(eds) *Talking to Children: Language Input and Acquisition.* Cambridge: Cambridge University Press, 109–50.

Penner, S.G. (1987) Parental responses to grammatical and ungrammatical child utterances. *Child Development* 58, 376–84.

Pinker, S. (1979) Formal models of language learning. *Cognition* 1, 217–83.

Pinker, S. (1984) *Language Learnability and Language Development.* Cambridge, MA: Harvard University Press.

Pinker, S. (1989) *Learnability and Cognition.* Cambridge, MA: MIT Press.

Roeper, T. (1987) The acquisition of implicit arguments and the distinction between theory, process, and mechanism, in B. MacWhinney (ed.) *Mechanisms of Language Acquisition.* Hillsdale, NJ: Erlbaum, 309–44.

Saxton, M., Houston-Price, C. and Dawson, N. (2005) The prompt hypothesis: clarification requests as corrective input for grammatical errors. *Applied Psycholinguistics* 26, 393–414.

Snow, C. (1986) Conversations with children, in P. Fletcher and M. Garman (eds) *Language Acquisition.* Cambridge: Cambridge University Press, 69–89.

Snow, C. (1989) Understanding social interaction and language acquisition: sentences are not enough, in M. Bornstein and J. Bruner (ed.) *Interaction in Human Development.* Hillsdale, NJ: Erlbaum, 83–103.

Snow, C. and Gilbreath, B. (1983) Explaining transitions, in R. Golinkoff (ed.) *The Transition from Prelinguistic to Linguistic Communication.* Hillsdale, NJ: Erlbaum, 281–96.

Sokolov, J.L. (1991) A Reverse Analysis of Implicit Negative Feedback: Exact, Expanded, and Reduced Parental Responses. Manuscript submitted for publication.

Wexler, K. and Culicover, P.W. (1980) *Formal Principles of Language Acquisition.* Cambridge, MA: MIT Press.

4.5 HOLGER DIESSEL

Learning *versus* Growth*

Introduction to Reading 4.5

Example (1) gives a Japanese phrase with translation into English, word for word and then in grammatical English:

1.   hito   no   kokoro   ni

        people   of   hearts   in

        in the hearts of people

Ignoring *the*, which doesn't have a corresponding word in Japanese, the word orders are opposite in the two languages. This is much more than a quirk of the words *of/no* and *in/ni*. The English words *in* and *of* are prepositions; and all prepositions – *at, to, through, under, during* are others – go before the noun phrases they belong to, whereas the corresponding Japanese words go after their noun phrases (and are called *postpositions*).

An even wider generalisation may be possible about word order in the two languages: English and Japanese have opposite word orders in some other constructions. Thus English puts auxiliary verbs before main verbs, for example <u>can</u> eat, <u>should</u> go; whereas Japanese auxiliaries come after main verbs. Tendencies such as these have led to the claim that some languages, including English, exhibit mainly right-branching structures, while others, including Japanese, have mainly left-branching structures. The terms *right-* and *left-branching* are not going to be explained here, beyond what you can infer from what has been said about prepositions/postpositions and auxiliaries. But if wide-ranging word-order generalisations can be made across languages it raises questions such as why they exist and how children acquire them.

Reading 4.5 compares two kinds of answer that linguists have been elaborating and testing, as to how children acquire constructions such as noun phrases, verb phrases and sentences. Diessel's book, the source of this excerpt, investigates the way five children growing up as speakers of English came to be able to construct complex sentences. The line of explanation that he favours is termed a *usage-based* approach, though it could well have been called a *use-based* approach because it sees language as being learnt in the business of using it.

What young children experience in use – the things that people say to them and the ways they notice their own utterances being understood – is the basis for patterns that appear in their developing language. And the patterns become increasingly abstract as a child gains experience: at first patterns are tied to individual words; later the patterns cover classes of words, such as verbs, nouns and prepositions; still later – perhaps under pressure from the psycholinguistic brain mechanisms that we have for making and understanding sentences – some patterns may be as abstract as a predominant direction of branching.

Diessel contrasts *use* as the foundation of language acquisition with a different approach, which he calls a Generative Approach, that attributes our knowledge of constructions to innateness, built-in characteristics of human intellect. According to such an approach, infants are thought of as born to handle languages of the humanly possible kinds, and the role of experience with the language they first meet is to set 'parameters' (such as left-branching or right-branching) to whatever they need to be set at for that particular language. Reading 4.3 (Pinker 1994) is an instance of this approach.

[Sections before 2.3 of the original chapter are omitted from the version reproduced here. The original section numbering is retained for referencing accuracy.]

2.3 LANGUAGE ACQUISITION

[. . .] I discuss some of the major differences between the usage-based approach and the generative approach to language acquisition. I first summarize the major arguments of the debate about innateness and then discuss the different views about grammatical development.

2.3.1 The innateness hypothesis

According to generative grammar, children are endowed with innate linguistic knowledge, which crucially determines the process of language acquisition. The initial state of the language faculty is called 'universal grammar' or, from a different perspective, the 'language acquisition device' (Chomsky 1999: 43). Universal grammar defines the class of possible languages that children are able to acquire. It consists of grammatical principles and parameters that provide a limited set of binary choices. Chomsky (1999: 49) characterizes the parameters as 'switches' that are initially unset or set to a default value (see also Hyams 1986). Grammatical development is seen as a process whereby children determine the parameter values of their language based on specific triggers in the input.

The innateness hypothesis of generative grammar is based on arguments from psychology, neurology, and linguistics. One of the most frequently cited arguments supporting the innateness hypothesis comes from brain function studies (i.e. [Positron] Emission Tomography (PET) and functional Magnetic Resonance Imaging (fMRI) studies). These studies have shown that different linguistic functions are located in different areas of the brain. The localization of language functions in specific brain areas is often taken as evidence for the innateness hypothesis (cf. Pinker 1994); however, as Elman

et al. (1996: 378) have argued convincingly, 'localization and innateness are not the same thing'. While there seem to be specific brain areas that are involved in particular language tasks, the specialization of these areas does not have to be innate; rather, local brain functions might emerge in the process of cognitive development. The brain is a self-organizing organ that develops local specializations as a consequence of processing a specific type of data. Strong support for this view comes from the fact that children with focal brain injuries often develop regional specializations for language in other areas of the brain than normal children (cf. Elman *et al.* 1996: ch. 5).

Other arguments supporting the innateness hypothesis are based on studies examining SLI children. SLI, which stands for Specific Language Impairment, is usually defined as a cognitive deficit that involves only language, in particular grammatical morphology. Since SLI tends to run in families, some researchers suggested that it is based on a genetic defect affecting grammar (cf. Pinker 1994). However, other researchers are not convinced that SLI is really restricted to language, let alone to grammatical morphology. Challenging the definition of SLI as a specific language impairment, they have shown that SLI children have general difficulties in processing information that occurs in rapid temporal sequences and that SLI children also suffer from deficits in symbolic play and spatial imagery (Tallal, Ross and Curtis 1989). This suggests that SLI is not caused by a genetic defect affecting only grammar or language (for a review of the literature see Elman *et al.* 1996: ch. 7).

In addition to the arguments from brain function studies and SLI children, the innateness hypothesis is commonly supported by linguistic arguments. In particular, it has been claimed that the ambient language is not sufficient to learn grammar from experience alone. According to Chomsky (1972: 78), there is an enormous discrepancy between the grammatical system that constitutes the speaker's competence and the 'meager and degenerate data' to which a child is exposed. Based on this assumption, Chomsky maintained that the gap between grammar and experience can only be closed if language acquisition is based on innate linguistic knowledge. This argument is known as 'the argument from the poverty of the stimulus' (for a recent discussion of this argument see Crain and Pietroski 2001; see also the articles in the special issue of *The Linguistic Review* 2002).

Challenging this view, Pullum (1996) and Pullum and Scholz (2002) have recently argued that this argument is empirically unfounded. Examining four constructions that, according to generative grammarians, are so rare that their grammatical properties cannot be learned from linguistic experience (i.e. plurals in compounds, auxiliary sequences, anaphoric *one*, and auxiliary-initial clauses), they show that all four types of constructions are quite frequent in both written and spoken language. While this does not refute the innateness hypothesis, it raises considerable doubt about the validity of the argument from the poverty of the stimulus (see also the corpus-based analysis of child-directed speech by Brent and Cartwright 1996; Cartwright and Brent 1997; Redington, Chater and Finch 1998; Redington and Chater 1998; and Mintz, Newport and Bever 2002).

Moreover, a number of recent studies suggested that children's ability to determine linguistic patterns is much better than is commonly assumed. For instance, Saffran, Aslin and Newport (1996) found that infants as young as 8 months are able to segment a complex string of nonsense syllables into word-like components based on their distribution. Similar results, emphasizing the role of distributional learning in early language

acquisition, are reported in studies by Jusczyk (1997), Santelmann and Jusczyk (1998), Marcus, Vijayan, Rao and Vishton (1999), Höhle and Weissenborn (1999) and Saffran (2001).

Another linguistic argument that generative grammarians have used to buttress the innateness hypothesis might be called 'the argument from the universality of grammatical features' (cf. Crain 1991). This argument is based on the assumption that all languages have certain grammatical properties in common. For instance, it has been argued that all languages employ the same grammatical categories such as nouns and verbs (cf. Pinker 1984). If this is correct, one might ask why these categories are universally attested. Generative grammarians explain the existence of universal categories in terms of innate universal grammar: grammatical categories are universal because they are innate. If they were not innate it would be a complete mystery, according to some generative grammarians, why they are universal (e.g. Crain 1991).

Outside of generative grammar, the existence of universal linguistic categories is highly controversial. Most typologists[a] assume that crosslinguistic generalizations represent tendencies rather than absolute universals (cf. Dryer 1997a). If there are any linguistic categories that exist in all languages, their number is extremely limited. Nouns and verbs are perhaps the only grammatical categories that are truly universal, but even that is controversial (cf. Sasse 1993). However, even if we make the assumption that there are some absolute universals, they would not have to be innate. There are other explanations for the existence of linguistic universals. For instance, nouns and verbs might be universal because all languages need these categories to denote two different types of concepts that are essential to human categorization (cf. Langacker 1987; see also Hopper and Thompson 1984). In general, the usage-based approach assumes that linguistic universals are motivated by functional and cognitive pressures (cf. Givón 1995; Dryer 1997b; Croft 2001, 2003). These pressures increase the frequency of particular linguistic patterns so that they may grammaticalize. Since there are usually several pressures competing with each other, linguistic universals tend to be statistical rather than absolute. For instance, although processing (and/or utterance planning) seems to motivate the use of consistent left- and right-branching [. . .], the branching directions of most languages are not entirely consistent. The inconsistency can be explained by the competition between processing and other factors affecting word order. There are, for instance, pragmatic word-order principles that can be in conflict with syntactic parsing principles (cf. Diessel [2005]). In addition, it is well known that language contact can have a significant effect on word order. Since individual languages balance the competing pressures in different ways, the branching directions are similar but not identical across languages. Similar analyses have been proposed for many other linguistic universals (cf. Haiman 1983, 1985; DuBois 1985, 1987; Givón 1984, 1990, 1995; Dryer 1997b; Croft 2001, 2003).

In sum, all of the arguments supporting the innateness hypothesis are controversial. There is no compelling evidence that children are endowed with an innate universal grammar. Of course, language acquisition has certain biological prerequisites, but there is no evidence that these prerequisites involve innate linguistic knowledge. Rather, it is con-

---

[a] Typologists are linguists who classify languages into different types on the basis of structural characteristics.

ceivable that language acquisition is based on general cognitive mechanisms that are also involved in the development of other cognitive domains.

2.3.2 Learning vs growth

In the usage-based approach grammatical development is based on (inductive) learning. It involves general psychological mechanisms such as habituation, entrenchment, and analogy. Habituation involves the routinization or automatization of complex verbal (and nonverbal) activities; entrenchment concerns the strength of mental representations; and analogy acts as a mechanism for the derivation of new knowledge. All three mechanisms are affected by frequency of occurrence: linguistic patterns that are frequently processed become routinized and automatized; their level of entrenchment is strengthened in mental grammar; and they are often involved in analogical reasoning.

Learning is crucially distinct from parameter setting and other mechanisms that in generative grammar explain how children 'hook up' their linguistic experience to innate universal grammar. In fact, Chomsky [. . .] argues that the notion of learning should be eliminated from the study of language acquisition:

> The term learning is, in fact, a very misleading one, and one that is perhaps best abandoned as a relic of an earlier age, and an earlier misunderstanding (Chomsky 1999: 43).

Instead of learning, Chomsky (1999) uses the notion of 'growth' to characterize the acquisition of grammar. Learning and growth are fundamentally distinguished. The remainder of this chapter discusses the most important differences between learning and Chomsky's notion of growth.[5]

The social–cognitive basis of grammatical development

First, learning and growth make very different assumptions about the social–cognitive foundations of language acquisition. According to Chomsky (1999: 41), grammatical development 'is something that happens to the child'. In this view, children acquire grammar in a quasi-automatic fashion: if they encounter the appropriate triggers in the input, grammar matures in the same way as the child's body or vision.

In the usage-based approach, grammatical development is considered an active process that crucially involves the use of language. In order to acquire language, including grammar, children have to be involved in social interactions (cf. Tomasello 1999, 2003; Clark 2003). According to Tomasello (1999), human infants are at first exclusively engaged in dyadic situations: they either manipulate objects or focus their intention on other people, whom they do not seem to recognize as a person like themselves. At around 9–12 months the situation changes: human infants begin to engage in triadic situations that involve the child, an object, and another person, who is now seen as an 'intentional agent'

---

[5] It must be emphasized that Chomsky's notion of growth is not generally assumed in generative studies of language acquisition. Thus, the following discussion characterizes only one position in the generative approach.

(i.e. a person like the self). Triadic situations require a co-ordination of interaction with other people; this provides a crucial prerequisite for language acquisition: children are able to learn the meaning and use of linguistic expressions only because they encounter them in pragmatically meaningful situations. Language is essentially an instrument that children acquire in social interactions with other people.

Thus, while Chomsky characterizes grammatical development as a quasi-automatic process that happens to the child, the usage-based model emphasizes the significance of social interactions for the acquisition of grammar.

The role of the ambient language

Second, learning and growth differ with regard to the data that are needed for acquisition. Learning requires robust data: children will be able to build up representations of grammatical patterns only if they are frequently exposed to the relevant data. In other words, frequency of occurrence plays an important role in learning. By contrast, growth is basically independent of frequency: parameters can be fixed based on very little data: 'The theory predicts that minimal exposure to data should be sufficient for parameter setting. Ideally, a single example encountered in the input could suffice' (Meisel 1994: 20).

The time course of grammatical development

Third, inductive learning is a gradual process, whereas growth is, at least in principle, instantaneous (cf. Meisel 1994: 14). As soon as the child is able to identify the elements that can act as triggers, a parameter can be set to a specific value. Assuming that most triggers are present in the input data, the theory predicts early and rapid acquisition (see especially Crain 1991 and Crain and Pietroski 2001). Of course, most generative grammarians acknowledge that grammatical development takes a certain amount of time, but this raises the question why triggers do not immediately fix a parameter when children encounter them. Borer and Wexler (1987) call this the 'triggering problem'. They argue that children initially are not sensitive to all triggers encountered in the data because universal grammar is not fully developed at birth; certain innately determined principles mature only later. Borer and Wexler call this the 'maturation hypothesis' (see also Wexler 1999). Based on this hypothesis, they argue that the acquisition of grammar takes time because it follows a 'biological program' that evolves only gradually during the early years of life.

Other generative linguists explain the triggering problem with the architecture of universal grammar (cf. Nishigauchi and Roeper 1987; Roeper and Weissenborn 1990; Roeper and de Villiers 1994; Weissenborn 1992). In their view, grammatical development takes time because parameters are interdependent such that a certain parameter can be set to a specific value only after the value of some other parameter has been determined. In this account, it is the arrangement of parameters in universal grammar that explains why parameters are not always immediately set to a specific value once a child encounters a particular trigger in the input.

Since the usage-based model assumes that language acquisition is based on learning, it is expected that grammatical development is gradual. In contrast to growth, learning requires repeated exposure to data over an extended period of time. From this perspective, the triggering problem is a pseudo-problem that arises from specific theoretical assumptions of generative grammar. In fact, the gradual development of grammar

is seen as evidence for the usage-based hypothesis that language acquisition is based on learning.

The relationship between child grammar and adult grammar

Finally, learning and growth make different predictions about the nature of children's grammatical categories. In the generative approach, it is assumed that children have the same grammatical categories as adult speakers. Pinker (1984) called this the 'continuity hypothesis'. It is a logical consequence of the innateness hypothesis: children have adult-like categories because the categories they acquire are predetermined by innate universal grammar.

In the usage-based approach, it is assumed that children's grammatical representations are distinct from the grammatical categories of adult speakers (cf. Tomasello 2000). Children develop representations of grammatical categories by analysing and systematizing the input data. The development is based on distributional analysis. Based on the distributional patterns that children detect in the ambient language, they construct abstract grammatical representations or schemas. The construction of schemas, which Langacker (2000) calls 'schematization', is based on a specific type of analogy that involves the extraction of common features from the ambient language. The extracted features reinforce each other, giving rise to constructional schemas and other abstract representations of linguistic knowledge [. . .]. Since the extraction of common features from the data is a continuous process, one has to assume that the categories of early child grammar are constantly changing. As children attempt to organize the data, they gradually build up a network of interrelated constructions that successively become more complex and schematic. From this perspective, it is expected that children's grammatical categories are distinct from the categories of adult grammar.

NOW, THINK, DO!

4.5.1 Diessel says it has been found that 'children with focal brain injuries often develop regional specializations for language in other areas of the brain than normal children'. What does this mean and why does Diessel regard it as support for a usage-based account of language acquisition? If necessary, consult Reading 4.1 (Obler and Gjerlow).

4.5.2 *In people's hearts*, using the suffix *'s* instead of the preposition *of*, is another way of expressing *in the hearts of people*, the phrase at the beginning of the editorial introduction to this reading. Possessives such as *people's hearts* may illustrate an exception to the right-branching tendency that predominates in English. Discuss this, after doing some library research to find out more about the linguistic notion of branching direction.