to ability but also to possibility and *must* not only to obligation but also to inference.

The essays of older, more literate writers thus reflect semantically more complex use of modal expressions. They also reveal different *attitudes* to the topic under discussion, giving voice to a more individual and personalized set of values than the socially normative prescriptions of children. This is in line with other studies from our project (e.g., Berman, 2005b; Ravid, 2006a; Ravid & Cahana-Amitay, 2005; Tolchinsky et al., 2002) that reflect age-related changes not only in the linguistic structure but also in the thematic content and pragmatic perspectives of the

language used by maturely literate although nonexpert writers in expressing their ideas.

A Conclusion

The three guiding motifs of this chapter – text production, later language development, and the modality/genre interface – converge to shed light on what is involved in becoming “a literate language user.” It entails the ability to use the linguistic repertoire of one’s native language in ways that meet the needs of varied communicative contexts in different types of text. Each of the four text types we elicited from the same participants represents a specific communicative setting, from more intimate and conversation-like personal narratives produced in speech to more distanced and formal discussion of an abstract topic produced in writing. Indeed, results of the manifold studies in the projects delineated herein yield a remarkably consistent hierarchy – as depicted in Figure 5 – in the language used across the four text types we examined: in lexical density and diversity; in abstractness and richness of the content vocabulary; in level of formality and linguistic register; and in syntactic complexity within and across clauses.

Insert Figure 5 about here

The hierarchy depicted in Figure 5 reflects a consistent trend in the linguistic patterning of texts produced by nonexpert speaker-writers of different languages from age nine across adolescence and into adulthood in meeting the different pragmatic functions involved in telling or writing a story about a personal experience as compared to giving a talk or writing an essay on an abstract topic.

Throughout the projects, the most distinct differences emerged between oral narratives and written expository texts as two extremes in use of complex language along a continuum that, in principle, could be extended in both directions: oral narratives to interactive conversation and written essays to literary composition or research articles. In the two extremes on this hierarchy, the factors of modality and genre operate in tandem to produce internally consistent linguistic usage. In contrast, the two “intermediate” text types – written narratives and spoken expository texts – are more mixed, revealing both the combined impact and the distinct contributions of the two variables of modality and genre. Thus, in writing a narrative text, speaker-writers need to meet the conflicting “communicative charges” (Slobin, 1977) of the written modality, on the one hand, and the personal narrative genre on the other. The first requires a more monitored and reflective style of discourse, whereas the second elicits more personalized, subjective, and less detached forms of expression. Similarly, construction of a spoken expository reflects the dual demands of “thinking for discussing” on an abstract topic (Slobin, 1996, 2001) while also contending with the processing constraints of on-line speech production.

The interface between modality and genre emerges as a facet of what we label “discourse stance”: how speaker-writers use language to position themselves with respect to a piece of discourse in a given set of circumstances (Berman, 2005b; Berman, Ragnarsdóttir, & Strömqvist, 2002). From this perspective, discourse stance is a textual property that serves as a pragmatic frame for the organization of different

types of discourse – from interactive conversation, via oral narratives, to formal written essays.

Across the studies in our projects, the essay type of text – a written exposition discussing a socially relevant issue – constitutes a preferred site for expression of a detached, more distant discourse stance. This type of writing requires reference to general, knowledge-based concepts and abstract issues and, hence, involves high-level language use, particularly in the school-like settings of our research. In this, it contrasts markedly with the subjectively immediate style of oral personal-experience narratives, whereas the written narrative and oral expository text lie somewhere in between. Taken together, these findings illuminate literate language use as playing a defining role in differentiating between types of discourse along the dimensions of both modality and genre – distinctions that from adolescence on are developmentally most marked.

☐ References

Abu-Salem, R. (2004). The development of narratives in Palestinian Arabic.

Unpublished master's thesis, Tel Aviv University [in Hebrew].

Alfi-Shabtay, I. (1999). Passives and alternatives in different text types in Hebrew.

In *Developing literacy across genres, modalities, and languages* (pp. 58–67).

Tel Aviv University International Literacy Project: Working Papers, Vol. I.

Anderson, S. R. (1985). Inflectional morphology. In T. Shopen (Ed.), *Language typology and syntactic description, Volume III: Grammatical categories and the lexicon* (pp. 150–201). Cambridge: Cambridge University Press.

- Ashkenazi, O., & Ravid, D.** (1998). Children's understanding of linguistic humor: An aspect of metalinguistic awareness. *Current Psychology of Cognition, 17*, 367–387.
- Bar-Ilan, L., & Berman, R. A.** (2007). Developing register differentiation: The Latinate-Germanic divide in English. *Linguistics, 45*, 1–36.
- Berman, R. A.** (1993). Developmental perspectives on transitivity: A confluence of cues. In Y. Levy (Ed.), *Other children, other languages: Issues in the theory of acquisition* (pp. 189–241). Hillsdale, NJ: Erlbaum.
- Berman, R. A.** (1996). Form and function in developing narrative abilities: The case of “and.” In D. Slobin, J. Gerhardt, A. Kyratzis, & J. Guo (Eds.), *Social interaction, context, and language: Essays in honor of Susan Ervin-Tripp* (pp. 243–268). Mahwah, NJ: Lawrence Erlbaum.
- Berman, R. A.** (1997). Narrative theory and narrative development: The Labovian impact. *Journal of Narrative and Life History, 7*, 235–244.
- Berman, R. A.** (2002a). Cross-linguistic comparisons in later language development. In S. Strömquist (Ed.), *The diversity of languages and language learning* (pp. 25–44). Lund, Sweden: Center for Languages and Literature.
- Berman, R. A.** (2002b). The lexicon–syntax interface: Development of verb usage in written Hebrew. Paper presented at the triennial conference of the International Association for the Study of Child Language (IASCL), Madison, Wisconsin (July).

- Berman, R. A. (Ed.)** (2004a). *Language development across childhood and adolescence: Psycholinguistic and cross-linguistic perspectives*. (Trends in Language Acquisition Research Series, Volume 3.) Amsterdam: John Benjamins.
- Berman, R. A.** (2004b). Between emergence and mastery: The long developmental route of language acquisition. In R. A. Berman (Ed.), *Language development across childhood and adolescence* (pp. 9–34). Amsterdam: John Benjamins.
- Berman, R. A. (Ed.)** (2005a). Developing discourse stance across adolescence. *Journal of Pragmatics*, 37, 2 (special issue).
- Berman, R. A.** (2005b). Introduction: Developing discourse stance in different text types and languages. *Journal of Pragmatics*, 37, 105–124.
- Berman, R. A.** (2005c). What makes NPs interesting? Symposium on noun phrase structure and content in later language development: Text-based cross-linguistic analyses. Berlin: International Association for the Study of Child Language (IASCL) (July).
- Berman, R. A.** (2007). Developing language knowledge and language use across adolescence. In E. Off & M. Shatz (Eds.), *Handbook of language development* (pp. 346–367). London: Blackwell.
- Berman, R. A., & Katzenberger, I.** (2004). Form and function in introducing narrative and expository texts: A developmental perspective. *Discourse Processes*, 38, 57–94.

- Berman, R. A., & Nir-Sagiv, B.** (2004). Linguistic indicators of inter-genre differentiation in later language development. *Journal of Child Language*, *31*, 339–380.
- Berman, R. A., & Nir-Sagiv, B.** (2006). Modality-driven versus modality-neutral features of text production. Paper presented to Second Biennial Conference on Cognitive Science, St. Petersburg, Russia (June).
- Berman, R. A., & Nir-Sagiv, B.** (2007). Comparing narrative and expository text construction across adolescence: A developmental paradox. *Discourse Processes*, *43*, 79–120.
- Berman, R. A., & Nir-Sagiv, B.** (In press-a). Clause-packaging in narratives: A cross-linguistic developmental study. In J. Guo, E. Lieven, S. Ervin-Tripp, N. Budwig, S. Özçalışkan, & K. Nakamura (Eds.), *Cross-linguistic approaches to the psychology of language: Research in the tradition of Dan I. Slobin*. Mahwah, NJ: Lawrence Erlbaum.
- Berman, R. A., & Nir-Sagiv, B.** (In press-b). Cognitive and linguistic factors in evaluating expository text quality: Global versus local? In V. Evans & S. Pourcel (Eds.), *New directions in cognitive linguistics*. Amsterdam: John Benjamins.
- Berman, R. A., Nir-Sagiv, B., & L. Bar-Ilan.** (In press). Vocabulary development across adolescence: Text-based analyses. In I. Kupferberg & A. Stavans

(Eds.), *Studies in language and language education: Essays in honor of Elite Olshtain*. Jerusalem: Magnes Press.

- Berman, R. A., & Ravid, D.** (1999). The oral/literate continuum: Developmental perspectives. Final report submitted to the Israel Science Foundation. Tel Aviv University (September).
- Berman, R. A., & Slobin, D.** (1994). *Relating events in narrative: A cross-linguistic developmental study*. Hillsdale, NJ: Erlbaum.
- Berman, R. A., & Verhoeven, L. (Eds.)** (2002a). Cross-linguistic perspectives on the development of text production abilities in speech and writing. *Written Languages and Literacy*, 5, Parts 1 and 2 (special issue).
- Berman, R. A., & Verhoeven, L.** (2002b). Developing text production abilities in speech and writing: Aims and methodology. *Written Languages and Literacy*, 5, 1–44.
- Berman, R. A., Ragnarsdóttir, H., & Strömqvist, S.** (2002). Discourse stance. *Written Languages and Literacy*, 5, 255–289.
- Brown, R.** (1973). *A first language: The early stages*. London: Allen & Unwin.
- Bruner, J.** (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.
- Bybee, J.** (2006). From usage to grammar: The mind's response to repetition. *Language*, 82, 529–551.

- Carlisle, J. F.** (2000). Awareness of the structure and meaning of morphologically complex words: Impact on reading. *Reading and Writing, 12*, 169–190.
- Chafe, W. L.** (1994). *Discourse, consciousness, and time: The flow of language in speech and writing*. Chicago: Chicago University Press.
- Dromi, E., & Berman, R.** (1982). A morphemic measure of early language development: Data from Hebrew. *Journal of Child Language, 9*, 403–424.
- Ehrlich, S.** (2001). Developing writing abilities in junior high-schoolers. Unpublished master's thesis, Tel Aviv University [in Hebrew].
- Farah, A.** (2004). The development of expositorys in Palestinian Arabic. Unpublished master's thesis, Tel Aviv University [in Hebrew].
- Friedman, N., & Novogrotsky, R.** (2004). The acquisition of relative clause comprehension in Hebrew: A study of SLI and normal development. *Journal of Child Language, 31*, 661–681.
- Gayraud, F.** (2000). *Le développement de la différentiation oral/écrit vu à travers le lexique*. Thèse de doctorat, Université Lumière, Lyon 2.
- Gayraud, F., Jisa, H., & Viguié, A.** (1999). The development of syntactic packaging in French children's spoken and written texts. In *Developing literacy across genres, modalities, and languages* (pp. 169–181). Tel Aviv University International Literacy Project: Working Papers, Volume I, July.

- Halliday, M. A. K.** (1985). *Spoken and written language*. Victoria, Australia: Deakin University.
- Hickmann, M.** (2003). *Children's discourse: Person, space and time across languages*. Cambridge: Cambridge University Press.
- Jisa, H.** (2004a). Growing into academic French. In R. A. Berman (Ed.), *Language development across childhood and adolescence* (pp. 135–162). Amsterdam: John Benjamins.
- Jisa, H.** (2004b). Developing alternatives for indicating discourse stance. In D. Ravid & H. Bat-Zeev Shyldkrot (Eds.), *Perspectives on language and language development: Essays in honor of Ruth A. Berman* (pp. 357–374). Dordrecht: Kluwer.
- Jisa, H., Reilly, J., Verhoeven, L., Baruch, E., & Rosado, E.** (2002). Passive voice constructions in written texts. *Written Language and Literacy*, 5, 163–182.
- Jisa, H., & Vigiúé, A.** (2005). A developmental perspective on the role of “on” in written and spoken expository texts in French. *Journal of Pragmatics*, 37, 125–144.
- Karmiloff-Smith, A.** (1986). Some fundamental aspects of language acquisition after five. In P. Fletcher & M. Garman (Eds.), *Studies in language acquisition* (2nd revised ed.) (pp. 455–474). Cambridge: Cambridge University Press.

- Kupersmitt, J.** (2006). Temporality in texts: A cross-linguistic developmental study of form-function relations in narrative and expository discourse. Unpublished doctoral dissertation, Bar-Ilan University, Israel.
- Langacker, R.** (1991). *Concept, image, and symbol: The cognitive basis of grammar*. Berlin: Mouton de Gruyter.
- Levin, M.** (2003). Narrative and linguistic development in English L2 compared to Hebrew L1 across adolescence. Unpublished master's thesis, Tel Aviv University.
- Loban, W.** (1976). *Language development: Kindergarten through grade twelve*. Champaign, IL: National Council of Teachers of English, Research Report No. 18.
- Macbeth, K. P.** (2006). Diverse, unforeseen and quaint difficulties: The sensible responses of novices learning to follow instructions in academic writing. *Research in the Teaching of English, 41*, 180–207.
- Malvern, D., Richards, B., Chipere, N., & Durán, P.** (2004). *Lexical diversity and language development: Quantification and assessment*. Basingstoke: Palgrave Macmillan.
- Nippold, M. A.** (1998). *Later language development*. Texas: PRO-ED.
- Nippold, M. A.** (2002). Lexical learning in school-age children, adolescents, and adults: A process where language and literacy converge. *Journal of Child Language, 29*, 474–478.

- Nippold, M. A., & Taylor, C. L.** (2002). Judgments of idiom familiarity and transparency: A comparison of children and adolescents. *Journal of Speech, Language, and Hearing Research, 45*, 384–391.
- Nir-Sagiv, B.** (2005). Word length as a criterion of text complexity: A cross-linguistic developmental study. Paper presented at triennial conference of the International Association for the Study of Child Language [IASCL], Berlin (July).
- Olson, D.** (1994). *The world on paper*. Cambridge: Cambridge University Press.
- Olson, D.** (2006a). Oral discourse in a world of literacy. *Research in Teaching of English, 41*, 136–142.
- Olson, D.** (2006b). Continuing the discourse on literacy. *Research in Teaching of English, 41*, 175–179.
- Ong, W. J.** (1992). Writing is a technology that restructures thought. In P. Downing, S. D. Lima, & M. Noonan (Eds.), *The linguistics of literacy* (pp. 293–319). Amsterdam: John Benjamins.
- Paus, T.** (2005). Mapping brain maturation and cognitive development during adolescence. *Trends in Cognitive Sciences, 9*, 60–68.
- Rabukhin, L.** (2003). Text production abilities in bilingual Hebrew-Russian children: A developmental study. Unpublished master's thesis, Tel Aviv University [in Hebrew].

Ragnarsdóttir, H., Cahana-Amitay, D., van Hell, J., Rosado, E., & Viguié, A.

(2002). Verbal structure and content in written discourse: Narrative and expository texts. *Written Language and Literacy*, 5, 95–126.

Ravid, D. (2004a). Later lexical development in Hebrew: Derivational morphology revisited. In R.A. Berman (Ed.), *Language development across childhood and adolescence* (pp. 53–82). Amsterdam: John Benjamins.

Ravid, D. (2004b). Emergence of linguistic complexity in written expository texts: Evidence from later language acquisition. In D. Ravid & H. Bat-Zeev Shyldkrot (Eds.), *Perspectives on language and language development: Essays in honor of Ruth A. Berman* (pp. 337–355). Dordrecht: Kluwer.

Ravid, D. (2005). Hebrew orthography and literacy. In R. M. Joshi & P. G. Aaron (Eds.), *Handbook of orthography and literacy* (pp. 339–363). Mahwah, NJ: Erlbaum.

Ravid, D. (2006a). Semantic development in textual contexts during the school years: Noun Scale analyses. *Journal of Child Language*, 33, 791–821.

Ravid, D. (2006b). Word-level morphology: A psycholinguistic perspective on linear formation in Hebrew nominals. *Morphology*, 16, 127–148.

Ravid, D., & Berman, R. A. (2006). Information density in the development of spoken and written narratives in English and Hebrew. *Discourse Processes*, 41, 117–149.

- Ravid, D., & Cahana-Amitay, D.** (2005). Verbal and nominal expression in narrating conflict situations in Hebrew. *Journal of Pragmatics*, 37, 157–183.
- Ravid, D., & Levie, R.** (submitted). Adjectives in the development of text production: Lexical, morphological and syntactic analyses.
- Ravid, D., & Saban, R.** (in press). Syntactic and meta-syntactic skills in the school years: A developmental study in Hebrew. In I. Kupferberg & A. Stavans (Eds.), *Language education in Israel: Papers in honor of Elite Olshtain*. Jerusalem: Magnes Press.
- Ravid, D., & Tolchinsky, L.** (2002). Developing linguistic literacy: A comprehensive model. *Journal of Child Language*, 29, 419–448.
- Ravid, D., van Hell, J., Rosado, E., & Zamora, A.** (2002). Subject NP patterning in the development of text production: Speech and writing. *Written Language and Literacy*, 5, 69–94.
- Ravid, D., & Zilberbuch, S.** (2003a). Morpho-syntactic constructs in the development of spoken and written Hebrew text production. *Journal of Child Language*, 30, 395–418.
- Ravid, D., & Zilberbuch, S.** (2003b). The development of complex nominals in expert and non-expert writing: A comparative study. *Pragmatics and Cognition*, 11, 267–297.

- Reilly, J. S., Jisa, H., & Berman, R. A.** (2002). Propositional attitudes: Development of modal expression. *Written Language and Literacy*, 5, 183–218.
- Reilly, J., Zamora, A., & McGivern, R. F.** (2005). Acquiring perspective in English: The development of stance. *Journal of Pragmatics*, 37, 185–207.
- Riedemann, H.** (1996). Word length distribution in English press texts. *Journal of Quantitative Linguistics*, 3, 265–271.
- Schleifer, M.** (2003). Development of written text production of native Israeli and Ethiopian immigrant schoolchildren and adolescents: Linguistic and sociocultural perspectives. Unpublished doctoral dissertation, Tel Aviv University.
- Scott, C. M.** (2004). Syntactic ability in children and adolescents with language and learning disabilities. In R. A. Berman (Ed.), *Language development across childhood and adolescence* (pp. 111–134). Amsterdam: John Benjamins.
- Segal, M.** (2001). Form-function relations in expressing evaluation in personal-experience narratives across adolescence. Unpublished doctoral dissertation, Tel Aviv University [in Hebrew].
- Seroussi, B.** (2004). Hebrew derived nouns in context: A developmental perspective. *Folia Phoniatrica et Logopaedica*, 56, 273–290.

- Shalmon, S.** (2002). Text production abilities in children from low-SES: A developmental study. Unpublished master's thesis, Tel Aviv University [in Hebrew].
- Shalom, T.** (2002). The language of Hebrew teaching textbooks. Unpublished doctoral dissertation, Bar-Ilan University, Israel [in Hebrew].
- Slobin, D. I.** (1977). Language change in childhood and in history. In J. Macnamara (Ed.), *Language learning and thought* (pp. 185–214). New York: Academic Press.
- Slobin, D. I.** (1996). From “thought and language” to “thinking for speaking.” In J. J. Gumperz & S. C. Levinson (Eds.), *Rethinking linguistic relativity* (pp. 70–96). Cambridge: Cambridge University Press.
- Slobin, D. I.** (2001). Form-function relations: How do children find out what they are? In M. Bowerman & S. C. Levinson (Eds.), *Language acquisition and conceptual development* (pp. 406–449). Cambridge: Cambridge University Press.
- Slobin, D. I.** (2003). Language and thought online: Cognitive consequences of linguistic relativity. In D. Gentner & S. Goldin-Meadow (Eds.), *Language in mind: Advances in the investigation of language and thought* (pp. 157–191). Cambridge, MA: MIT Press.
- Steinberg, L.** (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, 9, 69–74.

- Strömqvist, S., Johansson, V., Kriz, S., Ragnarsdóttir, R., & Ravid, D.** (2002). Towards a cross-linguistic comparison of lexical quanta in speech and writing. *Written Language & Literacy*, 5, 45–68.
- Strömqvist, S., Nordqvist, Å., & Wengelin, Å.** (2004). Writing the frog story: Developmental and cross-modal perspectives. In S. Strömqvist & L. Verhoeven (Eds.), *Relating events in narrative: Typological and contextual perspectives* (pp. 359–394). Mahwah, NJ: Lawrence Erlbaum.
- Tannenbaum, M., Abugov, N., & Ravid, D.** (2007). Linguistic patterns in narratives of ultra-orthodox girls. *Pragmatics and Cognition*, 15, 347–378.
- Tolchinsky, L.** (2004). The nature and scope of later language development. In R. A. Berman (Ed.), *Language development across childhood and adolescence* (pp. 233–248). Amsterdam: John Benjamins.
- Tolchinsky, L., Johansson, V., & Zamora, A.** (2002). Text openings and closings: Textual autonomy and differentiation. *Language and Literacy*, 5, 219–254.
- Tolchinsky, L., & Rosado, E.** (2005). The effect of literacy, text type, and modality on the use of grammatical means for agency alternation in Spanish. *Journal of Pragmatics*, 37, 209–237.
- Ure, J.** (1971). Lexical density and register differentiation. In G. E. Perren & I. L. M. Trim (Eds.), *Applications of linguistics* (pp. 443–452). Cambridge: Cambridge University Press.

Wimmer, G., & Altmann, G. (1996). The theory of word length distribution: Some results and generalizations. In P. Schmidt (Ed.), *Glottometrika* 15 (pp. 112–133). Trier, Germany: WVT.

A Figure Captions

Figure 1. Mean number of words per clause by age and text type.

Figure 2. Mean number of polysyllabic words out of total number of words per text, by age, genre, and modality (N = 20 per group).

Figure 3. Mean number of content words per clause.

Figure 4. Percentage of derived abstract nouns by age and modality.

Figure 5. Linguistic expression at the interface of modality and genre.

Footnotes

¹ The authors are indebted to Ronit Levie and Bracha Nir-Sagiv for their help in all phases of data collection and analysis.

² We deliberately exclude other facets of text construction that have been examined by the authors and their associates, such as top-down, global-level discourse structure and organization, rhetorical devices, and categories of referential content (e.g., [Berman, 1997](#); [Berman & Nir-Sagiv, 2007](#), in press-b; [Ravid & Berman, 2006](#); [Tolchinsky et al., 2002](#)).

³ Project I was funded by an Israel Science Foundation grant to Ruth Berman and Dorit Ravid for the study of “The Oral/Literate Continuum” (1996–1998) and Project II by a major research grant from the Spencer Foundation, Chicago, to Ruth Berman, PI, for the study of “Developing Literacy in Different Contexts and Different Languages” in seven countries (1997–2000), with Dorit Ravid responsible for the Hebrew-based project in Israel and Judy S. Reilly of San Diego State University for the English-language project in California.

⁴ In Israel, such studies have included ultra-orthodox Jews, first and second language users, bilinguals, and children of low and high SES background ([Abu-Salem, 2004](#); [Ehrlich, 2001](#); [Farah, 2004](#); [Levin, 2003](#); [Rabuhin \[Au: Refs spell it Rabukhin; please verify and correct where necessary\], 2003](#); [Schleifer, 2003](#); [Segal, 2001](#); [Shalmon, 2002](#); [Tannenbaum, Abugov, & Ravid, 2007](#)).

⁵ Text ID was identified by language – e, for English; grade level – J for junior high; participant number – 03 = the third student out of twenty in this group; sex – f, for female; and text type – ns = narrative spoken. Texts were transcribed in regular orthography (here, standardized for spelling and punctuation) in English and in broad phonemic transcription in Hebrew.

⁶ The caret signs (^) indicate morphemes that are separate words in the European languages in our sample but written as part of the next word in Hebrew. This meant we could count them both as part of the next word and as separate lexical items for purposes of comparison with (1) written Hebrew, and (2) other languages.