
ACQUISITION ARCHIVES

The Acquisition of Inflection: A Parameter-Setting Approach

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First written in 1986, prior to the many findings concerning the optionality of finiteness and the root infinitive phenomenon, this article attempts to extend the parameter-setting model of grammatical development to the acquisition of inflectional morphology. I propose that the Stem Parameter, which states that a stem *is/is* not a well-formed word in the language, is set early, and that a positive vs. negative setting directly affects the timing and manner in which children acquire inflectional morphemes. Related to this, I propose that the distinction between core and peripheral grammar (Chomsky (1981)) provides a complexity metric for grammatical development.

1. INTRODUCTION

One of the traditional concerns of language acquisition studies has been to determine what constitutes formal complexity for the child. This is because it is generally assumed that at least one important factor affecting the order of acquisition of various grammatical devices is the relative complexity of various rules and constructions (Slobin (1973)). It would therefore be useful to find an independent measure of grammatical complexity that would allow us to predict which aspects of grammar children will find most difficult. In this article I will

propose that recent versions of the theory of generative grammar (Chomsky (1981) and references cited there) do provide a measure of formal complexity against which the acquisition data may be viewed. In particular, I will consider the child's acquisition of inflectional morphology, and show that a number of well-known properties associated with actual development in this domain can be explained given one kind of "complexity metric" provided by linguistic theory, a distinction between core vs. peripheral properties of grammar. Before turning to the analysis of inflection I wish to propose, I will first present some central ideas in the current theory of grammar and their relevance to actual language development.

2. UNIVERSAL GRAMMAR, PARAMETERS, AND THE CORE/PERIPHERY DISTINCTION

One of the central claims of Government-Binding (GB) Theory, as detailed in Chomsky (1981), is that the syntactic component of the grammar is modular in structure, consisting of various principles that define well-formedness at different grammatical levels. On this approach there are no transformational rules that generate specific sentence types, for example, a passive rule. Rather, particular constructions arise through the interaction of general principles of grammar. A second property that distinguishes GB theory from previous theories is that Universal Grammar (UG), the innate component of the human language faculty, is viewed as a parametrized system. Thus, alongside the familiar absolute universals, for example, the "condition of recoverability of deletion," there are parameters that define a narrow range of variation that languages may exhibit with respect to some grammatical phenomenon. For example, UG requires that all phrases are "endocentric" or "headed." Thus, NP must contain N, VP V, and so on, and a rule such as NP → S, permitted under previous theories, is barred. Languages differ, however, with respect to the position of the head within its phrase. For example, English is head first—verbs precede their objects within VP—while Japanese is head last, or SOV. This variation is presented as a parameter of UG—the head parameter.

Parameter theory, as it is referred to, makes a precise claim about the manner in which the child develops certain aspects of grammar: she is presented with a set of parameters each of which must be "fixed" at the value that is appropriate for the language she is born into. For example, in the case just discussed, the English-speaking child will choose the head-first option given the evidence presented to her by her linguistic community; the Japanese child will choose the head-final option. Because of the structure of the parameter system, it will often happen that setting the parameter at one or the other of the possible values will have a number of repercussions throughout the grammar resulting in languages that differ from one another along several dimensions. The central claim of this

approach is that in setting parameters, the child constructs a linguistic system with properties that are entailed rather than directly experienced.

Closely related to parameter theory and to the modularity hypothesis are the concepts of "core" and "peripheral" grammar. The core grammar of a particular language results by setting each of the parameters of UG at one or the other of the possible configurations. Outside of core grammar is the set of "peripheral" or "marked" properties of the language.¹ The periphery includes, for example, exceptions or "relaxations" of the settings of core grammar and idiosyncratic features of the language that are associated with particular lexical items. Consider the following example. It is typically the case that languages do not allow a lexical NP to appear in subject position of infinitival clauses. So, the sentence "I tried John to go" is ungrammatical. This prohibition is standard in languages that exhibit a distinction between tensed and infinitival clauses. In English, however, there is an exception to this general rule: verbs such as *want* and *hope for* can take lexical subjects in their infinitival complements, as in "I want/hope for John to go." Under current theory such structures count as marked. They are permissible due to an idiosyncratic property of a certain class of matrix verbs, and do not follow from general principles of grammar.

Parameter theory, the modularity hypothesis, and the core/periphery distinction have rather direct implications for actual grammatical development in children. Parameter theory allows for the possibility that the child may go through a "stage" during which a particular parameter is "misset"; that is to say, it has a setting that is distinct from the value assumed in the adult language. This would make the child language differ in systematic and *predictable* ways from the adult language. I have argued elsewhere that this empirical possibility occurs in language development with respect to a parameter referred to as the null subject parameter (Hyams (1983; 1986)). The modularity hypothesis suggests that particular grammatical constructions will emerge in a step-wise fashion as the different principles that enter into a particular construction are acquired. This is in contrast to a more standard theory approach in which the child was viewed as acquiring a specific rule, for example, the passive transformation. On that view, we would expect a rather abrupt acquisition of passive. In actual acquisition, however, development appears to be more "modular" in structure. For example, Hamburger and Crain (1982) propose that children acquire relative clauses in such a step-wise or modular fashion and Borer and Wexler (1987) make a similar claim for the development of verbal passives.

¹Here and throughout this article, I use the terms "marked" and "peripheral" interchangeably. This may not be exact. Idiosyncratic lexical properties may be peripheral, but need not be marked. For the purposes of this article, however, I will continue to ignore the distinction. The acquisition predictions are unaffected by this sloppiness because both peripheral and marked properties are expected to be acquired later than core properties of a particular structure.

Finally, we have the core/periphery distinction, which is in effect a "complexity metric." As such it makes certain empirical predictions about the course of actual grammatical development. We expect that the marked or peripheral aspects of a particular grammatical phenomenon will be more "difficult" to acquire than those features of the construction that are derived from core grammar. This difficulty should be reflected in the actual time-course of development with peripheral features of a phenomenon acquired later. The difficulty associated with learning the periphery may be due to the fact that it must be learned on the basis of data that are more "exotic," less frequent, or somehow less accessible in the input. Or, it may be that learning the periphery involves more computation or a different sort of computation than the acquisition of core grammar.

Prima facie, there is support for the hypothesis that peripheral aspects of grammar pose a more substantial learning problem for the child. Consider the marked construction discussed earlier, infinitives with lexical subjects. Bloom, Takeff, and Lahey (1984) report that sentences such as "I want Mommy get it" and "I want this doll to stay here" are first produced at roughly age 3, significantly later than the corresponding infinitives without lexical subjects, such as "I want take the bridge away." In this case, "exceptional case marking," a marked/peripheral grammatical device, is acquired later than a related structure that conforms to the principles of core grammar.

In what follows, I will present further evidence that the structure of UG, in particular the core/periphery distinction, can illuminate various aspects of the developmental process. I will focus on the acquisition of verbal morphology, and attempt to explain a number of generalizations that have emerged in recent years. The remainder of the article is organized as follows. In the next section, I propose that the grammatical status of inflectional systems varies across languages. In certain cases, inflection can be considered part of core grammar; in other cases it is a peripheral property of the language. The variable status of inflection accounts for its relative ease or difficulty of acquisition in different languages. All else being equal, core inflectional systems are easier to acquire than peripheral ones. Following that discussion, I will consider certain general issues related to markedness and acquisition. In this context, I present some cross-linguistic data from agrammatic aphasics that further support the analysis of inflection.

3. THE ACQUISITION OF INFLECTION

The first question I would like to address is: why is an impoverished morphological system like that of English so difficult to acquire? It is well known that English-speaking children achieve productive control of verbal inflection relatively late in the acquisition process. Brown (1973), in his study of the 14 grammatical morphemes, ranks the '3rd person regular' (-s) as 9.66 in order of acquisition. The mean age of the three children studied by Brown at the

point at which they had productive control of this verbal inflection is 2;9. Similarly, Brown ranks acquisition of the regular past tense *-ed* morpheme as 9.00, only slightly earlier. This latter observation suggests that the child's difficulty with the 3rd person regular morpheme is not a function of whatever grammatical complexity is inherent in agreement rules, since the English past tense morpheme does not agree with the subject in any sense, though it is also a late acquisition. Rather, it seems that the English-speaking child has difficulty with verbal inflection in general. As noted by Brown and others, the absence of inflectional affixes is one of the salient properties of early language that contributes to its "telegraphic" quality. There is one apparent exception to this generalization, the present progressive morpheme *-ing*, which Brown ranks as the first of the 14 morphemes to be acquired. I will return to this later.

This late mastery of English inflection is particularly surprising in light of recent research showing that children acquiring much more richly inflected languages learn the inflectional system of these languages at a strikingly early age, and with relatively few errors. Consider, for example, the child acquiring Polish. Weist and Witkowska-Stadnik (1985) report that the children they studied had productive control of the nominal case system (that contains seven cases), and subject-verb agreement for person, number, and gender by age 1;9. Similarly, in my own study of the acquisition of agreement rules by Italian-speaking children (Hyams (1983; 1984)), I found that children as young as 1;11 correctly inflected the verb to agree in person and number with the subject and that there were strikingly few errors in this domain. Clancy (1987; personal communication) also notes that Japanese-speaking children behave very much like Italian and Polish children. She notes that "a striking feature of the acquisition of Japanese is the precocious control of verbal inflection" (Clancy (1985, 425)).

Returning to Italian, in this language the verb is inflected to agree with the subject in person and number. One of the present tense paradigms (for the *-are* conjugation class) is given in (1).

(1) *parl-* (speak)

	singular	plural
1p	-0	-iamo
2p	-i	-ate
3p	-a	-anno

If we compare the paradigm in (1) with the present tense paradigm for English in (2), it seems clear that the English-speaking child's problem does not lie in the learning of particular affixes. Common sense (and any learning theory) tells us that it should be more difficult to learn the six Italian affixes than the single English one.

(2) speak

	singular	plural
1p	0	0
2p	0	0
3p	-s	0

What then accounts for the relative difficulty that English-speaking children exhibit in learning the inflectional system of their language? In the section that follows I will propose an answer to this question.

The Stem Parameter

The differences in the speed of acquisition of verbal inflection across different languages suggest that the rate at which a child learns the inflectional system of his language is not a function of the intuitive complexity of the system. Rather, I will suggest that the relative ease of acquisition depends in large measure on how the system interacts with principles of UG, or more to the point, whether the inflectional system is a core or peripheral property of the language being acquired.

Before turning to the acquisition facts, let us consider the structure of the systems to be acquired. Notice that there is an obvious difference between English on the one hand, and languages like Italian on the other. In English, a verbal stem may surface without an overt affix. So, *speak* is a well-formed word in the language. In Italian, in contrast, the verbal root requires an overt affix. The form *parl* is simply ill-formed.

We can express the different morphological requirements of the two languages as a parameter, informally stated as in (3).

(3) *The Stem Parameter*

A verbal stem does/does not constitute a well-formed word.

Since languages may vary in the manner suggested in (3), this parameter must be fixed by the child by experience.

Let us now turn to the acquisition facts noted earlier. Young English-speaking children typically produce uninflected verb forms, as illustrated in (4).

(4) Mommy throw it away

Man sit down

Kathryn want build

Gia ride bike

(from Bloom, Lightbown, and Hood (1975))

These sentences violate a syntactic rule of agreement that requires that the verb agree with a 3rd person singular subject. However, given the parameter in (3), these productions are well-formed at the morphological level because a verbal

stem constitutes a well-formed word in English. In Italian-like languages, in contrast, the verb must surface with an overt affix. Children acquiring Italian and similar languages rarely, if ever, produce uninflected verbs. So, like English-speaking children, their verbs are well-formed at the appropriate grammatical level. These facts suggest that language particular conditions on word structure are learned at a very early age, or given the analysis proposed here, that the parameter in (3) is set very early on.

With regard to the learning of particular affixes, it seems reasonable to suppose that their rate of acquisition depends in part on the choice the child makes with respect to the Stem Parameter. Once the Italian-speaking child determines that stems require overt affixes in her language, she will need to learn the affixes in order to satisfy this requirement. So the learning of particular affixes is triggered by a particular parameter setting. The English-speaking child sets the Stem Parameter at the opposite value so that a verbal stem constitutes a well-formed word. Thus, she need not learn any inflectional morphemes in order to satisfy the well-formedness condition in her language. Obviously, each child sets this parameter based in large measure on the linguistic input she receives. The English-speaking child hears that the verb is largely invariant in form while the Italian child receives a much richer and more varied input. We will see later on, however, in the discussion of American Sign Language (ASL), that when the input data are ambiguous with regard to this morphological condition, the child assumes a "default" setting.

One desirable result of the parameter account is that there is no sense in which the English-speaking child is grammatically "delayed" relative to his Italian, Polish, or Japanese-speaking cohorts. The difference in linguistic behavior exhibited by the different populations is strictly an effect of different settings along a particular parameter. In each case, the child's language conforms to the specifications of the particular grammar she has developed. Moreover, the learning of particular affixes is no more or less difficult for the English-speaking children than for the Italian children. Rather, the English-speaking child does not learn inflectional morphemes at this stage because this development has not been triggered by her parameter setting. On her analysis, English is a language with no verbal morphology.

Assuming that this account is on the right track, what explains the precocious appearance of the progressive *-ing* morpheme, which as noted earlier, is the first of Brown's 14 grammatical morphemes to be acquired? Moreover, what do we say about the eventual acquisition of 3rd person regular and past tense morphemes? How are they acquired—and why? These questions will be addressed in the section that follows.

Learning the Periphery

I turn first to the progressive morpheme, illustrated in the sentences in (5) (from Bellugi (1967)).

- (5) No the sun shining
He eating ice cream
You waking me up
Oh, no raining

Although sentences of this sort are frequent in early language during a time when children are not using the present or past tense affixes, there is some reason to suspect that the child does not initially analyze the progressive form of the verb as consisting of a verbal stem and affix.

First, as exemplified by the examples in (5), the progressive verb is first used without the auxiliary *be*, suggesting that *-ing* is not a separate morpheme selected by the auxiliary, as is the case in the adult grammar. Instead, it may be that the child learns each progressive form as a distinct verb so that *hit* and *hitting*, for example, actually represent two distinct lexical entries. This hypothesis is supported by a second fact, noted by Cazden (1968), that, unlike the verbal affixes *-s* and *-ed*, *-ing* fails to overgeneralize. Thus, while errors such as those in (6) are common, forms such as those in (7) are virtually unattested in the acquisition data.

- (6) taked
tooks
gots
maked

- (7) taking
wenting

If we credit the child with actually knowing the progressive morpheme only at the time at which it co-occurs with the auxiliary *be*, then the point of acquisition occurs significantly later. According to Brown (1973), the auxiliary *be* is the last of the 14 grammatical morphemes to be acquired.

A possible problem for this proposal, pointed out by Cziko (personal communication) is that, as first noted by Brown (1986), children do not overgeneralize *-ing* to stative verbs. This fact has led many researchers to assume that very young children understand the process/stative distinction and the semantic restriction on *-ing*, and hence that they know that *-ing* is an affix. While it is possible, indeed likely, that children know the process/stative distinction very early on (see Cziko (1986) for impressive cross-linguistic evidence to this effect), it does not follow that they analyze the progressive form as bimorphemic at this point. As noted above, children do not overgeneralize *-ing* at all, hence they do not overgeneralize *-ing* to statives. An obvious explanation is the one given previously, namely, that the child initially learns each progressive form as a

separate unanalyzed verb and so uses only those forms that he has heard in the input, that is, nonstative verbs.²

Let me now turn to the question of how the child eventually acquires the verbal inflections of English. Here the core/periphery distinction becomes relevant. Recall that core properties of grammar are those that are determined by fixing the parameters of UG, while marked or peripheral processes often involve exceptions or relaxations of particular parameter settings. We saw that the acquisition of the Italian affixes is triggered by a particular setting along the Stem Parameter, one that requires that verbal stems bear affixes. On this account, inflectional morphology in a language like Italian represents a core property of the language insofar as it is closely related to (i.e., triggered by) the setting of a particular parameter. Consider, on the other hand, the English case. In English, the setting along the parameter specifies that verbs are uninflected. Such inflections as there are thus represent a "departure" from the core grammar of English. Assuming, as we have been, that the peripheral aspects of a grammatical subsystem take longer to sort out than the core properties (requiring either more exposure to data or more computation), it is clear why the relatively weak inflectional system of English is acquired later than the inflectional paradigms in more richly inflected languages.

The hypothesis is then that inflectional systems have a variable status across languages; in English, inflection is a peripheral property of the language while in Italian, for example, it is a core property. Naturally, we would expect this difference in the two language types to have consequences that extend beyond acquisition. This is indeed the case and some of these consequences will be discussed below when we turn to the aphasia facts. With respect to acquisition, however, the crucial point is that it is the markedness of rule systems, specifically, the degree of deviation from the core grammar, rather than the intuitive complexity of the data, that is responsible for the relative ease or difficulty of acquisition.

3.1. The Overgeneralization of Affixation

The analysis that I am proposing allows us to explain another curious acquisition phenomenon, namely, why children acquiring languages with relatively rich

²This raises the interesting question of what exactly is meant by "overgeneralization." Why do children overgeneralize inflectional morphemes such as *-ed* (*eated*), plural *-s* (*mouses*) but not *-ing*? Notice that the nature of the gaps in the past tense and plural paradigms is different from the *-ing* case. Past and plural have irregular forms (*ate*, *mice*), that is, formal exceptions to the general rule applying to a semantically unconditioned category, V. On the other hand, the distribution of progressive *-ing* is contingent on the inherent aspectual properties of the verb. It might therefore be useful to distinguish "overregularization" in the case of *-ed* and *-s*, from "overgeneralization" where by the latter we intend application of a rule to a structure (e.g., predicates that do not contain an event variable) outside its scope.

inflectional systems tend to avoid 0 affixation, even where the latter would be correct in the adult language. Slobin (1973) observes that children acquiring Russian mark all accusative nouns with the feminine accusative *-u* affix although in the adult language, masculine nonhuman and neuter accusative nouns bear a 0 affix. Similarly, he reports that Gvozdev's (1961) Russian child used the affix *-ov* for all plural genitive nouns, replacing the feminine plural genitive 0 affix. He further notes that the replacement of 0 affixes also occurs in the acquisition of Serbo-Croatian and this phenomenon has been observed in many other languages as well. Slobin expresses the generalization as in (8):

- (8) There is a preference not to mark a semantic category by 0 (zero morpheme). If a category is sometimes marked by 0 and sometimes by an overt phonological form, the latter will, at some stage, also replace the 0 (Slobin (1973, 202)).

The Stem Parameter (modified slightly to include nouns as well as verbs) provides a straightforward explanation for this phenomenon. Russian and the other cases noted by Slobin are richly inflected languages that typically do not allow bare stems, the obvious exceptions being the cases of 0 affixation like those previously discussed. We can therefore assume that Russian adopts the [-bare stem] option on the Stem Parameter. Having determined that bare stems are ill-formed in her language, the Russian-speaking child is driven to replace all zero morphemes with overt affixes. Those instances in which the noun is indeed uninflected represent a marked extension of the Russian system, a relaxation of the parameter, and are therefore a later acquisition.

Closely related to the 'avoid 0 affixation generalization' is a phenomenon that Slobin (1973) refers to as "inflectional imperialism." The latter can be partially explained by the analysis proposed in this article. Slobin notes that in acquiring a set of affixes for a particular grammatical class, children will very often first learn only one member of the set and overgeneralize it to all other members. A typical example is offered by Levy (1983), who observes that the Hebrew-speaking child first marks plurality on all nouns by the addition of the masculine suffix *-im*, and only later distinguishes the feminine nouns by the affix *-ot*. Although it is unclear why the child chooses a particular affix to begin with, for example, why the Hebrew-speaking child first chooses *-im*, the account proposed here does provide an explanation for why the first affix acquired is overgeneralized. The alternative would be to leave the other forms (for which the appropriate affix has not yet been learned) without any affix whatsoever. This latter option, however, is excluded by the requirement that the stem bear some affix. Thus, 'inflectional imperialism' is a kind of stop-gap measure that allows the child to satisfy the grammatical requirements imposed by her parameter setting during the period in which she is still acquiring the full range of affixes.

There is yet another tendency that is explicated by the analysis proposed here, namely, the avoidance of certain verbal forms. A child might simply not use a

form that represents a relaxation of a particular parameter setting. A case in point would be a highly inflected language with a bare stem imperative form. A child acquiring such a language might first learn and use those forms that are inflected, in accordance with the parameter setting, and only later acquire the "exceptional" form, in this case the imperative. Slobin (personal communication, 1986) notes that in Turkish, an otherwise highly inflected language, the imperative form is a bare stem, e.g., *ver* 'give.' He notes further that children do not erroneously inflect the imperative form, as would be predicted by the account proposed here. However, Turkish children do not appear to assign the inflected and bare forms the same status. This is shown by the relative order of acquisition of the tensed verb forms and the imperative form. Aksu-Koç and Slobin (1985) note that much of the verbal paradigm in Turkish is mastered by 24 months or earlier, including tense-aspect (past result, ongoing process, intention), person, negation, and interrogatives. They also note, in a discussion of politeness norms, that children acquire the bare stem imperative at roughly age 2. It is the first of a sequence of politeness forms that are acquired between the ages of 2 and 4. It thus appears that the bare imperative is acquired at a point at which the Turkish child has already mastered many of the more complex morphological forms. If the analysis proposed in this article is correct, the later acquisition of the imperative would be due to its marked morphological status in the language. The Turkish facts are rather striking because in many languages the imperative form is often one of the first verbal forms acquired, e.g., English and Italian. The delay in Turkish is therefore not plausibly due to semantic or conceptual factors.

Chomsky (1965) noted that in the study of adult languages, there is a tension that exists between the goal of adequately describing the variation that exists among different languages and the goal of constraining the descriptive mechanisms in order to achieve a level of explanation. A similar tension exists in the study of child language. We need to describe the variation that exists in the development of different languages (and among children acquiring the same language). However, it is also necessary to provide a theory of development that constrains the class of available acquisition mechanisms in some principled way. Parameter theory attempts to do just this. In the account of inflection outlined above, there are several devices that the child might avail herself of in order to conform to the requirements of the Stem Parameter, an element of core grammar, among which are the avoidance of 0 affixation, inflectional imperialism, delayed acquisition. The parameter account thus allows for a certain degree of individual variation in grammar construction. At the same time, however, it provides a unified explanation for the different devices that the child might adopt.

3.2. Modularity in the Acquisition of Inflection

It is worth noting that the overgeneralization of affixation, whether in the form of avoiding 0 forms, inflectional imperialism, or delayed acquisition does not really

correspond to what we might intuitively think of as the simplest or most efficient learning procedure for acquiring an inflectional system. A priori, it would seem that the easiest way to accomplish this task would be to learn each affix and its context and leave uninflected those forms for which the appropriate affixes have not yet been mastered. This is what we would expect of a truly conservative learner. As suggested above, the Hebrew-speaking child who learned by this deterministic method would first mark masculine nouns with *-im* and leave the feminine forms uninflected; inflected feminine forms would come later with the acquisition of *-ot*. Certainly, if we were to program a computer to acquire an inflectional system, we would avoid backtracking. So why isn't the child an efficient, albeit conservative learner in this domain?

In order to answer this question satisfactorily we need to tease apart two tasks that confront the child. One is the learning of particular affixes and their surface distribution. Let us refer to this simply as "affix-learning." The second task for the child involves grammatical development. She must determine the function of the inflectional system within the grammar as a whole, in our terms, whether it is a core or peripheral property of the language. Most accounts of the acquisition of inflection are concerned primarily with the problem of affix learning, and aim to isolate those properties that make particular inflectional endings easy or difficult to learn. For example, the extensive cross-linguistic work done by Slobin (1973; 1985) and colleagues suggests that the ease with which a child acquires a particular morpheme is dependent on a number of different factors, including semantic transparency, perceptual salience, and morphological regularity. The analysis proposed in this article, in contrast, is directed at the issue of grammar acquisition. This is not to deny that affix learning represents a formidable learning task for the child, comparable in many respects to word learning. It seems, however, that many of the most interesting phenomena associated with the acquisition of morphology, for example, the variable rate of acquisition across languages, overgeneralization (as in Russian), and undergeneralization (as in English) are more readily explained as effects of parameter setting rather than affix learning. The suggestion that the learning of inflection involves development in separate domains is obviously very much in the spirit of the modularity hypothesis discussed at the outset of this article.

In the section that follows I will briefly discuss the acquisition of inflection in ASL. As we will see, ASL falls somewhere between the Italian-like languages with their rich inflectional systems and English-like languages with an impoverished morphology, and therefore represents an interesting case.

3.3. American Sign Language

American Sign Language is a language that exhibits extensive subject verb (SV) agreement. Agreement is marked by the movement of the verb in relation to specific points in space. A priori we would expect the acquisition of the

agreement system to pattern like that of other inflected languages, for example, Italian. As it turns out, however, signing children acquire SV agreement quite late. This is so despite the fact, noted by Newport and Meier (1985), that the morphology is semantically transparent, indeed often iconic. Lillo-Martin (1986) reports that with nonpresent referents, that is, instances in which the subject of the sentence is not physically present, and is designated by a point in signing space, signing children do not achieve productive control of agreement until 5–6 years. With regard to the latter case, there are arguably nonlinguistic, cognitive factors at play (Newport & Meier (1985), Lillo-Martin (1986)). However, agreement with present referents, which should impose fewer cognitive demands, is still acquired late as compared to other highly inflected languages such as Italian, Polish, Japanese, and Turkish. According to Meier (1982), agreement with present referents is typically mastered at around 2 1/2 or 3 years. Prior to this point, the children use the citation form or bare stem, which interestingly, is less semantically transparent than the inflected form (Meier (1982)). Thus, ASL-signing children appear to pattern like English-speaking children, as against Italian- or Polish-speaking children—a rather surprising result on the face of it.

This result is somewhat less surprising, however, when we consider the nature of the input data in ASL. Although ASL has a much richer system of verbal morphology than English, because all grammatical persons are marked, this is true only for a subset of the verbs in the language. There is an entire class of verbs in ASL that does not agree with the subject, the so-called 'plain verbs.' Moreover, the inflection on the inflecting verbs is optional. (As we will see shortly, this optionality is an important factor determining the setting of the Stem Parameter in ASL.) The input data in ASL are therefore extremely variable as regards the presence of inflection (though the paradigms themselves are regular). This is a very different situation than exists in Italian or Polish, for example, where the input is quite consistent in this respect.

However, the inconsistency of the data does not explain why the signing child chooses the [+bare stem] option. Given such variable input, the child could easily choose either value of the parameter. Unlike the previous cases we have considered, in ASL the input does not determine the parameter setting in any straightforward way. There appear to be other factors at play. But the reason for the [+bare stem] setting in ASL becomes obvious once we view the problem from a learnability-theoretic perspective. On the well-motivated assumption that children learn from positive evidence alone (Baker (1979)), the only way the ASL-signing child could learn the inflectional system of the language is to assume a [+bare stem] setting. If the child starts out under the assumption that there is no inflection in the language, she can learn from positive evidence alone—tokens of inflected verbs in the input—that some verbs can be inflected. If, on the other hand, the child were to assume that all verbs are inflected, the [-bare stem] option, she would not be able to tell based on positive evidence alone, whether a particular uninflected form is a plain verb (that should never

be inflected) or simply an uninflected token of an inflecting verb (that can be inflected optionally). Thus the ASL-signing child initially assumes bare verbal stems are well-formed words—this constituting the default setting—and sets the parameter accordingly.³ Verbal inflection is late in ASL because, as in English, it is acquired as a peripheral property of the language. The child needs to learn, more or less on a verb-by-verb basis, which ones belong to the inflecting class. The peripheral status of inflection in ASL will surface again in the following section where we turn to a more general discussion of language development and the theory of markedness.

4. MARKEDNESS THEORY

The primary aim of this article has been to show that parameter theory and the core/periphery distinction have rather direct empirical consequences for actual grammatical development. In languages in which inflection represents a core property of the language, it is acquired early while it is a very late acquisition in those languages with peripheral morphology. In addition, various error patterns, including the overgeneralization and undergeneralization of inflection, can be explained as effects of the core/peripheral status of the inflectional system in a particular language.

A central point of the analysis of inflection is that the status of verbal morphology varies from language to language. This view of syntactic markedness, in which a particular phenomenon may be marked or peripheral in one language but part of core grammar in the next language, is somewhat unusual and perhaps not uncontroversial. In the remainder of this article I would like to provide some additional support for this claim. I will first consider some psycholinguistic evidence, production data from aphasic speakers. We will see that the cross-linguistic variation in the use of inflection by aphasic speakers follows from the markedness claims being proposed. Following that, I will briefly discuss some theory-internal evidence in support of the proposed analysis related to the interaction of the Stem Parameter and the Null Subject Parameter.

4.1. Language Dissolution

The claim that the formal grammatical status of inflectional systems varies from language to language receives some further support from cross-linguistic studies of agrammatic aphasics, in particular Grodzinsky (1984). Agrammatic patients, a subclass of Broca's aphasics, are typically characterized as having

³I should note that the two values of the Stem Parameter generate languages that are disjoint sets, i.e., one language in which all verbal forms are inflected and another in which none are. Thus the Subset Principle (Berwick (1982), Manzini and Wexler (1987)), which requires the child to first choose the smallest language in case the languages fall into a subset relation, is not relevant.

"telegraphic" speech. Like young children, their speech is marked by an absence of grammatical formatives, including inflections. Interestingly, Grodzinsky notes that of the languages he studied, the omission of inflectional morphology only occurs with English-speaking aphasics. Speakers of Italian, Russian, and Hebrew, in contrast, never drop inflectional affixes—though the affixes frequently fail to agree appropriately with the subject. Thus, while the Italian aphasic might utter sentences of the sort given in (9a, 9b), where the verb bears incorrect agreement, he will never make the error of producing a bare verbal stem (as in (9c)). The omission of inflection is characteristic of the English-speaking agrammatic aphasic. (The following are hypothetical examples of the phenomenon discussed by Grodzinsky. The actual Italian examples he cites involve complications that are irrelevant to the present discussion.)

- (9) a. Ragazza parlo.
(girl speak -1st person singular affix)
b. Ragazza parlare.
(girl speak-infinitive affix)
c. *Ragazza parl.
(Girl speak -stem)

This difference between aphasic speakers of English on the one hand, and aphasic speakers of languages like Italian, Russian, and Hebrew, on the other, is exactly what we would expect under the assumption that marked or peripheral grammatical processes are somehow more vulnerable or easily disrupted in the event of neurological damage, as originally proposed by Jakobson (1968). The inflectional requirements in the other languages are more closely connected to core grammar, and thus appear to be more stable.

To conclude the discussion of agrammatism, let us turn briefly to ASL. The analysis presented earlier, in which inflection in ASL is peripheral, leads us to expect that ASL agrammatic aphasics will pattern like English-speaking aphasics in omitting verbal inflection. I know of only one relevant case, discussed in Bellugi, Poizner, and Klima (1983), and this aphasic patient did indeed drop the agreement morphology, as predicted.

5. THE GRAMMATICAL FUNCTION OF INFLECTION

It is well known that not all languages require the overt expression of grammatical subjects. This is true, for example, in Italian and Spanish, as illustrated by the following examples:

- (10) a. (Io) vado al cinema stasera.
b. (Yo) voy al cine esta noche.
'I go to the movies tonight'

There are various pragmatic requirements that must be satisfied in order for the omission of the subject to be felicitous in a particular context, but the possibility of subject omission is a grammatical property of the languages in question. This is in contrast to the situation in languages like English and French, where overt subjects are required regardless of the linguistic or nonlinguistic context. Thus, 'go to the movies' is simply ungrammatical under a nonimperative interpretation.

This difference between languages like Spanish and Italian, on the one hand, and English and French, on the other, is formulated as a parameter, referred to as the Null Subject Parameter. Although there are a number of proposals as to the precise characterization of the parameter (cf., Jaeggli and Safir (1987)), it is the case that for a significant class of languages the null subject option is closely connected to the properties of the inflectional system. More specifically, in those languages in which I have proposed that inflection is part of core grammar, such as Italian and Spanish, subjects are optional. In those languages in which inflection is peripheral, subjects are obligatory. Intuitively, the situation is as follows: peripheral inflection, as in English, is simply too weak to recover the content of a missing subject in contrast to core inflection.

Interestingly, the interaction of these two parameters has further consequences for acquisition. Hyams and Jaeggli (1988), following Hyams (1983; 1986) propose that all children start out with a null subject grammar. We suggest, however, in contrast to Hyams' previous analysis, that it is by virtue of learning the core vs. peripheral status of inflection in her language that the child either persists with a null subject grammar or resets the parameter to disallow null subjects. This analysis explains a range of acquisition phenomena that tend to develop at roughly the same time, the shift to obligatory subject use in languages like English and German, the emergence of tense and agreement inflection, the first occurrence of modals in English, and the verb-second rule in languages like German. It is precisely this kind of clustering of properties or co-occurrence of grammatical developments that the parameter model is intended to explain.⁴

Summing up this section, I have proposed that in addition to the evidence from acquisition and aphasia, there is theory-internal support for the hypothesis that inflectional systems (and perhaps other subsystems of grammar as well) may vary across languages in terms of their markedness and that this has direct consequences for grammatical development in children.

⁴This proposal was ultimately realized as the Morphological Uniformity Principle (MUP) most fully developed in Jaeggli and Safir (1987) to describe the typological variation associated with null subjects in adult languages. The MUP states that null subjects are licensed in languages with uniform paradigms, roughly, every verbal form is inflected (e.g., Italian) or every verbal form is bare (e.g., Chinese). Null subjects are not permitted in "mixed" languages. Hyams and Jaeggli (1988) extend the MUP to account for the null subject phenomenon in child language.

6. CONCLUSION

Let me conclude by saying that the analysis of inflection proposed here obviously needs to be tested against the acquisition data of other languages—especially because morphological systems vary a fair amount from language to language. However, irrespective of the ultimate correctness of the specific analysis I have proposed, I hope to have made several more general theoretical and methodological points. First, it is not necessarily the intuitive complexity of the data that makes the acquisition of a particular construction or grammatical phenomenon difficult, but rather the complexity of rule systems, where we understand “complexity” to mean degree of deviation from core grammar. Second, it is sometimes the case that what appears to be acquisition of a single aspect of grammar, e.g., verbal inflection, involves development in several different domains that interact in very subtle ways. Finally, I hope to have shown that there is a constructive relationship to be had between the theory of grammar and a developmental theory of language. In particular, the core/periphery distinction provides a measure of linguistic complexity against which we can view the acquisition data and gain some understanding of the difficulties and delays that characterize the acquisition process. At the same time, acquisition data and other forms of psycholinguistic evidence, including processing effects and language deficits, can inform the theory of markedness and provide insight into the structure of Universal Grammar.

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