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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 up. Graduate students and researchers will find the chapters invaluable. Clinicians also will find some of the chapters of interest. In this introductory chapter I present a general overview of the field and some of the recent developments. In section 1.4 I 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 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 what goes wrong in particular situations. The chapters in this volume illustrate differences in theoretical perspective, language features investigated and methods used. They cover a range of theoretical 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,

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lexical, grammatical, semantic and pragmatic development. Additional topics include bilingualism and atypical language development. 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 is 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 or domain general tools are involved in acquiring a language. 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: infants' segmentation of the input language, as well as their development of word learning, that is, the mapping of form and meaning. Some of the word learning literature argues for innate biases. However, biases develop with exposure to a language (e.g. see Smith 1999). There are other questions – fundamental to particular aspects of the study of child language – questions related to crosslinguistic and crosscultural similarities in the course of language acquisition, whether there are different trajectories in acquiring one or two languages and how the study of atypical language development informs theories of typical language acquisition. Chapters in the handbook take up these and other issues.

1.3 The past two decades: developments in the field

In the past two decades acquisition research within the nativist (generativist) tradition, pioneered by Noam Chomsky, has focused on the principles and parameters theory. The theory supports the notion of Universal Grammar (see Ch. 2, Ch. 14), assuming universal principles of language and parameters that constrain possible variation across languages. Also in the past two decades, emergentist approaches to language acquisition have developed. MacWhinney (1999: xvii) describes emergentism as a way of 'linking a growing understanding of the brain with new theories of cognition'. Emergentism does not reject nativism; it provides 'accounts in which structures emerge from the interaction of known processes' (p. x). As reflected in this handbook, a large proportion of the current research on child language is based on emergentism.

Shifts in theoretical perspectives have led to new questions and new approaches. For example, the statistical learning approach has investigated how well infants can detect patterns in the linguistic input. There have also been advances in understanding the relationship between cognitive development and language development (e.g. see Bowerman & Levinson 2001). The emergentist coalition model of word learning (Hollich *et al*. 2000) has been proposed, a model in which domain general

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attentional processes, lexical principles and social pragmatic cues are all involved in the process of word learning, with different cues applying at different stages. The factors that help 'bootstrap' the infant into language have been researched, as has the continuity in development from prelinguistic to linguistic knowledge. Infant segmentation of the input language, their early vocalizations and their gesture use have been investigated in relation to how these early developments are linked to the child's developing linguistic system. Some of the research has targeted the natural course of language development; other research has focused on atypical language development. Verb learning has been a major issue in the past decade (e.g. see Hirsh-Pasek & Golinkoff 2006); the research undertaken has informed much of the theoretical debate. While still limited in terms of the number of languages investigated, crosslinguistic research has provided valuable information about the impact of language-specific factors on the acquisition process, as well as generating discussion about language universals. There have been developments in research on sign languages also. In the context of atypical language development a focus of theorizing has been on the relationship between language and cognition.

Research on language acquisition has benefited from new technologies, including online methods of testing children's developing language knowledge (e.g. see Sekerina *et al.* 2008). The intermodal preferential looking paradigm (Hirsh-Pasek & Golinkoff 1996) has influenced research on infants' and toddlers' knowledge of words and structures. For example, research on verb learning using this paradigm has investigated the age at which children are able to generalize new verbs to different structures. These research findings have informed theoretical claims about young children's knowledge of abstract syntactic categories, and whether the structure in which a verb appears helps in determining something about its meaning, that is, whether there is support for 'syntactic bootstrapping' (e.g. Naigles 1996, Fisher 2002b, and see Ch. 13).

Another technological advance has been the development of eye tracking, used to tap children's online processing of language structures (see Ch. 18). Eye tracking is used to investigate the interpretations being made by the listener at specific points in an utterance, for example an utterance that is potentially ambiguous. It has been used more recently to investigate structural priming – the effect of one structure on subsequent uses of that structure.

The use of neurophysiological measures to examine the brain's response to language-related stimuli has increased. As discussed by Friederici (Ch. 4), while no single method provides a range of information with the necessary fine-grained spatial and temporal resolution required to determine the relationship between particular brain regions and language functions, the use of event related potentials, for example, has added to our understanding of the neural commitment to language, the link between brain maturation and language development. Research using imaging techniques has informed the study of bilingualism and of sign languages.

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There have been additions to the number of languages included in the database of the Child Language Data Exchange System (CHILDES). Monolingual data, bilingual data and data from language-impaired children are available for researchers to access, and new tools for analysing the data have been developed. These are readily available to researchers (MacWhinney 2000, http://childes.psy.cmu.edu/).

There has been an increase in the number of studies using parent report measures for documenting developments in infant and toddler communication. For example, the Macarthur–Bates Communicative Development Inventories (Fenson *et al.* 1994, 2007, www.sci.sdsu.edu/cdi/cdiwelcome.htm) are used widely in English-speaking communities to identify variation in the development of prelinguistic communication, vocabulary and features of early grammatical development. The inventories have also been adapted for use with other languages.

Much progress has been made in the study of child language in the past two decades. I have outlined some of the developments; these and others are evident in the chapters of this volume.

1.4 The handbook: an overview

The handbook is divided into five parts. Part I focuses on theoretical and methodological perspectives on language acquisition. It covers the formal linguistic nativist approach and emergentist approaches. Issues of learnability and innatism are discussed in depth. One chapter focuses on statistical learning; another focuses on neurocognition, the link between brain development and the young child's response to linguistic stimuli. There is also a chapter showing the need for crosslinguistic typological research. Each of the chapters included in Part I provides an overview of a different way of approaching the study of child language, giving a rationale for the approach and some of the evidence supporting it. Methodological approaches are influenced by the theoretical perspective taken by researchers. The chapters in parts II, III, IV and V take up issues and approaches introduced in Part I. Many of the chapters include some crosslinguistic data.

The main focus of Part II is prelinguistic development, with two chapters on infants' speech perception and one chapter on the relationship between gesture and language development. Part III covers the structural aspects of language: phonology and grammar, with chapters on the development of phonology and theoretical explanations; factors influencing the acquisition of grammatical categories; verb argument structure; complex sentences; and the morphosyntax interface, with an emphasis on verb agreement. Part IV, covering the age range from toddler to teenager, focuses on semantic and pragmatic development. The chapters in this section discuss lexical meaning, sentence scope, sentence processing, pragmatic development and the development of structures and narrative organization. Part V examines

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different contexts of language acquisition. Included are chapters on bilingualism and sign languages and four chapters on atypical development. These four chapters cover specific language impairment (SLI), autism spectrum disorder (ASD), Williams syndrome and Down syndrome. The final chapter discusses the issue of how the brain adapts to overcome underlying deficits, and if compensation leads to alternative pathways to language acquisition in order to preserve language functioning.

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

1.4.1 Part I: theoretical and methodological approaches

Valian (Ch. 2) introduces the concepts of nativism and learnability. As she states, discussions about nativism focus on whether the child's mind has content independent of experience. There is disagreement amongst researchers working in the language domain as to the nature of the 'initial state', that is, what the child brings to the task of acquiring a language. The nativist perspective represented in this chapter assumes innate linguistic content, that is, abstract linguistic concepts. The 'final state' (the mature state) is viewed as a formal theory of language. According to this view, acquisition involves the mapping of particular forms from the language of the child's environment to the innate abstract categories. Opponents assume that abstract syntactic categories are learned but, as Valian points out, additional mechanisms would then be required to explain how the abstract categories are built up. The chapter draws on 'poverty of the stimulus' arguments, using the 'case filter' as an example of abstract syntactic categories for which there is no evidence in the input. 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 an opposing theoretical position to that presented in chapter 2, Thiessen (Ch. 3) provides an overview of Statistical Learning. Statistical Learning focuses on the fact that regularities in language occur at the phoneme, syllable, word and phrase level. The major task for the child in acquiring a language is detecting the regularities (patterns) in the input language. Pattern detection is clearly not domain specific; general cognitive abilities, not domain (language) specific, are assumed to be used in identifying the patterns. From the regularities detected, categories can be built by linking items that behave similarly. Research using natural languages as well as artificial stimuli reveals that infants are remarkably adept at detecting regularities, for example transitional probabilities. These can serve as cues to word boundaries. That experience with language affects learning is taken up in chapters 7 and 8.

Friederici's chapter (Ch. 4) on the neurocognition of language development illustrates that language development is closely linked to brain maturation. Neurophysiological measures are used to examine the brain's

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response to language-related stimuli. Event-related potentials (ERPs), in particular, have been used to document changes in infants' brains. Comparisons can then be made with an adult (mature) model, developed on the basis of ERP components generated by the adult brain in response to different language stimuli and aspects of language processing. ERP research on infant's discrimination of phonetic features, stress patterns and phonotactics is discussed in the chapter, as is research on lexical learning, which suggests that between 12 and 18 months of age there is some 'stabilization' between form and meaning. Friederici cites research with two year olds focusing on lexical and syntactic properties, showing that the 'structure building' processes are already in place but more development is required for the adult-like neural mechanisms which support syntactic processes.

Tomasello (Ch. 5) presents a usage-based approach to language development: 'structure emerges from use'. This is opposed to the theoretical position presented in chapter 2. Tomasello emphasizes the primacy of pragmatics in human communication. For example, even from the age of about one year, shared understandings are evident in infants' communication. It is assumed in this approach 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 to form abstract linguistic categories specific to their language. Naturalistic and experimental evidence discussed in the chapter supports the approach: that children initially learn on an item-by-item basis and build up abstract categories.

In the final chapter in Part I (Ch. 6), Stoll discusses the need for crosslinguistic typological research. She provides an overview of some of the crosslinguistic research that has been undertaken, which has provided valuable insights into similarities and differences in the course of language acquisition. However, the number and range of languages for which acquisition data is available represents a small percentage of the world's languages. Stoll argues that systematic comparisons of typologically different languages are necessary for identifying universals in acquisition. However, she also indicates some of the inherent problems in conducting research in culturally and linguistically diverse contexts. The existing data, some of which is available on the Child Language Data Exchange System (CHILDES), are not always comparable given different methods are used and different aspects of language researched.

1.4.2 Part II: early development: precursors to linguistic development

Three chapters comprise the early development section. They cover infant speech perception, crosslinguistic perspectives on segmentation and categorization in early language acquisition, and gesture use. Curtin and Hufnagle (Ch. 7) provide a comprehensive overview of research on infant

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speech perception, and some of the models proposed to explain the reorganisation of infants' perceptual abilities. The models differ in the assumptions made about the role of experience and the nature of innate biases. The research discussed in the chapter supports the Statistical Learning approach. That is, while biases are evident at birth, exposure to a language rapidly shapes infants' perceptual abilities. Categories emerge and are reorganized on the basis of perceptual learning and exposure to the language of the environment. More abstract phonemic representations emerge later.

In discussing infant speech perception in relation to segmenting of words, Höhle (Ch. 8) takes up the interplay between innate processing capacities and language particular properties. She focuses on information that may be used by infants in the early steps to language. Sensitivity to rhythmical information available at birth influences the rapid acquisition of rhythmic features of the language in the child's environment. Infants seem to rely on rhythmic as well as non-rhythmical features in the task of segmenting words from the input language. Höhle cites examples from typologically different languages to illustrate that rhythmical and distributional information at the phoneme, syllable and word level are relevant in the task of segmenting and categorizing.

In the third chapter in this section, Goldin-Meadow (Ch. 9) focuses on the close relationship between gesture and speech. She argues that gesture 'serves as a window on the child's communicative abilities'. The chapter discusses the changing function of gestures in a child's early years and the transition to speech. Gesture use is a precursor of the spoken word and a predictor of developing language. Goldin-Meadow proposes that gesture use may influence the cognitive state of the child; it might encourage language feedback, so helping to promote language learning by influencing the language input received. Included in the chapter is research with different groups: typically developing children, late talkers, deaf 'home-signers', children with Down syndrome, children with unilateral brain damage, and children with specific language impairment (see Tomblin Ch. 23, Leonard Ch. 24).

1.4.3 Part III: phonology, morphology and syntax

The chapters in Part III represent different theoretical views, explanations and data on the acquisition of phonology, morphology, syntax and semantics. Vihman, DePaolis and Keren-Portnoy (Ch. 10) draw on Dynamic Systems Theory (Thelen & Smith 1994) in explaining the continuity between babbling and first words. Lexical and phonological learning, they argue, requires the development of representations that integrate perception and production. Powerful learning mechanisms are proposed to explain development changes, as skills emerge and act as the catalyst for behavioural change. Babbling practice provides the resources for the

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identification and shaping of early word forms. Detailed examples are provided to illustrate that both distributional and item learning account for the development of a child's phonological system.

In chapter 11 Demuth takes a different perspective in linking phonological and language development, drawing on recent developments in phonological theory to explain developmental patterns across languages. She focuses on research that investigates the interactions between segments and higher level prosodic structures (e.g. prosodic words). Frequency in the input and competing 'markedness' constraints are discussed as two factors that contribute to variability in production, both within and across languages. However, as Demuth points out, it is not yet clear which units need to be considered in determining frequency. The chapter illustrates that the production of grammatical morphemes is constrained by children's developing prosodic representations. As discussed, it is those grammatical morphemes that are prosodically licensed that children are likely to produce.

Behrens (Ch. 12) provides a comprehensive account of factors that influence the acquisition of inflectional morphology and word formation. In contrast to the theoretical approach taken in chapter 15, Behrens adopts an emergentist perspective – children rely on language-specific heuristics to build up grammatical categories – and supports the usage-based approach discussed in chapter 3. She includes Brown's (1973) classic study of the acquisition of English morphology, but also draws on crosslinguistic data to illustrate how children build up morphological paradigms, how morphological development is measured and the different criteria used to determine productivity. Critical evaluation is provided on a number of explanations that have been proposed for the acquisition of grammatical morphology. She discusses recent research on the acquisition of past tense, Slobin's (1985c) operating principles, and the Competition Model.

In chapter 13, Allen discusses different theoretical approaches to explaining how children determine in which structures particular verbs are used by mature language users. She considers the innatist and usage-based positions, presenting arguments for and against semantic bootstrapping and syntactic bootstrapping. Drawing on evidence from children's spontaneous productions, elicited productions and experimental work testing comprehension of different structures, she shows that different conclusions are often drawn. Allen also discusses that much evidence in support of the usage-based approach could represent syntactic priming (Fisher 2002a), and the more recent proposal for 'weak abstract representations'. The chapter covers the acquisition of argument structure alternations, focusing on passive and dative structures, and in identifying the challenges posed for acquisition by ellipsis of arguments in the input language, Allen discusses preferred argument structure.

The topic of chapter 14 is complex structures. Lust, Foley and Dye, taking a Universal Grammar perspective, argue that complex structures provide a

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'core domain' for investigating aspects of syntactic and semantic knowledge including hierarchical structure; constituent order; locality domains recursion; and principles of Universal Grammar, such as structure dependence. The authors focus on four types of structures that are traditionally referred to as complex sentences: complementation, coordination, adverbial subordinate clause adjunction and relative clauses. For each of these structures, the chapter presents the challenge they pose for acquisition and data from early spontaneous speech as well as from experimental work. The authors argue that the young child brings knowledge about the linguistic system, for example, knowledge of control structures, branching direction and anaphora. They propose an integration of language-specific and potentially universal syntactic knowledge over the course of development.

Also adopting the Universal Grammar approach, Deen (Ch. 15) discusses the interaction of syntax with morphology, specifically three components of the morphosyntax interface. For readers not familiar with the formalism used in this approach a brief summary is provided. A main focus of the chapter is a detailed comparison of patterns in the development of verb inflection in languages with rich morphology (e.g. Italian) and morphologically poor languages (e.g. English), and in languages that allow null subjects and those that require overt subjects. The chapter examines the theoretical explanations that have been proposed for the omission of verb inflections by children: a deficit in inflectional knowledge, a deficit in converting a syntactic representation into a string of morphological items, or a deficit in the underlying syntactic representation.

1.4.4 Part IV: semantics, pragmatics and discourse

A range of possibilities exist for what a new word could mean, but children seem to target an appropriate preliminary meaning rapidly. Many researchers who work on the acquisition of word meaning have argued that children are guided in the task of word learning by constraints (or biases). These include the 'shape bias' and 'mutual exclusivity'. Such constraints limit the possible form–meaning mappings for the child. There is disagreement, however, about the origin of the constraints, whether they are innate or learned from identifying patterns in the input language. Clark (Ch. 16) adopts a different approach. She argues that children treat language as a cooperative endeavour, making pragmatic assumptions about communication; from these assumptions they 'pick up' information that helps them in developing a lexicon. Clark argues that joint attention, physical co-presence, and conversational co-presence are all factors that assist children in targeting an appropriate form in the input language with which to encode preliminary meanings associated with objects and events in their world.

Adopting a Universal Grammar approach, specifically the principles and parameters theory, Crain (Ch. 17) discusses the emergence of semantic knowledge. He illustrates that semantic scope in human languages is

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similar to that of classical logic. Different structures containing logical operators, e.g. *not, every*, *any*, are illustrated from several languages. He compares different entailment relations that apply in English and Japanese in simple negative statements with disjunction. The difference can be captured by a parameter of variation. Initially young English- and Japanese-speaking children make similar interpretations for these structures. This finding can be accounted for by the 'subset principle' within the theoretical framework adopted. Other topics discussed in the chapter include children's knowledge of isomorphism and inverse scope. Much of the research testing this knowledge adopts a truth verification task.

A recent development in the field is the use of eye-gaze paradigms to investigate the development of language comprehension, from word recognition to sentence interpretation. In chapter 18, Snedeker outlines the processes involved in understanding speech and discusses the reasons why it is important to understand the development of children's processing, not just to inform acquisition theory but also to provide insights into the architecture of the adult comprehension system. She discusses some of the research that has been undertaken using the 'visual world paradigm' to investigate lexical (verb bias), prosodic and referential effects on adults' and children's interpretation of potentially ambiguous syntactic structures. She also cites more recent experimental work that combines structural priming and eye-gaze analysis to investigate how children represent argument structure. The priming studies demonstrate that by age three years children employ abstract grammatical representations in online comprehension.

Language acquisition involves more than the mapping of form and meaning. It also involves knowing how to use the forms appropriately in different situations. This is the area of pragmatics. In chapter 19 Becker-Bryant discusses the developmental progression of pragmatic behaviours and the family and peer influences that affect the development of pragmatic competence. While infants demonstrate some rudimentary knowledge of conversational behaviour, the associated skills become more sophisticated over the childhood years. Initiating and sustaining conversations, perspective taking, responding to feedback, requests, are some of the topics included in the chapter, but there is much more. The chapter also covers the adolescent years – when different registers are used for different social functions, e.g. to indicate group identity, and the use of mobile phones and the internet mean conversations are not always face-to-face.

Berman (Ch. 20) focuses on the functions of linguistic forms in children's narratives. Different functions develop and new structures emerge as children master the global level of discourse organisation. Such development depends on children's linguistic and cognitive abilities. Berman discusses 'reference' and 'cohesion' with examples to illustrate some of the different strategies used by children in maintaining reference. She also includes research on 'temporality' and 'connectivity'. While the chapter on complex clauses in Part III of this volume focuses on structure at the

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