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DISCUSSION

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Literacy and development as discourse, cognition or as both?

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Commenting on R&T's 'Developing Linguistic Literacy' is not an easy task. Their attempt addresses precisely the right questions, in all their complexities and breadth, centring and bundling these questions in strategic and potentially novel ways, and thereby exploring new territories and encouraging investigators to enter these territories. However, I still feel left with a sense of incompleteness and exclusion when it comes to a more discursive orientation to theorizing literacy and development.

Starting my commentary on R&T's target article this way, I should mention that I approach literacy and development as someone whose research has shifted from studying 'Language' with a capital L, i.e. isolated aspects of language, how they are acquired by the universal but abstract 'child' with 'language' in a vacuum, to what people (including children) actually DO with language – how they perform their daily activities with and in language in a meaningful way, and in doing so display and contribute to a sense of who they are (as groups and as individuals). In other words, I came to see development as always tied intrinsically to the development of the person, their display and sense of self and identity; and issues of talk (whether literacy, narrativity, or language in general) in terms of how they contribute to this development. The implication of this shift is not that questions such as how individuals learn to master or possess a repertoire of forms or actions that were not theirs before, or how what always was considered to be already theirs matures, so they can participate in joint practices with others become irrelevant. However, such questions become secondary to the question of how particular activities (and the way these activities are performed) contribute to the development of a sense of self and identity. Of course, within this framework talk is always considered as meaningful action, or at least as oriented toward meaning in action; it is, in its broadest sense, *discourse*, and as such embedded in social action and interaction.

Reading R&T from this point of departure, their contribution can be viewed as an attempt to establish a linkage between more traditional

approaches that view the acquisition of reading and writing as 'basic' processes and skills that are acquired by the universal but isolated child on the one hand, with more discursive, action- and practice-oriented approaches that not only cover the establishment of larger textual units but more generally meaningful participation in social discourse, where selves and identity come to existence, on the other. Defining literacy in relatively broad strokes as 'rhetorical flexibility', i.e. as the ability to vary form and function relationships according to discursive purposes and situations, clearly documents the authors' discursive orientation. Furthermore, viewing literacy development (which can easily be extended to all language development) within these broader boundaries, and therefore defining it in terms of a life-long process,[1] their notion of development parallels the view of development as a continuous process of life-long identity formation and transformation processes in which discourse plays a major role. A further advantage and additional contribution to developmental theorizing lies in the fact that R&T design a clear telos toward which development is oriented: the ability to vary form and function relationships, if linked to rhetorical flexibility and participation in emancipatory practices is very much in line with the ideal of a Habermasian, rational society.

These aspects of R&T's model I find attractive and inspiring, because they offer a contextualization of literacy and literacy development in terms of larger discursive and developmentally constructivist approaches, which in turn enable empirical investigations of literacy and literacy development in innovative and potentially more comprehensive ways. In addition, as R&T have pointed out repeatedly, we are able to investigate how literacy itself impacts on other domains of language development, something that has widely been neglected in investigations of language development.

This assumption, however, that literacy itself functions as a developmental mechanism, one that impacts in interesting ways on other aspects of language development by way of constituting (or at least shaping) what is commonly called 'language knowledge' or 'metalinguistic awareness', I would like to take as my point of departure from R&T's model. Rather than defining 'language' and 'literacy' (abstractly) as knowledge systems, I would like to suggest that we follow the discursive and social constructionist orientation laid out in other strands of R&T's model. Children, from birth on (and possibly even earlier) participate as active agents in oral (and in most literate cultures soon thereafter in written) language practices. These practices are not governed or influenced, at least not *a priori*, by representational (cognitive) frameworks (or schemata) of self, other, and of language and

[1] In other words, development is not conceptualized in the form of relatively short-term processes that result in the appropriation of particular types of knowledge or particular skills, but are 'governed' by some overarching and value-laden telos.

communication as mediating means. Rather, in the course of repeated participation in these practices representational processes are instantiated in and through the medium of conversation, potentially resulting in some common heuristics, which, if this is deemed theoretically or methodologically advantageous, can in turn be viewed as equivalents of 'linguistic knowledge'. Now, if I understand the authors correctly, this is where literacy comes in and is given the credit (as a developmental mechanism) for transforming an early form of 'language knowledge' (one that is more 'implicit, holistic and content-directed'), into a more 'explicit and analytic awareness' that enables the speaker/writer to detach from content and situational context, generalize across them, and use linguistic forms in ways that signify 'rhetorical flexibility'.

Although I am supporting R&T in their attempt to investigate literacy as a form of discursive practice (though I would have wished for more explicitness and clarity in this orientation), I view their focus on literacy (and language) development as cognitive systems as counteracting this move and rather closing research territory than opening it. While language awareness and rhetorical flexibility in most cultures are concomitant processes of literacy development, they are not necessarily intrinsically tied to literacy, which I believe is the authors' assumption when couching literacy (and language) in terms of cognitive development. First, I would like to draw attention to non-literate cultures, where rhetorical flexibility is an achievement that solely rests on participation in non-literate, rhetorical practices. Second, and more related to the issue at hand, I would argue that the kind of linguistic awareness and rhetorical flexibility that literacy is credited with are first of all outcomes of a particular type of schooling discourse, one, however, that most commonly centres around literacy as its topic, and secondly that they are due to the fact that written discourse modes operate 'on-top-of' already established oral discourse modes. Let me briefly exemplify these two suggestions.

Literacy discourse is typically embedded in school-oriented activities, some of them already taking place early on in family activities, reaching their peak in practices in schools and educational frameworks. The language forms employed in these kinds of practices are typically descriptive and analytic, giving the impression that the speaker's perspective is that of everyone, i.e. ultimately nobody's. This way of constructing the relationship between the speaker's perspective and what the talk is about, in terms of detachment and analytic distinctness, is a socio-historical product that evolved concurrently with literacy, the novel, our modern views of self and others, and last but not least in what is known as 'scientific discourse'. Whether actually literacy, the invention of the novel, or at a much broader level, socio-economic transformations and the development of nation states have served as the mechanism for these dramatic changes in social practices is, in my mind, a matter of

opinion. In addition to these general changes of socio-historical practices and peoples' participation roles in them, the way literacy is typically taught in school-oriented activities, namely in terms of bottom-up strategies, may contribute further to the impression that literacy by itself functions as the decisive factor in becoming detached and analytic. If literacy discourse at home and in schools was more integrated in holistic and contextual activities, as suggested by many educators, its role as a contributing factor to reflection, rhetorical flexibility, and adaptability would appear to be less relevant.

My suggestion that literacy discourse operates 'on-top-of' a relatively well established oral discourse mode is an attempt to draw attention to discursive practices that are taking place in social spaces where different discourse modes are in competition, i.e. where speakers are confronted with more choices to construct their identity claims – such as in learning how to differentiate between different socio-, dia-, or genderlects. In situations like this, previous claims (and the way they have been constructed) may lose their status of 'naturalness', and can become more fragile, open for reflection, and result in a process that can be characterized in terms of greater awareness and reflectivity. However, there is no necessity for such an outcome within this contact of discourse modes, because both modes can co-exist next to one another, 'delivering' different forms of identity formation processes (as when two languages are spoken by the same person in clearly separate social spaces). And furthermore, if we had learnt literary modes of communication first, followed later on by oral modes,[2] it is likely that R&T's model would have credited orality as the decisive factor for the development of language awareness and rhetorical flexibility.

To sum up, R&T's attempts to integrate cognitive and discursive approaches to literacy and development are well meant and commendable, though ultimately disorienting and constraining. Rather than seeking false compromises and attempts of integration, I find it more productive to leave both approaches where they currently are, i.e. in competition, with different ontological and epistemological starting points as to what the human organism is and how it functions, with different notions of literacy and development, and with different methodologies to approach the empirical phenomena of literacy and development. This is not meant to imply that attempts to integrate cognition into social practices aren't possible (I even feel that they are ultimately necessary). However, they have to start with basic assumptions about the social construction of identities as central to

[2] As in, let's say – although it is hard to imagine – we were born with roots (like trees) that prevented us from moving around, but with a laptop that enabled us to communicate within the writing mode with all others of our species, so that literacy would have come to be our first and 'natural' discourse mode; and only later in our socio-historical and also ontogenetic development would we have learned to move around, and in this process we had learned to employ oral forms in face-to-face communication.

development, and participation in social practices as the central developmental mechanism. Subsequently, i.e. in the process of making narrative or literate practices more and more relevant for who and what we are, we begin to generalize across, and abstract from, such practices and bring such generalizations and abstractions into new forms of practices. Couching these forms of participation at such points in cognitive terms is perfectly legitimate and potentially productive, but it should be clear that this way of approaching the relationship between discourse and cognition is most definitely somewhat radical and controversial, but in clear contrast to the way R&T attempt to integrate them.

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Peer commentary on 'Developing linguistic literacy: a comprehensive model' by Dorit Ravid and Liliana Tolchinsky

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The authors of this rich and interesting paper[1] have done a fine service to the field of child language by bringing to the forefront the largely neglected topic of later language development. Major discourse-oriented studies including children beyond preschool age have been confined to oral production of narrative texts (Peterson & McCabe, 1983; Berman & Slobin, 1994; Hickmann, in press), and they all leave off at around age ten. The pathbreaking work of Labov (1972) did in fact consider the language of pre-adolescents and teenagers in explicitly linguistic terms, but this also concerned oral narratives without focusing on development. One important contribution of the present study, then, is to show that the progression from early school-age via middle childhood and on to adolescence and adulthood involves far more than merely increased vocabulary.

Another important thrust to this paper is its emphasis on what the authors term 'linguistic literacy' as a special kind of language knowledge and use. Much current work on the language and discourse skills of school-age children takes into account the entire gamut of verbal and even nonverbal aspects that constitute young people's contemporary environment. R&T deliberately attempt to distinguish between linguistic literacy and other kinds of literacy that are currently *de moda* such as computer literacy or visual literacy. Their concern is not, therefore, with 'multiliteracies', but rather

[1] Henceforth referred to as 'R&T'.

with a literacy that relates to knowledge and use of language, although this knowledge may derive from varied kinds of input. A valuable by-product of this paper might thus be to define the various sources of linguistic literacy and their relative impact at different phases of development.

For the authors, 'developing linguistic literacy means gaining increased control over a larger and more flexible linguistic repertoire and simultaneously becoming more aware of one's own spoken and written language systems'. In other words, there is such an entity as 'linguistic literacy' and this needs to be considered in the dual perspective of the impact of literacy both on knowledge and use OF language and also on metalinguistic awareness and knowledge ABOUT language. Familiarity with written language as a 'notational system' yields particularly clear instances of metalinguistic awareness, since interpretation of the sound system of one's language is necessarily different for literate versus uneducated speakers. The former have access to a wide range of interrelations on the 'graphic-orthographic dimension'. An example is the fact that when asked to explain the sources of children's morphophonological deviations from normative usage, Hebrew-speaking university students will analyse such problems in terms of how such words are spelled, whereas preschoolers have no access to this 'literate' source of information.

The multilevel knowledge models espoused by the authors of this paper are thus largely congenial to this reviewer (I have proposed a related distinction between the phases of emergence, acquisition, and mastery of linguistic knowledge). However, they might also have related processes of knowledge acquisition to a rather different distinction – between competence and performance. R&T argue that linguistic literacy means not only 'increased control over a larger and more flexible linguistic repertoire' but also 'becoming more aware of one's own language systems'. I interpret this to mean both greater knowledge of more linguistic systems and subsystems and also greater ability to put this knowledge to use. However the authors' proposals lack explicit formulation of the relationship between knowledge of language and use of language – both of which are distinct from the epilinguistic or metalinguistic level of representation. I have suggested (Berman, 1995) that in developing narrative abilities, as in other spheres of language use, the line between competence and performance is not only flexible and fuzzy, it is bidirectional. Knowledge of linguistic forms and narrative structure clearly underlies the ability to tell a story; but the act of (story-hearing and) story-telling impinges on this knowledge and affects it across the child's developmental history in becoming a proficient interpreter and teller of stories. I would be interested in how R&T address this issue of bidirectionality and their ideas for studying it empirically in the psycholinguistic model which they propose.

An original contribution is their suggestion that linguistic literacy be

defined in terms of mastery of linguistic variation – the ability to differentiate explicitly and appropriately between various contexts and types of language use. This is a critical point of departure for considering the largely untouched issue of the interrelations between language development, literacy, and language variation. The model proposed here provides an important basis for principled explanations of findings from a crosslinguistic project on the development of text production abilities in which this reviewer has been associated together with the authors of this paper. We found, for example, that nine-year-old grade-schoolers clearly distinguish between the forms of expression they use in telling a personal-experience narrative about an incident involving interpersonal conflict compared to when constructing an expository discussion of the same topic (Berman & Verhoeven, in press). Young school-age children, monolingual speakers of different languages, express these differences by a wide range of linguistic forms of expression (e.g. use of grammatical tense/aspect/mood, reliance on modal expressions, types of surface subjects, and internal clause structure). However, the complexity of the notion linguistic variation is underlined by the fact that, although the younger children in our sample all differentiated somewhat between the texts they produced in speech and writing, only older, high-school students were able to make consistent and appropriate use of written language as what R&T term 'a special discourse style'.

Another topic touched on here that has been considered mainly from the point of view of social and educational implications rather than in the psycholinguistic perspective of developing literacy they propose is: what is meant by different varieties of the same language? From the perspective of language learning, three major sociolinguistic varieties can characterize a language like Israeli Hebrew: (1) 'normative' usage, associated with the Hebrew Language Establishment; (2) 'standard' usage of educated native-speaking adults with a high level of linguistic literacy; and (3) 'substandard usage' associated with three groups – non-native speakers of the language; less educated adults for whom Hebrew is a dominant language but who lack linguistic literacy of the kind at issue here; and preliterate children who can be expected to eventually develop standard usage (Berman, 1987). The middle group has access to the widest range of language varieties – including slang and colloquial usage rejected by those in the first group, and literate styles of usage unavailable to those in the third group. The present paper provides an important frame of reference for investigating this idea, as do the authors' claims concerning the rhetorical flexibility that can be expected from populations with different levels of literacy. It is both methodologically difficult and politically problematic to design and conduct empirical research on such issues in different cultures and communities, but this is clearly a major challenge invoked by R&T's conceptualization of linguistic literacy and language variation.

Another important distinction which they articulate is between written language as a notational system compared with written language as a special discourse style. As the authors note, literacy research to date has tended to focus on the first facet of the topic. This is what is of major concern to educators, and this is what lay persons typically mean when they talk about knowing how to read and write. In contrast, R&T argue for a psycholinguistic orientation to the development of writing as a notational system that goes beyond simplistic claims for the role of phonological awareness (usually in the context of isolated words) as a precondition to acquisition of reading and writing – typical of much current research on early literacy. Instead, they propose that phonological awareness, like other facets of linguistic and metalinguistic knowledge, is better characterized as a consequence of, rather than merely as a requirement for, knowing how to read and write (Tolchinsky, in press).

More problematic even than a psycholinguistically sophisticated characterization of writing as a notational system is the issue of writing as a special discourse style. This has been the topic of concern for linguists from different research orientations (e.g. Halliday, 1989; Chafe, 1994; Biber, 1995), but it has not been addressed in developmental terms to date. One reason is that it is extremely difficult to characterize what is meant by 'written language style', and analyses of this notion tend to confound such variables as genre, register, communicative context of use, and modality. Another reason is that the ability to use this special style proficiently and appropriately involves far more than knowledge of linguistic forms *per se*, but depends on complicated and largely uncharted interrelations between conceptual development, world knowledge, experience with literacy-related activities, and individual rhetorical aptitude. We should be grateful to R&T for laying out these issues in all of their complexity.

Even though the paper in some ways suffers from being too rich and complex, since it introduces a plethora of ideas and distinctions for conceptualising and for investigating linguistic literacy, I would add a further dimension to the distinction between written language as notation and as discourse style. This is writing as a medium of language use that differs from speech in terms of processing constraints and the communicative situation. It makes sense to assume a causal interaction between these factors and the organization of linguistic content, including lexical choice, propositional content, and the online flow of information (Stromqvist & Ahlsen, 1999; Stromqvist, Ahlsen & Wengelin, 1999). There are few studies of online processes of text production in developmental, cross-genre, or cross-modal discourse perspectives of the kind necessary for probing relevant issues of linguistic literacy. The little work along these lines suggests that in producing (narrative) texts, older and more proficient speaker-writers engage in more pre-discourse planning and proceed with less inter-sentence pausing (e.g.

Chanquoy, Foulin & Fayol, 1990; Stromqvist, Nordqvist & Wengelin, in press). Any further undertaking of online processes of written text production will necessarily use R&T's ideas as a basic frame of reference.

Their paper constitutes a rich conceptual and principled basis for the study of linguistic literacy and later language development, which it highlights as major challenges for developmental psycholinguistics at the dawn of the 21st century. It is thus a 'source article' which provides much food for thought and even greater sustenance for rich and varied future research. For that reason I end with a minor quibble about the rather pretentious title. Why not let readers see for themselves that this proposal in fact constitutes 'a comprehensive model of linguistic literacy?

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Developing linguistic literacy: perspectives from corpus linguistics and multi-dimensional analysis

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INTRODUCTION

In their conceptual framework for linguistic literacy development, Ravid & Tolchinsky synthesize research studies from several perspectives. One of these is corpus-based research, which has been used for several large-scale research studies of spoken and written registers over the past 20 years. In this approach, a large, principled collection of natural texts (a 'corpus') is analysed using computational and interactive techniques, to identify the salient linguistic characteristics of each register or text variety. Three characteristics of corpus-based analysis are particularly important (see Biber, Conrad & Reppen 1998):

- a special concern for the representativeness of the text sample being analysed, and for the generalizability of findings;
- overt recognition of the interactions among linguistic features: the ways in which features co-occur and alternate;
- a focus on register as the most important parameter of linguistic variation: strong patterns of use in one register often represent only weak patterns in other registers.

Corpus studies have documented the linguistic differences among spoken and written registers in English and other languages. Further, by analyzing systematic corpora produced by students at different stages, these same techniques have been used to track the patterns of extended language development associated with literacy.

Two major patterns emerge from studies in this research tradition: (1) adult written language is dramatically different from natural conversation; and (2) written language is by no means homogeneous: rather, there are major linguistic differences among written registers. Thus, the developmental acquisition of linguistic literacy requires control over the patterns of register variation, in addition to a mastery of the mechanics of the written mode.

Corpus studies of individual linguistic features in speech and writing

Over the past 20 years, there have been numerous research papers and books using corpus-based techniques to document the linguistic characteristics of spoken and written registers. More recently, the *Longman Grammar of*

Spoken and Written English (LGSWE; Biber, Johansson, Leech, Conrad & Finegan, 1999) systematically describes the grammar of English giving equal attention to aspects of structure and use. The descriptions of language use in the LGSWE are based on empirical analysis of a 20-million-word corpus representing four spoken and four written registers: conversation, fiction, newspaper language, and academic prose (see Biber *et al*., 1999, chapter 2, for a description of the corpus).

Interestingly, many linguistic features show a fundamental spoken/written difference but also reflect particular patterns of variation among written registers. For example, lexical verbs and phrasal verbs are common in conversation and relatively rare in written academic prose, but they are actually most common in written fiction (LGSWE Fig. 5.2, pp. 367–69; Table 5.13, p. 409). Appositive noun phrases and relative clauses are typical characteristics of formal writing (and rare in conversation), but they turn out to be most common in newspaper writing rather than academic prose (Fig. 8.13, p. 606).

These corpus-based findings highlight the fundamental importance of mode (spoken vs. written) for descriptions of language use. However, they also show that register is a second fundamentally important factor, accounting for much of the variation within each mode.

Multi-dimensional studies of spoken and written registers

While some researchers have focused on the use of individual linguistic features, the multi-dimensional (MD) analytical approach was developed to describe the overall linguistic characteristics of a register, and to compare two or more registers. This corpus-based analytical approach is based on computational analysis of texts from spoken and written registers, to identify the most important patterns of linguistic co-occurrence: the 'dimensions' (identified statistically using factor analysis). Each dimension comprises a distinct set of co-occurring linguistic features, and each has distinct functional underpinnings. Registers can be compared in this multi-dimensional space, enabling empirical analysis of both the extent and the ways in which any two registers are different. Early MD studies investigated the synchronic relations among spoken and written registers in English (e.g. Biber, 1988), while later studies focused on the diachronic development of written registers and register variation in other languages (e.g. Korean and Somali, see Biber, 1995).

MD analyses have resulted in many unanticipated findings about the linguistic nature of spoken and written discourse. Although these studies have documented major linguistic differences between 'oral' and 'literate' registers (e.g. conversation vs. academic prose), they have not identified any absolute differences between speech and writing generally (Biber, 1988, 1995). The absence of absolute differences is due mostly to the extreme

versatility of the written mode. That is, there is comparatively little linguistic variation among spoken registers, apparently because they are all constrained by real-time production circumstances. In contrast, written registers range from the extremely dense informational styles of scientific exposition to the colloquial styles of personal letters and dialogue in fiction (Biber, 2001).

In earlier historical periods, there was considerably less variation among written registers in English (Biber, 1995; Biber & Finegan, 2001). That is, in the 17th and 18th centuries, scientific written registers were relatively similar linguistically to popular registers like fiction. But in the last century, scientific registers have moved away from popular registers, developing linguistic styles with densely packaged information, especially through complex modification of noun phrases. This gradual evolution suggests that the production possibilities of the written mode are not obvious. Rather, it took centuries to recognize that extensive revision and editing in writing can result in the extremely dense informational styles found in academic prose. These diachronic developments parallel the development of literacy skills by school-aged children explored by Ravid & Tolchinsky.

Multi-dimensional studies of literacy development

One important aspect of the framework proposed by Ravid & Tolchinsky is that linguistic development associated with literacy continues well into early adulthood. The MD approach has also been used to track these developmental changes.

For example, Reppen (1995, 2001a, b) uses the MD approach to investigate the patterns of linguistic development in a corpus of elementary student writing (ages 8;0–12;0). As early as 3rd grade (age 8;0), students begin to reflect register differences in their own writing, using linguistic features to distinguish between narrative tasks and expository tasks (e.g. use of past tense verbs vs. longer words and increased use of nominalization). This register awareness continues to be refined over the following years. For example, 6th grade (age 12;0) students begin to develop a distinct linguistic style for argumentative/persuasive writing, although it is still far removed from the decontextualized language used in adult argumentative/persuasive texts. These findings support the descriptions of increasing register or genre awareness in Ravid & Tolchinsky.

The MD analysis of elementary student registers can be compared to the adult MD model to show some of the developmental changes that take place between upper elementary school and adulthood (Reppen, 2001b). Two areas of comparison are noted here:

(1) First, the models can be compared with respect to their dimensions, and the functions represented by those dimensions. Both student and adult models have dimensions that serve the following functions: informa-

tional focus; narration; involvement/stance; argumentation (see Reppen, 2001b, p. 195). At the same time, there are striking differences. For example, student argumentative texts are contextualized and have a high number of second person pronouns, resulting in an 'other-directed' style; and the student 'projected scenario' dimension has no counterpart in the adult model.

(2) The order of the dimensions can also be compared, reflecting their relative strengths. In both the student and adult models, a fundamental oral/literate dimension is the first one to emerge. The second dimension in both models reflects narrative purposes. In contrast, in both models the last two dimensions reflect task-specific concerns, rather than the general production circumstances that are reflected in the first dimension.

The development of early adult literacy skills has also been investigated with the MD approach. Conrad (1996b, 2001) investigates variation across research and summary writing in two academic disciplines, biology and history, and compares the writing of professionals in these disciplines to university students' writing (Conrad, 1996a). Numerous differences exist across the disciplines and registers, but there are certain consistent patterns of writing development as students advance from the introductory undergraduate level through the graduate level. The most notable trend concerns the density of information packaging. In both disciplines and both types of writing, student writing at the introductory level is far less informationally dense than professional writing; but at each level, student writing becomes more informationally dense. Not only do students increase their use of technical terms, as is expected at higher levels, but they also come to control much more complex noun phrase structures generally, so that referents become highly specified. From this perspective, the development of student writing is similar to the development of scientific registers historically – that is, moving towards the extremely dense packaging of information.

Like Ravid & Tolchinsky, this MD study provides insight into the processes that influence students as they learn to write advanced, specialized registers. Specifically, in many cases students seem able to imitate the surface structure of professional writing without yet being able to express their ideas clearly through the use of those structures. For example, academic professionals in history frequently use *wh*-relative clauses for elaborated reference in summary writing. Graduate student writing shows an increasingly dense use of these same features, but in many cases, the students' elaboration makes the referents more confusing. For example, one student writes about Theodore Roosevelt: 'In 1897 his personal faith was that war with Spain would erase the social abyss which was not assured.' In examples like this, we see students imitating (or even exaggerating) the linguistic structures used

by professionals before they fully control the structure's function and can manipulate the structure competently.

As can be seen from this brief survey, corpus linguistics and Multi-Dimensional Analysis provide powerful tools to explore the linguistic developmental changes associated with older learners acquiring a range of spoken and written registers. These studies strongly support the developmental framework proposed by Ravid & Tolchinsky, documenting the important interaction between linguistic patterns of language development and register variation. There remain many areas that need to be explored further as we work to complete the picture of advanced language development.

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Sentence processing studies and linguistic literacy

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Among the various processes that characterize the development of literacy competence presented by Ravid & Tolchinsky in their paper, two are particularly relevant for studies of language development focusing on crosslinguistic sentence processing: (1) the continuity vs. discontinuity between the differential access to oral and written codes within the same language and between languages; (2) the representational status of the conscious access to language provided by the development of literacy, which renders variability more accessible and controllable. In this short note, I shall deal only with the first of these.

Even though variability between code modalities is universal, some languages are of particular interest. This is because many features of phonology, morphology or syntactic constructions are specific either to the oral or to the written code, producing a sort of bilingual system within a language. French is a very good example of such intralanguage dissociation, as can be seen from a few examples concerning verbal and nominal morphology and word ordering.

Verbal agreement in French is determined by the number of the subject and, in some complex constructions, by its gender. Gender is expressed only in complex verbal forms composed of the auxiliary 'be' and a past participle with masculine, feminine or plural marking ('Les feuilles sont ramassées en automne' *Leaves are collected in autumn*). As far as verbal agreement is concerned, a large gap exists between the oral and the written code. In the oral code, French has a large degree of ambiguity in its verbal inflectional system, particularly with the most frequent verbs ending with ER in the infinitive form such as 'chanter' (*to sing*). The various written inflections – person (je chante vs. tu chantes), number (il chante vs. ils chantent) are inaudible since the pronunciation is the same.

For nominal agreement, the phonological information conveyed by the last syllable of the noun has often (in 60% of cases) a high predictive value for gender assignment. In contrast, number agreement realized through the addition of 's' or 'x' for plurals is inaudible ('fille' vs. 'filles' 'genou' vs. 'genoux') and the plural is expressed through the determinants ('le' vs. 'les'). In a small set of nouns, which constitute an exception, number is expressed by an audible contrastive inflection ('le journal' vs. 'les journaux').

In French, canonical order is SVO. The first NP in a sentence is most

frequently the agent, the subject and, contrary to other romance languages such as Spanish or Italian, French does not permit subject ellipsis. Despite its preeminence, the canonical SVO order occurs along with other orders imposed by syntactic, pragmatic or contextual constraints. A major exception to SVO order is the use of right or left dislocations which are very frequent in oral informal speech but are excluded in written texts. For example, six-year-old French children introduce referents in oral narratives (Kail & Hickmann, 1992) with dislocations of the type 'Le garçon, la grenouille, il la regarde' (*the boy*, *the frog*, *he is looking at it*); at 10;0 such constructions have nearly disappeared because written rules are taught at school. Nevertheless, in informal conversations, such dislocations are very frequent even in very literate adults.

Taking the COMPETITION MODEL (Kail, 1989; MacWhinney & Bates, 1989) as a framework for studying the qualitative and quantitative variations between languages in studies of sentence comprehension in children and adults, I have become aware that the substantial body of experimental data obtained in many contrasting languages (over fifteen) were all obtained from oral language. Let me summarize briefly the main results obtained in this framework:

To interpret a sentence, native speakers depend on a particular set of probabilistic cues to assign formal surface devices in their language to a specified set of underlying functions. Among these surface cues, word order, nominal and verbal agreement, and nominal case marking have been extensively studied in the agent assignment, for example. The strength of a linguistic cue depends on three factors: its availability, defined as the number of times a cue is present and can be used to access the underlying function; its reliability, defined as the number of times a present cue signals the correct interpretation, and its cost which depends on the perceptual salience and the load it places on working memory.

To summarize, one of the most consistent results of off-line studies in adults is the very strong correlation across languages between cue strength and cue reliability. Developmental crosslinguistic studies also support the assumption that children acquire off-line sentence comprehension strategies in a sequence that is predictable from cue validity. However, a number of exceptions to predictions based on cue validity have been found, especially in French. Young French children initially base their sentence interpretation on word order whereas semantic and morphological cues are much more important than word order for sentence interpretation by French adults. Later, from six years upwards, children rely on verbal agreement as adults do. To explain this developmental reorganization of processing strategies, we proposed implementing the Competition Model with the notion of cue cost, refering to the distinction between local vs. topological processing (Kail & Charvillat, 1988; Kail, 1989).

Nevertheless, this developmental change in French children's processing could be explained by their increasing mastery of morphological cues supplied by growing knowledge of the written code which is clearer and more regular than the oral one. It seems reasonable to assume that linguistic literacy makes French morphology more accessible and more consistent providing a stable representation for agreements. As underlined by Clark (1997), oral and written language form a 'virtual loop in which the two interact and modify each other'. The consequences of this view are of special importance for on-line sentence processing in general and for French in particular.

Few on-line sentence processing studies in children and adults have been yet conducted (for a review, Kail, 1999) but they suggested that new constraints such as cue integration (Kail & Bassano, 1997) and cue perceptibility (Kempe & MacWhinney, 1999) have to be incorporated into the Competition Model. All of them indicate that interactions between cues govern a processing system operating in a highly interactive fashion.

The importance of word order for the on-line processing of morphological cues was underscored in a previous study with Greek adults and children over six years of age. In a task which required the interpretation of sentences with varied word order (NVN, NNV, VNN) and case morphology, Kail & Diakogiorgi (1994) found that the decision times for agent assignment were shorter in NNV sentences where the initial information on nouns concerned the most valid cue in Greek, case morphology. Analogous results were recently reported for Italian (Devescovi, d'Amico & Gentile, 1999). Italian subjects processed VNN sequences faster than NVN or NNV because of the immediate access to the most valid cue, verbal agreement. It is interesting to remark that in Italian, VNN is not the dominant word order ((S)VO is dominant), just as NNV is not the dominant word order in Greek.

It seems that the temporal constraints of on-line processing in languages with relatively rich morphology result in the mediation of morphology by word order. Given the crucial status of morphology in providing costless local cues, a realistic model of on-line sentence processing must take into account both oral and written properties of a given language and mainly the developmental dynamics between oral and written codes, in other words linguistic literacy.

In their paper, Ravid & Tolchinsky emphasize that 'linguistic literacy interfaces with language acquisition at all stages from birth to maturity'. In the early stages it remains potential, 'less visible though not less active' and at later stages, they suggest including literacy in any investigation of language acquisition. If this argument is correct, we have to predict that literacy may cause the child to notice conflict cases in the input (for example between word order and morphology) she has never noticed before. As we previously mentioned, real time language processing in a given language requires both

efficient form-function mappings and rapid context integration. Comprehension strategies may change over time as the pool of competing and converging sentence-types shifts and expands through the progressive mastery of oral and written discourse constraints. What Ravid & Tolchinsky do is on the one hand, to propose a new general framework, linguistic literacy, from which to address issues such as how the child becomes conscious of the availability of the multiple linguistic resources of her language; and on the other hand, which I found more innovative, to provide specific predictions concerning some areas such as morphological awareness.

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Commentary on Ravid & Tolchinsky 'Developing linguistic literacy: a comprehensive model'

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Ravid & Tolchinksy (R&T) introduce an important concept for the field of language acquisition and development: linguistic literacy. To be 'linguistically literate', they say, one must possess both 'knowledge of the two major linguistic modalities – speech and writing' and 'a linguistic repertoire that

encompasses a wide range of registers and genres'. These two statements make clear the great breadth of research that the authors have considered in formulating their model.

First, much research exists on the development of oral language, and much on written language, but it is less common for these to be considered together. Admittedly it is beyond the scope of most studies to pay as much attention to the participants' knowledge of spoken as of written language (or *vice versa*). However, this paper makes it clear that the links between these two modes of language are so rich and dense that researchers should make at least some consideration of the effect of the one on the other.

Second, R&T's focus on the control that the language user has over variations in the genres and registers of his or her language is very interesting. Their paper reveals the variety of ways in which language can be used in different situations, and the range of levels at which we can understand different aspects of our own language. It is impressive to see examples drawn from such a wide sweep of research, ranging from such general abilities as being able to choose linguistic items and patterns appropriate to the conversational situation, to more specific instances such as the spelling of morphology-based patterns. Many of these abilities take many years to develop, which is reflected in the fact that R&T do not confine their discussion to the first few years of language development. A preschooler may be able to converse fluently, and a primary-school child may be able to read and write long and interesting stories, but, as R&T amply demonstrate, many aspects of linguistic knowledge take until well into adulthood to acquire, if they are acquired at all. This emphasis on the continuing development of linguistic proficiency across the lifespan seems to me to be one of the most important contributions of the paper.

R&T's equal focus on the spoken and written modalities of language leads to their emphasis that 'the reciprocal character of speech and writing … makes it a synergistic system'. This reciprocity seems to hold just as strongly when we consider the concomitant process of linguistic literacy, language awareness. As the authors point out, phonological awareness has received many years of experimental attention for its role in learning to read and write, but more recently other types of metalinguistic awareness, especially morphological awareness, have come under study as well. Taking morphological awareness as our example, early studies focused on whether this was correlated with various literacy skills (e.g. Brittain, 1970; Freyd & Baron, 1982). Later studies have looked at causal relationships as well. Some researchers have concluded that increasing morphological awareness promotes the ability to read or spell morphologically complex words or pseudowords (e.g. Carlisle, 1995; Nunes, Bryant & Bindman, 1997), while others have shown that knowledge of morphologically based spelling can in turn influence oral morphological judgements (e.g. Derwing, Smith & Wiebe,

1995). However, the most thorough studies have reached a more complex but plausible conclusion: that causality goes in both directions (e.g. Bryant, Nunes & Bindman, 1998; Levin, Ravid & Rapaport, 1999). Just as increasing morphological awareness facilitates a child's learning of morphological spelling patterns, increasing familiarity with such patterns in writing is seen to promote development in their general understanding of morphology. R&T, through their own research and that of others, have gathered convincing evidence of the importance of language awareness for learning to read and write, and *vice versa*.

On a more specific point, R&T mention four knowledge dimensions that children must master in order to become linguistically literate: phonological, graphic-orthographic, morpho-phonological, and morphological. They are right to emphasise that learning about written language, at least for many orthographies, entails much more than simply mastering grapheme-phoneme correspondences. However, I would suggest a slight change in the way that these dimensions are conceptualised. In explaining the graphic-orthographic dimension R&T do not mention one seemingly quite important point: the understanding of spelling conventions or regularities, which often depend on word position.

Many orthographies contain instances of such spelling conventions. In English, for example, the sound /ɔɪ/ is virtually always spelled *oi* in the middle of words (e.g. *boil*), but *oy* at the end (e.g. *boy*), and in German the phenomenon of 'final devoicing' means that the sound /t/ can only be represented with *t* in word-initial or -medial position, but with *d* or *t* in word-final position (e.g. *Rad*, *Rat*). There are also spelling conventions about which letters can be doubled and where these doublets can occur, in English and also in French. Recent evidence suggests that even beginning spellers are sensitive to these conventions in these two languages (Cassar & Treiman, 1997; Pacton, Perruchet, Fayol & Cleeremans, 2001).

It would therefore be good to see 'mastery of spelling conventions' included as an important feature of the graphic-orthographic dimension. Also valuable would be a mention of the need to acquire a sight vocabulary of those words which could plausibly be spelled in a number of ways (e.g. *seat*, *seet*), or whose spelling cannot be guessed from knowledge of linguistic rules (e.g. *yacht*, *laugh*). (These may be much more important in the relatively irregular system of English than in many other orthographies.)

The final two of R&T's knowledge dimensions are the morpho-phonological and the morphological dimensions. In both cases, language users may use their knowledge of the morphology of these words to disambiguate a potentially ambiguous spelling. The only difference seems to be that in one case they can use only morphology (e.g. to decide how to spell the ending of *passed* or *past*), whereas in the other they can use morphology, but also sound (e.g. in American English, the *t* in *writer* is pronounced the same as the *d* in

rider, and only by thinking about the 'base' words *write* and *ride* can one decide upon the correct spelling for this otherwise ambiguous medial sound). These two dimensions thus seem much more similar than any of the several phenomena included in the 'graphic-orthographic' dimension, and might therefore be better treated not separately, but as two parts of a single, 'morphological' dimension.

R&T discuss another feature of written language that is necessary for becoming linguistically literate: punctuation. The development of knowledge about punctuation (even in the broad sense used in their paper) has been rather neglected by researchers, and so it is very helpful that these authors have emphasised its importance, and even argued for it to be recognised as a 'multifunctional linguistic system in its own right'.

The authors make several predictions concerning the acquisition of various types of punctuation, but they make few predictions overall, despite the many aspects of language use on which the model touches. It seems that the inclusion of more predictions would have been very useful both for making it possible to test various aspects of the proposed model, and for encouraging further research into a variety of areas of written and spoken language. Also, R&T point out only a few areas in which further research might be useful. Given the scope of their review, they could have made more of this opportunity to highlight more explicitly the questions which merit further study. Nevertheless, this paper presents a wide range of evidence in an integrated way. It draws our attention to the dense and interdependent relationship between oral and written language and the way in which this changes not just during childhood, but throughout adolescence and into adulthood. Its richness alone may well be sufficient to encourage others to interpret their results within its framework, and to conduct further studies to fill in any gaps that they see remaining.

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Questions about constructions

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Ravid & Tolchinsky are to be applauded for proposing literacy as a central topic in first language acquisition. A synthesis of research in spoken language, in literacy and literacy practices and the lines of enquiry represented in MacWhinney (1999) has interesting consequences for theories of first language acquisition, not least the nativist ones. This response focuses on constructions but a brief list of controversial points in R&T's paper will be useful.

1. Contra R&T, a clear boundary between spoken and written language cannot be drawn. (See Biber, 1988 and his concept of linguistic dimension.)
2. The paper discusses register, formality and planning time as causing differences between spoken texts. Another factor lies in differences among speakers, especially exposure to formal education – see Miller & Weinert (1998).
3. R&T's account of literacy and non-standard language is inadequate.
   a. Shirley Brice Heath (1983) did not argue that failure was a necessary consequence of different language practices inside and outside school. She did argue that a different pedagogical approach was essential.
   b. R&T's account of non-standard varieties, literacy and linguistic identity is oversimplified and idealized (possibly because of its brevity). There is a large literature on non-standard varieties and education, employment and social identity. Talk of illiterate ('non-literate'?) communities is not accurate in the modern world. On the range of genres available to non-literate communities, there is the classic paper by Akinnaso (1982); the excellent work on local and situated literacies by Barton & Hamilton (1998), Barton, Hamilton & Ivanic (2000) deals with written genres and speakers of non-standard varieties.

4. R&T suggest that written language promotes consciousness of the implicit structure of spoken language. Even literate speakers have very little idea of the syntactic structures of spoken language, except for planned spoken language that employs constructions typical of writing.

The remainder of this response deals with R&T's assertion that most [researchers] would agree that children growing up in a monolingual environment have access to the vast majority of morphological and syntactic structures of their language before they enter school age. Researchers indeed make such statements, e.g. Pinker's assertion (Pinker, 1994:273) that all languages are acquired with equal ease before the child turns four, except for rare constructions, constructions used predominantly in written language and constructions that are mentally taxing, such as *The horse that the elephant kicked kissed the pig*. Pinker assumes that far fewer constructions are used mainly in writing than are used mainly in speech. This assumption is disputable.

The assertion that English-speaking children have acquired the relative clause construction by age four contains a grain of truth, but what counts as a construction? Relative clauses have internal properties (What construction – *that*, contact or WH? How many phrasal constituents? How complex are the phrases?) and external properties (They occur in noun phrases, but where do the noun phrases occur in clauses and how complex are the noun phrases?).

Consider the relative clauses in (1).

(1) a I like the story you read
b I hate the boy that tore my picture

(1a) and (1b) exemplify the relative clauses typical of spontaneous spoken English. Both *you read* and *that tore my picture* modify direct object nouns, *story* and *boy*; in (1a) the contact relative clause has no complementizer while (1b) has the complementizer *that*. Prepositions occur at the end of such relative clauses, as in (2).

(2) this is the box (that) the biscuits are in

Possessive relative clauses are infrequent in spontaneous spoken English but the construction in (3) is typical. Note the shadow pronoun *their*. This construction is not non-standard but non-written.

(3) will those men I shout their names step forward

Note also the frequent construction in which a shadow pronoun functions as subject or object, as in (4).

(4) a I mean the girl that I saw her coming out of the shop

WH relative clauses with *who*, *whom*, and *whose* are rare in spontaneous spoken English but frequent in formal written English. *Whom* now occurs only in the most formal written English. In WH relative clauses prepositions can occur in initial or final position. See (5).

(5) a I have lost the diary which I kept addresses in
b I have lost the diary in which I kept addresses

Still more complex are WH relative clauses expressing both possession and location/movement, as in (6), and WH relative clauses in which the WH word is the specifier of a noun, which may have other modifiers, as in (7).

(6) This is the friend in whose house I first met my wife
(7) Tell us that scary story about the snake you told us last time

The relative clauses in (1)–(7) are mostly in object noun phrases. This is typical of spontaneous speech, which lacks subject noun phrases containing relative clauses.

Perera (1984) reports that only 40% of a sample of nine-year-olds used relative clauses in subject noun phrases; that primary schoolchildren generally do not use relative clauses introduced by *whom*, *whose* or preposition plus a relative pronoun – as in (5b); that one sample of seventeen-year-olds wrote texts containing 205 relative pronouns, including 1 *whom* , 2 *whose* and 5 Preposition + WH word. Consider children who use and understand relative clauses with *who* and *which*, but not *whose* or *whom*. Have they acquired the relative clause construction? What about children who have contact or TH relative clauses but not WH ones? And what about children who do not use relative clauses in subject noun phrases, or who do not use and understand complex noun phrases such as *the big house at the end of the road where my friend lives*?

The term 'relative clause construction' is a label for a large set. Many of the structures in the set are typical of writing but not spontaneous speech and many children master them relatively late (somewhere between twelve and eighteen) or not at all. The same can be said of complex vocabulary, which involves a large and complex derivational morphology. Pinker (1994:16) describes writing as an optional accessory and the spoken language acquired by children as the real engine of verbal communication. It is true that spoken language evolved first, is acquired first, and can be considered the foundation for other linguistic skills. But written language is not just a small add-on. Highly literate members of a literate society possess much syntax and derivational morphology which come with written language and which take many years to master, certainly until the end of secondary school. None of this is handled by any nativist theory of first language acquisition.

R&T's discussion of genres is important in another respect. Pinker (1994: 18) asserts that language is no more a cultural invention than upright posture, that it is not a cultural artifact that we learn the way we learn to tell the time. But humans learn the grammar, morphology and vocabulary of written language; the many genres and registers referred to by R&T have been consciously developed and elaborated by users of written language and have been developed in different ways in different cultures. Certain aspects of language are indubitably cultural and learned.

Literacy undermines other central tenets of nativist theories. Nativists claim that children are exposed to degenerate data but written data is edited and is typically not degenerate. Nativists claim that utterances are ephemeral and are not repeatedly presented to children, but written data is typically not ephemeral and children read and re-read their favourite stories.

We conclude with the other side of the literacy coin, the relative simplicity of spontaneous spoken language: the high proportion of main clauses, the minimal level of clause embedding, the lack of complex subordinate clauses, the small number of words per phrase and phrases per clause, and the large proportion of fixed phrases. These properties have been much discussed and exemplified in, e.g. Zemskaja (1973), Blanche-Benveniste (1991), Miller & Weinert (1998) and Wray (2001). Nativist theories of first language acquisition assume a large endowment of innate linguistic knowledge, without which it would (allegedly) be impossible for children to acquire the complex structures of any language. Once the complexities of written language are seen as learned over a longish period of schooling, once spontaneous spoken language is recognized as being relatively simple and once it is recognized that children do receive negative evidence (Sokolov & Snow 1994), nativist theories lose their *raison d'être*. This is the most important consequence of paying attention to literacy and the distinction between spoken and written language.

It is worthwhile emphasizing that, although the above remarks are critical (in the positive sense of the term), R&T's paper presents important facts which must be accommodated in any comprehensive and adequate theory of first language acquisition. The acquisition of literacy has been neglected by many researchers in first language acquisition, not least by the nativists. It is indeed time to look at 'language acquisition beyond preschool years' and to give due recognition to the fact that 'a five-year-old hardly matches an adult or even a twelve-year-old in linguistic proficiency'. Since the 1980s Chomsky has allowed a role for experience and maturation in first language acquisition, but without specifying what that experience might include. R&T point to the 'rich interaction between the developing child, written language and literacy activities' and to the increasing control of different genres. This indication is both correct and potentially fruitful, since it shows where to collect and explore the details of the experience and maturation.

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Lexical learning in school-age children, adolescents, and adults: a process where language and literacy converge

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As Ravid & Tolchinsky (2002) have indicated in their article, literacy has profound effects upon the development of language in school-age children, adolescents, and adults. Once children are able to read proficiently – typically by eight or nine years – their ability to acquire increasingly sophisticated aspects of language can expand greatly. The convergence of language and literacy is readily apparent upon examining the lexicon, a language domain that is subject to unlimited growth through the lifespan. For this reason, I would like to elaborate on the role of literacy in relation to lexical development beyond the preschool years, focusing on processes that facilitate the learning of word meanings. In this commentary, it will be shown that there is an ongoing reciprocal relationship between lexical development and literacy in which unfamiliar words are first encountered in print and learned through various metalinguistic strategies. Subsequently, this increased knowledge of

words leads to improved comprehension of text, which in turn, leads to further expansion of the lexicon (Sternberg & Powell, 1983).

Some words are learned through direct instruction where a teacher or other knowledgeable person defines an important concept. For example, when lecturing on volcanoes, a high school teacher might define the terms *caldera*, *lava tube*, and *tuff rings* to ensure students' knowledge of key terminology. The use of a dictionary to determine the meanings of unfamiliar words constitutes an additional source of direct instruction (Nippold, 1998).

However, research has demonstrated that most new words are learned indirectly through exposure (Nagy & Anderson, 1984; Nagy, Herman & Anderson, 1985; Miller & Gildea, 1987; Sternberg, 1987). Although both spoken and written forms of communication can provide this input, written language is generally superior in presenting difficult words that are important for succeeding in our technological and information-driven world. This was reported by Cunningham & Stanovich (1998), who found that magazines, newspapers, and books each contained a greater number of difficult words than various types of spoken language such as prime-time television shows, the conversational speech of college graduates, and expert witness testimonies. Indeed, it is easy to find instances of this in the popular press. For example, a recent news article (Levy, 2001, p. 53) contained numerous low-frequency adjectives such as *appellate*, *monopolistic*, and *antitrust*, each of which expressed subtle and abstract meanings.

There is evidence also that the sheer volume of reading that a person engages in makes a substantial contribution to vocabulary development through the lifespan, even when controlling for factors such as general intelligence. Cunningham & Stanovich (1998) reported that school-age children who engaged in as little as 21 minutes of independent reading per day were exposed to nearly two million words per year, and that the amount of reading they did contributed to their growth in word knowledge. Without a doubt, individuals who read minimally or not at all are missing an important opportunity to increase their knowledge of words. For reading to become a consistent habit – and hence a major tool for lexical learning through the lifespan – it is essential than children learn to read early, and that they become avid readers beyond the classroom, reading for pleasure and for gaining information (Cunningham & Stanovich, 1998).

Beyond simple exposure to words, metalinguistic factors are operating when an individual learns a new word encountered in print. One such factor is the abstraction of meaning from context clues (Sternberg & Powell, 1983; Miller & Gildea, 1987; Sternberg, 1987). One type of context clue that frequently occurs in writing is the RESTATEMENT, where a difficult word is explained using simpler vocabulary (Sinatra & Dowd, 1991). An American history book written for high school students illustrates this type of context clue for the noun ATTRITION:

> Grant's strategy was to use the North's advantages in terms of soldiers and supplies against an enemy reeling from shortages. Grant planned a war of attrition – to fight until the South ran out of men, supplies, and will. (Boyer & Stuckey, 1998, pp. 101–102).

Other types of context clues are more subtle and require a greater amount of inferencing on the part of the reader. For example, another paragraph in the same book contains the verb *secede*:

> In response to Lincoln's request, four states – Virginia, Arkansas, Tennessee, and North Carolina – decided to secede. Four other slave states – Delaware, Missouri, Kentucky, and Maryland – remained in the Union. The mountainous counties of northwestern Virginia stayed loyal to the Union as well. They set up their own government and joined the Union in 1863 as West Virginia. (Boyer & Stuckey, 1998, p. 97)

In this paragraph, a reader may be able to discern the meaning of *secede* by attending to the manner in which this word is contrasted with the neighboring verb phrases (e.g. 'remained in the union,' 'stayed loyal,' 'joined the union'). In addition, an understanding of slavery and the American Civil War would be helpful, as readers must apply their own background knowledge to the process of inferring word meaning from context clues (Sinatra & Dowd, 1991).

Unfortunately, not all paragraphs provide sufficient context clues to allow readers to infer the meanings of words, and it is particularly difficult to do so when the clues are less explicit or separated from the target word by one or more sentences (Carnine, Kameenui & Coyle, 1984). In addition, readers themselves differ widely in their ability to make use of context clues and to distinguish relevant from irrelevant information. For example, readers with poor reasoning skills have greater difficulty (Sternberg & Powell, 1983), along with those who are younger and less experienced in using the strategy (Carnine *et al.*, 1984). To compensate, students should receive direct instruction in the use of context clues. They should also be encouraged to read widely to gain sufficient exposure to words, given that the sheer volume of reading that takes place is a critical factor in the word-learning process (Cunningham & Stanovich, 1998).

An additional metalinguistic strategy that literate individuals employ to learn new words is morphological analysis (Wysocki & Jenkins, 1987; White, Power & White, 1989; Anglin, 1993; Nagy, Diakidoy & Anderson, 1993). This occurs, for example, when a reader encounters a compound word such as *middleman*, thinks about the meaning of each lexical morpheme (*middle*, *man*), and puts the two together to interpret the entire word. This strategy is also employed in relation to words that contain derivational morphemes such as *-able* (e.g. *marriageable*), *-ful* (e.g. *bountiful*), and *-ity* (e.g. *rarity*),

where the reader infers the meaning of the entire word based on an understanding of the individual morphemes.

As with contextual abstraction, however, morphological analysis is not a foolproof strategy for learning new words, as there are many instances where morphemes express unexpected meanings. For example, knowledge of the morpheme *sauro* – which means *lizard* in relation to *stegosaurus*, *brontosaurus*, and *tyrannosaurus* – provides no assistance in determining the meaning of *thesaurus*, nor does knowledge of *pine* and *apple* assist in interpreting *pineapple*. Hence, one must be ready to employ a variety of strategies to learn new words. This could occur, for example, when a reader generates a temporary definition of *middleman* using morphological analysis and then scrutinizes the broader linguistic context for additional clues to meaning, where the word is being used in reference to a sales person representing an auto parts manufacturer.

Students' knowledge of derivational morphemes and the way they contribute to word meanings steadily increases throughout the school-age and adolescent years (Wysocki & Jenkins, 1987; Anglin, 1993; Nagy *et al*., 1993). It has also been shown that stronger readers evidence greater proficiency in this area than weaker ones (Tyler & Nagy, 1990). This protracted course of development and association with reading is related to the fact that many of these morphemes, such as the suffixes *-ology* (e.g. *immunology*) and *-ize* (e.g. *magnetize*), occur far more frequently in formal written language such as scientific papers than in informal speech (Nagy *et al*., 1993). For this reason, students must read challenging text on a regular basis to gain exposure to derivational morphemes and to have opportunities for morphological analysis.

Once an individual has gained an understanding of previously unknown words through contextual abstraction, morphological analysis, or a combination of strategies, subsequent and frequent practice by using the words in daily spoken and written communication will help to strengthen both storage and retrieval capacities (Bjork & Bjork, 1992), thereby building ownership of the new vocabulary. As ownership deepens, readers can comprehend difficult text at a higher level than previously, thereby setting the stage for additional growth in word knowledge, and evidencing the continuous reciprocity between language and literacy.

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Oral language, written language and language awareness

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Ravid & Tolchinsky's paper draws a comprehensive picture of the fact that literacy is a lengthy developing process involving many linguistic factors which sometimes begins even before school age and lasts until adulthood. I very much appreciated the breadth and thoroughness of Ravid & Tolchinsky's paper and, in particular, the fact that they have taken the relationship between oral language and literacy into account. It seems to me that this is rarely the case in current linguistic theories and I would like to offer a few comments on some of the consequences that a serious approach

to literacy development would have on the studies of both oral language and literacy, and on linguistic theories themselves as well.

As pointed out in Ravid & Tolchinsky's paper, oral and written languages develop together and their structural properties in the adult's mind would not be the same had they developed separately, so that a model of the literacy development should not just be a model of the written language development, but of both modalities. This has two interesting corollaries: (1) the development of oral language is not achieved at age six, but goes on to be profoundly influenced by literacy development; (2) linguistic theory should take oral language, written language, and how they modify each other during development, into account.

Paradoxically, the fact that oral and written languages have great impact one on the other suggests that they are governed by different principles and rely on different types of knowledge. Ravid & Tolchinsky mention some of the structural differences between unconscious mastery of oral language and literacy development when they point out that 'naïve language users … are not aware of NP structures or verb arguments', and that 'side-by-side with the development of implicit language knowledge …, language users develop another facet of explicit and analytic awareness'. Structural differences between oral and written language have also been studied and described elsewhere (see for example, Halliday, 1985; Miller & Weinert, 1998), but I would like to go one step further and propose the following. Oral language is a basically unconscious process that would be better modelled by data-oriented, probabilistic or connectionist, exemplar-based, models such as those developed in computer linguistics (see for example, Bod, 1998; Daelemans, 1999; Barlow & Kemmer, 2000), whereas written language is basically a conscious process that can be adequately modelled by rule-like, non-probabilistic, symbolic, category-based approaches of linguistic theory (e.g. Government and Binding, Lexical Functional Grammar, Head-driven Phrase Structure Grammar, etc.). Interferences between oral and written language appear during development as oral language starts to include some conscious processing and written language becomes partly automatic and unconscious.

It is often pointed out that differences between oral and written language come from memory and processing limitations, or from the ability to edit, rewrite and restructure texts. I propose that the first and major reason for these differences is the development of language awareness and of the ability to RE-INTERPRET the language signal. Memory and processing limitations also apply to written language, even if not as severely, as written information can be retrieved as many times as necessary. However, taking another conscious look at what has just been perceived is impossible with oral language. Perception of a written signal first occurs through unconscious processing until some interpretation is achieved which can be used to consciously re-

analyse the written data. The initial data, the signal, the interpretation of which is highly dependent on the perception and language context, now appears as an 'object' clearly defined and focused in the reader's mind – the sharper the consciousness, the clearer the object. At that point, the object will be linked to the written word in the reader's mind. Any further reasoning about language structures or properties will be performed using these clearly-defined objects/written words. Thinking about language has become symbolic, with clear and non-ambiguous symbols highly suitable for producing symbolic and rule-like reasoning. Furthermore, when consciously analysing written material, relevant unconscious material is not taken into account because of its different nature. Over-generalization of rules is thus a logical consequence of this process because reasoning is performed with a reduced set of data. General properties are put forward and local specific characteristics ignored. Re-analysis of written material can be performed at any level – morphology, syntax, semantics, and pragmatics – because it is possible to focus consciously on any specific element.

All this is impossible with oral language because of the non-permanence of the speech signal. The signal is lost and only its interpretation remains, making both identification between the speech signal and the language interpretation and conscious rule-like reasoning with the speech signal impossible. The resulting interpretation of the oral signal can be conscious, but conscious perception of the formal characteristics of oral language signals is highly problematic, and requires a level of linguistic expertise beyond that which most people achieve. This expertise is usually acquired concomitantly with literacy, as is described in Ravid & Tolchinsky's paper. This makes morphology and syntax special because their conscious analysis is easy only in written language. The very length of the historical processes that made linguistics a science argues in the same direction, especially the high correlation between the history of the awareness of language structure and the history of literacy (see Harris, 1980; Ong, 1982; Auroux, 1989), to the point where the existence of metalinguistic awareness without written language becomes questionable (see Auroux, 1989, p. 21). It is thus logical to find that linguistic theories are well suited to the study of written language, and that classical linguistic theories are symbolic: they were developed through conscious analysis of language material and with the help of written material.

An important corollary of the remarks above is that it is virtually impossible to analyse child language using adult language theories and descriptions. Adult knowledge of language is a hybrid of symbolic and subsymbolic/probabilistic processes, whereas child knowledge is still only subsymbolic/probabilistic. This is why Ravid & Tolchinsky's proposals are so important. A better understanding of what is involved in the acquisition of literacy is necessary to be able to go backwards from adult to child knowledge

of language. It is also crucial to take into account the mutual and permanent influences between unconscious and conscious processes that govern the development of language and literacy. This should lead the way to developing child language, and to elaborating hybrid language models – both symbolic and probabilistic – for the adult language.

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The foundations and development of metalinguistic knowledge*

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Ravid & Tolchinsky present a valuable framework for understanding the development of metalinguistic knowledge (i.e. grasp of language form as opposed to content). Although this framework makes an admirable contribution, we question the authors' emphasis on familiarity with written language as an enabling condition, and instead outline an approach that makes more obvious provision for cognitive foundations and early development. This approach attempts to locate the development of metalinguistic understanding within the context of domain-general and age-related changes in cognitive function – in particular, increases in the complexity of representational structures involved in conscious reflection.

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It may be useful to begin by contrasting Ravid & Tolchinsky with Macnamara & Reyes (1994), who suggest that metalanguage is unlearned, and argue that it plays a foundational role in early word learning and syntax. Macnamara & Reyes claim, for example, that metalinguistic knowledge is what enables a token word to be classified as a word, or particular class of word (e.g. to treat *Rover* as a proper name and *dog* as a count noun). They summarize their position by stating:

> A child … may suddenly be asked to say 'Uncle Norman' (mention), and in the next breath to shake hands with Uncle Norman (use). Even small children never seem to be confused by the switch, which suggests that they have an easy command of logical resources that play the same logical role as addition and removal of quotes. We therefore treat quotes as a psychological primitive. (Macnamara & Reyes, 1994, p. 172).

In contrast, Ravid & Tolchinsky suggest that '… being able to lexically frame the different levels, qualifying one of them as said by someone, is an outcome of children's increasing experience with text, as well as a growing command of linguistic forms and meanings.' Ravid & Tolchinsky are making a useful distinction that is obscured by Macnamara & Reyes (1994), but in doing so they are also sidestepping the question of earliest cognitive and conceptual foundations. Arguably what is needed is an approach that incorporates elements of both perspectives. In what follows, we sketch how this can be done in a fashion that locates the acquisition of metalanguage within the context of broader age-related changes in representational complexity and flexibility (e.g. Zelazo, 1999).

Macnamara & Reyes's (1994) rich interpretation of children's grasp of the language-metalanguage distinction obscures bona fide changes in how such knowledge might be initially implicit and later become explicit, or initially represented in a simple representational format that is progressively articulated and reflected upon with age and experience. In contrast, we take language development to provide a reasonable guide to the degree of articulation of different types of knowledge. Consider the learning of a single word (e.g. *dog*). On this view, it should be possible to account for this by appealing to no more than a single representational structure with a unitary representational format. Hence, even though word learning as a matter of fact involves the dual task of positing a type for the relevant entity in the language (e.g. word) and the relevant entity in the world (e.g. dog), a single interpretive structure – positing a kind – manages both. That is, dogs and words may be different ontological types, but the notion of a kind is abstract and general and manages to cut across all ontological types. There is, moreover, evidence to suggest that infants first posit kinds in a manner that is yoked with learning first words, towards the end of the first year (e.g. Xu & Carey, 1996). It therefore makes sense to note that infants' knowledge at

about 1;0 covers both relevant ontological types; nothing, however, suggests that the language-metalanguage distinction is any further articulated or reflected upon at this point.

Progressive reflection upon the distinction takes place as language develops, and we suggest that the next step change coincides with the move from individual words to first syntax, which typically occurs in the second half of the second year. Children's rhetorical experiences at this point characteristically involve producing two-word utterances and engaging in turn-taking interactions, and these should support a commensurate degree of metalinguistic sophistication as children come to reflect upon and control supra-unitary linguistic representations. Consistent with this suggestion, Genesee, Boivin & Nicoladis (1996) found that bilingual children with an average age of 2;2 and an average MLU of 1·56 made accommodations to modify their language in response to the monolingualism of a stranger. One might also expect children at this point to explicitly refer to different rhetorical experiences, as with names for particular activity songs and picture books, or relevant general terms (e.g. read), which was the case with the first author's son Julian (aged 1;10).

The next step change is posited to occur together with the ability to handle not just phrasal structures but to engage in extended, connected discourse on a coherently linked topic, as in narratives or explanations, typically by about age 3;0 (e.g. Nelson, 1996). Commensurate with this, one might expect children to consciously initiate such interactions (e.g. by asking *how* and *why* questions), and to explicitly articulate metalinguistic knowledge with terms for specific rhetorical forms, including events (e.g. *question*, *story*, *joke*) and actions (e.g. *say*, *tell*). Moreover, such discourse should be rich enough to cover explicitly metalinguistic phenomena like such as rhymes. The first author observed all of these phenomena with his daughter Alex (aged 3;8) during this period. To illustrate with one example: several days after a discussion of rhymes and weak rhymes, she suggested that *Alex* and *Allie* (a friend's name) rhyme, but that it's a weak rhyme.

The next step change occurs together with the ability to handle not just extended, connected discourse, but to coordinate contrasting interpretations of states of affairs into a consistent over-arching synthesis, widely discussed in terms of the 4;0 transition. At this point, one might expect relevant linguistic developments like matrix and embedded clauses (e.g. see de Villiers & de Villiers, 2000) to be sufficient in principle to support accurate framing of quotations. One might also expect some articulation of explicitly metalinguistic knowledge to the effect that, say, *dog* is not only an (abstract) interpreted symbol but also a (physical) sound in the air or chalk mark on a blackboard. The former, linguistic construal is clearly stronger than the latter, metalinguistic construal, but the problem of coordinating the two seems to have the same basic structure and complexity in the case of both

speech and text. We take it to be hardly a coincidence that this is the age at which children are typically considered ready to begin formal schooling.

In sum, the approach sketched here is broadly compatible with existing work on age-related transitions occurring at roughly 1;0, 2;0, 3;0, and 4;0, and their implications for articulating knowledge of different types of experience (e.g. Zelazo, 1999). We do not deny that familiarity with writing might be particularly motivating or helpful in leading children to articulate later metalinguistic knowledge. We do suggest, however, whether Ravid & Tolchinsky's perspective might be complemented by a perspective that sees the relevant developments as anchored in fundamental cognitive-linguistic abilities that become better articulated with early age-related developments and rhetorical experiences that one might observe in all languages and cultures.

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Sociocultural and cognitive constraints on literacy development

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In their position paper, Dorit Ravid & Liliana Tolchinsky have made a critical attempt to develop a theoretical framework which would account for the success of learning to read and write in different languages throughout

the life span. The major focus of this framework is on the linguistic perspective of literacy development – leading to the concept of linguistic literacy. The authors highlight those aspects of literacy competence that are expressed in language as well as aspects of linguistic knowledge that are affected by literacy competence. They postulate control as a defining feature, metalanguage as a concomitant process, and familiarity with writing and written language as a condition of linguistic literacy. These postulations can be seen as highly relevant from both a theoretical and a practical point of view since such framework is useful in order to develop research initiatives and educational programs on literacy development. The view of literacy as a constituent of language knowledge characterized by the availability of multiple linguistic resources can be seen as powerful. However, given the multifaceted character of written language and its development, the question is to what extent the concept of linguistic literacy should be relativized. In the present commentary the impact of sociocultural and cognitive constraints on literacy will be stressed to disambiguate the monolithic conception of linguistic literacy.

Language can be seen as a universal human trait. Language is learned in the normal course of events by children with various intellectual skills, fostered or neglected, and exposed to whatever set of linguistic stimuli in the environment. The universal claim of language development has given way to linguistic theory which is 'primarily concerned with an ideal speaker-listener, in a completely homogeneous speech community, who knows its language perfectly and is affected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors in applying his knowledge of the language in actual performance' (Chomksy, 1965:3). From a linguistic point of view, language is conceived of as a body of knowledge separable from other aspects of human cognition. This claim about the autonomy of language has been abundantly tested in linguistic research. However, the relevance of an autonomous view on literacy development can be questioned.

First of all, sociocultural constraints apply to the development of literacy. It is a well-known fact that there is a great diversity in both the distribution and degree of (il)literacy in different parts of the world. About 23 percent of the world population is illiterate. There is also a great gender disparity in relation to literacy. Approximately two-thirds of the world's illiterates are women (e.g. Elley, 2001). In spite of the fact that the relative rates of illiteracy have decreased over the past decades, the disparity between the illiteracy rates of men and women has continuously increased as the world population continues to expand. At the same time, the gender disparities concerning illiteracy in different regions have constantly widened. With respect to literacy diversity, the position of ethnic minorities deserves special attention. In a multi-ethnic society, minority groups may use various written

codes serving at least partially distinct sets of functions (Verhoeven, 1996). Furthermore, linguistic abilities become very critical for people from ethnic minorities who have to learn to read and write in an unfamiliar (second) language. People acquiring literacy in a second language are faced with a dual task: besides the written code they also have to learn the grammatical and discourse competence of the second language. Research has shown that a minimum level of grammatical and discourse level in a language is needed in order to be able to learn to read and write successfully (Geva & Verhoeven, 2000).

Secondly, the acquisition of literacy is constrained by cognitive factors. It is generally accepted that a naturalistic model which relies exclusively on exposure and immersion does not fully account for the complex task of learning to read and write. Cognitive constraints mean that the development of literacy is at-risk for many children living in a literate environment. Accumulated research evidence indicates that children need sequentially structured activities that are mediated by a teacher or by skilled peers in order to learn the alphabetic code and to develop appropriate strategies for reading and writing continuous text (Snow, Burns & Griffin, 1998). A crucial role of direct instruction in acquiring automaticity in (de)coding has also been stressed (National Reading Panel, 2000). It is one of the most well documented facts in educational psychology that direct instruction in the orthographic code is more helpful for children than indirect instruction where children are left to infer the grapheme-phoneme mappings on their own.

Taking into account sociocultural and cognitive constraints on literacy development, the question is: what abilities underlie literate competence in the individual? It is clear that the development of literacy cannot be seen as an autonomous process of learning universal cognitive or technical skills independently of specific contexts or cultural frameworks. Instead of defining literacy from a strictly linguistic point of view, several authors have emphasized the social context of literacy, taking into account sociocultural aspects of development and the concerns of different communities and individuals (e.g. Street, 1994). Recent studies have attempted to articulate what is actually involved when people engage in cultural activities (Barton, 2001). From these studies it has become clear that literacy is a lifelong, context-bound set of practices in which an individual's needs vary with time and place. Research has also shown that the literacy practices through which individuals are socialized into various institutions can be extremely variable (Durgunoglu & Verhoeven, 1998).

By incorporating the concept of communicative competence (Hymes, 1971), a more elaborated conceptualization of literate competence can be arrived at, taking into account knowledge of how people learn to use written language in social settings to perform communicative functions. Applying

the theoretical framework of communicative competence to written language, Verhoeven (1994) has proposed a model of literate competence in which a distinction is made between the following types of competences:

- Grammatical competence
- Discourse competence
- (De)coding competence
- Strategic competence
- Sociolinguistic competence.

Grammatical competence covers the mastery of phonological rules, lexical items, morphosyntactic rules and rules of sentence formation. Discourse competence refers to the knowledge of conventions regarding the cohesion and coherence of various types of discourse, including rhetorical expressiveness. Given the continuities between oral and written language, the abilities involved in grammatical and discourse competence constitute basic components of literate competence.

The competence to code and decode written text comprises the technical abilities of writing and reading. Coding and decoding abilities relate to the mastery of the essentials of the written language code itself. From comparative studies of writing systems (see Perfetti, 1998) it can be concluded that all systems represent spoken language at one level or another and that readers activate speech codes during the decoding process – even in morphemic writing systems such as the Chinese. As such, literacy acquisition depends critically upon a child's speech processing skills (Snowling, 1998).

Strategic competence refers to the ability to perform planning, execution and evaluative functions to implement the communicative goal of the written text. Planning and evaluation (revision) turn out to be crucial abilities in writing (Levy & Ransdell, 1996), whereas monitoring plays an important role during the execution of the reading process (Butler & Winne, 1995).

Sociolinguistic competence comprises the literacy conventions which are appropriate in a given culture and in varying social situations. Literacy conventions refer to the register appropriateness of various types of documents that are used in the social institutions of a society, such as letters, forms, legal briefs, political tracts, religious texts, novels and poems. Documents often require specialized knowledge about particular document formats. Moreover, different types of documents may also call for different types of cultural background knowledge (see Goldman & Rakestraw, 2000) as well as different values and beliefs (Gee, 1990). It is important to see that the notion of sociolinguistic competence makes literacy a relative measure, depending on the social and cultural context.

The present model does not contradict the many valuable insights brought forward by Ravid & Tolchinsky. It should be seen as an attempt to arrive at a definition of literate competence which is more commensurate with the

cognitive prerequisites of learning to read and write and the sociocultural context in which such learning processes take place.

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