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Investigating literacy development and language acquisition. Reply to commentaries on 'Developing linguistic literacy: a comprehensive model'

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The model under discussion was elaborated in response to our need to construct a general, explicit and integrative framework for the seemingly different strands of research that we and our associates have carried out in the last decade or so. The findings of these studies made it increasingly clear to us that it is impossible to account for the dramatic changes in language knowledge and language use in children and adolescents within the boundaries of current research paradigms in language acquisition. Our goal was thus to relate later language acquisition and children's increasing cognitive abilities to literacy development in a motivated way, focusing on germane themes in socio-linguistics and discourse analysis, on the one hand, and facets of written language, on the other.

We thank the thirteen scholars who have honoured us with their thoughtful and absorbing commentaries on our work. While we do not always see eye to eye with all their ideas and suggestions, these commentaries indeed testify to the richness and complexity of the domain that we have attempted to model. Several of the commentators suggest implications of our work for even more fundamental questions; others propose ideas which are the natural outcome of our approach; and still others point the way to new, interesting directions of research which may complement our approach and highlight other worthwhile domains of inquiry. Due to the sheer diversity and scope of the commentaries, we have grouped our reply into a number of perspectives shared by commentators.

Several commentators (Ruth Berman, Michèle Kail, Nenagh Kemp, Jim Miller and Christophe Parisse) applaud highlighting later language acquisition. They provide evidence of late acquisitions in the realms of complex syntax, 'advanced' lexicon, derivational morphology and discourse organization, and make clear that any account of language acquisition should take into account development in these domains. Miller and Parisse go a step further, and consider the implications of later language development and the acquisition of linguistic literacy for a general stand on language acquisition. Miller claims that the long and arduous process of acquisition and the impact of literacy from very early on undermine central tenets of nativistic theories. If we contemplate the presence of written language as part of the linguistic input, the famous 'poverty of the stimulus' question loses its weight because written language is not 'ephemeral, simple and degenerate' but rather

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persistent, complex and edited. But does our model indeed undermine nativistic claims?

It was not our goal in this paper to challenge nativistic claims: if this had been the case, we would have focused on earlier phases of development and on the nature of the mechanisms children use to 'break' into language and to form initial linguistic representations. Nevertheless, it is true that our work deals with a level of development and a kind of knowledge for which nativistic accounts are not enough, and that the picture we present has significant implications for the study of language learning: we are interested in a later phase of linguistic development, where an already established language system undergoes radical changes in interaction with socio-cultural representational systems; and in examining the consolidation of creative and flexible use of language, communicative competence, control over linguistic variation and metalinguistic sensitivity. These, we believe, cannot be explained by a strictly nativistic view of language acquisition, which concentrates on how grammatical categories are learned. What nativists may claim is that the state of knowledge we are modelling is of no concern to linguistic theory, whereas from our point of view it is crucial to our understanding of what it means to 'learn' and 'know' a language.

Since we accept the multilevel nature of language knowledge, we are enthusiastic about Parisse's speculation that oral language might be best modelled by 'data-oriented, probabilistic or connectionist models', and written language by 'rule-liked, non-probabilistic, symbolic, category-based approaches of linguistic theory'. However Parisse notes that this dual modelling may not correspond throughout development to the spoken/written divide, because some aspects of oral language will be consciously monitored, while aspects of written language will become automatic (see also Karmiloff-Smith, 1992).

By accepting the concurrence of biological and socio-cultural explanations as well as the possibility of connectionist and symbolic modelling, we are not taking an eclectic posture or 'seeking false compromises' as suggested by Michael Bamberg. Rather, we are taking internal heterogeneity and multicausality as intrinsic features of the complex situated systems we discuss. Neither is there any compromise in Ruth Berman's and Michèle Kail's suggestions on how traditional linguistic dichotomies may be modified to play a role in fostering linguistic knowledge. Berman suggests that competence and performance are bi-directional entities on a continuum of language knowledge and language use since, for example, knowledge of bottom-up and top-down narrative structures both underlies and is fed by actual narrative ability. Berman would like to see empirical methodology for studying competence and performance bidirectionally. We agree with her interactive view of language knowledge and language use, since, in our view,

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both language knowledge and its use constantly interact with processing constraints.

Kail proposes that the discrepancy between speech and writing is a crucial factor in developing awareness of morphological cues. She reports studies showing that in French, the nature of the cues used for sentence comprehension changes from a heavy reliance on word order in children to the use of semantic and morphological cues in adults supported by a growing knowledge of the written code. Kail suggests that literacy may cause a child to notice cases of conflict in the input that she has never noticed before. Ravid (1995) reports that Hebrew-speaking preschoolers and less literate adults tend to omit verb agreement in sentences with post-verbal Subjects since they reanalyse Subjects as Objects. In contrast, literate adolescents and adults maintain verb agreement despite word order, indicating that their perception of 'syntactic subject' relies on semantic cues in addition to word order. Both examples support our claim that literacy interacts with linguistic representation. Following this reasoning, we may predict that developmental shifts will occur with the acquisition of literacy where writing provides either more specific or more consistent and explicit information than speech.

The commentaries by Douglas Biber with Randi Reppen and Susan Conrad, on the one hand, and by Nenagh Kemp, on the other, illustrate the duality that our work addresses: written language as discourse style and as a notational system. Biber, Reppen & Conrad report a series of studies from socio-genetic and ontogenetic perspectives, showing how the current informationally and syntactically dense written academic prose evolved in history and in child development. They strongly agree that adult written language differs from natural conversation in almost every aspect, and, like us, are interested in what exactly makes written adult style so 'rich' in comparison even to the language of adolescents (see also , Berman & Verhoeven, in press). We believe that the model presented in our paper might serve to explain why Biber, Reppen & Conrad have not identified 'absolute' differences between speech and writing: our current work shows that modality, genre and register may be teased apart in the development of text production, with adolescents, for example, producing high-register, genre-appropriate oral expository texts which are nonetheless syntactically fragmentary due to online processing constraints.

Nenagh Kemp writes about written language as a notational system, focusing on the four knowledge dimensions necessary for spelling development, and regards its morphological and morpho-phonological dimensions as two parts of a single whole. Preserving this distinction, however, might be highly relevant for understanding phenomena where morphology and phonology interact in particular ways and may influence spelling. In Spanish, some alternations that can be explained in phonological terms occur

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only when certain morphemes are involved. For example, the rule of assibilation of dentals between morphemes occurs only when the dental is part of a verbal root followed by the nominal suffix -ion (e.g. admitir 'to admit' / admission 'admission', ceder 'to cede' / cession 'cession'). This rule does not apply whenever the -ion ending appears (e.g. bastion 'bastion') (Diaz Hormigo, 2000). Moreover, a recent cross-linguistic study of spelling development (Gillis & Ravid, 2001) indicates that the typological features of languages highlight these two dimensions to different degrees: Hebrew-speaking gradeschoolers pay attention to and make use of morphological (i.e. categorial-semantic) cues in their spelling from early on, while morpho-phonological cues take much longer to attend to; Dutch-speaking (Belgian) gradeschoolers ignore morphological cues until the end of gradeschool, but they pay attention to morpho-phonology much earlier.

Two of the commentaries take broad educational perspectives on linguistic literacy. Marilyn Nippold highlights the role of lexical learning in later language development, showing how it interacts reciprocally with literacy – meta-linguistic processes assist in learning new words and the expansion of the lexicon promotes literacy. This is a view with which we are sympathetic not only for the sound reasons that Nippold discusses, but also because lexical learning interacts with morphological, syntactic and discourse development. A larger lexicon does not only mean 'more words' but also higher lexical density and diversity, a differential distribution of specific categories (e.g. verb-derived abstract nominals) in the mental lexicon, consequent linkage with specific syntactic constructions which take certain lexical classes as their nuclei, and the ability to use these constructions as hitching posts for information in the text (Dockrell, 2001; Ravid, van Hell, Rosado & Zamora, in press; Strömqvist, Johansson, Kriz, Ragnarsdóttir & Ravid, in press).

Ludo Verhoeven firmly embeds linguistic literacy in a socio-cultural environment, incorporating notions of communicative and socio-linguistic competence into learning how to use written language. Although we think that our concept of linguistic literacy embraces these components, Verhoeven claims that the concept of linguistic literacy should be 'relativized', taking into account gender disparity, the amount of illiteracy in the world, cognitive factors that constrain the acquisition of literacy, and the situation of ethnic minorities who have to learn to read and write in an unfamiliar second language. We are not proposing 'an autonomous process of learning cognitive or technical skills independently of specific contexts or cultural frameworks'; on the contrary, the notion of rhetorical flexibility, which stands at the core of our model, involves being able to produce linguistic output attuned to different addressees and communicative contexts. And the main outcome of linguistic literacy is both a more articulated personal identity and an increased capacity to use language under diverse circumstances. We cannot see why the unfair distribution of literacy and the cognitive or linguistic

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factors that constrain the learning process should be used to de-emphasize the linguistic aspects of literacy. Extant illiteracy is to be fought against and learning difficulties are to be taken into account in the development of teaching strategies, but it sounds paradoxical to turn the solution of these problems into prerequisites for developing literacy.

There are three other important pieces of criticism we would like to react to. The first concerns Bamberg's and Miller's remarks that language awareness and rhetorical flexibility, although concomitant with literacy in most cultures, are not exclusive to literacy, and might be very much a result of schooling discourse. We strongly agree with this comment, and we feel we did not make this point clear enough in the paper. The second relates to Dean Sharpe & Philip Zelazo's claim that it is necessary to integrate the roots of metalanguage with a general model of language development. We are convinced that a complete picture of development should take into account how the level and kind of knowledge we are modelling is rooted in basic linguistic and cognitive abilities, but this picture is beyond the goals and scope of the present paper. And last, but not least, Berman's remark on the need to consider processing as integral part of the model is most welcome and taken into account.

Finally, several commentators (Berman, Kail, Kemp, Miller) advise researchers to take into account the reciprocal effect of the spoken and written modalities. This is certainly in tune with our view of the domain. Indeed, the commentaries examining literacy development from a variety of viewpoints as well as our own research lead us (and everybody, not just us) to call for a rethink of what is meant by language acquisition and its knowledge. Take the case of particular constructions. For example, relative clauses as discussed by Miller: When can speakers be actually said to have 'acquired' them? When they can succeed on an experimental task? When they can understand them in a text? When they can actually use them in appropriate contexts?

In order to answer this question and its wider implications, we believe the research scope of language acquisition should be extended in terms of the age range, from focus on preschoolers alone to the investigation of language development until young adulthood; in terms of the domains of inquiry, from focus on the acquisition of basic morpho-syntactic categories to include later derivational morphology, the literate lexicon and complex 'written' syntax; in terms of modality, from focus on spoken language to the inclusion of written language knowledge; and in terms of the scope of inquiry, from focus on the acquisition of isolated constructions to a motivated integration of bottom-up and top-down linguistic properties of discourse. We believe that this expansion of our shared research domain may yield a better understanding of how language develops and how it interacts with the acquisition of literacy.

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