

contents

<i>series preface</i>	vii
<i>preface</i>	ix
<i>acknowledgements</i>	xi
<i>list of tables and figures</i>	xiii
<i>notes on contributors</i>	xvi

introduction	1
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part 1. explaining language acquisition

1. word learning and the origins of phonological systems	15
<i>marilyn vihman</i>	
2. cracking the language code: processing strategies in first language acquisition	40
<i>ann m. peters</i>	
3. the inevitability of child directed speech	62
<i>matthew saxton</i>	
4. universal grammar approaches to language acquisition	87
<i>maria teresa guasti</i>	
5. second language acquisition	109
<i>susan gass</i>	

part 2. windows on language acquisition

6. language and the many faces of emotion	143
<i>judy s. reilly</i>	

7. complements enable representation of the contents of
false beliefs: the evolution of a theory of theory of mind 169
jill g. de villiers and peter a. de villiers

8. going beyond semantics: the development
of pragmatic enrichment 196
nausicaa pouscoulous and ira a. noveck

9. the acquisition of phrasal vocabulary 216
koenraad kuiper, georgie columbus and norbert schmitt

part 3. language acquisition, culture and linguistic diversity

10. language development in simultaneous bilingual children 243
natascha müller

11. universals and cross-linguistic variability in
children's discourse 273
maya hickmann

12. trends in research on narrative development 294
ruth a. berman

13. family literacy activities: what is, what ought to
be and the role of parents' ideas 319
*stuart mcnaughton, meaola amituanai-toloa and
'ema wolfgramm-foliaki*

index 337

introduction

There have been, and probably always will be, two rather different approaches to language acquisition, which I have referred to as the ‘observational’ and the ‘logical’ (Foster-Cohen, 1999), and which, while not being entirely separable in practice, help us understand some of the key debates in language acquisition studies. In the first approach, the aim is to observe children acquiring languages in a range of circumstances and to capture those observations in whatever form current technologies make possible (pencil and paper, video, audio, etc.). Many of these observations are based on data now housed in corpora such as the CHILDES database at Carnegie Mellon University, developed and maintained by Brian MacWhinney. The second approach starts from the premise that to understand how language is acquired, we must first understand exactly what is being acquired and then try to, as it were, *fill in the gaps* between the capacities of the novice (infant, child or adult) and the competent language user: given their destination, what must the learner both bring to the task and experience along the road to get there?

To some extent, the differences between the ‘observational’ and the ‘logical’ are methodological, since no one ever goes looking at learners without some understanding of the task learners are expected to achieve. And in both approaches there is the need to know what the learner brings to the task of language acquisition, and what they can glean from the input. However, in practice, those (notably linguists) who have placed the initial focus on the endpoint of acquisition have come to rather different conclusions from those who have focused on the path, particularly those who have started at the very earliest stages of acquisition in infancy (notably anthropologists and psychologists). Not only do these researchers not share a common view as to the endpoint of acquisition, they also do not share a view of what is understood to be the input to language acquisition.

In general, those who view the nature of language as a body of overt constructions which form a toolbox for communication (e.g. Tomasello, 2003) view it as revealed by the language that learners hear, see and read (i.e. what speakers can and do say/write). They then tend to see the task of language acquisition as one of coming to mirror the language of the input by observation, imitation, pattern extraction and adjustment towards the adult model. Those who see language as a much more complex system, containing fine distinctions and subtle interpretations that are *not* revealed directly by the language to which learners are exposed, tend to see the task as involving much more complex interactions between the nature of the human animal and the input language. These researchers argue that equally as important as explaining what children come to understand they *can* say (or interpret linguistic strings as meaning) is explaining how they come to understand what they *cannot* say (or interpret).

Both the perspectives outlined above are represented in this volume because it is important to follow both the logic and the empirical findings of both approaches. I personally think that the story Tomasello (2003) tells about the emergence of symbolic communication in infants from the interpretation of other intentions in an excellent one. I remain unconvinced that the same story can be told about advanced syntax (Foster-Cohen, 2006). This then raises other questions about the nature of language development: is it a single path that needs the same sort of explanation throughout its trajectory? Or could different sorts of explanations come into play at different times? (This is the ‘continuity of explanations’ problem.) At the present state of our knowledge, I would argue that we must remain open to both possibilities: on the one hand that language is a system, or more likely a collection of systems, that can be constructed or reconstructed by each child through relatively straightforward pattern recognition strategies; and on the other that language, because of its inherent complexity of constraints and disallowed possibilities, must be, to a greater or lesser extent, built into the nature of the human brain. If we don’t *welcome* this tussle, we will have no hope of correctly interpreting either current or future data.

Part of the reason why a variety of different perspectives holds sway in the study of language acquisition is because so many different disciplines contribute to it. Linguistics, psychology, anthropology, education and, more recently, cognitive science and neuroscience, are all disciplines that have contributed significantly to our understanding of language acquisition, both first and second, monolingual and bilingual, typical and atypical (disordered), in languages around the world.

While such multidisciplinary activity has contributed significantly to the richness of our understanding of language acquisition, it has also been a source of tension. Each discipline comes with its theoretical assumptions and preferred methodologies for research, and as each discipline has independently matured and developed its own theoretical basis, it has become more and more difficult to reach across discipline boundaries and truly understand alternative perspectives. I am hopeful that in the future this chasm will begin to close, as our understanding of both the psychological and the social become more grounded in our understanding of the workings of the brain.

We are still a long way off being able to observe, through brain scans and other devices, the moment-by-moment acquisition of a language or languages by a child or adult, and even further away from understanding exactly what the brain activity we will be able to observe might actually reflect. However, though the neuroscience of language acquisition is very much in its infancy, it is the natural progression for a field that began by examining the *external* behaviour of language users (at a time when cognitive processes were not even accepted objects of research), and might now be able to examine the *internal* behaviour of language learners' brains. In between, we have enriched the study of language acquisition through examination of the cognitive and interactional aspects of acquisition, with a focus on a range of different levels of language from the phonetic to the pragmatic, viewed as the development of the individual and as the development of the individual in social and psychological connection with another. Along the way, language acquisition researchers have had long and heated debates about nature versus nurture, though now most recognize that these debates were based on a false dichotomy, since nothing in human development springs fully made from genetic instructions. As Matt Ridley puts it, it is always nature through nurture (Ridley, 2003). And if language is part of the human endowment, as Chomsky has always insisted it is, then it too will emerge through interaction, both internal and external to the human learner.

The question remains, however, whether there is anything that can be sensibly described as a domain-specific language acquisition mechanism as opposed to domain-general capacities that are called into service for language acquisition. Elizabeth Bates, who endeavoured more than anyone to make sense of our emerging understanding of the 'cascading consequences' nature of human development for language development, was convinced that language was 'a new system made up of old parts' and that a specifically evolved mechanism purely

for language development was extremely unlikely, given the nature of evolution (Bates et al., 2005). Even while there is a strong tendency for certain neuronal assemblies to fire in response to certain language tasks, she and others would argue that this does not mean there is a genetic programme for such similarity across individuals. Some, like Paula Tallal (2003), would argue that the left hemisphere is particularly attuned to fine auditory discrimination and that that is why language ends up being in the left hemisphere; unless of course that part of the brain is damaged, when other areas may step up to take on the task. Along the same lines, (Karmiloff-Smith, 1996) argues that there is a progressive modularization for language; and brain science now tells us that modules need not be anatomically localized, but are rather assemblies of interconnected neurons with fast connections.

These are interesting and valuable ideas; and there is no doubt that the staunchest supporter of Universal Grammar needs to take account of the nature of brain development in the young infant/child and the extent and limits of neuroplasticity in the older learner who is trying to add another language (or reclaim one that has been lost to trauma or disease). We must not, however, forget the point made earlier, that there are still questions to answer around the complexity of linguistic knowledge, and around the species specificity of complex language. To use an analogy Chomsky has used many times: humans will grow arms and not wings no matter what environment we put them into. And why is it that even though intact children are exposed to only a fraction of the possible data from a language or languages, they form quite clear intuitions about the limits on how language can/cannot be constructed and what it can/cannot mean? And why are these limits and possibilities of language so common across languages that differ widely one from another in so many other ways? And why are children's 'mistakes' almost always possible in some other human language, even while they are not possible in the one they are learning (Yang, 2006)?

There are those (several of whom appear in this volume) who think the similarities are because of similarities of cultural transmission and exposure to language input. However, we still need to account for the fact that languages only appear to be able to change within certain limits (Lightfoot, 2006), and that children acquiring language in the absence of a culturally transmitted model create and change their systems in only certain ways (Bickerton, 1992). (Several of the chapters in this volume make reference to the Nicaraguan Sign Language data, which can be used to address this issue.)

Will we ever agree on how learners, generation after generation, succeed in mastering the most wonderful and intricate systems of communication that we call language? Probably not. But we certainly will not agree on the ‘how’ unless we can agree on the ‘what’. Exactly what is it that children and older learners are acquiring? Exactly what help can and does the surrounding world give them? And exactly what is the path of acquisition at whatever age and with whatever linguistic background (in the case of bilinguals) they already have? As you will see in this volume, interesting ideas on all these topics have been proposed for first language acquisition in infancy and early childhood and for bilingual and second language acquisition in childhood and later.

One area that will, I believe, continue to be of acute interest to those studying language acquisition is the variation between individuals acquiring language: neurological variation, variation in input, variation in path and variation in endpoints (Foster-Cohen, 1999). It is vitally important that we do not simplify this variability by lumping learners into groups, but rather strive to understand the full complexity of the different ways learners acquire languages. A certain degree of idealization of the data is needed, of course, but I would like to think that, as we get better at understanding just how individuals are both similar and different, we can dispense with a number of demarcations that we have been making. Do we really know what makes for typical versus atypical development, for example? Are children with the same genetic markers (e.g. trisomy 21) really more similar to each other than they are different in language development? Is there really a single condition we can call specific language impairment (SLI), given the interrelationships in the development of the human phenotype (Laws and Bishop, 2004)? Why do certain features in first language acquisition get a designation as disordered when the same features in second language acquisition pass without comment as simply immature or errorful forms? The fact is that we are far from knowing the true extent of the ways individuals vary one from another in language development. We use notions of ‘normal’, ‘disordered’, ‘typical’, etc. as if we actually knew on what basis we were doing so. Those bases are almost entirely behavioural, whereas in fact two children with very similar paths may actually be acquiring language very differently. Two other children with very different paths as revealed by their comprehension and production may actually be acquiring language very similarly, but using their systems in ways that make them appear more different than in fact they are.

Rather than pre-empt discussions which I suspect will get more and more interesting as the limits and capacities for neuroplasticity are

investigated, I would like this volume to be clear in stating that all learners contribute to our understanding of the rich tapestry of human development. This means that they must all be referred to in terms that are respectful and open about the success they may achieve in developing our most human of capacities (Roeper, 2007). It is for that reason that, in this volume, learners will be referred to (where this needs to be done) as ‘typical’ and ‘atypical’ learners, rather than as ‘normal’, ‘disordered’ or ‘impaired’. I have also made a conscious choice when talking about children with various disabilities to refer to them as ‘children with Down syndrome’, ‘children with autism’, etc. rather than ‘Down syndrome, or autistic, children’. They are children first and foremost, and the particular aspect of them that makes them interesting from a language acquisition perspective is secondary from a human rights and humanitarian point of view.

I hope readers will agree that this volume contains some of the ‘hottest’ topics in language acquisition. Readers will certainly find some of the same issues being raised by writers coming from very different perspectives and covering a wide range of different aspects of acquisition. In order to facilitate finding the threads through the various chapters, I have noted many of them in the following summaries of each section of the book (with bolded key terms for convenience), and others can be accessed via the index.

part 1. explaining language acquisition

The first four chapters in this collection provide an overview of current thinking about language acquisition from very different perspectives. At the same time, they each raise several of the same issues as each other.

The first chapter, by Marilyn Vihman, provides an account of the movement from babbling to first words and on to the development of a phonological system. She appeals to the notion of **attention** as key, both in its presence (in explicit learning) and in its absence (in implicit learning), arguing that attention is involved in the acquisition of first words, but not in the approximation of babbling to the ambient language or in the emergence of the phonological system. Attention is also a key component in Susan Gass’s account of the Input/Interaction/Output model of second language acquisition. Here, though, the focus is on its role in the development of morphosyntax and pragmatics rather than phonology or lexis.

Gass’s chapter makes another important connection with those that are concerned with first language acquisition, since her interest in

attention is principally around its role in a learner's being able to take on board the kind of feedback that comes from **recasts** or reformulations of learner utterances. The importance to acquisition of these kinds of responses of the interaction partner is at the heart of Matthew Saxton's contribution in which he argues that children can and do make use of so-called corrective input in moving towards adult language. Gass and Saxton are both interested ultimately in the use that learners make of the **input** language to which they are exposed, an issue that has always been at the heart of language acquisition research.

In her chapter, Ann Peters focuses largely on the stage of child language development at which early words are separated out from the incoming speech stream and begin to be combined. She examines ways in which children can use the nature of the speech stream itself to help in carving it up; in cracking the linguistic code. Maria Teresa Guasti, on the other hand, has a very different take on the role of the input. Focused as she is on the complexities of advanced grammar, she makes the case that the input is inadequate in multiple ways to allow children to come to the conclusions about interpretations and possible constructions that they do. The tension between different conceptions of the nature of the **endpoint** of acquisition could not be any clearer when Guasti's chapter is compared to the others in this section. (I should note that, later in the volume, both de Villiers and de Villiers, and Pouscoulous and Noveck provide further detailed evidence for the complexity of the endpoint.)

Vihman, Peters, Saxton and Gass are all, in their different ways, focused on understanding just what learners can make of the input without any special help from preconceptions about the endpoint. Gass, however, because of her focus on a second language opens up the discussion to include situations where, unlike in first language acquisition, there must perforce always be linguistic preconceptions in the learner's mind. She is also, in contradistinction to Saxton, less hopeful that recasts and reformulations can actually do the work that is claimed for them, at least when it comes to adult learners. Guasti, for her part, opens up not only the issue of the complexity of what is to be explained, but also the depth of the issues surrounding the role and possible roles of the input in her discussion of the argument from the poverty of the stimulus. It is not just that the input can be unhelpful, a point which Saxton goes some considerable way towards countering, but that it simply does not show the complexity of the system that is acquired. This, however, means that we need to think carefully about Saxton's claim that grammar is both the input and the output to acquisition. Guasti

would heartily disagree, since, from her point of view, children do not have access to grammar in the input. Utterances do not bear their analysis on their sleeves.

Finally, and relatedly, these first four chapters raise the issue not just of input, but of **interaction**. While Saxton remarks in his contribution that the social interactional approach to language acquisition that was the focus of much work in the 1970s has been ignored in recent years, I believe these papers show that it still underlies much thinking in language development; as well it should. The problem with the earlier work was that while it showed quite clearly that social and emotional exchanges between individuals are necessary for language development, it was not able to show the mechanism by which interaction worked its wonders. It will, I believe, be one of the most exciting hallmarks of the next generation of research that the impact of interaction will be tackled in a whole new way through neuroscience techniques that were not available 40 years ago. We will, I believe, finally get some traction on the kinds of **internal and external drivers** of acquisition identified by Peters, including individual learning preferences, cultural differences in interaction and the context of learning, emerging desires for control over the environment through skill development, and memory development.

The four papers in this section, each in their own way, make an extremely important point: that the language acquisition process is **dynamic**. As Ann Peters puts it in her chapter, paraphrasing Heraclitus, learners never put their toes into the same linguistic river twice. As learners learn, the background against which they make each new step is different from the background against which they made the previous step. This is also the point of the cascading consequences model of human brain development (e.g. Stiles, 2008): each development impacts those that follow. Moreover, this is true no matter what approach to language acquisition is taken. We would do well to keep this in mind as we progress through the rest of the contributions.

part 2. windows on language acquisition

Language acquisition researchers have always understood that the only way to get a fix on language acquisition is to explore it through a variety of lenses. Researchers such as the late Elizabeth Bates, who gave so much to the field, helped open our eyes to the huge amount of **variation** in path and approach to development that could be understood by looking both at variation within the so-called typical language

learning population and through the lens of those acquiring language in unusual circumstances, or acquiring languages typologically distant from those most studied (cf. Bates, Tomasello and Slobin, 2005).

The four papers in this second section drill down into the question of the relationships between language and other forms of communication, and between language and thought. In so doing, they bring to the fore the issue of the complexity of what needs to be explained in language acquisition. Reilly, de Villiers and de Villiers, and Pouscoulous and Noveck all explore the **interface** between language and non-linguistic **emotion** and **thought**. These three papers use, in various ways and to various extents, the windows on language use and interpretation that are provided by atypical populations. Deaf children show us how separate linguistic and non-linguistic forms of communication are (Reilly), and how intertwined are the development of complex syntax and of reasoning about false beliefs (de Villiers and de Villiers). Children who have suffered perinatal stroke show us how language is differently organized from emotional aspects of communication in infancy (Reilly). Children with Williams syndrome (Reilly) and autism (Pouscoulous and Noveck) show how structural characteristics of language (morphosyntax) can fall out of step with pragmatic aspects of language use: in Reilly's case, in the context of evaluations in narratives; in the case of Pouscoulous and Noveck's work, in the disambiguation of possible interpretations of complex sentences.

De Villiers and de Villiers, Pouscoulous and Noveck, and Kuiper, Columbus and Schmitt provide a hugely important focus on the **hidden complexities** of language. Like Guasti, they urge us not to underestimate learners' grasp of how linguistic strings are constructed or how they can be interpreted. This puts an enormous importance on getting to grips with not only language production, but also language **comprehension**. Like Guasti in Part 1, de Villiers and de Villiers and Pouscoulous and Noveck put the focus directly on comprehension; vital if we are to understand the complexities of acquisition. They also put the focus on the degree of complexity of the representations and interpretations children have/make. And here, of course, we meet the limitations of corpora. A corpus of utterances can shed huge light on what children produce, but is severely limited in revealing what they understand; a challenge that Kuiper et al. take up in relation to second language acquisition. Despite the ubiquity of phrasal vocabulary in corpora of English, and thus the enormous exposure to these forms that learners in a range of environment have, their performance in cloze test evaluations of this exposure is, frankly, abysmal. As with the discussion

around input in Part 1 of this collection, input does not equal uptake, and we need to understand why.

One idea that recurs across many of the contributions to this volume is the notion of where the **seams in language** actually are. Kuiper et al., Reilly, and Peters emphasize the notion of chunks, either as a transitory phase or as a permanent state. In so doing, they lead us to pose questions about analysis and about control, along the lines suggested for second language acquisition by Bialystok (2001). **Chunking** (a neuroscientifically respectable notion, by the way) may be a necessary way-station on the road to analysis (as argued by Peters and by Reilly), but it is also a necessary endpoint for fluency and speed of language production (as argued by Kuiper et al.).

part 3. language acquisition, culture and linguistic diversity

The importance of casting the net as wide as it is cast deep in language acquisition studies cannot be over-emphasized. The previous section drilled down; this one will expand outwards to embrace the full richness of language acquisition as a human capability for communication and thought.

In a sense, every child in every generation goes it alone in language acquisition. They don't know about how languages other than the one(s) they are learning work, any more than they know the history of the language(s) to which they are exposed. Nonetheless, language comes in the context of a culture that is passed from generation to generation, and the history of each language is built into the way it is now. It is important, therefore, that we are always looking at how things work elsewhere: other languages, multiple languages at once, different cultural contexts.

Natascha Müller's paper, which opens this final section, challenges us to think carefully about the level at which we consider our analyses. Comparing the ways in which different children acquire various combinations of languages bilingually, she suggests that we cannot think in terms of languages compared as wholes. Rather, we need to think in terms of **subsystems** of languages in relation to each other and the interactions between these subsystems in the language-acquiring child. Like Susan Gass, in her discussion of second language acquisition, the question Müller poses is how children make sense of data from more than one language, in this case presented simultaneously. It is thus the question of **dynamism** and the impact of existing knowledge on knowledge

currently being acquired. How does knowing some part of language or having some aspect of language acquired or partially acquired impact that Heraclitan river of language acquisition? Like Peters' paper in Part 1, Müller's paper addresses the question of the interfaces between areas of language development, and of the processing requirements posed by systems and subsystems of language.

And finally, we move back (or up) from the microstructures of individual sentences and subsystems to the kinds of **macrostructures** that are represented by oral and written narratives, and to the impact of sociolinguistic variables on language development. Maya Hickmann focuses on children's ability to regulate the flow of information as it unfolds across utterances in discourse (discourse cohesion), with specific reference to referential domains of narrative discourse (entities, time and space) across child languages. Ruth Berman also focuses on narrative, drawing out underlying properties and principles by reviewing different approaches to the study of narrative development, surveying form–function relations in different domains of developing narrative production, and tracing the developmental path from interactive, conversation-embedded narration in childhood to autonomous text construction in adolescence and adulthood. Hickmann and Berman also address how the nature of the language being learned impacts on this development, just as it did on the kinds of issues addressed by Müller.

The final paper, by McNaughton, Amituanai-Toloa and Wolfgramm-Foliaki, addresses the impact of cultural expectations on literacy practices in Tongan and Samoan communities, and connects back to notions addressed in the first section around cultural expectations for first words (Peters), how one talks to children (Saxton) and what one expects of bilingual children (Müller).

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index

- adult language, 7, 16, 33, 35, 44,
247, 253
see also complexity; endpoint;
input
- articulatory filter, 20–8
- attention, 6, 15–16, 18–20, 25–6,
28, 29, 46, 52, 56, 58, 64, 67, 68,
69, 74, 78, 109, 110, 125, 131–2,
157, 158, 186, 189, 283, 289,
304, 325
- autism, 6, 9, 180, 191, 210–12
- babbling, 6, 16, 17, 21, 22, 28, 30, 93
- bilingual, 2, 5, 10, 11, 72, 178, 221,
227, 243–72, 327, 333
- brain, 2, 3, 4, 8, 95, 96, 102, 120, 122,
143–64, 244, 282
- Child Directed Speech, 62–8, 93,
123, 145
- chunking, 10, 40–58, 216–36
- complements, 63, 104, 132, 169–95
- complexity, 2, 4–5, 7, 9, 34, 35, 51, 57,
69, 122, 125, 203–6, 249, 252–6,
277, 287, 288
- comprehension, 5, 9, 28, 30, 41, 53,
56, 57, 69, 118–20, 126, 130, 144,
146–7, 152, 171, 179, 180, 207,
209, 264, 267, 290, 299, 300, 301,
320, 328–9
- cross-linguistic influence, 225,
243–72
- culture, 4, 8, 10–11, 42, 53–4, 62,
74–8, 80, 93–4, 100, 105, 109,
111–17, 122, 143, 145, 160, 190,
217, 224, 225–6, 232, 294, 295–7,
311, 319–34
- deafness, language acquisition and,
9, 70, 73, 99–102, 149–55, 161,
162–4, 172–3, 179, 182, 184,
187–91
- direct contrast hypothesis, 66–8
- discourse, 11, 64, 66–8, 110, 118, 122,
153, 155, 177, 180, 183, 190, 191,
216–18, 221–2, 250–1, 273–93, 2
94–318, 331
- disordered language development, 6,
9, 25, 103, 146–9, 157–60
- dynamism, 8, 10, 29, 55–9, 68–71,
122, 275, 309, 321, 322, 326, 330
- emotion, 9, 143–64
- endpoint, 1, 5, 7, 10, 87–93, 79
see also adult language; complexity;
input
- filler syllable, 33, 44
- formulaic language, 47, 216–42
- frequency, 16, 17, 18, 25, 35,
71–3, 118–20, 147, 157,
159, 221, 230–6, 307, 320, 331–2
- imitation, 2, 9, 34, 40, 59, 63, 70, 115,
116, 219, 324
- implicit vs. explicit learning/
knowledge, 6, 15–39, 90, 96, 186,
188–9, 207
- individual differences, 28, 43, 54
see also variation

- inferencing, 47, 89, 91–2, 198–212, 277, 300
- input, 1–10, 15, 17–23, 25, 28, 35, 53–8, 62–86, 87, 94, 96–105, 109–11, 118–20, 121, 122–32, 219, 223, 257, 300, 310
- interaction, 3, 6–8, 41, 51, 55, 62–4, 68, 69–71, 72–3, 76–8, 80, 109–10, 112, 114, 116, 122, 124–9, 131–2, 147, 216, 219, 296, 321
- language dominance, 243–72
- lexicon/lexical learning, 15–39, 46, 48, 56, 63, 69, 91, 94, 101, 103, 112, 118, 119, 128, 143, 154, 156, 157–62, 178–9, 198, 206, 216–42, 244–9, 258–61, 264–7, 278, 287, 288, 302
see also vocabulary
- literacy, 11, 115, 295, 296, 319–36
- memory, 8, 18, 20, 23, 30, 40, 41, 43–6, 48, 55, 132, 133, 172, 177–85, 188, 190, 217, 223, 300, 325, 326, 329
- narrative, 9, 11, 67, 70, 146, 150, 155–60, 161, 180, 229, 273–93, 294–318, 319–36
- negative evidence, 66–73, 97, 98, 124, 129
- Nicaraguan Sign Language, 4, 73, 101–2, 179, 188–9
- output, 6, 7, 27, 33–5, 79, 87, 97, 99, 105, 109–10, 129–31, 132, 222, 226, 308
see also production
- poverty of the stimulus, 7, 87, 94–103
- pragmatic enrichment, 196–215
- processing, 11, 18, 19, 20, 40–61, 95, 103, 109, 118, 119, 120–1, 132, 144, 145, 148, 158, 189, 203, 204, 207, 212–13, 217–18, 222–3, 264–5, 267, 299–300
- production, 9, 10, 11, 16–39, 45, 48, 55, 57, 67, 69, 111–12, 120, 129, 130, 144–7, 179, 206, 217–21, 228, 256, 264, 267, 290, 295, 299, 301, 303, 310
see also output
- prosody, 15, 16, 19, 52, 54, 56, 145, 155–7, 161, 162, 217
- quantifiers, 89–93, 196, 203–6, 209–12
- recasts, 7, 65, 66, 76, 78, 124–31, 132
- reference/referential language, 11, 18, 20, 28, 29, 51, 73, 155, 175–6, 181, 218, 226, 273–90, 295, 298–9, 301–2
- repetition, 40, 42, 45, 64, 65, 75, 77, 116, 127, 300, 328
- scaffolding, 44, 57, 58, 65, 155, 157, 161, 162, 310
- Second Language Acquisition, 5, 6, 9, 10, 109–39
- segmentation, 18, 26, 43–7, 53–4, 98–9, 218–19, 223
- Sign language, 4, 93, 99–103, 123, 132, 145, 149–55, 161, 162, 178, 179, 188
- Specific language impairments, 5, 103–4, 180, 182, 191
- stroke (perinatal), 9, 144, 146–9, 161–3
- theory of mind, 169–95
- triggering, 70, 72, 123, 131, 173, 310
- TV, 69–71
- Universal Grammar (UG), 4, 20, 72, 87–108, 110–11, 123, 132
- variation, 5, 8, 42, 54, 94, 112, 133, 256, 264, 288, 320, 321
- vocabulary, 9, 29, 34, 41, 51, 55, 57, 63, 64, 70–1, 78, 93, 94, 100–1, 146, 153, 170, 173, 179, 216–42
see also lexicon/lexical learning
- vocal motor scheme (VMS), 23, 25, 26
- Williams syndrome, 9, 157–60, 161, 162