5 CONCLUSIONS AND IMPLICATIONS

5.1. Theoretical implications

I would like to review eight important points made in this book:

1. The first units of language acquired by children do not necessarily correspond to the minimal units (morphemes) of language described by conventional linguistics. They frequently consist of more than one (adult) word or morpheme.

2. In terms of storage and use, however, there is no difference between such long units and units that happen to be minimal: To the language learner they are all units, and are stored in the lexicon and retrieved as such.

3. All units, or entries, in the learner's lexicon are candidates for the fundamental process of segmentation by which they are broken down into smaller units. Segmentation may be applied to material in ongoing conversations, or to units already stored in the lexicon.

4. The smaller units that result from segmentation are themselves entered in the lexicon.

5. A unit that has been segmented may or may not be deleted from the lexicon: That is, the original unit and the products of segmentation may coexist.[1]

6. Segmentation also results in structural information, beginning with the simplest formulaic frames with slots, which are progressively generalized into more general syntactic patterns. The beginnings of the acquisition of syntax can be observed in this process.

7. The learner's lexicon grows as the learner collects not only units perceived in conversation and the results of their segmentation, but also the results of what I have called fusion (4.2). This is the process by which often-used combinations are stored as preassembled units for quick and easy retrieval .

8. The process of fusion continues even into adulthood, where, even though mature speakers have presumably analyzed most of their original lexical entries into ultimate constituents, larger commonly used chunks seem to be available as single fused lexical units in the production of speech. Some items may also be stored at one or more intermediate levels, as partially assembled lexicosyntactic frames with open slots.

What, then, are the theoretical advantages to the linguist of assuming that whole utterances and words are treated in the same ways by the language learner? The biggest gain, to my mind, is in not needing to describe two separate systems.

Another unification made possible by these eight points is the continuity between child and adult language. I will return to this matter, after considering the implications of these points for adult language. Points 5, 7, and 8, in particular, imply that there is considerable redundancy in the storage of both lexical and syntactic information. The relation between syntax and lexicon may therefore be more fluid than is usually supposed: Under some circumstances an expression may be retrieved from the lexicon as a single unit; under others it may be constructed from partially assembled pieces in the lexicon, requiring somewhat more syntactic processing; under yet other circumstances it may be constructed *de novo* from morphemes. Syntax and lexicon are thus seen to be complementary in a dynamic and redundant way. The same information may be present in both, in different forms: It may be present implicitly in the lexicon fused into an expression or formulaic frame, and at the same time it may be explicitly represented in the syntax.[2]

From the existence of such redundant storage we may infer that storage is not the only parameter that a language user attempts to minimize. Efficiency of processing is an

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[1] MacWhinney presents an explicit formulation of a model for the acquisition of morphophonology in which alternative representations of an item may be present in the lexicon. He also proposes an explicit feedback cycle that strengthens or weakens a particular representation until presumably only one alternative remains (1978, 12).

[2] The formulation of this particular conclusion, though strictly my own, owes a great deal to discussions with Charles Fillmore, John Bisazza, and Andrew Pawley. It is also supported by Bolinger's (1975) observations that "the whole chunks that we learn also persist as coded units even after the chemical analysis into words has partially split them up" (1975, 100) and "the brain stores both the parts and the wholes, and we retrieve them when we need them" (105).

additional, competing requirement. If all lexical and syntactic information were stored without any redundancy, a speaker would have to construct every expression from morphemes. But evidence is accumulating that in order to reduce processing time we indeed use partially redundant forms of storage. This suggests that a realistic theory of language use should incorporate some sort of interaction or tradeoff between storage and processing economy.

Though Occam's razor requires that a description of the structure of a language be free of redundancy, we are here concerned rather with the speaker's knowledge of the language and with the evidence from real speech that this knowledge may actually be stored redundantly. We must account, for instance, for what seem to be alternative ways of producing what from a structural point of view is the same utterance.

Another past motivation for eschewing redundancy has been a misleading analogy that seems to have been drawn between the human brain and early computers. These computers were severely limited in memory capacity, but less limited in computational speed. As we have just seen, however, current evidence about the human brain suggests that it has a great deal of memory capacity (much more than the largest computer available today) and powerful information-handling abilities, but is severely limited in processing speed. Redundant forms of storage that would save processing time seem well adapted for these capabilities.

It seems reasonable and economical to assume that these redundant properties of adult language processing are also present in the child, but merely in different proportions. Although, for the language learner in the very first stages of acquisition, whole utterances may be stored away unanalyzed, they are soon segmented to some extent. As language acquisition proceeds, the proportion of unanalyzed multimorphemic units decreases but probably never entirely vanishes. Thus, even for most adults, there probably remain some potentially analyzable but somewhat opaque items that have not yet been analyzed. This is not to say, however, that the original large chunks are necessarily expunged from storage. In fact, the number of redundantly stored multimorphemic chunks actually would be expected to increase, since often-used constructions can also be stored as fused units, a device used by speakers of all ages. These redundantly stored pieces, however, unlike the large chunks originally learned by the child, are associated with an analysis within the speaker's system; the speaker knows the underlying structure. In studying language acquisition, therefore, we should be aware of (and on the lookout for) this developmental sequence, starting with unanalyzed chunks, proceeding through a stage of more or less complete analysis, and returning to refused but analyzed chunks (see 5.2.1).

A second major implication is that, contrary to the belief implicit in most current research, the learning of syntactic rules is not the first event of structural interest in a child's language acquisition. Rather, the first grammatically significant events are the analyses of individual chunks into shorter recurrent segments and, where a sufficient number of different chunks have been analyzed, the perception of structural patterns.

A corollary is that the role of analogy in language acquisition may be much greater than heretofore acknowledged. Analogy is here defined as the strategy of producing new constructions on the basis of frame- and slot-type patterns that have been discovered through segmentation. This device seems very similar to processes familiar to historical linguists (e.g., Bloomfield 1933; Bolinger 1975), but has been acknowledged as important by very few writers on child language. Although he does not use the term in quite this sense, MacWhinney's use of analogy could be reinterpreted in this light. His model for the acquisition of morphophonology recognizes the need for the child to use not one but three processes that interact in a complex way: "rote memorization, productive combination, and analogical formation" (1978, 1). Here "rote memorization" is roughly equivalent to extraction, "analogical formation" to the use of limited-scope formulas, and "productive combination" to the use of more generalized syntactic patterns. His monograph makes a good case for the importance of analogy in the learning of suffixally inflected languages such as Hungarian and German. Similarly, Berman's data (1981a, b) on the acquisition of Hebrew morphology support the role of analogy in a language where many inflections are sequences of vowels interdigitated with triconsonantal roots. My claim, which follows from

the data presented in 3.2 and 4.1, is that this type of analogical processing may be central in the acquisition of syntax as well as of morphology. This is an area that will have to be further explored (see 5.2.1).

Thirdly, we can specify certain cognitive abilities that a child's Language Acquisition System (LAS) would need in order to be able to carry out the acquisition of language along the lines proposed in the eight points with which this chapter opened. As suggested in Chapters 2 and 3, in order to break into the language system the child must have some strategies for extracting manageable chunks of speech from the continuous speech stream, and must be able to remember these chunks for long enough and in enough detail to compare them phonologically, recognize phonetically identical stretches, and remember these, perhaps as well as the residues, as new lexical items. Furthermore, the child must be able to recognize and remember the structural patterns and information about distribution classes revealed by such analysis. As language learning proceeds, the child must be able to utilize lexical and syntactic information already acquired to analyze (parse) new input, as well as be able to revise the lexical and syntactic information already acquired on the basis of new data. In short, a child confronted with an unknown language must use many of the strategies a field linguist would use in a similar situation (see, e.g., Nida 1949).

The set of heuristics presented in this book can be seen as a step toward a model of the earliest perceptual stages of language acquisition. Two specific contributions toward such a model are (I) the marshaling of evidence for a perceptual process in language acquisition in which long units are extracted from heard speech and successively segmented into shorter ones and (2) the demonstration that not only lexical but also syntactic information is gained by the child from such a process of segmentation. These contributions should provide a basis for a more realistic modeling of language acquisition than approaches in which children are assumed to begin with precisely the lexical items of the adult language.

In order to test this model and pursue its implications for language learning, further research focusing on units and their breakdown and absorption into the child's growing lexicogrammatical system will be needed. Such studies will entail coming to grips with the researcher's ability to recognize units in the child's system, as well as the various possible stages of their breakdown (unanalyzed, partially analyzed, fully analyzed, fused). In 1.3.1, I suggested some criteria for distinguishing one-unit from multiunit utterances. Now, however, we need to be even more sophisticated, since we also need to be able (I) to recognize long units incorporated within multiunit utterances, and (2) to recognize when they are in the process of breaking down .

Snow has addressed the first of these problems in her investigation of what she calls Expanded Imitations. These include "at least one stressed content word or morpheme from the adult utterance and at least one word or morpheme not in the modeled utterance" (1981a, 207). She proposes that looking at Deferred Imitations, which can occur several hours or even days after the model was heard, will be particularly fruitful in trying to trace the role of imitations in syntactic growth, but concedes that the identification of such imitated chunks poses a serious methodological problem. She offers the following two criteria: "(i) formal, including prosodic, identity to the model, and (ii) initial use in the situation in which the model was heard" (211).

Snow's criteria are similar to those of Moerk and Moerk, who are also concerned with the identification of imitated chunks of language. The differences in the phrasing of their criteria are perhaps useful in a supplementary way. Thus, as their major criterion, they look for "the presence of a largely identical preceding utterance" (1979, 46). As the time span between model and imitation increases, they rely increasingly on probability of occurrence:

> The closer the child's utterance followed the model's, identity factors being equal, the higher the probability for it to be classified as imitation. If, however, the construction was very rare or non-existent in the child's normal speech, either in regard to its vocabulary or its syntactic aspect, and if an almost identical model had occurred in the not too distant past, then the child's utterance was defined as imitation in spite of a quite possibly extended temporal interval. [47]

With respect to the second problem raised here, that of identifying units in various stages of breakdown, Moerk and Moerk point out that they found a residue of child

utterances for which an unequivocal decision concerning imitative status could not be made: "Known parental models suggested the utterance might be an imitation, but the employed structure was otherwise mastered by the child, so that it could have been formulated spontaneously" (47). But this is just what we should expect if "utterances that were at first obviously imitated . . . are reemployed by the child and are slowly incorporated into his spontaneous repertoire" (47). Thus the criteria for identification of imitations in their initial stages and the expectation that many such imitated chunks may get segmented and absorbed into the child's productive system may be the most important new tools to be added to the researcher's kit at this stage of investigation.

Before going on to suggest specific areas in which research needs to be done I would like to make some comments about the implications of the existence of "long units" for the practice of using mean length of utterance (MLU) as a tool for estimating a child's linguistic competence. To be useful in determining a child's competence, such a metric should presumably measure utterance length in terms of units within the child's linguistic system. In practice, however, it is the number of adult units in the child's utterance that is counted, though even this policy is not followed consistently. I have argued that these are different, the child's units often corresponding to multiple units of the adult system.

As early as 1959 Burling observed:

> Most studies of child language put heavy stress on the number of words used in a sentence. This is true of the psychological literature, but it is also true of Leopold's work. My feeling as I observed Stephen's language, and my conclusion now, is that the number of words or morphemes is perhaps the least important criterion of grammatical progress. What from an adult point of view are multi-morphemic words, or multi-word sentences, were used before their complex nature was recognized by Stephen. The most significant single advance in his ability came when he learned to make substitutions, and once this was achieved, he was soon able to make sentences with not just two morphemes but with three and more. One simply cannot reasonably speak of a two-morpheme stage of his speech development. (since Garo has such complex word formation, it is more significant to consider the number of morphemes in a sentence than the number of words.) [1973, 88]

In spite of these observations, MLU has newly been legitimized, especially among linguists, by Brown's presentation of the rules he used to calculate it for Adam, Eve, and Sarah (1973, 54). These rules seem to have been based on his familiarity with the intuitions about the data from these children, who on the whole seem to have been fairly analytic in their approach to language. There are difficulties, however, with Brown's formulation that may not have been faced by those other workers who, for the sake of comparability, have adopted his rules. These have to do with recognition of what is to be counted as a unit. Brown handles the matter with a set of five rules (numbers 4-8). Thus he decides that all compound words (e.g., *birthday),* proper names, ritualized reduplications *(choo-choo),* irregular past tenses *(got, did),* diminutives *(doggie),* and catenatives *(gonna, wanna)* are to be counted as units since they all seem to function as such for these children. On the other hand, he decides that all auxiliaries and inflections are to be counted as separate morphemes. He overlooks the possibility that the children might not have segmented some of these as separate morphemes - and although this may not have been a problem in Adam's, Eve's and Sarah's uses, it will be in some children's. (At the end of his book he does consider the problem of segmentation as manifested in particular by Adam's *it's* and *that-a* 13961, but he never relates this difficulty to his early decisions about counting morphemes.) There are also many other potentially unanalyzed chunks that Brown does not deal with in his rules and that have not been adequately considered by subsequent workers attempting to apply these rules. (That is, only the most obvious chunks have been recognized as such, whereas others have generally been dealt with according to the rules of English orthography: If there is a space in the spelling, count two units.) These potential chunks include such common occurrences as *all gone, get up, come here (c'mere), look at (lookit),* and *lie down*.[3]

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[3] This problem can be seen particularly clearly when one looks at the use of MLU as a measure of development in a morphologically complex language such as American Sign Language (ASL). Thus Terrace et al., state: "In calculating a child's MLU certain conventions are followed that cannot be applied directly to sequences of signs. A spoken utterance. for example, is often broken down into morphemes rather than

In short, Brown gives a list of rules of thumb for determining length of utterance based on his intuitive, and probably fairly accurate, feel for what his subjects at the early stages took to be single units. He then suggests that these rules can be used to make "one child's data comparable with another's, one project with another" (54). It should, however, be evident by now that the usefulness of this technique as a comparative measure is attenuated by the fact that his criteria for what is a unit, developed for Adam, Eve, and Sarah (who were firstborn mainstream American children chosen for their volubility and intelligibility), may not necessarily apply to other children, or to the same children at different stages, or even to the same child in different utterances.

MLU is certainly useful for making rough comparisons among most children learning to speak the same language. But it is also true that for some children, such as Gestalt-oriented ones like Minh, it is virtually impossible to calculate MLU at all. And at finer levels of comparison among children, one needs to be aware of the potential problems in identifying units. Ideally one needs to deal with the problem of what is a unit on a child-by-child, and even utterance-by utterance, basis. To be able to do this one must first be familiar with both the child's own usage and the language the child hears, in order to be able to recognize recurrent chunks that are likely to be perceived as unitary.

5.2. Further research questions

Although the approach advocated in this book provides a framework within which can be included more of the already observed phenomena of both child and adult speech than has hitherto been possible, it also reveals a number of problems needing more detailed investigation and suggests new areas for research. These problems can be grouped into two main categories: the place of formulaic learning in language acquisition, and the psychological status of various aspects of formulaic speech among adults. In addition, the status of formulaic speech should be explored in two other areas that I will not discuss: the neurolinguistic aspects of formulaic speech and the role in language change of formulaic learning of language. The more detailed questions for the first two categories that I present here are intended to be suggestive rather than exhaustive. Furthermore, since the study of formulaic speech is relatively new to linguistics, it will require some new research methods. Therefore, whenever possible, I also present suggestions about possible approaches to particular problems.

5.2.1. The role of units in language acquisition

Studies needed in this area include:

1. Analyses of input speech to see just what sorts of recurrent chunks are available to language learners, coupled with an effort to identify those circumstances under which these chunks are extracted and used by the learners;
2. Collection of evidence on segmentation of large chunks and situations in which segmentation is likely to occur:
3. Collection of evidence on fusion of large chunks;
4. A psycholinguistic exploration of what a child perceives to be a unit of language;
5. An investigation and delimitation of the factors that account for individual differences in the use of large chunks of language;

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words: *running,* and *run here* would each be regarded as a two-morpheme utterance. In sign language, the utterance, run *there* can be expressed as a single sign . . . One explanation for the apparent delay in the growth of MLU in deaf children has to do with the property of sign language that allows one to encode a number of morphemes within a single sign" (1979, 902). The sign for RUN-THERE, however, though not a sequence of two signs, nevertheless consists of two simultaneously articulated components, the sign RUN plus the path that denotes 'there,' each of which recurs in other signs (Carol Tane Akamatsu, personal communication). The child may or may not be aware of the individual components. If the child is aware, she or he should be given credit for two morphemes in the MLU count. More careful analysis of the morphemic composition of signs and consequent recalculation of MLUs for deaf children may result in the finding that their MLU growth is in fact not delayed with respect to that of hearing children. It may at the same time turn out that MLUs of hearing children have been unduly inflated by the practice of giving them credit for more morphemes than they deserve. Or perhaps it is not valid to compare MLUs across languages of different morphological types.

6. An investigation of what happens to large recurrent chunks in acquisition of languages of other morphological types than English.

The relation of input speech to extraction. If extraction of chunks of speech is crucial to language learning, then we should look for the sources of these chunks in the child's environment. This conclusion naturally leads to a new focus for the study of input speech, namely, as a source of chunks to be extracted. Where and when, for instance, is a child most likely to hear recurrent and predictable chunks of speech'? A particularly promising place to look would be at family rituals during routine daily activities such as dressing, diapering, bathing, and feeding. Can we document how chunks are extracted and used by children as they learn to participate verbally in such routines? In such studies, both immediate and delayed imitation would constitute evidence of extraction. We would also like to know what sorts of special modifications, such as addition of extra stress, exaggerated intonation contours, or repetition, that are made to input speech result in facilitating the process of extraction of particular chunks.

In order to carry out such studies, appropriate data collection and research methods will have to be devised. For very young children, well-designed diary studies, such as those proposed in Braunwald and Brislin (1979), will be necessary, since the relevant data will have to include the history of individual chunks picked up by the child - where they came from and what happened to them (both analysis and misanalysis) over a period of time. Such data cannot be collected in one-hour-per-week taping sessions, although judicious use of tape recording will undoubtedly be an important contribution to such studies. In any case, the major part of the data will almost certainly have to be collected by a member or members of the child's family. Since children do seem to show individual differences in picking up and using long chunks, it may be partly a matter of chance whether any particular child will provide much data on formulaic learning and breakdown. Moreover, the sheer intelligibility of a particular child may affect how easy such data are to analyze.

In addition, we need to know whether adult caretakers are the principal sources of formulaic input for the language learner, or whether older siblings, if present, are also important in this respect. As noted in 2.2.2, Montgomery's study of a pair of sisters showed that the younger had picked up from the older a number of situationally appropriate expressions, "thereby giving illusory impression of advanced competence" (1977, 4). Minh, too, learned such expressions from his older brother, including the useful summons phrase "Mommy, I wanna tell you something," in which the second part was clearly an unanalyzed chunk [aytɛiusɪnts] when I first heard him use it at 23 months. Input studies, then, need to be extended to include careful assessment of the nature and influence of sibling speech on language acquisition. Furthermore, in cultures where mothers work and institutionalized daycare is common, for example, from age 22 or 3 in the United States or age 2 in Israel, the language at the daycare center needs to be investigated, not only for ritualized uses, but also for systematic ways in which such routines resemble or differ from routines used at home.

It is also important to look at older children, those beyond the earliest stages of language acquisition. I am convinced that picking up of formulaic chunks is not confined to the earliest stages of language acquisition. For instance, we should examine what I like to call the "out of the mouths of babes" phenomenon, which occurs when an older child startles adults by coming out with a long, extremely mature-sounding and situationally appropriate expression. Under such circumstances the adults typically look at each other and ask, "Where did she get that?" I suspect that many such expressions are picked up without much analysis. A careful diary-type documentation of the history of such expressions would be extremely useful, indicating where they come from, under what circumstances they are used, whether there are misuses that might give clues about incomplete analysis, and so on.

Segmentation of extracted units. If segmentation of extracted chunks is an important process in language learning, we need to look for evidence of segmentation and the concomitant induction of morphosyntactic patterns. For instance, as the child's linguistic

sophistication grows, one would expect to find more and more instances (within predictable contexts) of expanded imitations of, or variations on, adult utterances. These would constitute evidence that segmentation of the source utterances had indeed taken place. (Again, there might be individual differences among children in the faithfulness, and hence the recognizability, of the imitations.)

We would also like to know what processes might be involved in the extraction of patterns from segmented chunks and their incorporation into the child's growing linguistic system. In particular, what evidence can we find for pattern extraction? Any evidence for the use of analogy in syntax as well as in morphology may be important in this respect. Wong Fillmore's second language data (1976) are certainly convincing enough to suggest that we should look for analogical processes in first-language acquisition. Whereas MacWhinney (1978) has discussed analogy in the acquisition of morphophonology, the role of this strategy in the acquisition of syntax should now also be investigated. What is crucial is to get enough of the right kind of data to be able to follow the *process* of generalization, from segmentation through limited-scope analogical patterns to more general patterns, along the lines suggested in 3.2.3 and 4.1.

Short of an exhaustive search of a child's entire output, where can we look for such evidence? Again, we should try looking at routines. But whereas it is predictable recurrence that is important for extraction, it is limited variation that will be crucial for segmentation. One research strategy might be to look for interactive routines that would support the acquisition of particular classes of words or specific linguistic constructions. For example, the "What's that?" routine can lead to acquisition of labels, both names and attributes (Ninio & Bruner 1978), and the "Where's your nose?" routine to body-part names (Sachs & Truswell 1978). By the same token, the ' What color is this?" routine could be expected to facilitate learning of color words. On a morphological level, we may find that there are routines, such as "Whose X is this?" or "Where is X?" that focus on possessive or locative constructions. Ritual conversations such as "Where's daddy? He's gone to work" may perhaps serve as models, not only for learning to talk about displaced reference (i.e., what needs to be specified in order to identify absent people or past events [Cazden 1979, 12]), but also for learning the syntax necessary for such talk (Stoel-Gammon & Cabral 1977).

Another approach is to look for routines that operate in the dual contexts of communicative functions and linguistic socialization. That is, what kinds of communicative functions do children have to acquire (such as greeting, leavetaking, requesting, thanking, interrupting, asking for information, giving information), and what are the ways in which they are taught to carry out these functions? (see the discussions in Gleason & Weintraub 1978; Schieffelin 1979). In particular, in what ways might linguistic routines be used to scaffold such learning? Also, if the child's ability to imitate modeled utterances is central in such routines, how is the expectation of imitation taught to the child? Do the routines for teaching such communicative functions change with the age of the child - one routine, for example, being used with babies but being dropped in favor of another as the child becomes a toddler'?[4] And, most crucial for our purposes, how is variation introduced and the range of acceptable variation conveyed'

For older children, too, such as the 3-year-olds studied by Iwamura and the school-age children studied by Wong Fillmore, there is evidence that the children's strong desire to communicate with each other may have catalyzed both the picking up of chunks and their subsequent segmentation. This suggests that settings where children are highly motivated to communicate - child-child conversations, for example, as opposed to adult-child interviews - may be particularly fruitful sources of data.

Fusion of large chunks. We also need more information about the processes by which useful chunks are built up and fused. In particular, since morphophonemic processes seem to be highly automatized in mature speakers of a language, it would be particularly enlightening to document how they get this way. MacWhinney (1978) has already detailed

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[4] This last question arises from preliminary results of research conducted by Karen Watson-Gegeo in the Solomon Islands (personal communication).

two stages of acquisition of morphophonology: (I) "rote memorization," where inflections are not yet recognized as separate elements and mistakes of construction do not occur; and (2) the early stages of synthesis, which MacWhinney divides into "analogical formation" and "productive combination" and which are characterized by errors of overgeneralization. I believe these (intermediate) stages should also be characterized by signs of relatively laborious production and by concomitant reduction in processing capacity available to other tasks in utterance production. As automatization develops and fusion progresses, these signs of difficulty should disappear. This final stage, then, should be characterized by smooth production, lack of hesitations or self-corrections, absence of analogical or combinational errors, evidence of more processing devoted to other aspects of production, and automatic morphophonemic adjustments when speech errors occur.[5]

Iwamura (1980) has some pertinent data, for a more advanced stage of grammatical development, on negotiation and subsequent fusion of what might be called compound words (see the "no-yes" and "down-floor-dress" examples in 4.2.2). Note that such fusions are not necessarily absolute, in the sense that an often-used phrase may at some times be more unitary than at others. Evidence for this can be seen in variable points for the application of inflections, as when a colleague of mine recently said "point of views" and in the next clause "points of view" (and when questioned afterward confessed to having been unaware of the variation he had produced). In fact, I suspect that a succession of stages in the automatization of grammatical processes above the word could also be documented if they were looked for (see, e.g., Johnson's 1980 study on question words). These sorts of data would substantiate Bisazza's (1978) claims about the existence of a number of different "Templating Levels," as discussed in 1.1. I can offer an anecdote that suggests what one might look for in the way of such evidence: I remember my son going through several stages of what seemed to me to be incipient stuttering at around age 3. Each time I was very worried, but after a week or so the difficulty would iron itself out, and I would notice that he was now producing syntactically more complex sentences. Unfortunately, I did not keep a diary of the exact gains he made, but these would be the kinds of data to look for.

Another possible source of data on fusion that would be worth exploring is the evolution of narratives that get told more than once, as when a child reports an event right after it happens and sometime later is asked to repeat the narrative to a new audience. In the first telling the child would be struggling to find ways to report the salient events. These struggles, aided by promptings, questionings, and clarifications from the first audience, would serve as a rehearsal for the second telling, which could be expected to be smoother and more effective. An example of such a repeated narrative can be found in Halliday (1975, 112). In my own data I have only the second story in such a sequence. At the time of the first telling, the 4-year-old narrator's father had been struck by the difficulty the boy was having in reporting the event, so the next day the father asked his son to tell me the story. This time, to the surprise of the father, the story was told relatively smoothly and easily.

The child's conception of a "word". Several studies have attempted to investigate children's conceptions of what a word is by asking them to indicate the number of words in given sentences (see, e.g., Berthoud-Papandropolou 1978; Lawler 1976). Both Lawler and Berthoud-Papandropolou, working respectively in English and French, found what Lawler calls the "functor effect" (2), whereby functors are not accorded the status of words by preschoolers, although nouns and verbs are. But in neither study was an attempt made to investigate systematically the question whether commonly occurring phrases would be more likely to be accorded single-"word" status than more obviously constructed phrases. For instance, given the sentences "It was a bright sunny morning" and "Mr. Jones said, 'Good morning,'" would *good morning* be perceived as more unitary than *sunny morning*? Such a

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[5] An example of this last is the voicing adjustment in "both sick*s* are kid" (for the intended "both kid*s* are sick". This example and other similar ones can be found in Fromkin 1973, 258-9.

study would provide evidence regarding one of the fundamental claims of this book, namely, that children's units are not necessarily the same as linguists'.

Individual differences. Evidence is accumulating that children do not all follow the same paths on the way to language acquisition - at least with respect to the kinds of utterances they produce. What goes on in their minds is another question, but one to which we can only infer the answers. Certainly, some children talk more than others, or are more intelligible, or are more adventuresome (as opposed to conservative) with language, or rely more on readily identifiable patterns (e.g., limited-scope formulas). Therefore we need more documentation on these different overt manifestations of the ranges of strategies children can use in their move toward adult language. And we need to try to make whatever links we can between these strategies and the factors that may foster them, such as those proposed in *2.2* and *3.4*. But we must bear in mind that just because a child does not overtly use a particular strategy (e.g., imitate a great deal), it does not necessarily imply that she or he is not using the strategy covertly. Rather, in such an instance we can only say that we have no evidence about what is going on in the child's head.

The contributing factors proposed in *2.2* and *3.4* can be divided into two types: those internal to and those external to the child. Internal factors include individual neurological endowment *(2.2.4);* external factors include aspects of input, language use, and cultural expectations, including tolerance for large chunks and amount and variability of routines. It seems, then, not only that we need to collect more data on individual differences with respect to the extraction, segmentation, and fusion of linguistic chunks, but that such data need to be focused in two different ways: We need data to point up individual differences within a culture, and we need data on acquisition under different cultural conditions.

Languages of different morphological types. Not only do we need to know more about language acquisition under different cultural conditions, we also lack information about linguistic development in languages of other morphological types than English, especially at the early stages. We particularly need to know more about how children go about solving extraction and segmentation problems in diverse languages, since certain properties of a language will affect how easy or hard it is to accomplish these tasks (see Peters 1981 for a somewhat more detailed discussion of the questions presented in this section). For example, the fact that English is a stress-timed language makes it relatively difficult for the learner to perceive functors as separate units, since they tend to be phonologically inconspicuous. The unpredictable position of stress within English words can also be expected to contribute to difficulty in recognition of word boundaries (see, for example, the word-boundary shifts in the misperceptions and misanalyses discussed in Chapter *3).* Similarly, in languages with cliticization and elision, such as French, where phonological and lexical words do not coincide very well, one would also expect children to have word-boundary problems. This expectation is supported by Grégoire's description of the difficulty French children have in determining the initial phoneme of words that begin with vowels. He cites the example of a 2-year-old boy who makes a number of attempts at saying the word *arbre* 'tree', each time picking up a different elided initial consonant: *le beau z-abe, le beau t-arbe, un petit n-arpe, au l'arpe* (1971, 94). In the same vein, Guillaume gives examples of cliticized pronouns being perceived as integral parts of verbs beginning with vowels: *Tu la l'ôtes, Moi la l'ai vue, Il la l'ouvre* (1973a, 242).

Even though English may present some difficulties in word-boundary recognition, it has relatively little word-internal morphology to be learned, especially before the latinate vocabulary begins to be acquired. This situation contrasts with that presented by highly inflecting languages. In those languages where there is "heavy" sandhi (such as metathesis, epenthesis, deletion, diphthongization, or fusion of vowels) at morpheme boundaries, segmentation will be correspondingly harder than in highly agglutinative languages with no sandhi at the boundaries. Some evidence for the problems caused by opaque morphophonemics comes from Hungarian, where word-internal morphophonemic processes make it relatively difficult to separate stems from affixes (MacWhinney 1978),

and French, where the learning of the verb-conjugation system presents a number of problems (Guillaume 1973a). On the other hand, children seem to have little difficulty in finding morpheme boundaries in such agglutinative languages as Turkish (Ekmeci 1979; Slobin & Aksu 1980) and Siswati (Kunene 1979). Besides degree of morphophonemic opacity, other variables that may affect segmentability of affixes are their syllabicity (or lack thereof), stressability, and consistency of form (see Pye 1980 for discussion and examples from Quiche Mayan).

In Semitic languages, which are characterized by interdigitated roots and inflections, children are faced with an entirely different kind of problem. Here they have no segmentation clues other than similarity of patterning to guide them to the realization of how roots and inflections must be disentangled, and at first they have no choice but to memorize inflected forms as units. Eventually, however, they will have built up a large enough corpus of memorized forms so that when they line them up mentally they will be able to perceive the inflectional patterns and extract the roots. See Berman (1981a) for a detailed discussion, including difficulties Israeli children have with certain opaque roots. In all of these morphologically complex languages, the role of analogy in language acquisition may be greater than it is in English.

In polysynthetic languages, where morphological structure is much more opaque, children may be faced with the choice of either memorizing entire words or extracting the most phonologically salient parts of words (e.g., the stressed parts and/or the ends). What role analogy would have in the subsequent breaking down of such large chunks as get extracted is not at all clear. We do not even know how much morphological segmentation is accomplished by the mature speakers of such languages. This is an area of child language acquisition and psycholinguistics in which we have even fewer data than we have for other language types. Another intriguing question relating to the acquisition of polysynthetic languages concerns the kinds of possible help caretakers might provide. Whereas in isolating and inflecting languages caretakers may present morphosyntactic minimal pairs (via expansions and reductions of previous utterances) that serve to help the child with phonological comparison and factoring, it is not yet known whether this kind of help is even possible for polysynthetic languages.

Another reason for studying the acquisition of languages of differing structural types is that in limiting ourselves almost exclusively to a heavily syntax oriented language, namely, English, we have been led to a much stronger focus on acquisition of syntax than on acquisition of morphology. Languages of the world, however, vary in the amount of functional weight borne by syntax and morphology. The way this weight is distributed in a particular language should affect what parts of the system children must learn first in order to be able to communicate their needs. Thus, if Brown (1973) is right in claiming that there are certain semantic relations that children tend to express early, children will first have to learn that part of the grammar (whether it is morphology or syntax or a mixture) which will allow them to express those relations. Burling, in fact, has already called attention to the possibility that in some languages morphology may be more important in early language acquisition than is customarily acknowledged:

> It has generally been assumed that syntactical constructions precede morphological ones Leopold states baldly, "In the field of grammar, syntax comes before morphology. The student of child language becomes very conscious of the fact that the morphological devices are a luxury of fully developed languages. The small child gets along quite well without them, for a short or long time. ' It is difficult and perhaps arbitrary in many languages to draw the line between morphology and syntax, but it is extremely convenient to make such a distinction for Garo, since there are stretches of several syllables set off by characteristic junctures which can be called words, and the grammatical devices used to form these words are very different from those used to join words together. If the distinction is made, Stephen defied the generalization that syntax comes first by learning to make both types of constructions simultaneously. Some reasons for this are obvious: What I am calling morphology in Garo is much more essential than the morphological process of English, or even of the other European languages. Morphology is not a "luxury" of the fully developed language. Moreover, it is far more regular, and therefore no doubt easier to learn than the morphology of European languages. [1973, 88-9]

In early acquisition of morphology, fission and fusion processes might have an even more important role than in the acquisition of syntax, since words, the raw material for

morphological analysis, being typically more phonologically unified than phrases, may be more readily perceived and stored as unanalyzed chunks.

Finally, it would be revealing to look at data on acquisition of American Sign Language (ASL) for insights into how children go about handling simultaneous (as opposed to sequential) complexity. For instance, aspect, number, path of movement, various classifiers, and reference to origin and goal can all be incorporated into ASL verbs, giving rise to morphologically very complex signs (Fischer & Gough 1978; Newport 1981). How are these perceived by children and how do the children go about sorting out the components? At the earliest stages complex signs may be perceived as unanalyzed wholes. For instance, one child who wanted her mother to look at her signed l-LOOKAT-YOU instead of YOU-LOOKAT-ME,[6] where the difference between these two sign complexes is merely one of hand orientation. In this instance the child could have copied what she actually signed directly from her mother as a single unanalyzed unit (see the similar verbal examples presented in 1.3.1, in which the pronouns were not yet being treated as replaceable morphemes: e.g., *Sit my knee).*

Although the studies of the acquisition of ASL that I have seen have dealt with children of 21/2 or older (thus presumably well beyond the initial extraction stage), there is a little support for the unanalyzed-chunk hypothesis in Newport's study of the acquisition of ASL verbs by three children. At the first session the youngest child, who was 2;4, produced two correct complex signs (out of a total of ten movement signs elicited during that session), whereas from 2;6 through 2;9 she produced no correct complex signs but seven with missing morphemes (out of a total of sixteen elicited [Newport 1981, tab. 2]). These results would be consistent with a preliminary stage of extracting unanalyzed complex signs, followed by a further extraction of some but not all of the component morphemes.

Another interesting question relating to the acquisition of ASL concerns the place of recurrent finger-spelled sequences. At what point, if ever, is finger spelling separated out as a subsystem of ASL? How is it perceived and used by preschool signers? How, if ever, is it eventually related to the written alphabet? Perhaps a better understanding of these processes would help in teaching deaf children to read.[7]

5.2.2. The psycholinguistic status of formulaic chunks for adults

In order better to understand the place of formulaic chunks in children's developing language systems, we need a better understanding of the status of formulaic chunks in adult speech (i.e., a better understanding of what the children's systems can be expected to develop into). In particular, if, as suggested in 5.1, there is indeed a relationship between syntax and lexicon that is both redundant and fluid, we need more evidence of the exact nature of this relationship. Some linguists (e.g., Fillmore 1978; Nagy 1978) have already shown that in order to account for the linguistic constraints on certain English constructions, these constructions must be stored in some sort of phraseological way in any lexical model. Such constructions include not only idioms, which are the most word like in their arbitrariness and lack of analyzability (Nagy 1978, 289), but also figures of speech, clichés, and collocations that, although more analyzable than idioms, are nevertheless somewhat "transformationally deficient" (Nagy 1978, 291) (see also the discussion in 1.1). To complement the continuing efforts to describe these sorts of phraseological units, I would like to suggest several sorts of investigations that could be carried out on adult language.

We need to study the range of variability in size of adult linguistic units in order to answer questions such as how the size of units varies. This matter could be investigated under both naturalistic and experimental conditions. Let us first look at ways in which naturally occurring data could be collected. One way would be to collect specific kinds of speech errors similar to those given by Fromkin (1973). One relevant kind of "error" would

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[6] Susan Fischer, personal communication.

[7] Akamatsu (1982) is a recently completed dissertation on this topic.

involve variability in the points at which inflectional affixes could be applied, as in the "point of views" example cited in 5.2.1. Another type of speech error, which I call a "crossed collocation," also gives evidence of formulaic processing. Such errors are similar to the word-level speech errors known as "blends" (e.g., *momentary + instantaneous > momentaneous,* or *mainly + mostly > maistly* [Fromkin 1973, 260]), except that they involve the blending of two semantically similar multiword phrases that are also syntactically similar enough so that the speaker can get derailed from one to the other. Some documented examples will illustrate this phenomenon:[8]

He was breathing down my neck.	}	He was breathing down my shoulder.
He was looking over my shoulder.	}	
I stuck my neck out.	}	I stuck my neck out on a limb.
I went out on a limb.	}	
In one ear and out the other	}	In one ear and gone tomorrow.
Here today and gone tomorrow.	}	

Notice in each case that the two original expressions share a common word where the derailment can occur. The fact that phrases such as *breathing down my neck* and *looking over my shoulder* can be subject to the same sort of retrieval error as single words like *mainly* and *mostly* gives us another clue that these phrases might at least sometimes be stored and retrieved much as single words are.

Another useful study would be a look at adult grammatical errors for evidence of formulaic processing and misanalysis. College or community college English compositions or term papers might be fruitful sources of such data. An example of the type of thing to look for is the not uncommon rendering of *would've* as *would of* rather than *would have.* Guillaume (1973b, 523-5) has collected a large number of such examples from the correspondence of French adults, including cases of running words together, for example, *ai dit > aidi, est-ce que > esque, s'est mis > semy;* oversegmentation of words, for example, *assez > a ses, trouvais > trou vais, encore > en core;* and combinations of these two, for example, *j'apprend > ja prend, d'école > dé colle.* Once a list of common formulaic misanalyses had been collected, one could use them as a basis for eliciting further information about their status in adult language systems, for example, by embedding them in sentences to be dictated, asking subjects to explain their structure, and so on. Needless to say, the subject population would have to consist of nonlinguists!

For literate speakers of languages that use the orthographic convention of spaces to indicate word breaks, learning to read marks the point at which knowledge of written forms begins to influence speakers' decisions about word boundaries. Therefore an investigation of perception of word (unit) boundaries among adults who do not write with word breaks would be very revealing.[9] Subjects in such studies might be illiterates, persons whose writing system does not conventionally indicate word breaks, or those whose language is not widely written (e.g., ASL). Interesting questions to ask would include: What sorts of units do particular subjects recognize? How much intersubject variability is there? How are such judgments affected by various types of context, including how the instructions are given? In particular, to what extent do linguistically naive signers recognize the componential nature of signs such as RUN-THERE, I-LOOKAT-YOU, CAR-TURN-CORNER? There is some evidence from signers' "slips of the hand" that these components are functionally independent in that an error can be made in just one morpheme of a complex (multimorphemic) sign (Newkirk, et al. 1980). How conscious signers are of these separate morphemes would be a matter for further psycholinguistic investigation.

Experimental investigation of unit size could include (I) having subjects indicate "units" via finger tapping (once per unit, but one would have to be careful how the instructions were worded), or (2) tachistoscopic recognition times for high-frequency

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[8] These examples were reported to me by Andrew Pawley, Charles Fillmore, and Victoria Fromkin, respectively. I myself have independently observed an instance of the first example.

[9] A look at subjects' decisions about how to write unfamiliar compound words for which word spacing conventions have not been standardized might also tell something about how many units each compound is thought to consist of. Thanks for this idea are due to Nancy Dorian (personal communication.

versus low-frequency phrases (controlling both for number of letters and for number of word spaces). Along this line, van Lancker and Canter (1981) have begun investigating the circumstances under which idiomatic phrases may be interpreted literally as opposed to idiomatically.

Since the very nature of formulaic speech processing has to do with words embedded in large contexts, still more work needs to be done on perception of fluent running speech. What sorts of segmentation cues do adults use? What are the respective roles of phonetic saliency (stress, pitch, clearness of articulation), semantics (lexical retrieval and semantic expectations), and syntax (expectations of certain syntactic constructions)? As a start, Clark and Clark (1977, 2119) report on some interesting instrumental techniques that have been used to approach some of these questions. Is the account of misperceptions presented in 3.3 indeed correct? If not, how should it be altered'? Can we investigate the conditions under which a hearer, when presented with the beginning of a possible formula, is likely to expect the formula rather than an analytic construction? Van Lancker, Canter, and Terbeek (1981) have made a start at answering this last question by looking at the phonetic cues supplied by speakers who are asked to produce "ditropic" sentence pairs (i.e., those which, like "He didn't know he was skating on thin ice," can be interpreted either idiomatically or nonidiomatically) so as to convey the two possible readings as clearly as possible. It was found that under these conditions speakers tend to increase the length of and the pauses between the main words in producing the nonidiomatic versions, while running the idiomatic versions together into more holistic units.

Another kind of study that it should be possible to conduct would be documentation of the progress of formulaic synthesis and fusion in technical jargon and in-group language. Groups of people who share a great deal of knowledge and who interact regularly, such as groups of colleagues or intimate groups of friends, regularly negotiate new uses of language with which to talk about new ideas and/or events. At first such language may be laboriously constructive, but as both the constructions and the meanings become established, shortcuts are taken until conveniently brief new expressions have evolved (much as in Suzy and Nani's "down-floor-dress" example in 4.4.2). Diary studies of colleagues' work sessions could reveal the steps in this process, and tape recording and phonetic analysis of such expressions at various stages of fusion might give us phonetic clues to help determine the state of fusion of other expressions of unknown history.

Another interesting way to observe fusion in action is to study the evolution of an oral narrative. Whereas Labov (1972) focused on the syntactic devices that make for an effectively told story, the study suggested here would trace the increasing effectiveness of such a story through repeated tellings. The kind of story to trace is the narration of a repeatedly "reportable" (in the sense of Labov 1972, 370-1) event, such as one resulting in a visible injury (large bandage, cast on arm or leg), which repeatedly elicits the question "What happened to you?" Presumably the answer to such a question would go through a series of stages, since at each telling the speaker would modify the story according to audience reaction, striving each time for a more effective account (until such time as boredom with the whole affair set in, with a resulting tendency for the account to be abbreviated). As the narrator evolved effective ways of conveying the various details of the story, I would expect to find fusion of the phrases used to recount those details, which would allow constructional effort to be shifted to the expression of other aspects of the story (see the discussion of processing limitations in 4.3).

5.3. Some practical implications

Besides the rather basic linguistic and psycholinguistic research questions I have been proposing in this chapter, what are the immediate practical implications for areas such as second-language teaching, bilingual classrooms, or language therapy? On the most superficial level it might seem that the case I have been making for the importance to the learner of large chunks of language could be taken as support for advocating a return to old-fashioned pattern practice. This is not precisely the case: Although I think that there are indications that certain kinds of work with linguistic routines will prove useful in a number

of teaching situations, these routines will need to be handled in a much more sophisticated fashion than in pattern practice.

As I have already noted in Chapter I (1.3.2), there is a pedagogical bias against the idea of rote memorization of long chunks of speech.[10] Thus Krashen and Scarcella (1978) argue that such long chunks are of little use either in real-life conversations or in the acquisition of grammar. Pattern drill exercises, where substitutions are made within formulaic frames, are also objected to on the grounds that they are so mindless that they are ineffective in promoting real second-language learning (see Lamendella 1979). It is indeed true that memorization of long chunks of speech (e.g., individual sentences in a dialogue) is at its simplest the equivalent of memorizing so many long "words," but only if no grammatical analysis (e.g., segmentation) is ever performed on these items. Since the likelihood of needing any of these exact "words" is quite small, such a procedure seems to be a relatively profitless way of cluttering up the memory of a student, who would be better off learning to construct more useful sentences.

Nevertheless, though many of the objections to memorization and pattern practice are valid, there are also advantages (to these or related activities) that should not be thrown out with the bath water. Thus memorization and pronunciation practice of long chunks do at least allow the learner to concentrate on fluent phonological production of relatively long pieces in a situation where other aspects of the processing load have been minimized. There is some evidence that second-language learners in naturalistic situations spontaneously rehearse phrases they have extracted and memorized; see, for instance, the quotation in 4.3 regarding Barber's experience (1980) with Russian. Although such practice may be effective in increasing fluency, it should not be overused to the point of boredom, and it must be combined with complementary teaching techniques involving use of the sentences in meaningful situations, as well as presentation of opportunities to do grammatical analysis on the sentences (there is further discussion of this matter later in the chapter). The biggest problem, then, with merely memorizing phrases and sentences lies in the fact that no systematic support is provided for segmenting these chunks and relating their structural patterns to patterns that are already known.

Are substitution drills, which do involve working with simple patterns, any better in this regard? One strike against them is that, as Lamendella claims, they can be performed completely mindlessly, utilizing only what he calls the "speech copying circuits" (1979, 14). Nevertheless, such drills can also be used as a way of gaining fluency in elementary construction (synthesis) and of consolidating partially learned patterns in a situation where other aspects of the processing load are reduced. Again, learners outside formal learning situations may spontaneously engage in such patterned rehearsals. Consider the following examples from Wong Fillmore:

While getting settled for the March 12, 1980 ESL lesson, Tony suddenly begins reciting to himself. He gets louder and louder as he does:
> What is that? That is a dok (dog)!
> What is that? That is a baseball.
> What is that? That is a telephone.
> What is that? That is a robin.

Etc.. etc.. for 33 turns, including the following:
> What is that? That is a teenage queen!
> What is that? That is a you.
> What is that? That is a alphabet.
> What is that? That is a Eleanore.

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[10] This bias is partly motivated by theoretical considerations, particularly reaction against behavioristic (stimulus-response) models of language learning. But there may be unconscious cultural influences here, too, in that in the United States we tend to look down on imitation as being somehow inferior to processes that are seen as creative. This contrasts with, for instance, the attitude of the Chinese, who highly value memorization and see it as a powerful means of acquiring all kinds of knowledge. I am grateful to Claudine Poggi and Theodore Rodgers for this insight. For a view of how one Chinese mother encourages her daughter's use of linguistic imitation, see Poggi (1982).

On the day of the observations, another child recited a litany of apologies to himself as he worked on his math paper:

>   I'm solly, William.
>   I'm solly, James.
>   I'm solly, Tony . . .   [1980, 16]

One pedagogical challenge, then, would seem to be to use such drills just enough to promote fluency and confidence without overdoing them in the direction of mindless exercise.

But memorizing large chunks and working with simple presegmented patterns, useful as they may be in developing fluency, are only small steps toward the larger goals of free creativity in language use. The implications of this book are that one way to accomplish this goal might be by encouraging the learner to segment known chunks and to extract and begin to use the associated structural patterns. In support of such an approach, there is plenty of evidence from studies of naturalistic second-language learning, such as those of Huang and Hatch (1978), Vihman (1979), and Wong Fillmore (1976), that children often do just this, starting by extracting large chunks that they then segment into smaller pieces. Such a method is also consistent with recent developments in language teaching, such as communicative language teaching (see, e.g., Littlewood 1981) or the notional-functional approach (see, e.g., Wilkins 1976), where the emphasis is on routines and formulas needed to perform specific speech "functions."

Can spontaneous segmentation be fostered in the classroom? I believe it can, but first we need to do more psycholinguistic research to determine at what point in its learning a unit is most segmentable. In the initial stages of learning a chunk, the phonetic details tend not to be very clearly perceived; it is hard enough at this point just to recognize or pronounce the chunk, without having to worry about how it has been constructed. On the other hand, once a chunk has been very well learned (or "overlearned"), it may already have undergone certain processes of automatization (through much rehearsal) to the point where it is somehow fossilized as a unit. By this stage it may no longer be easy to segment. This conclusion would fit with observations (such as those made by Brown & Hanlon 1970, 51, quoted in 1.3.2; or by Clark 1977, 344, quoted in 4.1.1) that in language acquisition items learned as chunks tend to persist as such and to resist segmentation. Rather than doing as others have done and adducing this phenomenon as evidence that segmentation of acquired chunks is not important in second-language learning. I would suggest that we look for an optimal segmentation period at an earlier stage of learning. I would predict that segmentation would be catalyzed by introducing controlled variation within learned chunks just at the point where they have been well enough learned so that resources are freed for paying attention to structure, but before they have been so well learned as to be automatized (see, for instance, Roger Brown's description of his successful segmentation of *korewa,* quoted in *3.1.2).* Thus it would seem that students would need as data small sets of related utterances on which to do phonological comparison and factoring, and also some sort of motivation to perform that analysis. Given such data, learners are in a position actually to construct their own grammar in personally meaningful ways, rather than having it fed in predetermined spoonfuls for which they may not be ready.

Other factors affecting the likelihood of segmentation may be rather sociolinguistic. Thus Wong Fillmore's work (1976, 1979) has shown that for children social meaningfulness is an extremely important factor, and Iwamura's work with first-language learners (1980) points up the role of communicative stress (i.e., really wanting to say something meaningful and straining all resources to do it). Ferguson (1976, 141) gives a nice anecdote relating how, under a certain amount of social pressure to speak, he was able to construct a socially appropriate and grammatically acceptable reply in Arabic to a formulaic congratulation he had never heard before. He did this by analyzing the new formula by analogy with similar formulas he already knew, and extracting the root, which he then used to construct the reply on the pattern of familiar associated replies. It is just this sort of

exercise, based on taking apart already memorized chunks and putting them together again in new ways, that should give students maximal opportunity to build their own grammars.

       Once we learn when and how segmentation can be triggered, we will be in a position to take advantage of language users' natural abilities and tendencies to assign whatever structure they can to stretches of speech, regardless of how much sense can be made of them. (That even adults do this actively and naturally as a matter of course can be seen from the prevalence, in the presence of noise, of mishearings, misanalyses, and even reanalyses, as discussed in *3.3.)* The goal, then, would be to design a set of materials that would lead the learners to perform their own segmentation and actively construct their own grammar, rather than having it spoonfed by teacher or textbook. Such materials could present the raw ingredients for grammar building in a much less haphazard sequence than would be likely to occur in a total-immersion situation, and would thus allow students to build up their grammar in a systematic fashion. On the other hand, this procedure would suffer from lack of the pressures of the real-world communication situation, unless they could somehow be incorporated in the teaching technique.

Points from this book that might prove to be of practical use include the following:

1. Invariant formulas or routines are likely to become automatized, and thus frozen (as well as boring, since they offer no further challenge to the learner once memorized).

2. The introduction of controlled variation within learned but not yet automatized formulas or routines may be a way to foster segmentation and pattern extraction .

3. Encouragement of expanded and varied imitations may be a particularly useful technique for consolidating new patterns, as well as for fostering diffusion of these patterns into new contexts.

4. Individuals and cultures differ in their tolerance for big as opposed to small chunks of language.

5. The "scaffolding" principle discussed in 3.4.3 might be a useful concept around which to design routines that would encourage learners to do their own segmentation. At first glance it would seem easier to develop such teaching routines for one-on-one situations like individual tutoring or language therapy than for large groups. I think, however, that, keeping the following points in mind, it should be possible to develop scaffolded routines for classroom use as well. What is needed at first is a single, very predictable situation, perhaps focused on a needed communicative function, along with some sort of fixed phrase or set of phrases for dealing with that situation.[11] Once this language has been fairly well learned, variation can be introduced in the form of several types of rephrasings, including expansions and reductions as well as variations and substitutions (see 3.4.2). Situational support will still be available for understanding these new forms, since they will all be centered around the original context. The variations offered should be systematic enough to foster segmentation and pattern perception. Accordingly, the goal would be to introduce sets of utterances that are both functionally and syntactically related - a kind of theme and variations, where the range of variation broadens with the increasing sophistication of the learner. As the learners note these variations they can be encouraged to produce similar variations of their own, thereby consolidating the patterns they have perceived.

5.4. Conclusion

As must have been evident at various points in this presentation and particularly in this chapter, I have been able only to sketch the outlines of a theory of early language acquisition, while leaving large patches of it unexplored. This being the case, it is inappropriate to offer any formal "conclusion": We are only at the outset of a newly defined course of exploration. But if there is any single concept that I would like most to leave with the reader it is this, that we must approach the study of language acquisition from the child's point of view, being aware of and trying to avoid any preconceptions derived from

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[11] Again, recent teaching methods are focusing on building lessons around specific communicative needs, such as getting into and out of conversations, introducing new topics, requesting information, answering questions. I would venture further, suggesting that segmentation can also be fostered in such situations.

the linguist's description of the adult language system. Only from observations that are interpreted on the basis of this principle can we justify inferences about the processes of language acquisition. Although the mechanisms presented in this book may need to be modified, or even in some cases replaced in the light of further observations, this basic principle must still be the guide to interpreting the observations.