CHAPTER 9

Language Acquisition: The Lexicon and Syntax

Eve V. Clark

I. INTRODUCTION

Speakers rely on a large stock of words when they communicate. The community of speakers agrees on the meaning or meanings assigned to each word form. For instance, speakers of English refer to a bicycle with the word *bicycle,* speakers of Dutch with the word *fiets,* and speakers of French with the word *vélo.* In each community of speakers, the relation between word form and word meaning is a conventional one, accepted or agreed on by all the speakers in that community. Speakers of each language, then, draw on a common set of forms with agreed-on meanings when they talk.

In general, words provide the building blocks for larger units. They may be combined as idioms, where the meanings of the parts do not add up to the meaning of the whole, as in *to belt up, to be in a flap, to hit the sack, to keep tabs on,* or *to blow one's own trumpet.* Idioms like these are typically restricted in syntax, so some, for instance, may not appear in the passive (compare *He blew his own trumpet* vs. **His own trumpet was blown by himself*). Words may be combined in short phrases that act as if they were single words, as in *by and large, in short, happy go lucky,* or *once upon a time.* Again, these forms are fixed: their word order is frozen, and many are used only in restricted contexts. *Once upon a time,* for example, serves to introduce fairy tales and rarely occurs outside that context. Finally, words can combine, following

Speech, Language, and Communication

the syntactic rules of a language, to form an indefinite number of noun phrases (e.g., *the lone skier, a red fox, three children*) and verb phrases (e.g., *raced down the hill, crossed the road, climbed over the gate*) in each language. Words, fixed phrases, and idioms, then, all contribute to the construction of clauses (e.g., *Justin changed gear, Rod plotted the data, Sophie is practicing her flute*). Speakers build their utterances (both clauses and combinations of clauses) from words, fixed phrases, and idioms. And these are also the lexical units identified by listeners as they parse and interpret utterances heard from others.

In short, lexical items "clothe" syntactic structure. They are what exemplify a relative clause (*Duncan pointed at the man who was running*), an adverbial clause (*Duncan went outside when he heard the car,* or a verb complement (*They wanted to climb the hill*). Without words, there is no way for the syntax of a language to be realized. Equally, without words, there is no way to exemplify the phonological system or the morphology of language, in inflections (e.g., in *jump -s, race -d, wait -ing, know -n; cup -s, toy -s, cat -'s*), derivations (e.g., *watch -er, violin -ist, construct -ion, silver -y, green -ish, palm -ate*), or compound words (e.g., *snow-plough, key-hole, pile-driver, writing desk*). In using language, children reveal what they know about it. And when children start to talk, they start with words—word forms and word meanings.

I argue in this chapter that lexical and syntactic development go hand in hand. Children learn the syntactic forms that go with specific lexical items, and gradually accumulate sets of words that can act the same way syntactically. It is unclear when (or whether) young children learn rules of syntax. Rather, I suggest, there is growing evidence that they learn syntactic properties specific to individual lexical items. As they learn more lexical items, they become more likely to act consistently in the syntactic patterns they produce. (Whether this consistency is best described in terms of rules or strategies remains an open question.) The present chapter focuses first on the acquisition of the lexicon and of individual lexical items, how children build up a vocabulary (isolating forms from the stream of speech, constructing hypotheses about possible meanings, and mapping those meanings onto forms). Children must also elaborate semantic fields, linking words whose meanings are related; analyze word structures, so they are able to identify stems and affixes and their relative contributions to meaning; and coin new words to express meanings where they lack the relevant conventional forms.

After a review of early lexical development, I turn to the acquisition of syntax, the point when children begin to combine words to convey meanings not conveyable by single words on their own. The first such combinations may not match the adult conventions on how to form relative clauses or complement structures because they often lack critical indications of

structure (e.g., *who, that, to, for, after*). I therefore trace how some syntactic forms are first produced and then elaborated as children move from two-word combinations to later, more adultlike forms in their speech. In particular, I focus on relative clauses, adverbial clauses, and complements, and trace their emergence in the speech of young children acquiring syntax.

Throughout this chapter, one recurring theme is the extent to which children's acquisition of syntax is lexically based. That is, how far is production a matter of learning which constructions can occur with each lexical item, for instance, with each verb? This question is particularly important for charting the course of acquisition, assessing where children learn item by item, and at what point they make generalizations that can be applied to new cases. I end with a brief discussion of the process of acquisition, and how discrepancies between comprehension and production are vital to acquisition itself. The picture of acquisition I present here is set against a background of some consideration of the sheer size of the learning task required for the lexicon, and hence for the syntax, of one's first language.

II. THE LEXICON

How many words do children have to learn? Adult vocabulary size in English has been estimated at between 50,000 and 100,000 words. And in the period from about age 2 to age 6, children are estimated to acquire around 14,000, a rate of some nine words a day. In school, from textbooks alone, children are exposed to at least 3000 new words a year up to age 17, aside from words learnt from reading at home, from newspapers, from sports, from television or radio shows, and from other nonschool sources (Carey, 1978; Nagy & Anderson, 1984; Templin, 1957). All this, of course, applies to children learning a first language. Bilingual children must learn close to double these figures, since they have words from each language in many domains, and so can talk equally easily about certain topics in either language.

What do children have to learn? For each word, set phrase, or idiom, children have to be able to segment out the form from the stream of speech and assign some meaning to it. On subsequent occasions, they must be able to identify the form spoken by a range of speakers, then look it up in memory and so retrieve the initial meaning assigned to it. As they hear a word spoken in more contexts, they may also refine their hypotheses about its meaning and adjust any information stored in memory. In trying to convey a particular meaning, they also have recourse to memory and they use the meaning they have assigned to retrieve the pertinent form for production. In short, mastering each word is no small task. Add to this the mastery of how each word is used in combination with other words, and the task becomes even more formidable. Yet children appear to acquire

vocabulary readily and rapidly throughout their childhood years. After a few weeks or months of producing just one word at a time, they begin to combine words and within a few months start to produce three-, four-, and five-word utterances on a frequent basis. In the section that follows, I review some of what we know about early word uses, about the mapping of meanings onto forms, about the building of a vocabulary in different semantic domains, and about the parallels observable across languages in early acquisition.

A. Early Word Uses in Production

When children attempt to produce their first words, these are not always readily recognized by the speakers around them. 1- and 2-year-olds have to work hard to produce the right sounds, in the right order, both in words and in combinations of words. Learning how to do this in production takes both time and extensive practice (see Ferguson, Menn, & Stoel-Gammon, 1992; Jusczyk, Chapter 8, this volume). Children usually start attempting some words in production around the end of their first year. Some start talking as early as 10 months, others not until as much as a year later. There is a similar range in what children produce in the first few months of talking. Some produce just one word at a time for several months (a one-word stage) before beginning to combine words into longer utterances; others start to combine words within weeks of the first word produced (Clark, 1993; Dromi, 1987). By age 2, children may produce anywhere from 50 to around 600 distinct words. And they typically understand many more than they produce.

Their first use of these words do not necessarily match adult usage. Some may be produced initially only in a single context, for example, *bye-bye* said only when standing by a particular door in the house. But such contextually bound uses typically last for only a short time before children extend the range of such words to something closer to adult use. Other words may be used appropriately but at first be underextended from the adult's point of view. For example, a child may say *shoe* only upon seeing shoes on someone's feet, but not upon seeing them in a closet or lying on the floor (Reich, 1976). And still others, sometimes amounting to as much as 40% of a 50 to 100-word vocabulary, are at first overextended. That is, they are used for a much larger range of referents than in adult speech: a word like *dog* may be produced to pick out not only dogs, but also cats, sheep, cows, and other four-legged mammals (Anglin, 1977; Clark, 1973; Rescorla, 1980). It is only as children master further words in production that they begin to restrict their overextensions. Once they produce *cat,* for example, they remove cats from the extension of *dog,* and so on (e.g., Barrett, 1986). Occasionally, children's early uses may fail to match adult usage altogether, with the mismatch resulting in a failure to communicate anything (e.g., Bloom, 1973). But for most word uses (including over- and underextensions), children's early uses overlap with adults' and are typically interpretable in context, even though the children do not yet know the full adult meanings (Huttenlocher & Smiley, 1987).

What do such uses tell us about children's knowledge of the lexicon? First, their attempts to produce word forms show that they focus on the conventional terms used by adults. Children do not make up sound sequences wholesale and then assign meanings to them. They aim for the adult targets, even if their articulatory skill causes them to fall far short in what they actually produce. The word *squirrel,* for example, may be produced at first as [ga],[1] the words *button, bottle,* and *spoon,* all as [ba], and the words *light, there,* and *dog,* all as [da]. Yet in comprehension, children have clearly represented the target adult forms since they respond to them and do not confuse them. As their articulatory skill improves, they differentiate their own productions and change them steadily in the direction of the adult targets.

Second, the first meanings children assign overlap with adult meanings. This suggests that children are able to select potential meanings in context with considerable success. Moreover, when they overextend words, they appear to do so for communicative reasons, because they lack other more appropriate words in their production repertoires. That is, they typically understand words appropriately when they hear them, even when they overextend them in production. For example, when asked to point to instances of *dog,* they choose pictures of dogs rather than of other animals (such as sheep) to which they themselves have extended *dog* on other occasions (Thomson & Chapman, 1977). This, I suggest, is because they are not yet able to produce the word *sheep,* or are unable to retrieve it when they need it. For the same reason, they may rely heavily on general purpose verbs like *do* for a large range of specific actions, even though they understand the relevant specific terms when they hear them. The result is that children understand verbs like *throw* or *turn on,* but in talking about throwing a ball or turning on a light, they themselves produce *do*. Children's success in early word uses, then, can be attributed perhaps more to their ability to assign relevant meanings than to their skill in matching adult pronunciations.

B. First Meanings

Children's assignments of possible meanings to their early word forms suggest that they draw heavily for their first hypotheses on their ontological categories. They have, of course, had up to a year or more to form conceptual categories of objects and actions, relations and properties, based on

their own observations of consistencies in the word around them. For several months before they begin to speak themselves, they have observed the objects and activities around them, the relations they have to each other, and the range of entities that make up their everyday surroundings. They play with, manipulate, and match objects around them. They fit them into boxes, and empty them out; arrange them in heaps or towers and knock them down; they push them and throw them. They watch and participate in all kinds of activities from clapping, exchanging objects, hiding their faces, crawling, sitting, standing, walking, carrying; opening and shutting containers and doors; pouring liquids and spilling them; eating, with or without utensils, and drinking. And above all, they watch the events around them, the kinds of activities and range of participants each involves, and the relations each bears to the others. The conceptual categories children build up in their first year of life provide the basis for their first hypotheses about word meaning.

When children begin to isolate word forms and assign meanings to them, they draw on the conceptual categories they have already represented in memory. They can use such categories to create potential meanings for newly isolated word forms. In this way, they can draw on categories of objects, relations, and states, activities, and events. The consistency with which children appear to assign meaning types suggests that they make certain assumptions about what words can mean. That is, they seem to draw on certain working assumptions as they make an initial mapping between meaning and form. For example, where they have no label yet for an object, they act as if a newly identified label must pick out the whole object and not just a part of it. Yet later on, when they hear further potential labels, they readily give up such an assumption and instead assign such meanings as 'superordinate term,' 'subordinate term,' 'property,' or 'state,' depending on the circumstances. Their notional categories, then, play a central role in lexical acquisition by providing potential meanings when children first try to create a meaning to map onto some newly identified form. How such a mapping is achieved seems to depend on certain assumptions about what words can be used for, the kinds of categories they can denote.

Some candidate assumptions in the mapping of potential meanings to words for objects and activities are listed in Table 1. Some of these assumptions remain unaffected by developmental changes or additions to the lexical repertoire. For instance, the *type assumption* holds as much for adult speakers as for children. Others may be given up early, for instance, the *whole-object assumption*. Others may apply only to objects or only to activities. For instance, the *taxonomic assumption* applies only to categories of objects and hence to terms that denote objects, since it is inconsistent with the nature of categories of actions. Still other assumptions may continue to

TABLE 1 Some Assumptions in the Early Mapping of Meanings[a]

Words for categories of objects:

1. *Whole-object assumption:* Speakers use words to pick out whole objects, not just a part or property of an object.
2. *Type assumption:* Speakers use words to denote types of objects.
3. *Basic-level assumption:* Speakers use words to pick out objects in basic-level categories.
4. *Equal-detail assumption:* Speakers use words to pick out equally detailed instances of object categories from within a single domain.
5. *Taxonomic assumption:* Speakers use words to pick out coherent categories of objects.

Words for categories of actions:

1. *Whole-action assumption:* Speakers use words to pick out whole actions, not just a part of an action.
2. *Type assumption:* Speakers use words to denote types of actions.
3. *Basic-level assumption:* Speakers use words to pick out basic-level action categories.
4. *Equal-detail assumption:* Speakers use words to pick out equally detailed instances of action categories.

[a]From Clark (1993).

apply for adults, but only in a more restricted domain. However, the inventory of such working assumptions, and their interactions with children's existing lexicons and with more general pragmatic principles, has yet to be fully established (Clark, 1993; Markman, 1987; Mervis, 1987).

Children often appear to assign *some* meaning right away to a new word, and to then produce it with that meaning (Carey, 1978; Heibeck & Markman, 1987). Such initial assignments of meaning have been called "fast mapping." As soon as children identify a possible meaning, a word can enter their repertoire and be available for use. But it may take them years to add to and adjust that initial meaning before it corresponds to the conventional meaning in use among adults. Reliance on fast mapping and a willingness to use newly acquired words mean that children do not wait until they are sure of the adult meaning before they try to use words. They simply call on and use whatever seems appropriate from their repertoires. Since there is no overt signal to inform children that they have acquired the conventional meaning, this strategy of immediate use helps children to build an extensive vocabulary at a rapid rate.

C. Pragmatic Principles

Speakers of a language rely on a large number of tacit agreements every day, agreements about which form conventionally conveys which meaning (see Clark and Bly, Chapter 11, this volume). That is, all the speakers within a particular speech community agree, for example, that *beech* designates a particular kind of tree and that *cat* designates a particular kind of mammal.

So, in speaking to each other, they observe the principle of conventionality (Clark, 1993), namely:

> "For certain meanings, there is a form that speakers expect to be used in the language community."

Different communities may have different conventions. For example, speakers of French will use *hêtre* in lieu of English *beech,* and *chat* in lieu of *cat.* In effect, each language community has its own set of conventions. The principle of conventionality captures the general nature of the agreements that hold among speakers over time, so they can count on consistency of use from one occasion to the next.

When speakers choose a form to express a particular meaning, they do so because they mean something that they would not have meant had they chosen some other expression. They rely, then, on the fact that different forms have different meanings. Along with conventionality, speakers assume the principle of contrast:

> "Speakers take every difference in form to mark a difference in meaning."

In other words, speakers do not tolerate any full synonyms. But they do tolerate multiple meanings being conventionally carried by one form. These two principles, conventionality and contrast, allow speakers to maintain language as a system of communication over time, and to maximize its usefulness by excluding total overlaps in meaning (full or true synonyms). Speaker choices of forms, then, mean what they do in part because they contrast with other options in the same semantic domain and in the language at large (see Clark, 1987, 1990).

For speakers of any language, these pragmatic principles have the following general consequences:

1. Words contrast in meaning.
2. Established words have priority.
3. Innovative words fill lexical gaps.

That is, when any new form is introduced into a conversation, the meaning it carries is assumed to contrast with all other forms already in use in the language. Moreover, if some meaning is already conventionally carried by a particular form, that form/meaning combination will take precedence over any lexical innovation that might be coined to carry that very meaning. The presence, then, of a conventional term already *in* the lexicon preempts the coining of a new term with just the same meaning. But when speakers wish to convey some meaning that has no conventional expression, they can do so by coining a new word, provided they make sure their addressees will be able to interpret it as intended.

The same consequences hold for children acquiring a lexicon, but here, there is an additional dimension, since children are starting from a point where nearly every word in the lexicon is unfamiliar. As a result, they do not know, often, whether there is a conventional expression for some meaning or not. But the assumption that different forms differ in meaning allows them to focus on *how,* not *whether,* each new word they encounter differs in meaning from each of the words they already know. Contrast, then, offers considerable economy of effort, since otherwise children would have to establish, for each new expression, that it differed in meaning from all the terms already acquired. When children encounter terms new to them, unfamiliar words, they can therefore assign them to lexical gaps. Equally, when they wish to talk about something for which they lack a conventional expression, they can coin a new word, again to fill a lexical gap. This is just what adults do too, but the difference is that children may coin words for meanings that have conventional expressions. It is just that children have not yet learnt what they are. For children, then, conventionality and contrast have the following consequences:

1. Words contrast in meaning.
2. Established words have priority.
3. New (unfamiliar) words fill lexical gaps.
4. Innovative words fill lexical gaps.

Conventionality and contrast guide the process of acquisition in the sense that they guide children's uses of words. They also constrain the inferences children make about unfamiliar words and about lexical innovations (Clark, 1993). In doing this, these principles also interact with other assumptions children make about potential meanings for word forms during acquisition, but unlike many of these assumptions, conventionality and contrast continue to play a critical role for adult speakers too. Other assumptions may be given up altogether or become restricted in their application as children learn more about the structure of specific domains in the lexicon.

But in order to find the limitations on the assumptions they start out with, children must do two things: they must learn which terms belong to specific semantic domains and what semantic relations link the senses of these words. I turn next, therefore, to the elaboration of semantic domains.

D. Elaborating Semantic Domains

By the time they can produce 50 distinct words, children can talk about several different domains. They have a few words for people (e.g., *mummy, daddy, baby* [used in self-reference]), animals (*dog, cat, bird*), toys (*ball, block, doll*), household objects (*light, clock, telephone*), and utensils (*cup, spoon, bottle*); activities and states (*up, down, on, off, there* [completing an action or

transferring an object]); and a number of routines also involving activities of some kind (*night-night, upsy-daisy, peek-a-boo*) (e.g., Clark, 1978, 1979; Dromi, 1987; Nelson, 1973). Children rapidly add new words to these early domains, extending and elaborating the distinctions they can make. Each early domain is essentially expanded and subdivided as children add more words.

The typical course of elaboration within a domain (here, terms for animals) is illustrated for one child in Table 2. In the first six months of production, children may accumulate several terms for domestic animals, a word like *bird, duck,* or *chicken,* typically applied to birds in general, and one or two terms for wild animals. Over the next 12–18 months, they may add many more terms for both domestic and wild animals; they add a good many terms for birds and for reptiles, and some terms for insects. By age 2, the domain for animals can be organized into several subdomains (see Clark, 1995).

E. Lexical Innovations

Children also expand their lexicon quite readily by coining new words. But for this, they need to analyze the internal structure of words they already know. They need to be able to identify the roots present in compound

TABLE 2 Animal Terms in One Child's Speech[a]

The first six months of production (1;0,29–1;6,0)
1;0,29 doggie, 1;1,15 dog, 1;1,26 bear 1;3,3 mouse, 1;3,23 cat, 1;4,28 horse
1;2,0 bird, 1;3,0 duck, −1;4 chicken
1;5,6 turtle

The next six months of production (1;6,1–1;11,30)
1;6,13 cow, 1;6,28 rabbit, 1;11,30 goat
1;7,19 lion, 1;8,8 alligator, 1;11,16 gorilla, 1;10,24 seal
1;7,2 goose
1;6,4 fish, 1;8,7 frog, 1;8,8 snake, 1;8,22 crab, 1;10,19 ladybug
1;7,20 animal

Elaborations in the second year of production (2;0–3;0)
2;0,8 puppy-dog <toy>, 2;2,24 baby-rabbit, 2;5,21 mummy-bunny <toy>, 2;7,27 sheep, 2;11,1 cattle, 2;11,1 baby-cattle, 2;11,1 daddy-cattles, 2;11,3 bronco-horse, 2;11,10 bucking-horse
2;0,6 gorilla, 2;0,11 hippo, 2;1,7 camel, 2;4,10 baboon, 2;4,16 tiger, 2;5,21 monkey, 2;7,15 wolf, 2;7,15 raccoon, 2;8,8 armadillo, 2;8,8 fox, 2;8,17 beaver
2;3,21 stork, 2;3,21 ostrich, 2;4,6 robin, 2;4,17 sparrow, 2;4,19 flamingo, 2;4,20 dove, 2;5,10 grouse, 2;5,14 woodpecker, 2;8,6 owl
2;5,1 trout, 2;5,4 flounder, 2;5,6 spider, 2;5,6 grasshopper, 2;7,2 fly, 2;7,2 bee, 2;8,14 butterfly, 2;9,21 lizard-animal <live>, 2;9,21 frog-animal <live>

[a]From E.V. Clark (unpublished diary data). This table includes only terms for animals, and not terms for parts or properties, or verbs for animal activities also acquired during this period.

nouns like *head-light* or *push-chair,* for example, and the root–affix combinations in words like *walker* (*walk, -er*) or *moving-van* (*move, -ing, van*). In fact, children make spontaneous analyses of complex words from an early age, and can pick out roots inside such words, as shown in Table 3. Once they have a repertoire of roots and affixes, and some knowledge of how these are combined in conventional lexical items, children are in a position to coin new words when the need arises.

They coin new nouns, new verbs, and new adjectives. The earliest nouns they coin in English appear around age 2 and are compound in form, usually constructed from two noun roots, as in *crow-bird* (picture of a bird, 1;7), *oil-spoon* (spoon for cod-liver oil, 1;11), *coffee-churn* (coffee grinder, 2;0), or *butterfly-shirt* (T-shirt with butterflies on it, 2;5,14). Between age 2 and 3, they also begin to produce a few derivational suffixes in new nouns, as in *You're the sworder* (role in pretend play, 2;4) or *That is a climber against the wall* (a ladder, 2;5,24). Their new verbs are all formed through conversion or

TABLE 3 Some Spontaneous Analyses of Word Forms[a]

(1) Mother, pointing at a picture of a ladybug: What's that?
D (2;4,13): *A lady-bug! That like 'lady.'*
(2) D (2;6,20, to his father, about a stick): *This is a running-stick.*
Father: A running-stick?
D: *Yes, because I run with it.*
(3) D (2;9,10): *You know why this is a HIGH-chair? Because it is high.*
(4) Mo: We're going to a place called Sundance.
D (2;11,0): *And you dance there. If there is music, we will dance there.*
(5) D (2;11,28, looking at flowering ice-plants): *What's that called?*
Mo: That's ice-plant.
D: *Does it grow ice?*
(6) D (3;0,4, playing with toy motor-boat; Mo touches the small hatch over the rear locker)
Mo: D'you remember what that little closet is called?
D: *No.*
Mo: A locker.
D: *And what does it lock up inside it?*
(7) D (3;1,10, on the way home, after Fa mentioned the word 'campus'): *A campus is where you go camping!*
(8) D (3;2,15): *Hey, 'golden' begins with 'Goldilocks,' in one of my books!*
(9) D (3;2,16): *Egg-nog comes from egg!*
(10) D (3;2,20, as he climbed into the car, holding both index fingers up to his head): *Do you know what head-lights are?*
Mo: No.
D: They're lights that go on in your head!
(11) D (3;3,3, while dressing): *If you put my underpants on OVER these, they'd be over-pants! Wouldn't that be funny?!*
(12) D (3;4,8 adding Lego blocks to a wall round a 'field' containing a Lego donkey): *These are lockers which lock the donkey up in the farmyard.*

[a]From E.V. Clark (unpublished diary data).

zero derivation (with no suffix), generally from nouns, as in *Don't hair me* (don't brush my hair, 2;4), *I'm lawning* (mowing the lawn, 2;9), or *Make it bell* (make the bell ring, 3;0). And their new adjectives are formed with the suffix *-y*, as in *Too dampy* (too damp, wet, 2;2), *It's bumpy* (describing a door banging, 2;6), or *That looks growly, doesn't it?* (describing a dinosaur drawing, 3;5). Some typical examples of early coinages from English-speaking children are given in Table 4.

In each case, children appear to favor devices that are common in the language and therefore well represented in the conventional words they already know. They also favor options that offer transparent combinations of roots or roots and affixes. That is, familiar roots remain readily recognizable in the new combination. Their earliest coinages make minimal changes in the elements used: new compounds and new verbs both build on bare roots, with no affixes at all. As they get older, they appear to favor those devices that adults also prefer in their coinages. These tendencies, which are also attested for other languages, suggest that children rely on some general principles for constructing new words. First, they make use of transparency of meaning in their construction of new words, building them from elements they already know. Second, they rely on simplicity of form, initially making the least adjustment possible in the forms of their new words. And third, they are sensitive to and track the productivity of each option for forming new words. Simplicity appears particularly important in the earlier stages of acquisition, while productivity mainly affects children's choices later on. Transparency remains important throughout (Clark, 1993; Clark & Berman, 1984; Clark & Cohen, 1984; Clark & Hecht, 1982).

F. Cross-Linguistic Parallels

Children appear to follow a similar course in lexical acquisition, regardless of the language being acquired. Early vocabularies for children acquiring very different languages show extensive overlap in the kinds of things children first acquire words for, and there has been relatively little change over the last century in early vocabularies (Clark, 1979). At the same time, children must become sensitive to the typology of the language being learnt at an early stage. They need to know, in identifying word forms, whether they are acquiring a polysynthetic language like West Greenlandic, where noun and verb bases form the core, modified by affixes, of whole utterances; a synthetic language like Hebrew, with word forms consisting of sequences of consonants, versus one like Spanish, where both vowels and consonants serve to identify word forms, yet where, for both languages, base word forms are modified by inflections expressing multiple meanings simultaneously; an agglutinative language like Turkish or Hungarian, where each derivational or inflectional morpheme adds a single meaning to

TABLE 4 Typical Early Coinages in English[a]

Innovative nouns

(1) D (1;10,10, looking at a man with very curly fair hair: *Bubble-hair.*
(2) D (1;11,28 wanting to be read "Lion in the Meadow"): *read ə lion-book.*[b]
(3) D (2;0,5, told that a friend was getting ready to leave): *Christiane packing ə..ə..ə pack-case.*
(4) D (2;0,11, pointing out a loose piece of tape on a box serving as a 'kennel' for toy puppy-dog): *Eve buy ə tape, mend puppydog-house.*
(5) D (2;1,9, sitting inside an orange crate): *I reading ə book in ə orange-box.*
(6) D (2;2,0, describing small and large sieves in the sink): *That ə tea-sieve.* (then pointing at the large one for vegetables): *That ə water-sieve.*
(7) D (2;3,17, having constructed a Lego house with two trees inside)
Father: What kind of house is that?
D: *A Christmas-tree-house.*
(8) D (2;5,26, as he reached across the kitchen counter): *I'm a big reacher.*

Innovative verbs

(9) D (2;4,13, grinding pepper onto the counter): *I'm sanding.* [= making x into sand]
(10) D (2;6,23, showing Fa two pencils): *I sharped them.* [= sharpen]
(11) D (2;8,4, with some sleep in one eye): *I have my window open so that sleep can wind away.* [= blow away, via the wind]
(12) D (2;8,20, to Mo holding hose in the garden): *an' water the dirt off my stick.* [= wash off with water]
(13) D (2;10,23, holding hand extended, palm down): *Straight your hand out like this and let me hit it.* [= straighten]
(14) D (2;11,29, pretending to be in a canoe): *I'm going to lie down under the blanket and then I'll oar.* [= row]
(15) D (3;1,6, taking stick Mo has been carrying): *Let me stick it hard.* [= touch firmly, hit, with the stick]
(16) D (3;2,9, picking up Cuisinart blade from the sink)
Mother: You shouldn't take that. It's very sharp.
D: *But I didn't blade myself.* [= cut with the blade]

Innovative adjectives

(17) D (2;5,23, as Fa closed the car trunk): *It makes me windy.* [= blown by the wind]
(18) D (2;6,13, watching Mo cook strips of veal): *These are floured.* [= covered in flour]
(19) D (2;6,22, describing wet newspaper): *It's all soaky. The paper is soaky.* [= soaked]
(20) D (2;7,5, driving home in the dark): *It's very nighty.* [= dark]
(21) D (2;10,23, looking at remains of a house wall built of stone): *There's a rocky house.* [= made/built of rocks]
(22) D (3;1,1, objecting as Mo removed a dieffenbachia stem): *No, it's not poisony.* [= poisonous]
(23) D (3;2,23, describing a sandwich): *I want it all crusty.* [= with crusts on]
(24) D (3;6,22, looking at a rabbit-stamp on the back of his hand): *Hey, d'you know what happens if you rub this? It'll get . . .*
Mo: Faint?
D: *Fainted.* [= faint, faded]

[a]From Clark (1993, unpublished diary data).

[b]The schwa (ə) represents the indeterminate vowel D used as a filler at this stage for various grammatical morphemes. He later replaced it by *the* or *a*, as appropriate.

the base word; or an analytic language like Mandarin Chinese, with no inflections, only distinct words, to mark particular modulations of meanings.

How children analyze existing words and build paradigms of forms related in meaning depends critically on their being able to identify candidate words. This in turn depends on their becoming sensitive to the characteristic structures at word- and sentence-level in their language. Evidence that they begin to take account of typological features at an early age (around 2 onwards) comes from their use of novel word formation. Children appear to be sensitive both to general structural features such as prefixing versus suffixing and to the relative productivity of options for new word formation. This sensitivity to distributional properties shows up in their propensity to pick up the more widespread and more frequent options first. In word formation, in their earliest coinages, children consistently favor options that are among the most productive and hence the most frequent in adult speech. This is apparent, for instance, in children's reliance initially on single suffixes to express such meanings as agentivity (e.g., Polish *-acz*), state (e.g., Russian *-ost'*), or activity (e.g., English zero derivation of verbs from nouns) (e.g., Chmura-Klekotowa, 1971; Clark, 1993; MacWhinney, 1976). Moreover, children acquiring languages such as French or Hebrew, where compounding is not productive, do not use it at all in early coinages. This is in marked contrast to children acquiring English or German, for example, who produce novel compound nouns from age 2 or younger (Clark, 1993).

Other factors also play an important role as children identify and begin to construct word forms to convey new meanings. For example, in the earlier stages of acquiring a language, children attend to the simplicity of the form required and prefer forms that require few or no changes over forms that require more extensive adjustments. They are also attentive to transparency of meaning in that they depend only on those resources that are already known to them, and hence transparent. Where only stems are transparent but not yet any suffixes, they will rely only on stems, provided the language in question has compounding as an option. Once children acquire the meanings of some affixes, they will begin to use those too. But mapping the meanings of affixes takes time, so for languages that depend on derivation rather than compounding, children may only begin to construct new words in any numbers from age 3 to 4 onwards (Clark, 1993). These factors, together with productivity, conventionality, and contrast, play a major role in children's acquisition and use of word formation.

G. Input and Lexical Acquisition

In attending to the typology of the language they are learning, children necessarily attend to their major source of information, the language input

they receive from the adults around them. This input not only provides typological information, but also information about contexts of use for different forms. For example, events that involve motion may receive rather different packaging in different languages. In English, verbs of motion often include information about manner or cause (as in *walk, stroll, stagger, run*) and add information about path by means of particles and prepositional phrases (e.g., *run away, walk up the hill, stroll across the road*). In Spanish, motion verbs include path information (as in *salir* 'go–out,' *subir* 'go–up,' *poner* 'put–on,' *juntar* 'put–together,' or *meter* 'put–in') and add information about manner through adverbs, adverbial phrases, or participles, as in *la botella entró en la cueva flotando* 'the bottle went-into the cave floating = the bottle floated into the cave' (Talmy, 1985). English and Spanish exhibit the same typological patterns in both transitive and intransitive actions, that is, caused motion and spontaneous motion. Some languages do make a distinction here. Korean, for example, combines motion and path within one word, just as Spanish does, for caused motion (transitive verbs), but for spontaneous motion (intransitive verbs), it relies on separate elements for motion, path, and manner.

In talking about motion events, children appear to be sensitive to differences across languages in whether path is combined with motion or not, and also, to whether a motion is caused or spontaneous. That is, in English, children aged 14–28 months make extensive use of particles and prepositional phrases to mark the path of caused motion, while in Korean, children the same age rely on verbs alone. In English, children rely on the same patterns for spontaneous motion too, while in Korean, they use different verbs for spontaneous versus caused motion. As a result, Korean children distinguish linguistically, from an early age, between transitive and intransitive motion events (Choi & Bowerman, 1991).

Some research has suggested that children learn nouns before verbs. That is, in their early production vocabularies, they often have more nouns than verbs (Gentner, 1982). The explanation offered is that the relational nature of verbs and their linkage to one or more nouns makes them more complex for acquisition. But when other relational terms (e.g., English particles like *up* or *off*) and words for routines (e.g., *peek-a-boo, upsy-daisy,* or *uh-oh*) are counted along with lexical verbs, the asymmetry becomes less striking (e.g., Bloom, Tinker, & Margulis, 1993). In fact, the proportions probably depend largely on the input children hear. For example, Korean-speaking children may acquire proportionately more verbs at an early age than English-speakers (Choi & Gopnik, 1993), but still learn more nouns than verbs early on (Au, Dapretto, & Song, 1994).

Input also plays a role with respect to the argument structure and complement types first exemplified by children for specific verbs. De Villiers (1985) found high correlations between the range of constructions used with verbs in the input and the range each child produced, but lower correlations

across the three children she studied. That is, individual parental input played an important role in exposing each child to the possible constructions associated with different verbs. If verbs and their associated constructions are so closely linked in acquisition, this would suggest that the line between what is lexical and what is syntactic or constructional is not always an easy one to draw. Moreover, it is important to remember that what children understand and therefore have stored in memory often far surpasses what they produce, both in the earlier stages of acquisition (e.g., Goldin-Meadow, Seligman, & Gelman, 1976) and later, even in adulthood (e.g., Clark & Hecht, 1983).

In summary, building up a repertoire of words is critical to the task of acquiring a language. Children produce their first words at 12–18 months, and may have a vocabulary of up to 600 words by the age of 2. But what they can produce may lag far behind what they understand, especially during the earlier stages of acquisition. Children rely both on their ontological categories and on input as they assign meanings to new words. Conceptual categories and organization offer a base onto which they can map words, and the input that they hear shapes and constrains the precise mapping made for each word. But words are rarely used by adults in isolation, on their own. They are combined with other words to express additional meanings, meanings that, together, are more than the sum of the parts.

III. EARLY SYNTAX

When do children start to combine words in production? The answer varies with the child. Some appear to go through a distinct one-word stage lasting several months, while others begin to combine words within weeks of producing their first single word utterance (Clark, 1993; Dromi, 1987; Peters & Menn, 1993). This variation across children, along with marked individual differences in articulatory skill in the first year of talking, suggest that motor skill in producing words may be a major factor in determining when children start to produce more than one word at a time. Some children also go through a distinct two-word stage before attempting longer combinations. Once children combine words, though, we can attribute to them some knowledge of syntactic structure, and hence of the meanings contributed by specific patterns of combination. It is only with the emergence of systematic word combinations, together with reliance on such factors as word order and morphological marking of case and agreement for person and number, that they can be credited with some mastery of the syntactic constructions of their first language.

Children's earliest word combinations typically consist of two words, though most quickly move on to produce longer sequences as well. Some may take time to build up a repertoire of two-word combinations, relying at

first on a small number of fixed patterns. For example, they may combine a variety of terms with *more,* as in *More milk* (glossable as 'I'd like some milk' or 'I'd like some more milk'), *More shoe* ('there's another shoe'), *More read* ('read me another book'), and so on. Many children appear to rely on certain fixed patterns such as this alongside combinations that appear much freer. What is striking, though, is that the kinds of relations expressed in early combinations appear very similar in meaning across languages. Children learning English, Finish, Hebrew, and Samoan appear to express the same kinds of meanings with their earliest word combinations (see Braine, 1976; Slobin, 1970). Some typical early combination types are illustrated for English in Table 5. From these it can be seen that children talk about the names and places for objects, about possessors, about properties, about events, and about what they do and do not want.

But any analysis of early combinations must depend heavily on the context of each utterance. An utterance like *Mommy sock* may be used to indicate possession on one occasion ('That's Mommy's sock') and agency on another ('Mommy's putting on a/my sock') (see Bloom, 1971). In a language like English, early combinations lack all grammatical information in the shape of case marking (e.g., *I* vs. *me*) or agreement between subject and verb (e.g., *He runs* vs. *They run*). Moreover, word order is often determined pragmatically rather than grammatically.[2] It often marks information as "given" versus "new" and so depends on what has just been talked about by the preceding speaker (e.g., Bates, 1976). Word order and inflections to mark agreement typically emerge in English only after children have begun to combine words, and it is only then that one can with certainty identify particular noun phrases as the subjects or objects of verbs (Bowerman, 1973).

In English, children begin to add noun and verb inflections between 1;6 and 2;0, although their general use may not meet adult criteria for many months (Brown, 1973).[3] In adding inflections, children appear attentive to the inherent meanings of the relevant terms, whether nouns (e.g., Mervis &

TABLE 5 Common Early Word-Combination Types[a]

Locate:	*baby high chair* *there book*	Desire:	*more milk* *want ball*
Label:	*that car* *see doggie*	Negate:	*no wet* *allgone milk*
Possess:	*baby shoe* *mama dress*	Question:	*where ball?*
Event:	*hit ball* *block fall*	Quality:	*big boat*

[a]From Slobin (1970).

Johnson, 1991) or verbs (e.g., Bloom, Lifter, & Hafitz, 1980; Clark, 1993). Their patterns of acquisition offer further evidence that children begin with a certain amount of word-by-word learning before they generalize to whole syntactic classes and hence to unfamiliar members of the syntactic class 'noun' or 'proper noun,' say. But in the course of learning, children also make certain generalizations, and, as a result, make consistent errors on irregular forms. They produce *mans* for plural *men, feets* or *foots*[4] for plural *feet,* and past tense forms like *comed, bringed, seed,* and *throwed* in place of (irregular) *came, brought, saw,* and *threw* (Kuczaj, 1977, 1978).

In short, as children elaborate their utterances by combining words, they also elaborate them by adding inflections to their nouns and verbs, and by inserting other grammatical morphemes such as articles and prepositions. Some children may go through a distinct two-word stage,[5] while others quickly move from one word at a time to longer combinations.

A. Semantic Bootstrapping

Adding the appropriate inflections, though, requires that children have already identified the syntactic category of the word in question, as a noun or a verb, for example. Children presumably do this well before they begin to produce inflections. And they do it, it has been suggested, through semantic bootstrapping. That is, although grammatical categories like 'noun' and 'verb' are not defined semantically, nouns and verbs typically refer to distinct semantic types in parental speech. People and objects are picked out by nouns; activities and changes of state by verbs; and properties of objects by adjectives. And adults talk about objects, actions, and properties when they talk to small children. When they use a verb, therefore, they do so with the relevant elements that belong with that word class. Verbs are accompanied by verb inflections (e.g., *he climbs, they are climbing, you climbed*) and nouns by noun inflections (e.g., *a kitten, three kittens, the kitten's tail*). Adult input is therefore consistent with a correlation of conceptual category (object, action, property) and word class (noun, verb, adjective), and thereby offers children a way in to the syntax of their first language.

If children assume different word classes on the basis of their meaning-to-form mappings of ontological types, they should be able to bootstrap their way into the syntactic categories needed for organizing words at the level of the clause. Once they have a basic framework of meaning-based information about possible word classes and the words that belong to them, they can learn more about what else belongs in each class by observing their distribution and identifying other properties. Such semantic bootstrapping, it has been argued, is critical to the acquisition of syntax (Grimshaw, 1981; Macnamara, 1972; Maratsos, 1990; Pinker, 1984, 1989).

To identify all the properties of a syntactic category may take time. With verbs, for example, children need to learn which inflections mark distinctions of aspect, tense, number, person, and gender, as well as any markers for such features as transitivity, finiteness, and specificity. The number of such distinctions varies with different languages. With nouns, children will need to identify inflections for such categories as case, number, and gender.

Children appear to attend to and exploit clues to word class quite early. Before age 2, English-speaking children attend to the difference between common and proper nouns (e.g., Gelman & Taylor, 1984; Katz, Baker, & Macnamara, 1974). Also around 2, they distinguish nouns and adjectives (Taylor & Gelman, 1988), and begin to attend to the difference between count and mass nouns (Gordon, 1985; Soja, Carey, & Spelke, 1991). They are also able to distinguish verbs and nouns. Here, their knowledge of specific inflections and inflectional paradigms presumably plays a role in assigning unfamiliar terms to the categories of 'noun' or 'verb,' thereby endowing them with some initial meaning (see Brown, 1957; Dockrell & McShane, 1990; Gleitman, 1990).

In summary, once children discover the correlation between their conceptual categories of objects, actions, and categories, and the relevant syntactic word classes, they can use properties of those word classes to increase their repertoires. New verbs will have the same inflectional properties as familiar ones, and new nouns the inflectional properties of familiar nouns. Once children have bootstrapped their way into the system, they can use both semantic and syntactic information to advance further along the road to mastering syntax.

B. Clause Structure

Children must go beyond identifying words as nouns or verbs if they are to learn the syntax of their language. They must learn which verbs occur with which configurations of arguments: whether a verb requires a subject and an object (e.g., *hit,* as in *Jan hit the ball* but not **Jan hit* or **The ball hit*), or only a subject (e.g., *skip,* as in *Jan skipped,* but **Jan skipped the road*). They must learn which kind of argument belongs in each slot (an agent, instrument, place, etc.). And they must learn the meaning conveyed by each verb frame or construction, that is, by the set of argument types. In fact, children appear to monitor the patterns of use associated with individual verbs in the input they hear. Maternal variety of use, the range of constructions used with each verb, is the best predictor of young children's own verb uses (de Villiers, 1985). This in turn suggests that children learn verbs one by one, perhaps in relative isolation from each other. That is, they do not initially make generalizations about structure or argument configurations, but rather gradually add to the structures associated with each separate verb (Tomasello, 1992; see also Kuczaj, 1982; Maratsos, 1983).

At some point, though, children must be able to make certain generalizations about possible argument structures. First, even where they have received little or no direct information about argument structure, children are willing to use a newly heard verb with an intransitive or transitive frame, depending on the prior discourse context (Braine, Brody, Fisch, Weisberger, & Blum, 1990). Second, children coin new verbs from nouns and adjectives from as young as 2 to 2½ years. And in doing so, they assign argument frames consistent with the meaning intended (Bowerman, 1974; Clark, 1982; Maratsos, Gudeman, Gerard-Ngo, & DeHart, 1987). To do this, they must have set up some representation of the relevant verb frames for the expression of specific meaning types.

Some verbs are used with two distinct frames or configurations of arguments. They alternate, depending on which perspective the speaker chooses in representing an event. Compare the uses of a verb like *load* in *They loaded the cart with hay* and *They loaded hay into the cart*. While this locative verb alternates, others allow only one perspective. Children take some time to learn, for each verb, which configuration of arguments is the conventional one, and whether each verb can alternate. They make such errors as *I'm going to cover a screen over me* (4;5, for 'cover myself with a screen'), *Can I fill some salt into the bear?* (a bear-shaped salt-shaker, 5;0, for 'fill the bear with salt'), and *Feel your hand to that* (6;10, for 'feel that with your hand') (Bowerman, 1982, 1988; Gropen, Pinker, Hollander, & Goldberg, 1991; see also Brinkmann, 1993). Mastering such alternations takes a long time and, for some verbs, is only complete at around age 10 to 12.

Other verbs can appear in either active or passive form, again offering alternative perspectives on the same event. Compare *Ken lit the fire* and *The fire was lit by Ken*. Not all verbs allow the passive alternation. Children learn the passive first for physical action verbs, like *hold*, and only later for mental activity verbs, like *like*. When they produce passives, they construct them with *be* and with *get*, as in *He got hit from his sister*, from around age 2;6 to 3;0, but they may take some time to learn how to mark the Agent of the action, with *by* (e.g., Budwig, 1990; Clark & Carpenter, 1989a, 1989b; Horgan, 1978; Maratsos, Fox, Becker, & Chalkley, 1985). Again, full mastery of the passive and where it can be used takes time, and depends, in the earlier stages, on knowledge about the meanings of specific verbs.

To produce more elaborate utterances, children must master a variety of devices and construction types in order to express different meanings within a clause. For example, to express negation or disagreement, they need to use forms like *not, never, no one, nothing*, and *nowhere*. To ask questions, they need *wh*-words like *what, where, who, when*, and *why*. But these lexical items alone are not enough. Children must also learn how to use them, how to choose both the form that conveys the relevant meaning and the construction that that form demands. In English, for example, the construction of negative and interrogative utterances depends critically on the acquisition of auxiliary verbs. Negatives depend on auxiliaries (e.g., *has* in *Justin hasn't finished lunch*) as do questions (e.g., *did* in *Where did Rod go?*) (e.g., Johnson, 1983; Klima & Bellugi, 1966).

Children also start to use adjuncts to mark present versus nonpresent time quite early on. For example, many 2-year-olds adopt a term like *tomorrow* or *yesterday* to refer to nonpresent times, but do not yet distinguish past from future with adverbs. For sequence in time, 2- and 3-year-olds rely on *and* and *and then*, or bare adverbs like *first* or *before*. Later on, they start to use conjunctions like *before, while, when*, and *after* with a full clause (Clark, 1970, 1971; Coker, 1978; Decroly & Degand, 1913; Harner, 1975, 1976). These forms complement children's emerging mastery of tense marking on verbs (Brown, 1973; see also Gerhardt, 1988).

Children also elaborate the noun phrases they use. They begin to distinguish definite from indefinite (with *the, this*, or *that*, vs. *a*) (Warden, 1976). They use quantifiers like *all, some*, and *every* (Donaldson & Lloyd, 1974; Hanlon, 1988); and they add qualifying adjectives (e.g., *the big dog, the red car*) and prepositional phrases (e.g., *the man with a hat*) to distinguish particular individuals (e.g., Tager-Flusberg, 1982). In short, once children begin to combine words, they steadily elaborate on the meanings they express. And they do this by adding words and constructions to their initial repertoires.

C. Embedding

Children also begin very early to combine what for adults would be separate clauses. Such clause combinations may be hard to detect prior to production of the relevant conjunctions or complementizers. Take an utterance like *Get down, cart* (1;8,12). This was produced on an occasion when the child wanted to climb down from his highchair in order to go and fetch his toy cart from the next room. Had he said, *I'm getting down to fetch my cart*, we would have no hesitation in crediting him with a complete utterance consisting of a main clause ('I'm getting down') and an embedded complement ('to get my cart'). But without the pertinent grammatical markers, complementizers (*to, for, that*), relative pronouns (*who, that, which*), or conjunctions (*when, before, if, because*), it may be hard to discern the antecedents to such constructions in children's early combinations of two or more predicates.

Relative clauses appear first with no relative pronoun, and may be used first only with empty nouns such as *thing, ones*, or *kind*, as in *Look the ones Mommy got* (2;9). Only after this, according to Limber (1973), do children produce relative clauses attached to full nouns like *book* or *ball*, as in *Here the ball that I got* (2;11) (see also Hamburger & Crain, 1982). But even the earliest spontaneous relative clauses may be attached to nouns with some content, as in the early examples shown in Table 6. Relative pronouns like *that, who*, or *which*, though, rarely appear before age 2½ or even 3.

Children also begin to talk about sequences of events, often well before

TABLE 6 Some Early Relative Clauses[a]

(1) D (1;11,22, showing off a cookie he'd been given): *Look I got!*
(2) D (2;0,0): *I see ə building Eve go.*
(3) D (2;0,1, picking up his doll): *Here ə doll Shelli give Damon.*
(4) D (2;0,6, reading Jersey Zoo book, at the page with a map): *That ə map gorilla live.*
(5) D (2;0,9): *Herb work ə big building have ə elevator 'n it.*
(6) D (2;0,14, looking at a picture in a book): *That ə birdhouse ə bird lives.*
(7) D (2;0,9, after discussion of his birthday a month earlier, but no mention of Shelli): *Where Shelli gave ə doll ə Damon?*
(8) D (2;1,30; after talking about the dark, D brought up something he'd seen the evening before): *I see swimmingpool have lights on.*
(9) D (2;2,5, after deciding he'd heard a truck, not a car, outside): *I go outside see ə truck may have dirt in it.*
(10) D (2;2,16, D looking for his thimble that he'd mislaid)
Mother: Where did you have your thimble?
D: *I leave it over there where I eat supper.*
(11) D (2;4,19, speaking of a toy): *I'm going to show you where Mr Lion is.*
(12) D (2;5,16, touching a wet spot on the front of the newspaper): *That paper what Eve got fell into a tiny puddle.*

[a]From D.V. Clark (unpublished diary data).

age 2. At first, they indicate sequence linguistically by order of mention alone. That is, they describe successive actions with no explicit links between them. Then, between age 2 and 3, after starting to use terms like *and* and *and then* to link sequences of events, they begin to use a variety of conjunctions to mark the relevant sequential relations. These include *when, before, after, if,* and *because.* (Conjunctions marking simultaneity, such as *while* or *as,* tend to emerge only later.)

In producing a conjunction to mark temporal sequence, children must take account of the actual sequence in time, the meaning of the conjunction, and the prior discourse. Children and adults alike tend to reflect actual time order in their descriptions of sequence, and the meaning of the conjunction will then affect its placement, whether it introduces the first or second clause of the utterance. The structure of the preceding discourse determines which event is talked about first, independent of its actual place in the sequence (Clark, 1970). The first temporal conjunction to be produced is *when.* It can indicate general location in time ('time at which') or sequence ('when/after event-1'), and is often indeterminate between the two. Some typical examples of early utterances that mark sequence in time, mostly with *when,* are listed in Table 7. Notice that although the conjunction is omitted in utterances (1)–(5) of Table 7, the child's order of mention reflects the actual order of the events. Sequences can also be indicated by terms like *once,* as in (10), *first . . . then,* or *next.*

Young children also talk from early on about events that are contingent on each other, linked not only in time but also by causality or conditionality. And the relevant conjunctions, *because* and *if,* emerge at about the same time as the various temporal connectives. Just as for temporal relations, children first imply contingency by simple juxtaposition, as when K (2;4) was climbing into her crib; *Climb in. Be fun.* She then toppled in, laughing. The same child, on top of the jungle gym with a sheet draped over it, pointed to the sheet and said: *Sit here. Fall down* (2;4).[6] Children then begin to mark sequence with subordinate clauses, and in particular to use predictive *when* clauses, as when L (2;6) said *When I go to Grammy's, I'll eat with my fingers.* They soon go on to produce an early form of generic utterance, as in the generalization in (1):

(1) Adult: What are umbrellas for?
L (2;7): *When rain comes, we put an umbrella on top of us.*

This is followed shortly by production of *if,* as in (2) and (3):

(2) Adult: Laurie, what if your baby cries?
L (2;8, putting doll in cradle): *Wants Mommy if her cry.*
Adult: What sweetheart?
L: *Cries. Want Mamma.*
(two turns later)
L: *Her cry if her want me.*

TABLE 7 Some Early Temporal Clauses[a]

(1) D (1;11,16, alluding to the morning before when his Fa had gone running very early): *Damon sad Herb go ə walk, say byebye.*
(2) D (2;0,18, to Fa who had just been picked up in the car): *I get out Eve stops.*
(3) D (2;1,11): *I get bigger, I have tea.*
(4) D (2;1,23, sitting in his car seat): *I get out!*
Mother: Not yet!
D: *Get home, get out.*
Mo: Yes. Then you'll get out.
(5) D (2;2,19, fantasizing): *You get a tiny baby, and I get bigger, I carry you back home.*
(6) D (2;4,26, at breakfast, to Fa): *The toast make a noise when you put butter on.*
(7) D (2;4,26, playing with the light switch on the door of the lower oven): *When I press this button, the light goes off.*
(8) D (2;5,3, as he was being put down for a nap): *When you close the door, then I can kick all my blankets off.*
(9) D (2;5,17, shaking a rattle Mo had bought as a present): *When I was a little baby, I used ə do that. And then I drop it down.*
(10) D (2;6,18, after putting the book *Henny Penny* on the table): *Once I get up, I'm going to show you Foxy Loxy an' ə crown.*
(11) D (2;6,20, picking up a stick he used for drumming): *This makes my knuckle don't hurt when I run.*
(12) D (2;6,22): *I going ə bring this pile of books to the table, after I aten my supper, then I can read them.*
(13) D (2;6,27): *You wear gloves when it's snowy-time.*

[a]From E.V. Clark (unpublished diary data).

(3) K (2;10, has hurt her eye)
Adult: How does your eye feel?
K (with her finger in her eye): *If I touch it, it hurts.*

Only after this do children produce hypothetical conditionals, as in the following utterances:

(4) R (2;10): *If Bulldozer-man saw a fire, he would call the fire department.*
(5) Adult: Molly, what if you ate three chocolate cakes?
M (3;6): *You would have a tummy ache.*

And by this point too, children appear to be aware that *if,* but not *when,* is the appropriate choice for hypothetical situations, as indicated by the first repair in G's utterance (3;10): *When I was <repair> if I was a tiger, I would cook pa* <repair> *popcorn* (Reilly, 1986). English-speaking children produce future predictives with *when* before those with *if.* The choice between the two conjunctions depends on the certainty of the antecedent event: certain events take *when,* uncertain ones *if.* In an analysis of three children's uses, Bowerman (1986) noted that English-speaking children appear to appreciate the relevance of certainty to conjunction choice from their first uses on. Where they have no basis for projecting how certain the event is, they always choose *if,* as in the following utterance from D:

(6) D (2;8,5, sitting in the bath): *If I get my graham cracker in the water, it'll get all soapy.*

Children go through several stages in the production of conditional clauses as they learn where *when* and *if* do and do not overlap, and as they come to understand hypothetical conditionals (Bowerman, 1986; Reilly, 1986).

Children also begin to use infinitival complement structures between age 2 and 3. When they learn *to* in such constructions as *He wants to go out,* they do not learn it as a general infinitive marker for *go out,* the verb in the complement. Rather, they learn that it can go with certain main or matrix verbs such as *want* or *go.* The earliest matrix verbs acquired are *want, go, get/got,* and *have.* Children typically omit the *to* altogether at first and then begin to use [ə] (the neutral vowel, schwa) as a place-holder for it, as in an utterance like *She wants ə get it.* The schwa is gradually replaced by *to* with the first matrix verbs acquired, *want* and *go.* From then on, *to* is used from the start with each newly acquired matrix verb, *like, be supposed, need, start, show how,* and so on (Bloom, Tackeff, & Lahey, 1984). Here, then, each specific lexical item being learnt, the matrix verb, becomes associated in turn with the *to* that introduces the complement.

Finally, complements generally take as their subject the nearest preceding noun phrase. In *Rod wanted Kate to read the book, Kate* is the subject of *read;* in *Rod would like to read the book, Rod* is the subject of *read.* But the nearest noun phrase is not always the subject of the verb in the complement. Consider the verb *to promise.* In *Justin promised Ned to turn a somersault,* the person turning the somersault is Justin, not Ned, even though *Ned* appears in the noun phrase nearest the complement. The meanings of complement verbs like *promise* take children many years to master (Chomsky, 1969; Kessel, 1970).

D. Form and Function

As children acquire the meanings of words and constructions, they must also learn how each element is used. But because they do not begin with full adult knowledge of the conventions, they may assign nonconventional meanings and also use terms in ways that diverge considerably from adult usage. Knowing the meaning of an expression does not automatically reveal how it should be used. For example, in choosing *statesman* versus *politician,* a speaker can convey regard and respect with the former that are absent with the latter. In using *tassie* versus *cup,* the speaker would show knowledge of the dialects most familiar to addressees from southern Scotland in the first case, and other English-speaking areas in the second. Or in using *policeman* versus *cop,* a speaker would mark the reference as neutral or formal in the first case, and as informal in the second. Each choice is appropriate to different circumstances and different addressees. The lexical choices differ in connotation, in dialect, and in formality. Some constructions also differ along such dimensions. For example, when a speaker makes a request, it may be marked as formal by the construction used, as in the formal *Would you by any chance mind helping me get this gate open?* versus the less formal *Open the gate,* or *Open the gate, will you?*

Learning the distinct functions of forms closely related in meaning is a difficult task. Children may come up with inappropriate hypotheses on the way. For example, some English-speaking children may link forms of the first person pronoun to the notion of agency. *Me* is taken to indicate agency and control on the part of the child, as in *Me throw ball,* said when the ball was in the child's possession, and *I* or *my* to indicate absence of control, as in *I like peas* (Budwig, 1989). Eventually, these children must revise their initial analysis and arrive at the pertinent grammatical distinction, with *I* marking the subject of the verb, and *me* the object. Or to take another example, when children wish to talk about events that have not actually occurred, they often start out by choosing the past tense. That is, they contrast the hypothetical with the actual or present, and then pick the major nonpresent option they have mastered. It is common to hear 3- and 4-year-olds describing what they are going to do in pretend play, for example, in past-tense form, as when a 4-year-old plans some play with a friend and first assigns roles by saying, *I was the mother and you were the baby* (e.g., Kaper, 1980; Lodge, 1979).

In short, children have to work out the conventional meanings of all the forms they hear. They are not given these already analyzed, nor are they presented with any set of relevant grammatical distinctions a priori. Those must be worked out for each word and each construction. Some grammatical paradigms children encounter are much more complex than others, and presumably take longer to acquire. In addition, children should entertain more alternative hypotheses about the members of these paradigms en route to the adult system (Clark, 1990). Constructional idioms also have conventions on their use. Consider the circumstances under which one might use *Mind your head, Break a leg!, Can you pass the salt?,* or *You must have some more cake.* These too have to be learnt.

Children must learn which forms are counted as appropriate on different occasions, to different addressees, to achieve different aims. They clearly realize, from a young age, that not all addressees should receive the same kind of speech. Children as young as 2, for example, use a small, high-pitched voice and very short sentences in talking to and talking for dolls, as well as in talking to babies (Sachs & Devin, 1976). By age 4, children give instructions on how to play with a toy Noah's Ark in very different form to 2-year-olds, other 4-year-olds, and adults. Their choices reflect the knowledge they assume their addressees have, as well as the relative status conferred by age. Requests to 2-year-olds, for instance, are typically imperative in form (e.g., *Put the lamb here*), while those to adults are much less direct (e.g., *D'you think you could put the lamb here?*). In the first case, the 4-year-old speaker has higher status, and in the second, lower status, than the addressee (Shatz & Gelman, 1973). By age 5 or so, children are sensitive not only to the age and status of many addressees, but also to how these are linked to power and sex. In role-playing with puppets, they differentiate request forms, for example, using politer ones to the person with greater power, independent of age. Child-puppets address politer requests to fathers than to mothers (e.g., *Ice cream tastes nice, doesn't it?* versus *I want some ice cream*); nurse-puppets address doctors with politer forms than doctor-puppets use to nurses or patients; and student-puppets use politer forms to teacher-puppets than to fellow students (Andersen, 1990). By age seven, children are well on their way in learning which forms have which functions, and to differentiating some of their usage on the basis of who their addressees are and what they know.

In summary, as children add more complex structures to their repertoires, they often tie new structures to specific lexical items. Complement structures, for example, at first are produced with only or two verbs. Children then add to this repertoire, consistently marking new matrix verbs by a following *to*. With adverbial clauses, children must learn the meanings of particular conjunctions, *when, after, until, if, because,* and learn how their meanings contrast. The same holds for relative clauses where they must distinguish *that, who,* and *which,* in addition to learning the relevant structure for each embedded clause-type. And for each of the forms and constructions learnt, children must also learn the functions. Learning forms, meanings, and functions takes time.

IV. THE PROCESS OF ACQUISITION

Production of language is only part of what is involved in any language use. So data from production alone may give a rather biased picture of what goes on during acquisition. In conversations, we both speak and listen. It may be tempting, therefore, to assume that production and comprehension are symmetrical, and that both rely on the same representations of linguistic information in memory. But in fact, differences between the two processes show up from the first in acquisition and continue to exist for adult speakers. The asymmetry between them, with comprehension leading production, in fact plays a critical role in the acquisition process itself (see also Bock, Chapter 6, this volume).

How are production and comprehension related in acquisition? Comprehension leads production and offers children a critical guide when they come to talk. For example, children typically understand words before they produce them. Young 1-year-olds understand words for up to three or four months before they try to say them; older children understand comparative constructions before they use them themselves; they can also interpret novel word forms before they are able to produce those same forms to coin words. In short, comprehension surpasses production, and does so in both children and adults (Clark, 1993; Clark & Hecht, 1983). Because of this, reliance on production data alone may lead researchers to seriously underestimate what children know. Production data must be supplemented, wherever possible, by comprehension data as well.

For children, the asymmetry between comprehension and production is important to acquisition itself. It allows children to work at their own pace without having to depend on adult speakers producing examples of target forms at just the right moment. The process seems to work as follows. Take the word *cup*. Children first set up a representation for comprehension, a C-representation, of the word form in memory, together with whatever meaning they have attached to it. This C-representation contains auditory information, the sound segments and their ordering, needed for identifying the word *cup*. When children next hear this sequence, they can recognize it as having been heard before and also access their meaning for it. Without a C-representation for comprehension, they would not know whether they had heard *cup* before, nor could they track successive uses in order to refine the meaning attached to it. As children hear further input, of course, they add further C-representations to memory.

Once a form has been stored for comprehension, children can also start trying to produce it. But producing a word so it is recognizable takes a lot of practice, much like any other motor skill. And to produce a word, children have to set up a P-representation, a representation for production. This will contain all the articulatory information needed to produce each word, information about the articulation of sound segments, their sequencing within words, and their relation to syllables and to stress, as well as to neighboring words. In addition, when children try to say a word, they need a target to measure their own effort against. They need some way to check on the adequacy of their P-representation, and hence on how recognizable their utterance is. Children's pronunciations must eventually match those of other speakers in the community.

One way of achieving this is to check their own productions against adult productions of the relevant words. But adults may not be around, or, even if they are, are unlikely to produce the right word just when it is needed. An alternative option for children is to make use of their own C-representations. Although, under this view, these contain no articulatory information, they offer a target against which to check children's productions. The closer the match between the output in production and the C-representation, the better aligned the two are. By checking what they say against their C-representations, children can detect any mismatch between their production and their comprehension.

To do this, children, like adults, must monitor what they say (Levelt, 1983, 1989). That is, they monitor the form they produce and compare it against the relevant C-representation. If it does not match, they identify the parts that do not match and make another attempt. The general process of aligning production with comprehension, then, involves the following steps (Clark, 1993):

1. Children create a C-representation for a word form, x.
2. Children try to create a P-representation for x.
3. Children execute the P-representation and, monitoring their word form, compare the form heard with their own existing C-representation for x.
4. Children then correct the P-representation for x.

The evidence for this general process is extensive. First, children make repairs to their own speech, spontaneously, from a very early age. Their repairs typically move them closer to the adult forms. In recognition tasks, children consistently reject imitations of their own defective pronunciations in favor of the conventional adult versions. Given two forms that they fail to distinguish in production, children nonetheless reliably distinguish them in comprehension. And once they master the pronunciation of a new segment, children add it only to those words where it was omitted previously. These findings strongly support the role of C-representations in the gradual refining of children's productions.

Once children can adjust their P-representations for forms where there was an initial mismatch, they can be said to have aligned their production with the relevant C-representation. The asymmetry between comprehension and production is central to this process of change that is integral to acquisition. Children rely on already-established C-representations when they check on their P-representations. With mismatches, they try to adjust their P-representations. This adjustment may take longer with some forms than others, so interim repairs may be only partly successful. But with constant monitoring, children eventually come to produce adultlike forms. This holds for both words and larger constructions. Such a model offers a general means of accounting for the myriad changes that take place during acquisition.

V. CONCLUSION

In acquisition, the lexicon and syntax are intertwined. Syntax in children's language emerges as part and parcel of their lexical knowledge. Each word carries with it a specification not only of its meaning (or meanings) but also its syntax, the range of constructions in which it can occur. For a noun like *horse,* the range consists of occurrence in noun phrases, typically preceded by an article or demonstrative (*the horse, that horse*), plus an adjective (*that roan horse,*) a quantifier (*two bay horses*), or a combination of these elements (*two of those piebald horses*). For a verb like *want,* the range of syntactic constructions includes occurrence with a direct object noun phrase (*want the cup*), an infinitival complement, with or without a direct object (*want to play chess, want to swim*), and with a *for–to* complement (*want to Jan to stay*). And for adjectives like *uneven* or *erstwhile,* the range of syntactic constructions may include both attributive and predicative uses (as in *the uneven road, the road was uneven*), or only attributive ones (as in *his erstwhile friend*). Children learn not only the meanings of words, but also their syntactic range, along with their internal morphological structure (in the case of complex words), and their phonological shape. To know a word, children need to have represented all four kinds of information about it. This representation may be only for comprehension, as is most likely for terms like *erstwhile, ilk, whilom,* or *distaff.* Or they may have one representation for comprehension and one for production, as is the case for the majority of terms in everyday use.

The importance of the lexicon stems in part from the conventional meanings it expresses, and in part from its role in the combinations of lexical items used to express further meanings. In the latter, the lexicon exemplifies the structure of a language and makes syntax audible, in the same way that

words themselves make morphological structure and phonological shape audible. When one tries to separate out any one of these dimensions, meaning, syntax, morphology, or phonology, it is clear that lexical acquisition provides the crux for language acquisition. Words are central. Word form (morphological structure and phonological shape) emerges early but only in combination with word meaning. Children do not learn forms just for the sake of it. They learn words to use them, to convey their own interests and desires, and to respond to those of others. But words used singly offer only limited options in this regard, and children soon learn how to combine them to convey more complex meanings. In doing this, they add to the basic lexical meanings the meanings conveyed by specific combinatorial options. And in doing so, they learn which options, which syntactic structures, go with each lexical item, and add this information to what they already know about meaning and form. In short, lexical knowledge and syntactic knowledge are interdependent, so they necessarily emerge together in the process of acquiring a language.

Acknowledgment

Preparation of this chapter was supported in part by the Center for the Study of Language and Information, Stanford University.

Endnotes

1. This form would result from (i) inability to produce liquids like /l/ and /r/; (ii) inability to produce consonant clusters like /sk-/ or clusters combined with a glide /skw-/, with a resultant simplification to the stop alone /k/; and (iii) voicing of the initial stop, /g-/ (or nonaspiration to reflect its form in the target cluster), combined with (iv) the common prototypical vowel, with no obstruction of the vocal tract, /a/, to result in the production [ga].
2. There are probably individual differences in which children recognize each of these factors as having a grammatical role. Some children give evidence of not recognizing the grammatical role of word order, for example, until well after the onset of quite elaborate combinations, and after the acquisition of noun and verb inflections. But there has been little detailed study of word order, perhaps because given-new based orders often parallel grammatical (subject-verb-object) ones (see also Braunwald, 1993).
3. In more highly inflected languages, children begin to make use of inflections for case, number, person, and tense rather earlier. See, for example, Aksu-Koç and Slobin (1985), Berman (1985), MacWhinney (1978), and Smoczyńska (1985).
4. The plural form children construct depends, of course, on which stem children pick up on (*foot* or *feet*, say) to begin with. Stem choice also seems to be at work when children choose either *break* or *broke* for the stem of the verb *break*, or *think* or *thought* for the verb *think* (see Clark, 1993, for further discussion).
5. This may also be a reflection of articulatory skill, with these children needing to perfect two-word sequences before they attempt longer ones (but see Gerken, 1991).
6. These utterances from K, as well as the examples from G, L, M, and R, are taken from Reilly (1986).

References

Aksu-Koç, A., & Slobin, D. I. (1985). The acquisition of Turkish. In D. I. Slobin (Ed.), *The crosslinguistic study of language acquisition* (Vol. 1, pp. 839–878). Hillsdale, NJ: Erlbaum.

Andersen, E. S. (1990). *Speaking with style: The sociolinguistic skills of children*. London: Routledge.

Anglin, J. M. (1977). *Word, object, and conceptual development*. New York: Norton.

Au, T. K.-F., Dapretto, M., & Song, Y.-K. (1994). Input vs. constraints: Early word acquisition in Korean and English. *Journal of Memory and Language, 33,* 567–592.

Barrett, M. D. (1986). Early semantic representations and early word usage. In S. A. Kuczaj, II & M. D. Barrett (Eds.), *The development of word meaning: Progress in cognitive development research* (pp. 39-67). Berlin & New York: Springer-Verlag.

Bates, E. (1976). *Language and context*. New York: Academic Press.

Berman, R. A. (1985). The acquisition of Hebrew. In D. I. Slobin (Ed.), *The crosslinguistic study of language acquisition* (Vol. 1, pp. 255–371). Hillsdale, NJ: Erlbaum.

Bloom, L. (1971). Why not pivot grammar? *Journal of Speech and Hearing Disorders, 36,* 40–50.

Bloom, L. (1973). *One word at a time*. The Hague: Mouton.

Bloom, L., Lifter, K., & Hafitz, J. (1980). Semantics of verbs and the development of verb inflections in child language. *Language, 56,* 387–412.

Bloom, L., Tackeff, J., & Lahey, M. (1984). Learning *to* in complement constructions. *Journal of Child Language, 11,* 391–406.

Bloom, L., Tinker, E., & Margulis, C. (1993). The words children learn: Evidence against a noun bias in early vocabularies. *Cognitive Development, 8,* 431–450.

Bowerman, M. (1973). *Early syntactic development: A cross-linguistic study with special reference to Finnish*. Cambridge, UK: Cambridge University Press.

Bowerman, M. (1974). Learning the structure of causative verbs: A study in the relationship of cognitive, semantic, and syntactic development. *Papers & Reports on Child Language Development* (Stanford University), *8,* 142–179.

Bowerman, M. (1982). Reorganizational processes in lexical and syntactic development. In E. Wanner & L. R. Gleitman (Eds.), *Language acquisition: The state of the art* (pp. 319–346). Cambridge, UK: Cambridge University Press.

Bowerman, M. (1986). First steps in acquiring conditionals. In E. C. Traugott, A. ter Meulen, J. S. Reilly, & C. A. Ferguson (Eds.), *On conditionals* (pp. 285–307). Cambridge, UK: Cambridge University Press.

Bowerman, M. (1988). The 'no negative evidence' problem: How do children avoid constructing an overly general grammar? In J. A. Hawkins (Ed.), *Explaining language universals* (pp. 73–101). Oxford: Blackwell.

Braine, M. D. S. (1976). Children's first word combinations. *Monographs of the Society for Research in Child Development, 41* (Serial No. 164).

Braine, M. D. S., Brody, R. E., Fisch, S. M., Weisberger, M. J., & Blum, M. (1990). Can children use a verb without exposure to its argument structure? *Journal of Child Language, 17,* 313–342.

Braunwald, S. (1993, March). *Differences in two sisters' acquisition of first verbs*. Paper presented at the biennial meeting of the Society for Research in Child Development, New Orleans, LA.

Brinkmann, U. (1993). Non-individuation versus affectedness: What licenses the promotion of the prepositional object? In E. V. Clark (Ed.), *Proceedings of the 25th annual Child Language Research Forum* (pp. 158–170). Stanford, CA: CSLI.

Brown, R. (1957). Linguistic determinism and the part of speech. *Journal of Abnormal and Social Psychology, 55,* 1–5.

Brown, R. (1973). *A first language: The early stages*. Cambridge, MA: Harvard University Press.

Budwig, N. (1989). The linguistic marking of agentivity and control in child language. *Journal of Child Language, 16,* 263–284.

Budwig, N. (1990). The linguistic marking of nonprototypical agency: An exploration into children's use of passives. *Linguistics, 28,* 1221–1252.

Carey, S. (1978). The child as word learner. In M. Halle, J. Bresnan, & G. A. Miller (Eds.), *Linguistic theory and psychological reality* (pp. 264–293). Cambridge, MA: MIT Press.

Chmura-Klekotowa, M. (1971). *Neologizmy slowotwórcze w mowie dzieci* [Derivational neologisms in children's speech]. *Prace Filologiczne* (Warsaw), *21,* 99–235.

Choi, S., & Bowerman, M. (1991). Learning to express motion events in English and Korean: The influence of language-specific lexicalization patterns. *Cognition, 41,* 83–121.

Choi, S., & Gopnik, A. (1993). Nouns are not always learned before verbs: An early verb spurt in Korean. In E. V. Clark (Ed.), *Proceedings of the 25th annual meeting of the Child Language Research Forum* (pp. 96–105.) Stanford, CA: CSLI.

Chomsky, C. S. (1969). *The acquisition of syntax in children from 5 to 10.* Cambridge, MA: MIT Press.

Clark, E. V. (1970). How young children describe events in time. In G. B. Flores d'Arcais & W. J. M. Levelt (Eds.), *Advances in psycholinguistics* (pp. 275–284). Amsterdam: North-Holland.

Clark, E. V. (1971). On the acquisition of the meaning of *before* and *after. Journal of Verbal Learning and Verbal Behavior, 10,* 266–275.

Clark, E. V. (1973). What's in a word? On the child's acquisition of semantics in his first language. In T. E. Moore (Ed.), *Cognitive development and the acquisition of language* (pp. 65–110). New York: Academic Press.

Clark, E. V. (1978). Discovering what words can do. In D. Farkas, W. M. Jacobsen, & K. W. Todrys (Eds.), *Papers from parasession on the lexicon* (pp. 34–57). Chicago: Chicago Linguistic Society.

Clark, E. V. (1979). Building a vocabulary: Words for objects, actions, and relations. In P. Fletcher & M. Garman (Eds.), *Language acquisition: Studies in first language development* (pp. 149–160). Cambridge, UK: Cambridge University Press.

Clark, E. V. (1982). The young word-maker: A case study of innovation in the child's lexicon. In E. Wanner & L. R. Gleitman (Eds.), *Language acquisition: The state of the art* (pp. 390–425). Cambridge, UK: Cambridge University Press.

Clark, E. V. (1987). The principle of Contrast: A constraint on language acquisition. In B. MacWhinney (Ed.), *Mechanisms of language acquisition* (pp. 1–33). Hillsdale, NJ: Erlbaum.

Clark, E. V. (1990). On the pragmatics of contrast. *Journal of Child Language, 17,* 417–432.

Clark, E. V. (1993). *The lexicon in acquisition.* Cambridge, UK: Cambridge University Press.

Clark, E. V. (1995). Later lexical development. In P. Fletcher & B. MacWhinney (Eds.), *Handbook on child language* (pp. 393–412). Oxford: Blackwell.

Clark, E. V., & Berman, R. A. (1984). Structure and use in the acquisition of word-formation. *Language, 60,* 547–590.

Clark, E. V., & Carpenter, K. L. (1989a). The notion of source in language acquisition. *Language, 65,* 1–32.

Clark, E. V., & Carpenter, K. L. (1989b). On children's uses of *from, by,* and *with* in oblique noun phrases. *Journal of Child Language, 16,* 349–364.

Clark, E. V., & Cohen, S. R. (1984). Productivity and memory for newly-formed words. *Journal of Child Language, 11,* 611–625.

Clark, E. V., & Hecht, B. F. (1982). Learning to coin agent and instrument nouns. *Cognition, 12,* 1–24.

Clark, E. V., & Hecht, B. F. (1983). Comprehension, production, and language acquisition. *Annual Review of Psychology, 34,* 325–349.

Coker, P. L. (1978). Syntactic and semantic factors in the acquisition of *before* and *after. Journal of Child Language, 5,* 261–277.

Decroly, O., & Degand, J. (1913). Observations relatives au développement de la notion du temps chez une petite fille. *Archives de Psychologie, 13,* 113–161.

de Villiers, J. G. (1985). Learning how to use verbs: Lexical learning and the influence of input. *Journal of Child Language, 12,* 587–595.

Dockrell, J., & McShane, J. (1990). Young children's use of phrase structure and inflectional information in form-class assignments of novel nouns and verbs. *First Language, 10,* 127–140.

Donaldson, M., & Lloyd, P. (1974). Sentences and situations: Children's judgments of match and mismatch. In *Problèmes actuels en psycholinguistique/Current problems in psycholinguistics* (pp. 73–87). Paris: Editions du Centre National de la Recherche Scientifique (Colloques internationaux No. 206).

Dromi, E. (1987). *Early lexical development.* Cambridge, UK: Cambridge University Press.

Ferguson, C. A., Menn, L., & Stoel-Gammon, C. (Eds.). (1992). *Phonological development: Models, research, implications.* Timonium, MD: York Press.

Gelman, S. A., & Taylor, M. (1984). How two-year-old children interpret proper and common names for unfamiliar objects. *Child Development, 55,* 1535–1540.

Gentner, D. (1982). Why nouns are learned before verbs: Linguistic relativity versus natural partitioning. In S. A. Kuczaj, II (Ed.), *Language development: Vol. 2. Language, culture, and cognition* (pp. 301–334). Hillsdale, NJ: Erlbaum.

Gerhardt, J. [Gee]. (1988). From discourse to semantics: The development of verb morphology and forms of self-reference in the speech of a 2-year-old child. *Journal of Child Language, 15,* 337–393.

Gerken, L. (1991). The metrical basis for children's subjectless sentences. *Journal of Memory and Language, 30,* 431–451.

Gleitman, L. R. (1990). The structural sources of verb meanings. *Language Acquisition, 1,* 3–55.

Goldin-Meadow, S., Seligman, M. E. P., & Gelman, R. (1976). Language in the two-year-old. *Cognition, 4,* 189–202.

Gordon, P. (1985). Evaluating the semantic categories hypothesis: The case of the count/mass distinction. *Cognition, 20,* 209–242.

Grimshaw, J. (1981). Form, function, and the language acquisition device. In C. L. Baker & J. J. McCarthy (Eds.), *The logical problem of language acquisition* (pp. 165–182). Cambridge, MA: MIT Press.

Gropen, J., Pinker, S., Hollander, M., & Goldberg, R. (1991). Syntax and semantics in the acquisition of locative verbs. *Journal of Child Language, 18,* 115–151.

Hamburger, H., & Crain, S. (1982). Relative acquisition. In S. A. Kuczaj, II (Ed.), *Language development: Vol. 1. Syntax and semantics* (pp. 245–273). Hillsdale, NJ: Erlbaum.

Hanlon, C. (1988). The emergence of set-relational quantifiers in early childhood. In F. S. Kessel (Ed.), *The development of language and language researchers* (pp. 65–78). Hillsdale, NJ: Erlbaum.

Harner, L. (1975). *Yesterday and tomorrow:* Development of early understanding of the terms. *Developmental Psychology, 11,* 864–865.

Harner, L. (1976). Children's understanding of linguistic reference to past and future. *Journal of Psycholinguistic Research, 5,* 65–84.

Heibeck, T. H., & Markman, E. M. (1987). Word learning in children: An examination of fast mapping. *Child Development, 58,* 1021–1034.

Horgan, D. (1978). The development of the full passive. *Journal of Child Language, 5,* 65–80.

Huttenlocher, J., & Smiley, P. (1987). Early word meanings: The case of object names. *Cognitive Psychology, 19,* 63–89.

Johnson, C. E. (1983). The development of children's interrogatives: From formulas to rules. *Papers and Reports on Child Language Development* (Stanford University), *22,* 108–115.

Kaper, W. (1980). The use of the past tense in games of pretend. *Journal of Child Language, 7,* 213–215.

Katz, N., Baker, E., & Macnamara, J. (1974). What's in a name? A study of how children learn common and proper names. *Child Development, 45,* 469–473.

Kessel, F. S. (1970). The role of syntax in children's comprehension from ages six to twelve. *Monographs of the Society for Research in Child Development, 35*(Serial No. 139).

Klima, E. S., & Bellugi, U. (1966). Syntactic regularities in the speech of children. In J. Lyons & R. J. Wales (Eds.), *Psycholinguistics papers: Proceedings of the 1966 Edinburgh Conference* (pp. 183–208). Edinburgh: Edinburgh University Press.

Kuczaj, S. A., II. (1977). The acquisition of regular and irregular past tense forms. *Journal of Verbal Learning and Verbal Behavior, 16,* 589–600.

Kuczaj, S. A., II. (1978). Children's judgments of grammatical and ungrammatical irregular past-tense verbs. *Child Development, 49,* 319–326.

Kuczaj, S. A., II. (1982). On the nature of syntactic development. In S. A. Kuczaj, II (Ed.), *Language development: Vol. 1. Syntax and Semantics* (pp. 37-71). Hillsdale, NJ: Erlbaum.

Levelt, W. J. M. (1983). Monitoring and self-repair in speech. *Cognition, 14,* 41–104.

Levelt, W. J. M. (1989). *Speaking: From intention to articulation.* Cambridge, MA: MIT Press/Bradford.

Limber, J. (1973). The genesis of complex sentences. In T. E. Moore (Ed.), *Cognitive development and the acquisition of language* (pp. 169–185). New York: Academic Press.

Lodge, K. R. (1979). The use of the past tense in games of pretend. *Journal of Child Language, 6,* 365–369.

Macnamara, J. (1972). Cognitive basis of language learning in infants. *Psychological Review, 79,* 1–13.

MacWhinney, B. (1976). Hungarian research on the acquisition of morphology and syntax. *Journal of Child Language, 3,* 397–410.

MacWhinney, B. (1978). The acquisition of morphophonology. *Monographs of the Society for Research in Child Development, 43*(Serial No. 174).

Maratsos, M. P. (1983). Some current issues in the study of the acquisition of grammar. In J. H. Flavell & E. M. Markman (Eds.), *Handbook of child psychology: Vol. 3. Cognitive development* (pp. 707–786). New York: Wiley.

Maratsos, M. P. (1990). Are actions to verbs as objects are to nouns? On the differential semantic bases of form, class, category. *Linguistics, 28,* 1351–1379.

Maratsos, M. P., Fox, D. E. C., Becker, J. A., & Chalkley, M. A. (1985). Semantic restrictions on children's passives. *Cognition, 19,* 167–191.

Maratsos, M. P., Gudeman, R., Gerard-Ngo, P., & DeHart, G. (1987). A study in novel word learning: The productivity of the causative. In B. MacWhinney (Ed.), *Mechanisms of language acquisition* (pp. 89–113). Hillsdale, NJ: Erlbaum.

Markman, E. M. (1987). How children constrain the possible meanings of words. In U. Neisser (Ed.), *Concepts and conceptual knowledge: Ecological and intellectual factors in categorization* (pp. 255–287). Cambridge, UK: Cambridge University Press.

Mervis, C. B. (1987). Child-basic object categories and early lexical development. In U. Neisser (Ed.), *Concepts and conceptual knowledge: Ecological and intellectual factors in categorization* (pp. 201–233). Cambridge, UK: Cambridge University Press.

Mervis, C. B., & Johnson, K. E. (1991). Acquisition of the plural morpheme: A case study. *Developmental Psychology, 27,* 222–235.

Nagy, W. E., & Anderson, R. C. (1984). The number of words in printed school English. *Reading Research Quarterly, 19,* 304–330.

Nelson, K. (1973). Structure and strategy in learning to talk. *Monographs of the Society for Research in Child Development, 38*(Serial No. 149).

Peters, A. M., & Menn, L. (1993). False starts and filler syllables: Ways to learn grammatical morphemes. *Language, 69,* 742–777.

Pinker, S. (1984). *Language learnability and language development.* Cambridge, MA: Harvard University Press.

Pinker, S. (1989). *Learnability and cognition: The acquisition of argument structure.* Cambridge, MA: MIT/Bradford.

Reich, P. (1976). The early acquisition of word meaning. *Journal of Child Language, 3,* 117–123.

Reilly, J. S. (1986). The acquisition of temporals and conditionals. In E. C. Traugott, A. ter Meulen, J. S. Reilly, & C. A. Ferguson (Eds.), *On conditionals* (pp. 309–331). Cambridge, UK: Cambridge University Press.

Rescorla, L. (1980). Overextension in early language development. *Journal of Child Language, 7,* 321–335.

Sachs, J., & Devin, J. (1976). Young children's use of age appropriate speech styles in social interaction and role-playing. *Journal of Child Language, 3,* 81–98.

Shatz, M., & Gelman, R. (1973). The development of communication skills: Modifications in the speech of young children as a function of listener. *Monographs of the Society for Research in Child Development, 38*(Serial No. 152).

Slobin, D. I. (1970). Universals of grammatical development in children. In G. B. Flores d'Arcais & W. J. M. Levelt (Eds.), *Advances in psycholinguistics* (pp. 174–186). Amsterdam: North-Holland.

Smoczyńska, M. (1985). The acquisition of Polish. In D. I. Slobin (Ed.), *The crosslinguistic study of language acquisition* (Vol. 1, pp. 595–686). Hillsdale, NJ: Erlbaum.

Soja, N. N., Carey, S., & Spelke, E. S. (1991). Ontological categories guide young children's inductions of word meaning: Object terms and substance terms. *Cognition, 38,* 179–211.

Tager-Flusberg, H. (1982). The development of relative clauses in child speech. *Papers & Reports on Child Language Development* (Stanford University), *21,* 104–111.

Talmy, L. (1985). Lexicalization patterns: Semantic structure in lexical form. In T. E. Shopen (Ed.), *Language typology and syntactic description: Vol. 3. Grammatical categories and the lexicon* (pp. 57–149). Cambridge, UK: Cambridge University Press.

Taylor, M., & Gelman, S. A. (1988). Adjectives and nouns: Children's strategies for learning new words. *Child Development, 59,* 411–419.

Templin, M. C. (1957). *Certain language skills in children: Their development and interrelationships.* Minneapolis: University of Minnesota Press.

Thomson, J. R., & Chapman, R. S. (1977). Who is 'Daddy' revisited: The status of two-year-olds' over-extended words in use and comprehension. *Journal of Child Language, 4,* 359–375.

Tomasello, M. (1992). *First verbs: A case study of early grammatical development.* Cambridge, UK: Cambridge University Press.

Warden, D. A. (1976). The influence of context on children's use of identifying expressions and references. *British Journal of Psychology, 67,* 101–112.