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Introduction: perspectives on child language

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1.1 Introduction

This handbook aims to provide an overview of current theoretical approaches and research in a range of topics related to child language. The field is multidimensional, as illustrated by the many courses on child language or language acquisition that are taught in departments of Linguistics, Psychology, Cognitive Science, Speech Pathology, Education and Anthropology. This cross-disciplinary nature of the field is reflected in this handbook, which is aimed at upper-level undergraduate students and beyond. Graduate students and researchers will find the chapters invaluable. Clinicians also will find some of the chapters of interest. In this introductory chapter we present a general overview of the field and some of the recent developments. In Section 1.4 we discuss the organization of this volume and provide an overview of each chapter.

1.2 The study of child language

There are different approaches to the study of child language, and researchers investigate different aspects of the language acquisition process. For example, some will focus on testing particular theoretical linguistic claims; others on developmental, cognitive or social factors in the acquisition process; others on the development of a particular feature of language; and others on what we might learn about language development from studying children developing in atypical biological and/or social situations. The chapters in this volume illustrate differences in theoretical perspective, language features investigated and methods used. They cover a range of theoretical

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issues and topics on aspects of the child's developing language system. The topics range from the infant's discrimination of sounds, segmentation of linguistic units and prelinguistic communication to children's phonological, lexical, grammatical, semantic and pragmatic development. Additional topics include bilingualism, atypical language development and reading. Each chapter presents the current state of knowledge in a particular area.

A number of questions underlie the theorizing and research on language acquisition. A crucial question is 'What does the child bring to the task of language acquisition?' (or 'What is the "initial state"?') There continues to be disagreement in the field as to whether linguistic concepts are innate or whether general cognitive abilities are sufficient for the child to acquire a language. The issue, then, is to what extent domain-specific and domain-general tools are involved in acquiring a language; that is, when and how does each exert its influence? A related question is: are there constraints or biases that influence the child's acquisition of language, and if so what is their origin? This question is discussed in relation to the prelinguistic domain; e.g. infants' segmentation of the input language, as well as their development of word learning, that is, the mapping of form and meaning, and to the extent that aspects of Universal Grammar (UG) can be considered constraints or biases, also to children's acquisition of grammar. The chapters in this volume illustrate how, at each of these levels, some patterns of language acquisition appear to be robust across languages – and sometimes even etiologies – while others are clearly affected by exposure to a specific language. Additional questions, fundamental to particular aspects of the study of child language, are related to crosslinguistic and crosscultural similarities in the course of language acquisition, whether there are different trajectories in acquiring one vs two or more languages, how the study of atypical language development informs theories of typical language acquisition, and how children proceed in what is for many the 'next step' in language development – namely, literacy. The chapters in the handbook take up these and other issues.

1.3 Making the old new: recent transformations of old themes

As many of the chapters in this volume attest, both the generativist/UG and usage-based theoretical approaches to child language acquisition are vibrant, continuing to yield new and thought-provoking findings. Yet what is also evident are some integrations of both perspectives within the same area of research (e.g. Chapter 13), as well as some striking similarities in content in chapters coming from these different theoretical views. For example, both Stoll (Chapter 6) and Deen (Chapter 15) consider how children's acquisition of morphosyntax proceeds across a variety of languages, and both describe how factors such as language-specific

complexity and regularity, as well as domain-general working memory and perspective-taking, seem to influence children's acquisition trajectory. In what follows, we highlight some additional cross-cutting themes (i.e. besides theoretical approaches) which are not new to child language research but which show some new and exciting directions, as illustrated in the chapters in this volume.

Child language researchers have discussed how children's processing of the input – both online and offline – might influence, promote and reflect their acquisition of language for over forty years (e.g. Ferguson & Slobin 1973 and see Chapter 12); however, the current period might be considered a 'golden age' of investigations into the roles of language processing in acquisition. Certainly, processing theories, explanations and data recur across the chapters in this volume. Of course, there are multiple ways to define and examine child language processing. For example, almost twenty years after the first demonstrations of statistical and distributional learning in infants (Saffran *et al.* 1996), this remains a vibrant approach to discovering infants' acquisition of the sound systems of their language (Chapters 3, 7, 8–10). That is, the infant shows an astonishing ability to notice, extract, remember and recombine configurations of segments, syllables and even larger units in their auditory input. Statistical and distributional learning mechanisms are also cited in lexical and grammatical development, although usually these are inferred rather than directly tested or simulated (Chapters 6, 12, 13, 17). Furthermore, child language processing research increasingly recognizes the roles of executive functions, such as attention, working memory and perspective-taking, in children's ability to extract linguistic patterns, map them onto linguistic meanings, and demonstrate what they know in a given context (Chapters 12–15, 21–23). Research with atypical populations has especially highlighted how processing variability might – but also might not – lead to representational variability (Chapters 24–29). Finally, research investigating children's online (real-time) processing, in terms of parsing, priming, attentional learning, along with their possible neurophysiological manifestations, has expanded across all levels of language (Chapters 4, 17, 19, 26, 29, 33). Determining experimentally when children are more vs less efficient processors of different kinds and combinations of linguistic stimuli provides some of the strongest clues yet about how they might be going about the business of language acquisition in the real world.

Child language researchers have also long been interested in the consequences of individual differences in children's language development (Bates 1979, Nelson 1973); initially, such differences were viewed primarily as counterexamples to claims of innate or universal paths to language acquisition (e.g. Chomsky 1965). Chapters in the current volume illustrate, though, how individual differences need not preclude innate constructs; they demonstrate how child-based and/or input-based variability affects children's trajectories *and* outcomes of language development. Individual

differences in children's speech perception abilities, gestural patterns, phonological memory, sentence processing efficiency, phonological and letter knowledge, and pragmatic skills have each been linked to subsequent measures of vocabulary, overall language proficiency and/or literacy (Chapters 7, 9, 19, 20, 22, 29, 30). Moreover, as Tomblin (Chapter 24) states, frank disorders of language development may be considered extremes – or anchor points – of child-based individual variability. That is, each etiology presented in this volume displays at least some components of language that are significantly disordered relative to neurotypical children; nonetheless, similarities in at least some processes or outcomes of language development in each disorder are also evident (Chapters 24–34). Input-based individual differences are also pervasive, surfacing in this volume in chapters on lexical development, bilingualism, pragmatics and atypical populations (Chapters 16, 17, 20, 22, 24). Thus, patterns of language acquisition vary depending on specific child factors (e.g. working memory, etiology) as well as properties of the input (frequency, regularity, complexity). However, these patterns of language acquisition do not all vary without limits. For example, even children with frank, biologically based language disorders show some typical patterns – e.g. the progression of early syntactic development looks similar in TD, ASD and DS groups (Chapters 12, 27, 29). Furthermore, many children who receive limited or no linguistic input nonetheless develop a communication system that is remarkably language-like in a number of ways (Chapters 9, 23). These cases highlight the resilience of language acquisition under situations of extreme variation, and point to additional constructs – possibly innate – that influence the process.

Child language research has always acknowledged the need for crosslinguistic comparison. Deeply rooted in our field's motivation is the truism that any language acquisition mechanism must be able to account for children's learning any of 5,000+ languages (see Chapter 6), and that comparisons of children learning different languages illuminate the joint influences of language-specific input and language-general structures and processes (Gleitman & Wanner 1982). Indeed, one of the unique aspects of the current volume is that the majority of chapters consider data from a variety of languages, representing every inhabited continent of the world. The conclusions that are drawn from these data, however, are not monolithic: some chapters highlight how crosslinguistic comparison reveals similarities in the processes, structures and/or trajectories of language acquisition (Chapters 13, 14, 18, 23) whereas others discuss how learning different languages presents the child with different challenges and thus promotes different processes, structures and/or trajectories (Chapters 6–8, 11–13, 15, 17, 21, 22, 25, 32). As acknowledged by many contributing authors (e.g. see Chapters 4, 17, 19, 20, 28, 29), additional crosslinguistic research is needed in a number of areas.

We are excited by the new directions observed in this volume in each of these areas – and others that we do not have space to mention here.

However, we raise here some additional areas that we think need further research in new directions. For example, many of the new language processing findings rely on the expanded use of comprehension methods, such as EEG and head-turn preference in infancy, intermodal preferential looking and looking-while-listening in toddlers, and eye tracking in preschoolers and school-age children. These methods reveal approximations of the timecourse of processing specific linguistic utterances in specific contexts. Children's language production also reflects aspects of their language processing; however, there has been a disconnect in the field between the ages, kinds and outcomes of language processing that are revealed in comprehension vs production measures (e.g. see Chapters 7–8, 10–11, 2, 5, 13, 16–17). One challenge we suggest for future research is to discover how the systematicities of children's language production 'fit' with the systematicities of their comprehension. Second, again with the assistance of new technologies (e.g. Naigles 2012), we are moving in the direction of increasingly bigger datasets. Larger corpora are being collected at both specific developmental timepoints as well as longitudinally, and we join Stoll and Tomblin (Chapters 6, 24) in calling for the increased use of more sophisticated quantitative tools to capture the subtle patterns and trajectories of such data (see also Chin *et al*. 2014, Tek *et al*. 2014).

In addition, the chapters in the current volume that focus on atypical populations illustrate the validity and benefit of investigating how children's language use and development across etiologies is related to their neurological functioning and genetic makeup (Chapters 24, 26, 32, 33). We suggest it is timely to investigate relationships between variation of language use *within* etiologies, including within neurotypical populations.

1.4 The handbook: an overview

The current edition of the handbook is substantially different from the earlier version: chapters on topics covered in the first edition have been revised and updated to cover new research – in a few instances with different authors. Also, three new chapters have been added (Chapters 17, 26, 28) in addition to a new section containing five chapters on reading (Chapters 30–34).

There are five parts to the handbook. Part I focuses on theoretical and methodological perspectives on language acquisition. Each of the chapters included in this section provides an overview of a different way of approaching the study of child language, giving a rationale for the approach and evidence to support it. The main focus of Part II is concerned with early developments, with chapters on infants' speech perception and the relationship between gesture and early language development. Part III covers the acquisition of structural aspects of language, that is, phonology

and grammar. Part IV, covering the age range from toddler to teenager, focuses on lexical, semantic and pragmatic development, and the development of narrative (discourse) skills. Part V examines language development in different contexts. Included are chapters on children acquiring two languages, the acquisition of sign languages, Specific Language Impairment (SLI), language development in genetic disorders (Down syndrome and Williams syndrome) and the language development of children with Autism Spectrum Disorders. Part VI covers reading development, including its precursors, behavioural and neurological processes, and disorders.

A brief overview of each chapter is presented in the following sections.

1.4.1 Part I: Theoretical and methodological approaches

Valian (Chapter 2) introduces the concepts of nativism and learnability and presents arguments for and against nativism. The nativist perspective represented in this chapter assumes innate linguistic content, that is, abstract linguistic concepts. Valian considers which parts of linguistic content could be innate and summarizes evidence that humans have innate linguistic knowledge. The special nature of language is illustrated with examples from animal communication, language development in special circumstances and the early language knowledge that children seem to demonstrate.

Representing a different theoretical position, Thiessen and Erickson (Chapter 3) provide an overview of Statistical Learning. Statistical Learning focuses on regularities (patterns) in language; these occur at the phoneme, syllable, word and phrase level. In this approach, acquiring a language involves detecting patterns in the input language using general cognitive abilities. Research cited in the chapter shows that even 2-month-old infants are remarkably adept at detecting regularities. The authors discuss which statistical features learners are sensitive to, constraints on statistical learning and the plausibility of statistical learning for language acquisition in naturalistic contexts.

The chapter by Friederici and Skeide (Chapter 4) on the neurocognition of language development illustrates how language development is closely linked to brain maturation. The chapter focuses on how maturation of the neural networks supporting language functions is reflected in the developing system of language. In addition to discussing methods used in neuropsychological research, the authors outline what is known about the neural basis of language processing in adults before discussing research findings from ERP and MRI studies with infants and children starting at 1 month of age.

Tomasello (Chapter 5) presents a usage-based approach to language development, which does not support the notion of innate knowledge of abstract categories. In this approach ‘structure emerges from use’. It is assumed that children rely on general cognitive skills in constructing their

language. These skills help in identifying the intentions of mature language users as well as the distributional patterns of the language. As patterns become entrenched, young children generalize so forming abstract linguistic categories specific to their language.

In the final chapter in Part I (Chapter 6), Stoll argues that the wide variation shown across languages challenges the notion of universal grammar. She illustrates how some of the crosslinguistic variation is observed during language acquisition and stresses the need for more typological research. Distinguished are intra-genealogical research, which compares languages of the same family; inter-genealogical research, which compares languages from different families; and the Maximum-Diversity Approach, which uses typological sampling to compare languages that are maximally different in grammatical structures. Stoll also discusses some of the challenges of conducting research in culturally and linguistically diverse contexts.

1.4.2 Part II: Early developments

In Part II, 'Early developments', Curtin and Archer (Chapter 7) cover prelinguistic speech perception abilities which aid infants in determining the sound categories of the ambient language and in segmenting syllables and words. Learning about the sounds of their language influences young children's early word–object associations. The authors discuss innate biases for speech perception and the role of experience, citing research from different languages. In Chapter 8, Höhle takes up the issue of the interplay between innate processing capacities and language-specific properties. She discusses variation in rhythmic properties across languages, syllable structure and the phonological cues to word boundaries. Also included is research showing correlations between phonological properties and lexical and grammatical morphemes. In Chapter 9, Goldin-Meadow argues that investigation of the developing use of gesture provides insight into how cognition shapes the course of language learning. She illustrates the close association between gestures used as communicative acts by infants in the prelinguistic stage and their later word production; early gestures gradually become integrated with speech. The chapter also covers research on young children's comprehension of gestures and the influence of caregiver gesture use on children's word learning. In addition to research with typically developing children, the author includes research on children with atypical development: children with Down syndrome, late talkers, children with unilateral brain damage, deaf home-signers and children with Specific Language impairment (SLI).

1.4.3 Part III: Phonology, morphology and syntax

This section begins with a chapter by Vihman, DePaolis and Keren-Portnoy (Chapter 10). They discuss babbling in relation to a child's first words

and illustrate how variability found in the speed and trajectory of the emergence of word production and phonological knowledge can be explained by Dynamical Systems Theory. Developmental changes are explained by powerful learning mechanisms; as skills emerge they act as a catalyst for behavioural change. In Chapter 11, Demuth adopts the view that phonological systems are governed by a series of constraints at higher-level prosodic levels such as the syllable, the prosodic word and the phonological phrase. She highlights how the availability of phonetically transcribed longitudinal data from young children from different languages makes it possible to investigate language-specific and crosslinguistic patterns of phonological development. In addition to discussing the association between perception and production abilities and the acoustic analysis of young children's speech, she discusses articulatory factors that influence phonological development.

Grammatical categories are the topic of Chapter 12, in which Behrens illustrates the wide diversity of grammatical categories, the form–function mapping of the categories across languages and the cues that might assist children in acquiring them. She also discusses measures used to assess morphological productivity, that is, the level of acquisition that encompasses creativity and abstract usage. She shows how children use distributional properties in their language input in acquiring the categories relevant to their language. She includes research on the onset of morphological paradigm building and the acquisition of inflectional morphology; the acquisition of plural formation and tense–aspect are used as examples. In Chapter 13, Allen highlights the link between morphology and syntax in relation to the task faced by children when learning about the structures in which specific verbs are used in their language. She contrasts different theoretical approaches, including innate approaches which propose children use semantics or syntax as a 'bootstrapping' mechanism to verb-specific structural knowledge, and usage-based learning approaches which propose that children begin with individual verbs and progressively develop their links with syntax. She also discusses what can be learned from priming studies, in which children are tested to determine if they repeat a modelled structure or produce an alternative appropriate for a particular verb, an indication of knowledge of the verb's argument structure. Research on the acquisition of passives, dative alternations and argument ellipsis is included.

In Chapter 14 Lust, Foley and Dye adopt the Universal Grammar perspective in examining the acquisition of sentences classified as 'complex', with a focus on complementation, coordination, adverbial subordinate clause adjunction and relative clauses. For each of these structures the authors discuss the challenges for acquisition, and present data illustrating the linguistic knowledge that young children have of complex sentence grammar from the beginning of productive combinatorial speech. They argue that complex sentences reveal aspects of functional category

development that cannot be explained by usage-based accounts of acquisition, which treat complex sentences as extensions of simpler constructions. In discussing inflectional morphology in relation to syntax, Deen (Chapter 15) also takes a generative theoretical perspective. He presents an overview of the approach and compares acquisition data of inflectional morphology in languages with rich morphology and sparse morphology. He examines proposed explanations for why children omit inflectional morphemes and sometimes produce root infinitives, concluding that differences between the child's grammar and the adult's may be attributable to extra-linguistic factors.

1.4.4 Part IV: Semantics, pragmatics and discourse

The first chapter in this section (Chapter 16) looks at the acquisition of word meaning, focusing especially on adult input to and interactions with young children. Clark argues that from the beginning children make pragmatic assumptions similar to those of adults about communication, treating language as a cooperative endeavour. From these assumptions, they identify information that helps in their lexical development. Clark argues that children's joint attention, physical co-presence and conversational co-presence all assist in targeting a linguistic form with which to encode preliminary meanings associated with objects and events. In Chapter 17, Graham, San Juan and Vukatana extend topics raised in earlier chapters. They discuss the cognitive and linguistic tools that develop prior to a child's word learning and the interaction between infants' knowledge of their language's phonology and their attention to social-referential cues. They discuss lexical 'constraints' (or biases) that have been proposed as guides to young children in mapping word forms to referents and evaluate the evidence for the 'noun bias' that nouns dominate in early vocabulary. They also consider other proposals, e.g. the Attentional Learning Account, which highlights how associative learning mechanisms influence word learning.

Adopting a Universal Grammar approach, specifically the Principles and Parameters theory, Crain (Chapter 18) discusses the emergence of propositional/semantic knowledge, focusing on the similarity between semantic scope in human languages and in classical logic. He illustrates how children's knowledge of scope relations using sentence structures that contain logical operators (e.g. *not, every*) varies across ages and languages, and discusses a task used to assess this knowledge, the truth verification task.

The topic of Chapter 19, by Snedeker and Huang, is children's sentence processing. In particular, the authors focus on eye-gaze paradigms, which provide fine-grained temporal information and thus can inform us about the incremental processes involved as children listen to language input. Their overview of current research highlights developmental changes in the efficiency with which children integrate multiple linguistic levels

when listening to sentences. In the following chapter, Becker Bryant (Chapter 20) discusses pragmatic development, how children learn to use language appropriately in social situations. She outlines two influential theories (speech act theory and Piaget's cognitive developmental theory) before presenting the developmental trajectory of acquiring pragmatic competence from infancy through adolescence. She also highlights how caregiver, teacher and peer interactions might facilitate the development of pragmatics, and considers the relationships among pragmatic, social, and cognitive knowledge during child development.

In the final chapter of this part of the handbook (Chapter 21) Berman looks at the development of discourse skills, citing crosslinguistic examples from spoken and written narratives. She shows that children from a young age distinguish different genres. Using examples primarily from preschool-aged children to age 10, she focuses on the domains of nominal reference, temporality and discourse connectivity to illustrate how the use of specific linguistic forms expands and becomes more complex concurrently with the child's developing knowledge of discourse functions.

1.4.5 Part V: Varieties of development

Many children in the world grow up exposed to more than one language. In Chapter 22, Hoff examines the development of language in bilingual children. She includes research on simultaneous bilingual development and bilingual development after a child has already started to acquire a first language. She considers in which ways language skills differ between children speaking one language versus two, as well as potential consequences of bilingualism on a child's social and cognitive development.

In Chapter 23, Lillo-Martin focuses on the acquisition of sign languages by deaf children born to deaf parents. Using examples from different sign languages, she discusses similarities and differences between the acquisition of signed and spoken languages, illustrating how sign language acquisition data are informative about the adult grammar, about theories of language acquisition and about the processes of language development.

Three chapters focus on the language development and profiles of children with Specific Language Impairment (SLI). In Chapter 24 Tomblin focuses on the course and etiology of SLI. He discusses the criteria used for identifying SLI and the issue of distinguishing between children with SLI and those with other forms of language impairment. Also discussed is the view that problems reported for children with SLI are not just language-specific. Other issues include the association between late talking and SLI, the persistence of SLI – whether SLI represents deviant or delayed language acquisition – and genetic, neurological and environmental factors.

In the second of the three chapters (Chapter 25), Leonard uses crosslinguistic data to highlight salient characteristics of SLI that emerge across