

# Language Acquisition across Linguistic and Cognitive Systems

Language Acquisition & Language Disorders

52

*Edited by*  
Michèle Kail  
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## INTRODUCTION

# New perspectives in the study of first and second language acquisition

## Linguistic and cognitive constraints

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### 1. Introduction

Recent advances in cognitive sciences have led to lively debates concerning the role of linguistic and cognitive determinants in language acquisition. This question is presently discussed across several disciplines (linguistics, psychology, neuroscience, computer science) where findings have shed light on the process of language acquisition, thereby also addressing fundamental questions concerning the nature of language and of our language faculty. Determining the relative weight of linguistic and cognitive constraints on acquisition requires a perspective that is both multidisciplinary and comparative in order to bring together different strands of research emerging from the simultaneous study of linguistic and cognitive systems across diverse languages, as well as across learners and learning situations: first language acquisition by children, early bilingualism, second language acquisition by children and by adults. Such a perspective is the main contribution of this volume.<sup>1</sup>

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1. A first version of the articles in this volume appeared in Kail, Fayol & Hickmann (2008), published by CNRS Editions, although all have been entirely revised and updated for the present volume.

## 2. Language acquisition: The debates

Language acquisition is one of the most fundamental dimensions of human cognition and a major source of reflection in the history of science. During the last twenty years or so, this field has undergone radical developments through new theoretical proposals as well as through the development of sophisticated methodologies that have allowed major advances in several disciplines of the cognitive sciences. This newly redefined and expanded field of research has major social implications and comprises remarkably diverse branches: the comparative study of different types of learners (children, adults), during normal and pathological development, with source and/or target languages presenting different properties and in different learning situations – spontaneous or guided acquisition at different ages and levels of competence, early bilingualism, later acquisition of a second language or of several languages in different sociolinguistic contexts.

The emergence of language during first language acquisition constitutes a turning point in children's development resulting in the mastery of a powerful symbolic system providing them with the necessary basis to reach complex levels of social and cognitive functioning. Language disorders in children represent a major social issue for public health requiring reliable diagnostic tools as well as appropriate and efficient remediation methods in need of much further research. Furthermore, the massive migration flows in today's world have resulted in such pervasive bilingualism or multilingualism that the previously predominant model of the monolingual speaker has become a rare exception.

Despite a growing number of relevant studies and many important theoretical advances, proposals still diverge with respect to some fundamental questions concerning the mechanisms underlying language acquisition. The old debate concerning whether the language faculty is innate versus learned in the human species has been revisited in light of connectionist models that propose a new perspective on development (Elman, Bates, Johnson, Karmiloff-Smith, Parisi & Plunkett 1996), although no consensus has yet been reached in this respect (Rispoli 1999). Furthermore, the question of the modularity of linguistic knowledge has been addressed in many studies that now combine behavioural measures with neuro-imagery (electroencephalography, functional brain imaging). The question is still open as to whether the activation of neural networks reflects a functional organization that is modular, serial and hierarchical (Gorell 1995; Friederici & Weissenborn 2007) or rather interactive, parallel and distributed (Mac Donald, Pearlmutter & Seidenberg 1994; Fuster 2006). Similarly, new behavioral and neuro-imaging data (Friederici & Thierry 2008) have begun to examine again the extent to which development is continuous or discontinuous. New neo-Whorfian research (since Berman & Slobin 1994; Choi & Bowerman



1991; Bowerman 1996; Slobin 1996) have also made proposals concerning the impact of language-specific properties on the development of linguistic competence. Finally, it still remains to be determined whether linguistic competence must be linked to language use in relation to discourse context, as claimed by some recent 'emergentist' theories that see input properties as a crucial driving force in the process of language acquisition. In this respect, Tomasello (2003) provides new insights on developmental change by studying emergent language within a usage-based approach derived from cognitive and functional linguistics. In addition, the theory of dynamic systems (Thelen & Smith 1994) has reconceptualized the nature and form of changes during child development.

These questions among many others have given rise to divergent proposals. The aim of this volume is to show how the study of language acquisition is now able to generate and learn from renewed debates among models that cohabit within the field and that are less polarized than they were during past phases characterized by unproductive antagonistic clashes between different schools of thought (e.g. Generative Grammar vs. Connectionism). Different theories have benefitted from such exchanges, particularly from interdisciplinary bridges that have promoted new approaches based on expanded empirical bases resulting in more complex and more precise proposals.

### 3. Coverage and aims of the volume

The volume as a whole covers three large domains in the study of language acquisition: first language acquisition, bilingualism, and second language acquisition. The chapters offer novel contributions in all of these lines of research and propose some of the most promising research directions at the forefront of the field. The general aim of the volume is to provide multidisciplinary and comparative perspectives on language acquisition concerning multiple and variable facets of typical and atypical language development within a large age range as well as across languages and learners.

#### 3.1 Intersdisciplinary perspectives on language acquisition

The first aim of the volume is to present current debates within an interdisciplinary framework that brings together research from different scientific traditions all concerned with language in the Cognitive sciences. These include diverse branches of linguistics (descriptive linguistics, typology, structurally and functionally oriented acquisition models), different branches of psychology (psycholinguistics,

cognitive psychology, infant and child psychology), the study of the neural substrates of language in neuroscience, and the use of computer simulation and modelling. The synergy thus obtained makes it possible to weigh the cognitive implications of fundamental (universal or variable) properties of linguistic systems for language acquisition by children or by adults. Furthermore, the volume integrates new research tools, some of which are presently proliferating (Sekerina, Fernandez & Clahsen 2008), such as the recording of brain activity, the on-line analysis of language processing, the construction of large cross-linguistic corpora, the use of Internet or of multimedia.

### 3.2 Multiple facets of linguistic competence in a large developmental age range

Depending on the questions addressed and on the theoretical approaches adopted, the chapters concern different language components during acquisition (phonology, morphology, syntax, the lexicon, semantics, pragmatics and discourse organization). Furthermore, these multiple facets of learners' linguistic competence are examined in different types of language behaviours (perception, comprehension, production). In this respect, the volume as a whole covers a large age range in development, addressing issues that concern infants' initial perceptual and comprehension capacities during the pre-linguistic phase to varied behaviours on the part of children and adults during early phases (the emergence of children's first language(s) and the beginning stage of adult learners' second language) to later phases of language acquisition by both child and adult learners.

### 3.3 Comparative perspectives: Acquisition across languages

A strong wish of the editors is to show the crucial contribution of comparative research that systematically contrasts different languages as well as different types of learners. With respect to cross-linguistic perspectives, the volume proposes comparisons among a large range of languages that examine the role of specific properties of linguistic systems in acquisition. Beyond the intrinsic relevance of such cross-linguistic comparisons, typological approaches (e.g. Talmy 2000) appeal to clusters of properties, thereby contributing notions such as linguistic 'distance' or 'resemblance' among language 'families' to the study of language acquisition. Depending on the studies and their domains, the selected languages present contrasts that are relevant from a cognitive point of view for child or adult learners, such as contrasts in morphological richness and transparency, structural variations or lexicalization patterns. Developments in the field now make such comparisons

indispensable in various disciplines where researchers cannot limit themselves to isolated languages anymore if they want to generalize conclusions concerning the nature of language and to explain the processes underlying its development.

### 3.4 Comparative perspectives: Acquisition across learners

With respect to comparisons across different types of learners, the volume brings together studies concerning the following populations: monolingual adult speakers (using their first language), monolingual children (acquiring their first language), bilingual speakers (adults and children who master two languages simultaneously and/or have learned two mother tongues), adults or children learning a second language (at different levels of competence and with different levels of dominance of one language in relation to the other). Such comparisons make it possible to isolate some factors that are normally confounded during development. For example, children's cognitive system grows with their first language(s), whereas adults are already equipped with a fully developed cognitive system when they come to the task of acquiring a second language. In addition, learning two languages at once (early bilingualism) or learning a second language (successive acquisition) confronts learners with two systems that may have very different properties affecting the acquisition process. Such comparisons allow us to address major questions such as the relative weight of cognitive and linguistic determinants, as well as the role of 'critical' periods in language acquisition.

### 3.5 Intra- and inter-individual variations in typical development

The volume also addresses the question of inter- and intra-individual variations that have been recurrently observed during normal development but insufficiently taken into account within a larger theoretical framework (Lautrey, Mazoyer & Van Geert 2002). When such variations are viewed as reflecting differences in rhythms, strategies and developmental trajectories, and/or as reflecting transitions, fluctuations and regressions within a given individual at a given moment in time, they become an intrinsic dimension of development, as first noted in the pioneering work of Bates, Dale & Thal (1995).

### 3.6 Language disorders and atypical development

Variability is also at the center of studies comparing typical and atypical development, including Williams syndrome, Down syndrome, mental retardation, children with cerebral lesions, aphasia, dyslexia, or Specific Language Impairments

(SLI). In addition to providing obviously relevant information to understand and help patients, such research can also bring evidence that sheds new light on different hypotheses in these debates. Thus, some of these disorders show dissociations between knowledge domains that are normally confounded during development, such as dissociations between verbal and non-verbal spatial capacities (Williams syndrome), between grammatical and lexical knowledge (aphasia), or between syntax and a variety of other language components (SLI). This type of research can relate genotypes and phenotypes, differentiate developmental delay from atypical profiles, assess the role of behavioural and cerebral plasticity in compensation and remediation processes, as well as test hypotheses concerning the relative autonomy vs. interactivity of different components of human cognition.

#### 4. Contents of the volume

A first set of chapters (Part I) presents available models of language acquisition and paradigms developed in different disciplines to address the above questions, with particular emphasis on the need to invent new experimental paradigms. As shown by the subsequent two sets of chapters, the cross-linguistic perspective has led to breakthrough findings and remains particularly productive in the study of first language acquisition (Part II) as well as in the study of bilingualism and second language acquisition (Part III).

##### 4.1 Part I – The emergence and dynamics of language acquisition and language disorders

MacWhinney opens the volume with an overview of the theoretical frameworks that are currently most predominant in the study of language acquisition: Chomsky's theory and the functional connectionist approach. Starting with a list of premises and hypotheses differentiating these two major theoretical perspectives, he then lists eight fundamental and debated questions that highlight in detail the divergences between them: (1) the relevance of the distinction between competence and performance; (2) the importance of recursion in defining natural language and (3) its role in phylogenetic evolution; (4) the genetic basis of the language faculty (and of language disorders); (5) the 'special' status of the language faculty; (6) the importance of a 'critical period' for language acquisition; (7) the modular or interactive nature of knowledge domains; (8) the role of the input. MacWhinney concludes by suggesting that only new methodologies will allow us to support one or the other of these two major paradigms. These include

large cross-linguistic corpora of productions collected in natural or experimentally controlled situations that can be analyzed through the development of Internet and of computational power in the further study of language acquisition in different language domains (phonology, gestures, pragmatics, conversation).

Van Geert pursues these thoughts by showing the usefulness of modelling, particularly within a dynamic systems approach to language acquisition. Dynamic systems comprise numerous components that follow different trajectories, the properties of which result from the dynamic interactions among them. A large range of components can provide indices for the mechanisms underlying change (number of words or of prepositions in utterances...). These observations can be stochastic indicators underlying, for example, transitions between distinct generator mechanisms, continuities or discontinuities, and regressions. A first way to better understand the dynamic acquisition process consists in modelling interactions and in comparing the qualitative properties of the data simulated in this model with the one that is observed in child data. A second approach consists in applying flexible smoothing techniques to serial data and to determine possible changes in the volume of fluctuations observed in the data. The discovery of indices showing transitions and a phase-like grammatical development in some studies raises new questions concerning the linguistic properties of children's productions.

Christophe, Millotte, Brusini and Cauvet address what is known as *bootstrapping question*, taking the following paradox as their starting point: for each language component to which children are confronted (lexicon, phonology, syntax...), knowledge in other domains would simplify acquisition. For example, to the extent that syntactic structure can specify relations among the words in a given sentence, children should have access to words and their meanings in order to learn syntax. Conversely, learning the meanings of words should be easier if children have access to some aspects of syntactic structure. Christophe et al. present findings showing that children can learn some structural aspects of their language on the basis of a surface analysis of the speech to which they are exposed. In particular, sentence prosody and grammatical words can interact during early acquisition. Thus, children have access to intermediate prosodic groups as early as during their first year of life and they exploit these phonological groups to constrain word segmentation. In addition, at two years of age, they can exploit grammatical information to infer the categories of unknown words (nouns vs. verbs) and to partially guess their probable meanings (object vs. action). Finally, as shown by results obtained with adults, it is possible that children may be able to construct partial syntactic structures by relying simultaneously on boundaries across phonological groups and on grammatical words.

Thomas closes this section by proposing a synthesis of research concerning language disorders proposing that developmental disorders should be viewed in terms of changing constraints on language acquisition. Thomas illustrates this view by comparing the linguistic profiles of children that suffer from autism, Down syndrome, Williams syndrome and SLI, suggesting that similarities and differences among these disorders can be interpreted in terms of the properties of the learning system. A detailed description of Williams syndrome and SLI shows the usefulness of interpreting atypical language development in terms of the trajectories of an adaptive system that is governed by altered constraints (reasoning and information). According to such a view, the first type of disorder is characterized by *redundancy*, the second one by *compensation* to be studied first and foremost through functional brain imagery.

#### 4.2 Part II – First language acquisition: universals and linguistic diversity

In Part II, Lieven first presents an overview of advances obtained within a cross-linguistic perspective during the last twenty years, showing how this comparative approach has become indispensable in the study of language acquisition since some pioneering proposals during the 20th century (MacWhinney & Bates 1989; Slobin 1985). A growing number of studies now rely on cross-linguistic comparisons between distant or closely related languages as a necessary tool to generalize results or to refute particular hypotheses concerning language acquisition. This research uses various methodologies implying the study of early spontaneous productions, experimentation or modelling. Lieven argues that the joint study of acquisition in several languages is the only way to provide psychologically convincing and realistic theories that can account for the processes whereby children build syntax in their first language.

Dressler stresses the relevance of research within a typological perspective that groups languages in terms of ‘families’ on the basis of properties that play a central role in language acquisition and according to several epistemological levels (classification, order, quantification). He illustrates this approach in the domain of morphology, examining in particular the impact of several language properties in this domain (richness, transparency, uniformity, productivity) on early phases of the acquisition of inflectional morphology. The general hypothesis is that during their social interactions children are sensitive to the typological properties of their mother tongue, noticing the structural and communicative importance of the linguistic patterns to which they are exposed during acquisition. Thus, the richer the morphology, the more quickly it is acquired. In addition, uniform and productive patterns are acquired more quickly than patterns that

are more opaque, not uniform and non productive. On the basis of these results, Dressler indicates the need to take into account the ways in which languages (or more precisely subsystems of languages) can be ordered according to the degree to which they approximate ideal morphological types, particularly the agglutinative inflectional (-fusional) and isolating type in the case of morphology.

The subsequent two chapters present divergent views of how children acquire spatial language and their implications for the language-cognition interface. According to one view (Landau & Jackendoff 1993), spatial representations are based on universal cognitive processes that are reflected in universal linguistic distinctions. However, the considerable variations that characterize spatial systems across languages has led to neo-Whorfian views of language acquisition (e.g., Slobin 1996), according to which language-specific properties have an impact on the rhythm and course of development. In the context of this debate, Hickmann presents an overview of research comparing the expression of motion by children (two to ten years) in French and in English. As predicted on the basis of typological properties, the results show systematic cross-linguistic differences in how children select and organize spatial information. At all ages the semantic density of responses is higher in English than in French as a result of the fact that English speakers use compact structures in which they systematically lexicalize cause and/or manner in the verb root to which they add path in satellites. These structures are readily available from two years on in English, whereas more varied and complex structures are necessary to express multiple types of information in French. The discussion highlights research directions that will be necessary to test strong hypotheses concerning the potentially deeper effect of such language effects on cognition.

In sharp contrast, Pléh presents two sets of findings that support the opposite universalistic approach. A first set of findings concerns child Hungarian and shows the existence of a universal cognitive tendency to attribute a privileged status to goals from very early on in a language that requires distinctions concerning path (for example, *in* with or without a change of location). Furthermore, this tendency can also be observed among speakers suffering from Williams syndrome, characterized by the under-development of posterior parietal regions of the brain that result in important deficits in spatial cognition. A second set of results presenting detailed comparisons between patients and healthy subjects shows no qualitative differences in their use of spatial language. Pléh concludes that these two groups carry out identical cognitive operations and only differ with respect to their computational capacities. This conclusion suggests a universal cognitive basis for the development and organization of spatial language.

Another component of children's linguistic competence, considered to be most fundamental by all models, is the marking of subject/object or agent/patient

roles in relation to the argument structure of the verb in various constructions. Jisa et al. examine how adults and children (five to ten years) in several language groups (Amharic, English, French, Hungarian) use different structural options to express event representations in narrative discourse. The analyses focus on grammatical constructions used to manipulate reference to entities in event representations involving role switches on the part of main characters who punctually change from being an agent to being a patient undergoing the action of a secondary character at different points of the plot. Narrative productions show a wide range of available structures (preposed patients, dislocations, inversions). These structures vary as a function of age and language, indicating a developmental progression in children's capacity to adopt different perspectives and to make choices between competing constructions in order to switch perspectives.

Kail, Costa and Hub Faria highlight the fact that on-line language processing in different languages has still not been sufficiently explored in language acquisition research. They report on studies they conducted in a number of languages using the paradigm of grammaticality judgments with monolingual and bilingual speakers. In this chapter, they compare on-line language processing by monolingual French and Portuguese subjects (adults and children between six to twelve years). The results first suggest the impact of some universal constraints. Thus, from six years on, in French and in Portuguese (as well as in other languages), violations that occur late in the sentence are more rapidly detected than those that occur early, indicating that subjects are able to use morphosyntactic information to make predictions on subsequent parts of the sentence. However, other constraints are language-specific. Thus in Portuguese, but not in French (or in some other languages), the validity of cues (morphology and word order) and the structural proximity (intra- vs. inter-syntagmatic violations) are influenced from six years on by the phonological detectability of morphological markings in oral speech.

Perdue's chapter makes the transition between Parts II and III in that it examines the expression of finiteness during both first and second language acquisition. This language domain has given rise to numerous analyses in a cross-linguistic perspective. Although the morphosyntactic categories of person and tense have been traditionally associated with finite propositions (in contrast to infinitives), finiteness also has semantic and pragmatic implications that have led several authors to propose a distinction between *morphological* (Fin-M) vs. *semantic* (Fin-S) finiteness. Taking this distinction as a starting point, Perdue analyzes the use of finiteness markings by two types of learners: adults acquiring French or a Germanic language as a second language (L2) who were tested in comparable verbal tasks; and children acquiring the same target languages as their mother tongue (spontaneous L1 productions). The analysis shows some similarities in the phases and acquisition paths observed in these different learners, but also



differences in their level of 'success' during the acquisition of verbal morphology that help to understand the organization and functioning of finiteness in language more generally.

#### 4.3 Part III – Bilingualism and second language acquisition: A multidisciplinary perspective

Meisel argues for the need to integrate the fundamental concept of the *age of onset* of acquisition through a wide comparison among several types of learners: children acquiring one or two mother tongues at the same time (L1 and 2L1), as well as children or adults acquiring a second language (cL2 and aL2). He notes that comparing aL2 with L1 confounds age of onset and exposure to more than one language, suggesting that aL2 should be rather compared to 2L1 or to cL2. He further notes that 2L1 children have developed grammatical knowledge in each of their languages that is comparable to monolingual children and argues that language cL2 children who are exposed to a second language from five years on are more similar to aL2 learners than to L1 children. He concludes that the differences observed between 2L1 and aL2 reflect fundamental differences related to learners' linguistic knowledge, providing evidence for the *Critical Period Hypothesis*, further supported by some recent neuropsychological data. According to this proposal, crucial parts of the LAD (*Language Acquisition Device*) that guide L1 acquisition become inaccessible to aL2 learners because of neuronal maturation, so that these learners must rely on other compensatory cognitive resources and their linguistic knowledge must be viewed as a special hybrid system.

Schlyter starts with the observation that the development of inflectional morphology is closely tied to syntactic development within the framework of generative grammar. Focusing on subject-verb agreement, Schlyter first stresses the fact that this development is slow among Swedish-speaking adult learners of French L2 in both the oral and the written modalities, notwithstanding differences between these two modalities. She then points out that this development does not seem to be linked to syntactic development. Thus, contrary to what has been proposed for children and for adults, it is not possible to consider subject pronouns as person markings since their clitic status is not clear. Schlyter puts forth the hypothesis that syntax and morphology are separated in adult learners and that morphological development could be linked to frequency effects in the input. This development is compared to the one that is observed in other types of learners, particularly in bilingual French-Swedish children who also show a slow development of verbal agreement. Taken together, these results call for new cross-linguistic comparisons necessary to contrast input varieties from a morphological point of view.