REVIEWS

MAYA HICKMANN, *Children's discourse: person, space, and time across languages*. Cambridge: CUP, 2003. Pp. 410. ISBN 0522584418.

Children's discourse: Person, Space, and Time across Languages (*PST*) by Hickman follows in the tradition of Berman & Slobin's *Relating events in narrative* (1994), and greatly extends their findings. Like Berman & Slobin, Hickmann asks a large number of participants from different language communities at carefully spaced ages to create a story from the same pictures. Then, to the extent possible, she performs the same analyses on all of them. *PST* presents data from French and Mandarin Chinese along with English and German. The elicitation materials are simple, consisting of 5 or 6 frames, with 3 actors and a single episode, so stories are more constrained than those based on Mayer's (1969) rambling 24-frame frog story. Further, great care is taken that the listener to whom the story is told cannot see the stimuli, so the contextual demands for young narrators are greater and the task more ecologically valid.

The strength of the book (and also the factor that makes it less accessible to the general reader) is its ambition to be a compendium of research, not just into discourse cohesion, the focus of these experiments, but of language development more generally. The first paragraph lays out broad issues of the interplay of structure and function within and across languages from the time children can reliably produce a narrative in an experimental situation until the adult target state. Since all of the linguistic devices under examination have other uses in the language, one cannot be content just to note their occurrences, but must establish the systematic, and relatively accurate, use of those structures for discourse purposes.

Hickmann is at pains to convince her readers that discourse development is important, not only for the linguistic devices used by children at different stages of acquisition in the creation of text, but for its potential to redefine the acquisition enterprise more generally. Half of the book is taken up with preparing the ground for the data presented in the second part. The 32-page list of references alone is a valuable contribution.

Hickmann conceives of the background for this research as not just the thorough reviews of previous findings on person, space, and time (Chapters 6 and 7), nor even the close examination of how these three major elements of a story's microstructure fit into the different levels of analysis of texts, as in Chapter 5. She devotes Chapter 2 to different conceptions of what the fundamental issues of acquisition are and another chapter (Chapter 3) to

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the potential contributions of a cross-linguistic perspective. She tackles such grand themes as innateness vs. gradual construction of language structure, continuity vs. discontinuity, the relation between language and cognition, and following Pierce, the nature of symbols more generally.

This 'brief and somewhat brutal sketch' of fundamental issues (Hickmann's own words, p. 25) serves to situate her findings in the landscape of linguistic theory, aiming to establish, in particular, that units of discourse are on a par with the sentence in importance as organizing principles for speech. Discourse – connected sentences and the links that connect them – she argues, imposes a broader level of explanation than what can be defined WITHIN sentences. A set of examples involving pronoun binding illustrates succinctly the distinction between referents that are recoverable from within sentences (like reflexives) and those whose possible and impossible co-reference relationships are determined in neighboring sentences. Sentence-internal features, like reflexives then, are among the few phenomena *not* treated in the book.

Hickmann illustrates within a functionalist perspective how the very words that have roles and constraints inside a sentence also participate in structure-building with elements outside the sentence. Indeed, having words play more than one role at a time is one of the greatest challenges of acquisition and its description. The clarity of Hickmann's treatment of this multifunctionality is one of the greatest assets of the book.

The studies

PST re-caps the 20-year research programme by Hickmann and her collaborators to elaborate on the development of cohesion. It builds on Hickmann's dissertation (1982) just a few years after Halliday & Hasan (1976) first proposed a framework that made discourse development amenable to study in a cognitively and linguistically interesting way. The protocol of the studies reported in the book spotlights how narrators meet the twin challenges of marking information status, what is presupposed or given vs. new, and also grounding it: indicating what is foreground and what is background, and providing anchors so listeners can reconstruct locations and events. Although the topics and themes are fixed by the pictures, subjects have freedom to choose from among the syntactic, semantic, and pragmatic devices they have available to them. Unlike spontaneous speech samples, the elicited narratives engineer an appropriate situation for the speaker's use of subtle linguistic devices and provide enough context for the researcher to interpret them when they are observed.

Two sets of line drawings used as stimuli exercise tight control over what the narrator must notice and relate. Hickmann's two stories differ with respect to the status of the characters, whether they are present throughout,

whether they are agents, and even how prominent they are in the frame of the picture. Other crucial differences are the number of events and whether they overlap, and the number of motion events and changes of location. The four languages represent a continuum with respect to the richness of their nominal and verbal morphology so that crosslinguistic comparisons can be made on the nature of the strategies that the requirements of the various linguistic forms promote. Overall, through the comparison across ages and languages, a picture emerges of the progressive mastery throughout childhood of the devices by which UTTERANCES can replace non-linguistic context in becoming their own context.

The corpus consists of two stories from each of 80 English speakers and 40 each of the other three languages, with equal numbers in four age groups, 4;5 to 5;5, 7;0, 9;0 to 11;0, and adults. For the cells of younger subjects, children who produced only picture labeling (a 'few' in each language group) were replaced by others. Therefore, the skills reported for the four to five-year-olds are a little less representative of the age group, but still show that many mature four-year-olds can 'make discourse'.

Hickmann's database coding (Hickmann, Hendriks, Roland, & Liang, 1994) is unusual only in its degree of thoroughness. Utterances were segmented into clausal units and then further into relevant categories of nominal or pronominal, determiner and classifier types. To the extent possible, the same sets of semantic roles (Agent, Patient, Experiencer, Instrumental, Beneficiary, Locative, and null) and syntactic forms (for Subject, Direct Object, Indirect Object, and Oblique) were examined across all languages. Case marking, verb agreement and position, and other potentially relevant characteristics of function and clause structure, especially animacy, referent introduction, and reference maintenance were tallied. Hickmann notes whether an element was in initial position, was an existential, a demonstrative predicate, a presentational, a main vs. subordinate clause, or a dislocation. Special scrutiny was given to spatial and temporal devices: denotation of motion and location of animate referents; figure-ground and temporal-aspectual markings, connectives, boundedness vs. durativity, succession or simultaneity, multifunctionality, and discontinuous elements.

Findings

The findings in the book are sweeping. Indeed, much can be gleaned from a casual glance at the 64 charts (about one every other page in Part two). For each variable represented, we can compare the four-graph sets for where the four languages look the same, or where one language or one age group is distinct from the others. We can look for confluence in the adult values across languages and see cases where the youngest children of all four

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languages exhibit similar tendencies. All that is without even referring to the framework of hypotheses and their relation to previous findings richly discussed throughout the book. These are well set out in Part I and summarized in the final chapter, but also importantly kept in the forefront to situate each result as it is uncovered.

At a very basic level, the book aims to chart the progressive mastery of the requirements of narrative in terms of the functions children can express and when they can express them. In general, Hickmann shows that the necessary forms for cohesion are acquired in the typical time frame by 5;0, but they are not recruited for discourse purposes until 6;0 and 7;0, and many of the cohesive devices are used imperfectly even by eleven-year-olds. In French, for example, left dislocations are seen in the youngest children's stories but they are used for all types of topic promotion, including first mentions, where they are inappropriate. Dislocation is not used to differentiate newness and givenness until later when seven-year-olds are more likely to reserve it for topic maintenance. Functions such as marking the information status of the elements of spatial frames take more planning and are still challenging for eleven-year-olds. Individuated locations, like 'a fence' may be explicitly mentioned by younger children ahead of when they are presupposed as part of the background, but this appears later for more general locative terms like 'the meadow.'

According to Hickmann, the acquisition sequence is a function of both relative functional complexity AND the nature of the forms to express it. One might recall the discussion of this interaction with respect to relative clauses in Berman & Slobin (1994: Chapter IIIC). *PST* illustrates a similar form–function interaction in the time domain. Past tense morphology is more complicated in French and German than English, and there is also a more complicated relationship in the former two languages between past tense and perfective aspect. By contrast, perfective/non-perfective aspect is neutralized in the present tense, so the present appears as the most frequent tense in those languages, while English narratives overwhelmingly use past tense in recounting events. With no formal reasons for favoring the use of the present, the decision to use the historical present is a marked choice in English, more common in adult than child narratives.

Children only gradually begin to respect listeners' needs relative to the newness of information (i.e. a FUNCTION) in the FORM of first mentions. In general, one expects to see obligatory markings used before optional ones (Slobin, 1985; Berman & Slobin, 1994) because the former are both more consistent and more frequent in the input. But one also expects mastery of local functions before global. Hickmann extensively explores their interaction. In the discussion of 'person' (Chapter 8), for example, she demonstrates that obligatory markings are first if they occur at the local level, but when they involve global functions, like the positioning of elements in a

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sentence, then optional local markings will precede obligatory global markings. When, as in Chinese, word order is required for processing grammatical relations, word order will be less available for discourse functions and so those functions may be more difficult than in other languages.

With respect to 'space' (Chapter 9), Hickmann examines Talmy's (1985) much-studied distinction between satellite- and verb-framed languages and how they encode information about the manner vs. path of a predicate. She finds, as do others (e.g. sp Strömqvist & Verhoeven, 2003), that even four- and five-year-olds show language-specific differences in the representation of motions and locations, but she shows further that the work of anchoring the spatial frame of the story in locations does not appear in children's repertories until 7;0, regardless of language, and it is not mastered until the adult stage. Some of this development takes place in orientations that establish settings, but for the most part, location remains part of the background. Younger children make few references to background entities before they are presupposed; the children rely, instead, on the listeners to infer details of the setting from their background knowledge.

Similarly, the grammatical devices for conveying tense and aspect – verb morphology, particles (in Chinese), and connectives – appear early and for the most part are used adequately within sentences. By 7;0 most children manage to tell 'who did what to whom' in reasonable chronological order. But they rarely recruit verbal forms for their major discourse function – to differentiate what events are in focus and what is presupposed. We do not see foregrounding and backgrounding of actions relative to each other, either for overlaps or other complex relationships. As the discourse function develops, these same devices begin to show a number of functions, including marking information status and referent introductions. The 'time' chapter (Chapter 10) treats sequencing of events (and simultaneity, as was also prominent in Berman & Slobin, 1994), but Hickmann is careful to include in the analyses the distinction between bounded and unbounded predicates in discussions of tense or aspect shifts. Thus the interaction between predicate semantics and tense in the service of foregrounding and backgrounding is better tested crosslinguistically here than in previous studies.

Evaluation

It is not clear to me to what extent new data are presented, but whatever the quantity of new evidence, there are no surprises. These findings reinforce the messages of data already presented by Hickmann and others. The key contribution of the book (and it is quite a feat) is to bring it all together in one place and situate it within an adequate textual context to demonstrate that focused studies of linguistic cohesion bear not just on cohesion but on broader developmental issues. For the purposes of the exposition, Hickmann

pursues the implications of every finding in three strands of inquiry, which she struggles to keep distinct: (1) What does it say about the general time-table for the acquisition of the elements of discourse cohesion? (2) How does it relate to developments within the sentence and across sentences? And (3) how does it reflect the impact of particular properties of the language being learned? This careful organization necessitates a fair bit of repetition, but the reward is in being able to unpack the multi-functions of each device and situate each development in the several theoretical contexts where it contributes.

The book is so dense, one cannot seriously fault it for not doing one or another analysis. Clearly, there will be interactions between the phenomena in development that are completely unexplored here, despite there being ample data for it. For example, one of the strengths of the experimental design is that there are two stories per child. We get some benefit of this in comparing specific devices that occur more in one of the stories than the other, even within languages. But there is no consideration of how the factors relate within-child. For example, one wonders whether children who encode rich time information are the same ones who can firmly anchor their narratives in space, or whether there is a point at which some children do one and others do the other. Also, there are very few tables, and almost all the charts are based on percents. The percentages permit many more comparisons and create a powerful visual unity, but we get little sense of how many TOKENS of any phenomenon are seen in a child's or language group's output.

Throughout the book, Hickmann makes the strong claim that discourse is constitutive, that it gives the child a mechanism for acquiring the linguistic elements discourse itself requires. Whether she proves this or not, much new weight is given to the evidence for the claim. With this volume Hickmann has made a considerable contribution to a field that her research has done so much to define.

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Reviewed by BARBARA ZURER PEARSON, Ph.D.
University of Massachusetts, Amherst

JOHNSON, M. H., MUNAKATA, Y. & GILMORE, R. O. (eds), *Brain development and cognition: a reader* (2nd Edition). Oxford: Blackwell Publishers, 2002. Pp. 544.

The second edition of *Brain development and cognition: a reader* seeks to provide a foundation for an understanding of developmental cognitive neuroscience. As such, it will be of considerable interest to researchers of child language. This volume of twenty-three previously published key journal articles and book chapters is divided into seven sections, each covering a particular aspect of brain development and its relationship to cognition. The sequence of sections provides coherence to the overall topic of brain development, with each clearly linked to the next. Even though there is much dialogue between sections, each is a stand-alone aspect of brain development and cognition, providing current thought on the state of research in each topic. The goal of this book is to provide an inclusive volume covering fundamental aspects of brain development and cognition. In many respects this second edition includes updates from the first that demonstrate the rapid advances made in the field. The success of the volume is largely due to the insightful editorial introductions to topics, rather than the selected research chapters alone.

Section One, Perspectives on Development, includes chapters by: Lorenz on the attitude of ethologists; Oyama on mechanisms of change; Piaget on the development of cognition; and Gottlieb on how genes produce an organism. These illustrate the diversity of notions that have been presented on development in the past.

Section Two, Brain Maturation, focuses on various aspects of brain development. It contains chapters by: Nowakowski & Hayes on brain development; Rakic on neocortical parcellation; Chugani, Phelps & Mazziotta on functional brain development and Huttenlocher on the development of the cortex.

Section Three, Brain Maturation and Cognition, brings a cognitive perspective to brain development. Chapters by Johnson on the development of visual attention and Nelson on the development of memory systems attempt to illustrate how these aspects of cognition relate to maturational processes in the brain.

Section Four, Brain Plasticity, provides chapters that illustrate the inherent malleability of the brain throughout development. Greenough, Black & Wallace outline how experience may shape brain development; O'Leary discusses how cortex originates from protocortex; and Shatz investigates order in the developing visual system.

Section Five, Brain Plasticity and Cognition, elaborates on Section Four, adding a cognitive perspective to the neuroscience contained therein. Chapters include one by Neville & Bavelier on this topic; Stiles, Bates, Thal, Trauner & Reilly on longitudinal investigation of brain injury; Merzenich, Wright, Jenkins, Xerri, Byrl, Miller & Tallal on cortical plasticity and its implications for rehabilitation; and Marler on the instinct to learn. Together they provide a framework for understanding the richness and complexity of this topic.

Section Six, Self-Organization and Development, outlines theories that attempt to explain the mystery of how development occurs. Chapters include contributions by Thelen on this topic; Karmiloff-Smith on development as a framework for understanding developmental disorders; and O'Reilly & Johnson on object recognition and sensitive periods.

Section Seven, New Directions, outlines some current issues of particular importance in developmental cognitive neuroscience, together with suggestions of how they may be investigated. In this section, Bates & Elman illustrate the application of connectionist models to development; Diamond discusses the role of dopamine in the development of the prefrontal cortex; and Pennington looks at individual differences, genes and the brain.

As mentioned, the editors begin each section with a detailed commentary, in which they attempt to reconcile competing explanations provided by authors of chapters and provide an update on older or unfashionable academic constructs, such as modularism and the mind.

The sections themselves are not without controversy, however. Section One, Perspectives on Development, is likely to be the most contentious for many readers. Johnson *et al*. present chapters outlining the classic viewpoints of 'innate' and 'learned' developmental processes. Through inclusion of the two extremes of opinion, the editors hope that the reader notices the pitfalls inherent in each stance. Certainly the inclusion of these articles can engender much debate and discussion about these key questions on development, particularly in the classroom setting. Yet, in actuality, the introduction to the section takes the stance that the middle road between the two positions is the only sensible path that can be taken from modern knowledge on the issue. A welcome addition would have been the inclusion of a chapter in this section delineating the merits of such a blend of these two extremes.

In addition, despite the topic of the book, theories related to the functional development of the brain, such as skill learning and interactive specialisation, are strangely lacking. The volume would have benefited

from the inclusion of Johnson's recent article or similar paper on these topics (Johnson, 2003). Further, the section on brain plasticity does not convincingly stand alone. For example, the article by Greenough, Black and Wallace addresses the issue of experiential effects and their relationship to brain development. The authors utilize animal research to illustrate the diverse nature of research on the topic, but it is questionable that experiential effects can be equated to plasticity in the brain.

The topic of future directions in developmental science may perhaps be the most thought-provoking for many readers. For example, Bates & Elman's chapter provides a compelling argument whereby connectionist modelling should act as a primary tool in developmental research. As the editors note in the introduction to the section, the articles on this topic highlight only some of the directions by which developmental studies will take startling leaps in the next decade. Indeed, from being an academic activity on the fringes of developmental research in 2000, connectionist modelling is now well on the way to becoming part of the mainstream.

The section on future directions begins to touch on new methodologies in the developmental sciences. It does not cover, however, such new methods in brain imaging as near-infrared spectroscopy, which will no doubt be included in future editions. It would have been optimal to have an entirely separate section of the volume indicating the various methodologies utilized in infancy research, particularly as modern approaches have undergone many changes in the past ten years. The application of EEG to infants, the use of eye tracking systems, and advances in basic behavioural methodologies provide new avenues for research. Such a section would also have provided a context for readers approaching the volume from a purely developmental or non-neuroscientific background. It should be noted that many articles in the volume feature the same methodology. Alternative articles could have been chosen for inclusion to illustrate the same points and at the same time display the wide range of methodologies used in the field. It should not be forgotten that there are areas of developmental research that do not use neuroimaging techniques yet still greatly inform brain development research (see, e.g. Johnson & Mareschal, 2001; Le Grand, Mondloch, Maurer & Brent, 2001).

Much has changed in the neurosciences between the first (1993) and second (2002) editions. In some instances updated chapters contribute new information at the cost of removing seminal information that is still highly important. For example, Neville's contribution in the first edition featured research into electrophysiological components relating to visual perception in the deaf. This compelling research is only briefly summarized in the updated chapter, which attempts to put plasticity into a broader framework of research. The results of the updated chapter, while fascinating, do not give us enough detail on the earlier studies and their important findings.

Johnson *et al*. have produced a volume that provides a basis for the understanding of complex areas of brain development and cognition. It is by no means a stand-alone text conveying everything known about brain development and cognition. However, with respect to its aim of conveying the breadth and depth of current research in the field it succeeds spectacularly. For child language researchers who wish to gain some background knowledge in this field, we recommend the volume highly. This text is suitable for academics and students alike. It is an excellent source, and the associated teaching resources available on-line are well constructed and highly useful.

There is much in the volume that relates to the development of language, even though language is only occasionally a primary issue within a chapter. Illustrations of developmental mechanisms are primarily made with visual processes, but not to the exclusion of other aspects of development. The section on plasticity covers issues such as the impact of brain injury on language faculties, with particular emphasis on grammar. The implications of the sections on cognitive development and brain function are inclusive of language. For example, an understanding of the development of the central nervous system as presented by Nowakowski and Hayes is as important for specialists in language as it is for those investigating other areas of human behaviour. Also, Bates & Elman raise the issue of how the brain functionally integrates sound and vision when we hear and see a person speak. The resulting emphasis of the chapter on mechanisms of change is as relevant to those interested in language development as it is to other fields, such as vision or motor function.

Because of the introductory commentaries and the structure of the volume, Johnson, Munakata and Gilmore have created a book that is greater than the sum of its parts. Despite the ability to source the individual articles elsewhere, the clarity and coherence of the overall arguments contained in the volume make the book a worthwhile component of any developmentalist's library.

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Reviewed by VINCENT REID
& TRICIA STRIANO
Cultural Ontogeny Group,
Max Planck Institute for Evolutionary Anthropology

LUDO VERHOEVEN & HANS VAN BALKOM (eds), *Classification of developmental language disorders. Theoretical issues and clinical implications*. Mahwah, NJ: Erlbaum, 2004. Pp. xii + 450. ISBN 0-8058-4122-9.

This volume addresses the issues of classification, assessment and intervention of Developmental Language Disorders (DLDs). Children are usually diagnosed as having a DLD on exclusionary bases (Stark & Tallal, 1981). Administration of age-appropriate, standardized language tests must document significant deficits in speech and language acquisition as compared to normally developing age peers, in the absence of general cognitive impairment, frank neurological symptoms, psychiatric illnesses, sensori-motor deficits or language/affect deprivation during infancy (International Classification of Diseases – 10th edition, ICD-10th, 1992). The prevalence of DLD is estimated between 5% and 10% of the population (Law, Boyle, Harris, Harkness & Ney, 2000). At times, the speech and language disorder is so severe as to compromise a child's personal and social development. Ultimately DLD children are at risk of academic failure.

The main aim of this book is to provide clinicians and researchers with a precise characterization of DLD children's biological, cognitive, personal and social potential. It is organized into three main parts, each containing 6 contributions. Part I deals with the etiological basis of DLDs. Part II focuses on the issue of DLD typology across languages and language levels. Finally, Part III includes contributions on assessment and intervention. The volume ends with an author index and a useful subject index.

Part I – Etiology

This part deals with the factors that seem to determine the phenotypes of DLD. In the first chapter, 'Characteristics of Children With Specific Language Impairment', Botting & Conti-Ramsden investigate verbal and nonverbal characteristics of DLD children at 7;0 and 8;0. At 7;0, cluster analysis gives evidence of five profiles of difficulty: (1) good phonology but problems in grammar comprehension and expression and word reading (lexical-syntactic deficit syndrome); (2) good expressive vocabulary but problems with phonology, grammar comprehension, and word reading (verbal dyspraxia); (3) better scores than profile 2 children but lower performance on expressive vocabulary (phonologic programming deficit syndrome); (4) problems at all levels (phonological syntactic deficit syndrome); (5) good phonology, grammar, expressive vocabulary and word reading but problems at discourse level, for example in telling a story (semantic-pragmatic deficit syndrome). By 8;0 many children (45%) have

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moved across the profiles, because of improvement on one subtest, most frequently involving phonology or vocabulary. It can be concluded that DLDs represent a complex of phenotypically different syndromes with internal dynamics.

The second chapter, 'Neuroplasticity and Development: The Acquisition of Morphosyntax in Children With Early Focal Lesions and Children With Specific Language Impairment', by Reilly, Weckerly & Wulfeck, looks at the morphological abilities of two clinical groups, DLD children and children with early unilateral focal (right hemisphere, RH, and left hemisphere, LH) brain lesions. The authors collected oral narratives and elicited tag question production from typically developing controls, DLD children and RH and LF children aged 4;0 to 14;0. Tag question production requires simultaneous processing of different bits of linguistic knowledge: agreement marking, auxiliary selection, subject selection, polarity. On tag questions, no group differences were present at ages 4;0 to 7;0. By age 5;0 to 6;0, typically developing children made few morphological errors. By ages 8;0 to 11;0 controls and LH and RH children scored higher than the DLD group. And by ages 12;0 to 14;0 controls outscored both clinical groups. It is concluded that clinical groups are not QUALITATIVELY different from controls, although they show a marked language delay. It is proposed that DLD be conceived as a functional systemic disease (bilaterally distributed cerebral lesions). This would explain why DLD children show limited plasticity, and intervention is often uneffective.

The third contribution, 'Language Disorders Across Modalities: The Case of Developmental Dyslexia', by Been & Zwarts, investigates the link between DLD and developmental dyslexia, for which DLD is a risk factor. Both dyslexics and DLD children show problems with phonological knowledge and rapid processing of phonological information across visual and auditory modalities (Tallal, 1990). The authors try to model the relationship between dyslexic brain and auditory impairment through a dynamic neural-networks model. Results show that both domain-general deficits (reduced cellular density in the modeled magnocellular pathway, subserving both auditory and visual modalities) and domain-specific deficits (modelled reduction of cerebral cellular layers for the phonological lexical detector) can produce the symptoms of dyslexia.

The fourth study, by Leppänen, Lyytinen, Choudhury & Benasich, focuses on 'Neuroimaging Measures in the Study of Specific Language Impairment'. Morphological abnormalities of developmental origin have been found in the perisylvian region, but no consistent correspondence with DLD has yet been discovered. It has also been proposed that DLD patients show abnormal hemispheric asymmetry, but both left and right hemispheric reduction have been associated with DLD. Event-related potential (ERP) studies show that the components that best discriminate DLD children from controls are N1

(affecting auditory processing lateralization), mismatch negativity (targeting deviant stimuli perception) and P3 (measuring attention abilities, among other things). Two main problems with neuroimaging research are, first, that neuroimaging studies usually involve small and heterogeneous experimental groups, and, second, that neuroimaging normative data are scarce.

In Chapter 5, 'Information Processing in Children With Specific Language Impairment', Gillam & Hoffman review five major hypotheses on the nature of information processing difficulties in DLD children. The first hypothesis argues that language delay is due to attentional limits: to trigger focused attention in DLD children, a larger than normal amount of stimulation is apparently needed. However, the speech processing deficit hypothesis claims that DLD children's major difficulty is in discriminating the characteristics of transient speech stimuli (Tallal & Piercy, 1974). Similarly, the phonological representational deficit hypothesis argues that poor low-level auditory discrimination may lead to high-level auditory impairment (blurred phonemic characterization). Some authors have also pointed out that a central executive dysfunction can contribute to semantic impairment in DLD children. Finally, other authors have suggested that DLD children may suffer from a generalized cognitive limitation (manifested through slower than normal nonverbal functions).

In Chapter 6, 'Environmental Factors in Developmental Language Disorders', Goorhius-Brouwer, Coster, Nakken & Spelberg study perceived and assessed social behavior of a group of more than 150 DLD children between 8;0 and 12;0. Parents and teachers indicated behaviour problems (social withdrawal, anxiety and depression) for around half of the DLD children. However, parents and teachers agreed on the occurrence of pathological behaviour for only 16% of the children. This implies that disruptive behaviour in DLD children may manifest itself differently depending on the context (home vs. school).

Part 2 – Typology

This second part directly tackles the central issue of classification and proceeds from articulatory disorders to pragmatic disability. In his chapter 'Speech Output Disorders' Maassen introduces the issue of articulation deficits. The speech output of a group of DLD children is compared with that of dysarthric children, children affected by developmental apraxia of speech (DAS) and a control group in two experimental studies. Dysarthric and dyspraxic children were compared on word and pseudoword elicitation tasks (Study 1); dyspraxic and DLD children were compared on a picture naming plus sentence completion task and on an imitation task (Study 2). Results show that dysarthric children produce slow speech and many distortion errors, while DAS children have a high proportion of place-of-articulation

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substitutions. Around 50% of the DLD children performed similarly to children with DAS. It remains to be investigated whether such dyspraxic features are due to articulatory deficits or word and syllable structure disorders, both in the DAS and the DLD groups.

Chapter 8, by Katz & Tillery, focuses on 'Central Auditory Processing'. Central Auditory Processing (CAP) represents the complex interaction of sound localization, auditory discrimination, and stimuli selection and storing processes, which together allow speech sounds to take on a phonologic form. DLD children may suffer from a CAP deficit and thus be likely to lose track of what was said, get confused on what they heard, and miss information. CAP disorders especially impair reading acquisition and may lead to important communicative and academic failures.

In Chapter 9, Leonard & Deevy investigate 'Lexical Deficits in Specific Language Impairment'. First they highlight the importance of early lexical acquisition, which in DLD children is markedly delayed. It is suggested that DLD children have more difficulties with the phonological representation of words. It may also be that DLD children possess a normally structured but less elaborate lexical network, whereby lexical entries are more difficult to retrieve. Verbs may constitute an area of special difficulty for DLD children, since they appear in nonsalient (sentence-medial) positions and convey a great deal of grammatical information, such as argument structure. The case of verb learning underlines the important point that lexical limitations may join with other sources of difficulties, such as limitations in syntactic processing, to yield a complex DLD phenotype.

In Chapter 10, on 'Morphological disorders', Ravid, Levie & Ben-Zvi investigate derivational morphology, in particular adjective derivation, in Hebrew-speaking DLD children. Hebrew adjectives come in three classes: (1) primary CVC adjectives; (2) nonlinear root-and-pattern form (Semitic root+vocalic structure); (3) denominal adjectives. Besides having distinct phonotactic structure, these classes differ also with respect to semantic content and age of acquisition. The authors investigated adjective comprehension and production by a group of 14 DLD children, and 14 age-matched and 14 language-level-matched controls. Results show that DLD children performed worse than both control groups in comprehension and production. Resultative adjectives (belonging to the second class) scored better than attributive (first and second class) and denominal adjectives (third class), in line with normal acquisition patterns. The authors conclude that the acquisition of adjectives, and its disruption, can be best explained by multiple factors, semantic as well as phonotactic.

In Chapter 11, 'Grammatical impairment: an overview and a sketch of Dutch', de Jong shows that cross-linguistic DLD research yields at least four descriptive explanations for syntactic problems in DLD children: (1) Nonsaliency of inflectional markers (Leonard, 1998); (2) inability to control

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subject–verb relationships (Clahsen, 1989); (3) protracted optionality of finite verb marking (Wexler, 1994); 4) lack of knowledge of abstract grammatical features (Gopnik, 1990). The author illustrates with research on tense and agreement marking in Dutch-speaking DLDs. The types of errors that DLD children make with respect to both age controls and language-matched controls include omission of nonsalient suffixes, substitution of singular markers for plural markers, and use of infinitival verb forms in final position. The author argues that, taken separately, none of the highlighted four explanations can fully account for the observed deficits.

In Chapter 12, 'Pragmatic Disability in Children with Specific Language Impairments', Van Balkom & Verhoeven show that some DLD children have difficulties with discourse coherence, topic-theme alternation, and turn-taking. Van Balkom & Verhoeven present a longitudinal study of DLD children and control-age matched toddlers (from around age 2;6 to age 4;10) in videotaped free-play interaction with their parents. Results show that DLD children are active initiators of communication, but that they initiate mostly through nonverbal acts. As DLD children grow older, their parents significantly increase the use of clarification requests, attention recalls and corrections as these children are significantly more likely to present with communication breakdowns than the control group. In sum, from a pragmatic viewpoint DLD children score like controls in having acquired given pragmatic features, but they use them inappropriately (e.g. they overuse them).

Part III – assessment and intervention

The chapters in this section focus on different factors to be considered in tailoring intervention in DLD. Bishop's chapter, 'Specific Language Impairment: Diagnostic Dilemmas', shows that research tends to select pure cases of DLD in search of the etiology of DLD, while clinical practice is faced with less stringent definitions and thus ultimately with different subjects. It is concluded that no single definition of DLD is shared by both clinicians and researchers. The fact that DLD often appears in comorbidity with other developmental disorders, including ADHD, developmental motor disorders, literacy problems and impairment of social interaction, suggests that a multidimensional diagnostic model is to be preferred (Bishop, 1997). The chapter ends with a review of the clinical relevance of epileptic dysphasia, verbal dyspraxia and pragmatic language impairment for a multidimensional clinical perspective on DLD.

In Chapter 14, van Geert provides the outline of 'A Dynamic Systems Approach to Diagnostic Measurement of SLI', a mathematical model of normal and defective language acquisition.

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In Chapter 15, 'Early Detection of Developmental Language Disorders', de Ridder & van der Stege present the results of a validity study of a screening questionnaire for early communicative impairments in Dutch children between the ages of 0 and 2;6. This questionnaire can be used to identify problems in comprehension, production and communicative interaction skills at the very early age of 2;0.

In Chapter 16 Warren & Yoder discuss 'Early Intervention for Young Children with Language Impairment'. They show that explicit recasting of children's communicative attempts is effective for children whose MLU is above 2·5, while milieu teaching (incidental communication) is effective with younger children at a prelinguistic level.

In Chapter 17, Verhoeven & Segers reflect on the 'Benefits of Speech Manipulation for Children with Specific Language Impairment'. Reviewing the relevant literature, they conclude that DLD children may benefit from computer-assisted gradual training with formant transitions (Merzenich, Jenkins, Johnston, Schreiner, Miller & Tallal, 1996).

In Chapter 18, Law discusses 'The Close Association Between Classification and Intervention for Children with Primary Language Impairments'. A meta-analysis of intervention studies shows that parent-administered treatment is as effective as clinician-operated treatment in dealing with expressive language and articulation/phonology disorders, while indirect treatment (that is, parent–child treatment) shows a highly significant positive effect on the recovery of receptive language disorders.

This book presents with contributions of the highest relevance to both the clinician and the researcher. The clinician may be interested in the relationship between classification and intervention: on the one hand, the issue of classification is broadened as compared to diagnostic manuals, and the book describes DLD subtypes in ways that are both new and revealing. At the same time, the book underlines the issue of the effectiveness of intervention practices, which should be of the utmost interest to clinicians. Researchers may be particularly interested in the discussion concerning 'pure' subgroups. The language abilities of DLD children can be consistently tested from different theoretical perspectives. It may also be the case that different theoretical hypotheses suit different DLD subgroups. In this perspective, psycholinguistic research could have a profound impact on clinical practice, and even shed new light on the nature of language itself. Finally, the book is also highly valuable as a reference book as it provides up-to-date bibliographical references on the whole spectrum of developmental language disorders.

One thing the book achieves is that it explicitly lays out the very complex relationship between psycholinguistic theory and clinical practice, fields which conceive of DLD children from different, often competing, perspectives.

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Reviewed by ALESSANDRO TAVANO
University of Udine

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